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WILD BIRDS AND THEIR HAUNTS

(A BOOK FOR STUDENTS AND SPORTSMEN)

GREAT CRESTED GREBE.

WILD BIRDS AND THEIR HAUNTS

(A BOOK FOR STUDENTS AND SPORTSMEN)

BY

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With a FOREWORD by

GENE STRATTON-PORTER

And an INTRODUCTION by

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HEATH CRANTON LIMITED

6, FLEET LANE, LONDON, E.C. 4

22-88581 [illegible]
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Dedication

To the memory of one whom I loved and lost—a real lover of nature—are these lines of my best work dedicated.

W. H.

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I AM greatly indebted to many friends for permission to use several of the bigger bird pictures in this work, and to the publishers, Messrs. Heath Cranton, Ltd., for most of the remaining illustrations, and I thank the courteous Hon. Sec. of the Farne Island Association for his notes regarding the prosperous work of that body in the matter of protection of the rarer species of the wild birds.

I am also sensible of the large amount of support which the general public, and especially my friends of the North, have given to the books, which I have from time to time placed upon the market. To them I tender my hearty thanks for so lengthy a patronage.

THE AUTHOR.

January, 1922.

AUTHOR'S NOTE

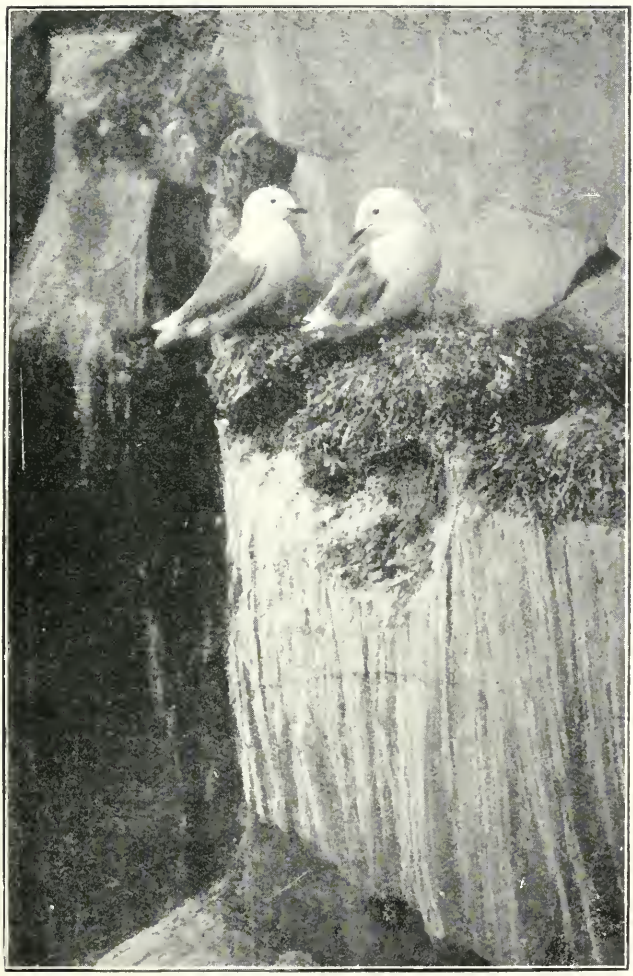
I AM about to describe the particular species of Natatores, or Swimmers, found on the coast and the Farnes, and whose whole life and business is among the waters.

From the insular character of Britain these are conspicuously numerous in a fauna so limited; and while thousands in summer—speaking of the British Isles as a whole—seek our precipitous coasts and headlands as breeding stations, others, scarcely less numerous, flock in winter from their more northern incubations, and fill our bays and marine inlets.

The contrast of these localities at the different seasons is most striking; rocks standing far in the ocean's void, and precipices of the most dizzy height, to which all approach by land is cut off, possess a dreary solitude for seven or eight months of the year; a few cormorants seeking repose during the night, or some gulls claiming a temporary shelter or resting-place from the violence of the storm, are almost the only, and then but occasional, tenants.

In the throng of the breeding season a very different picture is presented: the whole rocks and sea and air are one scene of animation, and the various groups have returned to take up their old stations, and are now employed in all the accessories of incubation, affording lessons to the ornithological student which he will in vain look for elsewhere; the very rocks are lighted up, and would seem to take a brightness from the hurry around, while the cries of the inhabitants, discordant alone, harmonise with the scene.

During the same season, upon the low sandy or muddy coasts, or extensive merses, where the tide recedes for miles, and the only interruption on the outline is the slight undulation of some mussel-scaups, the dark colour of some bed of "Zostera Marina" contrasting against the long bright crest of the surf, or in the middle distance some bare posts set up as a land-mark, or the timbers of some ill-fated vessels rising above the quicksand, there reigns, on the contrary, a solitude of another kind; it is now broken only by the distant roll of the surf, by the shrill pipe of the ring-dotterel, or the glance of its flight as it rises noiselessly; a solitary gull or tern that has



KITTIWAKES NESTING.

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lagged from the flock may sail along, uttering as it were an unwilling inward sound as it passes the intruder ; everything is calm and still, the sensation increased by the hot glimmer that spreads along the sands ; there is no voice, there is no animal life.

During winter the scene may at first sight appear nearly similar ; the warm and flickering haze is changed for a light that can be seen into ; the noise of the surge comes deeper through the clear air of frost, and with it at intervals hoarse sounds and shrill whistles, to which the ear is unaccustomed ; acres of dark masses are seen, which may be taken for low rocks or scaups, and the line of the sea in the bays contains something which rises and falls, and seems as if it were about to be cast on shore with every coming swell.

To sportsmen these signs are familiar, and they know their meaning ; but to one who has for the first time trodden these flat coasts some distant shot or other alarm first explains everything. The line of the coast is now one dark moving mass ; the air seems alive with waterfowl, and is filled with sounds that rise and fall, and vary as the troops wheel around, and this continues until they have again settled to their rest ; as dusk approaches, these sounds are gradually resumed, at first coming from the ground, as warnings that it is time to be alert ; as the darkness and stillness of night sets in, one large flock after another hastens to its feeding ground, and the various calls and the noise of wings is heard with a clearness which is sufficient to enable the sportsman to mark the kinds, and trace his prey, to their feeding-stations, to make him aware of their approach long before they come within his reach.

The total number of British birds enumerated by Jenyns, exclusive of twenty-six doubtful species, is three hundred and twelve, of which Natatores furnish ninety. Of the latter again, one half nearly is made up of ducks, there being, according to the above-mentioned authority, forty-one species, including the Mergi or Gooseanders.

The remainder is chiefly composed of gulls, including the terns and petrels ; while the grebes, divers, cormorants, and solan geese make up the balance.

FOREWORD

BY

GENE STRATTON-PORTER,

Author of "A Girl of the Limberlost," "Birds of the Bible," etc., etc.

THERE never can be too many good books on the subject of "WILD BIRDS AND THEIR HAUNTS," because the scientist of to-day has finally arrived at the realization that our food and comfort depend upon the birds. On account of the likeness of the processes of human life to those of bird life in mating, home building, and the rearing and feeding of young, all Nature birds elicit our tenderest sympathy. We appreciate their grace in flight, their beauty of colouring, their exquisite and appealing song. We are touched by their trust in us, that fellowship that brings humming birds and warblers to the roses screening our windows, wrens to the knot holes in our weather boarding, robins to our lintels, swallows to our chimneys, and martins to our eaves. There is no more pathetic spectacle on the landscape than a birdless home; as a rule it is also a flowerless and loveless home.

That the birds enrich us with their beauty and cheer us with their song is the smallest part of their service to us. Without their help in cleaning the air of mosquitoes and tiny insects we should be much more uncomfortable than we are now. Without their work in eliminating slug and aphis; borer and beetle from our gardens and orchards, half our flower and fruit crops would be lost. This applies not alone to the delicate and lovely song birds. Quail and pheasant are busy in the fields, plover and rail around the lake shores, hawk and owl at work in the forest. Our forefathers felt justified in shooting gallinæ for food, and falcons, hawks, and owls on sight, in the belief that the loss of an occasional domestic fowl

THE MUD FLATS AT SUNSET

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demanded protection against raptores. To-day we know that every so called "game bird" taken from its work of cleaning up insect pests and weed seeds in the fields is a distinct and heavy financial loss to the farmer. Every hawk or owl stopped in its natural work of eliminating beetles, grasshoppers, field mice, moles, and other rodents, leaves thousands of these pests that it would have killed to go on destroying fortunes in vegetable gardens and grain fields. The figures on the subject of destruction of fruit, vegetables, and grain, by insect pests, are appalling. Conversely, carefully compiled statistics concerning the insects and rodents consumed annually by the birds are so amazing that we are led to see that not only are they our loving and entertaining friends, but that they actually stand between us and famine. So I would introduce the birds to every student of bird life on an economic basis first; and afterward throw in for good measure the gift of their beauty and their song. I would lead no sportsman to the haunt of any bird for any consideration. Each bird, from swallow winnowing the air of insect pests, to scavenging gull and vulture, has its part to perform in the great scheme of Creation.

GENE STRATTON-PORTER.

Limberlost Cabin,
Rome City,
Indiana,
U.S.A.

INTRODUCTION

BY

W. Percival Westell, F.L.S.

Author of "Every Boy's Book of Geology," "The Boy's Own Nature Book," Etc., Etc.

EVER since the dawn of civilisation, mankind has evinced keen interest in birds, and the reasons for this are not far to seek. Their winning ways, wonderful minstrelsy, remarkable attire, cleverly constructed homesteads, beautifully coloured eggs, devotion to their young, and last, but by no means least, their value in the economy of life, all tend to show why our feathered friends have made such an irresistible appeal to both town and country dwellers everywhere. Of more recent years, their wonderful migration movements have interested, nay fascinated, those of us who so lovingly tread the byways of Birdland in a manner never before made possible in the history of the world. To the sportsman, bird dealer, and plume hunter, these feathered bipeds have also made an undoubted claim, but a rabid sentimentalist such as myself has no patience whatsoever, and no place within his ken, for such as these. Gene Stratton-Porter's sentiments coincide with mine in this connection. Give me my ears and eyes, aided for preference, by a pair of good field glasses, and I am content to watch and listen, to observe and notify, rather than to capture, maim, or slaughter these bright winsome creatures, whose right it is to share with ourselves the beneficence of the sunshine and the glorious in-breathing of the air.

I make no idle boast of the belief I hold that every created thing serves some good purpose to the great scheme of life, and it is only the poverty of our knowledge

TERNS OR SEA SWALLOWS ON THE WING.

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or our lack of appreciation or understanding, that so often results in the woeful condemnation of this or that. Prove to me up to the hilt that any *one thing that lives* does *not* fulfil some useful link in the immense chain of existence, and to my mind the whole scheme of creation falls toppling to the ground. But enough of this moralising. Let us to the fields and woods to listen to the birdland orchestra, or to be conducted by the Author to the rockgirt shores of our treasure island home so as to watch the seabirds both at work and play. There one shall find respite and relaxation from the busy turmoil of a topsey-turvey world at a period when the mind sorely demands some solace and stimulant such as Nature alone can offer.

Birds, as I have stated in "My Life as a Naturalist," and several other volumes which have met with so much encouraging success from an appreciative Nature loving public, were my early love and I shall always retain a warm place in my affections for these cheery heralds of the Spring and Winter's frost and snow

The nightingale visits my dining-room every Summer, the Redbreast persists in curtseying to me and feeding from my hand, and I have noted over sixty different species of birds in and around my home-made garden at Letchworth Garden City. These feathered visitors afford me unfeigned delight at all times, and are so conscious of protection that, my ire during the fruit season, is frustrated because of the good they otherwise do and the immense pleasure they afford during my country pilgrimages.

In the great play that's never done birds occupy a very important part, and it is difficult to conjure up those far off days when there were no birds and no flowers, a birdless and a flowerless world. We live to-day in the most beautiful period in the world's history, and when civilisation awakes to its real sense of proportion we shall all, as Ruskin predicted, return to Nature. Then, let us fervently hope, we shall, in the words of Ralph Walds Emerson, "walk with her trustingly, scorning

nothing, rejecting nothing, and rejoicing always in the truth."

The Author of this volume has had exceptional opportunities for studying various kinds of feathered fowl in their own homes, and if his experiences help to arouse greater interest in the pure science of Ornithology he will have done yeoman service on behalf of a fascinating life-study which lies very near and dear to my own heart.

W. PERCIVAL WESTELL, F.L.S.

Verulum, Letchworth.
Hertfordshire
January, 1922

BUTT OF LEWIS LIGHTHOUSE WHERE THE SOLAN GOOSE IS AT HOME.

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THE BIRDS OF LEWIS, HEBRIDES.

RECENTLY, on the kind invitation of the owner of Lewis, or Lews—as the original name is—Rt. Hon. Lord Leverhulme, I visited the Island to take a naturalist's survey of this famous haunt of birds.

I arrived at Lochalsh to take steamer for Stornoway on August the first, and during the voyage, which usually takes six hours—for this Glasgow boat is a slow one, doing about ten knots at most—I saw several species of gulls, either disporting themselves in the water, or following the vessel in quest of broken bits thrown overboard. Further in the Minch I descried bunches of the *Little Stint*, the usual frequenters of most island shores. Now an early *Widgeon* comes into view, and then one sees a darting swift descend in the wake of the vessel. This is the *Skua*, who has noticed the gull in the act of taking a herring or other fish, and who promptly descends to wrest the morsel, as is his custom.

Still further out, with the aid of glasses I saw the *Gannet* in its hawklike plunge to the "briny," evidently after herring. The shades of evening put a stop to further investigation. Next morning I visited Stornoway Castle and grounds—of which I learned later there are no less than twenty miles of paths formed mostly in terraces, amid circuitous routes, amongst the most picturesque sylvan scenery of woodland, and bordered by the delightful sea reach.

Here I came across skeletons and feathers of songbirds, and herein lies a tale. I found the hawks in possession—*Sparrow-hawk*, *Merlin*, and *Kestrel*, all had contributed to the spoilation of the beautiful singing species of the countryside. I reported this.

My next place of vantage was the Port of Ness and the Butt of Lewis, in the extreme north of the island, Here I remained for a fortnight, and I was amply repaid for this visit. The *Kittiwakes* were seen resting on many of the rock ledges, and flitting to and fro uttering their customary shrill cry. Further out *Cormorants* flew just over the crest of the wave, and now and again the great *Black-*

back in stately fashion winged its flight. *Gannet* or *Solan Geese* were extraordinarily numerous, the flocks coming and going to and from Coundal Bay in quick succession. The chief officer of the Light-house described the procedure of capturing these birds, other than by a gun. "We usually tie a herring to a flat piece of board and place it on the wave. Presently down comes the *Gannet* and pounces on the fish, to get its neck broken on the piece of board, and a boat is at once put off for the dead bird." "This is done," said he "whenever we are short of a meal." The explanation of a well-known naturalist that the *Gannets* "follow the shoals of herring and mackerel," does not, in my opinion, satisfactorily solve the problem as regards this particular locality.

The Butt of Lewis being the extreme turning point or gateway from the Minch to the open West Atlantic, and centrally situated between the gannetries of St. Kilda Sulesgeir, and Stack of Skerry, is doubtless the reason for so many passing, but leaves us none the wiser as to whether they are St. Kilda or Stack *Gannets*, nor what necessitates their quest so far afield. From the Butt, St. Kilda is about 90 miles S.W., Sulesgeir about 30 north, and the Stack about 65 in N.N.E. direction. At these gannetries J. H. Gurney, in his interesting book on the *Gannet* gives the number of birds approximately as 30,000 at the St. Kilda group of islets, and 8,000 at each of the other two places. A compulsory close season of the herring fishing in this district did not to any extent affect the number of *Gannets* passing. They were seen earlier and more numerous in January, 1915, than usual, then occurred a blank for two weeks, before a gradual and continued increase of passing birds set in. So numerous and continuous were they passing in large flocks from S.E. to S.W. during the first week of April that from a certain standpoint it was possible to see with one sweep of the eye, a lane of at least a thousand birds in flight.

At the outset it may be stated that early hatching of *Gannets* at the Bass Rock is 10th May; late, end of July. At these farther north gannetries mentioned the first

or second week of June is probably the earliest date of hatching. I saw flocks of golden *plover, field fares,* and *Curlews,* and the rock pigeons were more numerous than any others, incessantly going to and form the patches of barley and oats, which with the potato patches, form the harvest of the fisherman-crofter in these parts.

I next visited Doune Tower, a moorland rendezvous situated some five miles from the Port of Ness.

On this journey I was accompanied by Mr. Nicholson, a native, and one of the best naturalists it has been my pleasure to meet. Here I saw the young of a species—the *Fulmar*—for the first time—a species of Gull.

On the ledges beneath the Doune Tower, five or six of the young could plainly be seen—birds of some six weeks or two months old, preparing to go seawards.

This is the bird from whose feathers the rent of the Island of St. Kilda is paid. It is said that 250 lbs. of "down" is collected to pay the rent, and an oil is extracted from the stomach which enables the St. Kildians to have light for their lamps, etc.

Although it was late in the season for the collection of eggs, I contrived to bring away those of the *Black Guillemot, Brindled Guillemot, Fulmar, Twist-tailed-Petrel, Twist-tailed Gull, Kittiwake, Rock Pigeon, Skua,* and the gulls of several other varieties.

The autumn migration was scarcely begun by the end of August, otherwise my account of the birds would have been much more lengthy and interesting. I can imagine this Island to be "par excellence," a veritable paradise for the naturalist, and under the beneficent rule of the present owner the resources of bird-life, fishing, poultry rearing, and gardening, will be tapped to its utmost, and forestry.

The Island sometimes called Long Island—is forty miles long, and has an average width of fifteen miles, and in pre-war times had a population of 35,000, Stornoway—an exceedingly busy fishing port—has a population roughly computed at 4,000. The "Sheila" calls every two days, at midnight, for mails and commissariat, and to set down and convey passengers and merchandise.

OCCURRENCES OF RARE BIRDS.

DURING the migration period—say from early September to the beginning of March—many rare specimens of bird tribe are seen, and oft-times captured, on the North-East coast. They also are seen in flocks in the winter thus—

The *Little Auk*, whose breeding-place is circum-polar—for a celebrated Arctic traveller, Captain Fielden, found it nesting in latitude 82°, north—was brought to the writer on January 23, 1909, and on two previous occasions this handsomely plumaged bird was captured this season.

A very rare visitant is the *Rough-legged Buzzard*, and it is now some five years since last seen on the coast.

The *Golden Eyes* (Garrot) comes into view every year, and there are evidences of its visit, year by year, in the stuffed specimens exhibited in several of the cottages of the fishermen of the north, along the stretch of coast.

Another rare bird is the *Shoveller*. Indeed, amongst the natives of a certain island it is affirmed that this bird bred here a few years ago. One man states that he received the sum of ten shillings for a single nest of eggs, whilst individuals inform me that they used often to find the eggs. It comes now but rarely, and appears to have been scared away by those who should have protected it.

Of the *Pintail*, two have been taken since Christmas last.

Of the *long-tailed ducks*, Lord William Percy, of Alnwick Castle, shot the last from a coble outside the bar. It is curious to note the vernacular term applied to these ducks, for instance the male is called by the natives "Jacky Foster" and the female "Jennie."

Richardson's Skua is an autumn visitant, and is easily distinguished from the others of the species by its swifter flight and darker plumage. Its eggs are somewhat similar to the true gulls. Very rarely does it take the trouble to seek food for itself, but lives almost exclusively on the depredations of the gulls and terns. This species of gull usually derive their entire food from the pursuit of other

birds, using what they are made to disgorge. I spent a most agreeable half-hour in September watching the manœuvres of this bird in its method of prey-seeking. Its rapid, darting flight was most noticeable, and its general method of attack proved most interesting. It is not of the diving species, as has been affirmed by some writers, no gulls are.

The *Scaup* (pochard) may be seen at any time during the winter months, in various places on the coast, and the red-headed scaup is also seen here, but rarely. These birds are known locally by the term "covey."

The *Snow-Bunting* may be singled out as an exceedingly rare visitor, save in hard winters, though it occurs all along the Yorkshire coast. Several were discovered during the snowy weather in early February, 1909, and then they appeared tame. They usually are common in the British Isles in November.

Not less rare is the *Great Grey Shrike*, a casual winter visitant, whilst the *Spoonbill* ranks nearly as rare.

The *Arctic* and *Sandwich Terns* may be seen all the summer, for they make Farnes their breeding ground. The *Roseate Tern* is represented by just a couple of pairs on the Knoxes, Farne Islands, during the period of incubation.

The *Razor-Bill*, known locally also by the name of "Willick" among the natives (who probably confound this bird with the *spoonbill* when seen on the wing), has been seen and captured many times.

The *Puffin*, or sea-parrot, called also "Tommy Noddy"—which is probably a corruption of the Scotch, "Tammy Norrie"—is very common, and may be descried in company with the *Guillemots*, both of which breed on the friendly Farnes, Bass Rock, and especially St. Kilda.

Neither of these make nests. The former usually selects a rabbit burrow, and lays the eggs on the bare ground, some ten or twelve inches from the surface, and woe to the inquisitive person who essays to thrust his hand into the hole, for a decisive peck will instantly be meted out as a punishment.

Of the *Scoter* family of ducks, both the common and

velvet—the latter a fine bird—are found, and preserved specimens can be seen. The *surf-Scoter* is never met with. The latter is an American duck.

The *Merganser* has often been seen and captured in the harbours and creeks from the Firth of Forth to the Yorkshire Coast.

There is a bird which attracts many, viz., the *Great Northern Diver*, an excellent specimen having been shot this year in January by Lord William Percy and visiting fowlers.

Cormorants, *Eider-ducks*, and *Shell-ducks* may be seen at any time breeding in large numbers on the Farne Islands, and along the East coast southwards and north.

It should be noted in passing that it is a common practice in China to tame and use this bird (Cormorant) for taking fish. A ring is fastened round the lower part of its neck, to prevent it swallowing the fish it catches, and thus its owner increases his revenue by its exertions. At one time an ingenious islander adopted the same plan, and was equally successful. The two latter species (*Eider* and *Shell-duck*) make their nesting haunts on the Farnes, the latter sometimes prefers the mainland opposite these islands for incubation. Very rarely do either succeed in hatching their eggs, because of the rascally gulls, who are ever on the alert to steal the eggs, should the mother birds leave the nests uncovered for any time.

Oyster-catchers or *Sea-pies* are numerous, and so are *Godwits* or *Specths* everywhere on the coast.

The great attraction which this Holy island holds out to sportsmen is centred in the dense numbers of *Widgeon*, *Mallard*, *Curlew*, *Teal*, *Plover* (green, grey, and golden). and *Brent Geese*. It is no exaggeration to say that they arrive in clouds, and can be observed thousands strong in the air and also on mud flats, feeding on the widgeon grass, or "Zostera Marina." These sportsmen have usually a lively time of it, bringing to shore from twenty to eighty per day. The writer inspected the victims of two shots by the swivel punt gun once when he counted eighty birds, chiefly *widgeon* and *mallard*, with a sprinkling of *teal*.

During one week in the previous month (November) the sum total brought in by punts and shore gunners reached two hundred and thirty-five birds.

The *brent* this year at a certain place, have been exceedingly wary, and only some thirty of this kind have been brought down, though they have been as numerous as ever.

Farne Islands has been called the "birds' sanctuary," and judging by the numbers at ebb and half-flood tides, it is patent that the locality is a great attraction for the winged tribe, though whether—judging by the slaughter in its vicinity—it is really in the true sense a sanctuary or hallowed spot, I will leave my readers to form an opinion.

It should be mentioned that the *Water Rail* was shot a season or two ago, and can be seen preserved, and the pretty *purple Sand-piper* or "Tinker" is often met with.

Every kind of bird may be seen at times on the shores, from the diminutive *Golden-crested Wren*—which usually arrive in large numbers in mid-November—to the huge *Heron* and the gigantic *Crane*, a monster standing six feet, but of the latter it should in all truth be stated that this bird has made only one appearance, in November last, within the memory of the oldest inhabitant. From some correspondence in the "Field," it appears the bird escaped from a private collection at Morpeth.

For several years it has been noted that visits are paid by the *Hoopers*, or Wild Swans, in parties of four, six, or even eight, and these visits have been annual, mostly during severe weather.

A string of fourteen were seen to pass over the "Law" in close proximity to the harbour. They were evidently making for Budle Bay, which is in a south-easterly direction. Though common on the Scottish shores, they are undoubtedly considered a great prize to a sportsman.

Three members of the *Wheat Ear* family of birds arrived on April 9th, and from careful observation it has been shown for several years that the bird invariably arrives whilst the Cheviots are clothed in a mantle of snow.

The names applied to this bird are various, for instance, Fallowsmith, White-tail, or White-rump.

This clean, interesting bird is one of the earliest of our summer visitants. It breeds in holes, under and among rocks and stones, in the burrows of rabbits, even occasionally in those scraped by the Sand-Martin, in old walls, and in quarries, and its nest has been found in the rents or splits of dry peat mosses.

It is time for its usual follower, the *Sand-Martin*, to put in an appearance, for it is noted by the native naturalists that this bird usually arrives before the fourteenth of the month (April).

THE LATE SIR RALPH PAYNE-GALLWEY, BART.

(PRESIDENT OF THE WILDFOWLERS' ASSOCIATION).

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WILD FOWL SHOOTING.

THE LATE SIR RALPH PAYNE-GALLWEY GAVE THE FOLLOWING INTERESTING ACCOUNT.

I SHOT over the tidal flats for ten years, usually for six weeks after Christmas, with the assistance of one of the best puntsmen in England, with every appliance for obtaining sport, and at all hours by day and by night.

The Brent geese are seldom present in any number before Christmas, but after Christmas, and till the end of February, they are often very numerous. In a hard winter, especially if the weather is severe in North Holland and in Denmark, from 1,500 to 2,000 geese frequent the mud-flats. In mild winters their numbers vary from 600 to 800.

These birds are very difficult to obtain for the reason that they pass most of the day in security at sea, and only fly to the flats to feed on the sea grass (Zostera Marina) when the tide is low. They are then, as a rule, unapproachable, as they are careful to alight at a long distance from the water, and when a boat or punt can push up within a couple of hundred yards of them, on the flowing tide, they fly out to sea or to other parts of the flats where they are secure from the gunner.

At the same time, by the exercise of much patience, hard work night and day, and a good deal of luck, a shot at the Brent with a punt gun can now and then be achieved, especially in very windy weather, when they fly low and are not so apt to leave for a rough sea. But this only occurs when the wind is strong and, of course, on shore. In such favourable weather, and with plenty of frost, a bag of from 60 to 80 geese may be made during the month of January. I have obtained as many as 200 after Christmas, but with every exertion, as well as with good luck, the average number would seldom exceed eighty of these

excessively wary fowl, and in mild winters perhaps not more than from 40 to 50.

What causes all gunning afloat to be difficult is the fact that an entire estuary dries at low water, and that there are then no creeks and channels along which a boat or duck punt can be paddled up to the birds as they rest or feed on the flats. If this was not the case the geese would not remain, as they would soon be driven away to other haunts. By anchoring a boat behind small promontories or under the shelter of rocks, occasional shots at the geese may he had with a shoulder gun as they fly from the sea to or from the mudflats, presuming always that the wind is strong enough to cause the birds to fly low.

As to other wild fowl, there are very few. I have never seen a hundred widgeon together, and probably at most a couple of hundred frequent the flats, and then seldom during the daytime.

In hard frost, wild duck are driven from inland ponds and rivers to the tide, and sometimes a score may be noticed, but usually not more than a half dozen here and there, and these are probably sleeping in safety on the dry ooze far beyond the reach of the fowler's gun. Teal are rare visitants; in ten years I scarce saw a dozen. Among diving ducks, the scaup is the common species, few others of this worthless tribe being seen.

Many shore birds may be noticed, though few of interest from the gunner's point of view. Plovers, golden and green, are scarce, though they are common on the marshes and fields near the sea shore. In severe weather there are always three or four swans about, both Hooper's and Bewick's.

To an enthusiastic wild fowl shooter I can imagine a fortnight in hard weather would be a delightful excursion, for even if his bag were a light one, he would always have the chance of a few shots, and, at all events, have the pleasure of seeing wild fowl, that is, Brent geese, in considerable numbers, along the Northumbrian coasting.

AS TO GUNS.

In his "Letters to Young Shooters," Sir Ralph

Payne-Gallwey, writing of first-grade game guns for game and ordinary general shooting, indicates a pattern of 140, and says, to quote his own words, "our best guns are made to do this." Further on, Sir Ralph says he was much struck one day by observing the masterly performance of a fine shot, who was pulling down pheasant after pheasant as they came down-wind very high up over the tree-tops without a miss. Curiosity prompted the worthy baronet to examine and afterwards test his friendly gun, only to find it was but an open-shooting cylinder, scarcely giving the pattern of 140 mentioned above!

Finally, though at the risk of being accused of unnecessary repetition, I may once more instance the case of Lord Walsingham and his celebrated bag of 1,070 grouse in one day to his own gun alone. Here are his Lordship's own and oft-repeated words: "When I made my bag of 1,070 grouse I used four Purdey guns, cylinders, not chokes." In the face of all this, what, I, ask, becomes of the argument of those who say such guns will not kill game at 40 yards? One last example. Take the game guns turned out by Purdey, Atkin, Lancaster, or Boss, and examine them for choke. I think the result of any such examination will be to show clearly there is precious little choke in any of them. The statement, then, that cylinder or improved cylinder guns will not kill game at 40 yards must be dismissed as a fallacy, and there for the present we may as well leave it.

Among my many friends who go in for the choke a favourite plan seems to be the letting of the game get far enough away before firing. This is well enough, certainly, where the surroundings admit of it, but they don't always do so. Practically the only shooting that permits latitude of this sort is grouse-shooting on the wide, treeless, hedgeless moors, or partridge shooting in a fairly open country with hedges, trees, or ditches not tumbling over each other or pressing upon yourself. Such open expanses are only found under certain circumstances—for example, the moors referred to or the

large agricultural parts of England, for the partridge is an agricultural bird and prefers a life on a well-cultivated farm to any other sort of existence. Wildfowl do not come within the scope of my remarks. Grouse, then, you can let go as far as you like, partridges you can do the same with if the country is open enough, and then you are finished with it. But in a wooded country, in covert-shooting, rabbiting, or any other sort, you cannot fire fast or slow according to whim; you must take your birds or ground game as they offer themselves or let them away altogether. And, apart from all this, it is distinctly bad form to be picking and choosing time and opportunity; it looks bad, it is bad, and I take it on me to say you never see a crack game shot of experience guilty of it. On the other hand, it is a pleasure to watch a downright good performer at fast birds or other game. His gun seems part and parcel of himself, for it fits him like a glove; he takes his brace of birds out of a covey with grace and ease; he does the same with a pack of grouse; he crumples up an old cock rocketing pheasant, shot dead through the head and neck, as he comes with the wind at fifty miles an hour, or snapshots a scuttling rabbit in the thicket cover and lays him out dead in his tracks! I say it is a treat to watch such a performer, and a greater contrast between such a man and a shooter who has to pick and choose both his mark and his distances because he is using or trying to use a full choke must be seen to be realised! I have witnessed both many a time and oft; the first I am only too anxious to be a spectator of every day in the week, the second I never wish to see again.

PINNACLE ROCKS, FARNE ISLANDS.

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BIRD LIFE ON THE FARNE ISLANDS.

THE Farnes consist of a number of low basaltic islets, some fifteen in number, and cover an area of from three to three and a half miles. Some are isolated rocks, others are partly covered with a coarse herbage of various kinds, amongst which thrift and white campion are conspicuous.

The Inner Farne is the nearest island, being situate two miles from the mainland. Near it are the east and west Wide Opens and the Knoxes; after crossing a channel a mile and a half wide we reach the Staples, with the Pinnacles, the North and South Wamses, Big Harcar, Clove Car, and Brownsman. The Crumstone, the breeding place of several seals, is a mile and a half south-east from the Staples, and to the north-west is situated the Megstone, the rock on which the cormorants breed. The Outer Farne or Longstone is the most northerly of the islands, and five miles from shore.

A light house is placed on the Longstone, and in the early hours of September 6, 1838, the steamer "Forfarshire," of three hundred tons, bound from Hull to Dundee, drifted on to the Harcar rocks, which are close to the Longstone, and broke up. Many of the passengers and crew were drowned during the terrible storm that raged on that wild September night and morn. Grace Darling, the lightkeeper's daughter (only 23 years of age), induced her father to launch a coble, and after a gallant struggle succeeded in reaching the wreck and bringing off what remained of the passengers and crew. The heroine, Grace Darling, died in 1842, when 27 years of age. She is buried in the churchyard of Bamburgh, the village in which she was born.

The Inner Farne is the largest of the islands, and to this romantic situation St. Cuthbert retired and lived as a hermit, "far from the madding crowd," for nine years. The two lighthouses and the tower, a square-shaped structure erected by a Prior of Durham, are the only other

buildings. The Farnes are leased to an association that is interested in the protection and preservation of the species breeding there :—

The *Rock Dove* (*Columba livia*).—This species can be distinguished from its near relative, the stock dove, by the white rump (instead of blue) and by having black bars on the wing. It nests in a cave below the Pinnacles.

The *Ring Plover* (*Ægialitis hiaticula*).—The eggs, four in number, are laid upon the shingle, and are marvellous illustrations of protective coloration ; so closely do they resemble their surroundings that it is extremely difficult even for the trained eye of an ornithologist to distinguish them. The young birds, too, when just hatched, harmonise perfectly with the colour of the sand or shingle upon which they rest. This protection is increased by their remaining perfectly motionless when danger is near.

The *Oyster Catcher* (*Hæmatopus ostralegus*) nests on the shingle on the Wide Opens, and usually lays three eggs, which, like those of the ring plover, closely resemble their surroundings, as also do the young birds. The oyster-catcher, also called sea-pie or olive, has an orange-coloured bill, legs of a flesh colour, and black and white plumage, making it a most conspicuous and handsome bird.

The *Herring Gull* (*Larus argentatus*) nests on the Staples and the Wamses. The eggs of this species are very difficult—practically impossible—to distinguish from those of the lesser black-backed gull, a very much commoner species on the Farnes. Eggs, two or three in number.

The *Sheldrake* (*Tadorna vulpanser*).—A species of duck that frequents sandhills and nests in a burrow. It is sometimes called burrow duck.

Rock Pipit (*Anthus obscuras*).—A close relative of the meadow pipit. This bird makes its nest in the crevices of the rock and lays four or five eggs.

The *Cormorants* (*Phalacrocorax carbo*) nest on the Megstone. On approaching the rock the old birds may be seen standing on the rock like sentinels, but fly off before you land. The situation chosen for nests is the highest part of the island. The nests are large structures,

composed of coarse sea-weed, usually about 18 inches in height. The cormorant is a large bird, about three feet in length. Its eyes are of a bright emerald green colour, and its plumage almost entirely black. Cormorants are trained by the Chinese to fish, and also by some gentlemen on the south coast of England. Albinos occasionally occur. The black-backed gulls levy a heavy toll on the eggs of this species. It is a most interesting sight to observe carefully the mated pair preparing their nest. Whilst the site is being fixed upon, some half-a-dozen others are seen to carry huge strips of sea-weed—of which chiefly the nest is composed—to the required rendezvous, and this is carefully placed by the future parents in the correct position. Directly the young ones are hatched they are extremely feeble and walking is merely a shuffle, so spindle-like are their movements. After a day or two they are seen to topple from the edge of the cliff into the briny, and thus, like many an Indian child, they can swim much sooner than they can walk.

We find the following story, given by the Dutch naturalist, Tonston, from Odorie. "In a certaine city," says he, "situate by the great river in the East, we went to see our host fish. I saw in his little ships cormorants tied upon a perch, and he had tied their throat with a string, that they should not swallow the fish they took. In every bark they set three great panniers, one in the middle, and at each end one; then they let loose their cormorants, who presently caught abundance of fish, which they put into the panniers, so that in a short time they filled them all. Then mine host took off the straps from their necks, and let them fish for themselves. When they were full they came back to their perches and were tied up again." A similar mode of fishing was also practised at Venice.

The Lesser Black-backed Gull (*Larus fuscus*) nests on the Wamses, the Staples, and the Wide Opens. Eggs two or three in number, These birds destroy great numbers of the eggs of most of the species breeding on the Farnes.

The *Kittewake* (*Rissa tridyctyla*).—The nesting place of

this species is on the sides of the Pinnacles, where their nests are to be found on every available ledge. The eggs are obtained by means of a small net fixed at the end of a long pole. The kittiwake may be distinguished from any European gull by the absence of a hind toe. Plumage of the mature birds: Head, neck, tail, and under parts white, mantle grey, wings (flight feathers) with a good deal of black, legs and feet black. The kittiwake has a peculiar cry which resembles very closely its name.

The *Roseate Tern* (*Sterna dougallii*).—First discovered as a British bird by Dr. M. Dougall, of Glasgow, who found it in the Firth of Clyde. Harting says (page 292 of "Handbook of British Birds"): "Unlike the common and Arctic terns, the bill of this species, when adult, is black, with the gape orange, and the legs and feet orange red." One or two pairs of this beautiful and rare tern breed on the Farnes (the only locality in Britain where it now nests).

Sandwich Tern (*Sterna cantiaca*).—First discovered as a British species at Sandwich, in Kent, a summer migrant. Harting says (page 293, "Handbook of British Birds"): "At once distinguishable amongst other terns on the same breeding ground by its superior size, fuller wings, the expanse of which is 2ft 9in., black bill with yellow tip, and black legs and feet." Nests on the Wide Opens. This bird has a peculiar harsh, grating cry, which can be heard at a considerable distance. A large colony nests on the Knoxes. The eggs of this species are two or three in number, and are subject to considerable variation. The numbers of this species nesting on the Farnes show a considerable increase.

The *Arctic Tern* (*Sterna hirundo*).—Breeds in company with the common tern on the Longstone, one of the Farne Islands. According to Mr. J. E. Harting's valuable "Handbook of British Birds," page 290, "when near enough to be clearly distinguished, it may be known from the common tern by its shorter bill, which is wholly red, i.e., without a black tip, and by its longer outer tail feathers, as indicated by the specific name macrura." On closer examination it will be found to have shorter legs

than the common species. The young of both kinds have the dorsal plumage mottled and barred with buff; the bill yellow, with a dark tip, the legs and feet at first yellow, then orange brown, finally red. Nests on the Brownsman and the Wide Opens. The eggs are in such numbers that great care has to be exercised to avoid treading on them. It is practically impossible to distinguish the eggs of this species from its relative, the common tern, except by seeing the birds.

The *Eider Duck* (*Somateria mollissima*).—Mr. Fortune said the numbers of this species nesting on the Farnes had wonderfully increased during the last few years, which increase was undoubtedly due to the protection it received during the breeding season, and estimated the number nesting on the Farnes in 1908 as nearly three hundred pairs. When sitting, the female bird will often allow a very near approach, and can sometimes be stroked upon the nest. The down of this species is grey in colour, and highly valued for quilts and coverlets, about 1½lb. being required to make a coverlet for one bed. Unbleached down usually fetches from 12s. to 15s. per lb. The eider breeds most commonly on the Brownsman, and also nests on the Wide Opens. The drakes during the breeding season spend all their time out at sea, and do not assist in incubation. The nests are principally composed of seaweed, and are lined with down plucked from the bird's breast. The eggs are four in number, and often more, of an olive green colour. The female bird on leaving the nest covers the eggs with down. This covering not only keeps the eggs warm but protects them from the prying gaze of the lesser black-backed gulls, who prey upon the eggs of this and other species whenever the opportunity occurs. When suddenly disturbed from the nest, the duck has a nasty habit of fouling it, and, as most ornithologists know, the stench thus caused is very powerful and disagreeable. Eiders will swallow large mussels, shells and all, as much as 2½ inches in length.

The *Puffin* (*Fratercula arctica*).—This species usually arrives on the Farnes about April 15, leaving about September 5, being a summer migrant. The puffin swarms

on the Staples, where it nests in holes burrowed out in the peaty soil by the birds, and in which it deposits its one egg, which is white in colour. Young puffins are mere balls of black down. It also breeds on the North and South Wamses. The puffin is also known by the name of parrot, on account of its parrot-like beak, and also as Tammy-norie. In many parts of the world, notably St. Kilda and Iceland, puffins are eaten in great numbers by the inhabitants.

The *Guillemot* (*Uria troile*), also called scoot, deposits its one egg, which varies immensely in colour, markings, and size, on the bare rock, and on the Farnes is almost entirely confined to the Pinnacles—four flat-topped rocks, each some twenty to thirty feet square, separated by a chasm about twenty feet wide from the Staples. The tops of the Pinnacles during the breeding season are literally covered with about as many guillemots as can find standing room, each bird brooding its single egg. A few razorbills also occur, along with guillemots. The Pinnacles are amongst the best places in Great Britain or Ireland for studying the habits of the guillemots at short range (i.e., about twenty feet) distance.

"A MIGHTY CONGREGATION." PINNACLE ROCK, FARNE ISLANDS.

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AMONG THE SEA BIRDS.

ON FARNE ISLANDS IN JUNE.

TO this interesting group of rock-bound islands I wended my way to study bird-life. There are in all twenty-two at low water, and fifteen when the tide is at flood, for then the lower islets are submerged.

They are composed of basalt, and this is really the extremity of the stratum which runs practically through the county of Northumberland, and thence sea-wards. This marine stratum may be traced from St. Cuthbert's small isle, in close proximity to Holy Island, or Lindisfarne, as was its ancient name. It then forms what is called the "Heugh" at the Holy Island—a rampart some five hundred yards long. It is then submerged, and reappears in the "Fort of Beblowe"—in old writings—or Holy Island Castle. It goes again under the sea practically for six sea miles, until it culminates in the famous bird-breeding haunt, Farne Islands. Of all the feathered resorts, this is pre-eminently the most marvellous, for here as many as fifteen distinct species incubate and rear their young.

It would be impossible to describe all I saw on this interesting group of islands. My first landing was on the Inner Farne, where St. Cuthbert, in the far-off seventh century, built a cell, and lived the life of a hermit, "far from the madding crowd." Here I was fortunate in meeting Mr. Paynter, of Alnwick, the honorary secretary of the Farne Island Association, and with him discussed the progress of the incubatory species, many of which were pointed out and briefly described.

The Association consists of a band of gentlemen devoted to the protection of these birds, and two keepers are stationed here throughout the season to keep the gulls from playing havoc with the eggs and

young, and also to conduct from island to island the naturalist visitor in search of information. That the objects of the Association are well and faithfully carried out there is evident proof in the large increase of the young birds reared, and of the more rare species, and the thanks of all bird-lovers are due to the Association for its benevolent work.

The chief bird of the islands is, without doubt, the "Lesser Black-backed Gull," for he is everywhere. He is a fine, handsome fellow, but at the same time he is a sad rascal, for he regularly and persistently robs the other birds, both of their eggs and young ones. When the young Terns are hatching it is impossible for the keepers to drive the gulls away until they have had their enormous appetites satisfied, and other young birds are made to pay toll in the same way, though the gulls are said not to interfere with the eggs of their own species.

One of the most interesting sights on these islands is that of the famous Pinnacle Rocks, rising like columns out of the sea to a great height. Their tops are perfectly flat, and are the homes of countless Guillemots.

From the main island the visitor looks down right on to the heaving mass, and cannot help wondering what would happen if a mother Guillemot left her egg for a short visit to the sea, for surely she would never find it again among so many.

This bird lays a single egg only, and, in what appears to be a perfectly upright position, she proceeds to bring about incubation.

By taking up a position about half a dozen yards from these Pinnacles one has a most entrancing time, surveying the going and coming of these winged creatures.

A very pleasing result of the protection afforded is the great increase in the numbers of the charming "Kittiwake," the handsomest and gentlest of all the Gull tribe.

On the Farnes these birds are delightfully tame and confiding, and the visitor is well repaid by being

allowed to see them truly "at home." There can be no finer sight than a colony of Kittiwakes sitting upon their eggs, their beautiful plumage affording a striking contrast to the dark rocks upon which they place their nests—the smallest ledges serving for this purpose.

"O, say, what sight is this the cake that takes?
A colony of sitting Kittiwakes!
Of all the prospects that our earth affords,
Gazed at by ladies, and admired by lords,
Sure none can vie with that which here we view,
So blithely beautiful, so strange, so true!"

A pleasing increase has also taken place in the number of Eider ducks or Culver ducks. These are found nearly everywhere, making their nests among the rocks the plants, or on the open beach. Some are so tame that they will even allow the visitor to stroke them upon the nest. Mr. Eider is much more finely dressed than his wife.

As a rule he keeps well out to sea, but whenever his partner quits her nest for a little exercise he at once comes home to attend her. Should the female happen to leave her nest in a hurry, as she sometimes does, without covering her eggs with "down" she will be sorry on her return, for it is quite certain that they will have been carried off by those thieving rogues, the Lesser Black-backed Gulls.

One may hope, however, that this Gull is not so black as painted. But in any case a useful lesson may be learned from him, as a well-known writer has pointed out:

"E'en from the Lesser Black-backed Gull
Some slight instruction we may cull,
He bids us as he swims the deep,
On the main chance our glances keep;
Nor let occasion slip away,
But, while the sun shines, make our hay."

It is very surprising that the Gulls have never yet found out that the dainties of which they are so fond, are lying snugly hidden beneath those heaps of down.

Puffins are very numerous on one or two of the islands. Upon Staple Island, the soil is so riddled with their burrows that the visitor can scarcely move about without his feet sinking into one of them. The

eggs are laid some way up the burrow, so that our robber friend, the Lesser Black-backed Gull, cannot get at them, but he has his opportunity—and a good meal—when the young comes forth. The Puffin is a quaint fellow, with a grotesque bill, which he is well able to use, as daring folk find out, for such a nip as he can administer will instantly remind the intruder, who ventures his hand into the burrow, of the bird's presence.

The Puffin is one of the best known excavators. It is remarkable for the singular form of its bill, which exactly resembles two very short blades of a knife applied one against the other by the edge, so as to form a sort of triangle, but longer than it is broad, and channelled transversely with three or four little furrows near the point. From the position of the feet, also, which are thrown so far back that they stand almost upright, Puffins have more the air of small kangaroos than of birds. They have this character in common with all the true diving ducks.

Soon after their advent for the purpose of breeding, it is noticed that the male, contrary to the usual economy of birds, undertakes the hardest part of the labour of nest-building. He begins by scraping up a hole in the sand not far from the shore, and, after having got to some depth, he throws himself on his back, and, with his powerful bill as a digger, and his broad feet to remove the rubbish, he excavates a burrow with several windings and turnings from eight to ten feet deep.

He prefers, when he can find a stone, to dig under it, in order that his retreat may be more securely fortified. Whilst thus employed, the birds are so intent upon their work that they are easily caught by the hand. This bird, like others which burrow in similar localities, is accused of dispossessing the rabbits, and even of killing and devouring their young. Experienced naturalists discountenance this belief.

On the occasion of my visit, I asked a friendly keeper if he would procure me one of these birds from the burrow, and I noticed that he bared his arm and cautiously ran the hand along the surface of the ground, dexterously

clutching the bird under the beak, and brought it forth, whilst I secured the solitary egg.

Having noted the shape and size—a little bigger than that of the wood pigeon's—I replaced it carefully, and on the keeper releasing the puffin, it at once hurriedly shuffled back to its accustomed place, much in the manner of the farmyard hen; neither was it scared by our intrusion. Its voracity is proverbial, and is excelled only by the cormorant.

Oyster-catchers are fairly numerous, and may be seen on most of the islands.

On Staple Island—known as the home of the last-named bird—there are the remains of an old lighthouse, and on the top of the ruined walls a pair of oyster-catchers regularly build their nest. From the nomenclature of the bird one might think that oysters form their chief food, but in reality they usually feed upon mussels, cockles, limpets, and other common shell-fish, so that they are probably named on the well-known principle according to which Lime Tree Avenue was so called because there were no limes in it.

> "They call him oyster-catcher, but you really must not think
> That oysters solely and alone form all his meat and drink.
> He knows they are expensive, and a thrifty bird is he,
> So he's always quite contented with a limpet for his tea.
> Mussels, cockles, starfish, scallops, he will also not decline,
> If they're served up nicely when you ask him out to dine."

The cormorants are very interesting birds, and formerly a large colony nested on Megstone Island. They build their nests well above high water mark, but one spring the tide rose so high that many nests and eggs were washed away. The next season the birds resorted to the Harcar Rocks—a spot ever to be remembered as the scene of Grace Darling's bravery, when the ship *Forfarshire* was wrecked in the year 1838. Here the cormorants fared little better than before, for a big battle ensued between them and the gulls; so the following year they returned to the Megstone, their former haunt, though a few are still found on the place I have mentioned and also on the Wamses Island, but the gull is a formidable foe.

When visitors approach the islands these big birds with greenish eyes take flight, and at once the gulls fly to their nests and dexterously clear out every egg. Thus it would seem that bad weather is really the best for the cormorant, as then no visitors can land and the bird keeps to his nest. The voracity of this bird has long been proverbial, and once led to unfavourable comment:

> "The Cormorant (or Shag) frequents our coasts;
> A most amazing appetite he boasts.
> No other fowl that flies, not even the puffin,
> Such quantities of provender can stuff in.
> To see the rascal feed, you'd think he'd fasted
> As long as good King George's reign has lasted;
> In fact, his name's another word for glutton;
> But, sooth to say, he doesn't care a button!"

As the boat approached their haunt, the Megstone Island, a line of these big birds could distinctly be seen standing like sentinels on the horizon, and if a more conclusive proof were needed to assure one of their vicinity, one has it in the offensive odour wafted on the breeze.

I once spent a most interesting time in watching the manœuvres of this species of sea-bird in the matter of nest construction.

From my point of vantage I saw the mated pair selecting the site for the future home, while some four or five others were busily employed, dragging long fibrous pieces of seaweed stalks and other impedimenta to the rendezvous of the nest. Then the pair placed these in position preparatory to the egg deposits. Indeed, for the space of a couple of hours, the scene presented was one of earnest business, carried out with a determination that would have merited approbation in human enterprise.

It has been observed that young cormorants can swim before they can properly walk, for on their first visit to the ocean they seem to shuffle along till they reach the edge of a precipitous cliff and then merely topple over.

Next to the Kittiwakes the most interesting bird appears to be the Tern, and special care is paid to its

protection. Visitors are not allowed to remain long on any of the islands, but on that where the Terns nest only a very short stay is permitted.

Four species of this bird are found on the islands, the most common being the Arctic Tern, whose head-quarters are upon the Wide-opens and the Knoxes. These two islands are quite unlike the others in character. The islet known as the Knoxes, for instance, is quite low, except at one end, and is covered with sand and pebbles. This island is almost sacred to the Terns, which lay their eggs all over the place, amongst the pebbles, or on the coast, and usually without the slightest attempt at a nest. So close to the edge of the water are the eggs placed that vast numbers are destroyed every season when the wind brings the waves a little higher than usual.

Mr. Stanley Duncan, Hon. Secretary of the Wild Fowling Association, in his interesting article on "British Wild Fowling and Pleasure Resorts," says :—

"On journeying south from Berwick our first place to stay, if desirous of shooting along Fenhamslakes and Budle Bay, is Elwick, situated about two miles from the north-west corner of Budle Bay and a mile from Fenham-slake. Along this shore a shoulder gun wild fowler would find, in suitable weather, many excellent fowl worthy of much trouble to obtain.

Widgeon are usually exceedingly numerous, especially during hard weather, and mallards are often in as large droves. Sometimes these birds flock upon the stake like clouds or swarms of bees. To see them in such large numbers is worth to a wild fowler all the time spent if one should be so extremely unfortunate as to bag none, though this would rarely happen to an average shot staying in this neighbourhood for a few days when the birds are there.

Brent, too, are frequenters of this coast, at times in myriads. The main portion of the brent are shot by the punters, who, by the way, are in nearly all places, the wild fowlers securing the "cream of the fowl." As I take

it, the true shoulder gun wild fowler is not so desirous of obtaining large numbers of fowl as a warm and jolly piece of wild sport; the idea of record breaking should be only a secondary consideration.

Our next village of note is Bamburgh, where close by stands the old castle of that name towering above its surroundings. The coast from Budle Bay to Bamburgh is not of a very entertaining nature to the wild fowler, being out of the bounds of the famous Holy Island fowling grounds. Beyond the chance of some stray fowl at irregular times, nothing further may be expected. It is not likely that a shore shooter will long haunt a bit of coast when he knows that a few miles in either direction will find better sport.

Bamburgh is the birth-place of the world-known Grace Darling, who so heroically aided in the rescue of the crew of the "Forfarshire" on the Farne Islands. Beyond this, Bamburgh might be passed, as far as these papers are concerned. In the sandhills north of Bamburgh a few pairs of shell-ducks breed nearly every summer, but are so wily in their habits that they cleverly escape casual observation.

Leaving Bamburgh, we soon come to Seahouses and North Sunderland, which are close to each other, the former being approached first. At Seahouses there is a small harbour, chiefly for fishing boats and the like. Here it is that visitors to the noted Farne Islands "take off." Before describing the islands, which do not fail to interes all the community at large, to say nothing of the ornithologist and the wild fowler, it, perhaps, would be more fitting to state that from Chathill, on the main line, there is a light railway, which conveys visitors and others almost to the scene of the starting-point for the islands.

The Farne Islands in the winter afford capital shelter for most kinds of our sea-ducks, amongst which the eider is a prominent species. The sport of shooting these ducks is usually practised from a boat, the fishing coble being the most suitable for this coast. Boats can be hired at Seahouses; but it should be remembered that a crew of at least three hands is necessary to man a coble for this work,

THE FARNE ISLANDS.

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as the task is, even in mild weather, really a rough one, so strong are the tidal influences round these islands, Beyond the sea-ducks and a few other sea birds, such as divers, little else may be expected."

A NIGHT OF WILD FOWLING.

IN THE MARSHES OF NORTH KENT.

A HARD blue sky is overhead, without a vestige of cloud; the wind blowing keen from the east, and the marshes covered with frozen snow, so deep in many places that few travellers would dare venture out there; but I want birds as specimens, and the long-continued cold has made them tame.

The tide is running up and the birds are on flight from place to place. There are very treacherous traps for the unwary in the Saltings—that meadow-like space left between the salt water and the sea wall. To look at it you would think it easy travelling, but the thick growth of the sea blite and coarse grass and rush conceal the runs and dykes made by the rush of the tide, some of which lead to the sluice-gates in the sea wall. The force of the tide opens these in flowing up, and fills all the dykes; when the ebb takes place the gates close again. Four, five, to eight feet in depth these runs and dykes are; only a marsh-man can go safely over these places.

Nothing is to be seen yet but a few hooded crows on the prowl. It is no use to think of shooting the saltings just now, so we turn into the marsh to look about for a bit; and the *Curlews* (*Numenius arquata*) screaming will let us know when the tide has turned.

What a long dreary space it is, covered with glittering snow! But the cold is fearful, and a bird will not leave shelter if he can possibly help it; so we tramp on in the hope of a chance shot. Here and there we come upon the footprints of a heron, for the snow is soft round the margins of the springs. The other birds do not like him, for he is always hungry, and his stomach is very accommodating.

Near some pollard willows some starved-out fieldfares are bunched up. They utter a feeble "chuck" at times; their feathers are puffed out, making them look twice

CRIPPLE STOPPING.

TILTING THE GUN FOR A FLYING SHOT.

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their natural size. A gull comes flapping over on the hunt, for a dead or wounded bird is a nice meal for him.

From a bunch of dead flags with a scape-scape-scape up springs a snipe, with that twist-and-turn-about flight peculiar to himself and his relatives. He is not fired at, for if there are any fowl in hiding anywhere in his line of flight that cry will move them.

It has done so. Three mallards rise from a dyke ; they are low down, and fly straight to where I am standing by the willows ; three in a line, their green heads glistening in the sun—for it is morning—and the red-brown of their breasts is showing distinctly. They are near enough now, I think—two of them, at any rate.

" Bang ! " " Quack, quack ! " A twist and turn of their necks and bodies tells that they have been hit, but they do not fall. It serves one right, for it is almost useless firing at fowl coming right at you ; the breast feathers are so thick. It is a warning to resist temptation for the future.

As we near the Saltings, something springs from a patch of dead flag, which we shoot, and it proves to be a fine specimen of the *Short-eared Owl* (*Strix brachyotes*) or " woodcock owl " of the marshmen. His light body and hawk-like flight often lead folks to take him for some other bird. He hunts by day as well as in the evening ; any hen-footed fowl is his prey—that is, if it is not too big for him.

The shore-shooters know him well ; they see him, just as the light begins to fade, come skimming over the flats, now high up, the next moment close to the ground. All at once he stops, and fans with his wings, like a kestrel, over a tuft of rushes. That fanning of the wings is remarkable ; it causes a current of air, much stronger than any one would imagine, which rattles and stirs the dry rushes, so that any creature that has sheltered there comes out, and the owl gets it. His near relative, the long-eared owl, has the same tactics. They do not eat all they catch at the time, but hide it till wanted, and the contents of their larder would surprise many people.

Gaining the foot of the sea wall, we crouch down for

shelter, and listen for the notes of the fowl, driven by the fierce wind off the open sea to seek harbour in the bays then comes the screaming of the redshanks, the cackle of gulls ; all combined with the peculiar chatter of thousands of *Dunlins* or *Oxbirds* (*Tringa variabilis*).

The fowl are coming up with the wind, so, crawling up the bank, we peep very cautiously out over the Saltings and down the creek. The whole place is alive with hen and web-footed fowl ; only a mile away a line of birds is to be seen coming over from the opposite shore ; we get quickly back to the bottom of the wall and wait for them.

The whistle of their wings is first heard, and then we can distinguish them. Widgeon they are, the feathers underneath shining like white satin. Picking out the leader as he passes by, and aiming a yard in front, we bring him down with a thud—dead. And now the fowl are on the Saltings ; their scream, chatter, quack, and whistle, all mixed up together, while from the other side of the water comes the sound of the heavy duck guns hard at work.

We slip over the wall, and begin to crawl on hands and knees to the fowl feeding on the very edge of the ebb-tide. Curlews are not to be thought of ; they know exactly how far a gun will reach, and keep just the right distance out of harm's way. Besides, they post one of their number for sentry duty. The redshanks are nearly as bad for they kick up a noise, and let all the other birds know that something is crawling along.

Getting under the shelter of the wall, I made my way lower down to the tide, where, crouching under the remains of a stack of reeds, I found a " shore shooter," one who makes his living by means of his gun. By some unlucky chance he had forgotten to fill his powder-flask. The birds are well up on the Saltings, and he has only enough for another charge for his duck gun. Could I oblige him with a charge ? he asked.

" Certainly, with half-a-dozen, if you like," is my reply.

" I can't afford to shoot them little hen-footed things," he remarks. " Powder and shot cost money. Are you after something to stuff ? "

"Well, yes; something in that way."

"Ah, I fancied you was by your shootin'. You let some fowl go by that I should have pulled at. You don't shoot for a livin'?"

"No, I do not."

"Shall you be down this part any more, think you?"

"Yes, I may, for anything I know."

"Well, there's some of your sort of birds about here, what you're after, and I could knock a few over for you. Would this one be any good to you? If it is, take it."

I was glad to have it, for it was a fine specimen of the *Kentish Plover*, or *Dotterel* (*Charadrius cantianus*)—a rare bird even here.

"Can you live by your gun?" I asked.

"Sometimes; last winter I did well, though it was by chance like! It come about this way. I had to go to the marshes at the back of the island—Sheerness. You don't know it, do you?"

"I know it well, a shallow part especially, covered over with sea grass and weed, and a good nine miles from here."

"Ah, that's it! The geese are well sheltered there, with plenty of food, and they'd gathered from all parts. I brought home three couple on my first night, and sold 'em. Then I bought myself powder and shot, and a few other things, and went to work. Well, all through that winter I managed to live; rough work at times, mind you, but I lived, and that's somethin'. I allays keeps me own secrets. My line of work is shootin' fowl, an' I don't want anybody to help me!"

I gathered afterwards on the trudge home that my companion made a very good living indeed, though he made little noise and much less boast.

A FEW COMMENTS ON THE SPORT.

PUNT-SHOOTING VERSUS SHORE-SHOOTING.

NO one appears to have anything to say against the practice of shooting birds from the shore, or even with the shoulder gun on the stakes, but with the punt gunner it is totally different, if one may judge by the antagonism shown in the local press, at times.

The sport of punting is variously summed up and condemned by those who do not possess a shooting punt. It is called murder, massacre, butchery, &c., &c., the different degrees of nomenclature varying probably with the dislike, petty spite, or jealousy of the different critics.

The view which I have always held in relation to this matter is that undoubtedly punt shooting is one of the kings of sport, and it calls forth all the skill, patience, and energy requisite in a successful shore shooter, and a great deal more wariness and science are required in the punter, in his method of approaching his prey ; therefore, why all this adverse criticism ?

One can well imagine the exultation which necessarily fills the breast of the individual who has, with one discharge, captured a modest quarter of a hundred birds. Neither can I regard as inhuman punt shooting, for every precaution is taken, at all shoots, to kill, with the hand gun, all birds that have been winged or only slightly wounded.

"A SUCCESSFUL MORNING," PUNT SHOOTING.

MR. SYDNEY H. SMITH (OF THE WILDFOWLERS' ASSOCIATION) GOING ABOARD

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"TAKING THE BREECHLOADER ABOARD."

"THE PUNT UNDER SAIL."

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HOW I BECAME A NATURALIST.

MY home as a boy was in a quaint old fishing village close to the edge of the North Kent marshes. The place had an old, irregular look; one would think its inhabitants had begun building from the shore inland to a certain point, and then come back and finished along the water's edge.

The top rooms of the houses generally projected over the pavement—somewhat savouring of Shakesperian—with queer gables, which were ornamented with grotesque figures. By the water stood old mills, warehouses, and shipyards, all having a decayed look. That business of some kind had been once carried on there, the old wharves and fine houses showed, but when that time was no one about the place in my time knew. It was entirely isolated from any other town or village, and railroads and steamboats were things known only by name to the general community. Nearly all the people got their living on the water. Poor they were, but a contented lot, and, as this world runs, honest. Now and again it would be gently hinted that they smuggled—who can say? The virtuous have enemies; they, perhaps, had theirs. One thing I can testify—if at any time a little medicine was needed, it was sure to come out of a very short-necked, dark-green bottle holding more than a pint, and that medicine was certainly made in Holland.

The fishermen and their lads always passed our house on their way to and from their fishing boats, which lay at anchor below in the marshes. On the return journey they were sure to have something in the shape of wild fowl—for you would find a duck gun on board all the boats—and to catch a sight of these was my principal delight. When they found out this they never passed the door without showing "the boy" what they had got. Many were the questions I asked them about bird and fish, and I never rested until the kind-hearted fisher-lads had taken me with them to see for myself the birds they talked about.

Before long I knew where to look for the birds, and could mimic their cries—the shriek of the curlew and his mournful whistle, the *Peewit* (*Vanellus cristatus*), and the note of the *Stone Curlew* (*Edicnemus crepitans*), or thick-knee (called in the marshes "the king of the curlews"). I had plenty of room to move about, and no one interfered with me or the birds. The Bird Preservation Act was not thought of at that time. The plover's eggs were left for the bird to hatch, and if the young were picked up just to look at they would be gently put down again. Bird and egg-collectors had not reached our neighbourhood then. The miles of marshland teemed with bird-life. When the gun was used it was for the wild fowl proper—geese, duck, widgeon, teal—but the waders that gave life to the dreary-looking pools were little troubled, for powder and shot with the fishermen meant money. When they fired at a bird they shot at something that would do for dinner.

I had watched the life on the marshes at all hours of day and night—in the early morning, when the mist rolled over the lands and the scattered poplars and stunted willows took strange shapes, while the red hares flicked the wet off their hind feet as they sat on the mole hillocks, and at midday, when the gulls left the sea to come to the hollow marsh pools to bathe and rest—a pretty sight. With them would be seen the peewits and *Red-legged Sand-pipers* (*Scolopax calidris*). One would hear them, too—the cackle of the gulls, the "pewit, pewit," of the green plover, and the scream of the redshank. In the evening flight after flight of starlings made their way over the flats to meet in one vast host to go through their drill before settling for the night in the reeds. At one particular hour of the afternoon, in summer—between five and six o'clock—the marshes shone in a golden light, which tinted all things far and near (just such a tone as Cuyp gave to his marsh scenes), and, to complete the picture, one saw the men-o'-war, frigates, and sloops off the mouth of Medway in the distance. Turner visited our marshes and painted some of his famous pictures from what he saw there, to wit, "Stangate Creek," "Shrimping Sands," and "Off Sheerness."

My companions in our village were at times what the present more refined state of society might term "doubtful." They lived by the gun, but they were good to me, and would take me with them over the Saltings, close to heel, ready to drop or crawl at a motion when the water-spaniel got the scent of fowl. Sure shots and true field-naturalists, they knew them all and where to find them. I owe my early insight into bird-life to these men and to an inborn love of all living creatures. Coming past the long, shallow pools, my companions would point out the various waders, their bodies reflected in the clear water by the light of the setting sun, and the tern, with his shuttle-cock flight, catching insects and small fish.

The man with whom I went out oftenest told me of a struggle he once had with a great sea-eagle that was shot in the wing on the rabbit-links in the marsh just enough to prevent his rising.

I remember, too, one of my school companions, not much more than a boy, going out with a borrowed boat and a gun and shooting a wild swan—a fine Hooper—dead with his first shot on a rising tide.

A good mile from our village stood the grand old parish church, with its massive square tower built of flint stones, a prominent object, which can be seen from far over the water. The interior of the church is very beautiful.

When I was about twenty years of age domestic changes caused me to leave my old marshland home. I parted with my old companions and kind friends with sorrow. Just as I was going a hamper was brought. It was a parting gift and contained water-birds and waders captured by the fishermen and their lads.

A very good authority remarks:—Verily, one man's meat is another's poison, and the iron-bound ground which puts a stop to hunting and spoils other winter sport comes as a boon to the fowler. Early and late he is enjoying sport. He steals off in the morning, and obtains a bag, often before his neighbours are out of bed. Again, in the evening he is flight-shooting, sheltered, if possible, from the keen wintry blast, until silhouetted against the western sky he sees a thin line which warns him of the approach

of fowl, travelling at, perhaps, sixty miles an hour. Maybe they will pass near his hiding-place, if it be well chosen, and he may have time for a double-barrelled salute before the advance guard sweeps away into the darkness. Then he reloads the gun and puts it at ease to await the next chance. The various species of wild fowl sought by the gunner may be set down as legion.

The remark that a duck will live anywhere, upon anything, is almost correct. We might call him omnivorous. This more especially applies to the domesticated variety, which has a predilection for refuse, and a shame-faced love for anything too "high" for other inhabitants of the farmyard. His wild cousin is, in most cases, far more particular. Indeed, unless in a starving condition, he is epicurean in his tastes. Even as the canvas-back duck, beloved of the gourmet, obtains his distinctive flavour from a diet of the delicate wild celery, so the mallard wants one quality of food—the best—and nearly always contrives to get it. Succulent herbage, seakale, mollusc, crustacea, grain, berries, and pulse form part of his bill of fare. He fattens on the stubble fields inland, and then flies to the ooze beside river and estuary to plunge his sensitive bill in the soft mud and distil nourishment therefrom in the shape of amphibious insect life. Compared with the domestic bird, it is an instance of Hyperion to a satyr. Domesticity has infected the tame duck with a waddle and dimmed his lustre. At mating time, when the wild variety puts on a better attire, we have few British birds to vie with him. His helm is of brilliant metallic green. A white gorget parts his morion from the ruddy chocolate of the breast, chestnut-brown is his mantle, and brilliant orange his legs and feet. He walks smartly, and with none of the awkwardness of his tame relation. His sex is indicated by the four lyre-shaped middle feathers of the tail, which curl upward and outward. A somewhat curious chapter can be filched from the book of Nature upon the courting of duck and drake. We put him in the second place, because the maid makes the wooing. She is sombre of hue, while he, clad in all the glories of colour, remains to be approached. She

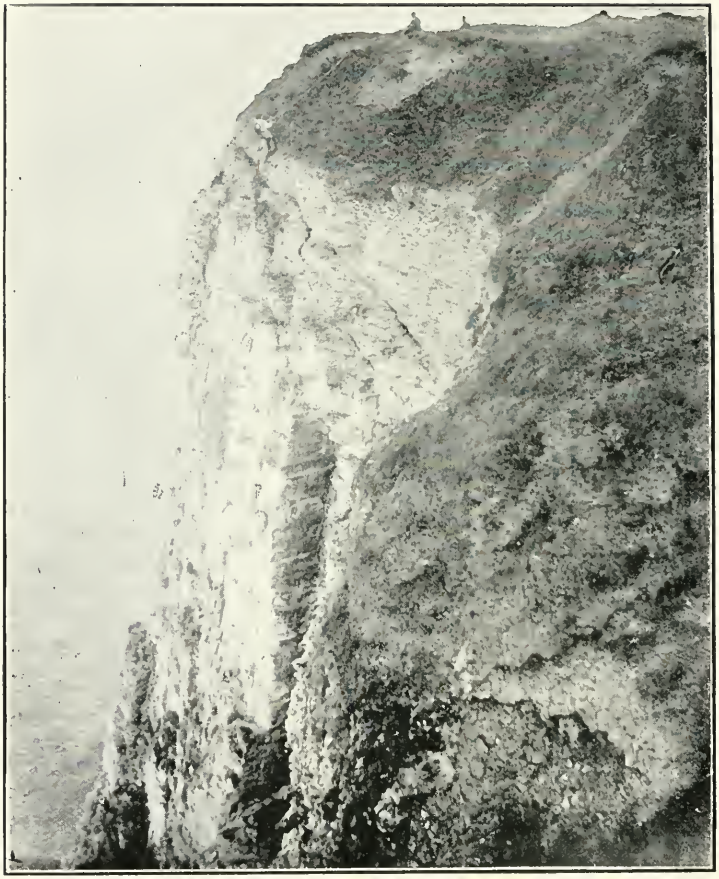
sails round him, uttering cooing notes of love; while he, to all appearances indifferent, acts the part of a coquette, avoiding her advances. She redoubles her efforts, swimming round him, and occasionally lowers herself in the water until only the head and neck are visible. Reciprocal feelings eventually being established, the pair go through a series of seemingly concealed figures, advancing, retiring, bowing their heads, and uttering notes of endearment. This is preliminary to the construction of a nest, which is usually placed in the midst of a tuft of rushes, in the hollow of an old tree stump, or occasionally in a pollard tree, twenty or more feet from the ground This is more especially the case when there are many four-footed enemies about. The drake takes no part in the nest-making; all these duties are performed by his mate. When the nest is finished, she lays from ten to twenty eggs—usually about a dozen—and as soon as she begins to sit, plucks the down from her breast to prevent the eggs from getting cold while she is away from the nest, which she never leaves until forced to do so by the pangs of hunger. Even then she carefully conceals her treasures by putting herbage over them, as she may have to fly many miles in search of food. The drake does not assist the incubation in any way. He goes to his club with other drakes, only occasionally flying round overhead and quacking. This seems to be done less with an idea of cheering her long vigil than of assuring his anxious mate that he is all right. After twenty-eight days' close sitting, the brown, downy brood hatches out, delighting the maternal heart. Strange to say, after all her solicitude, she is strangely lacking in prudence. She will march her brood over long distances, never looking behind her, until some drop from exhaustion. Then again, otters and pike devour them in the water, and cats and other enemies on land; indeed, it is a wonder how any of them survive.

The brent goose is the most common, and a general object of interest to the fowler. He can easily be distinguished from other geese at a distance, the beak, head, and neck, breast, tail, and feet being deep black. The

back is slate-grey, and upon each side of the neck he has a white patch. The female has similar plumage. Unlike other geese, the brent never feeds on dry land, nor have we seen him on land. He gathers his sustenance from the seashore and in the estuaries, frequenting the ooze and shallow water, and collecting floating seaweed, and more especially sea grass. This latter is the favourite food, and in the presence of brent, or black geese, as they are often termed, can at once be recognised, as, while other wild geese bite off wet grass as if cut with a pair of shears, the brent tears it up, eating the white part of the root, and throwing the other away. Brent visit these islands in thousands, and, no matter how vigorous the gunning may be, it only renders them more wary, but does not drive the flocks away.

With regard to guns and ammunition, as upon most other subjects, the doctors differ. Under such circumstances, wise sportsmen steer a course of their own, and when doing this we have found that, as far as shore-shooting is concerned, heavy guns are a mistake. Some persons will advocate a double-barrel 8-bore. Now, this is not only an ammunition-wasting weapon, but terribly cumbersome in the strongest hands. If an 8-bore must be carried, let it be a single-barrel, as it is quickly loaded. What, however, can beat a 12-bore double with 3¼dr. of powder and 1¼oz. of No. 4 shot? It will stop anything, even a Hooper swan, and, as it weighs only about 7lb. or 8lb., the weight is not excessive. It should be furnished with a shoulder strap or sling, to leave the hands free when birds are not near. In our opinion, the only proper place to use a large shoulder-gun is from a boat. As far as powders are concerned, we prefer the white nitro compounds, as black powder, even if it hits harder, generates so much smoke that it is a nuisance in heavy weather. No shot should be without a supply of brass cartridge cases. They can be charged several times, do not stick or jam in the gun, and hit much harder than cardboard cases.

A day with duck properly carried through is not only an exciting but a very arduous amusement. Of course, it



METHOD OF WALKING OVER CLIFF EDGE.

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depends upon the state of tide when the punt is taken out. It should be at flood—that is, when the tide is turning to run ; never at high tide or on the ebb, as it only frightens them. After a good meal and something in the punt to go on with, a companion to propel the punt is necessary, and, in addition to the long swivel, a good double-barrel cripple-stopper must go on board. One cannot wear too much flannel clothing, consistently with freedom of movement, as the nor'-easter in the estuary is keen, and goes through thin clothing like a knife. Birds are scattered in all directions on the breast of the heaving waters—sheldrake and pintail, shoveller and scaup ; but brent, widgeon, and mallard are more in the mind. A sweep of the field-glasses reveals several bunches of widgeon drifting towards the flats and sand-dunes, while a gaggle of brent geese are calling as they sweep in great circles over the ooze, seeking a suitable place to pitch. Further on, too, are mallard in goodly numbers, while the bean geese are sweeping to the stubble fields. How to get at them is the rub ! The long, cold paddle is only sustained by the wrought-up excitement. The wind is rising and knocking the punt about ; but this is all the better, as far as fowl are concerned, as it tames them. The punt is pushed on, interposing every object possible between the fowlers and the fowl. It is becoming dangerous enough for the punt, but the gaggle of brent geese are huddled together on the ooze—they do not like their feathers ruffled by that bitter blast. Slowly the distance decreases from 150 to 120 yards ; then to 100. This is the exciting time, as 70 yards is quite far enough away with a dancing punt on a rolling sea. The sentinels appear to be uneasy as the range lessens, and at about 75 yards the flocks raise their pinions. Simultaneously the 8ft thunderer hurls 1lb. of heavy shot among them as they open their wings, and, quick as thought, the second barrel goes in the retreating remainder, from which "droppers" fall out—thirteen dead and six cripples is enough to go on with. The cripple-stopper accounted for all but one wounded, which escaped to sea.

There is a heavy surf on the bar, the gulls are driving

in shore, and the sea-horses look angry. It will be a wild night. So much the better; the higher the wind, the lower the birds. The powdered snow drifts sharp on the wind. Heavy clouds partially blot out the moon's rays and the "whe-oh" of the widgeon has something almost eerie in it. Now for the 12-bores, wire cartridges, and No. 4 shot. The cutting nor'-easter makes us glad enough to crouch under the old sea-wall. The widgeon call grows nearer and louder; swiftly some dark blots frame in the sky; the guns speak, and there is that heavy "splosh!" so loved of the shooter. It is not a widgeon, when retrieved, but a fine mallard. First blood to the gun! Then follow in rapid succession a gaggle of bean geese, too high, a leash of pintail, two of which pay forfeit, and the trumpet call of an invisible Hooper. Then, fast, and furious, for twenty minutes, teal, pintail, mallard, widgeon, and curlew succeed. It is hard work to load, so rapid is the succession; and, as is always the case, a lot of unlucky shooting occurs, as in the deceptive light a judgment of pace and distance is all but impossible. Twenty minutes of hot work, and the flight is over, ceasing as suddenly as it began.

BIRD MIGRATION.

UNTIL the last few years it was generally believed by naturalists and ornithologists alike that in migration the older or parent birds preceded the younger ones on their long flight, and even eminent authorities on bird life fell into this error.

Expressed in the simplest language, the incontestable result of all the numerous phenomena as they came under notice in a certain North Sea observatory is as follows :—

(1) That under normal conditions in the case of over three hundred specimens, with the exception of a single one, the autumn migration is initiated by the young birds from about six to eight weeks after leaving their nests.

(2) That the parents of these do not follow till one or two months later.

(3) That of these old birds the most handsome old males are the last to set out on the migratory journey.

The only exception to this rule, as previously mentioned, is the cuckoo, and this for reasons easy to divine. Plumage enters a great deal into the art of ascertaining the old from the young whilst on the wing. The marking and colour of such birds as the starling would at once identify the age. The blackbird, again, is another species in the case of which the time of migration in respect to age and sex can be determined with the utmost exactness by reason of the difference between their early and adult plumages. The young reddish-brown birds with which the migration commences rarely make their appearance before, say, October ; the old black males defer their arrival till November, and of these latter again the last to arrive, some weeks later, are the beautiful glossy blackbirds with orange-yellow bills.

In regard to the difference of time of migration of young and old birds, it would be well to quote a remark or two from an excellent authority, viz., " Rodd's Birds of Cornwall and the Scilly Isles." Speaking of the knot, the

author mentions: "I have also noticed that the first flocks of these migratory sandpipers, which usually arrive about the second week in August, are almost entirely composed of young birds. The old birds arrive somewhat later." Referring to the woodcock, the same book says: "When it first comes its flesh is short and tender, whereas afterwards it eats stringy and is of a fibrous flesh, as others of our fowls are."

Even to the scientist in Nature study it appears mysterious that young birds of, say from eight to ten weeks old are able successfully to complete a lengthy ærial journey of some five hundred miles in the greatest safety. It must be borne in mind that this is a maiden venture, or original undertaking; yet the same unerring certainty is there as practised by their parents previously. Anyone who on dark, starless nights has heard the babel of voices of these myriads of migrants travelling past him overhead, in one fixed direction and in undiminishing numbers, for weeks and months, without the help of any guiding mark discernible by the human eye, cannot fail to be led by the supreme grandeur of this phenomenon to speculate as to what kind of capacities the unfailing performance of such an act is due.

For centuries this question has received the most serious consideration on the part of inquirers, but no final solution of the problem has as yet been forthcoming. The greatest amount of investigation of these unknown things produces, seemingly, but the chaos of nothingness; hence, in their perplexity to account for this remarkable phenomenon, scientists and observers have sought refuge in the assumption of an "instinctive action" (as Gatke puts it) on the part of birds, in virtue of which they adopted unconsciously the right road towards the attainment of an unknown goal. Alfred Newton's remarks on "Birds" in the "Encyclopædia Britannica" rejects the idea of instinct as a mere evasion of the difficulty of the question, and as excluding all scientific investigation of the same. According to his view, birds act unconsciously in a manner suited to a certain purpose; but what, one might ask, is this but instinct?

The absorbingly interesting subject of bird migration is one than cannot be dealt with in a few cursory notes, or in any wise scantily treated, for whatever theory is advanced the idea baffles the most devoted student of natural history.

An excellent authority very ably puts it thus—and this view is the one now generally adopted on this question :—

> " Originally birds lived in latitudes which supplied them throughout the whole year with everything necessary to their existence ; that in process of time some of them accidentally came to stray so far beyond the northern limit of their home that on the approach of winter they were compelled to retrace their path thither in order not to succumb to cold and hunger : that a habit of migration was developed from such accidental erratic wanderings, and that this habit, together with the experiences made on these journeys, had been passed on by inheritance from the old birds to their young."

He further states that the flock of migrants generally had for their leaders older and stronger individuals : that the young were not possessed of an inborn consciousness of the necessity of migration, but had to learn all this from their parents.

The roads frequently travelled over by these old birds consisted of a succession of spots favourable for taking rest ; or feeding grounds on which they were dependent, and the so-called routes of migration were determined by the geographical situation of such places. Such young birds again, as travel alone, are further credited with the possession of a so-called local sense or local memory. This is acquired at first by their getting to know such feeding grounds as are situated in the immediate vicinity of their nests, impressing these upon their memory, then discovering others further removed, and so on. Supported by this knowledge of stations where food may be obtained, the young birds are now left to their own resources to find the way to their winter quarters.

It may not be out of place here to refer to the inexplicable manner in which dogs are able to find their way back to their homes from very long distances. A friend of the

writer had occasion to send a dog by train on a long journey, at the end of which, however, he managed to escape, reappearing a few days after in a very emaciated condition, having scampered the sixty or more miles without food till the homestead was reached. Another instance, a pet dachshund, about a year old, was put into a sack on the estate of its owner, and conveyed in a close cart to a farm miles away. Arrived at its destination, the dog was liberated, but disappeared, and was back home again before the conveyance returned! Some farm hands stated that the animal was seen going "as the crow flies" across ditches and through hedges in a direct line for home.

On the trackless plains of North America cattle, after having been driven for hundreds of miles, have followed the same method of returning, oft-times through brushwood and dense forests.

So far, mention has been made of the land routes of the migratory species. It is now my intention to bring under the reader's notice a theory which has been established to explain the crossing of wide seas by this host, more especially in relation to the occurrence of American birds in Europe.

As already intimated, it was considered absolutely impossible for a bird to traverse a stretch of water at least sixteen hundred miles in breadth, which is the extent of the Atlantic between Newfoundland and Ireland. Hence it was believed that the only way in which it could accomplish this journey was by making use of what was called "diluvial land bridges." These at the present day are represented by the mere isolated remnants of what, in primary geological periods, were large land connections between different continents.

In the case of birds crossing over from America to Europe, such a connection is assumed to be formed by Greenland, Iceland, the Faroes, Shetland and Orkney Islands. The employment of this path as a migration route is considered to have developed into a habit, and this habit to have passed by hereditary transmission from one generation to another from primitive times down to

the present day, so that the birds now in existence are able to find their way with perfect certainty from one to another of these mutilated remnants of a previously continuous chain of land in spite of the fact that these detached fragments lie far beyond their range of vision.

Italy, which at one time connected Europe with Africa, dividing the Mediterranean into two inland lakes, is said to have formed a land bridge of this kind for birds exchanging their habitations between these two continents.

As to the arrival and departure of our friends the migrants, I am at one with an eminent practical fowler, who, in his writings, talks as one who has well studied his subject. I refer to Mr. Stanley Duncan, of Hull, and I cannot do better than to copy, with his kind permission, his remarks as follow :—

"Some notes relative to the dates on which numbers of our shore-birds and wild fowl visit or reach our shores from their breeding homes and northern haunts may here be very fitting.

Several species of shore-birds and wild fowl breed in our islands, but their numbers (even if all stayed the year round), are very small compared with those which reach us from the north. What are known as residential birds, such as the redshank, curlew, green plover, golden plover, dunlin, mallard, and teal, by the end of July begin to flock on the coast, either from our local breeding-grounds or from those abroad. In August most of the curlew and golden plover have left their moorland haunts and resorted to quarters adjacent to the coast. In this same month large numbers of knot, godwit, whimbrel, and mature grey plover arrive ; also the less plentiful green sandpiper, common sandpiper, and greenshank, are in strong evidence. At this season oyster-catchers, turnstones, sanderlings, and many other species are to be met with flying the coast-line in search of new quarters. In August also the home-bred mallard have flocked, and daily wing to the estuaries and other safe retreats.

The beginning of September brings an increase in the number of birds on the coast. Great flocks of gulls and terns, leaving their sea-bound breeding homes for more

southern climes, may be seen. At this time the curlew, sandpiper, little stint, and other less numerous birds pay us a passing visit. They stay from a week to a fortnight with us, then depart for the south. By the middle of September the full swing of shore-bird migration is in operation. A noticeable increase in curlews (noted by their different manners and unwary movements) occurs in October. Shore-birds are in this month as numerous as they will be, if no severe weather influences an immigration from the Continent. Thus, in the months of January and February, knots, in very hard winters, congregate in enormous flocks on our coasts.

In August some local migration of wild fowl takes place. We are in this month visited by the first lots of mallard leaving their breeding haunts, as well as other fowl, such as shovellers, teal, tufted duck, and pochards. A few widgeon—probably those which breed in the northern parts of Scotland or at no higher latitude—are often met with in England during August. Of course, a few odd pairs breed in England, but the widgeon seen in August undoubtedly outnumber those which breed in this country.

October brings with it the arrival of large numbers of widgeon and mallard, but the latter species may be said to come in the largest flocks in November. Grey geese reach us in force during October, and increase until the end of November. Some pass further south. In February they return, and during this month are most numerous on the tideways. Whether large numbers of grey geese (pink-footed) which have journeyed south along the Continent return *via* the British Isles I cannot say, but it is undoubted that when these birds are congregating to go north they are seen in the largest flocks.

Brent, compared with other fowl, reach us late. Few are here before November, and in general they are not looked for in great numbers until after Christmas. The severity of a winter has much to do with the number of brent which reach our shores. Their proper migratory season is over long before the inclement weather drives them in big lots to the British Isles; thus it might be stated that brent, and to an extent all geese, are subject

to local migration, which is partly governed by the weather. Of course, brent occur every year, but for great numbers to visit us we are much dependent on the severity of the winter on the Continent. The severity of our winters counts as little on this score, except that when hard the fowl are not so difficult to procure.

Bernicle, although allied to brent, more closely resemble the grey geese in their migratory movements. Being marsh-feeders, bernicle geese frequent very local areas in our islands. The bernicle has frequently been shot in August. At this season they have been met with at places which are not usually visited by them. As this fowl is fairly common as an ornamental water fowl, it may be possible that these early visitors are "escapes."

In spring a return of the fowl and shore-birds takes place. The wild fowl leave us in the majority first. The shore-birds which have wintered further south, such as the whimbrel and curlew-sandpiper pass our shores in May. A few linger until the first week in June. All the summer a few straggling shore-birds may be seen on the coast, including godwits, turnstones, grey plover, sanderlings, and knots. These may be immature which have not gone on to breed, or possibly they are either barren or 'pricked' birds."

FROM AMERICA TO EUROPE.

THE occurrence of so many American species on European soil involuntarily suggests the question as to the possible route by which these birds may have reached us from their distant homes. That they should have crossed that vast waste of water, the Atlantic, was at first either disbelieved or only admitted with much reserve, mainly because it was considered quite impossible for a bird to sustain the uninterrupted flight of at least sixteen hundred geographical miles involved in such a journey.

Instead of at once entering into the consideration as to the possibility of such a feat, it would perhaps be wiser to examine which of the two routes leading from America to Europe seems more likely to be adopted by migrants —that to the east over the ocean or, otherwise, the so-called overland route through Asia and Eastern Europe.

For this purpose a comparison of the lists of rare and exceptional occurrences in Germany with that of the similar occurrences in England at one glance decides this question in a most convincing manner, because, whereas Germany can show an unexampled number of Asiatic species, with only extremely isolated instances of American birds, England marshals a perfect flood of American species and individuals, among which only a few scattered visitors from Asia are found.

These facts speak clearly enough ; it is impossible that two hundred and fifty birds should travel from America through Asia and the greater part of the continent of Europe to England without more than ten of their number being observed or killed in Germany ; on the other hand, all the facts point to the conclusion that the birds reach the coast of England direct by way of the great Atlantic. Nor, indeed, could a large number of birds like that have travelled *via* Greenland, Iceland, and the Faroes, as one might feel inclined to assume, without leaving behind them more extensive traces than it has been possible, in spite of all efforts, to obtain.

It has also been long known that ships half way between Europe and America have fallen in with birds travelling, either singly or in flocks, in an easterly direction, migrants of this kind having not rarely attempted to alight upon the rigging, and some having also been caught there. A case of this kind is mentioned by no less an authority than Professor Alfred Newton, according to whom Dr. Dewar observed on his passage from America, about six hundred geographical miles east of Newfoundland, flocks of the American white-winged crossbill crossing the Atlantic in a stiff westerly breeze. Many of the flocks alighted on the rigging of the ship, and of these twelve examples were captured. One or two of the latter escaped as the ship reached the Irish coast, and made straight for the land. Two others succeeded in escaping from their cages in the streets of Liverpool, and five were safely brought home. The Professor draws the conclusion that many others are thus helped across the streak by human aid—with what success may be inferred from the American element in the list of so-called British birds.

If strong westerly winds were the cause of, or exercised an influence upon, the migration of American birds to Europe, as has evidently been assumed to be the case, the plover should be subject to such influences to a far wider extent than any other species whose home is on the other side of the Atlantic, for amongst the enormous flocks of these birds which cross that ocean from north to south one might expect that a violent westerly autumn breeze would in all likelihood drive some individual or other less robust than the rest across to the shores of Europe. Such, however, is not the case ; whence the fact of the non-appearance of this plover in Europe supplies far weightier evidence against the theory of migrants being driven out of their course by storms than all the known instances of the occurrence of strangers ever furnished in its favour.

At the time when the question of a possible flight from America to Europe was first mooted, an achievement of this kind appeared utterly beyond the capacity for flight possessed by birds, so far as this was understood, and

consequently was dismissed as impossible, without being even deemed worthy of further investigation. Harting still remains very undecided in his opinion on this question. Thus in one place he says that it is extremely hard to believe that birds, other than natatorial species should have succeeded in crossing the Atlantic, but adds that most of them nevertheless have accomplished this feat, because, on the one hand, many which have occurred in England or Ireland have never been observed anywhere on the continent of Europe. He, however, considerably weakens his argument when he goes on to say that there was probably good reason for suspecting that many of the smaller of these birds largely availed themselves of the rigging of ships in the course of this passage, overlooking the fact that the hours lost by the birds during such rests only prolong the time which they have to pass without nourishment. The same argument might be urged with equal force in the case of all swimming birds belonging to the Anatidæ which might purpose to interrupt their flight across the ocean, for even if we allow that all such birds are diving ducks—*i.e.*, Platypeds—(which, however, is certainly not the case), the depth of the water in mid-ocean is such as would quite preclude their search after any kind of food.

From the foregoing facts the probability of a voluntary and direct flight can hardly any longer be open to doubt. It remains for us, therefore, to establish the possibility of such a flight. The stretch of ocean between Newfoundland and the west coast of Ireland covers at least sixteen hundred miles without any intermediate resting-place. To accomplish this distance would, at the lowest speed of flight as determined in the case of a wild bird—viz., the hooded crow—occupy about fourteen and a half hours. On the other hand, in the case of the bluethroat only nine hours would be required. Nor is there any reason for doubting that a healthy bird and a fairly good flier is capable of remaining on the wing for nine, and in extreme cases even fifteen, hours.

It is a fact that during its autumn migration the Virginian plover travels from the Hudson Bay Territory

and Labrador, across Guiana and Northern Brazil, to Lower South America, or three thousand two hundred geographical miles.

It has been further observed that in the course of their normal passage these birds neither resort to Bermuda nor to the Antilles for resting purposes, but fly across without alighting, and the only interruption of the journey is when forced by sudden and violent storms, in which case countless numbers of them seek shelter on one or other of these aforementioned islands. Observation has also revealed the fact that they travel in a southerly direction some six hundred miles east of Bermuda, for whole days and nights in dense flocks, succeeding each other without interruption or intermission, and numbering from a hundred to a thousand head. These flocks, it is averred on the best authority, proceeding from Labrador to Northern Brazil, meet nowhere with any resting-place in the course of their long migratory flight across the ocean, and are consequently obliged to perform this long stretch of 3,200 miles without a stoppage. They thus accomplish double the distance of 1,600 miles from Newfoundland to Ireland, and, consequently, remove every doubt as regards the possibility of the latter achievement.

It will perhaps occur to the reader that it is possible some of these birds would become exhausted before reaching land, and thus perish. It is known, however, that such land-birds as thrushes, buntings, finches, and the like are able, in case of exhaustion, to take rest for a short time on the surface of the water—even if the waves are boisterous—and are able afterwards to continue their journey. The ways and means provided by Nature are inexhaustible, and, despite the minutest and most unflagging energy of the observer, there are doubtless channels, at present unknown to mankind, through which many species of birds—the destination of which is not at present known—find their way to their natural haunts. Such birds as the cuckoo, bird of paradise, &c., have in all ages been of remarkable interest to those who devote their lives to "find out God in the natural world."

The destination of migratory birds has always been a

subject of much interest to naturalists, and with a view to obtaining definite information upon the subject a large number of these birds were captured some two years ago by naturalists in Prussia, and a light metal ring, bearing a number and the date, was fastened to one foot of the bird, which was then set at liberty.

One of these birds—a lake fowl, bearing the date of July 26, 1907—was shot in El Bahira, Tunis, and a stork, dated July 5, 1907, was killed at Fort Jameson, Rhodesia, far beyond the Equator. It has long been known that the house stork winters in great numbers in Egypt, and that they have often been seen in Central Africa and German East Africa ; and it is no new discovery that they should fly so far as from North Germany to South Africa.

Another authority says :—

"In the feathered world migration plays a most important part in the life of each little songster of wood and field. We know the why and the wherefore of the autumn or southern flight ; it is entirely a matter of food supply. As for the northern or spring flight we can assume no logical reason. Why the birds should desert a land of plenty and attempt a journey often thousands of miles in extent, often reaching their summer homes before the snow and ice of winter have released their hold on earth and tree, is at present a mystery, and perhaps ever will be."

The query as to the causes of the northern or spring exodus has prompted me to make an effort to explain, at least in some measure, those laws which govern migrations, not only of birds, but of certain of our mammals as well. It is a subject of which, so far as I am informed, but very little of an explanatory character has been written. Anything which may here be advanced shall be of a tentative nature. The basis of my explanations will be the recent theory of Dr. Marsden Manson, as stated in his "Evolution of Climates."

This theory has been accepted by many of the advanced scientists of to-day throughout the world. Professor Schaberle, formerly of the University of Michigan, has recently announced that Dr. Manson's theory may be

considered as proven. Furthermore, the work of the United States Astro-Physical Observatory, as may be seen in the recently issued report, is favourable to the same conclusion as that reached by Prof. Schaberle.

This is not the place to state even briefly the principles of Dr. Manson's theory. I may say, however, that it makes clear and logical the various climates which have ruled upon the surface of this globe since life began, and that it has made adherents in the ranks of science from its announcement. Physicists, geologists, and astronomers, these have accepted the theory because of that unity and simplicity which distinguishes it from the many complicated and laboured dissertations on the subject which crowd our book-shelves. I shall not say that its acceptance has been universal. That could not be. There are two many who "do not wish to be disturbed" even in the ranks of science to permit such a result. The majority, however, of those who approach the subject in a fair, unprejudiced manner are accepting Dr. Manson's conclusions.

Almost without exception, however, scientists are agreed that previous to the period termed the glacial or ice age, climates were non-zonal—that is, that they were of the same general temperature everywhere from pole to pole. First, that there was an epoch of torrid heat followed by one of tropical heat and succeeded by one of temperate heat, which gradually passed into one of excessive cold, during which period the higher lands were snow-covered. From these regions descended those immense glaciers, many reaching the sea level. Since this ice age climates have become zonal—a condition which seems to us most natural, because man remembers naught to the contrary.

The geological record shows us, however, that everywhere from pole to pole the same life existed during all the periods before the latter part of the temperate tertiary epoch. This implies that the ranges of all the various species were then vastly wider. Fossil sequoias and poplars found in the Arctic complete families mostly found on the Pacific coast.

Aside from these differences of temperature resulting from elevation ("land masses were thrust up above the then existing snow line, such snow line being independent of latitude"), there were, in the nature of things, few reasons for migrations of either fauna or flora. The first wanderings would have been due to these causes, and were undoubtedly as limited as these causes.

When finally the gradual transition from earth-heat control to sun-heat control had taken place, and the ice age began, these wanderings to and fro become systematic and periodical. The stronger and more active individuals pushed further on than their fellows, or they climbed up further on the mountain sides, thereby forming a class apart. They mated and founded new varieties. This process of natural selection continued for many thousands of years. The fur-bearing animals were in time produced, and as their protective coverings increased in warmth these extended their search for such conditions of temperature or of food supply as their well-being demanded.

So here we have in its earliest and simplest form the origin of the migratory movements of animals which have developed to such an extent in this day under the present zonal distribution of climates. Birds and beasts travel thousands of hundreds of miles at the oncoming of spring or fall.

During all the latter part of the long tertiary period the process of mountain building or subsidence was changing the face of Nature. The fauna which had previously enjoyed so wide a range of equable temperature and a general food supply discovered that those ranges had been restricted in certain directions, while perhaps they had become more extended in others. The land bridges which had previously given them passage had sunk beneath the encroaching waters. Mountain ranges had reared their heads into the clouds and were snow-covered, forming impassable barriers in the paths of certain species. The true migration began to take form, keeping pace with the constantly changing climatic conditions, and in general terms they may be said to have begun with the ice age.

The direct burning rays of the sun near the Equator were

the whips which drove onward to a more temperate region both birds and beasts. The increase of cold and the curtailment of their food supply drove them back again. The sheep and goat families accomplished their migrations in altitude and became specialised, remaining there to-day. Certain of the largest birds followed their example. Others of the feathered tribe, needing no land bridges, scorning even the mountain barriers, "took to themselves the wings of the morning and fled to the uttermost parts of the earth."

Food supply was not the only cause for these flights, but comfort and well-being, and after the passing of ages the newly acquired habit of life. They were unconsciously striving for the continuance of the former level temperature condition which had been, during millions on millions of generations, the whole life history of their species. Many varieties, however, failed to pass this extreme test of their powers.

When the ice age reached its maximum of cold and the glacier front had crept far down the Mississippi valley, when the tops of the Rocky Mountains and the Mexican and Central American Cordilleras were capped with snow and ice, glaciers streaming far down their sides towards the sea, several species found their retreat cut off either by sea or ice. It is my belief that at this time and for this cause our American horses and camels and elephants perished. Their remains are found in vast beds in the warmest parts of the United States, bordering on the Gulf of Mexico. They had reached an impassable barrier, and not being fitted (specialised) they inevitably perished. A different geographical formation in Asia enabled the same creatures to make good their escape to warmer regions.

As there was a minimum and there will be a maximum to the ice age, so there has been a minimum and there will be a maximum to migrations. The ice fronts of the polar regions must be the limits of the feathered tribes. Mammalian life will find its migratory limit far short of those points.

In common with other species there is little doubt that earliest man himself was of a migratory habit. The

human family was put to the same test as others, and came out of it triumphant. The obstacles which he was forced to cope with resulted in his great mental development that placed him far in the van in this struggle for existence. He invented clothing, made better dwellings, discovered the uses of fire, and became a domesticator of the wild animals, or, taking lessons from some others, stored away food for the inclement season. Thus the most improved race abandoned migration, and a great advance on civilisation was accomplished.

In answer to Mr. Gregor's question as to the "logical reason" of the spring migration, I conclude that this characteristic of certain species dates from the pleistocene era of the tertiary period and has two causes—food supply and comfort.

Of the first category the examples are numerous and present in everybody's mind. As to the second, a forcible case would be that of the caribou of Newfoundland, which seeks a temperature more suitable to their heavy body, covering three hundred miles to the north of their winter home, the most northerly point, in fact, which it is in their power to reach, further progress being cut off by the straits of Belle Isle. Here they pass the summer months in comparative comfort. There is no lack of provender in the southern land which they abandoned. The barrens are covered with the white moss which forms their principal nourishment, but the heat of their thick matted hair becomes too oppressive to be borne.

We know now however that many caribou reside permanently in the South, and do not migrate northwards (see selons and millars).

This is undoubtedly also the case with our geese and ducks and of all those varieties which greet us in the spring and fall in this half-way house of their passage.

We thus may reach the conclusion that, beginning with the first modifications of climate, perhaps at the commencement of the pleistocene era, the various forms of life being suited to a uniform environment, sought in their wanderings to and fro, the continuance of those conditions.

These movements becoming more necessary as the climatic changes became more marked, regular migratory passages became systematised and further extended as the requirements have demanded.

THE AUTUMN MIGRANTS.

PROFESSOR J. A. Thomson, who in his recently-published book, "The Biology of the Seasons," has collected a number of data and calculations which have been made as to the questions of flight and pace, devotes several very interesting pages of his book to enlarging on the theory that the mainspring of the phenomenon of bird migration belongs to the Ice Age. If (adds the Spectator) we may accept the principle of a migratory instinct, he asks, what are the conditions which led to the establishment of this instinct? He imagines a gradual change of conditions of climate which in turn evoked a changed type of bird.

There was a time when Greenland and other northern countries had as mild a climate as Penzance. Gradually the climate of the whole northern hemisphere changed: the snow-line came lower on the mountains, great glaciers formed, and birds moved further and further south after food. After a time it became impossible to breed in the accustomed places; and so there arose a new and revolutionary type of bird to meet these changed conditions, a bird "who would not take hard times lying down, who was sensitive, alert, restless, unconventional, adventurous, and original, who was a genius, in short a Columbus-bird." And the less alert, less adventurous birds who would not journey forth with the Columbus-birds were in process of time eliminated. All the birds who survived had a strong sense of direction and of the necessity of changing ground, and this sense of direction became confirmed into an abiding migratory instinct.

Then, in a later age, when the Ice Zone had retreated again, and the northern hemisphere had become once more habitable, there came back to these adventurous birds, with their strong sense of direction, "an organic reminiscence of the original headquarters before the Ice Age." And so, Professor Thomson argues, the northern migration became an established habit in spring, and the

southern migration equally firmly established on the approach of winter. The simplicity of this theory becomes the more attractive by being stated as if the process it suggests could happen in a short space of time; but of course, like all evolutionary processes, it must have been a change of infinite slowness.

THE POWER OF FLIGHT POSSESSED BY BIRDS.

MOST people are familiar with the apologue of Plato, wherein a representation is given of the qualities best adapted to the modes of life of the animal creation : " To some he gave wings, to show them that their safety is in the air."

There is a great similarity between the performance of the winged tribe and the fishes in the sea, save that the bird is heavier in comparison with the air than is the fish in comparison with the water. At first sight it might be thought impossible for so huge an animal as the Ostend whale, weighing four hundred and ninety thousand pounds, to swim in the sea, considering that its body, so far as the bones and muscles are concerned, must be considerably heavier than water ; yet, by a singular contrivance, it is at once buoyed up in the sea and rendered so much lighter than water that it floats on the surface when dead. This is caused by an enormous layer of an oily substance called blubber, immediately under the skin. It is said that in this particular whale the weight of blubber was one-twelfth of the whole body, measuring four thousand gallons ; hence the extreme difficulty experienced in diving.

The contrivance for rendering birds buoyant in the air is totally different, and the celebrated Harvey is reputed to have been the happy discoverer. Air in considerable volume is introduced into the body, though it is not, as in fishes, contained in one cavity, but is distributed amongst numerous cells in various parts of the body.

The lungs, compared with those of quadrupeds, are rather small, but the air-cells with which they communicate occupy a considerable space of the chest and belly. These cells are much divided by partitions, furnished, as has been observed in large birds, with muscular fibres, supposed to be employed in sending the air back to the lungs, as is done by the diaphragm in other animals,

which is wanting in birds. This is no doubt the reason why birds appear to pant so much in breathing, a much greater portion of the body being always put in motion than in quadrupeds. Besides these air-cells there are others situated in the bones themselves, particularly the larger bones, both those which are cylindrical and those which are broad and angular. It is not a little remarkable that all these bones in birds are destitute of marrow —at least, in the middle.

"The air-bones in young birds" are described as "filled with marrow, which becomes gradually absorbed to make room for the admission of air. This gradual expansion of the air-cells and absorption of the marrow can nowhere be observed so well as in the young tame geese when killed in different periods of autumn and winter. The limits to the air-cells may be clearly seen from without by the transparency of the bony walls.

"From week to week the air-cells increase in size, till, towards the close of the season, the air-bones become transparent. Towards the close of the summer and beginning of autumn, although in external appearance the young goose resembles the parent, no trace of air-cells can be discovered in the bones, the interior of the bones being then filled with marrow. About the fifth or sixth month the marrow begins to disappear. Not only the bones but the quills of the feathers also make a part of this contrivance. These, while growing, are filled with an organised pulp, but as soon as they arrive at their full growth this pulp being absorbed renders them light, and the lightness is increased by air from the atmosphere being introduced into their cavity through a small opening at the termination of the furrow where the quill or barrel ends and the plumelets of the feather begin. The existence of these cells can be shown upon any bird by simply blowing with a little force into the windpipe, by which means the belly may be blown up to a considerable size, a circumstance which would not occur in other animals."

Some remarks by Sir Charles Bell on the subject of buoyancy are well worth reproducing. "First," he says, "it is necessary that birds, as they are buoyed in the air,

be specifically lighter ; secondly, the circumference of their thorax must be extended and the motions of their ribs limited, that the muscles of the wings may have sufficient space and firmness for their attachment. Both these objects are attained by a modification of the apparatus of breathing. The lungs are highly vascular and spongy, but they are not distended with air.

"The weight of the body being a necessary concomitant of muscular strength, we see why birds, by reason of their lightness, as well as by the conformation of their skeleton, walk badly. And, on the other hand, in observing how the lightness is adapted for flight, it is remarkable how small an addition to their body will prevent them rising on the wing.

"It is interesting to notice the relations of great functions in the animal economy. Birds are oviparous, because they never could have risen on the wing had they been viviparous. If the full stomach of a carnivorous bird retard its flight, we perceive that it could not have carried its young. The light body, the quill feathers, the bill, and the laying of eggs are all necessarily connected.

"As everyone must have observed, the breastbone of birds extends the whole length of the body, and, owing to this extension, a lesser degree of motion suffices for respiration; so that a greater surface, necessary for the lodgment and attachment of the muscles of the wings, is obtained, whilst that surface is less disturbed by the action of breathing, and is more steady. The vertebræ of the back being fixed in birds, and the pelvis reaching high, there is no motion in the body ; indeed, if there were it would be interrupted by the sternum. We cannot but admire, therefore, the composition of the neck and head, and how the extension of the vertebræ and the length and pliability of the neck, whilst they given to the bill the office of a hand, become a substitution for the loss of motion in the body, by balancing the whole, as in standing, running or flying. Is it not curious to observe how the whole skeleton is adapted to this one object, the power of the wings ? "

If it be true that birds, when migrating, require a wind that blows against them, it implies an extraordinary power as well as continuance of muscular exertion. We see how Nature completes her work when the intention is that the animal shall rise buoyant and powerful in the air. The whole texture of the frame is altered and made light, in a manner consistent with strength. We see also how the mechanism of the anterior extremity is changed, and the muscles of the trunk altered directly. In the ingenious attempts which have been made to devise wings to enable men to fly in the air, it has rarely been taken into account that the muscles of the most powerful arm are proportionately slender and weak when compared with the wing muscles of birds.

Even if artificial wings sufficiently efficient could be contrived, the arms would be too feeble to wield them, considering also that there are no air-cells distributed through the human body as in birds to diminish its specific gravity by inflation. It may prove interesting to many of my readers to give a few details respecting these muscles of flight in birds, and we cannot follow a better guide than the late M. Chabrier, who made the flight both of birds and insects his particular study for nearly half a century, and published the result of his earlier observations in a considerable volume.

"If each muscle of flight," says he, "were to contract individually and independently of the rest, it would only put in motion the most movable parts of the body with which it is specially connected; there would be no reaction. This assertion is true in all respects, as, for example, in the depression of the wings during flight, the resistance or the contraction of the middle pectorals and their congeners is absolutely necessary, since without it the wings would fall by their own weight, and the action of the great pectorals would be useless. Besides, in the depression of the wings, the fixed point of the middle pectorals, where the respective tendons attach themselves to the humerus, being removed, the sudden contraction of these pectorals must necessarily facilitate the ascension of the trunk until the humerus is stopped by the cessation of action in

the great pectorals. It may easily be conceived why the projecting muscles of the trunk and the depression of the wings are stronger than the elevators; it is because the former cause the trunk to start, and by this means depress the wings, notwithstanding the resistance of the latter. These, being unable to prevent the humerus from descending, become fixed there, and draw up the trunk, thus assisting the action of the great pectorals, and also participating in projecting the trunk both forwards and above.

"Thus, that the bird may raise and direct itself in the air, all the muscles must contract themselves in the following manner:—The clavicle and the omoplate being fixed by the trapezium, the rhomboid, the upper part of the great dorsal, the costo-scapular, and the short clavicular, and the wing being partly unfolded, brought forward, and raised by the action of the middle pectoral of the internal sub-clavian, the elevators of the humerus, of the coraco-brachial and of the extensors of the anterior membrane of the wing, the bird springs into the air, completely expanding its wings. At the same time, the great pectorals, the primary agents of the wings, of which the point is fixed in the humerus by the insertion of their respective tendons, contract suddenly, and, in consequence of the resistance which the air opposes to the movement of the wings, carry all their power to the sternum. By this intervention they cause the trunk to rise, and the wings, whose immediate depression is resisted by the atmospheric air, as we have just said, are nevertheless depressed by these indirect means.

"While all this is performed with extreme quickness, several muscles of the wings, besides, among others, the extensors of the tail, strive to extend the wing; but, as the resistance of the air on the extremities of the plumage is very great, and this fluid opposing all rapid movement on their part, these muscles then direct their power against the sides of the trunk. Taking, then, their position on the bone of the wing on the external side of the wing, and acting by their upper extremity, they extend the main wing-bone over the fore wing-bone, and, as this action

and that of the great pectorals occur at the same instant and in concert on each side of the trunk, the latter is forced up in a middle direction.

"Thus the combination of these various efforts impart to the trunk a force of projecting forward and ascending, by which it is propelled with the wings. This projection is evidently similar to the leap of other animals. The great pectorals then relax, and the wings immediately reascend, partly by the reaction of the air on their lower surface and the descent of trunk, and partly by the action of the middle pectorals and their congeners, whose contraction, so to speak, continues during the flight.

"After having darted forward, the bird remains for an instant unsupported by the air; this fluid then, by its reaction, repels and tends to raise it still higher than the leap alone could have done, and afterwards prevents it again falling as low as the point of departure. The ascension of the trunk is doubtless favoured by the internal air, which insinuates itself into every part of the animal, and which the latter has the faculty of retaining. The air, which is perhaps a light gas, being dilated and rarified by great heat, not only is its specific gravity probably diminished, but it must also contribute to diminish that of the air by inflating it and supplying all vacancies during the flight.

"If the bird which descends precipitately fears to hurt itself on approaching the earth, it opens its wings, and its tail, and takes several little leaps, which, diminishing the rapidity of the descent, permit it to alight gently on the earth. It is by the assistance of the tail that certain birds are enabled to descend with precipitation from a great height. By spreading the tail and closing the wings they cause the action of the air to predominate on the hind part of the body, which directs the forepart downwards and leaves it entirely to the influence of gravitation. The tail may strengthen the action of the wing by moving towards the same side."

Though it is obvious that birds could not fly without wings, yet the peculiar mechanism of the process is not, as it were, generally understood. It is no uncommon

thing to see a goose, while walking on a common, spread out its wings to their full extent, and begin to flap them about with great violence, and yet the bird is not thereby moved an inch from the ground—a circumstance that, without inquiry into the cause, seems contrary to what might have been anticipated.

By observing the difference between this ground-flying —if I may call it so—of the goose and the actual rising of a pheasant, for example, into the air, one may arrive at the reason why the goose does not, while the pheasant does, ascend. The goose, it may be remarked, keeps her wings spread both in the upward and downward motion, and, consequently, the resistance of the air in the first case will press her body downwards rather than upwards; while, as her evident intention is not to rise above the ground, she forcibly expels the air from her air-cells, as may be inferred from the screaming always uttered on those occasions, and caused, one has reason to believe, by the forcible expulsion of the air. Her body is thus rendered specifically heavier, and, consequently, resists the upward impulse given by the downward motion of the wings. The pheasant, on the other hand, instead of expelling the air, takes a deep inspiration, increasing the size of the body as much as possible, inflating at the same time the wing feathers and bulging them outwards without separating their tips from the sides. While taking deep inspirations he may be observed also several times rising on tiptoe and puffing out and balancing his body, to feel whether he has thrown enough air into the bones and feathers to float him along. He then crouches back in order to give additional force to his spring, and forthwith leaps up into the air, at the same time rapidly raising his wings from the sides, but keeping the individual feathers close together, like a folded fan, which he takes care not to open till he begins to bring them down. For this purpose he spreads them out to their utmost extent, and then, striking the air with all his force, its resistance pushes him upwards, and he bounds aloft towards his tree-perch, or wherever else he wishes to go.

The same series of motions—first raising the folded

wings and then forcibly bringing down the spread wings —must be incessantly repeated during the flight of every bird, in the same manner as a swimmer, by pressing the water downwards with his spread hands, keeps himself afloat, and by directing the motion obliquely backwards is thereby pushed forward. It may also be remarked that the swimmer raises his hands before renewing the stroke with the fingers closed, slanting, in a similar way to the bird raising its folded wings, so as to diminish the surface opposed to the resisting medium.

When birds fly horizontally, their motion is not in a straight line, but obliquely upwards, and they allow the body to come down to a lower level before a second stroke is made by the wings, so that they move in a succession of curves. To ascend obliquely, the wings must repeat their strokes upon the air in quick succession, and in descending obliquely these actions are proportionally slower.

In birds of prey the form of the wings is very oblique, so that they cannot rise in the air perpendicularly unless they fly against the wind. They have, however, a greater power of horizontal motion than other birds, because the extreme parts of the wings are long, and the ends of the feathers lap over each other, which opposes a uniform resistance to the air, while in other birds the air passes through between the feathers, which lessens the power of keeping the wing oblique. To enable themselves to turn to the right or left, they move one wing more rapidly than the other. This is attended with difficulty when the flight is rapid ; they therefore make a large sweep before they can turn round.

WONDERFUL TRAVELLING.

The most wonderful bird flight noted is the migratory achievement of the Virginia plover, which leaves its haunts in North America, and, taking a course down the Atlantic, usually from four to five hundred miles east of the Bermudes, reaches the coast of Brazil in one unbroken flight of fifteen hours, covering a distance of over three thousand miles at the rate of four miles a minute.

How Sea Birds Drink.

Sea-birds sometimes spend weeks at sea, and are believed to quench their thirst partly from the falling rains and partly from the fat and oil which they devour ravenously when opportunity puts them in their way. The keen eyesight of birds is well known, and sea-birds have been observed flocking from all points of the compass towards the stormcloud about to burst, and apparently drinking the water as it descends from the skies.

COMPARATIVE ENERGY IN BIRDS.

THE members of the feathered tribe, especially small birds, appear to be the most restless of all animals—a circumstance which might lead one to conclude that animals are restless in proportion to their diminutive size, were this not in opposition to many other facts.

The bee, for example, is equally noted for industry and bustling activity with the ant, which is not one-fourth of its size; nay, the *Large Wood Ant* (*Formica rufa*) is greatly more active than the very small *Black Ant* (*Ponera contracta*).

The Gnat (*Culex*) again, a comparatively small insect, seems to repose during the greater part of its existence, remaining fixed in one spot for whole days together, and only moving about for an hour or two in the evening; while there may be observed on the same wall a still smaller insect (*Neiedes elegans*), seldom moving quicker than the minute-hand of a clock, the motion of which, by interrupted jerks, much resembles that of the insect.

There cannot, however, be a doubt that the wren and the tom-tit are more active and restless than the bustard, the ostrich, or even than the eagle; and the activity, moreover, of such small birds is not, like that of the gnat, confined to an hour or two, but continues almost uninterruptedly during sunlight, sleep being, it would appear, less necessary than it is to larger animals to restore vigour after exertions so long continued.

Motion of some kind indeed seems as indispensable to life as food and air; and even the motions of animals, which may be primarily accounted for by referring to their exertions to procure subsistence, and shelter, and the like, must always, in a secondary point of view, give them beneficial exercise.

FACULTIES OF VISION IN BIRDS.

THE great power of flight possessed by birds is seconded by as great a power of vision, which enables them, as they travel at so swift a rate, to inspect the country below, discover their food with facility, and thus attain the object for which their journey has been undertaken.

This has been abundantly proved to be the case, for the winged species have been observed, when passing over a sterile part of the country, or one scantily furnished with food suited to them, to keep high in the air, flying with an extended front, so as to enable them to survey hundreds of acres at once. On the contrary, when the land is richly covered with food, or the trees are abundantly hung with mast, they fly low, in order to discover the part most plentifully supplied. Their body is of an elongated oval form, steered by a long, well-plumed tail, and propelled by well-set wings, the muscles of which are very large and powerful for the size of the bird.

As soon as the pigeons, for example, discover a sufficiency of food to entice them to alight, they fly round in circles, reviewing the country below. During their evolutions on such occasions, the dense mass which they form exhibits a beautiful appearance as it changes its direction, now displaying a glistening sheet of azure, when the backs of the birds come simultaneously into view, and anon suddenly presenting a mass of rich deep purple. They then pass lower over the woods, and for a moment are lost among the foliage, but again emerge and are seen gliding aloft.

The return of the carrier pigeon from such distances to its home is, one thinks, most plausibly accounted for by its mode of flying in circles; but that there may be some other manner in which it is directed is not improbable from what takes place among quadrupeds.

Instances, for example, are not uncommon of cats having returned of their own accord to the place from

which they have been carried, though at the distance of many miles, and even across rivers, where they could not possibly have had any knowledge either of the road or of the direction that would lead them to it. "The nature of the beast" is to love the place of her breeding; neither will she tarry in any strange place, although carried far, being never willing to forsake the house for the love of any man, and most contrary to the nature of a dog, who will travel abroad with his master; but, although their masters forsake their houses, yet will not these beasts (cats) bear them company, and, being carried forth in close baskets or sacks, they will return again. A cat has been known to travel from London to Chatham, in Kent, a distance of thirty miles, and most persons can relate similar incidents. But then dogs do the same.

A mastiff, which a gentleman had brought up in India from two months old, accompanied him and a friend from Pondicherry to Bangalore, a distance of more than three hundred leagues. "Our journey," he goes on to relate, "occupied nearly three weeks, and we had to traverse numerous plains and mountains, and to ford rivers and go along several by-paths. The animal, which had certainly never been in that country before, lost us at the extreme end of our journey, and immediately returned to Pondicherry. He went directly to the house of a friend with whom I had formerly lived. Now, the difficulty is not so much to know how the dog subsisted on the road (for he was very strong and well able to procure for himself food), but how he could so well have found his way after an interval of more than a month."

A still more extraordinary instance of returning is recorded on the authority of the late Lieutenant Alderson, of the Royal Engineers, who was personally acquainted with the facts. An ass, the property of Captain Dundas, R.N., then at Malta, was shipped on board the "Ister" frigate (Captain Forrest), bound from Gibraltar for that island. The vessel having struck on some sands off the Point de Gat, at some distance from the shore, the ass was thrown overboard to give it a chance of swimming to land—a poor one, for the sea was running so high that a

boat which left the ship was lost. A few days afterwards, however, when the gates of Gibraltar were opened in the morning, the ass presented itself for admittance and proceeded to the stable of Mr. Weeks, a merchant, which he had formerly occupied, to the no small surprise of this gentleman, who imagined that, from some accident, the animal had never been shipped on board the "Ister."

On the return of the vessel to repair, the mystery was explained, and it turned out that "Valiante" (sc the ass was called) had not only swam safely to shore, but, without guide, compass, or travelling map, had found his way from Point de Gat to Gibraltar, a distance of more than two hundred miles, through a mountainous and intricate country, intersected by streams, which he had never traversed before, and in so short a period that he could not have made one false turn. His not having been stopped on the road was attributed to the circumstance of his having been formerly used to whip criminals upon, which was indicated to the peasants (who have a superstitious horror of such asses) by the holes in his ears, to which the persons flogged were tied.

It would appear, from an observation of Professor Lichenstein, that birds which feed on carrion may probably resort to making circular flights, similar to the pigeon, in order to discover a carcase. He remarked, when travelling in South Africa, that if an animal chanced to died in the very midst of the most desert wilderness in less than half an hour there was seen high in the zenith a number of minute objects descending in spiral circles, and increasing in visible magnitude at every revolution. These were soon discovered to be a flight of vultures, which must have observed from a height, viewless to the human eye, the dropping of the animal immediately marked out for prey.

An old writer, Dr. James Johnson, mentions a fact illustrative of the same view. During the north-east monsoon, when the wind blew steadily in one point for months in succession, he observed a concourse of birds of prey from every point of the horizon hastening to a corpse that was floating down the River Ganges, and he

accounted for their thus congregating and appearing suddenly from immense distances to their soaring high in the air for the purpose of looking out for food.

It is said in St. Matthew, as the received translation gives it, that, "where the carcase is, there will the eagles be gathered together," and in Job it is said "Where the slain is, there is she." Now, it is well known that the eagle does not feed on carrion, and it has been proved by experiment that it will not touch it unless pressed by hunger (Selby). Yet Professor Paxton contends with St. Jerome that the eagle is certainly meant in the text, and quotes, after Bochart, the Arabian historian, Damir, who asserts that the eagle can discover a carcase at a distance of four hundred parasangs, with this singularity, that if he finds parts of it have been previously eaten by the osprey he will not touch the leavings of his inferior. This circumstance makes rather against Dr. Paxton's opinion, supposing the authority Damir to be good. In consequence of this apparent discrepancy between facts and the text, St. Chrysostom proposed to read "vultures" for "eagles" in the passages both in Matthew and Job (Chrysos. Hom., xlix.). Aldrovand, it would appear, has given the only judicious solution of the difficulty by referring to a very common Oriental species (*Gypactus barbatus, Storr*), which was remarked by Aristotle to be similar in form to the eagle, but had more the habits of the vulture.

Besides the nictitating membrane in the eye of birds, which is not altogether peculiar to them, there is another singular part of the organ whose use has not hitherto been clearly ascertained. It is called by the French Academicians the *Purse* (*Marsupium*) and the *Comb* (*Pecten plicatum*). It arises in the back of the eye, and, proceeding apparently through a slit in the retina, it passes obliquely into the vitreous humour, where it terminates, reaching in some species to the capsule of the lens. Numerous blood-vessels run in the folds of the membranes which compose it, and the black pigment by which it is covered suggests the idea that it is chiefly destined to absorb the rays of light when they are too strong or

dazzling. If this be the fact, it may serve the eagle in good stead when gazing, if he ever does so, on the sun.

It is the manifest opinion of others that it serves to assist in producing the internal changes of the eye ; but this has been opposed by Crampton, who has shown that the changes in question—at least in the ostrich and several large birds, are produced bya peculiar circular muscle in the eyeball. Buffon is of opinion that, on account of this expansion of the optic nerve, birds must have a vastly more perfect sight than other animals, embracing also a much wider range. Hence it is that a sparrow-hawk, while he hovers in the air, espies a lark sitting on a clod, though at twenty times the distance at which it could be perceived by a man or dog.

The kite, which soars to so amazing a height as totally to vanish from our sight, can yet distinguish small lizards, field-mice, and birds, and from this lofty station he selects his prey. This prodigious extent of vision is, moreover, conjoined with equal accuracy and clearness, inasmuch as the eye can dilate and contract, can be shaded or uncovered, depressed or protruded, readily assuming the precise condition adapted to the distance of an object and the quantity of light.

Had they, indeed, been formed with eyes like the mole, incapable of seeing more than a few inches' distance, they would have been in constant danger of dashing against every intervening obstacle. "Indeed," remarks the same writer, "we may consider the celerity with which an animal moves as a just indication of the perfection of its vision. A bird, for instance, that shoots swiftly through the air must undoubtedly see better than one which slowly describes a tortuous tract. Among quadrupeds, again, the sloths have a very limited sight."

It may accordingly be inferred that birds have more precise ideas than slow-moving caterpillars of motion and its accompanying circumstances, such as those of relative velocity, extent of country, the proportional height of eminences, and the various inequalities of hill and dale, mountain and valley.

Our birds'-eye views, of which the accurate execution is so tedious and difficult, give but a very imperfect picture of the relative inequality of the surfaces which they represent, but birds can choose the proper stations, can successively traverse a field in all directions, and with one glance comprehend the whole. On the other hand, the quadruped knows only the spot where it feeds—its valley, its mountain, or its plain; but it has no conception of expanse or surface—no idea of immense distances, and no desire to push forward its excursions.

The eye of birds, it is worthy of remark, besides being peculiar in structure, is also greatly larger than in most other animals in proportion to the bulk of the head. According to a very distinguished writer, the ball of the eye in a female eagle was, at its greatest width, an inch and a half in diameter; that of the male was three times less; that of an ibis, six times; of a stork, four times larger. That of a cassowary was four times larger than its cornea, being an inch and a half in diameter, while the cornea was only three lines. The woodcock has very large, prominent eyes, but it cannot support a strong light, and sees best during twilight; and as Colonel Montagu remarks, its eyes seem to be peculiarly calculated for collecting the faint rays of light in the darkened vales and sequestered woodlands during nocturnal excursions, thus enabling it to avoid trees aud other obstacles. It is probable, indeed, that the proverbial stupidity of the bird arises from this weakness of sight. Like the owl, indeed, its motions are much more agile and lively at nightfall and dawn than at any other time; and so strong is this propensity to action at the rise or descent of the sun that woodcock when kept in a room are observed to flutter about regularly every morning and evening, while during the day they only trip on the floor without attempting to fly.

The stone-curlew differs from the last-named particularly in this, that, though its eyes are similarly prominent, its sight is very acute in the daytime. The prominence of its eyes enables it to see behind as well as before, and it is with difficulty, therefore, that it can be approached.

With respect to owls, as well as night-prowling animals, the eye is unquestionably very sensitive.

Of the barred owl an experienced naturalist remarks, "Its power of sight during the day seems to be rather of an equivocal character, as I once saw one alight on the back of a cow, which it left so suddenly afterwards, when the cow moved, as to prove to me that it had mistaken the object on which it had perched for something else. At other times I have observed that the approach of the grey squirrel intimidated them, if one of these animals accidentally jumped on a branch close to them, although the owl destroys a number of them during twilight."

Wilson says of the snowy owl that "the conformation of the eye forms a curious and interesting subject to the young anatomist. The globe of the eye is immoveably fixed in its socket by a strong, elastic, hard, cartilaginous case, in the form of a truncated cone. This case, being closely covered with a skin, appears at first to be of one continued piece, but on removing the exterior membrane it is found to be formed of no less than fifteen pieces, placed like the staves of a cask, overlapping a little at the base or narrow end, and seem as if capable of being enlarged or contracted, perhaps by the muscular membrane in which they are encased."

In nocturnal birds—it has been remarked by several writers—the eye, besides being comparatively very large, is flat (comprime) both before and behind, while the transparent cornea is placed at the end of a sort of tube formed by the bony portion of the sclerotic. The retina is consequently comparatively very large and extended, and the iris also; while the membranes, being probably more soft and delicate, are more susceptible of impressions from a small quantity of light. The nictitating membrane is also very large, and the upper eyelid, unlike other birds', is moveable.

I have adverted to the method of catching larks by means of a looking-glass, referring to the remarkable curiosity of birds as the probable cause of their being attracted to the bright glass. Whether it is on a similar principle that ravens, jays, and magpies (*corvidæ*), are

fond of bright objects we have no means of deciding. In accordance with this view, a writer on natural history says: "A looking-glass is a matter of great wonder to magpies. We once saw one placed on the ground where two were hopping about. One of them came up to it, stared at it in apparent wonder, hopped off to the other, and then both returned and spent at least ten minutes in nodding, chattering, and hopping about the glass."

Colonel Montagu tells us he was "assured by a gentleman of veracity that his butler, having missed a great many silver spoons and other articles without being able to detect the thief for some time, at last observed a tame raven with one in his mouth and watched him to his hiding-place where he found more than a dozen."

A similar story is told by a lady of a raven kept a few years ago at Newhaven, in Sussex—at an inn on the road between Buxton and Ashbourne. This bird had been taught to call the poultry when they fed, and could do it very well too. One day the table had been set out for the coach passengers; the cloth was laid with the knives, and forks, spoons, mats, and bread, and in that state was left some time, the room door being shut but the window open. The raven had watched the operation very quietly, and, we may suppose, felt a strong ambition to do the like. When the coach was about arriving, and the dinner carried in, behold, the whole paraphernalia of the dinner-table had vanished! It was a moment of consternation—silver spoons, knives, forks, all gone. But what was the surprise and amusement to see, through the open window, upon a heap of rubbish in the yard, the whole array carefully set out, and the raven performing the honours of the table to a numerous party of poultry which he had summoned about him, and was very consequentially regaling with bread.

M. Antoine tells us that there is an annual mass, called the Magpie Mass, said in the Church of St. John at Greve, which arose from the following circumstance. A magpie, indulging its propensity to carry off and conceal glittering objects, took a fancy to make free with the church plate, and in consequence thereof a maid-servant

was accused of the theft and delivered over to the hands of justice. The accused, according to the barbarous custom of that period, was put to the torture, and, a confession of the crime being thus extorted, the poor girl was condemned to die. Six months after the lost plate was discovered behind a mass of tiles on an old house, where a tame magpie had concealed them and continued to add to the hoard. The mass was founded on account of the innocent girl who had fallen a victim to an execrable law. This story was no doubt the origin of the well-known melodrama, "The Maid and the Magpie."

A famous naturalist author mentions that he once saw "taken out of a magpie's nest a crooked sixpence, of which some village fair one had haply been despoiled, a tailor's thimble, two metal buttons, a small plated buckle, and three or four bits of broken crockery." At the same time he exculpates the *Jackdaw* (*Corvus monedula*), for want of proof, of a similar charge made against him.

"At country churches," he says, "where it frequents the steeple, a situation to which it is very partial, we have heard it accused of a very profane theft. At those places in the North a collection is made in a salver outside the door, and if a sixpence or a shilling finds its way among the copper donations, the jackdaw is accused of pouncing down and purloining it; but there is no proof against it."

"The *Divers* (*Colymbi*) of Louisiana," says M. Dupratz, "when they see the fire of the touch-pan, dive so nimbly that the lead cannot hit them, for which reason they are called lead-eaters."

Observers repeatedly see the same quickness of eye exemplified in the *Cormorant* (*Carbo cormoranus*) of our own seas; for, though approached with the greatest caution, and when the bird has not manifested any fear, but was skimming about on the water, the instant the powder flashed in the pan it would dive down and escape the danger.

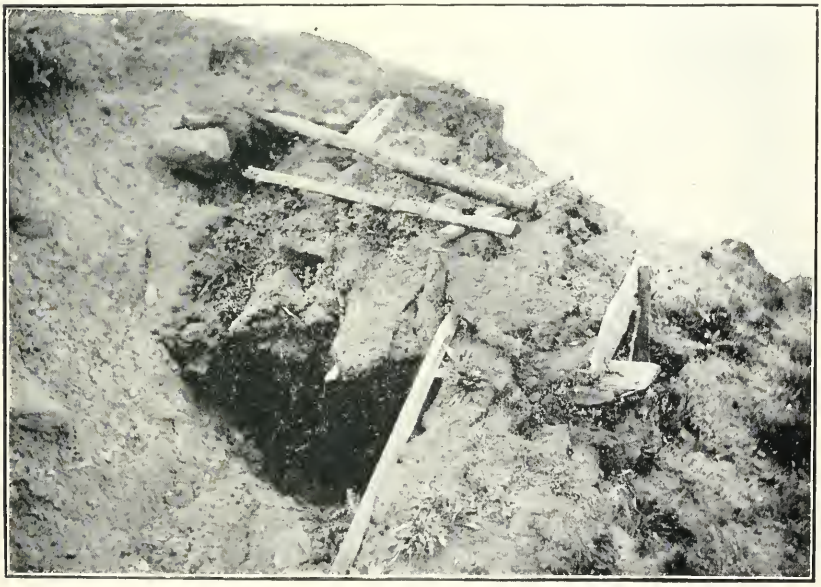
It may be worth mentioning that animals born with perfect eyes can use them the instant they enter the world. Sir James Hall, when making experiments on hatching, observed a chicken in the act of breaking through the shell,

and, just as it got out, a spider began to run along the box, when the chicken darted forward, seized and swallowed it as adroitly as if it had been instructed by its mother.

PECULIARITY OF BIRD VISION.

It has been slowly brought to our understanding that the world is not the same to all creatures, and probably, says *Science Siftings*, no experiments have tended more to make this clear than those by Professor Karl Hesz, of Wuerzburg, on the colour-sense of chickens, pigeons, owls, and kestrels. Men with hungry chickens and pigeons were first kept an hour in a bright room to become accustomed to the light. The floor was then spread with a smooth black cloth, evenly covered with grains of wheat, a strong spectrum was thrown on it from the ceiling, and the hungry animals were turned loose. They picked the wheat first from the bright red, then the ultra-red, next the yellow, and finally the green. They touched nothing in the blue and violet, because they saw nothing ; but, on the other hand, they saw the grains in the ultra-red that were invisible to the men. This proved that for chickens and pigeons the spectrum is shortened at the violet end of short-wave length and extended at the red end of long-wave length. This is the effect one might expect from wearing orange-coloured glasses, and Hesz demonstrated that fowls see through such spectacles in the form of yellow and orange oil-globules embedded in the light-sensitive layer. To kestrels and bussards the brightest zone was the green instead of the red, the blue being visible. To owls the colours were as men see them.

A GROUP OF CLIFF CLIMBERS



A CLIFF CLIMBER'S SHELTER.

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BIRD CHARACTERISTIC ARCHITECTURALLY.

THE *Stormy Petrel*, also called the Storm-swallow by the Dutch, whose great power of wing enables it to sweep over the ocean at every distance from land, and even to weather the most tempestuous winds, has a great peculiarity. With its webbed feet and light form it can actually walk upon the billows with as much ease as a sparrow can hop along a garden wall.

"It is indeed an interesting sight," says Wilson, "to observe these little birds, in a gale, coursing over the waves, down the declivities, and up the ascents of the foaming surf that threatens to burst over their heads, sweeping along the hollow troughs of the sea, as in a sheltered valley, and again mounting with the rising billow, and just above its surface, occasionally dropping their feet, which, striking the water, throw them up again with additional force, sometimes leaping, with both legs parallel, on the surface of the roughest waves for several yards at a time. Meanwhile they continue coursing from side to side of the ship's wake, making excursions far and wide to the right and to the left, now a great way ahead and now shooting astern for several hundred yards, returning again to the ship as if she were all the while stationary, though perhaps running at least ten knots an hour. But the most singular peculiarity of this bird is its faculty of standing, and even running, on the surface of the water, which it performs with apparent facility. When any greasy matter is thrown overboard these birds instantly collect around it, facing to windward, with their long wings expanded and their webbed feet patting the water. The lightness of their bodies and the action of the wind on their wings enable them with ease to assume this position. In calm weather they perform the same manœuvre by keeping their wings just as much in action as to prevent their feet from sinking below the surface."

In days long past, happily, the mariner regarded this species of bird as the harbingers of all that is evil. They have been called "witches," "the Devil's birds," and "Mother Cary's chickens," probably from some celebrated ideal hag of that name; and their unexpected and numerous appearance in those days threw a momentary damp over the mind of the hardiest seaman.

When we inquire, by diligent research, into the unvarnished history of this ominous bird, we find that it is by no means peculiar in presaging storms, for many others of very different families are evidently endowed with an equally nice perception of a change in the atmosphere. Hence it is that, before rain, swallows are seen more eagerly hawking for flies, and ducks carefully trimming their feathers and tossing water over their backs to try whether it will run off again without wetting them. But it would be as absurd to accuse the swallows and ducks on that account of being the cause of rain as to impute a tempest to the spiteful malice of the poor petrels. Seamen ought rather to be thankful to them for the warning which their delicate feelings of aerial change enable them to give of an approaching hurricane.

"As well," says Wilson, "might they curse the midnight lighthouse that, starlike, guides them on their watery way, or the buoy that warns them of the sunken rocks below, as this harmless wanderer, whose manner informs them of the approach of the storm, and thereby enables them to prepare for it."

The petrels are nocturnal birds. When, therefore, they are seen flying about and feeding by day, the fact appears to indicate that they have been driven from their usual quarters by a storm; and hence, perhaps, arose the association of the bird with the tempest. The once popular opinion among sailors that the petrels carry their eggs under their wings in order to hatch them is no less unfounded than the fancy of their causing storms; it is indeed physically impossible.

They have been ascertained to breed on rocky shores, in numerous communities like the bank-swallow, making their nests in the holes and cavities of the rocks above the

sea, returning to feed their young only during the night with the superabundant oily food from their stomachs. The quantity of the oily matter is so considerable that in the Faroe Isles they use petrels for candles, with no other preparation than drawing a wick through the body ofthe birds from the mouth to the rump. While nesting they make a cluttering or croaking noise, similar to frogs, which may be heard during the whole night on the shores of the Bahamas and Bermuda Islands and on the coasts of Cuba and Florida, where they abound.

Forster says they bury themselves by thousands in holes underground, where they rear their young and lodge at night, and in New Zealand the shores resound with the noise similar to the clucking of hens or the croaking of frogs, which they send forth from their concealment.

The eggs of the petrel are surprisingly large considering the diminutive size of the bird, being as fine as those of the thrush. The female lays two eggs of a dirty or dingy-white, encircled at the larger end by a ring of fine rust-coloured freckles In many parts of the world, notably Juan Fernandez and similar Pacific islands, they occupy the rabbit burrows or scoop out similar earth channels, and in this respect they imitate the sea-parrot or puffin.

The *Puffin* (*Fratercula arctica*) is one of the best known excavators. It is remarkable for the singular form of its bill, which exactly resembles two very short blades of a knife applied one against the other by the edge, so as to form a sort of triangle, but longer than it is broad and channelled transversely with three or four little furrows near the point. From the position of the feet, also, which are thrown so far back that it stands almost upright, it has more the air of a small kangaroo than of a bird. They have this character in common with all the true diving ducks.

In the breeding season, numerous troops of them visit several places on our coast, particularly the small island of Priestholm, near Anglesey, which might well be called puffin-land, as the whole surface appears literally covered with them. Soon after their arrival in May they prepare for breeding, and it is said the male, contrary to the usual

economy of birds, undertakes the hardest part of the labour He begins by scraping up a hole in the sand not far from the shore, and, after having got to some depth, he throws himself on his back, and, with his powerful bill as a digger and his broad feet to remove the rubbish, he excavates a burrow with several windings and turnings from eight to ten feet deep He prefers, when he can find a stone, to dig under it, in order that his retreat may be more securely fortified. Whilst thus employed, the birds are so intent upon their work that they are easily caught by the hand.

This bird, like others which burrow in similar localities, is accused of dispossessing the rabbits, and even of killing and devouring their young. But it would require more authentic testimony than the majority of naturalists have met with to convince one of this alleged robbery, the only apparent evidence being that they are found burrowing along with rabbits in similar holes. We very commonly find, in the same sandbank, numerous perforations crowded into a small space, the work of various species of solitary bees, side by side and intermingled with those of *Sand-wasps* (*Sphecidæ*); but no naturalist who has accurately observed the proceedings of these insects would conclude that they were mutual robbers, merely because he observed them going in and out of contiguous holes.

In some instances it is certain that the puffin must form its own burrows.

"In one part of the island," (Akaroe), says Professor Hooker, "where there is a considerable quantity of rich loose mould, the puffins breeds in vast numbers, forming holes three feet below the surface resembling rabbit burrows, at the bottom of which they lay a single white egg, about the size of that of the lapwing, upon the bare earth. Our people dug out about twenty of these birds, which they afterwards assured me made an excellent sea-pie." If the puffin, however, is really a robber of rabbit burrows, it is too formidably armed to allow of retaliation with impunity, and few birds or beasts venture to attack it in its retreat.

The *Penguin* (*Aptenodytes patachonica*) is still more like

a kangaroo than the last named, on account of its having no quill feathers in its wings, or, rather, arms; while it is so large that it has as well as the albatross, obtained from our sailors the name of the Cape sheep. But, though its bill, which is long and narrow, seems less strong for digging than that of the puffin, it contrives to form extensive burrows in the desolate islands which it frequents. Sir Francis Drake says the French called them toads, from their creeping into holes underground; and Van Noort tells us that they make the holes themselves, as the rabbits do. They select for nestling a sandy plain or down, where they usually congregate in such numbers as everywhere to undermine the ground, so that in walking it is not unusual to sink up to the knees; but, if the penguin chances to be at home, she revenges herself upon the passenger who has destroyed her roof by fastening upon his legs and biting him severely.

Another species of these birds, called the *Cape Penguin* (*Aptenodytes demersa*), smaller than the preceding, makes its nest among brambles, scraping in the sand and forming a hole, in which it lurks so closely that in passing along it is not readily perceived, though the traveller soon receives no very friendly notice to quit the premises by the penguin biting his legs with her formidable bill. They are also known to nestle on the islets along the southern coasts of Africa; and, what is remarkable, they were observed in one instance to prefer a raised knoll, though it was half a mile from the sea.

Another bird with an architectural bent is the *Burrowing Owl* (*Strix cunicularia*), a singular bird, found in some of the warmer districts of America. This bird, too, is accused of availing itself of the labours of others with as much injustice as it appears the puffin is subjected to. Fouillee and Molina, the original describers, say that the owl found in Chili digs a hole in the ground for its nest.

"The evidence for this fact," says Hill, "is far from being satisfactory, for it does not follow that a bird which has been found in a hole underground either dug that subterranean habitation or constantly resided there."

The evidence upon the subject is certainly contra-

dictory, and can only be reconciled by considering that the observations of travellers apply to distinct species of these birds. Vieillot tells us that the owl he observed in St. Domingo digs itself a burrow two feet deep, at the bottom of which its eggs are deposited on a bed of moss, stalks of herbs, and dried roots, and that the young, when only covered with down, frequently ascend to the entrance to enjoy the warmth of the sun, but, being very fearful of danger, they quickly hide themselves in the burrow the instant they are approached. Azara, on the other hand, says that the diurnal owl, which he calls Suinda, never enters woods or perches upon trees, but exclusively haunts the open country where game abounds, making its nest and concealing itself in the holes or kennels of the armadillos, which are not very deep but well lined with hay or straw.

PECULIARITIES OF BIRDS.

THE *Herring Gull*, the old ones of this species usually being called the summer gull and the youthful members the grey gull, is usually well represented on most of our coastings. During the fishing seasons in spring and autumn, when the fish offal supplies them with an abundance of welcome fare, hundreds of them assemble near the shore ; in the early summer months by far the larger majority of these are old individuals in snow-white plumage.

At such times the scene presented to the eye of an observer is truly wonderful. They spread themselves in a motley crowd, at all heights above the sea up to two or three hundred feet ; they soar about confusedly among each other, crossing each other's paths, ascending and descending, amid frequent utterance of their loud, clear-sounding " kliau, kliau, kliau ! "

Still more beautiful is the scene when, momentarily disturbed by a boat, the whole flock rises in circling flight above the elevated sandhill or cliff, and there, in the calm, clear atmosphere, soars about on motionless expanded wings, neither lowering nor ascending, but performing revolutions in beautiful curves and circles, until the object (boat probably) having disappeared, the birds once more return to their previous occupations.

In my previous notes I have dealt with the altitude of the migration flight, and I have found that these gulls, and in fact the majority of birds, are endowed with qualities and capacities by means of which they are enabled, according to their needs, to neutralise and overcome the general and established laws of gravity, without making use of the mechanical powers of their wings, or being supported by atmospheric currents. Not only are these gulls able to soar in a calm atmosphere in a direction straight before them, or sideways, on outspread wings, but, like the buzzard, they can also, in a manner similar to theirs, soar upwards to any desired altitude.

The gulls are able to perform their soaring movements on the same plane in all phases of the weather, during the most violent storm as well as in a perfect calm, pressing forwards or athwartwise at the most diversified rates of velocity; now skimming along with the fleetness of an arrow, then merely gliding, as it were, at the slowest pace imaginable.

One is almost led to the belief that these birds must have at their command some unknown means or mechanism which prevents their sinking; for neither is the surface-area of their wings large enough, nor are these organs sufficiently concave in form, to allow of their supporting the bird after the manner of a parachute.

It has been conjectured that this upward soaring flight of birds is accomplished by vibratory movements of the separate feathers. But this theory has been seriously discounted by observations carried out by eminent authorities on bird-life.

During a heavy storm these large gulls soar about at heights of at least a thousand feet with the same demeanour as in the most perfect calm. Direction of wind, contrary or otherwise, makes no difference. At one time they may be seen soaring quite slowly to and fro, at another dashing with unusual haste towards some object sighted in the distance; very frequently they will remain poised motionless at one spot apparently for the space of minutes.

Herring gulls, if reared quite young, become extraordinarily tame

Their nesting quarters extend from Scandinavia westwards to the Farne Islands, and onward to the central parts of North America, and ofttimes extend their range to the Azores and Canary Islands

II.

Birds of prey—though not calculated to make a pleasing impression on the mind of the observer—are objects of utility and interest. They free the countries where they dwell from an immense number of noxious creatures, such as serpents, and some of them at least clear away the

carrion. Singing birds devour an innumerable multitude of caterpillars and insects.

Birds in proportion to their size require much more food than mammiferous animals, and thus become much more useful. Many species of birds serve mankind for food; and their eggs are both nutritious and pleasant. Their plumage serves partly for warmth and partly for ornament. Many delight us with the exquisite modulation of their notes; nor is our admiration less excited by the skill displayed in the construction of their nests.

The migratory habits of various birds are also highly deserving of our notice. Some are only partially migratory, removing from one district or locality to another, as from the borders of the sea into the interior of the country, or from the mountains to the plains or *vice versa*. Others remove to a distant country, like the stork, which is found in Holland in the summer, but makes its winter abode in Egypt and Barbary. The swallow tribe quit this country and other parts of Europe in the autumn, and pass in large troops over to Africa; they arrive in Senegal early in October.

But many birds, which among us are birds of passage, are stationary in the milder climate of Palestine, and never leave the place of their birth, unless for a very short time. The number of species of birds is much greater than that of quadrupeds; many of them also are very long lived. The swan is said to attain the age of a hundred years.

The organs of breathing in birds are admirably constructed for the purpose of enabling them to fly with greater ease. The air passes through their lungs into air-cells, which either surround or are joined to the heart and liver, and other internal parts; there are even air-cells in the bones, which are supplied in the same way. In the *Wild Swan* (*Cygnus ferus*) the wind-pipe, after passing down the long neck of the bird, is curiously coiled up within the breast-bone for the same purpose. Naturalists state that in the *Tame Swan* (*Cygnus olor*) the trachea does not make this convolution.

There is a closer resemblance than appears at first sight

between the wings of birds and the fore-legs of quadrupeds. The joints are similar, and in both the upper part of the limb consist of a single bone, and the lower of two.

The brain in birds is larger in proportion than that of quadrupeds. The eyes are so large that there is no brain between them, but only a thin plate of the skull. The organ of smell lies at the root of the beak. The tongue in most birds is gristly, and not formed for any delicacy of taste. In the parrot it is thick and fleshy, and also in the duck and goose. They have no outward ear like quadrupeds, but an opening covered with feathers.

Birds of prey are known by their bent beak and crooked talons, very powerful weapons, which they employ to take other birds, and even weak quadrupeds and reptiles ; they have all four toes ; the nail of the hind toe and that of the internal toe are the strongest. They form two families, the diurnal and the nocturnal. The former have a quick and piercing sight ; a membrane called the cere covers the base of the beak, in which are placed the nostrils ; they have three toes before and one behind ; the two outward toes are almost always united at their base by a short membrane ; the plumage is close ; the feathers are strong, and the flight powerful.

It is easy to imagine that long-winged birds such as cuckoos, swallows, swifts, curlews, sand-pipers, crows, thrushes, and blackbirds are capable of sustained flight, but it must be confessed it is perplexing to understand that such feathered mites as tits, gold crests, and the short-winged warblers cover immense distances. One would consider it in the light of an absolute impossibility for these little creatures to wing such long flights unaided.

From observation I have noticed that whilst in this country the smaller warblers never cover more than from a hundred to a hundred and thirty yards at a stretch. Nevertheless these tiny creatures do really perform long aerial journeys and we are bound to recognise the fact with this proviso, viz., the lengthly migrations are taken bit by bit and not in a continuous flight. The old writers had a way of inventing possibilities, such as larger birds hiring themselves out to carry the smaller

fry across the ocean. For instance White suggested hibernation as a solution. The whole question, even in this far advanced twentieth century, remains a mystery. Birds are capable of sustaining life in rarified atmospheres where other mammalia could not. By a single mechanical ascent, they can reach within a space of half a dozen miles or so, regions and conditions quite beyond human knowledge, and can find meteorological or atmospheric forces that mitigates the labours of ordinary flight, or possibly help them forward. Birds travel infinitely higher than our limited vision can penetrate and in this latter consideration doubtless there is a wide field for speculation.

THE BIRDS OF LEICESTERSHIRE.

I AM indebted to Stephen H. Pilgrim, Esq., of Burbage, for his interesting following notes:—

"Mr. Montague Browne, late curator of the Leicester Museum, is the only man so far as I know who has in recent times given a reliable history of the birds of the county, of which he records some 190 species, though many of these are only of single or very rare or accidental occurrences. The history is contained in his book, 'The Vertebrate Animals of Leicestershire and Rutland,' and also in the 'Victoria History of the County of Leicester,' and in several instances he quotes as an authority for including a species the writings of Harley, who wrote in the latter part of the first half of last century. We cannot expect to find many of the birds he mentions here, as he had the large reservoirs in some parts of the county, the district watered by the Soar, etc., Charnwood Forest and Belvoir, with the district bordering Lincolnshire to draw upon.

"Taking the various families in the order in which they appear in his book, we come first to the sub-family "*Turdinæ*,' which embraces the thrushes, chats, redstarts, redbreasts and nightingale, and of these we have the five common thrushes, the song thrush, blackbird and missel thrush as residents, and the fieldfare and redwing as winter visitors. The only other one mentioned by Montague Browne as an uncommon visitor is the ring ousel. I have only a record of one which was picked up dead about 22 years ago under the telegraph wires not far from this place, and as it is a moorland bird leaving this country in the winter, we are hardly likely to meet with it except by accident or on migration. The very rare White's thrush, a Continental bird, is a possibility only. The three chats Mr. Browne gives we also have, viz., the wheatear, the stonechat, and the whinchat, but the first only on his passage to and from his breeding quarters and the stonechat is uncommon; he is a beau-

tiful bird in breeding plumage, with his black head and bright chestnut breast. The whinchat is a common summer visitor, and is known locally as the utick, from his note. Mr. Browne has no record of two or three other rare species of wheatears which occasionally visit this country. We have the common redstart, but it is rare, and I have one record of the rare black redstart, about four years ago, which haunted a certain stretch of the Watling Street Road. There is only one other record for the county. These are the only two which visit this country. The redbreast and nightingale are, of course, on our list.

The next sub-family, '*Sylviinæ*'—the warblers—are the most difficult of all to see much of. They are all, except the Dartford warbler, which is very local and only found in one or two of the southern counties, and the golden crested wren, summer visitors only and practically all of them haunt places where the dense cover affords them hiding-places, which they make use of very effectually. They are a charming family of dainty little birds, some of which have delightful songs, such as the blackcap and the garden warbler. We have all those included in Mr. Browne's list except the aquatic warbler, which is only mentioned as having occurred once between 40 and 50 years ago, and the reed warbler, which requires reed beds and though it may possibly occur at Bosworth I have not yet met with it. Our list comprises the greater and lesser white-throats, the latter more plentiful with us than in many districts. Mr. Browne says 'sparingly distributed'—the blackcap, garden warbler, the golden crested wren, the chiff chaff, willow warbler and wood warbler; the latter I have only seen on its spring migration, and Mr. Browne writes that he had not seen one for 25 years, and is evidently sceptical as to its occurrence in the county, but though I have only seen it here as a passenger on migration and not as a breeding species. I have found it in one or two places in Warwickshire within about 12 miles of the Watling Street; the sedge warbler, whose chattering song you may often hear on a summer's night in some roadside hedge; the

grasshopper warbler, so called from the resemblance his song bears to the grasshopper's churring noise—really it sounds to me more like the noise made by a fishing reel when the line is being run off. They may be sometimes heard in Burbage Wood in summer evenings. He is a very interesting bird, and like the corn crake a ventriloquist There are two others which I hardly dare mention, and only do so with bated breath They are not mentioned by Mr. Browne and would not be accepted by ornithologists, because I did not reduce them into possession. One of them, the very rare icterine warbler, I am pretty sure of. He is a small bird very much of the willow wren type, though decidedly larger and distinctly yellow in the under parts, but he made himself known to me by his very loud note for so small a bird. It is more than 24 years ago, but I remember him well. The other is the likewise very rare orphean warbler which I believe I came across in 1890, but I am not so sure about this as the last, though the amount of white in its colouration distinguishes it from the blackcap, which it somewhat resembles. Both these birds occurred in the Castle Hill garden.

"Of the next family the '*Accentorinæ*,' we have only one species the hedge sparrow, who of course has nothing whatever in common with the house sparrow. Of the *Cinclidæ*, of which the only British representative is the dipper or water ousel, we have none, and very few examples have occurred in the county. The next, the '*Panuridæ*,' is represented by only one species on the British list, the bearded tit, or bearded reedling, called locally the reed pheasant, not on account of his size, for he is no bigger, in fact not so big, as the great tit, but has a very long tail proportionately. It is a bird of the great reed beds of the Norfolk Broads, and is not on our list, though Mr. Browne gives one or two records for the country, but it has never occurred in this district, nor is it likely to do so. The '*Paridæ*' comprises the tits, and we have the five given by Mr. Browne. The great tit, the blue tit, the cole tit, the marsh tit, and the charming little long-tailed tit, which makes the most

beautiful nest of all our birds not even excepting the chaffinch. There is only one other on the British list,* the crested tit, which is practically found only in the pine woods of the Highlands, and I ought to mention another which has been looked upon lately by modern ornithologists as a distinct species, viz., the willow tit. He was not treated as such at the date of Mr. Browne's book, and he differs but little from the marsh tit, a little mouse-brown bird with a glossy black head. In the willow tit these black feathers are edged with a lighter colour, giving a laced appearance. I can't say if it occurs here, and it would probably be necessary to kill a number of birds to establish the fact. I have no doubt it has the same notes, lays the same kinds of eggs, and probably inter-breeds with the marsh tit. Is it more than a variety ?

"The "*Sittidæ*' family includes only the nuthatch so far as this country is concerned. Mr. Browne says 'sparingly distributed in wooded district.' With us it is very sparingly distributed, and I have only a few records. The lack of old timber which I mentioned before no doubt accounting for this. It is a very pretty and interesting little bird, capable of walking down a tree trunk head first. It breeds in holes and hollows in trees, and when these last are too large it partially fills up the aperture with clay. It has occurred in the Castle Hill garden. The next family, the '*Troglodytidæ*' is a formidable name for the only representative, the wren. The next family, the '*Motacellidæ*,' includes those most graceful birds, the wagtails, as well as the pipits. Mr. Browne has four species of wagtails, and so have we. The white (which is scarce), the pied or water wagtail, the grey and the yellow. Though there is no record of the rare blue headed occurring in the county, is is by no means so unlikely as not to be worth looking for in spring and summer. It is really the Continental form of the yellow, and a lovely bird. There are only two pipits, the tree pipit and the meadow pipit, but here again there

*This is now recognised as a distinct species as is also the Irish Cole Tit discovered by Mr. Ingram. S.H.P.

is a chance of adding to our list and that of the county, for there are other species which occasionally visit this country besides the resident rock pipit, which is confined to the coast line. We have not any record of the '*Oriolidæ*,' the golden oriole, and Mr. Browne has only one satisfactory one for the county. Mr. Browne mentions two species of the family, '*Laniidæ*,' viz., the great grey shrike, which we have not got, and the red backed shrike, or butcher bird, which is rare with us. I have only one or two records, though I remember when I was a youngster two of my brothers taking a nest close to where Mount Road now is—then of course open fields.

"Of the '*Ampelidæ*,' represented by the waxwing, the only specimen I have seen or heard of in our neighbourhood was one exhibited at our Fur and Father Show in 1913, but we are entitled to put this bird in our list, as Mr. Browne gives an account of one killed at Stoney Stanton in 1850, which was in the possession of the late Mr. Henry Townshend, of Stanton House, members of whose family I know well, another at Claybrooke and three near Bagworth. The '*Muscicapidæ*,' comprises the two flycatchers, the spotted, known I suppose to everyone, and the pied, which is probably not. Mr. Browne has very few records for the county, and I believe there are none for several years past until 1913, when I had the good fortune to find one in the grove at Burbage Rectory. He was probably a straggler on migration, for he only stayed for one day after that on which I first saw him and then disappeared. Being a black and white bird the male is somewhat conspicuous, and the sparrows regarded him as a stranger and interloper, and persecuted him accordingly. There are three species of the swallow family, the '*Hirundinidæ*,' the chimney swallow, the house martin, and sand martin—all common—though the last is only found where there is a suitable sand bank or side of a sand pit, in which it can bore the holes for its nests. There is a colony at one of Messrs. Hudson's brickyards, and another has during the last three years established itself in the bank

of the new sand pit opened behind the old Burbage Toll Gate at the entrance to the Sapcote Road. Some of you may think the swift should be included, but this bird belongs to another family, his anatomy showing him to be no swallow. The family, '*Certhiidæ*' is represented by only one member, the tree creeper, a pretty and unobtrusive little bird, not very common, and I expect frequently overlooked. He is often found in winter in company with a party of titmice, as they go flitting about the country from tree to tree in search of food. His method of doing this is to begin low down on a tree and run or creep up it till he gets towards the top of the trunk, and then fly to another and repeat the performance. He is a resident. The finches, '*Fringillidæ*,' are more numerous. Of these we have the goldfinch, siskin (at least I think I may say he very occasionally occurs but it is very seldom),* greenfinch, hawfinch, another rather rare finch, but I have known him nest with us, and he certainly spends the summer in the grove and gardens at Burbage Rectory, where my attention was first called to the fact by finding the stones of the wild cherries neatly split in two under the trees. He is a very shy bird indeed, and though the largest of our finches, seldom seen. House sparrow, tree sparrow; Mr. Browne says sparingly distributed, but it is common in this district, though no doubt confounded by the great majority of people with the house sparrow, from which it differs in having a chestnut or maroon-coloured crown to its head, instead of an ash grey one, and having a white collar with a black spot on its cheek. He is much more a bird of the open country, and is never seen in towns or villages except in winter, when hard pressed for food. The chaffinch, bramble finch (a scarce winter visitor), linnet, lesser red poll, mealy redpoll (Mr. Browne has no record of this bird, but I saw two which had been caught at Shenton last winter, 1914), twite or mountain linnet (but I have only one record of this, on the authority of Puffer, the taxidermist, who told me some boys took one to him in the autumn of 1889, and there is no other record

*I have two records since this paper was written.

for the county), and bullfinch. Mr. Browne mentions the parrot crossbill, one occurrence in 1849, and the common crossbill as a rare visitor. I have no records of either, and though in 1911 there was a large invasion of crossbills from the Continent, and many remained and bred in various parts of the country rich in conifers which are necessary for their existence, I neither saw nor heard of them here, though I did of two at Belvoir.

"The next sub-family is the '*Emberizinæ*,' buntings, and we have four of these, the corn bunting, yellow hammer, reed bunting and snow bunting. These are resident, except the last, which only occasionally visits us in winter. One of our bird-catchers, in the winter of 1913, asked me to call and see a beautiful plumaged bird he had caught in this neighbourhood. I did so, and found a very fine male snow bunting in, as he said, beautiful plumage. He soon found a purchaser at a good price. Mr. Browne mentions one occurrence only of the cirl bunting* (very many years ago), and the ortolan bunting also one only, and that he gives with some reserve. The '*Sturnidæ*' are represented with us only by the starling. Mr. Browne mentions also the rose-coloured pastor as having occurred twice many years ago (one at Enderby). The '*Corvidæ*' include the jay, magpie, jackdaw, carrion crow, hooded crow (of which I have only a record of one, shot by my eldest son at Stoke Golding in the winter of 1913 while shooting with Mr. Robertson, who now has it stuffed), and rook, the raven being extinct in the county. The '*Alaudidæ*' with us include only the skylark. We have not the woodlark, and Mr. Browne says he has no knowledge of it. The swift represents the family, '*Cypselidæ*,' and of the next family, the '*Caprimulgidæ*,' the nightjar is very rare. One was shot at Newbold Verdon by a party of sportsmen of whom Mr. Frank Bouskell was one, in Sept., 1914, and Colonel Harris recollects some at the Shade, Sharnford, when he lived there as a boy.

*Mr. Davenport, of Melton Mowbray, has recently recorded the nesting of the Cirl Bunting near there. S.H.P.

"Of the '*Picidæ*,' we have the green wood-pecker, the greater spotted and the lesser spotted, but the two last are rare owing to the scarcity of old timber in any quantity, and the wryneck, but the last belongs to a different sub-family; and is very rare. The '*Alcedinidæ*' family is represented by the kingfisher. We had, I am glad to say, a brood hatched in Burbage in the summer of 1913. The hoopœ of the family '*Upupidæ*' does not occur with us, but Mr. Cope, of Osbaston Hall, has one stuffed, which is supposed to have been shot at Nailstone in 1828, and Harley mentions one shot at Stapleton in 1851, which is now in the museum. It only occurs with any regularity in some of the southern counties, and is a Continental bird. The family, '*Cuculidæ*,' includes only the cuckoo. Of the '*Strigidæ*' we have the barn owl, the wood or brown or tawny owl (for they are all the same bird), and the little owl, which was introduced into this country by the late Lord Lilford some years ago, and is not an indigenous species, though it has spread rapidly and will not now, I think, be exterminated. I do not know of either the long-eared owl which likes fir woods and plantations, or the short-eared, both of which are given by Mr. Browne. The '*Falconidæ*' family is an interesting one for the reason that it includes Montagu's harrier,* a record for the county, shot in 1893, since Mr. Browne published his book on the vertebrates of the county, but he mentions it in the history of the county. The bird was killed by Mr. John Powers of Barwell, in the parish of Earl Shilton, and is now in the Leicester Museum. The other species are the sparrow hawk, the kestrel, the hobby, and the merlin (one having been shot at Barwell in 1892). In 1913 a specimen of the North American peregrine falcon was shot within a few miles of here (near Desford), and was portrayed in 'British Birds,' but this was, of course, only an accidental straggler. One record of the peregrine falcon at Newbold Verdon in October, 1891, is mentioned in the County History. We now come to some families of birds of quite

*The Marsh Harrier must now be included, one having been shot at Upton since this paper was written. S.H.P.

a different kind of some of which we have no representatives, and I need not mention these. They are principally of water birds, of which we are not rich, but of the family, '*Ardidæ*,' we have the heron, which has bred at Gopsall, and of the '*Anseres*' we occasionally have a flock of geese fly over, probably grey lags, and I suppose we may include the mute swan, and the whooper has occurred at Croft, on floods (the late Mr. W. Brookes having shot two there on one occasion), and of course the wild duck or mallard. The gadwall has occurred at Bitteswell Hall. The teal very occasionally may be flushed from some quiet pond. Several were shot at Sheepy a few months ago, and Mr. Aylward sent me a fine male pochard for identification which he shot at Enderby in Jan., 1893. The golden eye and scoter are reported to have visited Bosworth. The '*Columbidæ*' gives us the wood pigeon or ring dove, the stock dove and the very pretty little turtle dove. There was in 1888 a remarkable invasion of sand grouse of the family, '*Pteroclidæ*,' but none were observed in this district, though they did visit the county. It is a remarkable bird, and though it has its legs and feet covered with short down like feathers, as is the case with the grouse, it is really more nearly related to the pigeons. It is an inhabitant of the Steppes of Eastern Russia and Asia.

"Of the '*Phasianidæ*' we have the pheasant, which is not indigenous to this country, but is supposed to have been introduced from Asia Minor by the Romans, the partridge, the red-legged partridge, and the quail, but this last is very rare, and I have only two or three records of its occurrence. It is migratory. The family '*Rallidæ*' supply us with the water rail (a very shy bird very seldom seen, and consequently appearing to be rarer than it probably is), the corn crake or land rail, the moor hen or water hen, and coot. Of the '*Charadriidæ*,' the golden plover, Mr. Browne speaks of Mr. Standbridge shooting some at Aston and Mr. Brookes frequently at Croft, a winter visitor only, and the lapwing or peewit, which is much more numerous here now than it was some years ago. The '*Scolopacidæ*' include with us the

woodcock, great or solitary snipe (rare) common snipe and the diminutive jack snipe, the redshank (a pair of which I found in a marshy meadow through which the brook runs at Aston Flamville, in the early spring of 1914), the common sandpiper sparingly, and the green sandpiper, the latter, however, very rare. This family includes many waders, of which some species doubtless fly over this district at night when moving from one part of the country to another, and the celebrated forty whistlers, so much dreaded by the colliers as foretelling some disaster, no doubt are of one of those species.

"The *Laridæ*,' the gull family, are naturally but sparsely represented with us, and only by some storm-driven birds passing over—generally, I think, herring gulls, but they are not often near enough to identify with any certainty. Of the '*Procellariidæ*,' a specimen of the Manx shearwater (a straggler, of course), was found by some boys in a field near Barwell Rectory in 1891, and was brought to me by Mr. Charles Titley, who kept it alive for a few days, and on the 31st January last I saw in a case of stuffed birds in Mr. Thomas Bates's house at Burbage, a specimen of the very rare Fork-tailed Petrel, which he told me he had picked up in an exhausted condition at Sketchley about 40 years ago—this is a record for the county. The '*Podicipidæ*' family includes the great crested grebe, which breeds on the 'big river' in Bosworth Park, and is a very striking and interesting bird, and the little grebe or dabchick. This concludes the list of the birds of this district so far as I know, but there is no doubt that with a sufficient number of enthusiastic and competent observers, several species might be added to it."

THE DISTINCTION BETWEEN MAN AND THE INFERIOR ANIMALS.

IN previous notes I have devoted considerable space to the characteristics of birds as architects, whether as miners, ground-builders, masons, carpenters, basket-makers, weavers, tailors, etc., but I have not dwelt at much length upon any fancied analogies between their arts and those of the human race. The great distinction between man and the inferior animals is that the one learns almost every art progressively by his own experience operating with the accumulated knowledge of past generations, whilst the others work by a fixed rule, improving very little if any during the course of their own lives, and rarely deviating to-day from the plans pursued by the same species a thousand years ago.

It is true that the swallow, which doubtless once built its nest in hollow trees, has now accommodated itself to the progress of human society by choosing chimneys for nestling; and it is also to be noticed, that in the selection of materials a great many birds, as has been already shown, accommodate themselves to their individual opportunities of procuring substances differing in some degree from those used in other situations by the same species. These adaptations only show that the instinct which guides them to the construction of the nests best fitted to their habits is not a blind one; that it is very nearly allied to the reasoning faculty, if it is not identified with it. But that the rule by which birds conduct their architectural labours is exceedingly limited, must be evident from the consideration that no species whatever is in a state of progression from a rude to a polished style of construction. There is nearly as much difference between the comparative beauty of the nests of a wood-pigeon and of a bottle-tit, as between the hut of a North American savage and a Grecian temple. But although the savage, in the course of ages, may attain

as much civilization as would lead him to the construction of a new Parthenon, the wood-pigeon will continue only to make a platform of sticks to the end of time. It is evident, from a contemplation of all nature, that the faculties of quadrupeds, birds, insects, and all the inferior animals, are stationary:—those of man only are progressive. It is this distinction which enables him, agreeably to the will of his Creator, to "have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth." But within their limited range the inferior animals perform their proper labours with an unwearied industry, and an unerring precision, which call forth our wonder and admiration. Of these remarkable qualities abundant examples have been given in previous notes, and they are not without moral instruction.

Elevated as our minds are in the comparative scale of nature, we may still take example from the diligence; the perseverance, and the cheerfulness which preside over the architectural characteristics of birds.

In a word the term constancy may well be rightly applied to the feathered tribe in their habits and concentrated customs, whilst progression is reserved as the supreme characteristic of man.

FACULTIES OF BIRDS GENERALLY.

ONE of the most voracious of carnivorous birds is the gigantic crane, or, as it is termed in India, the *Adjutant* (*Ciconia argala*). It does not, however, rank in systematic arrangements as a bird of prey any more than the bustard, though the latter lives partly on animal food.

The structure of the stomach in the adjutant corresponds with this similarity in habit, though the solvent glands are differently formed from those of any other bird. These glands are not placed round the upper portion of the stomach, but form two circular figures, about one inch and a half in diameter on the fore and back part of it, each gland being composed of five or six cells, and each opening into one common pipe. The gizzard and digastric muscle are nearly of the same strength with that of the crow, and the former is lined with a similar horny cuticle.

These birds are not only capable of digesting bones, as Spallanzani proved eagles and owls to be, but they seem to be fond of them, swallowing every bone which they can get down their gullet, whence they are denominated bone-eaters. It has been stated by Sir Everard Home that there was found in the craw and stomach of one of these birds a land tortoise, ten inches long, and a large male black cat, entire.

The adjutants are said to be met with in companies, and when seen at a distance, near the mouths of rivers coming towards an observer, which they often do, with their wings extended, may well be taken for canoes upon the surface of a smooth sea ; when on the sand-banks, for men and women picking up shell-fish or other things on the beach.

One of these, a young bird about five feet high, was brought up tame, and presented to the Chief of the Bananas ; and, being accustomed to be fed in the great hall, soon became familiar, duly attending that place at

EGGS AND NEST OF SANDWICH TERN

BLACK TERN, WINTER PLUMAGE.

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dinner-time, placing itself behind its master's chair, frequently before the guests entered. The servants were obliged to watch narrowly, and to defend the provisions with switches; but, notwithstanding, it would frequently seize something or other, and on one occasion purloined a whole boiled fowl, which it swallowed in an instant. Its courage is not equal to its voracity, for a child of eight or ten years old soon puts it to flight with a switch, though at first it seems to stand on its defence, by threatening, with its enormous bill widely extended, and roaring with a loud voice like a bear or tiger.

It is an enemy to small quadrupeds, as well as birds and reptiles, and slyly destroys fowls or chickens, though it dares not attack a hen openly with her young. Everything is swallowed whole, and so accommodating is its throat that not only an animal as big as a cat is gulped down, but a shin of beef broken asunder serves it but for two morsels.

It is known to swallow a leg of mutton of five or six pounds, a hare, a small fox, &c. After a time the bones are rejected from the stomach, which seems to be voluntary, for it has been known that an ounce or two of emetic tartar given to one of these birds produced no effect.

THE SENSE OF HEARING.

IT has been well remarked by the earliest authors, that birds are not provided like other animals with an external ear, because their passage through the air would have been obstructed by long ears like those of the hare or the ass.

In owls there is a peculiar valve placed at the opening, partly of a membranous, and partly of a muscular structure, which has by some authors been deemed analogous to the human ear, and it is around this that the tuft of feathers is arranged, so as to form a large funnel, which is brought into view when the two folds or lips are separated. The outer opening is very large, parted into two chambers by a square bone, and forming a considerable upright slit in the form of an S, extending as high as the head itself.

The drum of the ear in birds bulges outwards in a somewhat convex form, and consists of two membranes. In order to support, distend, or relax the exterior membrane there is a cartilaginous organ stretching from the side of the passage almost to the middle of the membrane; while there is another cartilage divided into three branches, the middle one of which, being the longest, is joined to the top of the cartilaginous organ beforementioned, and assists in bearing up the exterior membrane. The cartilage joins the top of the columella (*Ossiculum auditus*), which is a very fine, thin, light, bony tube, the bottom of which expands into a plate (*Sperculum*), corresponding to the base of the stirrup-bone in the human ear, and, like it, fitting the oval hole, to which it is braced all round by a very slender membrane.

M. D. Blainville, in opposition to most other comparative anatomists, and in conformity to the doctrine of minute analogies, now pursued on the Continent, endeavours to show that the chain of bones found in the human ear is equally to be found in birds, though in order to make this out he is under the necessity of confessing that, while "the chain of small bones is complete," these

bones consist not of bony substance, but of cartilage, sub-cartilage, and even of muscles.

With reference to this speculative theory upon the subject of the ear of birds, Sir Charles Bell justly remarks that "the only effect of this hypothesis is to make us lose sight of the principle which ought to direct us in the observation of such curious structures, as well as of the conclusions to which an unbiassed mind would come. The matter to be explained is simply this: the chain of bones in the ear, which is so curiously adapted in the mammalia to convey the vibrations of the membrane of the tympanum to the nerve of hearing, is not found in the organ of hearing of birds; but there is substituted a mechanism entirely different. They choose to say that the incus, one of the bones of the chain, is wanting in the bird. Where shall we find it? they ask. Here it is in the apparatus of the jaw or mandible; in that bone which is called Os quadratum."

From this mode of enquiry we find that the sense of hearing is enjoyed in an exquisite degree in birds; that the organ of the sense is not imperfect, but is adapted to a new construction, and a varied apparatus, suited to the condition of the bird; and that there is no accidental dislocation, or substitution of something less perfect than what we find in other classes of animals.

The internal parts of the ear in birds are much less complicated than in man and quadrupeds. We have little doubt that the provision made for rendering birds more buoyant, consisting of air-vessels extended from the lungs throughout the body, and even to the bones themselves, contributes to render the vibrations of the air more distinct, muffled as they must always partially be by the feathers of the bird.

The faculty of imitating sounds possessed by certain birds proves that their hearing must be exceedingly delicate; and though we suspend our belief of the great musical talents which some birds are said to have derived from education, we find many well-attested instances of a delicate ear in species by no means remarkable for vocal execution.

Madame Piozzi gives an account of a tame pigeon, which answered by gesticulation to every note of a harpsichord. As often as she began to play the pigeon hurried to the concert, with every indication of rapturous delight. A false note produced in the bird evident tokens of displeasure, and if frequently repeated it lost all temper and tore her hands.

It is again related that a gentleman was staying at a certain house in Cheshire, and the daughter of the host was a fine performer on the same class of instrument. He observed a pigeon which, whenever the young lady played the song of "Speri si" in Handel's opera of "Admetus," would descend from an adjacent dove-cot to the room window where she sat, and listen with every indication of pleasure till the song was finished, when it uniformly returned to the dove-cot.

Who, after this, will aver that birds have not a keen sense of hearing?

FORMATION OF BIRDS.

IN considering the external form of a bird, the first thing that strikes a philosophical inquirer is the wisdom with which Providence has adapted it to the element in which it is destined to move.

In its smooth pointed bill, and gradually enlarging head and neck, he perceives an instrument admirably calculated to penetrate the yielding air. The rounded prow-like shape of its breast, too, is adapted with mathematical exactness to the same useful purpose; while its flexible tail is made with surprising skill to perform the part of a rudder; and its wings equally poised and furnished with quills and feathers modelled by numerous wonderful contrivances, at once for lightness, for strength, and for tenacity, and altogether exhibiting a machine of the most perfect kind for aerial navigation.

The very varieties in the nature of this machinery, adapted as they are to the faculties and instincts of each species, impress the mind with a deep sense of the minute and skilful care of a beneficent Creator, and give a peculiar interest to the investigation.

When we proceed from the external form to the consideration of the internal structure of birds, as adapted to their peculiar function of moving through the air, we perceive a system of contrivances evidently intended to promote the same end. In the mechanical art exhibited in the formation of the bones and muscles, by which power and motion is given to the wings—in the conformation of all the bones, uniting strength with lightness—in the air so singularly distributed through the bones and in other parts of the body—in the modification of the intestines—in the whole comparative anatomy; in short, of the winged tribes, we trace, with an astonishment increasing in proportion to the diligence of the research, the same unceasing solicitude to adapt everything to their nature.

Nor is it less worthy of remark that there is scarcely a vegetable or animal production which some species of

bird does not seem created to feed upon ; and that, speaking generally, wherever that peculiar production is to be found, there is also to be found the particular kind of bird to which it furnishes wholesome food.

With some striking examples of this kind the sportsman of our own country is well acquainted. He finds the partridge in the plains, the woodcock in the forests, the grouse on the moors, and the ptarmigan on the loftiest peak of the mountains. He knows, too, that other species migrate from country to country, seeking their food in distant regions, over trackless oceans, and through an extended atmosphere, when it fails in their native haunts. The ornithologist is aware that instances of this kind are not confined to the birds of game only, but form a rule so universal as to deserve a place among the wonderful adaptations which exist between the animal and vegetable worlds.

Nor is it to be forgotten that of all sublunary creatures man alone is endowed with faculties capable of discerning the Creator's hand in His works. Had not the human race been called into existence all these magnificent provisions would have been unappreciated and unknown.

The glories of the Divine perfections would still indeed have been inscribed on nature, but among earthly existences there would have been no eye to read and no heart to feel them. Man has justly been called the priest of nature ; and while from the seen he rises to the unseen—from the temporal to the eternal—he ought never to forget that the high rank that has been assigned him implies a high responsibility ; and that, in proportion as his vision is enlarged, and his faculties are exalted, his duties and obligations are, to an equal extent, increased.

FOOTLESS BIRDS.

"ALL living creatures," says Pliny, "have one-certaine manner of marching and going, accord ing to their several kinds, unto which they keep, and alter not. Birds only vary their course, whether they go upon the ground or flie in the aire. Some walke their stations, as crowes and choughs; others hop and skip, as sparrows and ousels; some run, as partridges, woodcocks, and snipes; others again cast out their feet before them, staulk and jet as they go, as storks and cranes."

Aristotle has remarked that there is no animal known to fly always as fish are known to swim; hence he concluded that all birds could walk, though such as have small feet were sometimes called "footless" (Apoda).

Some singular beliefs were, however, formerly maintained respecting the feet of birds, which it may be interesting to mention. According to some ancient authors, the bird of paradise was without feet; for none of the great numbers imported to Europe had them. It was even alleged that the inhabitants of Aron believed the bird to be hatched with legs, but apt to lose them, either from disease or old age. The primitive impression that the bird was footless arose from the fact that the leg is extremely slender, and only about a palm in length. The Dutch navigators were challenged to investigate the point, and found that the legs were certainly there but more weak and slender than those of the magpie, and that they could walk and fly like other birds; but the Indians, upon taking them, cut off the legs, and, taking out the entrails, dried the birds in the sun to fit them the better for ornamental head-dresses. The practice of disembowelling them, in conjunction with their being deprived of feet, led to another singular fancy—that, having no need of food, they lived wholly upon dew and vapours.

There is a British bird—the *Swift* (*Cypselus murarius*)—which has, at least in name, been represented as "footless"; but, though its legs are exceedingly short, the

structure of its feet is admirably adapted for their uses. The shortness of the legs and the great length of the wings render it very difficult, if not impossible, for it to rise from any even surface, and, as if conscious of this inability, it is never seen to alight on the ground.

The peculiar conformation of the foot distinguishes the swift from the swallows, and, indeed, from all other known birds; for, though some species have the power of turning one of their toes either before or behind, none but the swift can turn all the four toes of the foot forward. The smallest toe also consists only of a single bone, while the other three toes have only two bones each—a structure adapted to the habit of the bird of clinging to the perpendicular face of walls and rocks and eaves of houses, aided by its strong, sharp, hooked claws.

The feet in swallows, though not quite so short as in the swift, are very small, but peculiarly adapted to the bird's habits. In the capture of its prey, for example it does not employ its feet. In fact, the great requisite in the foot of the swallow is that it shall be formed without those qualifications which are such wise provisions in the feet of most other birds, for what is a perfection in them would be an imperfection in it.

The *Kingfisher* (*Alcedo ispida*) is another British bird whose legs are exceedingly small and not well adapted for walking, which, familiar as we are with the species, we never saw it attempt. In this it is singularly different from its fellow-fisher, the *Dipper* (*Cinclus aquaticus*), which can not only trip along the edge of a rock, but can walk, as we have repeatedly witnessed, directly under water in shallow pools and slow-running streams, emerging to the surface at a considerable distance from the place where it had entered. The leg is feathered to the knee, and claws are very strong and curved, the claws of the back toe being the strongest. Its curious habit of walking under water appears to have been first observed by Hebert, whose interesting narrative will be familiar to most naturalists.

The Laplanders call the *Loon* (*Colymbus glacialis*) the lame bird, because it walks awkwardly, the legs, indeed,

being so placed as to render it difficult to use them in walking. When one under observation quitted the water it shoved its body along upon the ground like a seal, by jerks, rubbing the breast against the ground, and returned again to the water in a similar manner.

The *Coot* (*Fulica atra*), like the divers, has an aversion to take wing, and can seldom be sprung in its retreat at low water ; yet, though it walks rather awkwardly, it contrives to skulk through the grass and reeds with considerable quickness, the compressed form of its body being peculiarly fitted for this purpose, and its progress has often been remarked by the top of the herbage on the edge of a lake moving as if it had been swept by a narrow current of wind. The same preference to run rather than take wing may also be remarked in the *Rails* (*Ralledæ*), some of which are land-birds and amongst these may be mentioned the *Landrail* or *Corncrake* (*Ortygometra crex*), a bird that has been said never to take the water, and keeps regularly upon the ground taking flight but rarely, and never except when compelled thereto.

BIRDS WHOSE FEET AND LEGS ARE STRONGLY IN EVIDENCE.

THE bird most celebrated for fleetness in running is the *Ostrich*, or *Bird-camel* (*Struthio camelus*), as it may well be named. "What time she lifteth up herself on high," says Job, "she scorneth the horse and his rider."

According to most writers, the wings serve both for sails and oars, whilst the feet, which have only two toes, and are not unlike the camel's, can bear great fatigue. M. Montbeillard, however, was of opinion that it does not spread its wings and tail-feathers with the view of assisting its motion, but from the common effect of the corresponding muscles, as a man in swimming throws out his arms. Though the ostrich is universally admitted to run faster than the fleetest horse, the Arabs contrive to run these birds down on horseback, their feathers being valuable and their flesh not to be despised.

The best and fleetest horses are trained for this chase. When the hunter has started his game he puts his horse upon a gentle gallop, so as to keep the ostrich in sight without coming too near to alarm it and put it to its full speed. Upon observing itself pursued, therefore, it begins to run at first but gently, its wings, like two arms, keeping alternate motion with its feet. It seldom runs in a direct line, but, like the hare, doubles, or rather courses in a circular manner, while the hunters, taking the diameter or tracing a smaller circle, meet the birds at unexpected turns, and with less fatigue to the horses. This chase is often continued for a day or two, when the poor ostrich is starved out and exhausted, and, finding all power of escape impossible, it endeavours to hide itself from the enemies it cannot avoid, running into some thicket or burying its head in the sand. The hunters then rush in at full speed, heading as much as possible against the wind, and kill the bird with clubs, lest the feathers should be soiled with blood.

Everybody must at some time or other have seen a partridge run, and consequently must know that no man is able to keep up with it, and it is easy to imagine that if this bird had a longer step its speed would be considerably augmented. The ostrich moves like the partridge, with both these advantages, and there are instances of these birds having put on such a speed as to distance the fleetest racehorse ever bred in England. It is true they would not hold out as long as a horse, but without doubt they would be able to perform the race in less time. Had we but the knowledge and method of breaking it and managing this bird as we do the horse, there is no knowing what speed might be attained by a bird with such prodigious strength.

A British bird, the *Bustard* (*Otis tarda*), now rarely seen, if not quite extinct, is very similar to the ostrich in its faculty of running, and said to be hunted with greyhounds, a sport followed even by the ancient Greeks, as we learn from Xenophon and Ælian. The male of this species is furnished with a singular bag or pouch, opening under the tongue, and hanging down on the forepart of the gullet, as low as the middle of the neck. This seems to have been observed by Aristotle, but was particularly described by Dr. Douglas, who advanced the idea it was intended as a reservoir for water, indispensable in the extensive arid plains which it inhabits. He found it capacious enough to hold several quarts of water.

Another writer of that period, Colonel Montagu, however, appears to be somewhat sceptical upon this point. "We think it impossible," he says, "that the bird could fly with such an addition of weight before its wings, which would throw it out of the centre of gravity. We see the heron and many other birds obliged to extend their legs behind and contract their necks when flying, in order to balance themselves on the wing. Seven quarts of water (the quantity mentioned by Dr. Douglas) are nearly equal to fourteen pounds weight, and certainly more than the bird could carry in that situation."

It would appear, indeed, from the observations of Sir

Everard Home, that Montagu's objections are valid, for in the *Adjutant* (*Ciconia argala*), which has a bag precisely similar, he found that it contained "nothing but air, which the bird has the power of expelling and filling the bag again at pleasure." In the adjutant the bag communicates with the large air-cells at the back of the neck, and therefore we may fairly conclude it is intended to render the birds light and buoyant for running, since they are too heavy to fly without considerable difficulty.

These birds are remarkable for the length of their legs, which must be very advantageous for swiftness of running; but it would be wrong to infer as a general principle that all birds with long legs are swift-footed. On the contrary, the *Wading Birds* (*Grallatores*), which have proportionately much longer legs than the ostrich or the bustard, are not well adapted for walking on land. Amongst these the *Flamingo* (*Phœnicopterus ruber*) is one of the longest legged birds; yet it is in this respect far exceeded by the *Stilt* (*Himantopus melanopterus*), and the legs in the latter are, besides, slender, and even "so flexible," as Wilson says of the American stilt, "that they may be bent considerably without danger of breaking," as if, in accordance with Pliny's name (*Himantopus*), they had been cut out of a thong of leather.

The reasoning of naturalists, indeed, respecting the conformation of the feet of birds is, when not derived from living specimens, as frequently wrong as right. It has been usual, for example, since the time, if I mistake not, of Gesner and Aldrovand, to consider the peculiar structure of the foot in parrots and woodpeckers, with two toes before and two behind, as so peculiarly characteristic of climbing birds that in systematic classifications the birds which have their toes so placed are denominated climbing birds (*Scansores*); but, unfortunately for this division, many species which have the feet so constructed have never been observed to climb, such as the cuckoo and the wryneck, while many species which do climb, such as the *Nuthatch* (*Sitta*) and the *Creeper* (*Certhia*) have their toes placed in the usual manner.

White's remarks on the walk of birds are well worth

quoting. "Most small birds" he says "hop; but wagtails and larks walk, moving their legs alternately; all the duck kind waddle; divers and auks walk as if fettered, and stand erect on their tails; crows and daws swagger in their walk; woodpeckers use their tails, which incline downward, as a support when they run up trees; parrots, like all other hook-clawed birds, walk awkwardly, and make use of their bills as a third foot, climbing and descending with ridiculous caution. All the poultry (*Gallinæ*) parade and walk gracefully and run nimbly."

It is worthy of remark that, as the bones commonly considered as belonging to the leg in bird correspond to the heel of the human foot, all birds must walk, as we may say, on tiptoe. As they have their centre of gravity, however, not directly over their legs, but more forward, it requires peculiar contrivances in their formation to enable them to balance themselves on their toes. Accordingly, birds have their toes for the most part proportionately much longer than other animals, while the great flexion of the leg upon the thigh brings the toes more under the centre of gravity.

Birds have also this further peculiarity, that the standing posture is their state of most perfect rest, arising from the structure of their legs, as first explained by the old Italian naturalist, Borelli. The tendons of the muscles which bend the claws pass over the joints of the heel and are joined there by another muscle which passes over the knee, so that the bending of the heel is necessarily followed by a bending of the toes. When a bird, therefore, alights on the branch of a tree, the weight of its body bends those joints, and thus puts the tendons on the stretch, which draws in the claws to lay hold of the branch without any seeming effort on the part of the bird.

THE SUPERIORITY OF THE FEMALE IN NATURAL HISTORY.

ABUNDANT instances are given us in the annals of natural history of this superiority, and the close study of this subject reveals the undoubted fact that the feminine mind controls the action of the paired ones, whether in beast, bird, or fish. The arrogation of this superiority is also acknowledged by the old writers, both in this and continental countries.

Everyone is familiar with the architectural instincts of the elephant, without which irrigation work could scarcely be carried out in hot countries where the natural beast of burden with us, viz., the horse, cannot be employed. As for road-making and the laying of pipes for drainage he is indispensable, and he is known to exercise a deal of prudence, more so than any other beast of burden. He not only is capable of undertaking tremendous tasks but he has the natural instinctive quality largely developed of finding out the shortest possible routes to the required rendezvous, choosing the easiest slopes, and thereby gaining his goal with a minimum of exertion, so unlike other animals.

When travelling in herds the female invariably leads, proving that sagacity is more conspicuous in the gentler sex of this gigantic animal.

Take another animal, the gnu. The cows will themselves expel an obnoxious bull from their society without more ado; and so it is obvious that, even among the quadrupeds, the male, for all his superior pluck and much talked of courage, does not have things all his own way.

It has also been observed that in the American prairie the heifer in its infuriation is more dangerous than a bull; for the bull charges straight ahead, as if blindfolded, intent on mastering its foe by sheer force, whereas the more subtle cow will run at the enemy sideways, with a keen eye to an effective sidelong thrust with her sharp horns.

Among the feathered tribe one has abundant instances of the assertion of superiority by the female, and one simple observation lesson will reveal the correctness of this statement, whilst traversing an ordinary country hedgerow.

The ordinary thrush or blackbird female has an extremely dowdy appearance, with a sombre sooty-brown attire, suggesting another bird's leave-offs; but closer acquaintance will reveal the fact that she is bigger, and endowed with more strength than her mate, and that when the commissariat runs short, it is the male that has to go without dinner, should the provision be scanty.

The sparrow is very amusing in his love-making, for his gestures go a certain way to indicate that he is a much superior bird. This notion, however, the female sternly rebukes by administering a decisive dig in the breast, or grabbing him by the scruff of the neck and shaking him heartily. The male again has to haul the materials for the nest, whilst the female surveys the scene, leaving the he-male to negotiate the obstreperous straws, and feathers, and moss hangings, which at length comprise the homestead.

To use a more familiar illustration still, look at the cock-pigeon, parading round his mate, with swelling throat and sweeping tail, the very personification of dominant masculinity; but the sequel comes later, for he sits on the eggs for the best hours of the day, whilst his wife has enjoyment galore, and so it is easy to realise that the female has the best side of the bargain, at any rate, from a pigeon's point of view.

The male of this species, is, in fact, every inch a family man, and throughout the bringing up of the nestlings he does the homing duties to a nicety. The hen is known to rest in a state of indifference, and considers herself free. If they are unattached their thought is to form other ties, for the erstwhile family tie counts for little.

In the case of birds of prey, it has over and over again been determined that the female is the better of the two. So great is the difference, indeed, in the case of the hawk, in capitivity, that the lady hawk has been known to kill

and devour her mate, though in a wild state she adheres to the usual traditions of her sex in the monotonous business of sitting upon her eggs and caring for the young.

Amongst the flightless birds, the emu and cassowary, the supremacy of the fair sex has gone still further.

It is well known that the biggest, the brightest coloured, and the more courageous birds of these species, are not the males, but the females. The male birds realise again that the home is their sphere of activities, and they consistently look after the eggs and the chicks. The hen cassowary shows an unbecoming contempt for her mate.

In an experiment of pairing off these mated pairs at the Zoo, some time ago, as related by one of the keepers, the male was discovered some days after with bald patches on the back, doubtless due to frequent and well-directed kicks on the part of the softer sex. This fact brings us to an interesting fact in animal economy ; when the male is, as usual, the stronger sex, he is often found to exhibit a chivalrously forbearing spirit towards his mate, as any one may see in the case of the farmyard rooster.

Mr. Hill emphasises the theory that all birds have been descended from ancestors which could fly, and he says that although the absence of enemies and abundance of food close at hand may suggest reasons for the loss of flight in such birds as the kiwi and owl parrot of New Zealand, yet it is probable that here, as elsewhere, the law of correlation of structure, about which at present we know so little, has played a part in the transformation, coupled with a change in the habit and circumstances of the ancestors of flightless birds.

FOWLING REMINISCENCES.

A TRUE sportsman is entirely devoted to his speciality of wildfowling, and actually asserts that "punting is the art of pursuing wildfowl in a small boat termed gunning-punt"; whereas punting is generally held to mean the science of sitting in a huge flat-bottomed vessel, in company with two or three other old gentlemen who bob for gudgeon. The boat of the wildfowler, in reality, is built in proportion to the size of the punt-gun it is meant to accommodate—a formidable weapon, carrying a pound of shot at a charge, and fired from the head of the boat, not from the shoulder, but like a piece of ordnance. You have to lie upon your stomach, it seems, at the bottom of the boat, and propel it, face foremost, with a pair of small sculls—an exertion tremendous indeed, yet quite insufficient to keep you warm in a winter's midnight upon an exposed tidal river, When the tide is low, you must get out and push your boat before you upon the mud; and if you have not got "splashers" on (thin boards about eighteen inches square lashed to the soles of your boots), you had better be particular where you tread, since, if you fall, the greater probability is that you will never get up again. The same precaution has, of course, to be observed in pursuing wounded birds upon the treacherous ooze.

The only practicable method of getting up from a fall on the ooze is by rolling over on the back so as to draw the arms out of the mud, and then by placing one foot, with the splasher, firmly and flatly on the ooze, at the same time pressing both hands on the knee of the leg so raised, and giving a cautious but determined spring, a man may succeed in bringing himself again to his legs. But it is useless to attempt getting up by resting the hands on the mud, as one would do on hard ground; the arms only sink deeper and deeper, and, if the mud be very rotten, the fallen individual finds it impossible

to rise in that manner, and by kneeling it would be just as difficult. What very much enhances the unpleasantness of a position of this kind, is the knowledge that the tide must sooner or later come up and drown you.

This miserable fate of death by inches attends the uncautious night wildfowler who, under any circumstances, wanders too far from his punt and is unable to regain it; and with a flowing tide it is almost impossible to recognise its position, however carefully marked beforehand. Conceive him leaving his home in the winter evening, well victualled (that is, within; for a gunning punt is not quite the place for taking supper in), and rigged out with such garments as you see in tubs before the doors of great London waterproof clothing shops; by no means careless of wind and weather (since it is useless to go on such an excursion in a wind, because the birds cannot be seen for the ripples), but well provided against cold and wet. Placing himself at full length in his small flat-bottomed vessel, he directs his movements according to the position of light and shadow, keeping his punt on the dark side of the moon, and cautiously approaching the spot to which, by the different notes and calls of the aquatic birds, his attention is courteously invited. He moves quite noiselessly, for he knows that wildfowl, whether sleeping or feeding, have always sentinels watching, so that the slightest indication of his approach will be at once communicated to the whole body. If he hears birds on the outer or wrong side of the moon (as he frequently will), he must not be tempted to set towards them, but must row in a contrary direction, and work his course so as to bring them into a proper light between the punt and the moon, although he may have to spend an hour on the tedious toil.

The tide is coming in with a slight breeze, and the ripple darkens the deep water. Such of the oozes, too, as remain uncovered look pitchy dark enough, but the shallows show a silvery whiteness; on these, to the very last, the waterfowl will delay, crowding, perhaps, on one small mound, from which they will not budge till

fairly lifted by the tide. Thus "on their last legs," as it is technically expressed, they stand visibly exposed upon the white water, although before the tide had reached them they were in complete obscurity. The sportsman has now only to wait in the dark water until there is sufficient depth on the white surface to enable his punt to approach within range of the birds, when very large numbers—upwards of fifty at a shot—may be killed by a well-aimed discharge. These, of course, are very favourable conditions; at other times, and when there is no moon, the punter must let fly the instant that he distinguishes the birds, or, as it sometimes happens, as soon as he gets within shooting distance of the inexperienced sporting curate in his punt, whom he mistakes for the birds. The writer himself, in company with two other punters, once bore down upon a young clerical gentleman for several minutes, with three miniature cannon, in the shape of punt-guns, primed, capped, and cocked, and carrying about two pounds of shot in all, and absolutely covered him at less than sixty yards—under the impression that he was widgeon.

A good ear for ornithological sounds is as necessary to the midnight sportsman as the natural musical ear is to the most accomplished harpist. Every wildfowler, from the practised sportsman to the decoyman's wring-neck, is more or less familiar with the ordinary notes of the species duck, widgeon, geese, and such-like. He knows the trumpet-like noise of a gaggle of wild geese, resembling at a distance the rich tone of a pack of foxhounds in full cry; the sonorous and saucy "quack! quack!" of the wild duck; the soft but attractive "wheow! wheow!" of the widgeon; the sharp and wailing whistle of the plover; the shrill but mournful cry of the curlew; the simple "pee-wit!" of the lapwing; and the "frank!" warning of the majestic heron. With these and many others the wildfowler becomes so easily acquainted that a mistake of species cannot well be made.

When free from all suspicion and unconscious of danger, the note of the solan goose is "grog! grog!" and so

long as the fowler of St. Kilda hears no other note, he is assured the birds are not suspecting him; but if he hears their watchword, "birr! birr!" he instantly desists, and remains as quiet and motionless as possible, because he knows it is the warning note of the sentinel, which, in that one sound, informs all its companions of the suspected approach of an enemy. Generally, after lying still a few minutes, the words of assurance, "grog! grog!" are repeated, and then the 'fowler resumes his movements. The warning given by a sentry wildfowl, of whatever species, seems to strike through every ear of the assemblage with electrical precision, and this though numbering many hundreds; in an instant, heads are up, ears searching, eyes piercing, and all from the effects of the sentry's single note; then, if the suspicions are confirmed by further noise or movement of the enemy, the whole flight simultaneously takes wing, and the bungling fowler's chance is gone. An experienced decoyer can always tell, by the talk of his fowl, when they are thinking of leaving the pond for an excursion out to sea or to feed on the savannas. Just before twilight the debate is opened by wild ducks, the clamour of the female being loudest and most incessant. This is continued some ten or twenty minutes, as if they were arranging a rendezvous at some distant fen, and when all is decided they quietly leave the decoy in small and separate teams of from ten to twenty or more, according to the extent of their numbers.

A MEMORABLE ADVENTURE.

IT was during the season of 1912 when the events hereafter recorded took place. I was living on the North-east Coast, in the centre of the "cream of wild-fowling." Again, the place was off the beaten track, so to speak, and for miles and miles one could find birds right away to the Firth of Forth on the north to the Tyne—equidistant—on the south. For this foray I took a guide, and we left home at midnight.

Soon a considerable tract of waste land—covered with wrack-grass—was reached, and then the main estuary came into view—a glassy sheet, extending for miles. If solitude hath charms, as the poet says, we were indeed fortunate, for it reigned supreme. A lonely spot indeed, but the very stillness seemed to nerve us to our sport. Scattered along the entire length were numerous shallow inlets or lagoons of brackish water, a likely haunt of wildfowl. Already, as we noiselessly approached, ducks could be heard quacking loudly in several places, and we lost no time in repairing to a punt which had been placed in readiness for the foray. Away we paddled silently towards the calls. Our destination was a coveted reedy corner of the estuary and here we put the punt aground. This was our point of vantage, for in full view we discovered several paddlings of duck on the surface of the silvery-looking stream, whilst others were moving on its edge shovelling with their beaks in the mud. Two or three other big paddlings were on our left and right, but not within gunshot. As a few of these reconnoitred nearer to us I kept the gun at the "ready." I was tempted once or twice to open fire, when suddenly I heard a swish of wings behind me, and a colony numbering probably thirty or forty attempted to alight to within a few yards of the first paddling. Seeing the rare chance thus offered, I fired a rapid right and left into the middle of them at the right moment ere they closed their wings. This was indeed

one of my evenings out, my bag being a quartette, whilst a fifth got away with a broken wing. Dexterity, however, in reloading gave me this bird eventually—not a bad beginning. Alarmed at the reports, a couple of ducks came speeding across from my left, and the laggard of the twain I commandeered.

I then left my mate in the punt for his vigil, whilst I went forward. It must have been a mile or more before I came to a likely sheltered estuary covering nearly an acre. Hearing ducks quacking among the reeds which grew here, I managed to scramble into a dry ditch, which seemed to connect with a pond, and reached what was to me a favourite spot.

I could now view a large portion of the unfrozen pool, Loud quacking was going on but no ducks could be seen. Presently a nice little company emerged from behind some reeds. In almost breathless silence I gazed upon them, anxiously hoping they would come in my direction. Once they turned as if again taking to the reeds, but at length the leading mallard, judging all was clear, manœuvred in a way that was soon to bring his company within gunshot of the place where I was lying in wait. I at once opened fire from a point where I could not possibly be seen. Some of them were on wing before the shot reached them, otherwise the execution would have been much greater. I could distinctly see three left behind—two stone dead, while a third was making off for the reeds. Although I made a nasty reload the culprit escaped. I felt very comfortable as to results so far, and essayed forth with my spoit for the next adventure, which presented itself before I expected, for I had just turned to retrace my steps towards the coast when a couple were seen passing directly overhead. They were pretty high, but the moon just now shone brilliantly, and, aiming well in front of the birds, I lowered them both at my feet. Soon after I saw, whilst keeping a sharp look-out ahead, a mass of birds close to the edge of a stream leading to the sea. Stopping instantly, I peered through the night to discover my quarry, for the shape made by the patch of

birds surprised me not a little. Was it, after all, an animal on the water's edge? I decided to walk it up, and then my conjecture proved correct, and a solitary duck first left the dark patch towards the coast. Without more ado, I fired into the dark patch, but I was behind them, for all rose before the shot, and I was thus cheated of a fine coup. I felt I had miscalculated and my efforts had been in vain, for the mass of birds became invisible. "Never daunted" was my motto, and on my way to join the punt I heard behind me the significant whistle of widgeon. They were some distance in the rear, and I was able to ensconce myself among some sand-heaps covered with zostera marina, and I had not long to wait ere a big flight of these birds came straight over my concealed hiding-place. Bang! Bang! rang out my trusty fowling-piece. Great Scot! Seven birds and another floundering close by, which I eventually secured. Though I carried weight, my tread was elastic with success, and on joining my companion I found that he, too, had shared my good fortune—five mallard and three widgeon, a truly memorable night's fowling.

We wended our way homewards in the frosty Christmas air with our pipes well charged and our hands full.

"A HOLIDAY AT WILDFOWLING."

FOR years it has been my custom, whenever opportunity offers, and that said opportunity is on the occasion of a break in the dull monotony of every-day life, to make an excursion to new grounds for sport. On a certain Friday evening recently I packed up the customary paraphernalia, gun, cartridges, knee boots, etc., and journeyed to an unbeaten track on the Lincolnshire coast. I found a snug hotel on the banks of the sea in the Fen district, and having partaken of a cheery cup of tea, I sauntered alongside. Few birds were astir. In the distance I could hear, as night closed in, a few curlew calling. They were undoubtedly waiting for the tide to recede. One bird only passed alongshore, and I caught just a glimpse of it against the darkling sky. I fired somewhat at random, and with a stroke of good luck I hit it, but it fell in the long, fibrous, wet grass of the tide-covered saltings, where I allowed it to remain, as I was not desirous of retrieving it, at the cost of getting wet, and as my intention was that of prospecting, I had not donned my rubber sea boots. Nothing more did I observe that evening. The moon in all its glory then appeared in brilliant splendour, above the leaden wastes of the mighty Wash, its first rising tip shining like a fire bar on the horizon. In this delightful if weird loneliness, I retraced my steps to the hospitable hotel, where dinner was awaiting. The situation is ideal for a fowler. Here one is "on the job," so to speak; there is no tedious trap or motor ride, after the shooting. The sportsman goes from the door on to his shooting. Next morning the host gave me an early call. It took little time for me to be ready, and in quest of a shot. In order to facilitate that desire for sport, I selected an elevated mound on these saltings, approximately a hundred yards from the ooze bank. I found that this elevation was improvised, after draining operations, from the delves on the inside of the sea-wall.

Long grass has flourished on the mound, and thus afforded me cover, as I thought, sufficient for the object in view, viz., to negotiate the wary sea-fowl. I had not long to wait till a redshank came along—a nice shot—and to test my early morning prowess I doubled it up with a left of No. 6 shot.

Following in its wake to the south, and a mile or so behind, had been a quintette of curlews. These came along full wily. I imitated their call, and they sailed towards me to a nicety. I called more vigorously, but somehow they detected my imperfect cover, and seemed to veer seawards. However, "nothing venture nothing have," I let go the redoubtable left barrel, and was myself surprised to see that I had secured the rear bird, which fell in the tide-way, which I knew I could secure, when the tide had more flood. Another bird or two of the wembrel passed inshore, though beyond range of a shot.

As my position was becoming untenable by the inrush of the tide, and not knowing to what extent the rise would take, I took the precaution to retreat to the bank. Just then the notes of the golden plover were heard, and the bird then seemed to circle over head a half a dozen times, and as I was about to fire, it took a direct course and made away. Next a "shank" broke the silence; and a few large gulls loomed in sight. Then twisted along a turnstone, which, with a few calls, came foolishly my way, and was easily despatched. I then repaired to the back of the sea-wall, knowing that from the south the curlews habitually wing north in the mornings, when the tides run at about eight o'clock, and pass a point of the bank about half a mile north of the village. I had not long to wait till a small lot hove in sight. Incessant calling drew them nearer, but only one came within range, and paid the full penalty for doing so, and then a foolish young wembrel rushed to meet a mimicry of its notes, and also fell an easy victim. At this point sport seemed brisk. It was soon over however. More curlew passed, but well out of range. A goodly company of widgeon then sailed along, but of course, in such open

weather, far out over the water. A leisurely retreat brought breakfast time, and with appetites, of which only early shore-gunners can boast, I cheerfully set about doing justice to the inner man.

Thus passed my week-end.

A GOOD HAUL.

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PART II.

"THE EVE OF CHRISTMAS."

IT was the memorable eve of Christmas and I was desirous of celebrating the event by a wild fowling expedition to new grounds. The weather was sharp, the air keen, and the ground hard with frost—in fact a typical Christmas Eve. I hastily packed up and made for the nearest station to convey me by train to the required rendezvous, which I had, as it were, momentarily chosen. I at length reached my destination, and essayed forth unaccompanied, preferring to go on my "wild goose chase" alone. I was serviceably clad, high boots, and the customary paraphernalia, with, of course my invaluable twelve bore, being on this occasion, content with what sportsmen would call light artillery, I made perforce my own way from the quaint hotel, my new headquarters, to traverse a couple of miles of frost-covered mudflats, to what is locally known as "the slakes" or swad—to be more correct and understandable I was in short making for the vicinity of the "Zostera Marina," the feeding grounds of the host of the winged tribe. The windswept area of the estuary bore a truly desolate aspect—mile upon mile of perfectly level, tide-lapped sand, intersected by estuarial tributaries, and bordered in the distance, by cultivated land rising gently from the shore. Not a human being was to be seen, and the only sounds discernible were the rippling waters of the remaining ebb, and tne different notes of the waders—curlew (predominating), grey plover, knot; redshank, dunlin, gulls, and some herons, the latter perched like sentinels along the margin of the different streams. In deeper water some duck were floating on the tide, and I discovered a big bunch approaching over the flats.

I remained motionless, and as they swung round I rose and fired, dropping one not far away. With the lowering of the wind came the snow, and a somewhat

dense mist veiled the twilight with a greyish mantle. I made straight for the creek, in close proximity to the more abundant widgeon-grass. I trudged onward, ankle deep in shifting wet sand so recently washed by the ebbing stream, the wreathing snowflakes the while filling my eyes to smarting.

Reaching an elevated bank I awaited the coming of the birds.

The snow now ceased, and the moon shone out in all her brilliancy, casting a welcome beam athwart the mudflats, and lighting up the foam-tipped water of the estuary until it symbolized molten silver. I had not been esconced long before the whistling of wings heralded the approach of mallard, and a few moments later a nice bunch of this species flashed through the monnbeams, and passed clean over my head, on their way to feeding grounds at the extreme end of the main estuary. The ducks were evidently well within shot, and I had strong temptation to deliver a right and left; but then I was after more important quarry, and these reports would undoubtedly have scared bigger prey.

Just now however the wind changed from a north-easterly and piercingly cold, to a strong one from the mainland; and I knew that under such conditions the geese would not be uncomfortably disturbed at my reports.

Indeed so bright was the moon that one was able to distinguish the various species of waders, as they surveyed the mud-flats, not a long distance from my hiding-place. Various small colonies of mallard and curlew passed within easy shot, but these I ignored, and they were suffered to depart in peace. Above the various calls I suddenly heard the welcome "Torock, torock!" of brent geese, making straight towards me from the open sea. Now was a time of excitement. I crouched down and peered through the haze for the sight of fowl.

"Torock, torock," came many times during the process of waiting, as if the trumpet-majors of the brent, like the sappers on an expedition, were clearing the way for the host.

At length the music of voluminous wings, beating the air, sounded nearer and nearer. On and on came the legions in much quicker time than I take in relating it, until myriads seemed to pass over the disc of the silvery moon. Many of these perched not far away, and I could distinctly hear them ravenously tearing at the vegetation behind me. Presently a small gaggle, headed by a single sentinel, with his distinctive "Torock," came straight for me—seven in all. Raising my weapon, that had stood me in good stead on many a similar expedition, I pulled well ahead of the foremost goose, which, doubtless seeing the movement of my barrels, swung round right-handed, and down it came to the brink of the gully. I pulled again, but to no effect; and the remaining half dozen flew seawards, their notes of relief or warning being drowned in the multitudinous sounds created by the main herd of brents rising in a complete cloud on the left.

I had secured my much coveted Christmas Goose, and prepared to trudge homeward to the hospitable fireside. As I was about to remove the empty cartridges, however, preparatory to my return, again my trained ear caught the sound of wings, which I knew by intuition to belong widgeon, and saw straight overhead such a host, travelling low during the now overclouded moon.

My trusty firearm thundered forth its duet of sounds, and birds flumped down around me, beyond my wildest expectations; for I gathered five, all told. I walked home with an elastic tread, and felt an inborn conviction that for one flighting I had done not amiss. Had I secured none I would not have been disappointed seeing the place chosen was strange to me and there is the satisfaction that I saw birds in great variety and considerable in numbers; but the possession of my coveted goose, plus five widgeon and a mallard fully compensated me for time spent and the piercing winds of a desolate mud-flat.

I invariably go alone with the shoulder-gun in quest of fowl, for the simple reason that I can do my own bidding, and secure my prey in my own way. "Individuality, in this sport, courts success," is my motto; and I have

found it to be true on many a shooting expedition. Neither is there the danger of wounding a comrade should he shift his position, a circumstance which has befallen some friends of the writer in youthful days, on the Kentish Saltings.

It came about a few days after the capture of my goose that my genial hostess served the venerable bird—for so it proved to be—at table. I had heard of geese of tender years and of questionable age; indeed, it was averred by a writer in a contemporary that such a bird has been known to weather from thirty to forty winters.

At all events, the one under review completely beat my best endeavours to carve it, and I found it practically impossible to negotiate one of its legs, and so did my canine friend, to whom it was afterwards offered. Teeth were useless.

THE LITTLE AUK (MERGULUS ALLE).

IN the New World it is not abundant, save on some parts of its Arctic shores. In New Jersey it has been seen but rarely.

In the plumage of the summer, or while breeding, the head, neck, upper part of the breast, back, wings, and tail, are glossy brownish black, on the head and neck a somewhat browner tint, the tips of the secondaries are white, and the long scapulars are bordered with the same colour ; above each eye there is a narrow speck of white ; the under plumage is white, except a part of the long flank feathers covering the thighs, which have the inner webs blackish brown.

In winter the change is confined to the sides of the neck and breast, and the posterior parts of the cheeks, which becomes pure white. Its habits are gregarious ; they breed on ledges on rocks ; flight imperfect.

So numerous are they in the northern regions that flocks extending for three miles have been seen by travellers, and a single shot has magnetised half a dozen of these birds.

THE TURNSTONE
(STREPSILAS INTERPRES)

THIS bird, which is sometimes called the Hebridal Sandpiper, and by others the Sea Dotterel, is only a winter visitant to the British Isles.

It breeds in the north of Europe, and in the cold latitudes of both hemispheres, migrating late in spring from this country. From the time of its return during winter and early spring it may be found in small parties along the shores, frequenting chiefly those parts where there are jutting-out ledges of rock, or the smaller rocky islands.

It feeds on nearly the same substances as the Maritime Dotterels ; but, as the name implies, it actively turns over the small stones and other bodies on the feeding ground in search of prey ; and it is probable that this is more confined to the particular animals that hide or live under cover.

The flight is rapid, and a shrill peculiar whistle is uttered during it, or when suddenly startled which easily betrays its presence if associated with the sandpipers or dotterels.

No very authentic account of its breeding in our islands has been given, but it has been conjectured that it makes its haunt as near as Zetland from the fact that it is seen there all the year round. Its nest has often been seen also in Norway. It invariably takes a wide range for its breeding zone, viz., from the Cape of Good Hope, thence to New Guinea and the Straits of Magellan.

The adult breeding plumage is beautifully variegated with black, white, and chestnut. The forehead, eyebrows, around the auriculars, lower part of the back and upper tail-coverts, throat, belly, vent, and under tail-coverts, are pure white ; the crown of the head is black, and is relieved by the edges of the feathers being yellowish ; but the auricular feathers streak from the base maxilla stretching down the neck, surrounding the white of the throat, and occupying the whole breast (the white of the other lower part running up in the centre to a

point); and the rump deep black; the back, scapulars, and long tertials, are varied with deep black, and clear brownish-orange, some of the feathers being entirely of either colour, while others have the basal half, or the shafts only, black, and these colours do not seem to be disposed regularly, or the same in different specimens; the outer margins of the scapulars are narrowly edged with white, which mixes conspicuously in the general mass; the wings are dark brownish black, the secondaries with a broad white tip forming a bar across the wing; the base of the outer webs of the last quills are also white, showing a triangular spot adjoining to the bar; the upper tail-coverts lie over the tail, so as to conceal the whole of the basal white, and make it appear entirely dark with a white tip; the feet and legs are bright orpiment orange.

THE GOLDEN EYE (GLANGULA VULGARIS).

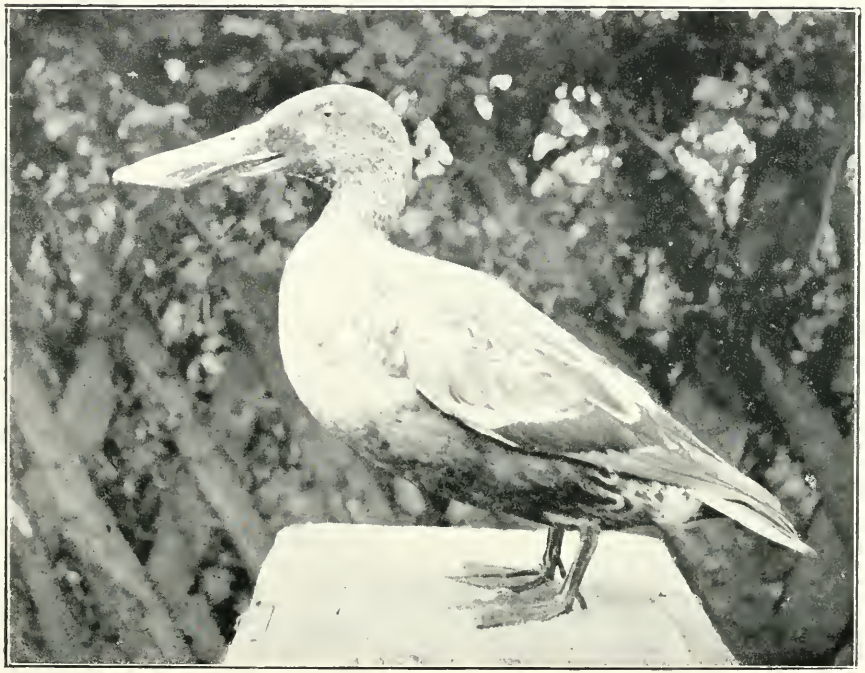
THE *Golden-eye* (*Glangula vulgaris*), which is a very handsome plumaged duck, is an excellent example of the garrots.

As winter visitants, they usually feed on the shallow parts of the coast at the foot of pools or estuaries, seeking their food by diving, and performing that act simultaneously, so much so that it is possible to approach them by easy stages, moving forward and standing stock still alternately, as the birds rise or dive, by which means a sportsman may reach the water's edge. They would then on rising take flight, never attempting to escape by again diving, as a grebe or diver would do.

The adult male has the head and upper part of the neck rich glossy green, the feathers of a loose texture, and capable of being much raised at will; the chin nearly black; but a conspicuous mark is an oval spot behind the base of the maxilla of pure white, which can be seen in flight even at a great distance.

The lower parts of the neck, breast, belly, and vent are pure white, the long flank feathers having the outer part of their inner webs black; the back and mantle part of the scapulars and long tertials black; the outer scapulars white, having their exterior webs margined with black; the intermediate wing-covers and last secondaries pure white; the quills and tail blackish brown; legs and feet orange.

In the female the head and neck are umber-brown, the breast grey, and remaining under-parts pure white.



SHOVELLER DRAKE, WINTER PLUMAGE.

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THE COMMON SHOVELLER (ANAS AYPEATA).

THIS very beautiful and interesting duck is of considerable rarity in Britain, generally considered as a winter visitant, but now known to breed in limited numbers in the marshes of Norfolk. Nests have been discovered in the Firth of Forth, where at one time was a good deal of marsh land, and many small reedy pools of water.

In its habits it is regarded as an inland bird, but at times it is shot on the shores of some of our islands. Another authority regards it as promiscuous in its feeding, and never procures its food by semi-immersion, nor does it dive unless when hard pressed. In America it is much esteemed for the table, and the menu of the Duke of Norfolk years ago at a special feast consisted, among other fowl, of four seapeys and two shovellers.

Bill black, the head and neck in some lights appear brown, in others rich green, but anterior to the eyes, and on the crown and throat there is the least reflection of the bright colour ; lower parts of the neck, breast, scapulars, and sides of the rump, pure white ; back blackish brown, gradually shading to greenish black on the rump and upper tail-covers ; whole of the wing anterior to the greater covers with the outer webs of the large scapulars greyish blue ; the latter have a remarkable form, the inner white web being produced in a narrow point beyond the outer ; the lower scapulars are greenish-black, the tips along the shafts for a narrow space white ; lesser covers clove-brown with white tips, secondaries bright green ; belly, vent, and flanks, chestnut-brown ; under tail-covers glossy blackish green ; tail clove-brown, with pale edges.

THE COMMON PINTAIL (DAFILA ACUTA).

THE *Common Pintail* (*Dafila caudacuta*) or *Sea-Pheasant*, is a periodical visitant, arriving in October, and occurring chiefly during winter, both in inland lakes and fens of the south and on the coasts of England and Scotland. In Scotland, however, it is by no means frequent, and it is nearly certain, as an old writer correctly observes, that the long-tailed duck has been mistaken for it on the Western Island and northern coasts, where its presence has been regarded as more frequent.

In the male the colours are very decidedly marked : the head, throat, and forepart of the upper neck are umber-brown ; on the crown, with the feathers having pale tips, and on the hind head and sides of the head and auriculars, having a bright purple gloss ; the hind head shades gradually into deep greenish black, forming a dark nuchal stripe joining with the grey plumage of the upper parts ; the fore part of the neck, breast, and belly are white, that colour running up in a narrow lateral stripe between the umber-brown throat and dark nape ; on the belly and sides the feathers are minutely freckled with grey ; the vent and upper tail-covers black ; the lateral covers edged with white. On the upper surface the lower part of the neck, back, and part of the scapulars are marked with zigzag bars of black and yellowish-white, giving a grey tone to the whole

Also called Long-neck

THE KNOT (TRINGA CANUTUS).

THIS bird, from its very different seasonal dress, has also undergone a variety of nomenclature, but is now understood in its changes. It is not known as a summer bird with us, or as breeding in this country, although it remains sufficiently long to attain its full breeding dress, and often returns with it only partially changed.

After they have recovered from their migration they are rather shy and difficult of approach; at other times again they may appear utterly regardless of danger, and on Holy Island, Northumberland, one may often manage to get within ten or twelve yards of a large flock of these birds, mostly of the first year's growth. These latter must be those that have recently arrived from their long flight, for, even when disturbed by a shot, they would not remove more than from fifty to one hundred yards, alighting and crowding the tops of the isolated rocks which are found mostly near the caves or "coves" of this island.

In the plumage of incubation we see the reddish-orange predominating; all the face, crown, and under parts, from the chin downwards, are of that tint, on the cheeks slightly spotted with brownish-black, and on the crown and occiput having the feathers broadly marked in the centre with the same colour. The centre of the back, scapulars, and long tertials are deep blackish-brown, on the first having the feathers broadly margined with buff-orange, on the latter having them irregularly blotched, and cut into with yellowish-white.

The quills are clove-brown, paler on the inner webs, and having the shafts broad and white; the tail is dark brocoli-brown, tinted with rufous.

In the adult full winter dress, the plumage above is brocoli-brown, on the crown and back of the neck with the centre of the feathers darker, on the back having the shafts only dark; the under parts of the bird are pure

white, having the feathers on the cheeks and neck dark in the centres; on the breast these are broader, and on the flanks they are distributed in irregular waves; the rump and upper tail-coverts are white, with the upper plumage, the outer feathers paler in shade barred with clove-brown; the tail is nearly of the same tint, all narrowly edged with, and having the shafts yellowish-white. Its breeding-place is Northern and Arctic Europe, Northern and Arctic America, and New Holland.

RICHARDSON'S SKUA (LESTRIS RICHARDSONII).

THIS species has been evidently considered by many authors as the true parasitic or Arctic gull, and it has been described as *L. Parasiticus* and *Crepidatus*. It is certainly the most common of the British Skuas.

It breeds in the Hebrides, Orkney, and Shetlands, where it is more diffused and more abundant than any of the others of its kind.

The entire plumage is usually of a greyish clove-brown, paler beneath, the edges and bend of the wing only being white ; the auriculars and sides of the neck slightly tinted with shining sienna-yellow.

Before passing from this remarkable species of gull, I may say it is generally stated that they derive their whole food from their energetic pursuit of other birds, using what they are made to disgorge.

In the somewhat analogous case of the fish-hawk; we know this is practised ; but at the same time these birds can and do forage for themselves, and one is almost inclined to believe that the Skuas are not quite dependent on the work of others, but occasionally seek food for themselves, and that the large species will feed on carrion thrown upon the coast.

The writer must here confess that he has never seen these birds employed for themselves, but there is the possibility of their industry in this direction.

THE COMMON SKUA (STERCORARIUS).

THE *Skua* is a northern bird, appearing on our shores in autumn and beginning of winter.

Specimens have occurred on the coasts of Norfolk, Essex, Kent, Sussex, Devon, and Cornwall, and they have been observed on the Solway Firth, on the Northumberland coast, Holy Island notably, and far up the Firth of Forth. These seem almost its most southern range; and it is there seen now flying swiftly over the waves, now pursuing some of the weaker gulls, following them about as a hawk does a small bird, and generally finishing the chase when the victim has given up its own prey.

Scotland is supposed to be out of its breeding range, for the isles of Shetland is its southern limit for this purpose, and St. Rona's Hill has been long known as a favourite station there; it incubates in pairs, making the nest among the moss and heath (not on rocks as the true gulls), and during this time both sexes are very fierce and courageous in defending their property, driving off all animal intruders, and they are said even to attack man when he enters upon their precincts.

The more proper territority of the skua is, however, northward; it is found in the Faroe Islands, Norway, and Iceland, Nova Zembla and Spitzbergen. It is a powerfully made bird, little inferior in size to the lesser black-backed gull, but of a thicker and stronger make.

The ground colour of the plumage may be said to be shades of clove-brown, the feathers in the centre yellowish and reddish-brown; on the head and neck the feathers are pointed, and the yellowish-brown prevails on the sides and auriculars; on the lower parts the ground tint is paler, and in the centre the reddish-brown prevails; the secondaries, quills, and tail are nearly brownish-black, the base of the quills with their shafts white; the tail is rounded; legs and feet black, front of the tarsi irregularly scaled; the other parts with small prominent rounded or oval scales, rough to the touch, and reminding one of the fish-hawks.

THE TWIST-TAILED OR POMATORHINE SKUA (STERCORARIUS POMATORHINUS)

THIS bird belongs to the species of robber gulls. Its home is in the Arctic Seas from whence it strays southwards in winter, and has been seen occasionally on our coasts. Its habits, however, vary but little from those of the other species. The peculiar mal-formation—so to speak—of its tail feathers is its distinguishing mark. In this bird you have a series of these feathers standing perpendicularly, not as in other birds, horizontally. Upper plumage dark brown; feathers of the nape long, tapering and glossy; upper plumage and sides of face white; brown spots on the breast, and on the flanks; ends of the tail-feathers and quills white, save at the very tip; two central tail-feathers projecting beyond the others; length twenty-one inches. Upper plumage of young birds dusky-brown mottled with dark yellow. Eggs a peculiar green; spotted with dark patches.

During November a very fine specimen was shot by a native fisherman on the Slakes in the company of a bunch of widgeon. It was the first of its kind ever seen by me on Holy Island and therefore forms an important item in my catalogue of the sea-fowl of the Northumbrian coast. As I do not possess a taxidermised collection I sent this bird to a wild-fowling friend at York, and it certainly augments the number already enumerated in my previous notes on the liberal avi-fauna found in this famous haunt of the migratory birds. This species of robber gull is most voracious in preying upon other birds. It has been known to attack the ordinary gull and some of the larger species of duck, and it is recorded that in captivity one of these birds devoured a quarter of a hundred sparrows at a meal.

THE EARED GREBE (PODICEPS AURITUS).

THIS, doubtless, is the rarest of the British species. It remains to a great extent a matter of doubt as to the exact place of breeding, and in consequence of its very rare occurrence its habits are not so well known as others of the grebe family. Various English counties are accredited with its capture, but Northumberland stands pre-eminent in this respect. It is supposed to breed very rarely in the north, and its range is said to be Eastern or North-Eastern Europe and Asia. It is also common in the Adriatic.

The bill is black, about an inch in length, measured from the forehead ; depressed at the base, and having the tip slightly reflected ; lore blackish-red ; crown of the head and short ruff round the neck, shining black ; from behind and below the eyes, on each side, a tuft of long, slender, shining, orange-buff feathers, which cover the ears and nearly meet behind ; throat, neck, sides of the breast, and upper plumage deep shining greyish-black ; flanks and sides reddish-brown, mixed with greyish-black ; secondaries white ; under plumage white, with a silky lustre.

In the plumage of winter it closely resembles the horned grebe, but may be distinguished by the turned-up form of the bill, and the eared grebe is altogether more slender and graceful.

THE GREAT CRESTED GREBE (PODICEPS CRISTATUS).

THIS bird—sometimes called by authors the dab-chick—is a large and fine species, the largest of the genus, and in the plumage of incubation has an imposing appearance from the rich coloring and ample adornments of the head and neck. Unlike the divers, the larger grebes have their range to the southward, and continue resident in many of the English counties for the whole year, and more particularly in the fenny districts; to the North of England they become more unfrequent in summer; in fact, it is scarcely ever seen on the borders during summer.

It is only met with here as a winter visitant. In Holland it may often be seen on the inland waters, and, in fact, it can be seen almost anywhere between Norway and the Mexican coast, so universal is its range. It has been descried passing through the air in flocks of seven to fifty in number.

The nest, placed among reeds or aquatic herbage, is formed of decayed plants, and is sometimes of considerable bulk. The old birds at this time are very wary, the female sliding almost imperceptibly from the nest, dives, and rises at a distance, leaving her track without a possibility of being discovered.

The usual characteristics of the species are: forehead and crown greyish brown, and on each side of the latter the feathers become elongated, and form two lengthened tufts, the colours gradually shading into deep greyish black; from the base of these tufts, around the auriculars and throat, springs an ample ruff, which can be displayed at pleasure; the chin and below the eyes shading into orange-brown, which deepens in shade towards the terminal end of the ruff, where it becomes lustrous greyish-black; the occiput and neck succeeding the ruff are chestnut-red and brownish-black intermixed; the back of the neck, upper parts, and wings are blackish-brown, darker

on the back, and therewith slight greenish reflections; secondaries white; the back of the neck tinted with grey; the fore part of the neck below the ruff, breast, belly, and vent, silvery white; sides of the breast and flank, dashed with brown and chestnut.

It is noticed that the young birds want the ruff and the deeper rufous tints in the plumage, and it used to be considered that these were the distinctions of the nuptial dress, but in specimens kept by the Ornithological Society the ruff has been retained throughout the year in one or two instances.

It would be exceedingly interesting to know at what age this bird retains a permanent set of plumes.

THE POCHARD (FULIGULA FRINA).

THIS is a hardy northern bird of somewhat wide geographical range, with considerable flight power. It is also a skilful diver, and does not confine itself particularly to any one kind of diet (both vegetable and mollusca).

It is known, in the south of Europe as a winter visitant. Red-headed Pochards are as numerous in Norfolk as any other kind of duck which falls to the fowler's gun. Great numbers may be seen flying over the fenny districts in the evenings, whilst in the day time they are mostly skimming over the seas and estuaries. As these birds are esteemed as an article of diet there is a ready sale, and they thus contribute in no small measure to the support of the seaside population, when the customary avocations of fishing, etc., cannot be followed. These men may be seen prowling around the shore armed with guns of various calibre, for the chance of securing in a few of these ducks the substitute for a day's fishing.

The nomenclature in different districts varies, for instance the red-head, dun-birds, etc., The red-headed; however, must not be confused with the red-crested.

Generic marks—Head and neck light-chestnut ; breast; upper parts of the back, and rump, black ; back, scapulars, flanks and abdomen greyish-white; marked with wavy lines ; bill black with a lead-coloured band ; feet lead colour ; membranes black. Female smaller ; head; neck, and breast, reddish-brown.

THE SCAUP (FULIGULA MARITA).

THIS very handsome species will give some idea of the general form of the pochards.

In form these birds are compact and heavy, the wings comparatively short, but sharp pointed, and propelling the bird. when once fairly raised, by short but rapid and oft-repeated strokes. The body is broad and depressed, of a form fitted for buoyancy, but at the same time, from its weight, sinking deep in the water when swimming.

This bird is a regular winter visitant to the coasts on the North of England and South of Scotland, and from the testimony of most writers it is nearly equally so on both the southern and northern extremes of our island.

It arrives about the end of October, and continues with us till spring, frequenting the lower lying coasts of a soft or muddy character, and feeding on sea grass and vegetable substances, the smaller bivalves, which are generally found there in abundance. Its usual practice is to stick to the sea in preference to fresh-water streams. It is a shy and wary bird, assembling in flocks and feeding together; at the same time, with a stormy wind, one can get within shot, especially when feeding in the muddy creeks of the Solway Firth.

The male in full plumage is a showy bird; the bill is a bright, bluish-grey, with a black nail; the head and neck brackish-green, with glossy green and purple reflections; the plumage full, and of a silky texture; the lower part of the neck and breast are deep black, belly and flanks white, the vent waved with narrow lines of blackish-grey; the mantle and scapular feathers, contrasting with the other dark plumage, are clear greyish-white, strongly marked with wavy zigzag lines; quills black, secondaries having short black tips, but with the base white, forming a light bar, lesser covers traversed by white lines; legs and feet bluish-grey, webs darker.

THE GREAT GREY SHRIKE (LANIUS EXCUBITOR).

THE shrikes are generally of a size and form exhibiting a moderate degree of strength, and strongly show indications of raptorial disposition, especially in the strong and toothed form of the bill; and in many of the species, the centre feathers of the tail being longest, an elegance and lightness to their shape and figure is imparted, at variance with the powerful form necessary for contest.

The Common Grey Shrike is perfectly typical in its form, and will rank among the larger species of the genus. In length it is about nine inches, appearing more graceful from the graduated form of the tail, though it is in reality a firmly and compactly made bird.

In the old male the upper parts are of a chaste and clear pearl-grey, while the whole of the under parts are pure whites; these tints are beautifully broken, and contrasted by the deep black of the greater portion of the wings and tail, and by the marking of the same colour which appears on the forehead, the lores, and on the auriculars; on the latter there is an oval patch resembling in form and situation the distribution of the darker shades on these parts of the falconidæ.

The wings have the base of the primaries white, forming a triangular mark on these parts, and the exterior tail feathers, with the tips of all the rest, except the two in the centre, the space widening to the outside, are of the same pure tint. The female has the colours in general duller, and the breast is undulated with narrow dusky transverse bars.

The bird is only an occasional visitant to the British Isles, and that even of rare occurrence, except in some of the southern and midland counties of England. Towards the north and on the confines of the border, it becomes less frequent; in the South of Scotland it is a rare bird, a few instances only of its capture having been noted;

neither have any instances of its breeding in this country ever been recorded.

The eggs are from five to seven in number, they are of a blueish or greyish white, spotted and blotched over with brown or purplish grey.

THE TERNS.

OF the Tern species the *Roseate*, or *Sterna Dougallii*, is the most elegantly formed of all the kinds, but it is, in the North of England at least, uncommon. Going back a hundred years or so, these birds were unknown in and around the Farne group of islands and elsewhere afterwards they were identified. As years rolled on they brought others, till half a century ago writers spoke of these birds as being numerous, but in our day they have again vanished, and only a few individuals are ever seen south of Scotland.

Their breeding place on the Farnes was formerly on the outskirts of the station occupied by the Arctic Tern.

All these birds are very light, the body being comparatively small, and the expanse of wings and tail so buoys them up that when shot in the air they are sustained, their wings fold above them, and they whirl gently down like a shuttlecock. This bird is remarkably buoyant. They are of most delicate form, the pale tint of the mantle, the rosy hue of the under parts when newly killed, and by the bill being black as far as the nostrils, the base of it only vermilion-red. The forehead and crown passing narrowly below the eyes, and terminating in a peak on the back of the neck, deep black ; the mantle and wings very pale grey ; rump and lower back, white ; tail long; and outer feathers narrow.

They also breed in the Sandwick Bay, Stornoway, Isle of Lewis, and in many parts of Scotland, St. Kilda, Isle of Man, etc.

THE RAZOR BILL AUK (ALCA TORDA).

THIS species on some coasts is nearly equally abundant with the Guillemots, and resembles it much in habits, breeding in the same manner and gregariously on the same rocks, appearing off our shores and in our firths and inlets during the winter in small parties.

They are easily approached in a boat, but they do not allow the hunter to come so near as the guillemots, diving or taking wing when a boat approaches to within thirty or forty yards. The wings are shorter, and it has a more rapid flight, which is swift while it lasts. It seems to skim the water in winter time.

This member of the Auk family is found breeding in suitable localities over a long range, viz., from Shetland to the Isle of Wight, and thence southward. It is supposed to be equally abundant on the continental shores, but there is uncertainty as to the exact southern limit.

Certain it is that the Zoological Society has received specimens from Tangiers; in the Arctic Seas it is also found. It has been found breeding in the fissures of rock in British North America.

In the breeding plumage the head and neck are brownish black, of a paler or browner tint on the throat, a narrow streak of white extends from the culmen of the bill to the angle of the eye; the plumage is thick and soft; above, very deep brownish black; the secondary quills tipped with white, forming a narrow bar across the wing; tail cuneated with the centre feathers, narrowed towards the tip; under plumage entirely white; the bill black, transversely furrowed, with a line of white in that of the centre; legs and feet nearly black.

In the plumage of the first year, when it is known under the name of Black-billed Auk, the bill is very weak, and the indication of the white streak to the eye is just marked; the upper parts are as in the adult breeding state, but without the lustre; while the chin, throat, cheeks, and sides of the head, as well as the under parts, are white; the light colour passing over nearly to the occiput, where it is very slightly clouded, and the feathers become gradually purer, the tips for a certain space only being dark.

THE PUFFIN (FRATERCULA ARCTICA).

THIS curious bird, usually called Sea Parrot by fishermen, is found in this vicinity from March to Autumn. Its usual companions, the Guillemots, also accompany it on the Farnes during breeding time.

It may be said to take an exceedingly wide range during the summer, for some of the species breed on the southern coasts of England and Ireland. On the Bass Rock, in Scotland, the holes in the ruins of the old fortifications afford a retreat, burrows being also made in the shelving ground in front of the building. On a small rocky island opposite the harbour of North Berwick a large colony of these birds used to resort.

Various island and northern tribes in whose neighbourhood they breed have been known to use its flesh as an article of diet, and the "Voyagers round the Coast of Scotland and the Isles" have stated that their chief sustenance consisted of the small sea-fowl (puffin). They have been known to breed in large numbers in Labrador, hence the previous statement that the bird takes a very wide range for its haunts.

Now as to plumage. Cheeks and throat pale grey, when viewed from the side appearing as a round pale patch on the side of the head; the colour is darker at the sides of the chin and immediately behind the eye, where the line separating the auricular feathers from the others is apparent; eyes protected by a large scale above and below, that above triangular, that below oblong; crown forming a band to the occiput, collar round the throat, upper parts, wings, and tail, black; on the crown and collar, tinted with grey under parts pure white.

The bill occupies the whole face of the bird, is very much compressed, and is traversed on the madella by three, on the mandible by two furrows; the colours are bluish-grey and orange-red; the sides of the mouth are furnished with a corrugated orange-yellow skin. Feet and legs orange-red.

THE VELVET SCOTER (ŒDEMIA FUSCA).

THE *Velvet Scoter* (*Œdemia Fusca*) is generally designated the Velvet duck or double Scoter. This fine species is also a sea duck in the most extensive sense, and is a winter visitant on our coasts. They are sometimes taken by the gunner, who can generally contrive to get quite close and well within range, for the extreme shyness which is oftentimes attributed to them is not a reality. They do not usually rise until the pursuer is within forty yards of them.

Their food is chiefly bivalve molusca, frequently those of a very hard structure ; the strong covering of their very powerful gizzard enables them easily to bruise and triturate. Its range of migration is also very wide, for out of Britain the continental ornithologists have found it in Southern Italy. Its places of nidification are, however, well known, but it has been observed by northern travellers in Norway, Sweden, and Scandinavia, and in Lapland it is common everywhere. In North America it is also migratory.

Plumage entirely of a deep velvet black, except a pure white spot on the lower eyelid, which passes behind the eye in the form of an acute angle, and the tips of the greater covers, which are of the same colour, and show a bright and strongly contrasting bar across each wing ; on the head and neck the colouring is without lustre and soft ; the base and margin of the bill are black, the other parts bright orpiment-orange ; inside of the tarsus carmine-red, toes orange-red, the membranes black.

In the female the plumage is brownish-black, paler on the under surface, on the auriculars a patch of greyish white ; the bill and legs have not the vivid colouring of the male.

The young much resemble the female during the first year, the white spots on the head being apparent ; the feet beginning to show their brilliant colour.

THE RED BREASTED MERGANSER (MERGUS SERRATOR).

THE *Red-breasted Merganser* (*Mergus Serrator*). It makes its nest, like the Eider, with its own down a few yards from the water of the more retired Highland lochs. When the female commences sitting she is left by the drake, which retires and completes its moult, after having assumed a somewhat duck-like appearance.

The female is the Dun diver, but the handsome male has the head and neck greenish black, mingled with a few reddish-brown feathers ; the occiput adorned with a long loose crest ; the lower neck and upper breast reddish-brown ; the back, sides of the breast, scapulars, and quills, black ; the lower part of the back, rump, tail, and flanks, grey, the latter with narrow irregular bars of black ; the breast, belly, and vent, salmon colour ; the greater wing-covers and secondaries, white, each with a black base, which forms a double bar across the wing ; the tertials white, with a narrow edging of black ; but a most conspicuous marking is seen in a few rather large feathers which spring from either side of the breast above the bend of the wing, and over which, while the bird is at rest, they fold—these are pure white, with a margin all round of deep black. The colours are more distinctly marked in the breeding season.

THE GREAT NORTHERN DIVER (COLYMBUS GLACIALIS).

THIS very handsome bird occurs on the shores of England, during winter, in a manner similar to the black-throated diver, but less frequently; and upon all the British or Irish coasts it is much more rare. From the Firth of Forth to the Tyne may be said to be his favourite grounds during a hard winter. It breeds in the Faroe Islands, and Iceland.

A curious bit of Lapland folk-lore may be inserted here. The inhabitants of this far north region believe that should a person hear the cry of any of the divers in the spring, and while fasting, the milk from his flocks will not curdle for the whole year.

The people here make two sorts of hats from the skins of the different divers, which are either given as presents or sold to traders on the coast. The one kind, and which must have rather a handsome appearance, is made from the skins of the Great Northern diver; the shape of the head is formed out of several sk;ns sewed together, and an entire skin, with neither the head nor tail cut off, is placed overhanging, the head and bill turned in front. The other kind of hat is made of five skins of the neck of the Northern Diver, with a portion of the breast specially prepared.

In the plumage of the first year, when the bird is known as *Colymbus immer*, the whole under surface is pure white, shading upwards on the head and neck to greyish-brown or clove-brown; the back and wings a very dark similar tint, each feather broadly margined with grey; the bill pale, except along the culmen; the inside of the tarsi and toes of a much lighter colour. The adult male, in spring, or at the commencement of breeding, is a remarkably handsome bird, as follows: Bill black, paler towards the tip, nearly three-quarters of an inch long, much compressed, tapering, the upper mandible gently arched, the lower one channelled beneath and deepest in the middle,

the angle sloping gradually upwards to the point ; tomia of both mandibles inflected ; head and neck black, glossed with purplish green ; transverse bar upon the throat, middle neck, collar, and sides of the upper part of the breast, black, the feathers having raised white margins, which give these parts a striated appearance ; the whole of the upper plumage glossy black, each feather having two pure white spots, one on each side of the shaft near the tip, forming rows ; those upon the scapulars and tertials large and quadrangular, but becoming small and nearly round upon the lower part of the back and rump. Flanks and sides black, spotted with white, the rest of the under plumage white ; the long axillary feathers the same, with a black stripe down their centres ; tail short and rounded, consisting of twenty feathers ; legs greyish-black.

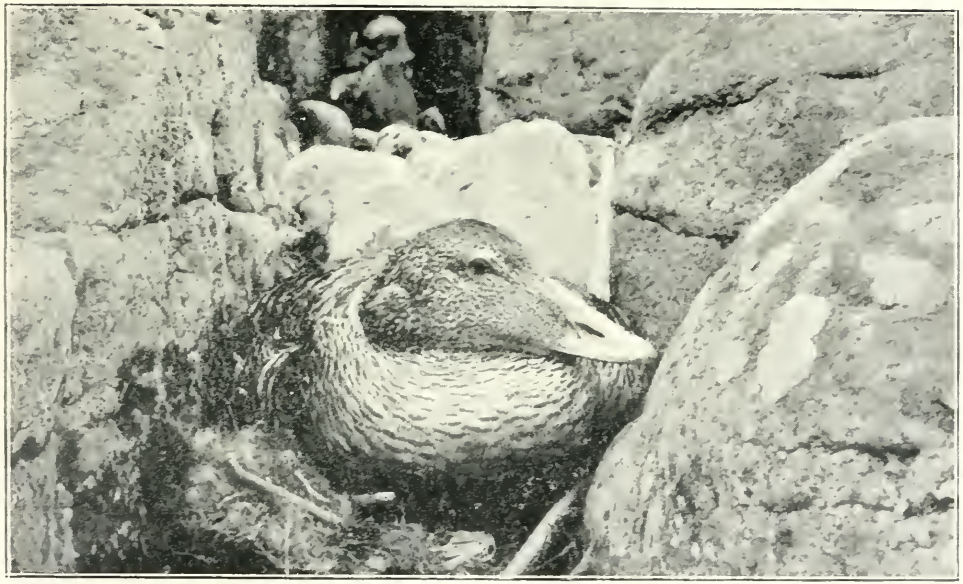
THE COMMON EIDER (SOMATERIA MOLLISSIMA).

THIS gaily-plumaged but rather clumsily-formed duck is a good example of the genus. It is completely maritime in habits, frequenting the sea coasts or islands, and in its distribution is a northern bird. In North America it is noted by many ornithologists, but New York is usually the limit of its range southward.

The plumage of the head is short and soft; the forehead and sides of the head running in a line with the lower part of the eyes, and terminating in a narrow point opposite the nostrils, rich bluish black, having in some lights a deep bluish tint; this is divided on the crown from the line of the eyes backwards by a narrow line of greenish-white; the occiput and sides of the neck, with a large patch rounded inferiorly pistachio green, the feathers being rather long and stiff, capable of being raised at will; the cheeks, neck, back, and sides of the rump, pure white; breast, rich cream-yellow; the wings above the greater covers, scapulars, and tertials, white tinted with straw-yellow; the latter loose in their webs, and curved over the wing; the rump and upper tail-covers, belly, vent, and under tail-covers, black; the greater wing covers short and black; secondaries blackish-brown; quills and tail greyish-brown; bill and legs greenish yellow.

Among the small parties on our shores, many birds are noticed of a piebald appearance, and are really those that have not attained their complete dress, which includes a period of four years, the time allotted by the large majority of British writers.

The female has a more subdued plumage altogether.



EIDER DUCK AND NEST

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THE COMMON SHELLDRAKE (TADORNA BELONII).

IN the full adult state of this bird, from the decided markings of clear white, reddish-orange, and black, it is one of our most beautiful and clean-looking ducks. It is a truly maritime species, or a shore duck, being seldom or never seen far inland, nor frequenting fresh waters, except during the season of incubation.

It breeds in the holes and crevices of rocks, and when near a warren selects the rabbit burrows. When the young are hatched, they are conducted to the sea, and are sometimes carried in the bill of the parents to their protecting element. If come upon when the young are newly hatched, the old birds endeavour to lead off the intruder by feigning lameness, like some of the rasores and grallatores, but when they have reached a more advanced state, unless a dog is present, they almost invariably fly straight away.

Head and neck glossy blackish green; lower part of neck and upper breast pure white, succeeded by a broad pectoral and narrow dorsal band of pale chestnut-red; centre of back, rump, tail, shoulders, lesser wing-covers, sides, and thighs, pure white; scapulars, quills, and tip of the tail, black; tertials white, outer webs broadly edged with chestnut, separated from the white by a dark line shading into both colours; centre of the belly and running through the chestnut band, black; vent and under tail-covers, pale yellowish red.

The young birds have not the bright colouring or decided markings of the old; the chestnut colours are more of a blackish-brown; and the white is clouded with grey. The glossy black of the head and neck is also wanting; the fore part of the neck being white, the crown and back of the neck blackish-brown.

Of the Ruddy Shelldrake only a few specimens are found in this country.

THE COMMON WILD DUCK OR MALLARD (BOSCHAS FERA).

THIS common and useful species is abundantly distributed over all our British Islands, few localities being without some parts suitable for their habits, and many districts being peculiarly adapted for them ; at the same time causes similar to those which have operated on the frequency of many other species have very materially diminished the numbers of the wild duck, and among the most serious is the profuse system of drainage which has taken place in many of the lower lying counties of England, where decoys and the produce of the fens furnished a regular and often handsome income.

Upon the sea coast there is always a considerable number to be seen during winter, and in severe weather, but bearing no proportion to the large flocks of widgeon and some of the true sea ducks.

One peculiarity which will always distinguish it as a species is the dark green curled feathers of the tail, showing a development or variation carried out in other parts or in other ways among the members of this or other very nearly allied genera.

The young males in their first dress resemble the female. The males, after the season of incubation has passed, lose the green head and distinguishing plumage of the upper parts, and become of a more sombre tint.

A sight that is very rarely met with is the happy contentment exhibited by an animal and bird side by side in one nest.

A gentleman who, a year or two ago, had a fancy for keeping homing pigeons, all at once missed a pair from his loft, and after diligent search the culprits were found at the rear of the dwelling-house, the male cooing its love-song, whilst the female covered a couple of eggs, and in close proximity—in fact, only an in chor two distant—was the domestic cat, fondling, in a curled-up position, her progeny of five kittens. Perfect harmony prevailed,

NEST OF WILD DUCK.

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and the young pigeons were duly hatched, and took to themselves wings.

Speaking of peculiar bed-fellows, I discovered a nest near the Lough last year containing fourteen eggs, six of which were that of the mallard duck, and the remaining eight were partridge eggs, presided over by the hen mallard. It was, to the naturalists, a great disappointment when the nest was eventually harried, for it would be hazardous to speculate on the composition of the brood.

The question has often been asked, "Does the mallard duck breed in captivity?" The best solution is centred in the fact that at the present time, what is termed the common duck (hen mallard) is sitting hard on ten eggs. To my knowledge this bird is one of five that have been winged, or in some other way captured, and the little flock, with wings clipped, go about similar to the ordinary farm-yard duck, and they are prolific in the matter of egg-production, also similar to the ordinary farm-yard duck, though the eggs are laid in batches, as though intended only for incubation.

UNORTHODOX NESTING.

WHAT possessed the blackbirds which built their nest above the cylinder of a Westinghouse brake of a meat van? A naturalist states that the blackbird is not, as a rule, unorthodox in the selection of its nesting place, but many birds there are which select all kinds of strange abodes in which to transact their family affairs. The robin chooses all sorts of queer spots—tool baskets, farm waggons, old watering cans are often made use of—and the birds are almost always unmolested by the owners of the borrowed articles. A duckwing hen has been known to lay in a starch box, placed on the kitchen dresser, while the owner's family were at dinner. A second hen favoured a nest among the pots and pans on a scullery shelf.

THE COMMON WIDGEON (MARECA PENELOPE).

THIS bird, also called "Whew" by authors, is exceedingly shy, and though it breeds inland, it frequents the coast more commonly than many others.

From the hallux being slightly lobed, and from the bill having that peculiar blue colour seen in the scaups and pochards, and altogether, although its habits of feeding are more goose-like and grallatorial, there is something that assimilates it to the maritime species.

The male widgeon, like most of the other ducks, receives his full and beautiful plumage in complete perfection in autumn, putting it on in winter, but gradually attaining more brilliancy as the season for pairing advances; while, after incubation, it becomes of a more unobtrusive description, approaching nearly to that of the female.

In the male, in adult plumage, the bill is bluish-grey, black towards the tip, and having the nail of that colour the forehead and crown are pale buff-orange, chin and throat black, while the rest of the head and neck are rich orange-brown; breast purplish-red, tinged with grey; belly and vent pure white; the back, scapulars, sides and flanks are finely waved with irregular bars of black and white; smaller wing-covers next the shoulders grey, the other pure white, the greater covers with black tips.

Widgeon delight in feeding on the same food as noted when referring to the brent. This food is a long weed with succulent white roots, which grows on the mudflats in various estuaries and on the coast. Its scientific name is Zostera Marina, but it is known in many places locally by gunners as "wrack grass," "zos," "widgeon weed," and so on. At daybreak the ducks seek the open sea or bays for safety during the day, but if the weather boisterous they will fly along-shore, in trips searching for a safe shelter. At such times they also often resort to the mudflats, and should any fresh-water stream run

through the flats at low tide the ducks will be found during bad weather in incredible numbers sporting and drinking, or else dead asleep in the vicinity of such quarters. But ducks are hardy fowl, and little shelter will suffice for them; thus it is only at places where the tide recedes far out from the mainland that ducks may be met with availing themselves of such conditions. The sea ducks feed day and night, according to tide times and conditions of the weather.

Shore birds—*i.e.*, those of the wader tribe—are very regular in their habits in winter. As the tide flows and so covers their feeding-grounds, shore birds of the commoner kinds, such as curlew, plover, godwit, redshank, knot, and dunlin wing in small parties higher up the estuaries or along the coast to places where sandbars, salting edges, or islands are to be found, and on which they may rest until the tide recedes. Their chief feeding-times are governed by the tides; thus it is compulsory for them to seek their food both day and night.

They feed most greedily between half-ebb and ebb tide, but when high spring tides are running, which keep their grounds covered so long with water, they become anxious to feed as soon as the tide has left bare the first tract of feeding ground. In autumn, when high tides occur and no resting-ground on the shore is left bare at top tide, the shore birds will often resort to large pastures, fallow fields, and such places inland. If disturbed, they then take wing to sea, where they will fly for hours together until the tide again ebbs.

Shore birds of the larger and more worthy kind, such as curlew and godwit, when much persecuted become exceedingly wary, and fly high when crossing what they know to be dangerous spots; but in the usual course of things these birds, if unmolested, make their daily tidal flights at no great height. Flying against a strong wind; they merely skim the ground, only rising a little to take the banks.

THE COMMON TEAL (BOSCHAS GRECCA).

THIS small species is one of our most beautiful ducks, the male in adult plumage exhibiting a richness and variation which can scarcely be exceeded. It is not nearly so shy a bird as many of our wild fowl, and with ordinary care may always be approached; when disturbed, it flies in circles around, wheeling somewhat like plovers; and if taken at the proper time, several may often be procured at a shot.

The nest is found generally at a distance from the water, placed dry, often among brush or young plantations, formed upon the ground, upon the same plan as that of the mallard.

In Scotland it is not generally regarded as migratory, but in England it is essentially a winter visitor, making its appearance by the end of September, the numbers increasing during winter by additional arrivals from the north of Europe; at the same time, several instances of its breeding are given. It also breeds in captivity, for instance, in the Zoological Gardens.

The similar bird found in America was at one time considered identical. The distinctions consist principally in the white crescent-shaped band, which crosses the sides of the breast nearly in a line with the bend of the wing; and in the want of the white scapulars which form so conspicuous a line down each side of the back of the European birds. The distribution of the colours on the head are also different.

THE BRENT GOOSE (ANSER BRENTA).

THE *Brent* is also a winter visitant; most numerous on the eastern coasts of Scotland and England. On the north-eastern shores they are entirely maritime, not being known to leave the water mark, or even to feed on the pastures or young grain. During ebb-tide they feed on the banks of Zostera Marina, then uncovered, the "ulva latissima" having oft-time been found in the stomachs. At other times they rest on the sandbanks, which are quite open, and afford no shelter for approach; or they ride, as it were, just off the land, buoyant upon the wave, and occasionally pluck the sea grass or weeds, which are yet borne up within their reach.

During the feeding-time, or when resting, they are clamorous, and a flock is heard at a considerable distance from the regularity of the call of all the members, which is simultaneously kept up. They are also extremely wary, and most difficult to approach openly; and from experience it is best to obtain shots, either at night by lying in wait in the line of the flight, or by coasting in a punt on a day when the wind is favourable, when they may either be "run into," or watched for in the range of flight.

The geographical range is northwards; we have it in Northern Europe, Iceland, Hudson Bay, Greenland, and Nova Zembla.

The head, neck, and upper part of the breast are dull black, on the sides of the neck, an interrupted patch of white; back, scapulars, rump, and under parts anterior to the legs clove-brown, paler on the latter, each feather having the tips and margins of a lighter shade; flank feathers tipped with white; vent, upper and under tail-covers, the latter exceeding the tail in length, pure white; tail clove-brown; quills and secondaries, blackish-brown; bill, legs, and feet black.

The sexes do not vary much in plumage.

In size the male is said to be slightly the bigger. During the winter—after Christmas—they are very

numerous on the slakes. I have seen them in large numbers, whilst during flighting I have observed long strings of them heading, in the customary V formation, through the harbour, towards the feeding grounds.

They are most numerous and more approachable after an unusually high and lasting tide. "Hunger tames both bird and beast."

Both the Spitsbergen and Greenland geese (white and dark fronted) visit our shores.

THE GEOGRAPHICAL RANGE OF THE BRENT GOOSE.

THE *Brent Goose* is essentially a winter visitant; and as we find the Bernicle species abundant on the western sides of our islands, so do we find the present species most numerous on the eastern coasts. On the north-eastern shores of England, where one gets opportunities of seeing them, they might be considered as entirely maritime, not being known to leave the water mark, or ever to feed on the pastures or young grain. During ebb-tide, they feed on the banks of Zostera Marina, then uncovered; and an old authoritative writer, Mr. Selby, mentions the ulva latissima as very frequently found in their stomachs; at other times they rest on the sand-banks, which are quite open, and afford no shelter for approach; or they ride, as it were, just off the land, buoyant upon the wave, and occasionally pluck the sea-grass or weeds, which are yet borne up within their reach. During the feeding time, or when resting, as has been mentioned in the foregoing, they are clamorous, and a flock is heard at a considerable distance from the regularity of the call of all the members, which is simultaneously kept up. They are also extremely wary, and it is next to impossible to approach them openly; and according to the accounts of expert sportsmen, shots are best obtained, either at night by lying in wait in the line of flight, or by coasting in a punt on a day, when the wind is favourable, when they may either be "run into," or watched for in the range of flight. In Ireland this goose is also abundant, and furnishes most of the night shooting, which is much followed on various parts of the coast.

The geographical range of the *brent* is northward; we have it in Shetland, and in Northern Europe, Iceland, Hudson Bay, Greenland, and Nova Zembla. In some of these northern latitudes it breeds, but the identical

system of nest structure is not well known ; the eggs are greyish white.

In North America it is migratory but for a long time the extent of the migrations of this species remained unknown.

It has not been observed in Mexican or Asiatic collections, neither has its occurrence been notified either in Texas or South Carolina, though it may range to the northern extreme of the Asiatic continent.

This North American bird is exclusively maritime, but easily tamed, feeding upon grain ; it has been known to produce young in captivity.

Unlike many of the birds known to the wildfowler the plumage of the sexes does not vary much.

THE SOLAN GOOSE.

A CURIOUS FIND ON THE BEACH.

DURING a coastal ramble lately I came acroes a bird lying on the sands on the North shore opposite Berwick-on-Tweed.

It was a big bird—a young *Solan goose*, and it had met its death by endeavouring to swallow a gurnet, a fish with a big head. It had evidently pounced ravenously upon the fish, and unable to pass it successfully, it had succumbed. The general mode for this bird is to swallow it head first. From the neck markings I was able to class it as a bird of the first year. As is well known to north country naturalists, the Bass Rock, in the Firth of Forth, is a recognised rendezvous for these Solans to breed, and altogether it is perhaps one of the most interesting sights that the ornithologist can be placed before, whether he surveys the crowd nestling upon their eggs, greeting their mates on their arrival from the sea, or squabbling, if one happens to intrude a little too near another ; or to sit aside, and view the troops of birds in adult and changing and first year's plumage, pass and repass, surveying their visitor, and sailing past him in a smooth, noiseless flight so near, that the eye and every feather is distinctly seen, the bird motionless, except a slight inclination of the head when opposite. On the Bass the great proportion of the birds build on the ledges of the precipitous face of the rock ; but a considerable number also place their nests on the summit, near the edge, where they can be walked among ; there the birds are quite tame, allowing a person to approach them, as in the case of the Eider on Farne Islands. On a certain occasion I took a small spaniel near the retreat of these birds and this dog at once gave battle to the geese, though forced to retreat ; and had he not been tied up, it is nearly certain that he would either have lost his sight, or been tumbled over the rock, by the strokes of the bird's wings.

The protective instinct is similar to that of the Great Skua in the isles of Shetland. A friend of the writers approached one of these nests on the Isle of Mist during the breeding season of last year, and walked unwearily towards the nest, but he had to beat a hasty retreat. "They come for you with all they are worth," was his account of the affair.

Several of the breeding Solans have black (or immature) feathers on the scapulars and wings, and a few on the back, with sometimes one and sometimes both the centre tail-feathers. The flight and habits at sea are also very interesting to witness; when returning to the rock, it pursues a straight forward course, at a considerable elevation, without turning to the right or left; but, when fishing, it may be seen suddenly to turn, and prepare itself for the plunge, and then follow its survey, the sight having been mistaken, or the prey disappeared; but, when certain, the course is in a moment stopped, the wings closed to the sides, and a perpendicular descent is made, often to a considerable depth, if one may judge from the period of immersion; the spray dashes up, and the bird is for some time lost until it again appears with a fish in its beak, which is soon got into the proper position, and swallowed head downwards, as mentioned in the case of the bird found on Holy Island.

It used to be a common custom to take successfully this bird by alluring it to a fish fastened to a board, the force of the stroke killing the bird instantly. It roams upwards, opposite to Leith, and seawards to and beyond the Farne Islands.

THE PINK-FOOTED GOOSE (ANSER BRACHYRHYNCHUS.

THE bird was first noticed as new to Britain in the year 1839, when specimens were exhibited to the Zoological Society, but at a remoter period it was known as the short-billed goose. These birds are generally regarded by fishermen as the forerunners of the flocks of Arctic, brent, and other geese which come upon our shores at the end of the year. About half a dozen are annually shot at Holy Island.

In extreme length it is about two feet five inches ; bill of a livid pink ; the nail black, but pale towards its base ; the base of the bill is surrounded by a narrow list of white, and the head, cheeks, and throat are dark olive brown, shading into yellowish brown upon the neck ; on the back and scapulars the base of the feathers is greyish brown, each towards the tip inclining to yellowish-brown, and finally tipped with yellowish-white ; the upper tail-covers pure white, having the crescented pale mark common more or less to the three species ; tail (of fourteen feathers), dark at the base and broadly tipped with white, the shafts of the feathers of the same colour ; the wings, except the quills and greater covers, are of a paler tint, the feathers tipped with the same colour with those of the back ; quills are black at the tips, shading into pale grey on the outer webs, with very strong, broad, white shafts ; the greater covers are dark brownish-black.

Below, the colour of the neck gradually shades into a yellowish-grey on the breast and belly, interrupted by the darker base of the feathers, further shading into pure white on the vent and lower tail-covers ; the sides and feathers covering the thighs are greyish brown, each feather broadly tipped with white. The feet and legs of a livid pink, the nails pale at the base, with dark tips.

" Except the solans, all sea-birds nesting on the Bass Rock this season have been fully a fortnight later in laying than formerly—a fact which may possibly be accounted for by the prolonged spell of exceptionally dry

weather experienced, though this appeared to be no deterrent to the earlier nesting solans, whose eggs were in evidence quite up to former dates early in April. The entire pasturage of the Rock is computed at seven acres —a statement scarcely creditable considering the bald appearance the Rock presents to the passing traveller—and at one time gave excellent sustenance to a score of sheep, but is now given over to the birds and rabbits. Parched as it was by the excessive drought and intense heat of May and June, the rabbits suffered from lack of supplies, many of the young ones being found dead. In the east rookery the solans sit in the full glare of the mid-day sun, their saliva-dripping bills slightly agape, and throats vibrating rapidly, suggestive of a dog under similar conditions. To leave the egg exposed for any length of time to such scorching heat would probably be fatal to the embryo chick, so the patient brooder must wait the return of its mate, foraging far at sea, before going itself in quest of supplies. Many years ago I was informed that the female alone incubated the solitary egg and was fed by the male bird on the nest. This, I have found is incorrect. Both birds share in incubation, and never leave the nest till relieved by their partner. After hatching out, and when able to partake of solid food, the chick is fed by both parents, and in the later stages develops an appetite which appears insatiable, taxing the resources of the old birds to their utmost. The average weight of an adult solan is eight pounds, but this is frequently exceeded by the fledglings, which pile an adipose tissue at an alarming rate just prior to taking flight, which in many a case is rendered ludicrously abortive by their superfluous avoirdupois. Consequently, many of the young birds on leaving the nest find their wings unable to support their bulky bodies, and spend their first few days floating in the water, assimilating their surplus fat before finally taking their departure. This is generally undertaken immediately they gain the effective use of their wings, and, strange to say, without waiting for the general exodus of their elders in late November."

THE COMMON NIGHT-HERON (NYCTICORAX GARDENII).

THERE is a distinguishing hoarse call uttered by birds of this particular species, and hence its nomenclature of raven.

They feed invariably during the night, and remain inactive in the day-time.

They are generally distributed over the different quarters of the globe; breed in companies, and on trees, and have the plumage of some dark chaste shade of grey, olive, or brown, above; white below, but tinted in parts with the same colour as that of the upper parts; the head crested generally with three long narrow feathers.

This bird ranges over Europe and America. In Britain it is of occasional appearance, like most of the rare species (egrets, bitterns, &c.), and there is no instance of the bird having bred in the British Isles.

Several times they have been captured both on the coast and on the borders of inland lakes. They are described as extremely noisy and watchful, their sense of hearing being particularly acute; at the same time they are easily procured by lying in watch, and shooting the birds as they come into their nests or to roost.

The nests are of considerable size, and are constructed of sticks and roots; the eggs are of the pale bluish-green common to the greater part of the Ardeadoe. The young are esteemed, as food, equal to young pigeons, and seem to be sought after both by man and the rapacious birds, which collect around the breeding stations for the supply which is at this season there furnished.

The back of the neck, wings, rump, and tail, are of a fine pearl-grey, palest on the back of the neck; the forehead, cheeks, throat, and under parts, pure white; the crown of the head and nape, with the upper part of the back and mantle, are of a rich glossy greenish-black, the feathers on the centre of the back being rather long, and having their webs unconnected, as in the true herons;

and from the occiput springs a beautiful adornment of generally three pure white narrow feathers, which reach to the back. The bill is black; the legs greenish-yellow; appearing of a clearer colour as the bird attains maturity.

The specimen captured and brought to the writer measured thirty-eight inches. It was a male bird in adult plumage, and weighed over six pounds. The shore gunner was secreted in a fissure of the rock facing the harbour, over which the crowds of brent geese wing their flight at eventide, and the heron was observed making for the estuaries, which are formed by the sea and mudflats, at half-flood tide, when a well-directed shot brought it down.

Herons are melancholy birds, remaining for hours on the edge of the waters. But though they seek their food in a solitary manner, they build their nests in company; as many as eighty nests have been seen on one tree.

The word anapha, translated heron in Scripture, has been variously understood. Some have rendered it the kite, others the woodcock, the curlew, the crane. Another authority thought it to mean the mountain falcon, the same that the Greeks call *anopea*, mentioned by Homer, and this bears a strong resemblance to the Hebrew name.

An outcry raised in Scotland against the heron as a destroyer of trout has led to strong protest by many in the bird's favour as a destroyer of eels. "If," says one writer, "heron destroyers would only turn themselves into rook destroyers, they would do much good to the farmer and to sport in general, as the crows (rooks) are far the greatest enemies of farmers, and are besides persecutors of the herons, who keep down the eels, which are so destructive to the trout" The heron also feeds largely on water-voles, shrews, and beetles which live in the water, particularly *Dytiscus marginalis* and *Geotrupes stercorarius*, and also grass.

THE HOOPER OR WILD SWAN (CYGNUS FERUS).

THIS species is the most common in Britain, being a general winter visitant, frequenting at this time the coasts of England, and the lochs, together with occasionally the shores and inland estuaries of Scotland, in severe weather, frequently ascending the courses of rivers for many miles. They are said to come from the north.

There is no doubt but that the greater mass migrate and incubate in the northern countries of Europe. We have, however, few records of an extra-European range, the American bird being now considered distinct.

In confinement to artificial waters, this swan seems very readily to accommodate itself. In the gardens of the Zoological Society they have repeatedly bred.

The wild swan is easily distinguished from the others by the want of the knob and black base of the bill. This member is orange-yellow for more than half its length; the colour extends forward on the edges of the mandible, and forms a lengthened triangle of that colour, the apical portion of the bill is black.

The plumage is pure white, but on the head, cheeks, and upper part of the neck there is often a variation streaked with reddish-brown; the young are often of a dull brown; internally the trachea forms a convolution inside the keel of the sternum, entering and returning inside of the osifurcatorius; the bronchial divisions are of considerable length.

BLACK SWAN (CYGNUS BEWICKII).

THIS distinct species of swan only began to attract attention about the years 1827-8, although one or two ornithologists have previously examined specimens, and pointed out distinctions. Soon after its dedication, to hand down to posterity the Ornithologist of Newcastle, was by common consent recognised. It is generally supposed to breed in Iceland. Many specimens have been procured in various districts of England, Scotland, and Ireland.

The adult plumage is white after passing through the changes of dull brown. The head and neck are also generally streaked with rufous. But it is easily distinguished by its lesser size, and by the colouring of the bill, which has the greater part of its terminal portion black, the orange at the base assuming nearly the form of an oval spot carried out to the eye.

This species has also a convolution of the trachea within the sternum, but it enters the cavity outside the osifurcatorius, and the bronchial divarications are very short.

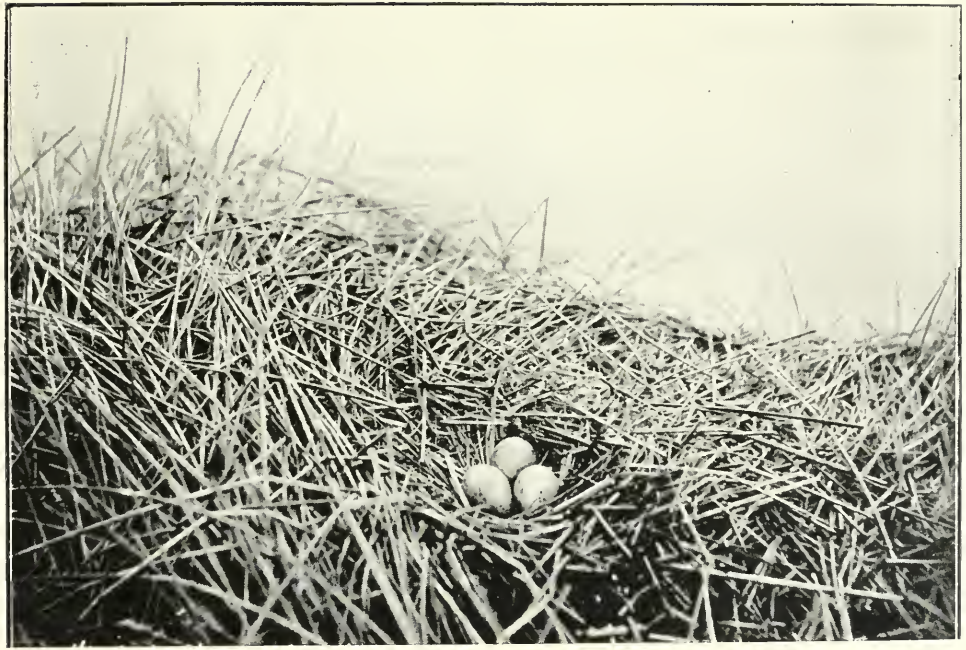
THE PURPLE SANDPIPER (TRINGA STRIATA).

GENERIC marks: Bill longer than the head, slightly bent down at the tip, dusky, the base reddish-orange; head and neck dusky brown, tinged with grey; back and scapulars black; with purple and violet reflections, the feathers edged with deep ash; breast, grey and white; under plumage white, streaked on the flanks with grey; feet ochre-yellow. Length eight and a quarter inches. Eggs yellowish-olive, spotted and speckled with reddish-brown.

The Purple Sandpiper is described as being far less common than the Dunlin, and differing from it in habits, inasmuch as it resorts to the rocky coast in preference to sandy flats. The few specimens seen by the writer were associated with dunlins, flying with them, and so closely resembling them in size and movements that a description of the one equally characterises the other. It was only, in fact, by the coloration that I could discriminate between them; and this I did, on several occasions with great ease, having obtained my specimens singly while they were surrounded by other birds.

This bird is very numerous in Orkney and Shetland, appearing early in autumn, and leaving again at the latter end of April, about which time it collects in large flocks, and may be found on the rocks at ebb-tide, watching each retiring wave, running down as the water falls back, picking small shell-fish off the stones, and displaying great activity in escaping the advancing sea. It does not breed there.

The bird has a wide geographical range. It has been often observed in the Arctic regions, where it breeds about lat. 78°. It is also well known in North America, and is found in various parts of the continent of Europe, especially Holland and Jutland.



NEST OF BLACK-HEADED GULL.

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THE GREAT BLACK-BACKED GULL (LARUS MARINUS).

GENERIC features: Wings extending but little beyond the tail; legs pale flesh-colour; length, thirty inches; breadth about five feet nine inches. In most other respects resembling the Lesser Black-back Gull. Eggs stone-buff, blotched, and spotted with dusky brown.

Of the two Black-backed Gulls, the Greater, or "Cobb," is by far the less frequent on our coasts, and when seen generally occurs in pairs. It remains with us all the year, but is most frequent in the south during winter.

In spring, Great Black-back Gulls for the most part withdraw to cliffs and rocky islands far north, as, for instance, the Orkneys and Hebrides, where they are numerous, a few only nesting southwards. Unlike most other gulls, birds of this species are unsociable even in the breeding season. They build their nests on the most inaccessible parts of the rocks, and reserve the situation entirely to themselves, not even permitting birds of their own species or any other intruders to settle there. They are exceedingly wary, and give notice of the approach of danger to other animals. Consequently they are held in dislike by the gunner, whether in pursuit of sea birds or seals.

Like the rest of the gulls, they are omnivorous, but are more than any others, addicted to carrion, in quest of which they often wander inland; hence, they are sometimes called Carrion Gulls. "If a floating prize presents itself," says Mr. St. John, "such as the remains of a large fish, or dead bird, it is soon discovered by one of the large gulls, who is not, however, allowed to enjoy his prize alone, for every one of his fellows within sight joins in tearing it to pieces. When I have winged a duck, and it has escaped and gone out to sea, I have frequently seen it attacked, and devoured almost alive by these birds."

Stations occur here and there on the coast of England in which the Great Black-backed Gull builds. It sometimes resorts to a marsh at the breeding season, but retains its habit of driving away all intruders. Its eggs are prized as dainties, being thought to resemble plover's eggs.

The finest specimen of this species was brought to me during the past winter. When outstretched, its wings measured seventy-two inches.

CHANGING HABITS OF BIRDS.

A FEW years ago none of the feathered tribes stood higher in the estimation of the farmer than the gulls which followed in the track of the plough. Low forms of grub life were the staple food of the birds, and their presence was generally supposed to enhance the productive properties of the soil. But of late years, according to the "Glasgow News," various observers have noted that the gull has been manifesting a growing partiality for ripening corn. So rapidly has the new taste been acquired that seed-sowing is associated with a new source of worry. An eminent agriculturist states that, in the course of the last few weeks, he has observed flocks of gulls searching for grain with a pertinacity that would have done credit to barndoor fowls. According to this authority, the starling is another bird whose habits have undergone a great transformation within comparatively recent years.

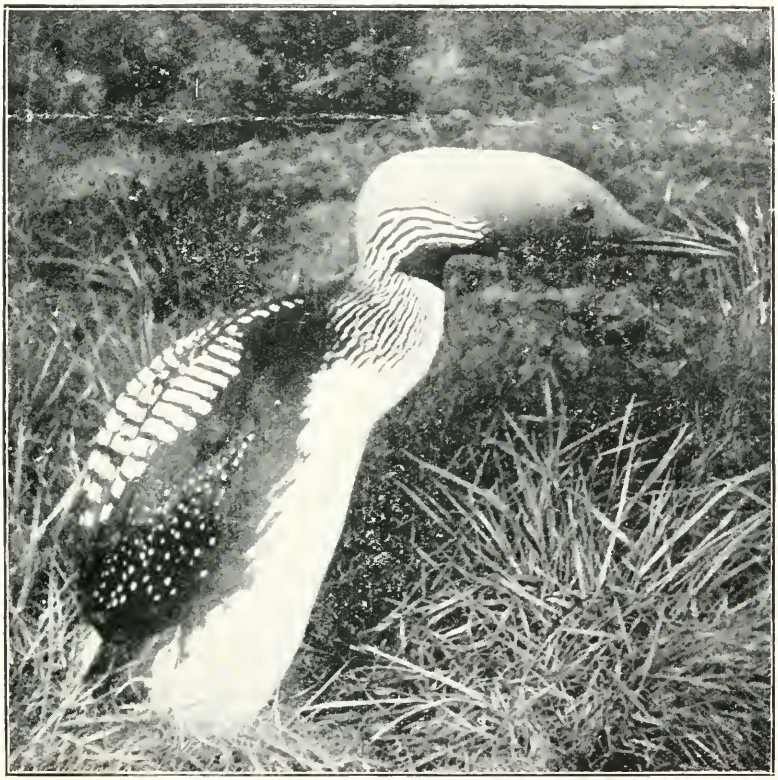
THE RED-THROATED DIVER (COLYMBUS SEPTENTRIONALIS).

GENERIC markings: Bill slightly curved upwards, not exceeding three inches in length; head with the edges of both mandibles much incurved, throat, and sides of the neck mouse-colour; crown spotted with black; neck both above and below marked with white and black lines; on the front of the neck a large orange-coloured patch; back, dusky-brown; lower parts white. Eggs chestnut-brown, spotted with a darker colour.

There is similarity between the Crested Grebe and the Red-throated Diver, so much so in general shape as to merit by some the general term of "Loon." Amongst the old writers, too, this generic term is sometimes applied, for instance, by our countrymen, Ray and Willughby, with this difference, the Great Northern Diver is called "Loon," and the species about which I am now writing "Lumme."

The birds are said to be numerous on the coasts of the Isle of Wight, passing and re-passing in small flocks and in lines about a mile or so apart. This species, like the rest of the genus, obtains its food by diving; when pursued it rarely endeavours to escape by taking wing, though its power of flight is somewhat remarkable. It is also common for fishermen to note them passing through the water at good speed, and at a considerable depth, propelling themselves by a free and active use of their wings. The customary time for the visits of these very interesting birds is from October to the end of May.

Towards the end of spring they withdraw northwards, and build their nests, chiefly of coarse grass and herbs, usually close to the edge of some fresh-water loch. They lay two eggs, and the male is said by close observers to take his turn in the task of incubation. Stray couples breed in the Orkneys, Outer Hebrides, and in the north of Ireland.



RED-THROATED DIVER.

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On one of my fishing expeditions near the Border I was intent on watching for fish to come to my bait—for being a sandy bottom I could distinctly note the presence of fish—when a bird some two fathoms down, swam or shuffled across my line. I immediately drew the lead to the surface and by mistake hooked the bird, a beautiful specimen of the Red Throated Diver, and it is to-day exhibited in the Hull Museum.

It is said that the bird's speed under water is five miles per hour.

THE COMMON PHEASANT (PHASIANUS COLCHICUS).

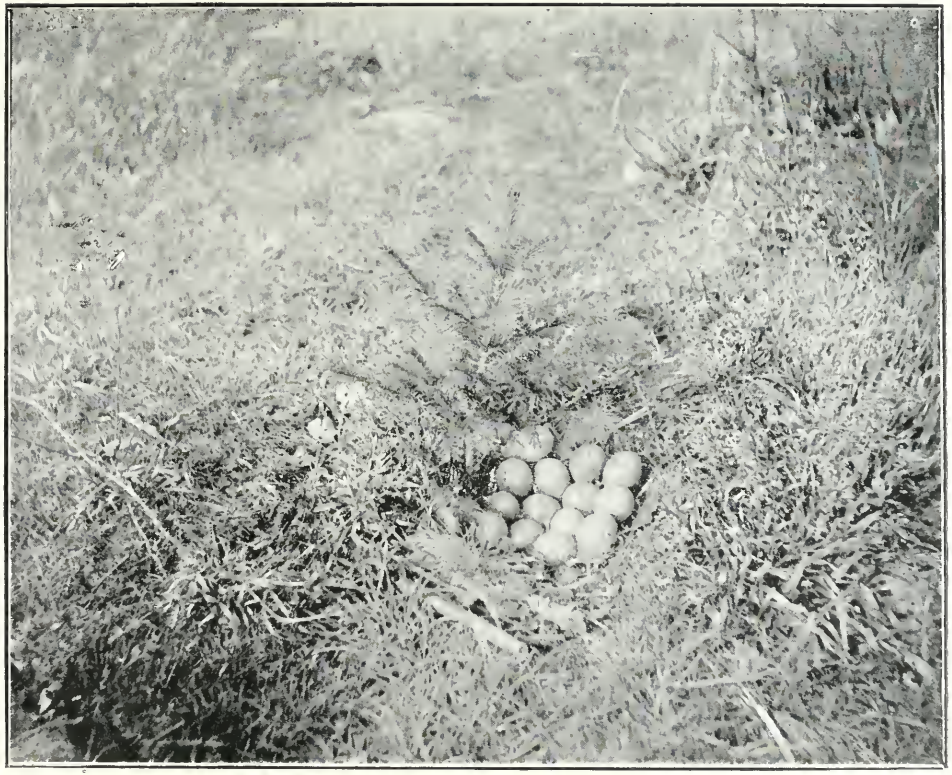
ACCORDING to the old writers, this bird has a most remarkable ancestry, as its reputed introduction into Europe took place more than a thousand years before the Christian era, whilst its arrival into Britain is said to have been about the time of the First Edward. It has been fostered and preserved, from time almost immemorial, on account of its ease in rearing, the beauty of its plumage, the extreme delicacy of its flesh, and the cover which it gives to the sportsman. Its range is universal in the British Isles, though in Ireland it is certainly not so evenly distributed owing to the lack of preservation.

In Europe, or wherever they have been introduced, one may notice two birds of different plumage, the one with a conspicuous white ring upon the neck, the other with the ring minus.

In the preserves at home, in consequence of close breeding, the mark becomes modified or entirely obliterated. Again, the female appears to assume at times an entirely pure white plumage more frequently than the male. Like its neighbour, the partridge, various foreign invigorating strains have been introduced, notably the various European importations. Crosses with the common hen, black grouse, &c., have in many cases proved successful. Coloration of plumage, and the differentiation, is often attributable to the semi-domestication to which these birds are subjected in the preserves. They are much inclined to become spotted or pied with white, and often show very beautifully contrasted markings.

Mr. Harwood Brierley says :—

The prodigious cost of the pheasant-rearing hobby does not decrease. Abundant proof exists that it is firmly established and ot national importance. Had that great naturalised bird, "Phasianus colchicus," and the hand-



NEST AND EGGS OF PHEASANT.

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somest of all birds save one, been left to take care of himself he would most assuredly have become ere this as extinct as the dodo. At any cost he must henceforth be reared under artificial conditions, and to meet the growing demand for eggs of different breeds more and more game-farms appear to be coming into existence annually, many of the best being in a position to book up their orders well in advance. Of practicable and fancy sorts there are now pheasants galore, so that a beginner is often undecided which sort or sorts to rear in the face of discussions and recommendations which are not always the outcome of experience. A Norfolk game-farm selects from a stock of 250,000 eggs which include the Mongolian-Chinese cross, the half-bred Mongolian, the Park-necked, and other much advocated breeds, and it is no unusual thing to find such eggs advertised as yielding birds "exceptionally hardy and easy to rear, free from disease, grand flyers, and non-strayers," while "every egg (is) guaranteed fertile"—some of which statements we are disposed to doubt. Another growing industry is the preparation of pheasant biscuits, foods, stay-at-home covert mixtures, and scent destroyers; while the country carpenter benefits by building sheds, mess-houses, brood-hen boxes, and coops. The game preserver has to maintain a special staff for feeding and watching the birds, repressing the vermin, etc.; the quantity of hard-boiled hens' eggs alone consumed in a season representing a heavy item on his bill. Pheasant shooting is general enough to take the lead in sporting gunmanship, and it causes many thousands of pounds to be distributed annually in a legitimate manner, as witness the busy gunsmiths' shops, the employment of gamekeepers, loaders, beaters, stops, etc. The battue cannot fairly be decried, because a good deal of training and not a little dexterity is needed to bring down a couple of rocketers with a right barrel and a left. You will hear a youthful beater say to his neighbour as a bird falls, "Up goes a quid, pop goes a penny, and down comes three bob!"—which is equivalent to saying that a pheasant costs a sovereign to rear, but only realises three shillings for the city man's dinner table. I can prove that on some

estates there are bad seasons when each bird costs £2, if all the expenses are reckoned up closely ; and if a manorial lord wishes to circulate his wealth in this fashion for the good of the country, pray do not seek to make the taxation intolerably burdensome, or he will go abroad to spend it.

THE COVERT.

The best pheasantries have their home and distant coverts, which usually take a parallelogram or curvilinear form. They abound with fir, larch, yew, birch, ash and sycamore, and "rides" are cut through a dense undergrowth of rhododendrons, hazels, willow; holly, laurel, elder, guelder-rose, snowberry, privet, and barberry. The plantations enclose oblong patches tilled for buck-wheat and other small crops, which can be applied for feeding the "chicks of the covert," and keep them from wandering away to other "liberties." In the very heart of these Phasianic Elysian Fields are the rearing grounds, much divided by wire fencing, and overlooked by the upper windows of the head-keeper's brick cottage, while at different points are kenelled watch-dogs, whose breed or training disallows of continuous barking except when provoked by intruders, so that the preserved area remains as fearsome to poachers as it was under the old dispensation of man-traps and spring guns. George Wotherspoon, one keeper so stationed, to whom I came by recommendation on my tour, very aptly quoted from Holy Writ: "The lines are fallen on me in pleasant places; yea, I have a goodly heritage." He readily conducted me around an old-fashioned flower-garden, along an aisle between lilacs, laburnums, and rhododendrons in bloom, along one side of a cherry orchard, and eventually planted me on a bench facing the extensive rearing-fields, where refreshment was served. After about half an hour's chat I had to undergo a punctilious introduction to a couple of under-keepers.

FAMILY AFFAIRS.

The lord of the manor, or his lessee, wants as many pheasants for the autumn shooting as can be conveniently

accommodated in the surrounding coverts, and the gamekeeper's future depends on the realisation of his ambition to show a large head of game. "Phasianus colchicus" and the allied breeds make a notoriously careless, shiftless, selfish motherhood, and the slightest alarm will usually cause a bird to desert her post at the sitting period. At another time she will consider her own safety a good deal more than that of her progeny. However superficially amorous Prince Colchicus may be, it is clear that he takes no real interest in family matters but prefers to gallivant about. Any sort of a nest is tumbled together under a bush or hedge, or in the undergrowth, wherein is laid a clutch of fourteen or fifteen olive-brown and minutely speckled eggs. It is admittedly the better way to spend time systematically searching for these eggs, or there will be a tremendous wastage in stock, so addicted is the hen bird to shirking the full discharge of duties incumbent on her by setting off with an incomplete brood, thus deserting many valuable eggs perhaps just when they are about to chip, with the result that carrion crows, rooks, magpies, rats, &c., pounce upon them. At all times pheasants of both sexes are incorrigible wanderers, the careless mother going foraging long distances, minding not if her family is fagged out, losing some of them before the day is over, and taking not the trouble to look for them. The result is that a few succumb to "clash," leaving only two or three survivors to tell the story of their wretched life. Temporarily or permanently deserted eggs, some already chipped, are each season recovered and brought home to the incubator (which often has a holding capacity of 300), where the chicks made their exit within a few hours. The chief value of an incubator lies in the fact that eggs of uncertain age can be dealt with easily, and the chicks dried off as soon as they leave the shell; for this drying process represents a very critical stage. Further, when chicks are hatched by an ordinary brood-hen they can be removed to the incubator's drying chamber in order to avoid the risk of being crushed to death by the fussy foster-mother.

The pheasants on any estate could soon be numbered

on one's fingers were it not for the employment of incubators and domestic brood-hens. The very shyest, wildest bird from the covert, the very courtliest or most reserved Prince Phasianus himself, has in all probability some strain of the foreign or English barnyard fowl in him; a detailed pedigree going far enough back would almost certainly show that he had benefited directly or indirectly by some dowdy yellow hen or a lifeless incubator. Thus the pheasant has lost his or her claim to rank among the wild winged game of the field or copse, and as far back as the time of Elizabeth the male bird was known to cross voluntarily with the ordinary domestic fowl fetched originally from Indian jungles. I have myself observed Prince Phasianus attempting to fraternise in the poultry-yard, as showing what a fearful rake he may become in spite of all our specialised stay-at-home covert-mixtures. Decided hybrids have been brought home to my very door, and become pets and playthings for children, while two miles away the highly burnished Phasianus himself strutted like an independent lordling. His territory had its human custodians, who were also purveyors of wholesome food, and general attendants on his person, and though professing to be too proud to rub shoulders with them, he would never hesitate to creep out on the sly to pick up the food thrown down.

The pheasant's attention to his mate and family soon ceases, and in the time of danger he takes care to look after himself, leaving every other member of the family to do likewise. But then there is much excuse for him, for nature has made him an easy target by the exceedingly gaudy plumage with which he is endowed.

To this bird belongs the honour of being one of the first birds to be introduced into our land by the Romans. We read how in the days of Edward the First a pheasant could be purchased for quite a trifling sum, but the woods have decreased and the mouths have multiplied since those days. It is believed that these birds were introduced into Europe some thirteen hundred years before Christ, its natural habitat being the borders of the Caspian Sea. Its name has been derived from the river

Phasis; the famous scene of the expedition of the Argonauts. After the days of the Crusaders the pheasant became the most popular bird in the Western countries, and in France especially was the object of Royal protection. But with the fall of the old regime the laws protecting the bird were relaxed or revoked, with the result that the numbers of pheasants in that country have been dwindling for some years, until there is a likelihood of its early extinction.

THE COMMON PARTRIDGE (PREDIX CINEREA).

AVERAGE length of male specimen from thirteen inches, female less. This might justly be termed an universal bird, for it is found generally throughout Central Europe.

With the solitary exception of the northern moors, it is everywhere abundant throughout the British Isles. It is perfectly true that wherever man brings into cultivation the wastes, there the partridge delights to roam, and there he assists in husbanding, though in a different sense, the grain which civilisation supplies. The more richly cultivated land harbours the greater number of these birds. They choose their mates usually very early in spring—the first mild days of February being not too early—and they haunt the vicinity of their future nesting-places. Their plans, however, for incubation often take a procrastinating form, for it is not unusual to find only half grown birds in the month of September.

They lay variously ; sometimes one discovers a nest of a dozen eggs, and even twenty may be seen in a scooped-out hollow, or, preferably, a furrow of tilled ground, and this mode of nidification prevails almost interruptedly through the whole genus.

Concealment is not in the nature of the plump little bird, neither is there any great pretention to a nest, properly so called. Neither is the selection of the site always on *terra firma*, for instances are recorded of trees being appropriated for this purpose. "Far from the madding crowd" is not by any means applicable to this species of bird, for invariably he chooses the most frequented parts.

During the incubatory period they are extraordinarily tame, and will allow the keeper or even strangers to approach to within a foot or two of the nest. Neither are they, at times, particular as to the companionship they keep, for I have discovered on more than one occa-

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SITTING PARTRIDGE

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sion quite a complex array of eggs. For instance, last year I came across a combination of partridge and mallard duck eggs, in the proportion of eight to six I visited the spot several times, and usually found the partiridge, but once I discerned the duck, as if one had kept watch for the other, and had taken their turns Never were they seen sitting together. As a naturalist, I was particularly interested in the development of this phenomenon, and anxiously awaited the forthcoming strange brood. I was, however, denied this, for the nest was ultimately harried.

That the parent birds sedulously protect their young is conclusively proved, and the crows and similar rapacious birds have been seen to beat a hasty retreat.

I have seen that the partridge can adopt different forms of defence, and it has been known to feign lameness, and even death, as a stratagem to get rid of the aggressor. They utter, at these times, terrified screams, and appear to be retreating with broken limbs; and, like the wary peewit, will conjure up all kinds of devices to draw the trespasser, be he human or animal, from the vicinity of the nest.

During the breeding season, like most birds, they assume a deeper and more majestic coloration, and in the male there is seen a slight imitation of the wattle incident to the true grouse; and this shows a pinkish colour.

In the female the tips of the feathers become more decidedly marked with somewhat pale yellowish-gray. There is no other bird, however, with, perhaps, the exception of the pheasant, that is so liable to variation, and this comes about more markedly in recent years, probably in consequence of the introduction of foreign strains for crossing purposes. Both the French and the Hungarian birds have been largely used for this purpose.

The partridge is a flat runner, and the sportsman, in his novitiate days, is not a little deceived as to the whereabouts of the birds, after alighting to the ground. In order to ensure their salvation, they use their legs very nimbly in running a considerable distance.

"The partridge is one of the best birds wearing feathers. He is a gentleman from the horseshoe on his

breast to the tip of his dear little tail. As a family man he is all he could or should be; he helps to build the nest, and though taking no hand in the laying of the eggs he is an 'interested party' to the operation. He helps to hatch them, however, and takes good care of his young responsibilities as soon as they emerge from the shell. He continues his fatherly protection till they are all fit to look after themselves. As a sporting bird he sees to it that you find him first, shoot him after, and gather him to finish up with; not till then is he yours."

The partridge loves the fruitful fells,
The plover loves the mountains;
The woodcock haunts the lonely dells,
The soaring hern the fountains;
Through lofty groves the cushat roves
The path of man to shun it;
The hazel bush o'erhangs the thrush
The spreading thorn the linnet.

II.

From enquiries made on estates in different parts of the country, the writer learns that all is well with partridges, although nearly every correspondent laments the scarcity of nests. However, so far as the keepers are concerned, the birds are breeding under ideal conditions, everything possible having been done to safeguard them. Never have rats and other vermin been so closely killed down, and the crow or magpie nest which has escaped the keeper's keen eye is cleverly concealed indeed. Foxes, too, must wonder at the care bestowed upon them, and never have vixens had an easier task to feed their cubs; food such as freshly killed rabbits and rooks, has been placed near every earth, the idea being to keep the vixen owning it from hunting and interfering with sitting birds.

Foxes are very deadly among partridge broods when the latter first hatch and run, as the chicks trailing along after the two parent birds leave a very strongly scented trail, and once a fox strikes it he has no difficulty in

following it till the brood is found. If it were not for the clever habit the old partridges have of fluttering away and decoying a fox from the youngsters, hardly a brood would escape destruction ; but this device does not always answer if the aggressor is a fox several seasons old who has learned from experience. Keepers say that they would sooner have a dozen youngsters to contend with than one a year or two old, the cunning of the latter enabling it to be exceedingly destructive. Hunting men cry out for old foxes, but the game preserver for young ones.

A few seasons ago we watched a kestrel hawk stealing young partridges from a brood a few days old, and anyone who witnessed that sight would no longer proclaim the innocence of the bird. From what we saw, we arrived at an opinion that long grass is the best protection a brood can have, as the chicks have sense enough to bury themselves in it, and, strive how it may, the hawk cannot disentangle a chick from among it. The hawk clutches grass and all, cannot disengage its prey, and dare not stay long because the old birds attack it. A peculiar fact about the hawk is that, however heavy its burden, one claw only is used to carry away the prey. The writer has never seen a hawk employing both.

Old partridges with broods are very careful to avoid other partridges, evidently aware of each other's propensity for stealing chicks, for there can be no other reason. We have never seen two young broods in the vicinity of each other, and, however many occupy a field, each lot keeps to its own domain. Parent partridges are especially fearful of any barren pair which dares to venture near their brood, and at once drive those birds away—at least, the cock does so, assailing both male and female of the barren pair, and following them up till their retreat is assured. Keepers often wonder at the appearance of a pair of partridges with but one or two youngsters, when other adjacent coveys are large, and these are more frequently a barren pair which has stolen a chick or two than a pair which has lost nearly all its brood after hatching.

THE WOOD PIGEON (COLUMBA PALUMBUS).

GENERIC features: Head, cheeks, neck, and upper parts of the tail, bluish grey; back and wing-coverts, darker; a white crescent-shaped spot on each side of the neck surrounded by scale-like feathers, with green and purple reflections; primaries grey towards the base, white in the middle, and dusky towards the extremity, with the outer web white; tail barred with black at the end; abdomen whitish; bill orange, powdered with white at the base; iris light yellow; feet blood-red; claws brown. Length, sixteen and a half inches. Eggs pure white.

Three or four centuries ago the taste for keeping pigeons of different sorts was as strong as it is at the present day, and the popular names of Runts, Croppers, Carriers, Jacobins, Tumblers, Chequers, &c., modern though the names may sound, were then applied to the very same varieties which are described in the books of to-day. Many of these were of foreign origin, and well known at a remote period in various eastern countries, so that there can be no doubt that the custom of keeping tame pigeons is of very ancient date.

The pigeons in some of their habits approach the gallinaceous birds, with which accordingly they are classed. They are furnished with long and powerful wings, by help of which they can sustain a rapid and continuous flight. They seek their food mostly on the ground, but do not scratch with their feet, and are more given to bathe in water than to flutter in a bath of dust, though in this habit also they not unfrequently indulge.

The crop is large, in which the food supplied to their young is partly macerated and reduced to a kind of pulp before the young are fed. This process is carried on more by the agency of the receiver than of the giver, as the young birds, instead of opening their mouths and allowing the food to be dropped in, help themselves by inserting their bills into the sides of the old bird's mouth.

Their mode of drinking differs from that of the true gallinaceous birds ; they do not take short sips, lifting the head after every draught, but satisfy their thirst by one continuous immersion of the whole bill.

They build their nests of a few sticks, and lay two white eggs.

The food and habits of wood pigeons vary with the season. In spring and summer they are most frequently seen alone or in pairs. They then feed principally on the tender leaves of growing plants, and often commit great ravage in fields of beans and peas. Spring-sown corn is attacked by them both in the grain and the blade, and as soon as young turnips have put forth their second pair of leaves, they, too, come in for their share of devastation.

As the season advances, they visit the cornfields, especially those in the vicinity of their native woods. They prefer, above all, those parts where the corn has been laid by rain or wind, and where a neighbouring grove or thicket will afford them a ready retreat if disturbed. They have become a scourge of agriculture, and hence the war which is now systematically waged, by organised shoots, against them. They are in great demand as an article of diet, but, being very cautious and shy, are somewhat difficult of approach. I have given my experiences, however, in the article which follows.

THE ENEMY OF THE FARMER—THE QUIST

It is true that the yeoman in the centre and south of England has latterly been relieved of this pest by the recently organised pigeon drives, notably in Herefordshire and the neighbouring county of Gloucester, but sad havoc is still wrought by these birds in spring and the beginning of harvest. I have seen whole patches of peas, beans, &c., laid waste by the wood pigeon in spring, whilst the storm-beaten wheat and barley comes in for wholesale devastation. Of course, there is sport for anyone who cares for a shot at these birds, and the farmer welcomes with open arms such aid in ridding the land of such a pest. I know the country pretty well from Berwick-upon-Tweed to Lizard Point, a range of some 360

miles, and I can say with assurance that no applicant for a day's shooting among the quists is ever refused.

When last I engaged in this sport I pursued the following tactics: I arrived in the county of Herefordshire, in the Ross-on-Wye district, one evening in spring, and having asked permission of a neighbouring farmer, I sallied forth the following morning at daybreak, and having constructed a bower of cut branches in the vacant space between two thick bushes, close to the young peas, I awaited the early birds. Soon was heard the whistle of wings as a bird alighted in the branches of the overarching tree. An upward glance revealed the culprit, and down came number one. This bird I placed in position among the growing crops, and a very short time elapsed before number two alighted close by. The moment it reached earth I fired, and thus gave the dead bird a companion. This sort of warfare went on, firing at short and long range—viz., from fifteen to forty yards—till eleven o'clock, when I repaired to my temporary homestead for lunch, carrying 26 plump birds.

The next day I selected the other extremity of the farm of two hundred acres, where a similar crop had been sown, and, although I had fewer birds, I managed to do well to the tune of 18.

My best day at this sport, however, was in Wiltshire, on a farm, bordering well-wooded land, belonging to the Marquis of Aylesbury. It was the beginning of harvest, and the shocks of wheat were piled up on one end of an oblong-shaped field. I duly selected my bower as in the spring, and kept watch towards the wood for the first arrival. Soon a bird was seen making for the cut wheat, which I secured, and followed the tactics before mentioned. Presently several were seen to enter the tree above me, and as they flew to the wheat I despatched them one by one, sticking each bird in a feeding position at varying distances, some on the shocks and others on *terra firma*. This sort of sport went on all the morning till I had bagged 20 couple, to the apparent delight of the farmer and his agricultural neighbours who participated in the spoil. Extreme caution is needed at the onset if a good haul is desired, for even the quist can be wary.

THE PIGEON AS A MESSENGER.

The pigeon family is one of the most widely distributed orders of birds, for, with the exception of the frigid zones it is found throughout the entire globe, being most abundant however in Southern Asia the Indian Archipelago, and North America. The genera are extremely numerous and differ widely in their habits, some being arboreal and others terrestrial. But in one particular they all agree ; they all possess an innate love of home—a love so strong that when removed from their habitation they will at once return, though the distance to be covered may be many miles.

At a very early period of the world's history this inbred homing tendency was noticed by man, and by him was taken advantage of to utilize the bird for the purpose of carrying messages. When this custom originated is lost in obscurity ; but for many centuries pigeon-flying has been a favourite custom and pastime with various nations and, as in England at the present day, it has now been a prolific source of gambling.

So far as we know Noah was the first to use the pigeon as a bearer of intelligence ; but the first nation of whom we have any record as employing the bird as a messenger is the Greeks. By them it was used with great advantage, and the knowledge they had gained respecting it they imparted to the Romans, who first utilised it as a message-bearer about B.C. 120. That it satisfactorily performed the office of courier may be inferred from the fact that nearly three-quarters of a century later it was employed by Julius Cæsar as a military messenger ; and when Modena, or Mutina, where pigeon-flying is still carried on to a great extent, was besieged by Mark Antony, in 44 B.C., we read that Decimus Brutus, whilst shut up in the city frequently communicated with Consul Hertius by means of this bird. For centuries pigeons continued to be used as conveyers of intelligence, and about 500 years ago they formed part of a telegraphic system adopted by the Turks, who erected high towers at distances of thirty or forty miles apart. These were provided with pigeons, and sentinels stood constantly on the watch to secure the

messages as the birds arrived, and to pass the intelligence on by means of others. The communication was written on a thin slip of paper, and enclosed in a very small gold box, almost as thin as the paper itself, suspended to the neck of the bird. The time of arrival and departure was marked at each successive tower, and, for greater security, a duplicate message was always despatched a couple of hours after the first.

Military men will see in this piece of ingenuity a similarity between this system and the cipher method of signalling messages in our day. The intelligence, however, was not invariably enclosed in a gold box, but was sometimes merely wrapped in paper, in which case, to prevent the bird being injured by damp, the legs of the bird were bathed in vinegar, with a view to keep them cool, so that there might be no settling to drink or wash on the way.

The light, active body and long wings render the pigeon peculiarly adapted for speed, and for very many years it remained the fleetest means of communication which the world possessed. As instances of its velocity, it may be mentioned that on November 22, 1819, thirty-two pigeons which had "homed" at Antwerp were liberated from London at 7 a.m., and at noon the first bird reached its destination, having accomplished the distance of 210 miles in (allowing for difference of time) about four and three-quarter hours, or at the rate of something like 45 miles per hour—the speed of a railway train. A few years later fifty-six pigeons were brought over from Holland, and having been set free in London at 4-30 a.m., the swiftest bird traversed the distance of 300 miles at the rate of 50 miles per hour, the slowest doing it in 37½ miles in the hour, on an average. But a much quicker flight than this is on record; for we find it chronicled that in 1842 a pigeon flew from Ballinasloe in Ireland to Castle Bernard, a distance of twenty-three Irish miles, in eleven minutes which gives the almost incredible velocity of 160 English miles per hour, a speed nearly equal to that of the common swift, which is, without doubt, the fleetest of all birds. As a bearer of military despatches,

the pigeon has long since given way to the mounted messenger, the railway, the telegraph, and heliograph, and other methods of signalling, though up to within comparatively recent times it continued to be employed as a conveyer of general intelligence.

As already stated, pigeons have long since ceased to be employed as carriers of military intelligence, but within the past decade or so the war authorities of the chief European nations have given much consideration as to the advisableness of again utilising them for this purpose, as the fact that it was only by means of these birds that Paris received news from the outside world during the many weeks of the siege of 1870-71, set at rest all doubts as to the possibility of usefully employing these swift aerial messengers under certain conditions.

In our own country, the exigencies of climate—mist, fog, sea fret, &c., render the employment of the bird as a national resource out of the question. The country doctor and postmaster in many different parts of these islands, however, find the " carrier " of great value.

THE SKYLARK (ALAUDA ARVENSIS).

GENERIC characteristics: Upper parts light reddish-brown, the middle and upwards of each feather dark brown; a whitish-smeary streak above the eyes; throat white; neck and breast whitish; tinged with yellowish-red, and smeared with a darker brown; tail moderate. Average length seven and a quarter inches. The eggs are greyish, more than ordinarily speckled with dark grey and brown.

Many of the bygone poets have struck the lyre in these well-known lines:—

> "Hark! hark! the lark at Heaven's gate sings,
> When Phœbus 'gins to rise."

This universally known bird, which has charmed generations of our country folk from time immemorial, rich and poor, high and low, prince and peasant alike, is plentifully distributed over the wholeof our islands from John O'Groat's to the Lizard. In a country where the plough was little known, and the cultivation of to-day had not commenced, the localities of the skylark were in extensive ranges of pasture land. Grazing lands, however, are still its favourite range, and it is often found in large numbers where the upland sheep pastures commence.

In these localities, and among the grass ripe for hay, it forms its nest and rears its young. Many a time, when a boy, have I discovered the young larks, in their infancy, scattered about the long grass after the passage of the scythe. The reaping machine of modern days tells a similar tale, viz., of the wholesale destruction of broods of this beautiful songster.

The male, it is said, sings the loudest during the period of incubation, perched on a small elevated clod, or rising above the spot with a rapid motion of the wings, and during ascent pouring forth that melody which has been so often the theme of our more homely poets, and is a

marked illustration with all who describe the accessories to rural scenery.

The song is sustained for a considerable time without break or interruption, both during the ascent and after having attained its wished-for elevation, and also while remaining poised in the air, so high as frequently to be known only by its song faintly heard.

Some of the old naturalists speak of its total disappearance, the height being so great. I have never met with such an experience, for I have been able to descry the small speck at all times in the azure sky. It is quite true the speck has been at times almost infinitesimal.

There is a legend—very pretty truly to the child mind and imagination—that the bird soars so high and so near Paradise that it borrows its song, in its richness, from the angelic choirs.

It never perches on trees, but is entirely terrestrial, walking and running with facility and swiftness, and never has it recourse to hopping.

In its geographical range the skylark seems pretty generally and commonly distributed over Europe, decreasing to the northward, and there becoming migratory in winter.

I have noticed it as early as March the first, both on this island and the adjacent mainland, and it remains in full evidence till September, if fine.

Not only those in possession of souls poetic have been enraptured with the charming cadence of this prince of songsters, but the rough gold-diggers, the early pioneers of emigration to the Southern Cross, we are told, walked many miles on the Sabbath to listen to the rich, full melody of an English lark, which a female emigrant had brought with her from the old country. These rough men begged to be allowed to come, week by week, to hear its song, which reminded them of the old associations of their youth in an English peasant home.

In the days of the early gold-mining, the Sabbath had no meaning for them, as the extension of the Missionary Society had not reached Australia, but to them the song of this bird was typical of all that made life happy in the old home, across the eleven thousand miles of ocean.

For several years the bird was noted near my home On February 17th and in the early days of March its song was in full cadence and could be heard at a long distance.

The weather no doubt being so mild, mystified the usual date of its advent. It continued in song right up to October 20th, a space of over eight months. It would thus appear that it lingers longer in the north than in other parts of England.

THE *Skylark* is a bird much praised by all English writers. Jeremy Taylor said, "It did rise and sing as if it had learned music and motion from an angel." It sings while on the wing. At first as it springs from the ground, its notes are low and feeble, but its music swells as it rises and long after the bird is lost to the eye it continues to charm the ear with its melody. Even then a practised ear will know the motion of the bird by its song.

It climbs up the sky by a flight, winding like a spiral stair constantly growing wider. It gives a swelling song as it ascends, and a sinking one as it descends. It does not alight straight to the nest, but reconnoitres for a time till safety is assured. The desire to throw itself up when it sings is so great, even when confined, that it sometimes leaps against the top of the cage, and woul thus injure itself if we had not learned to prevent it by lining the roof with green baize.

A pair of larks had hatched a brood of young in a grass field. The grass had to be cut before the young ones could fly and as the mowers approached the nest, the old birds were very much alarmed. Finally the mother laid herself flat on the ground with wings outspread, and her mate, by pulling and pushing drew one of the young on her back. She flew away with that and soon returned for another.

This time the father took his turn, and thus they carried away all the young before the mowers reached the place. In spring and summer the larks live in pairs, but in autumn they gather in large flocks and before the

snow falls they become very fat, when thousands are killed for the market. The back of the bird is brown, blackish-brown, and gray, the lower parts dingy white. It is about seven inches long, the tail being three inches.

TO A LARK.

To be a lark, aloft and free,
Fit emblem of ecstatic glee;
  On joyous wing to cleave the sky
  (Which means, in point of fact, to fly);
To sing from dawn till after tea,
Without a change of tune or key,
Ah, yes! that really is to be!
  I think so now, and often sigh
    To be a lark.

Time was when on some grassy lea
(You'd be much safer up a tree),
  Your humble dwelling I would spy,
  And take your eggs out on the sly,
  For as a boy that seemed to me
    To be a lark.

HANZARD WATT.

THE COMMON CUCKOO (CUCULUS CANORUS).

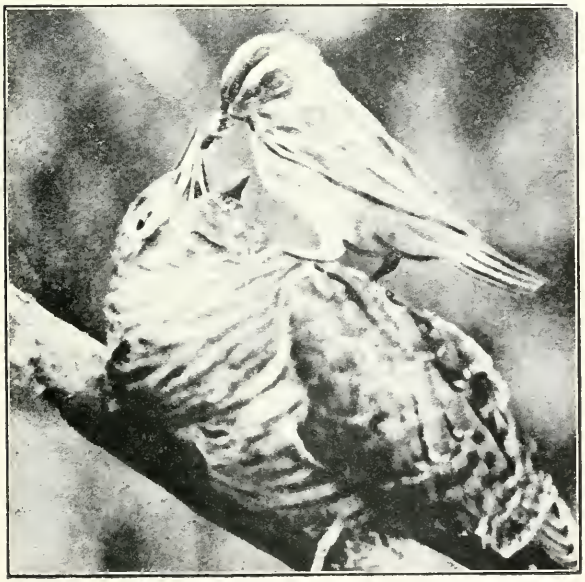
FROM time immemorial this bird has excited extraordinary interest, not only with children, but wherever it is found people of all ages rejoice to hear its clear note in the spring. It is supposed to be the harbinger of sunny skies and bursting foliage, and it carries with it dear associations wherever it goes, while its great peculiarity of locating itself in the nests of other birds, and therein depositing its eggs, has created an interest and curiosity amongst naturalists and others beyond the usual limit.

Another peculiar phase is the indifference with which it regards these deposits, for it relegates, with entire confidence, the charge of its young to the alien. Situation has, apparently, nothing to do with it, for this custom is universal with this species of bird. Indeed, it has puzzled ornithologists and naturalists alike, through the ages. Its structure, food, and habits are not dissimilar to others of the migratory tribe, but its process of incubation remains a mystery. No doubt it might have been managed in the usual course, but there can be no doubt also that the departure from it has been so arranged as to fill up or complete some principle in the economy of this special tribe of birds, or, as an old writer puts it, "some link in the zoological chain which has not entered the mind of the curious in nature," and one would suggest that a probable means of discovering the bearings of this mysterious deviation would be to endeavour to connect it with analogous cases in the other branches, where the variety of circumstances by which it would be developed might lead to something which would unlock the mystery.

Birds possessing this parasitical economy are exceedingly few in numbers.

It arrives in April, and immediately proclaims the fact to its mate. This is continued unremittingly until the breeding season has passed, the note gradually becoming

PIPIT OFFERING HER MORSEL TO CUCKOO.



WILLOW WREN FEEDING CUCKOO.

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hoarser and more indistinct as the season advances, and ultimately before their departure they are entirely mute.

July usually sees the last of them—the first migrants to leave our shores. The period of remaining in the British Isles appears to be limited to the time necessary for a selection of nest and laying the quota of eggs.

The bird is very generally distributed, and is found in districts of every character. In this respect it differs from the nightingale, which is very seldom heard in the mining districts of South Wales, although across the Bristol Channel, on the coasts of Somerset and Devon, it occurs frequently and regularly. In choosing its nest, it goes invariably for that of insectivorous birds, like itself, and caterpillars form its staple food, hence its partiality for lands of high pasture and moorland.

The plumage of the head, neck, breast, and upper parts is of a deep bluish-grey. The whole of the belly and remaining under parts, and auxiliary feathers white, with pretty distinct black bars. The quills are blackish-grey, the inner webs have white bars. Tail of a darker tint, blackish at the end. Feet, dark yellow. The sexes are much alike in coloration; so unlike the sea birds. But the most complete account of what was anciently known and believed of these singular birds is given by Pliny—an authority which most naturalists will accept. He says: "They alwaies lay in other bird's nests, and most of all in the stockdove's, commonly one egge and no more (which no other bird doth besides), and seldom twain. The reason why they would have other birds to sit upon their eggs and hatch them, is because they know how all birds hate them, for even the very little birds are readie to war with them; for feare, therefore, that the whole race be utterly destroyed by the furie of others of the same kind, they make no nest of their owne (being otherwise timorous and feareful naturally of themselves), and so are forced by this craftie shift to avoid the danger. The titling (Anthus pratensis) therefore that sitteth, being thus deceived, hatcheth the egge, and bringeth up the chick of another bird. And this young cuckoo, being greedy by kind, beguiling the

other young birds and intercepting the nest from them, groweth thereby fat and fair-liking whereby it comes into special grace and favour with the dam of the rest and nurse to it. She joyeth to see so goodly a bird toward, and wonders at herselfe that she hath hatched and reared so trim a chick. The rest which are her owne indeed, she sets no store by, as if they were changelings, but in regard of that one counteth them all misbegotten, yea, and suffereth them to be eaten and devoured of the other even before her face; and this she doth so long, until the young cuckoo, being once fledged and readie to flie abroad, is so bold as to seize on the old titling and to eat her up."

Linnæus, the German, repeats this story of the voracious appetite, and hence the strange, but—to the Germans—appropriate expression, "ungrateful as a cuckoo." It appears, however, physically impossible that the young cuckoo, whose bill is only adapted for providing a meal of soft caterpillars, could ever perpetrate this horrible crime, and it is suggested that a conglomeration of observations of other foreign birds' habits have given rise to this particular trait in this fledgling. That the egg of the cuckoo is carried in its beak to the selected nest is indisputable, for the shooting of the bird in transit to a nest has revealed this fact, the egg having been invariably found not far from the dead bird. Speaking of its insatiable appetite, the writer, when a youth, endeavoured to rear a young cuckoo, and attended to it for some time, and such was its appetite that it never seemed to have enough. Yet it did not make any attempt to eat unless it was fed. Its wild, outrageously wild, nature never forsook it. It would screech, and exhibit unmistaken signs of disgust at its captivity, and all attempts at pacification ended in the same way. It was, therefore, set free.

It is a curious phenomenon of nature, that the baby cuckoo is apparently endowed with strength and vigour far beyond that of the ordinary bird, and it has a marked propensity to rid the nest of other occupants. It endeavours to the utmost of its powers to bundle the real owners—or the progeny of the real owners—headlong

from the nest, for a space of some ten or twelve days, after which time, if its herculean efforts are unavailing, it assumes a quiet attitude, and remains to all intents and purposes in perfect harmony with its neighbours. The very formation—deformity, perhaps, would be the better word—of its body, assists its will-power, for close anatomists concur in the opinion that it has an extraordinary hollow or depression between the shoulders, which in no small degree conduces to assist the young bird in working itself under the other young, and getting them on its shoulders, for the toppling over process, for which it is noted.

As I have already and previously intimated, we have not a very high opinion of the cuckoo as a musician, or vocalist, because he is monotonous until he becomes bilingual, and gargles, or crows, or croaks. Those persons who do not dwell constantly in the heart of the country are apt to think and chortle poetically of many rural sounds which we bucolics, or agrestics, adjure prosaically ; but the present point is that the gargling of the cuckoo is synchronal with the closing of the principal act of the annual trouting drama. After the passing of the drake, both trout and trout-fishers take a rest of many bars' duration, and so we look back and review the recent circumstances.

CUCKOO CHARACTERISTICS

THE injuries," says an old writer, "which so frequently happen to the eggs of those birds, in whose nests cuckoos lay, are occasioned, as I have often proved experimentally, by the sitting bird, in attempting to accommodate herself to eggs of different sizes. If comparatively large and small eggs are placed in the same nest, some of the smaller ones are generally thrown out, or rendered useless, by the hen bird, in endeavouring to arrange them so that she may distribute nearly an equal degree of warmth and pressure to all: but the larger ones, which chiefly sustain her weight, and consequently are less liable to be moved, usually remain unmolested. When the eggs of birds are exchanged for others of a uniform magnitude, whether larger or smaller, than their own, provided the difference is not so great as to occasion them to be forsaken, no disturbance ensues, whatever their colour may be, the change either not being perceived, or totally disregarded." If there be no mistake in the fact of the cuckoo's eggs having been found in the nests of wrens, it may well excite a question in what manner it was introduced for the entrance of any of these little nests being in the side, and not more than an inch or an inch and a half in diameter either way, it is obviously impossible so large a bird as the cuckoo could get into the nest, which is barely wide enough to admit the wren herself.

Should we reject (though we have no reason to do so) the evidence of M. Montbeillard with respect to the wrens, we cannot refuse to believe the accuracy of Dr. Tanner, who found a cuckoo's egg in the nest of a wagtail in a hole under the cave of a cottage; though it was a singular place for a wagtail to build in. Nay, even leaving these doomed nests with a narrow entrance out of the question, and taking the nests most usually chosen by the cuckoo for her progeny, one must conclude that she cannot in many instances sit upon the nest while

depositing her egg. She may, indeed, manage this in the nests of the larks, and in the wagtails' when built, as it usually is on the ground; but the case is very different with the hedge-sparrow, the green-finch, the linnet, or the white-throat, all of whose nests are usually placed in thick-thorn-bushes, or among brambles, and so closely fenced in therewith; that the schoolboy can with difficulty reach in his hand (which is not one third the size of the cuckoo) to rob them of their eggs. From these facts one can infer that it is physically impossible for the cuckoo to sit upon the nests when she deposits her egg. An old authority Valiant, rightly observes, "Of all the cuckoos which I observed in Africa, the didric was by far the most numerous; for I perceive, by referring to my journal, that I, and my faithful Klaas, shot 210 males, 130 females, and 103 young ones, in all 443; whilst it would not have been difficult to have procured a much greater number.

If I add, besides, that we found 83 of their eggs in as many nests, belonging to insectivorous birds, I think it will appear that I have not wanted opportunities of studying its history.

Although this bird be so common, not indeed in the environs, but about one hundred leagues from Cape-town, it was scarcely known in Europe before my voyage, and in France there was only one mutilated and badly preserved specimen of it to be seen in the Royal Museum at Paris. I myself brought over 150 males and females, as well as young ones, which are now exhibited in the chief cabinets of Europe. To this beautiful species, also, I am indebted for my principal knowledge of the cuckoo family. From the facility I had of leisurely and successfully observing its manners, I always entertained the hope that I should one day surprise a female didric in the act of depositing its egg in the nest of another bird; but having been disappointed in this respect I began to imagine that my ignorance on this point would never be removed, when one day having killed a female of this species, and wishing to introduce into its throat a hempen stopper, according to my custom after bringing

down a bird, in order to prevent the blood from staining its plumage, I was not a little surprised, on opening its bill for this purpose, to find in its throat an entire egg, which I knew immediately, from its form, size, and beautiful whiteness, to belong to the didric. Delighted at length, after so many useless efforts, at having obtained a confirmation of my suspicions, I loudly called my faithful Klaas, who was only a few paces from me, to whom I imparted my discovery with much pleasure, as he had used his best exertions to second my views. Klaas, on seeing the egg in the bird's gullet, told me that, after killing female cuckoos he had frequently observed a newly broken egg lying upon the ground near where they had fallen, which he supposed they had dropped, in their fall, from being at that moment ready to lay. I recollect very well, that when this good Hottentot brought me the fruits of his sports, he frequently remarked, as he pointed to the cuckoo, "This one laid her egg as she fell from the tree!"

Although I was convinced, from this circumstance, that the female cuckoo deposits her egg in the nests of other birds by conveying it in her beak, I was very desirous to collect what facts I could upon the subject.

But one of the most remarkable circumstances is, that though the birds which feed on grain are more numerous in Southern Africa, and their nests more easily found, the cuckoos never select them for depositing their eggs, but uniformly the nests of birds which feed on insects.

Dr. Fleming asserts—as almost a solitary authority—that the bird constructs its own nest in some cases and deposits three eggs. Reverend Mr. Wilmot, of Morley, in byegone times makes this assertion:—"I was attending some labourers on my farm, when one of them said to me, 'There is a bird's nest in one of the coal-slack hills; the bird is now sitting, and is exactly like a cuckoo. They say cuckoos never hatch their own eggs otherwise I should have sworn it was one.' He took me to the spot. It was in an open fallow ground; the bird was upon the nest; I stood and observed her for some

time, and was perfectly satisfied it was a cuckoo ; I then put my hand towards her, and she almost let me touch her before she rose from the nest, which she appeared to quit with great uneasiness, skimming over the ground in a manner that a hen partridge does when disturbed from a newly-hatched brood, and went only to a thicket about forty or fifty yards from the nest, continuing there as long as I remained to observe her. In the nest, which was barely a hole scratched out of the coal-slack, in the manner of a plover's nest, I observed three eggs, but did not touch them." The narrator goes on to mention that two young ones were hatched, which he and his friends observed for several days to be constantly fed by the attentive parents, till they successively disappeared, either by accident or by flying away.

Naturalists of to-day regards such stories as myths, and even in those days the night-jar was oft-times mistaken for the cuckoo.

THE WOODCOCK (SCOLOPAX RUSTICOLA)

GENERIC markings: Back of the head barred transversely dusky; upper plumage mottled with chestnut, yellow, ash, and black; lower, reddish-yellow, with brown zigzag lines; quills barred on their outer web with rust-red and black; tail of twelve feathers, tipped above with grey, below with silvery white; bill flesh-colour; feet, livid. Length, thirteen inches. Eggs; dirty yellow, blotched, and spotted with brown and grey.

The history of the woodcock as a visitor in the British Isles is briefly as follows: Wood cocks come to us from the south in autumn, the earliest being annually observed about the twentieth of October. On their first arrival they are generally found to be in bad condition; so weak, in fact, that one recollects many instances of flights having reached the coasts of Cornwall, only able to gain the land. Their condition at these times is one of extreme exhaustion, and they become the prey not only of the sportsman but are easily captured alive.

In the course of a very few days those that escape the fowler or prowler, very quickly recruit their strength, when they make their way inland. They have been known to settle even on the deck of a ship, at sea, in order to rest; or actually to alight for a few moments in the smooth water of a ship's wake. Their usual place of resort by day are woods and coppices in hilly districts, whither they repair for shelter and concealment.

Disliking cold, they select in preference the side of a valley which is least exposed to the wind; and though they never perch on a branch they prefer the concealment offered by trees to that of any other covert. There crouching under a holly, or among briars and thorns, they spend the day in inactivity, guarded from molestation by their stillness, and by the rich brown tint of their plumage, which can hardly be distinguished from dead leaves. Their large prominent bead-like eyes are alone likely to betray them; and this, it is said, is sometimes the case.

So conscious do they seem that their great security lies in concealment that they will remain motionless until a dog is almost on them, or until the beater reaches the very bush under which they are crouching. When at length roused, they start up with a whirr, winding and twisting through the overhanging boughs, and make for the nearest open place ahead ; now, however, flying in almost a straight line, till discovering another convenient lurking place, they descend suddenly, to be "marked" for another shot.

About twilight the woodcock awakens out of its lethargy, and repairs to its feeding-ground. Observation having shown that on these occasions it does not trouble itself to mount above the trees before it starts, but makes for the nearest clear place, in the wood, through which it gains the open country; fowlers were formerly in the habit of erecting in glades in the woods two high poles, from which was suspended a fine net. This was so placed as to hang across the course which the birds were likely to take, and when a cock flew against it the net was suddenly made to drop by the concealed fowler, and the bird caught, entangled in the meshes. Not many years ago, these nets were commonly employed in the woods, near the coast of the north of Devon, and they are still said to be in use on the Continent. The passages through which the birds flew were known by the name of "cockroads," and "cockshoots."

The localities which woodcocks most frequent are places which abound in earth worms, their favourite food. When the earth is frozen they repair to the sea, or near springs ; and now probably they are less select in their diet, feeding on any living animal matter that may fall in their way.

In March they change their quarters again, preparatory to quitting the country ; hence it often happens that considerable numbers are seen at this season in places where none had been observed during the previous winter. They now have a call-note, though before they had been quite mute ; it is said by some to resemble the syllables "pitt-pitt-coor," by others to be very like the croak of a frog.

It is pleasing to be able to corroborate the testimony of many sporting estate owners and gamekeepers, that the habits of the woodcock have gradually been undergoing a change to their advantage during the last decade or two. In short, "*Scolopax rusticola*" can no longer be described as an autumnal immigrant only, but as an acclimatised species likely to become a valuable asset of many English and Scottish estates where properly cared for.

In northern, eastern, and central districts it shows each season a greater inclination to linger into the spring; but, unfortunately for the sporting western counties, the rule seems to be more relaxed that the mass of immigrants pass on thitherward. I view as a matter of correction the opinion nowadays so frequently heard that there must be some change in climatic conditions to account for the growing attachment of these wanderers to our country. I, for one, am persuaded that the climate has nowise changed of late, but that woodcock are simply returning to their old home because of the encouragement given by estate-owners, gamekeepers and protectionists under a more merciful regime. There can hardly be any doubt that, with the help of the general press, more and more good work is being done to make their sojourn comfortable, hence the reason of so many broods reared on British soil.

Wise sportsmen have learnt that the "pound of flesh" is but a premature and a false gain. Moreover, high authority recognises as important that no woodcock should be shot after January has turned, since the birds commence pairing in February, and any persecution during the second month of the year will sharply cause their departure. Hence the circular addressed by the Field Sports and Game Guild (with Lord Westbury as chairman) to the various committees of the Wild Birds' Protection Act under County Councils, calling attention to the unsatisfactory regulations with respect to woodcock and their eggs.

As considerable confusion arises out of the multiplicity of orders and the inconsistency of dates even in counties which adjoin, it is suggested that the Home Secretary be petitioned to cancel all orders now in force, and,

for the simplifying of the law, make them uniform for general application throughout the whole of England and Wales. The mean fence-time hitherto existing may be said to extend from March 1st to August 31st; but February 1st or 2nd is the new date selected by the Field Sports and Game Guild, the protection to last until August 12th.

I have had several pairs of breeding woodcock under observation during recent years, and obtained records of others from game-preservers on estates where they have been absent before.

In a favourable season the pairing seems to be fully accomplished by the first week in March. The "nests" are made in fairly warm, unwatered thickets often near the base of the grouse moors, some being in larch woods, where the trees average 60ft. high, where the ground is at ordinary times hard and dry, and the nearest boring ground over a mile away. The nidus, or apology for a nest, is in all cases a slight hollow or scoop near or among decayed leaves, preference being shown, I think, for the "needles" of a pine or fir the worse for decay; but, at any rate, there is a tree in the immediate vicinity. The nidus is largely composed of local foliaceous matter, eke dry grass.

It is not surprising that I almost trod upon one of these "nests" quite accidentally one day, for gamekeepers have been known to miss the bird herself while squatting in the undergrowth at their very feet. No bird sits closer or preserves better silence than the woodcock; her long bill of three inches being meanwhile depressed. It apparently needs a bit of special training to detect her, for she is in excellent harmony with the general tone of her surroundings. The protective colouring is noticeable in her wood-brown back and breast, and in various tinted mottlings which blend with dead leaves and the soil over which they are strewn. Reddish brown is overlaid with oval chestnut marks, and shades of buff melt into golden and silvern grey with purposeful but quiet magic. Usually the woodcock is betrayed by her luminous, convex black-brown eye, which, at such

times, is wide open in its proper place, singularly near the top of her poll; which orb, by its great brilliance and size, proclaims the bird to be of nocturnal habits. Says Butler: "For fools are known by looking wise, as men find woodcocks by their eyes."

There are three or four eggs to the clutch. These are creamy or stone-grey, with often faint violet-washed marks, and decided warm brown blotches at the larger end. By mid-April I have seen the nestling chicks, which are of a light buffish brown above, with dark chestnut stripe on the centre of the crown. This, although interrupted at the nape, is taken up again and carried down the back. There are similar though undecided transverse broad stripes and the under parts become almost white.

These nidulants—one can hardly call them nestlings—"run away from home" almost immediately they are hatched, just like water-loving moorhens, coots, mallard, and other youngsters of the duck tribe. On one noteworthy occasion, however, I was just in time, along with a friend carrying a camera, to find a still plump mother-woodcock sitting as tightly as a tired newly-arrived immigrant will do in her determination to protect half a handful of her offspring in the transitional stage. We afterwards found that she retained charge of one chick, that a second had skedaddled, and that a third was chipping its shell. Close at hand were some fragments of a shell from which a chick had quite recently been hatched. However, this mother-bird faced the camera with sufficient equanimity, and subsequently allowed Harry Lavender, the gamekeeper, to stroke her back. He went as far as to say that he would lift her off the ground and pretend to put her in his pocket; but this proposed outrage on the bird's confidence he failed to commit. She fled, but was sharply back again, to be welcomed by two nidulants and a half, which within a couple of hours became a full family complement of four, and several passable photos were secured.

Another maternal woodcock declined this outside familiarity. On being disturbed by two strangers she snatched up the chick nearest to her, and bore it off to a distance—right across the river in the valley, said our

keeper. This chick's two fellow-mates simultaneously disappeared into cover, and did not emerge therefrom until called together by their parent, who, to our great satisfaction, brought back the other little one. I do not wish to suggest that behaviour of the kind is characteristic of the woodcock, which has surely never been seen carrying off a chick dangling at the end of her long bill. Lavender, the gamekeeper mentioned, says he has seen more than one youngster tucked privily away oetween the mother-bird's wonderfully fine thighs, and in such fashion deported to moist probing-grounds at a distance.

Since home-breeding woodcock are now more numerous, one would naturally expect to hear of more mature birds being bagged during the autumn and winter. I do not think it is so, because, unfortunately, a very great number of home-reared birds go away. The Duke of Northumberland, at Alnwick, has been very successful with the catching and marking of young birds, whose legs carry a small ring, marked "N," along with the year. Several have been shot at different points of the compass, but it has been shown that the majority proceeded north towards the end of summer.

Some countrymen will inform you that the woodcock is double-brooded, although they are not able to prove it. Could others do so, I think it might be found that the first brood turned north, while the second brood turned south with other migrants at the appointed time. If the double brood be mythical, those unfledged birds which are often encountered in early autumn point to my sinister conclusion that the original clutch of eggs was either stolen or destroyed by vermin.

Mention is made of the scarcity of woodcock. A short time ago many of these birds rested in their aerial flight on the Farnes, and the two men, the sole occupants of those islands, had a lively time with the gun—so much so that they ran short of ammunition, one securing sixteen brace and the other seventeen. Since that shoot some visiting gentlemen have shot several of these birds from the cobles. The Farne Islands offer varied and sensational sport, for ofttimes when birds are scarce one may

get a shot at a basking seal. Four woodcock and a couple of seals fell to the lot of a gun from a small boat recently. The seals were of baby growth, scaling from four to seven stone. It is well known to Scotch naturalists that this animal attains a weight of seventy stone. It should be remembered that shooting parties can hire cobbles from either Seahouses or Holy Island for these excursions.

It is estimated that lighthouses on the Atlantic coast of the United States cause the destruction of about 100,000 birds annually. The birds, being attracted by the light, and flying against the glass, are dashed to pieces. The migratory birds are the chief sufferers, the havoc being great in April along the northern coasts, from Cape May to Maine, and in October on the Florida shores. At one lighthouse in Florida the lantern itself was broken by the repeated shocks from ducks, and an iron network had to be erected round the light. Even then the ducks struck the netting with such force as to break through it and smash the heavy outer plate-glass of the lantern. From twenty to fifty dead birds were often found in the morning.

A writer at Holy Island, who represents the Wild Fowling Association, mentions the fact, in corroboration of the foregoing, that the ever-memorable Longstone Lighthouse has caused the destruction of many of the winged tribe in their migration flights. The flash of this light can be seen for fifteen miles, encompassing and protecting the twenty islets which form the Farne group. It was in winter no uncommon sight for the lighthouse keeper—then a Darling—to descry in the early morning several ducks with broken necks lying on the rocks close by. It is a common saying that "Longstone has a meal to-day." Some woodcock were recently found similarly killed, whilst many more have been shot by the daring visiting fowlers who made North Sunderland their rendezvous.

"The Scottish Field" says:—Some doubt has been recently expressed by writers who are generally well informed as to the nidification of the woodcock on Scottish soil. I had fancied that the fact had long been universally accepted that the long-billed bird nested and reared its broods in this country, but it would appear that a num-

ber of sceptics still exist. Mr MacInroy has come forward and unequivocally stated that the nesting of woodcock in Scotland is quite common. Twenty-nine years ago he found the first nest, and as the years pass by such nests are encountered in ever-increasing numbers. For carrying out its domestic plans, the bird favours certain districts and avoids others. Many people believe that the woodcock produces two broods in the season, but on this point there is really no conclusive evidence. Unfledged birds have been found as early as the middle of April and as late as the end of August, but these irregularities may be accounted for in various ways. Young birds are often shot whenever the grouse season opens. Certain "sportsmen" have been known to make really large bags of young cock even on the Twelfth. Although the law permits the killing of the birds from the first day of August, it is a well-known fact that they are unfit either for shooting or eating until October. No true sportsman will endeavour to bag them earlier. If the birds are to be accorded an opportunity of gaining a firm foothold as residents in this country the season for shooting them must be limited by law, and should begin, as in the case of the pheasant on 1st October, and terminate on 1st February. I may remind sportsmen that on the Duke of Northumberland's estate of Hulme Abbey, Alnwick, woodcock have been marked every year since 1891 and a careful record is kept of all the marked birds afterwards discovered and shot.

Until recent years it was a common delusion that long billed birds, such as woodcock and snipe, lived by suction alone, though most upholders of this view would have found themselves at a loss if asked to explain how this could possibly be the case. What nourishment could be drawn from the ground by this means is hard to imagine, but the idea prevailed, and, though long since exploded, is not infrequently stated by ignorant people who wish to pose as ornithologists at the present day. It was possibly fostered by the uncertainty surrounding the movements and habits of these species, for in the rustic imagination "these 'ere foreigners" are credited with powers of which no resident species can boast.

Strictly speaking, the curlew should be classed with the longbills mentioned above, for their food is very similar, though the habits and movements of this "watch dog of the moors" are peculiar to itself alone. Long-billed birds generally lay pointed eggs, and, with few exceptions, the nests are made on the ground, and the materials used in their formation are of the scantiest, consisting merely of dry grass, hay, and a few odd pieces of straw, rushes, etc. The curlew, however, only lays two, or at most three, eggs, and it is exceedingly rare to find four in one clutch. The woodcock lays four, beautifully mottled with rich brown, while those of the snipe resemble the well-known eggs of the lapwing on a smaller scale, being, however, somewhat darker in shade. Woodcock often rear two broods, and it is not uncommon to find incubation still in progress at the beginning of August, especially when the spring has been accompanied by late frosts and snow. The diet of woodcock and snipe is of a varied nature, consisting of insects, worms, and grubs of all descriptions, which are located by the long and sensitive bill in the soft ooze or marshes affected by the species at nightfall. On a moonlight night the birds may be seen probing diligently for their food, and the quantity thus obtained in favourable localities is best shown by the speed with which they recover from the effects of their long autumn flight.

Scandinavia is pre-eminently the home of the woodcock, though the species is distributed generally all over Northern Europe. The American species is totally distinct, and, so far as I am aware, has never found its way across the Atlantic. In the vast pinewoods of Norway it breeds in peace and security, though large numbers are caught for the market when gathering on the coast-line at the first breath of winter. There they may be seen in large parties, preparing for their autumn migration; and it is probable that only a small proportion find their way home again in the spring. Some travel as far as Spain and the shores of the Mediterranean, being guided solely by the instinct which prompts them to resort to milder climates at the approach of winter. Their sensitive bills

are ill-fitted to penetrate frost-bound ground, and food, water, and shelter are indispensable for their existence.

Annually increasing numbers breed in the British Isles, and the growing popularity of covert-shooting has provided them with extensive plantations in all parts of the country where they may carry out their nesting operations undisturbed. The partiality of the species for young woods composed of larch and Scotch fir is well known, and the presence of a flight of 'cock lends an additional charm to a day in the coverts when longtails and longbills may both be expected.

Home-bred birds generally leave the coverts in which they were reared at an early date, and one would almost credit them with a knowledge that the close time expired on the first of August. The fact is, however, that the woodcock resents disturbance, and in the islands on the west coast of Scotland it is commonly supposed that a longbill which has once heard the whistle of the lead takes its departure on the following night. Certain it is that in this locality no beat should be worked twice on consecutive days under ordinary circumstances, and that at least three days should be allowed before it is shot over again. During severe weather, when the big flights arrive, this rule is hardly applicable, for fresh birds cross the narrow sea night after night, and take the places of those which have gone.

Sometimes, the first arrivals appear early in October, but only if driven from their northern haunts by stress of weather. These migrants arrive in an exhausted condition, especially if a change of wind has rendered their progress more laborious. A moonlight night is generally chosen for the crossing, with a strong wind blowing from the north-east to help them on their way. As a rule, the main flights appear on the east coast at the end of the last month, in autumn and during the course of November, though a few stray parties may turn up any time before the end of January. After a short rest, varying in length according to the feed obtained in the place where the flight has pitched, they split up into small parties and scatter over the mainland till the advance of winter

drives them further west to the coast-line and to the Emerald Isle.

Other flights have frequently been noticed during February on the west coast of Scotland, and these probably consist of birds returning from Ireland, which rest for a short period in Raasay, Skye, and elsewhere before finally crossing Scotland *en route* for their Norwegian home.

Woodcock, as already remarked, feed by night, and the state of the weather at daybreak offers a sure guide as to where they will be found during the following day, for, except during severe frost, they seldom feed during daylight, being, like others of their congeners, of a shy and retiring nature. Thus, after a stormy morning 'cock may be sought in the shelter of burns, pine and birch woods, and, generally speaking, in the hollows below the wind. If the days has dawned quiet and peaceful, they may be seen anywhere in the open or in the shelter, wherever the fancy of each individual bird has led it after its meal. After a light night, 'cock sit close, having gorged themselves to such an extent that they may sometimes be caught by dogs or with the naked hand. After a stormy night they are wild, unsettled, rising like a snipe, and zigzagging away with an uncertain and puzzling flight, while on other occasions they rise with slowly moving wings, flying like an owl when bewildered by the light of day. The large eyes of woodcock are sufficient to betray its night-feeding propensities, and it is this bright organ alone which enables the observer to locate the hen when sitting on her nest in dry leaves or dead bracken, which precisely match the colours of her plumage.

Generally speaking, woodcock lie facing the sun, and thick heather slopes, with a few birches scattered here and there, are favoured in such localities where food is plentiful in the neighbourhood. It stands to reason that a woodcock is unwilling to travel far after a full meal, just as so many human bipeds prefer the comfort of an armchair after dinner to a long cross-country walk. Hence they are often found near the feeding-grounds, even when frost has not driven them to the neighbourhood of water, al-

though in the latter case it is far easier to predict with any certainty the spot chosen by the long-billed bird. Their habits are, however, very variable, and every sportsman will frequently find his pet theories upset by the elusive bird. Often we find them where least expected, and it is common indeed to see it rise close to our feet when both barrels have been uselessly expended on some furtive bunny dodging in the heather.

The migrations of snipe are more regular, and, though likewise affected by severe weather, their arrival can be foretold with greater accuracy. From the end of September till the beginning of December snipe appear in these islands, but as regards their habits, the above remarks about 'cock are to a great extent applicable. The same feeding-grounds are chosen, but whereas the woodcock prefers a dry bed during the day, the snipe still remains in the marshes, and rests on some tuft of rushes rising above the surface of the water. It is almost needless to state that snipe should, where possible, be walked up down-wind, except during frost, when the opposite manœuvre will be found most successful. Snipe, like woodcock, are perfectly equipped by nature for their mode of life, and can best be studied in their natural surroundings—far from Kensington or other abodes of stuffed specimens.

THE WOODCOCK.

BY THE LATE CAPTAIN HORACE TOWNSHEND.

Of all the birds from over the sea
Who flock when the cold north wind blows free,
I hold the woodcock to be the king,
With full bright eyes and brown, bent wing.
Silently flitting across the ride,
Sweeping—a flash—down the mountain side,
Hiding beneath the holly tree,
The brave old 'cock is the bird for me

The lord of the acres may boast his stock,
The well-fed tribe of his pheasant flock;
But can he whistle or can he bring
At his call the bird of the brown, bent wing?
He knoweth little of keeper's care;
His home is the moorland, bleak and bare,
And the sheltered glen where the holly tree
Just kisses the wild brook lovingly.

Where the moss-clad rocks rise round the spring,
Veiled by the ferns thick clustering,
With a small, bright peep of the sky o'erhead—
There was my wild bird born and bred,
A round little lump of dusky down.
That will change at last to these feathers brown,
When he flies to his haunt by the holly tree
And the brook that ripples unceasingly.

The winds of winter fiercely blow;
He findeth shelter enough below;
The briars tangled, yellow and red,
The tall trees swaying overhead.
But the end must come, though all seems fair.
A sharp crack rings through the frosty air,
And, with dulling eye by the holly tree,
He lies, once king of that woodland free.

MARKING OF WOODCOCK IN NORTHUMBERLAND.

Hulne Abbey, Alnwick.
June 8, 1910.

Sir,—In reply to your letter *re* marking of birds, I beg to say that the woodcock is the only bird that we mark, which we have done since 1891. I have records of our birds having been shot in England—several counties—Ireland, Scotland, and Wales. Also one in France. I am sending you on *Shooting Times* of May 21, in which you will find an article on our marking, as follows. If you wish I can forward on my book, in which I keep a record of all marked birds, and where shot.

Yours obediently,
W. MEECH.

W. Halliday, Esq.

A RECENT note in the *Shooting Times* makes reference to the nesting of woodcock in many parts of Great Britain, and a query which happens to bear on exactly the same subject is sent by a correspondent, whose letter was published in the same issue. This letter has already been answered, the inquirer being informed that the woodcock shot by his friend undoubtedly was one of those marked by the keepers on the Duke of Northumberland's estate at Alnwick. Probably there are a good many readers of this paper who would like to hear more as to these experiments with the woodcock bred at Alnwick, the marking of which is carried out in order to discover as far as possible the movements of the British-bred 'cock.

As stated in the note referred to above, there is, of course, no longer any doubt as to the more or less common occurrence of the woodcock as a breeding species in these islands, but very little so far has been discovered as to what becomes of these birds, for, although there would seem to be no longer any diminution in the number of

woodcock killed each season in this country, the increase that might well be expected from the greater plenty of nesting birds has not yet made itself manifest.

It is true, of course, that in those districts in which woodcock now breed somewhat extensively rather heavier bags than formerly are obtainable each season, but the increase is not in any way proportionate to the larger number bred; in fact, it is known in one or two cases that the proportion is very much smaller than might have been reasonably anticipated. The woodcock in a certain district are, we will say, increasing, so far as nesting goes, at the rate of 25 per cent. per annum, but the bags obtained do not represent anything larger than an addition of some 5 per cent. The obvious inference is that the remainder of the birds go off to other districts, but even this does not take into account the possibility that the larger total of birds killed may be represented to some extent by a slight increase in foreign visitors coming in the autumn.

Seeing that upon the evidence collected it is plain enough that the woodcock bred in any .particular locality distribute themselves somewhat widely, the question then arises: Where do they go to? So far the answer to this query is only partially answered, and it is still contended by certain recognised authorities—men who have taken great pains to discover the solution of this interesting problem—that home-bred woodcock do not go so far afield as might be supposed. Mr. Charles Dixon, for instance, writing in that fine work of his, "The Game-birds and Wild Fowl of the British Islands," says:—

"Speaking from a naturalist's point of view, and with a full knowledge of the habits of birds during the moulting season, I should say emphatically that the woodcock breeding in the British Islands are stationary; that is, in the sense of not crossing the seas. I am glad to say that this opinion is confirmed by several intelligent game-keepers, on whose grounds the bird breeds in fair numbers every season."

Now, of course, unless these birds are marked it is impossible to say what may become of them, for it is freely

admitted that it is not very easy to distinguish a foreign-bred woodcock from one that is hatched in these islands, nor is it at all easy to state the age of any woodcock. Moreover, the experiments at Alnwick go to show that some, at least, of the woodcock bred there do go a long distance from their home, although it seems more than probable that many of them return in after years to their original home. Many of the birds bred at Alnwick have been killed there some years after they were marked, but that must not be taken as conclusive evidence that they have never been far away. It may be conceded, perhaps, that when a woodcock is killed at home in the same year that it was bred, or even at any time during the following shooting season, it has never been far away, but even here we are jumping to a conclusion without being able to substantiate it.

By way of illustrating the fact that many home-bred woodcock do travel very far from home, and that a certain proportion of them do actually cross the sea at some time or other, it may be as well to instance some of the cases that have cropped up in the course of the Alnwick experiments, which have now extended over a period of twenty seasons. We will take first those that were killed in the shooting season following their being marked—that is, within a year of hatching. The first example of this occurred in December, 1897, when a bird of the year was killed in Co. Wexford, Ireland. In the year following a bird of that season's hatching was secured in Co. Cork, and further instances, no doubt, have occurred, though they have not been reported up to the present.

Several woodcock from Alnwick have been killed in Ireland some time after their first season, as the following instances will show: One marked in 1902 was shot on the Dunmanay Mountains, Co. Cork, in March, 1903,; another, marked in 1903, was killed on the Castle Townshend estate, in the same county, on January 8, 1907; and another, marked in 1905, was secured at Carass, Croom, Co. Limerick, on November 21, 1906. The best illustration of all, however, is supplied by the bird killed in Brittany, in the Commune of Glomel, near Rostrenen,

Cotes du Nord, in November, 1907. This bird was marked in 1905, and its identity was proved beyond a doubt, the ring round its leg being sent home by the Vicomte de Foulavoir, who vouched for the accuracy of the particulars given. It may safely be concluded from this last instance, that home-bred woodcock are, on occasion, as much given to wandering as any of the birds that pay a visit to Great Britain in the autumn, and it is likely that for one woodcock killed and identified there are a dozen others that either escape altogether or are not reported.

So far as they go, the Alnwick experiments are intensely interesting, but one must be careful not to draw hasty, and possibly incorrect, conclusions from them. They may mean a great deal, or, upon the other hand, they may not be so conclusive as they seem. And this is because, owing to the nature of the marking, the endeavour cannot be regarded as quite complete. The birds are marked with a soft metal ring, upon which is simply stamped the initial "N" followed by the year of marking. Now, to the stranger, and especially to the foreigner, these marks are not very intelligible, and it is more than likely that out of every dozen woodcock thus marked that might be discovered by gunners in various parts of this or any other country, not three would be reported to the proper quarter. Some of those who shoot birds with these mysterious markings might not deem it worth while to take the trouble to report; others, like the friend of the *Shooting Times* correspondent referred to, would have no notion what the marks might mean, while it is at least conceivable that a proportion of these marked birds that find their way into somebody's bag are not even noticed. A case of the latter kind was reported not long ago, the writer stating that it was not until the bag was spread out for admiration at the end of the day that someone noticed one of the woodcock had a ring round its leg.

It is only to be expected that the larger number of woodcock marked on any estate are likely to be killed at or near home, and this has proved to be the case in the

experiments conducted at Alnwick. But this does not prove that the birds are chiefly of a stay-at-home disposition. In the immediate neighbourhood of the place where the marking was carried out, it would be fairly well known that such a system was extant, and every keeper or gunner who shot a woodcock would examine it closely to see whether it was a marked bird or not. In places further afield the fact of a marked woodcock being shot might be talked about locally, and possibly someone might communicate the circumstance to the local paper, but there, very probably, the whole thing might end, unless someone who happened to know all about the marking chanced to hear about it.

For all these reasons it is to be hoped that in future bird marking experiments a more comprehensible plan will be adopted, so that whenever a bird is found it may be possible for the finder to get into communication with the marker. In regard to birds in general a system of this kind has been practised for the last year or two by the editors of the journal, *British Birds*, the name of one of the editors, followed by his London address, being stamped on even the smallest rings. This system leaves nothing to be desired, for everyone knows where London is, and as each ring has a distinctive number the mere return of it to its original source is sufficient to trace the person by whom it was affixed, the kind of bird to which it was attached, and the date of marking, all these particulars being registered in the first instance. It is greatly to be hoped that in all cases of woodcock-marking in the future this excellent system will be followed.

In a paper on "The Cleverness of the Woodcock," the writer combats the assertion that the woodcock is "stupid" (having in mind, possibly, the French saying, "*Bete comme un becasse*"), and among other illustrations of his point he states that "though a 'cock may flap away in seeming hopelessness, a sportsman should not allow himself to be deceived into thinking that the shot is necessarily easy. The very appearance of hopelessness may be a trick, and at the moment when the trigger is pulled a twist and swerve will come from those power-

ful wings that will fling the little body far outside the shot's pattern—' fling,' for that expresses just what these wings and what the 'cock's strong thighs and legs can do to win its safety."

In 1909, 2,200 birds were marked with the " British Birds " rings, and during last summer 7,900 were marked with these rings. Of course, it is impossible to map out any migration routes on two seasons' returns, but it appears that the black-headed gulls marked in Cumberland migrate south down both the east and the west coasts. From the west coast birds have been recovered all down the Lancashire coast, and from Cheshire down to the Bristol Channel, as shown by two returns from Newport (Mon.) and the Severn in Gloucestershire, and then across the English Channel, as shown by two returns from France, in Finisterre and Brittany.

The lesser black-backed gull seems to migrate to the Mediterranean, as the only three returns from birds marked are all foreign ones, being from the mouth of the Loire in France and from Portugal. The migration of the common tern or sea-swallow seems also to be south to the Mediterranean and further by both coasts, as birds marked in Cumberland have been recovered from Morecambe Bay and the Lancashire coast, and also from the Solway and Berwickshire, two rings being also returned from Spain and Portugal respectively.

These are instances of results obtained in this country. Bird ringing is much more advanced on the Continent, and there the results have been most valuable. The Germans have an ornithological station as Rossitten, on the Baltic, of which Dr. Thieneman is the director. Dr. Otto Herman is the director of the Hungarian Central Bureau, whose headquarters are at Budapest, while in Denmark Herr Mortensen officiates at Viborg, and at all these stations bird marking is carried on on a large scale.

From birds marked at the Rossitten and Viborg stations the migration of the white stork hence in the autumn has been determined, and a line can be drawn across Europe, passing through Tunis in North Africa, Lake

Chad in Central Africa, down to Basutoland, Rhodesia, and Natal in South Africa, from all of which places rings have been returned bearing the Rossitten or Viborg superscription stamped upon them, this route being almost due south. A few have passed more east, through Austria and into Asia Minor, entering Africa via Egypt, as shown by rings returned from south-east of Damascus, in Syria, and the Sudan. This migration of the white stork is an immense one, covering as it does a distance of more than 5,500 miles, which is the distance in a straight line from their summer nesting-place in East Prussia or Denmark, where they are marked as nestlings, to their winter quarters in Natal, Rhodesia, and Basutoland, so that in their double migration they must cover no less a distance than eleven thousand miles, taking a straight line from point to point.

Herr Mortensen has also been very successful in his marking of teal in Denmark, and from his returns we learn that the autumn migration of this small and sporting duck is in a south-westerly direction, many of them passing almost due west, as is shown by the number of rings recovered from Ireland. In 1907 he marked 102 on the island of Fanoe, in South Denmark, and up to the end of 1908 22 of these had been recovered, with one exception, in the winter, 10 of these, or nearly half, being in Great Britain, 7 in France between the Loire and the Gironde, 2 in Holland, 1 in the South of Spain, and another in the North of Italy.

That swallows and martins return to nest in the same place year after year is shown by an adult and nesting house-martin marked at Rossitten in July, 1906, being recaptured in the nest within a few yards of the same place in July, 1909, and also by an adult and resting swallow marked in Kent in May, 1909, being recaptured at the same house on its arrival there in April, 1910, where it announced its return by falling down a chimney. The autumn migration of these birds from this country seems to be due south, as witnessed by two marked in North Lancashire being picked up dead in Surrey and at Villedon, Indre-et-Loire, France, both

places being on a line drawn due south from where they they were marked to North Africa.

All the birds mentioned so far, with the exception of those of the swallow tribe, the terns, and the storks, were not thought to migrate at all a few years ago, but were supposed to be resident on account of the species being represented all the year round ; but it is now generally acknowledged, and confirmed by these marking experiments, that the majority of them are migratory, and that the majority of those we have with us in the winter are birds from the far north, which leave again in the spring, to be replaced by others of the same species from the south, which have wintered in southern climes. Blackbirds, and thrushes, for instance, are apparently resident, until we think of the vast hordes which stream past our South-coast lighthouses in the autumn, outward bound, hundreds killing themselves against the lanterns should the weather be thick during the middle of September, when the autumn migration is at its height. Few realise that the lapwing or peewit is chiefly a migratory bird, yet there is a great southward movement in autumn, the Shetlands, Orkneys, and the North of Scotland being utterly devoid of this species between October and March, and one of these birds marked in Stirlingshire in July had got as far as the Basses-Pyreneas in the South of France, where it was shot in Novembet. A starling also, marked apparently in Edinburgh with a private ring, was shot in Denmark, and another marked in Lincolnshire had passed due west across England into Pembrokeshire.

An Irish-bred woodcock was shot in Portugal, and a Yorkshire one at Dunblane in Scotland. A Yorkshire cuckoo was caught in Essex, a Cumberland-marked ringed plover was shot in County Down, Ireland ; Argyllshire-bred common gulls had reached Northumberland and Londonderry, a Sussex pied wagtail travelled down into Portugal, and a dunlin, marked on the Baltic coast, was killed in Essex. A curious record is that of two blackbirds caught in a fruit-net in Ayrshire in June

and July, 1909, being both recaught in the same fruit-net on August 8 in the following year, 1910.

In the North of England, however, in which part the increase of woodcock has been most noticeable of recent years, there has been some excellent 'cock-shooting of late, and we feel sure that those of our readers who are interested in the keeping of records will be glad to have the report just to hand concerning the season's sport with the "bird of birds" on the estate of the Duke of Northumberland at Alnwick Castle. So far as woodcock are concerned, the past season has indeed been a remarkable one, for the total bag on the Duke's estate exceeds by no fewer than 57 birds the best bag of previous years. Up to the end of January, when the shooting season was concluded 243 woodcock had been killed at Alnwick, the best days of the season being as follows:—December 2 (four guns, covert-shooting), 13 'cock; December 6 (two guns), 20; December 7 (two guns), 53; December 17 (four guns, covert-shooting), 11; January 24 (one gun), 31; January 28 (two guns), 19. The best day's bag—53 woodcock to a couple of guns—is also a record, though it only exceeds by a single bird the number obtained by a similar number of guns on December 17, 1908. In that season, which was the next best to the one just concluded, 176 woodcock were bagged. Prior to that the season's bags of over one hundred woodcock were as follow:—1890-1, 116 'cock; 1898-9 126; 1903-4, 109; 1905-6, 130; 1906-7, 155; and 1909-10, 124.

THE GOLDEN PLOVER (CHARADRIUS PLUVIALUS).

GENERIC markings.—In winter: Upper plumage dusky, spotted with yellow, cheeks, neck and breast mottled with ash-brown and buff; throat and abdomen white; quills dusky, white along the shafts towards the end; beak dusky, feet deep ash-colour; irides brown. Summer: Upper plumage greyish-black, spotted with bright yellow; forehead and space above the eyes, white; sides of the neck white, mottled with black and yellow; lore, throat, neck, and lower parts, deep black. Length, nine inches. Eggs, yellowish-green, blotched and spotted with black.

The Golden Plover is a common bird in the south of England during the winter months, and it is also liberally distributed in the Midlands and in the North, especially on the coastings; also in the mountainous parts of Scotland. Many of this species are found on the Northumbrian coast from early October right away to the beginning of March, and the flesh of this bird is highly prized by sportsmen.

Its habits and plumage are so different at the extremes of winter and summer that the young naturalist who has had no opportunities of observing them in their transition stage, and has had no access to trustworthy books or notes might be forgiven for setting down the two forms of the bird as distinct species.

In the hilly districts of the north of Europe, golden plovers are numerous, sometimes being, with ptarmigans, the only birds which relieve the solitude of the desolate wastes. Though numerous in the same localities, they are not gregarious during spring and summer, and are remarkable for their extreme fearlessness of man. So tame, indeed, are they, that in little frequented places, when disturbed by the traveller they will run along the stony ground a few yards in front of him, then fly a few yards, then stand and stare and run as before. On such oc-

casions they frequently utter their singular cry—the note so often referred to in Sir Walter Scott's poems—which, like the nightingale's song, is considered simply plaintive or painfully woe-begone, according to the natural temperament or occasional mood of the hearer.

This bird builds no nest ; a natural depression in the ground, unprotected by bush, heather, or rock, serves its purpose, and here the female lays four eggs, much pointed at one end, and arranges them in accordance with this. At the approach of autumn, no matter where their summer may have been passed, plovers migrate southwards in large flights, those from Scotland to the southern counties of England, where they frequent wide moist pastures, heaths, and re-claimed marsh-land.

From the northern parts of the Continent of Europe they take their departure in October, either to the European shores of the Mediterranean or to the plains of Northern Africa. In these migrations they are not unfrequently joined by starlings.

They travel in close array, forming large flocks much wider than deep, moving their sharp wings rapidly, and making a whizzing sound which may be heard a long way off. Now and then, as if actuated by a single impulse, they sweep towards the ground, suddenly alter the direction of their flight, then wheel upwards with the regularity of a machine, and either alight or pursue their onward course. This habit of skimming along the ground and announcing their approach before hand is turned to good purpose by the bird-catcher, who imitates their note, attracts the whole flight to sweep down into his neighbourhood, and captures them in his net, a hundred at a time, or when they are within range, has no difficulty in killing from twelve to twenty at a shot. Not unfrequently, too, when some members of a flock have been killed or wounded, the remainder, before they remove out of danger, wheel round and sweep just over the heads of their ill-fated companions, as if for the purpose of inquiring the reason why they have deserted the party, or of alluring them to join it once more.

This habit is not peculiar to plovers, but may be noticed

in the case of several of the seaside waders, as Dunlins and Sanderlings.

In severe winter weather they desert the meadows, in which the worms have descended into the ground, beyond the reach of frost, and so of their bills, and resort to the muddy or sandy sea-shore. In the Hebrides it is said that they do not migrate at all, but simply content themselves with shifting from the moors to the shore and back again, according to the weather.

In the northern parts of France, on the other hand, they are only known as passengers on their way to the south. From making their appearance in the rainy season they are often called "pluviers," whence our name plover, which, however, is supposed by some to have been given to them for their indicating by their movements coming changes in the weather, in which respect indeed their skill is marvellous.

The Golden Plover, sometimes called also Yellow Plover, and Green Plover, is found at various seasons in most countries of Europe ; but the golden plovers of Asia and America are considered to be different species.

An interesting duel between a plover and a magpie and afterwards between the same plover and a terrier, was witnessed recently at Ponthis, near Newport. The plover, whose nest had been attacked by the magpie, defended it pluckily, at times literally screaming with rage, and the intruder being ultimately driven off. In the second contest a terrier wandered in the vicinity of the nest, but the plover swooped down and pecked viciously at its neck. The startled animal, unaware of the source of attack, still wandered about, and the plover got in a second peck. This time the terrier saw the plover and jumped, but failed to catch it. The duel continued until the terrier, almost exhausted by the pluck and persistency of his opponent, gave up the unequal contest, and retreated from the field of battle.

It breeds commonly on the moors of Northumberland, Durham, Yorkshire, etc., etc.

THE QUAIL (COTURNIX COMMUNIS)

AS a subject of natural history this bird may be said to rank pre-eminent, as it has been conspicuously before the naturalist from the earliest times. In the early days of the Egyptian dynasty to the withdrawal of the Israelites from bondage, the quail figured largely as an item of diet, and in one instance we read that "they came up and covered the land."

"This species," says a French naturalist, "is probably the most productive of all winged creatures; and it could not well be otherwise, or it would be unable to withstand the war of extermination declared against it by human beings and birds of prey. One may get an idea of the prodigious number of victims which the passage or migration costs the species by the two well-known routes.

"There is a small islet, about the size of Holy Island, in the Bay of Naples called the Bishop of Capri, which used to clear a net revenue of 25,000 francs a year by its quails. This sum represents 160,000 birds at the most modest computation.

"In certain islands of the European Archipelago and parts of the coast of the Peloponnesian Islands, the inhabitants, men, and women, have no other occupation during two months of the year than that of collecting the quails which are showered on them from Heaven, picking and cleaning them, salting them, and packing them away in casks for transportation to the principal markets of the Levant. That is to say, the migration of quails is to this part of Greece what the migration of herrings is to Holland and Scotland.

"The quail-catchers arrive at the shore a fortnight in advance, and every man numbers his ground to avoid disputes. The bird arrives in France from Africa early in May, and takes its departure towards the end of August."

Another French author says: "Like rails, woodcocks, snipes, and many of the waders, the quail, when it travels

towards the sea-shore, flies only in the night. It leaves the lands, where it has passed the day, about the dusk of the evening, and settles again with the dawn of the morning. Not unfrequently, while performing their transit, they become weary, and alight on vessels or fall into the sea, and are drowned."

"Being at a small town on the coast in the month of May," says M. Pellicot, "I saw some boats come in with ten or a dozen sharks. They were all opened before me, and there was not one which had not from eight to twelve quails in its body."

Enormous flights are annually observed at the spring and fall, after crossing an immense surface of sea, to take a brief repose in the islands of Malta, Sicily, Sardinia, Crete, in the kingdom of Naples, and about Constantinople, where, on these occasions, there is a general shooting match, which lasts two or three days. This occurs always in the autumn. The birds, starting from the Crimea about seven at night, and with a northerly wind, before dawn accomplish a passage of about sixty leagues in breadth, and alight on the southern shore to feed and repose. In the vernal season the direction of the flight is reversed, and they arrive in similar condition on the Russian coast. The same phenomena occur in Malta and other places.

On its arrival, the quail betakes itself to open plains and rich grassy meadows—very like the partridge in this respect—especially where the soil is calcareous, and naturally avoids woody countries. During the early part of summer it frequents corn fields, saintfoin, and lucerne. In September it is found in stubble and clover fields, and among the weeds growing in dry ponds, or it finds shelter in any crops which may yet remain standing. In warm countries it resorts to vineyards, attracted, it is said, not so much by the grapes as by the numerous small snails with which the vines are infested; for the crops of the late birds are generally found filled with these molluscs.

In locomotion it makes more use of its feet than its wings, and when put up is never induced to perch on a

tree. Its flight resembles in character that of the partridge, but it rarely flies far, and when it alights makes awkward attempts to conceal itself, but often fails, and may sometimes be captured with the hand.

In June or July the female lays from eight to fourteen eggs in a hole in the ground, and brings up her young without the assistance of the male.

Towards the end of August the old birds migrate southwards, and are followed by the young. Before the end of October all have disappeared, though instances have occurred of their being shot during winter, especially in seasons when the harvest has been a late one.

The flesh of the quail is considered a great delicacy, and many thousands are caught and imported to the London markets for the table. They are placed in low flat cages, scarcely exceeding in height the stature of the bird, for the reason that in confinement the birds, in their effort to escape, would beat themselves against the upper bars and destroy themselves. These are said to be all old males. Quails inhabit the Eastern Continent, from China—where they are said to be carried about in winter by the natives to keep their hands warm—to the British Isles.

With us they are nowhere plentiful, but are occasionally shot by sportsmen in most parts of the country. In cornfields, on the shores of Belfast Lough, in the north of Ireland, they are of frequent occurrence. In Palestine they still come up in the night and "cover the land."

II.

Says Mr. Harwood Brierley :—

Not long ago I came across an old "quailer" living on the borders of Hatfield Chace, Yorkshire. I had never seen any quail-pipes until he pulled a set out of an untidy drawer in his cottage, and I wanted to purchase these as a curiosity; but the old professional hand imagined he would want them again some time, arguing that new quail-pipes were no more use than new fiddles. To a waist-belt with a buckle were suspended

three leather pipes, not unlike the teats of a cow, each with a mouthpiece like a whistle. Concealing himself with this instrument tied round his waist in a barred patch of high corn during the month of August, he squeezed the air out of No. 1 pipe, which yielded a comparatively loud whistle deceptive enough to challenge any he-quail within earshot. It would be that bird's instinct to run in the direction whence this vexatious sound proceeded, whereupon the old quailer would squeeze pipe No. 2, whose note simulated a retreating bird's confession, "I am funky and will not fight." The third whistle impelled the oncoming dupe, and he, with bosom in a ferment of blended pugnacity and amorousness, rushed blindly into the net spread at the quailer's feet.

To Yorkshire naturalists, sportsmen, and epicures the quail is just now an interesting study. Perhaps no other bird has formed the basis of so much speculation on the subject of migration. No bird is, perhaps, so world-wide in its distribution; none so apt to go to extremes as constituting a plague which cometh in the night, or making itself strictly "conspicuous by its absence." Its movements seem all the more remarkable because it is included in the British game list, and related to the grouse and partridge, two birds which are indigenous to these islands, but do not migrate. The "common" quail (Coturnix communis) is not so common nowadays even in Ireland—its favourite haunt in these islands—while in Scotland it is virtually unknown; but there are other species which pass as "rara avis" in Europe. All alike are distinguished from grouse and partridge by their entirely feathered heads, their straighter and more pointed wings, and shorter tail. "Coturnix," the smallest of our highly prized game-birds, measures seven to eight inches. His upper parts are variegated with reddish-grey and brownish-black, marked with white bands, of which there are three on the head, the male having a dark brown and the female a yellowish-grey throat.

The name "quail" appears to come from the old French "quaille," now written "caille," or in Italian

"quaglia," in German "wachtel," and in Danish "kwakkel." To my mind, the suggestion that the origin of these names is onomatopæic, like "cuckoo," "curlew," "peewit," &c., is not worth serious consideration. Nor is its cry so querulous as to suggest that "quail" comes from the Anglo-Saxon "cwelan" or Danish "quelen," meaning to lose heart or give way before difficulty or danger. Although of most retiring habits during the breeding season, our partridge in miniature is a strong-winged migrant, with plenty of fat to subsist upon during privation, and a hot-blooded gamester ready to fight a round or two with any other quail who interferes with his wooing. In the corn crops he is an artful dodger, and only "quails" at the sound of an unexpected footstep which denotes the nearness, say, of some crack shot.

Our stock of information about *Coturnix communis* is rather meagre. We know him as a summer visitant from the arid parts of Africa, from the far Soudan, and the hinterland of Algeria. In Palestine enormous flocks of migrants arrive during March and April nights, and literally blacken—or brown—over the land, these being the same species which were brought to the camp of the Israelites. Long ago the common quail was dedicated to the Egyptian goddess of fertility, Astarte. He is known in India, China, Greece, Italy, Germany, France, and Denmark, often in such vast numbers as to defy calculation. Millions and millions again cross the Mediterranean Sea. They are netted wholesale in many countries on their spring migration from Africa, the first great catches being male birds, which the experts take easily by simulating the call of the females.

Some of the Central European Powers have at different times intervened to protect quails during the breeding season. Great numbers are, however, still shipped from France, from Mediterranean and Adriatic ports, and even from the Grecian Archipelago, in defiance of a statute which penalises any person found in possession of live birds scheduled for protection during the breeding season. Only in July, last year, I saw a report in the newspapers

that 30,000 quails, valued at over £1,500, were burnt to death in the aviary of a large dealer at Wood Green, London, where they were being fattened for market on hemp-seed, millet, &c. If there were the least likelihood of quails ever becoming exterminated by a world-wide traffic in them, it would not need an international convention of ornithologists to put the machinery of the law in operation. If the British Customs House officers were to receive instructions to report for prosecution such owners and masters of ocean and Channel steamers as had live quail on board, a system of cold storage would probably be initiated forthwith. Personally I do not see the necessity of enforcing the law as to the keeping of such so-called British game-birds as quails in captivity during the breeding season when they are known to be imported, for not only are they as proverbially numerous as the sands of the desert, but they are in high demand in all countries as an article of food. In "Troilus and Cressida," that "honest fellow enough, and one that likes quails," was no bad judge of flesh; he must surely have been an epicure. At the Cawood Castle banquet given by Archbishop Neville of York in 1466, a hundred dozen "quayles" were provided; and Earl Percy's house-book for as early as 1512 shows that no feast was ever held at Wressell and Leconfield Castles without a great number of fat "quayles" appearing on the table.

From a naturalist's and a sportsman's point of view, it is much to be regretted that so few quail reach the English and Irish shores nowadays for the purpose of breeding. They have always been more abundant in Ireland than in England. A very limited number are seen each year in Norfolk, Lincolnshire, and Yorkshire, but rarely further north. Though preferring sandy ground where rye is grown, and disdaining damp clay soils, the quail has yet been reported as breeding some years since in the vicinity of Yorkshire's busiest towns. A pair was seen in the vicarage gardens at Danby-in-Cleveland in Canon Atkinson's time. A nest containing eleven eggs was found on a railway embankment in East Yorkshire in

July, 1870. More recently a few have been seen in Holderness.

IT may seem strange that birds, such as the Quail and Land-rail, remarkable for their limited powers of flight, should be able to perform so extensive a journey as that from England to Egypt; but doubtless these, and many species of small birds, instead of flying continuously, proceed at intervals only, journeying by night and resting by day. The celerity with which swallows fly renders any exploit by them on the wing credible enough; and the steady flight of gannets, geese and ducks, is obviously capable of carrying them over a very large space in a short time. The flight of birds generally may be estimated at from fifty to one hundred and twenty miles an hour; and if we take the mean of this, we shall find it sufficient to enable the migratory birds to perform the most extended journeys. The wonder is not in the flight itself, but in the impulse and instinct by which it is commenced and carried on. Pennant finds no difficulty in accounting for the motive of migrations; a defect of food at certain seasons, or the want of a secure asylum from the persecutions of man during the time of courtship, incubation, and nutrition. He considers that most of the birds which leave us in spring to spend the summer elsewhere have been traced to Lapland, a country of lakes, rivers, swamps, and alps covered with thick and gloomy forests that afford shelter during summer to these fowls; which in winter disperse over the greater part of Europe. In these arctic regions; in consequence of the thickness of the woods, the ground remains soft and impenetrable to the wood-cocks, and other slender-billed fowls; and for the web-footed birds the water affords innumerable larvæ of the gnat. The days are there long, and the beautiful meteorous nights indulge them with every opportunity of collecting so minute a food; whilst mankind is very sparingly scattered over those vast northern wastes. The migration of winter birds of passage doubtless proceeds on the same general law as that which regulates the movements of

those birds which spend the summer with us and leave us in the winter. Birds which find the temperature and circumstances of our summer most congenial to their wants and habits retire on the approach of severe weather to find something similar in the south ; while others which remain among us in winter, to avoid the extreme rigour of that season in the most northernly regions, return to their own country when that rigour has abated. Nevertheless; there are difficulties in accounting for the migration of the winter birds of passage, which are not so apparent in the case of the others. There appears no necessity, either on the score of food or climate, for their departure from us. They probably come here in winter for the sake of food and a more genial climate than that which they have left ; but in some very severe seasons, when there is a great scarcity of berries, they find their subsistence here with difficulty, and often perish from the want of sufficient food. It is, therefore, unaccountable that after they have remained through the hardships of a severe winter with us, and might be expected to rejoice at the approaching spring, and build their nests and couple, they, on the contrary, then take their departure, as if that wild and pleasant temperature, which delights and cherishes most other creatures, were disagreeable to them. The place of their summer retirement is Sweden, and other countries in that latitude ; but as they would find those countries too cold for their reception, and probably destitute of provision, if they went thither immediately on leaving this country, they travel gradually, and prolong their passage through the more moderate countries of Germany and Poland, so that by the time they reach the northern regions, the severity of the cold has much abated, and some sorts of food may be there found. The winter food of these birds being berries, and particularly haus, and as these grow more abundantly here than in northern regions, this may be one of the circumstances which attract them to this country ; but, no doubt, their principal motive is to exchange for a more temperate climate the rigour of the frozen countries of the north. Their

coming may thus be accounted for ; but the cause of their departure at the season they leave us presents a considerable difficulty. If it be said that they do not go until the haus and berries are gone, and they are necessitated to seek for food elsewhere, this would not account for it unless we supposed that the north could afford them a fresh and better supply, which it certainly could not.

It is, therefore, likely that they change their diet ; but even then, one would imagine that it would be easier for them to find their subsistence here than in the northern regions to which they then proceed.

Among the most remarkable of this class of birds who find the severe weather from which others retire most congenial to their wants or constitutions, may be mentioned the snow-bunting and the snow-bird.

The former, although a bird of song, withdraws to the frozen zone to breed and nurture its young. It inhabits, not only Greenland, but even the dreadful climate of Spitsbergen, where vegetation is almost extint, and where scarcely any but eryptogamous plants are found. Yet these buntings are found in great flocks both on the land and ice of Spitsbergen ; it is probable that they breed there, and it is certain that they do so in Greenland, where they arrive in April, and make their nests in the fissures of the rocks in May. M. Temminck presents the best observations of the migratory tribes thus :—" The yearlings and the old birds rarely travel together in these journeys, which are longer or shorter as the necessity of seeking a fresh supply of food in other climates obliges them to quit those places which fail at certain seasons to furnish them with the means of subsistence. I think I have traced the reason of this separation of families, and the collection into flocks of birds nearly of the same age, to a very natural cause, produced by the difference of the periods at which the moult takes place in the old and young birds ; and this also appears to be the cause that the flocks composed of adult individuals migrate to a much greater distance, whether in autumn, or at their return in spring, than the bands

composed of young ones, which do not in either season extend their journey so far. The plumage of these birds being still incomplete, and the colours not fixed, they generally take one or two years before they are in a state for breeding. They then choose those places where adults of their own species do not build their nests, the latter always expelling them from the districts, which are to give birth to a new progeny. The route most frequented by all the water birds is along the borders of the sea. Those which come from Spain and the coast of Barbary, appear to follow that only. The divers and grebes, and other fresh-water fowl, which seldom fly when occupied in the north with the cares of pairing and breeding, are however endowed with great powers for this action; their flight is vigorous and long sustained; they even rise above the high mountains, for it is not rare to find individuals of this species on the lakes of the Alps, where the waders and web-footed species are often killed.

THE WHEAT EAR (SAXICULA AENANTHE).

THIS bird is known by several names, thus—Fallowsmith, White-tail, White-rump.

This clean, and to the ornithologist, interesting bird, is one of our earliest summer visitants, sometimes appearing even when the ground is whitened with the last snow showers of spring. It is a common species, and extends from the Land's End to Cape Wrath, reaching northwards to the Hebrides. It abounds in the downs and warrens of the south, on the lower ranges of sea-coast around our islands, and in nearly all the pastoral districts of Scotland. In the latter it arrives in the first week in March, and spends the breeding season, flitting from stone to stone, from one rising ground to another, or in a district where stone walls form the enclosures, flitting before the traveller, and appearing to fall, as it were, on the opposite side of the wall, when starting to resume its flight. It breeds in holes, under and among rocks and stones, in the burrows of rabbits, even occasionally in those scraped by the Sand-Martin, in old walls and in quarries, and the nest has been found in the rents or splits of dry peat mosses. The nest is built according to the form of the hole, and is composed of fine grasses, with a little lining of wood or hair. The eggs are of a pale green. The food, during its residence in Britain, is composed of insects. On the coast the small mollusca of the warrens are its composite food.

The colours of the adult birds blend and harmonize beautifully together, and are at the same time very contrasted. The forehead, and a stripe above the eyes, are white; the space between the bill and the eyes, the auriculars, the wings, one third of the outer tail feathers, and the whole of the pair in the centre are deep black; the secondaries, quills and coverts, being edged with a pale brown, or brownish-white. These decided markings relieve the pale and delicate bluish-grey of the head and

back, which is still farther broken by the pure white of the base of the tail and its coverts, which form a beautiful band, appearing very conspicuous during flight, and presenting a characteristic mark in the distribution of the colouring of the whole genus. The under parts are pale chestnut-brown, becoming paler towards the vent. In the female the colours are less clear, and are marked with more brown. In the young birds the tips of the feathers are brown, and the dark markings are indistinct, the pale colours of the edges of the feathers of the wings broader, and the breast is marked with narrow dark bars. It is conjectured that the winter dress is very much more subdued and minus the distinct coloration which characterises the bird in the summer or nuptial season. As spring advances the sombre feather tips give place to unsullied tints; the same occurs with the grey portions of the back, which is supposed to be more or less tinted with brown.

In the north of England or I might say Northumberland this dainty bird makes its appearance usually from the middle to the twenty-fourth of April. It has certainly been observed earlier on occasions and so has its companion arrival the Sand-Martin.

When the one puts in an appearance the naturalist eagerly anticipates the advent of the latter.

In the spring of 1911, I noted its appearance (wheatear) on April 20th, and the following year on April 14th, the Sand-Martin following a week later.

THE CHIMNEY SWALLOW (HIRUNDO RUSTICA).

THIS favourite bird is perhaps the most common and most equally distributed of our native species. Its arrival in April is watched and hailed as the precursor of summer, and as the period when the piercing blasts of winter and spring shall have ceased for a time. In this country, and indeed in Europe, it is the constant attendant on cultivation, and makes use of the artificial structures of man as retreats for shelter and breeding. As far as the writings of naturalists go there is not any natural breeding station for this bird. Its most common and favourite place here is in the interior of out-houses, open barns, or sheds, where the nest, composed of clay, and strengthened with straws or slender roots, lined with feathers, and open at the top, is placed against some of the rafters or woodwork of the roof; the insides of chimneys, (whence its common name) the eaves of houses, and the forsaken shafts of mines and coal-pits, are all resorts during the season of incubation, so that in a natural state, or rather in a country wanting these structures, its breeding places may be supposed to be the rents in rocks and caves or fissures. Two or three pairs often frequent the same out-house, and are known to have returned from year to year to the same nest. They hunt in small parties; as the time of their departure arrives, the young are collected together, and many of those in the vicinity assemble; at times during the day they may be seen congregated on the roof of some building, or a wall or railing, or on some bare tree, pluming themselves, and resting from the incessant activity, and hunting after food, which characterises them in the previous part of the year. At this time they also roost together and select for this place willow beds, or brushwood fringing some lake or stream, occasionally among the tall reeds, and this has given rise to the idea that they retired during winter under

water, for the departure of the great mass takes place simultaneously; and the retreat which was one night enlivened by their evolutions and sprightly twitter, is the next solitary, or rendered to appearance more deserted, by the appearance of the few who have been unable to accompany the great body of the flight.

In distribution this species decreases northward, but is abundant in central and southern Europe. How far it extends into Asia is a matter of speculation, or whether it is partially migratory from any part of that division of the world. The great mass of European birds seem to pass from Northern Africa. One writer places it among the birds of Japan.

The adult male has the head and upper parts deep and rich steel blue, running into a black pectoral band; the forehead and throat are deep reddish chestnut; the belly and feet reddish white, tinged on the flanks with brown; the tail deeply forked, the outer feathers narrowing towards the ends, is black with blue reflections, and has a large white spot on the inner webs of all the feathers, except the two in the centre. In the female the colours are all less brilliant, and the chestnut on the forehead and throat less in extent. The young have the tail nearly square, and the colour of the throat a pale reddish brown, shading into grey upon the breast. Pure white varieties are occasionally met with.

According to the theory that men acquired their first notions of architecture from birds, we are told that Doxius, the inventor of clay houses, took the hint from swallows; and Aristotle thinks there is more ingenuity displayed in the construction of these nests than in some of the greater efforts of human intelligence. We cannot however give the swallows the credit of one feat of contrivance, which we find echoed from one writer to another, from Pliny, Plutarch and St. Basil, down to more modern authors. "It is curious," says one of the latter, as if from personal remark, "to observe them dipping their breasts swiftly into pools, and then immediately resorting to their nests to temper the mortar with the moisture." "I have frequently seen from my window,"

remarks another, "the swallow either beginning or repairing her nest, which is a structure entirely different from all others. She wants neither wood, nor hay, nor bands, but knows how to make a kind of plaster, or rather cement, with which she erects a dwelling equally secure and convenient for herself and all her family. She has no vessel to receive the water she uses, nor a barrow to convey her sand, nor a shovel to mix her mortar; but I have seen her pass and repass over the basin in the parterre; she raises her wings, and wets her breast on the surface of the water, after which she sheds the dew over the dust, and then tempers and works it up with her bill." Pliny says very tersely, "Surely in no one thing is the will of sillie birds more admirable. The swallows frame their nests of clay and earth, but they strengthen and make them fast with straw. In case at any time they cannot meet with soft and tough clay, for want thereof they drench and wet their feathers with good store of water, and then bestrew them over with dust." However plausible these several modes of making building mortar may appear, we have no hesitation in pronouncing them to be altogether fabulous. Swallows, may be frequently seen both drinking and washing on the wing, and also collecting mud from cart-ruts and other places. But they never carry water in their bills, or on their feathers. They are incapable of performing either operation; for they want the necessary muscles to carry water in their mouths, as we can do, and whatever water might adhere to their feathers would be instantly shaken off in flying, for according to minute observation, it runs off from them as it does from the feathers of ducks and other water fowl. Besides, their inability to find materials sufficiently moist is a supposition altogether improbable, with respect to a bird of such powerful wing, whose flight is so excursive, and usually in the vicinity of water.

The natural conclusion is, that the swallows employ some salivary fluid besides the water which may be in the mud.

Anatomical examination confirms the fact that the

bird moistens the clay with saliva, for the presence of large salivary glands have been shown upon dissection.

This bird is a great promoter of vegetation, which would proceed but lamely without it, by boring, perforating, and loosening the soil, and rendering it pervious to rains and the fibres of plants, by drawing straws and stalks of leaves and twigs into it; and, most of all; by throwing up such infinite numbers of lumps of earth called earth-casts, which, being their excrement, is a fine manure for grain and grass. Earth worms make their casts most in mild weather, about March and April.

The fact is the casts are not their excrements, but a sort of masonry, somewhat rude, indeed, but not the less efficient in protecting their burrows, both from too much rain, which would destroy them, and from the intrusion of enemies.

The swallow is a great favourite. He comes to us when nature is putting on her most smiling aspect, and he stays with us through the months of sunshine and gladness. "The swallow," says S. W. H. Davy, "is one of my favourite birds, and a rival of the nightingale; for he glads my sense of seeing, as much as the other does my sense of hearing. He is the joyous prophet of the year, the harbinger of the best season; he lives a life of enjoyment amongst the loveliest forms of nature; winter is unknown to him, and he leaves the green meadows of England in autumn, for the myrtle and orange groves of Italy, and for the plains of Africa.

"Gentle bird! we find thee here
When nature wears her summer vest;
Thou com'st to weave thy simple nest;
And when the chilling winter lowers,
Again thou seek'st the gentle bowers
Of Memphes, or the shores of Nile,
Where sunny hours of verdure smile."

THE WHITE THROAT (CURUCA CINERREA.

THIS bird is very commonly distributed over all parts of the country, frequenting hedges, whin covers, thickets of brushwood, the outskirts of plantations and the garden; but the older and more retired woods, and a country road or lane can scarcely be travelled during the early part of summer, without being enlivened by this pretty warbler, flitting out from the hedge or brushwood, uttering its few notes of alarm or song with erected crest, and again for a short space concealing itself. At other times the song is uttered during a short and peculiar flight above its retreat, and which being completed, it descends, hides, and continues to utter a few low irregular notes in cover. The nest is also of the same careless structure with those of the Blackcap and Prettychaps; indeed this manner of building seems, to a certain extent, characteristic of all the currucae; the nest being loosely constructed of straws, roots, etc., the lining by no means warm or very compact—that of the White-throat is placed generally in a low bush, or among strong and tall herbaceous plants. Over the British Isles this bird is plentifully distributed, extending northward to the extremity of the mainland.

On the Continent it is equally plentiful; and may be found in goodly numbers in the Mediterranean or Grecian Archipelago. Upper parts and auriculars yellowish brown; tinged with grey between the bill and the eyes, and a streak over each of the latter with yellowish white; the wings and tail are pale umber brown, having the tertials broadly edged with reddish or yellowish brown; the edge of the outer quill white; the tail is more rounded than usual, or slightly cunealed, and the outer feather has the outer web, and often a portion of the inner, white; the throat and centre of the belly are white, shading to yellowish white over the flanks; the breast

is tinted with rose red, which, in a subdued manner, often tints more or less the whole lower parts ; the richness fades somewhat after being killed.

In the female, as in many other species, all the tints are more subdued, and less marked, particularly the edging of the quills, and the rose tint on the breast. Length about five inches and a half. In this species the colour of the iris is remarkable ; of a beautiful straw-coloured yellow, and when nearly inspected it has an apparent consistency of bronze.

The white-throat, "Scolding Peggy," or nettle-creeper, as it is called, has also arrived in goodly numbers, and scolds as you walk along, but taking care to keep the other side of the hedge, and at times suddenly darting upwards for a short distance, with jerky flight and song as if in imitation of the lark, but when a few yards high, and you are expecting music, it suddenly descends into the hedge.

From the peculiarity of the formation of the nest of the Whiteh-troat an old naturalist derived the notion that the bird uses spiders' webs as a binding material. How he arrived at such a conclusion I cannot imagine ; for from many which I have examined I have not been able to verify in any way this supposition.

It is the rough reflexed prickles of the catchwood which binds the exterior, and the hairs (probably glued with saliva, which keep the inside in shape.

The bird, as distinguished from a similar species, makes use of a few roots in lining, which say the babillard never does, while the latter seems fonder of working tufts of willow down into the brim of the nest.

THE MISSEL—THRUSH (DURDUS VISCIVOROUS.

THIS bird is at the present time pretty generally distributed over England and the southern part of Scotland, living in the latter oft-times in pairs, in the richer woodland parts especially; yet neither so abundant, nor prevailing so equally and indiscriminately, as the common Song-Thrush or Blackbird. I would consider it more as a forest bird, but here it also frequents the borders of the wood, or the orchards and gardens situated in a well-clothed district. In England and particularly in the northern counties, it has increased in abundance; and in its Scotch localities it has now become one of frequent occurrence. Out of Europe it extends to Asia, and some specimens have been obtained from the Himalayan range, varying in no respect. They pair very early, and the male begins to attempt his song often ere the winter's storm has commenced.

On more than one occasion he has been heard in full song by January 5th.

During the whole breeding season, they are bold defenders of their territory, suffering no intruder to approach without every attempt being made to defend their nest. Magpies and carrion crows are severe assailants, though both are often successfully engaged; but their most troublesome enemy, where there happens to be a colony near, is the Jack-daw, which gains by perseverance what the others fail to obtain by force. Five or six of these birds have been seen to assail the parent thrushes, and while some delivered the attack, the others deliberately plundered the nest. During the contest, the cries of the thrushes are loud and incessant, and at once tell that some depredator is near. The nest is placed almost always in the cleft of a tree or close to the bole; at times it is near the summit, at other times placed so low that we could look into it from the ground, and it is very frequently built on the fruit trees of a

garden or orchard, for man's protection. The foundation of the nest is laid with slender twigs, or stalks of grass, and when the fabric is reared, the outside is patched over with pieces of lichen, apparently generally taken from the tree on which it is built, certainly never of a very opposite character from those which grow around, and thus they serve as an excellent blind against detection. The eggs are from four to six in number, of a green or bluish-white, spotted and blotched with reddish-brown. When the duties of incubation are concluded, the broods with the old birds keep together, and towards the commencement of winter, sometimes collect in flocks of from twenty to thirty, feeding on the wild berries, which are at this time nearly ripe. They soon, however seem to disperse again, and during the whole of the winter may be seen in parties of five or six, or in pairs, feeding sometimes on the wild fruits, and at others selecting the low meadows or pasture grounds. They often create havoc among fruit crops ; in winter they select the berries of the holly and yew in preference to those of the hawthorn, or our other native kinds. This thrush remains with us during the year, and one is not aware of any partial migration taking place, or of any accession of numbers, though it is surmised that the colonies of from twenty to thirty more from place to place probably for Commissariat.

These may be certainly parties of the younger birds commencing a migration, for we have hardly an increase to account for all those which are bred in a district ; at the same time, we know that many pairs of old birds remain constantly, and without changing the range to a great distance, and some we have seen, for a year together, every day we remained at home.

The general colour of the upper plumage is hair brown, varying in intensity, and sometime tinted with yellowish or with oil-green, which prevails on the neck. The outer webs of the quills, coverts and scapulars, are edged with pale wood-brown ; the inner webs umber-brown, tinted with ash-grey ; the tail is chiefly of the latter colour ; the outer feathers tipped with white. The under parts are

clear and delicate yellowish white, often shaded on the sides of breast and flanks with buff-orange; the tip of each feather has an umber-brown spot, triangular in form on the throat and breast, on the belly and flanks of the shape of the tip of the feather.

The edges of the auriculars are also tinted with the same colour, and the whole under surface presents a rich but chaste combination of colours and markings. The under wing coverts and auxillary feathers are of the purest white, serving at once to distinguish the Missel-Thrush from the Indian species, somewhat similarly dressed. Legs are pale wood brown. The length is from eleven to eleven and a half inches, and there is little difference either in the size or colours in each sex.

The young have the upper plumage confusedly barred with yellowish-white, and have more grey on the head and neck. The quills and coverts have broader pale margins and tips and the under parts have a more defined yellow tinge.

A gentleman at Whitburn in the north of England reports the early nesting of bird thus—

On Friday, April 28th, I had a slight suspicion that a pair of Missel Thrushes had nested here, and to-day have had my vigilance rewarded. You may picture my surprise on seeing the parent bird feeding her young. I have paid a visit to-night to the nest but dare not venture too near, the three inmates being already strong, and liable to seek safety in flight. Especially is one of the young Thrushes strong and vigorous. Perhaps the favoured one may claim all the attention of the one parent, whilst the remaining two are dependent on the cock or hen—as the case may be—for their support.

The oak on which the young Missel Thrushes were reared stands on the boundary of the Cricket Field. Saturday, April 22, was the day chosen for the first practice match; it seemed appropriate that the young birds should also fledge on that date and test their flying powers. How wonderful that instinct should teach them that their eye is the centre of attraction, and to close it when danger is near. A few days before leaving

the nest the young Missels adopt this method of concealment ; and continue it till they are safely on the wing. After explaining the above trait to a lady on Saturday last, I had an excellent opportunity of demonstrating that such was the case. Perched on a low shrub, the bird closed its eyes on our near approach, refraining from again opening them till we had retired. Towards evening I found one on the lawn which adopted the same method, allowing me to pick it up and restore it safely to a branch near the spot where it had first seen the light of day.

THE STORM-COCK.

The Missel Thrush is also called the storm-cock, because he is wont to sing when it is raining and when the wind is high. I have read somewhere that it gets the name of "Missel" because of its fondness for berries of the mistletoe, being, indeed, the chief propagator of this vegetable parasite. Is it not also called the Holm-thrush because of its fondness for "holm-berries," the red berries of the butcher's broom. Let my Whitburn correspondent beware of disturbing the brooding Missel Thrush : she has been know to fly in the face of an intruder.

"I was once," says M. Vaillant, "witness to a combat which took place in the environs of Paris, between ten missel thrushes and a white-tailed Eagle, in which the latter was completely beaten, and had squatted down in a shed, where he had sought refuge. Attracted by the reiterated cries and continued agitation of the thrushes, whose manœuvring announced something extraordinary, I went to the spot, and was surprised to find them engaged with an eagle. Being in what were called the royal preserves, I was not provided with arms, but unwilling to resist so fine an opportunity of procuring a bird which would be a valuable asset to my collection, I stole off to my abode and returned with a pistol and a large ball, as my fowling piece would have too much exposed me. I regained the plain. I saw the eagle still fighting with the missel-thrushes, who had not all given way ; and, in defiance of vigilant and inflexible keepers, and the

atrocious game laws, with a heart palpitating between joy and apprehension I approached within ten paces of the dastardly bird, and nicely adjusting my pistol, killed him. Immediately burying my weapon, and concealing the eagle among some branches, I quitted the place, looking eagerly around me with no little apprehension, as every man whom I saw moving about the plain seemed to me to wear a keeper's uniform. I bore off my prize, and gained my dwelling without detection, where proud of my acquisition, I invited all my friends to be witnesses of my triumph."

The habits of the missel thrush appear to vary according to circumstances , for Temminck informs us it prefers black forests situated upon mountains ; while, in England; another tells us it keeps to open fields and commons; heaths, and unfrequented places, being of a wild and wary nature, and only approaches our plantations and shrubberies in severe weather, and in breeding time.

THE MERLIN OR STONE-FALCON.

MR. HARWOOD BRIERLEY says: "On many of our best stocked grouse moors of great extent *the Merlin* (*Falco æsalon*) is commoner than either sportsmen or gamekeepers suspect. I have never yet seen it figure on the gamekeeper's vermin-pole, but absence therefrom is no disproof of its presence on heathery fells and moors with steep ghylls where much common vermin is shot or trapped.

Although the merlin never seems to become abundant in any locality, it is nevertheless the principal winged poacher on certain moors I could name; and it is, in my opinion, the pluckiest, most dashing, and destructive of all birds of prey for its size, though I challenge a statement that it has caused even old grouse to succumb to terror and exhaustion. The ancient idea that a female merlin could have all her own way with grouse, partridges, plovers, starlings, larks, &c., is utterly fallacious. The smaller tiercel would probably starve if his living depended on hunting such birds, while his partner, too, has usually to work so hard for her living—losing many a skylark or meadow-pipit that she has singled out to make the object of pursuit—that often she is compelled to resort to sharp practices unbecoming a true falcon.

Long centuries ago the skylark and kindred breeds were allotted to the merlin as her special quarry, August being the month most favoured for sport, and the fair sex regarding her as their special "pocket falconette," for she is hardly larger than a thrush. As a trained pursuer of partridges, pigeons, plover, snipe, dunlin, etc., she has achieved some wonderful successes, being at any time game enough to get on the track of birds far bigger than herself and bring them to earth.

Though frequently termed the "blue stone hawk" our merlin, is of course, a true falcon, as indicated by her pointed wings as long as her tail, the notch in the upper mandible of her beak, tubercle in the middle of each

nostril, and dark brown eyes, whereas amongst the characteristics of hawks we shall find rounded wings shorter than the tail, "festooned" beaks, and yellow eyes.

For her size, the merlin has all the pluck of the peregrine, which species alone is flown to-day by the Old English Hawking Club at black-headed gulls and rooks. The great peregrine ascends to a considerable height above her quarry, seizing an opportunity to swoop to the same in full view of the mounted company below. The little merlin chases her quarry often far afield, and at a great rate, closely following every double, twist, and turn, but never far from the ground. Whilst both peregrine and merlin rely on superior wing-power and endurance in pursuit, the sparrow-hawk adopts manœuvres; we shall see her skimming over hill-top and hedge, beating bush and shrubbery, and coming round rocks on the fugitive unaware. The kestrel will "windhover" almost stationary awhile, then suddenly pounce down upon her quarry—generally a mouse on the ground.

In my moorland rambles with George Jeddle, a Yorkshire gamekeeper, the nesting merlin has been traced. Like other watchers of grouse moors, Jeddle wants to see the merlin exterminated, his young cheepers, which it cannot let alone, being of more importance than the welfare of the British Constitution. He vows vengeance against every one he sees and can hear tell of; he will stoop to smash the eggs, kill the "baregollies," and trap or shoot the adult birds.

The only consolation a keeper can have is that a radius of, perhaps, eight miles does not hold more than one merlin's nest, though it cannot be denied that a pair of birds, followed by their brood of four, will soon do a deal of damage amongst grouse cheepers. Jeddle avows that he has seen a pair of merlins working together and quartering the ground like a brace of well-broken pointers. This is credible enough in the light of well-ascertained facts as to the bird's cunning and its audacity in attacking partridges, lapwings, golden plover, snipe, and other birds superior in size to itself.

Jeddle informs me that the merlin has been known to

resort to the mean practice of taking a grouse cheeper unawares on the ground, and this is certainly an instance of a noble character degraded. On the other hand, I have seen the merlin single out a starling from a flock in the autumn and follow it probably for miles, the starling proving an equal match as regards speed of flight.

Striding over the leagues of heather one day with Jeddle, we observed a merlin rise from a rock, scout a good area of ground from above, and return to its post. From this same area presently rose a young grouse as we attempted to get within gunshot of the merlin. We saw the latter bird's wings raised and neck outstretched. Gaining, in my mind, some redemption of its character, the predatory creature gave her intended quarry what looked like a good sporting start, and then made hot pursuit, which lasted for fully a mile in a straight line. While Jeddle uttered maledictions enough for two men the merlin overtook the grouse on the moorland plateau within sight. It was struck down, and the merlin picked up her prize and flew away with it. Wading through the scratchy heather "birns," we traced them both to the bare top of an ancient British tumulus or burial ground, whose sides were covered with scrubby ling. Half an hour after the kill we found that the poor grouse had been torn to pieces and devoured on this elevated little table, around it being strewn many recent feathers, bones, entrails, &c. Here I traced remains of meadow-pipits and twites, as well as what appeared to be ejectmentia of the fluffy wings of eggar moths and elytra of beetles, as well as of cockchafers.

Although not addicted to photographic "nest-poking," my curiosity as to a merlin's nest has been satisfied. Jeddle and I lit on one on the rocky, bracken-covered slope of a moor a good height above the beck.

It was a mere depression or scratch-out partly filled with heather "birns" and dried grass. I learnt that the merlin's common name of "stone falcon" was derived from this bird's habit of watching for prey from some overtopping rock often far enough away from the nest, or even when it had no nest. We took three bluish eggs blotched

with the deep reddish-brown before the full complement of four to the clutch was made up. Jeddle's triumph culminated in his shooting the falconette, the female bird—which is slightly larger than the tiercel, or male—a day or two later, but I was not then present, It would certainly be interesting to know if the escaped tiercel found another partner shortly afterwards, for certain it is that we took a full clutch of eggs out of the same nest about a month later.

The female proved an exceedingly close sitter, and was nearly trodden upon, whereas the male seemed to menace us with shrill cries whilst flying about as we approached the spot. Personally, I am sorry to report that Jeddle got both these birds, and did not fail to secure his employer's approbation. The hen he shot on the ground close to the nest ; the cock he took on a tumulus—a mere pimple on the tableland of moor—half a mile off, cruelly, I thought, but without penalising himself under statutory law as regards the banned pole-trap and its allies.

We treated this bird in a surgeon-like manner ; he was even reduced to a degree of tractability in confinement. There seemed a possibility of turning him to account for flying at skylarks if one cared to spend time over his training. However, he made good his escape one day, and returned, presumably, to the wild life which would doubtless prove more agreeable to him.

THE GOLDEN EAGLE (AQUILA CHRYSAETA).

"THE pride and the pest of the parish" are words that have been applied to this type of nobility and majesty, amongst birds, in many a Scottish village. True it is that in days long past its pilfering instincts were more noticeable, because eagles were much more numerous than now.

In ancient mythology, and indeed in Eastern lands to-day, the natives glory in the eagle's plume as the most distinguished head-dress; in fact, in India it is as indispensable as the badge of the Highland chieftain; and if, by the trammels of system we are forced to place him in a less honourable position, yet, when met with on his native mountains, free and uncontrolled, one cannot refuse the tribute which has undoubtedly been rendered to him by chroniclers of old.

In England and the Lowlands of Scotland the Golden Eagle is accounted rare, very few districts of the former country being adapted to its disposition, or suitable for breeding-places. Isolated haunts may be mentioned, for instance, parts of Derbyshire, Wales, Cumberland, and Westmoreland, at one time boasted of them.

"The Scottish border claimed several pairs, but their breeding-places were rarely discovered. It is not until we really enter the Highlands of Scotland proper, by one of the grand and romantic passes, that this noble bird can be said occasionally to occur," says a writer.

The species must be surely rapidly decreasing, for in consequence of the depredations committed amongst the flocks in the lambing season, every device is employed, and expense incurred in the shape of rewards for their destruction.

It is recorded that from March, 1831, for a space of three years, in the county of Sutherland alone, one hundred and seventy-one old birds, with fifty-three young and eggs,

were destroyed, which, while it is a standing proof that the bird is not of that extreme rarity which is sometimes supposed, it, at the same time, tells us that whilst the war of extermination goes on we shall look in vain for this appropriate ornamentation of our northern landscape.

The eyrie of this magnificent and lordly bird is usually placed on the face of some stupendous cliff situated some what inland ; the nest is built on what might be termed a projecting shelve, or on the stump of a tree that emanates from the rock, generally in a situation perfectly inaccessible without artificial means, and often out of the reach of shot, either from below or from the summit of the precipice. It is composed usually of dead vegetable matter, entangled strongly together, and in abundance, but without any lining on the inside ; the eggs are two in number of a white colour, with pale brown or purplish blotches, most numerous and largest at the thicker end.

During the season of incubation a fabulous quantity of food is procured, so much so that it is almost incredible ; it is composed of nearly all the inhabitants of the wild districts called forests, but in many cases these tracts are entirely treeless. Hares, lambs, young deer, roebuck, grouse, black game, ptarmigan, curlews, plover, &c., &c.

Somewhat similar to the male eider, the plumage does not reach its limit of grandeur till close upon the fourth year in a wild bird, and in captivity it takes longer for it to develop its distinctive markings.

Its generic markings in adult birds are as follow : Deep and rich umber brown, glossed with purple on the back and wings ; on the hind part of the head and neck the feathers are hackled and pale orange-brown, occasionally edged with a somewhat paler tint, and when reflected by the sun's rays they have a brilliant, almost golden appearance, hence its sobriquet. Thighs and shoulders of the same pale orange brown. Quills, blackish-brown ; inner webs clouded with greyish-black. The secondaries are clouded with brown, light brown, and umber brown. Tail nearly square.

THE PASSING OF THE GOLDEN EAGLE FROM SCOTLAND.

His Grace the Duke of Sutherland has formed an excellent museum at Dunrobin Castle. The museum, situated in the pleasure grounds, near the castle, is admirably fitted up, and contains a most interesting collection. The antiquities, especially the relics of the ancient Picts, are well worthy of notice, but to the naturalist the collection of birds is of the highest interest.

In this museum one finds specimens of nearly all the avi-fauna of Scotland. Some, however, are fast disappearing before the guns and traps of poachers and others.

Among the native Scottish birds the eagle is by far the most noble, and it is deplorable that this species is said to be gradually getting scarce. The brilliance of its eyes as it poses watching the approach of an enemy, and its general attitude admirably realises the following passage culled from the book called "Highland Sports," by Mr. S. John :—

"How picturesque he looks, and how perfectly he represents the genus loci as, perched on some rocky point or withered tree, he sits unconcerned in wind and storm, motionless and statue-like, with his keen, stern eye, however, intently following every movement of the shepherd or the sportsman, who, deceived by his apparent disregard, attempts to creep within rifle-shot! Long before he can reckon on reaching so far with his bullet the bird launches himself into the air, and, gradually sweeping upwards, wheels high out of shot, leaving his enemy disappointed and vexed at having crept in vain through bog and over rock in expectation of carrying home so glorious a trophy of his skill."

The measurements of an eagle of average size are as follow :—Length from tip of beak to end of tail, 35in. ; from the surface of the rock on which he sits to top of head, 20in. ; width of partially expanded tail, 15in. ; length of wing from shoulder to end of flight feathers, 24in.

The eagle is admirably adapted to perform the duties

assigned to him. The anatomy of the eye alone is a perfect study, and this wonderful organ has a power of vision of which men have not the slightest idea, even though our sight might be aided by a telescope. The brain is large and well developed, the convolutions of grey matter dipped deep down into the white matter, thus showing a considerable amount of intelligence in the bird. The lens of the eye is very peculiar ; it is flattened on each side and as brilliant as a diamond. A fish's lens is round. It is commonly believed that the eagle has a muscular apparatus connected with his eye, by means of which he can convert it, as it were, into a telescope for seeing long distances, and can so adapt his powers of vision as to see clearly at shorter distances. He must, indeed, have the most perfect organs of sight of any created thing. When he is soaring so high in the air that he can hardly be seen by the human eye it is said that he can easily detect a hare or a lamb on the ground.

The appearance of the bird in high air is very interesting, and its average height is such as to make it appear as merely a swallow. That eagles usually hunt for prey in couples is well known, and it is observed that they invariably describe the figure of eight in their peculiarly graceful curves, whilst their general motion in flight is elegance itself. It is also noticed how one flap of the wings serves to carry the bird on for many minutes without any more exertion on his part. The great power of the eagle is concentrated in the hind claw. When the bird strikes his prey he does so from above. Charging downwards with immense velocity he drives his hind claw into the body of his victim. The talon at the end of the hind toe usually measures two inches, and the point is as sharp as a needle. This formidable weapon would drive the body of the prey seized directly into the grasp of the three talons, which form the front of the foot. Thus we have a grasping machine combining the essentials of strength and lightness.

In Scotland there was a general belief that the bird fed largely on grouse. It is quite certain that they will eat such food, but it must be borne in mind that it would

catch diseased and sickly grouse, and thus go far to stamp out the grouse disease. Their chief food is undoubtedly blue hares. By destroying the eagles, therefore, one might venture to say that the Scotch proprietors are acting unwisely, for surely the loss of a few grouse and hares is not too great a payment to the eagle for the good he otherwise brings about by his gratuitous exertions.

With the deer-foresting of much of the Highlands (whereby grouse become a nuisance) eagles are now largely preserved and, according to latest accounts, have increased.

The following story will bear out my remarks on the depredations of the eagle—"In the Grampians, not many miles from an eagle's eyrie, there lived a hard-working man and his wife and family. They had often found it difficult to make both ends meet and feed their large family.

One day while the woman was out in the vicinity of the eagle's nest, in which were two eaglets, she saw the remains of grouse, rabbits, and other game. A happy idea struck her, and, returning to the eyrie next day, when the parent birds were away, she adjusted two pieces of wood tied like bits, on the mouths of the young birds. Daily, at opportune moments, after the parent birds had scoured the country and brought game home to the eyrie, the ingenious woman would steal up to the nest, feed the young eaglets, and then, having replaced the wooden bits, pick up the game, or whatever it might be, and bring the spoil to her humble dwellingt or eplenish her scanty larder.

This mode of freebooting was carried on for at least two months, until the youngsters began to grow too big.

Last month a large eagle was seen near Scarborough. For several days it remained in the neighbourhood of Bickley, near Hackness, and while there it attacked a sheep. The bird, which has since been shot, is now being stuffed in Scarborough. It is a very fine specimen of the white-tailed species, and appears to have been about three years old. It weighed 11lb., and its expanse of wings measured over 6ft.

THE SWALLOW (HIRUNDO RUSTICA).

THERE is no doubt but that this bird creates as much, or more, interest as any of the spring migrants, for from the oldest naturalist to the child his visit is eagerly anticipated year by year, and so he may justly be regarded as a favourite among birds.

"The swallow knoweth the time of her coming" has grown to be a homely expression, and it is very remarkable in this connection to notice the punctuality of the yearly visit, whilst the date of departure, it has been observed, varies considerably with the weather and meteorological conditions. Its arrival in April is watched and hailed as the forerunner or precursor of summer, though one often hears the phrase "one swallow does not make a summer."

It is true that in this country, and throughout Europe more or less, it is the constant attendant on cultivation, and makes use of the artificial structures of man as retreats for both shelter and breeding. Ornithologists, do not, in any age, particularly specify any definite breeding station for this bird. Farm out-houses and sheds, inside and out, are the usual places for the disposition of the nest, which is usually composed of clay and strengthened with straws or small roots, lined with feathers and open at the top. Ruined coal-pits and disused barns are also resorts during the season of incubation. In open country, fissures of rocks or caves. So regular are they in their habits that it is noticed that the same pair will continue year by year to occupy the same site for its architectural nest construction.

I have seen in early October, on the south coast of England, hundreds of these interesting creatures posted on the roof of a certain hotel awaiting their mates to perform the return journey. In a space of two or three hours the roof has been suddenly deserted, and the swallows have winged their flight seawards. Observations of this kind rather confirm the theory that swallows in a body migrate southward to a warmer clime, and

refutes the somewhat fantastical idea that they bury themselves in the soil, or remain in a torpid state in our own land, during the winter.

Now to its generic markings. The adult male has the head and upper parts deep steel blue, running into a black band ; the fore part of the head and throat deep chestnut ; the belly and feet of a reddish-white, tinged with brown ; a large white spot on the inner webs of most of the feathers ; the outer feathers narrowing towards the ends. The coloration of the female is more sombre, and the forehead shows a darker chestnut. There are instances of pure white coloration throughout. When in search of commissariat they hunt in small colonies and are most easily discernible by their flight.

THE PASSING OF THE SWALLOW.

The question whether this bird in its species or family does really leave this country in the fall of the year has exercised the minds of naturalists in every age, and from time immemorial, and it would be well to weigh the pros and cons as to the truth. The task is a big one, inasmuch as the mind and observations of mortal man are infinitely inferior to so gigantic a work as finding out Nature, that is, God. The more one probes into the whys and wherefores of the laws of Nature the more insignificant does the created being feel himself before the Maker of all.

In this connection, however, it would be well to scan superficially the opinions expressed from time to time, and probably some who peruse these lines may be inclined to offer suggestions, as in the recent literary debate which my notes on " Can fishes hear ? " produced.

Observers, past and present, are divided in opinion on this very interesting subject. The regular appearance and disappearance of some species of birds excited the curiosity of observers in all ages, and led to many conjectures respecting its causes.

It was long alleged and believed that swallows, instead of removing to warmer climates, lie concealed in fissures

of rocks, in sand-banks, in the holes of decayed trees, and even at the bottom of the water in ponds, remaining during the winter in a torpid state.

"It is certain," said the Dutch naturalist Jonston; "that in hollow trees, lying many close together, they preserve themselves by mutual heat."

"In certain woods of Upper Germany," said another authority, "upon cutting up a rotten oak tree it was found full of swallows."

Unfortunately for the credibility of such accounts; however, they all wear the aspect of fanciful conjecture; rather than of a fact actually observed; and though there are accounts of similar circumstances purporting to be from actual observation, they all appear suspicious when strictly investigated.

In our own county of Northumberland it has been reported more than once; notably on the authority of the late Lord Belhaven, "that numbers of swallows have been found in old dry walls and in sandhills at Morpeth; and also near his late lordship's seat in East Lothian; not once only, but from year to year, and that when they were exposed to the warmth of a fire they revived."

Etmuller, Professor of Botany and Anatomy at Leipsic, gives his testimony thus:—"I remember," he said, "to have found more than a bushel measure would hold of swallows closely clustered among the reeds of a fish pond under the ice, all of them in appearance dead, but the heart still pulsating." Against this I place the experience of no less an authority than the late John Hunter.

"I have dissected many swallows, but found nothing in them different from other birds as to the organs of respiration. More than this, all the animals dissected by me, of the class that sleep during winter, such as lizards, frogs; &c.; had a very different conformation as to these organs. But I am firmly of opinion that terrestrial animals cannot remain any long time under water without drowning."

Independently of the established principles of physiology, the matter has been experimentally tried, and it

has been found that swallows kept under water, with all due precautions, die in a few minutes.

A no less fanciful, but, as it appears to many, a more defensible opinion, was published in a scarce tract, purporting to be written by "A Person of Learning and Piety," who maintained with no little ingenuity that our migratory birds retire to the moon. He thinks that they are about two months in passing thither, and that after they are arrived above the lower regions of the air into the thin æther, they will have no occasion for food, as it will not be so apt to prey upon the spirits as our lower air.

Even on our earth, he argues, bears will live upon their fat all the winter; and hence these birds, being very succulent and sanguine, may have their provisions laid up in their bodies for the voyage; or perhaps they are thrown into a state of somnolency by the motion arising from the mutual attraction of the earth and moon.

There is a preponderating list of eminent naturalists who favour the idea that swallows migrate, and the gist of their remarks may be very briefly summed up. Birds certainly leave our country. Without disputing that difference of temperature and nourishment have much to do with it, they are inclined to consider, that habit is quite as much concerned; according to them the recollection of the old ones, that they have made the journey, carrying the young with them, and the "instinct of travel," which, at certain periods, affects them with real nostalgia, must be considered, especially the last as the principal and immediately exciting cause of these migrations. Birds of passage, too, always migrate with a contrary wind, which instead of frustrating, really eases and raises them in their flight.

The late famous M. Brehm puts it thus: "Every bird has its native country, where it freely reproduces, and remains part of the year, travelling in the remainder. Most birds spend half of the time at their home, and pass the other half in travelling. Some, particularly birds of prey, travel by day; but by far the greater part go by night; and some perform their migrations indifferently either by day or night. They seem to pass the whole of

their migration without sleep, for they employ the day in seeking for food, stopping in the places where they are most likely to find it. They commonly keep very high in the air, and always at nearly the same distance from the earth, so that they rise very high over mountains, and fly lower along valleys.

CONCLUSION.

I ask no apologies for, what some might call, an intrusion into this territory, seeing that I spent many years in ascertaining the why and wherefore of bird life on our wild and rocky coast, which teems with interest at all times very dear to the true student of nature and sportsman.

From remote times, aye, so far back as the time of the gentle S. Cuthbert, the Farnes have been the recognised rendezvous of myriads of the winged tribes, for it is recorded that the saint could command the gulls and rooks from attacking the scanty corn crops which he grew, in the meagre fallow portions of the bigger or House Island, where he erected his small primitive cell in which to live the life of a recluse.

I therefore present these pages with the hope that those who—and they are legion—annually visit this marvellous haunt of bird-life in the breeding season—May to end of July—will be aided in the work of observation and research towards perfecting their accumulated knowledge of their delightful friends and companions, the birds.

I have visited many bird haunts in the British Isles, but I have never seen any one nesting place to be compared with the rocky islets of the Farne group. Here you have a veritable sanctuary, seabound and secure from invaders, and even in summer the swell of the ocean about here is so strong, that for days no fishermen will attempt to effect a landing. When I first visited these islands in 1907, I was so impressed that I exclaimed, "Here we have what a true naturalist would call an ideal home for the east coast avi-fauna, islands, entombed by their own fastnesses, here birds may incubate and rear their young under the best conditions, and protection in the bargain." It is indeed no wonder that increases in the more important species are annually reported. There is an enemy and one to be reckoned with;

and that is the ever vigilant Black-back gull, and hence the presence of dozens of the eggs of this species, made to visitors by the watchers, the ostensible object being to lessen the supply of these rapacious gulls.

A visitor cannot help being impressed with the magnitude of birds of this class, for he has to step very warily unless damage is done to the eggs, which are laid all over the place.

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