

THE
FEATHERED TRIBES

OF THE
BRITISH ISLANDS,

BY
ROBERT MUDIE.



Little Grebes and Nest.

VOLUME THE SECOND.

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HENRY G. BOHN, YORK STREET, COVENT GARDEN.
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OF
THE BRITISH ISLANDS.

BY
ROBERT MUDIE.

FOURTH EDITION,

REVISED BY W. C. L. MARTIN, ESQ.

Late one of the Scientific Officers of the Zoological Society of London.

ILLUSTRATED WITH TWENTY-EIGHT PLATES,
CONTAINING FIFTY-TWO FIGURES OF BIRDS, AND SEVEN
ADDITIONAL PLATES OF EGGS.

IN TWO VOLUMES,

VOL. II.

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THE
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ORDER XI.

GRAMINIVORÆ.

SEED-EATING BIRDS.

THIS is by no means a precise or well-defined order. Indeed, there is no possibility, in the present state of our knowledge, of forming anything like a good natural arrangement. Birds vary so much in their food, and change so much in their localities, that it is impossible to classify them with even tolerable precision. To any one who examines them, even with slight attention, the reason of that must appear very obvious. The classification of birds cannot be formed upon any one character, as that of the mammalia is upon the teeth. It depends on the bill and alimentary system, the feet, and the wings jointly, or rather upon the *relations* in which these stand to each other; and, as a relation cannot be either expressed or understood, except by means of the things that are related, it cannot be made the foundation of a clear or simple definition. Hence, when we apply the term

insectivorous, or *graminivorous* (or *granivorous*), as descriptive of an order of birds, all that we can mean by it is, that their principal dependence is upon that species of food.*

This, however, is sufficient to lead to other distinctions, such as those of locality and season. Insects in their advanced state, whether as larvæ or as perfect, are children of the sun and the summer; and it is when they are in those states, that they are best suited for the food of birds. The supply of them is consequently an equatorial and a summer supply, fluctuating northward and southward with the apparent annual motions of the sun; and the summer migratory birds flit along with it, for a greater or less range, according to their structure and habits.

The supply of vegetable food is, to a considerable extent, just the reverse. Birds do not feed upon the perfect or growing vegetable—the stalk, the leaf, or the flowers; vegetable matter in an inactive state, accumulated in the lobes of seeds and kernels, or in the hybernacula of buds, is that upon which they feed; and though there be a succession of small seeds upon some herbaceous plants during the greater part of the summer, the grand vegetable harvest is a store prepared in the autumn, to last during winter, and be ready for new action when spring returns. As the situation is farther distant from the equator, the vegetable harvest becomes more decided, and the seeds of plants become more firm in their integuments, so as better to resist the cold.

The fertility of some of those plants is astonishing; the dock or thistles of a single acre would sow a county; and there are others even more prolific. The hundredth part of them is not wanted for the supply of vegetation, and there is, therefore, abundance to spare for the birds. Annual vegetation proceeds more from seeds, and less from bulbs and tubers, in the cold countries than in the warm ones: and in

* The order *graminivoræ* is not adopted by ornithologists.—M.

the latter, where the trees are not only always in leaf, but always in growth, there are none of those fat or farinaceous buds which are found in winter upon even the evergreens of the colder climates.

It is true, that when summer does come in the high latitudes, the productions of that season, whether animal or vegetable, have little or no pause, because there is little or no night. The produce is then very great, both in the insect and the vegetable food of birds, and then the strangers from lower latitudes migrate thither, to share in the abundance; and it is not unworthy of remark, that, in the regions to which those insectivorous migrants resort in the summer, there is a supply of succulent berries, increasing with the latitude, which comes in when the insects begin to be fewer, and enables the birds to feed themselves into sufficient strength for their migration southward. The graminivorous birds do not interfere much with that pulpy store; the seeds, the pips, and the hard winter berries, agree better with their organization.

Thus they have altogether a more polar locality. In the temperate latitude of Britain, where the winds from the sea keep the surface clear of snow for the greater part of the winter, the greater number of them are resident; and any that do come as visitants, come only in the winter, and from countries farther to the north, or where the snow falls more thickly, or lies longer. They migrate more on the continent, because the seasonal variations, being less tempered by the vicinity of the sea, are greater there; and hence the occasional visitants are more numerous in proportion to those that come regularly, than in the case of the summer birds.

So far as has been observed, the resident species of British birds of this order are more numerous, in proportion to the visitants and stragglers, than in the insectivorous birds; and as the visitants come at a time when birds flock or congregate,

and not when they spread themselves over their pastures as they do in the breeding season, the winter stragglers are better seen than the summer ones.

The general characters are: the bill short, strong, and conical, the upper mandible advancing upon the line of the forehead, and the under one having its lower outline a little convex, so that the whole bill has great power for its size. They have three toes before and one behind, the former free for their whole length; and thus the foot is adapted for walking, for perching, or for grasping. The wings are of mean length, and vary in the form of their terminations according to the habits of the birds. The tails are generally strong; the whole plumage is firmer in its texture, and (generally) more decided in its colours, than that of the insectivorous birds, and the general expression is more energetic and lively. In some respects they have a resemblance to the omnivorous birds, and in others to the gallinaceous. They pair for the whole year, perhaps for life; and they flock in the winter, different species mingling peacefully together on the same pasture. The males are in general much richer in the tints of their plumage than the females; but those gay tints are chiefly the livery of the nuptial season, and they are often accompanied by peculiar feathers, which, as well as the tints, disappear at other times, and the sexes more resemble each other.

We shall notice them in those families or groups to which peculiar names have been given.

LARKS (*Alauda*).

The sky-lark, which is the type of this tribe, being a very general favourite, the name Lark has been applied, both popularly and by authors, to birds which have none of the true characters: the pipits, and some of the warblers have, in this way, been called larks. There are only two British

larks, the sky-lark and the wood-lark, which resemble each other, and are peculiar and different from all other birds, both in appearance and in habits.

Their bills are less conical, and consequently weaker; and they are much less graminivorous than most of the order, though more so than those of the pipits, with which they have been confounded. They are also much better formed for running; and the great length of claw upon the hind toe enables them to run on the surface of thick-matted grass, or rise from it, or alight on it, with much less inconvenience than almost any other birds. The form of the lark's foot, as contrasted with that of the wagtail, which walks on soft weed, may be seen by looking back to the cut in page 303, vol. i.

They are field-birds, and resemble, in their general air, and in the tints of their plumage, the gallinaceous birds that inhabit similar places. They are different in the form of their bodies, and in the structure of their wings and tails, because they are birds which are much on the wing, and the gallinæ are not. They nestle on the ground, and, in the summer, field-insects and earth-worms, especially the latter, form a very considerable portion of the food both of themselves and their broods; but in the winter they live more upon seeds, chiefly those seeds of annual weeds which are scattered over the corn-fields, and have been partially soaked and softened by the autumnal rains.

Larks are fleet runners, and they stand up for observation, with their heads above the cover, after the manner of grouse; the head, which is generally crested, and has the crest erected, not being easily distinguishable from a clod. The colours are brown and brownish white, in variously mottled tints, with the feathers on the upper part well relieved by paler margins. Their colours are sober, but there is a warmth of tone about them, which, taken in conjunction with the form

and air of the birds, renders their appearance much more attractive than that of some gayer birds.

And they have other attractions : they inhabit where few other birds inhabit, sing where few other birds sing, and are more songsters of the free air than any others. Our other songsters must, generally speaking, have their coverts, the grove, the thicket, or the brake ; and, in so far as they are concerned, where there is no bush there is no bird, at least no bird worth listening to. But the larks nestle on the hedgeless field, or the bushless upland, and send down their song, while the figure of the songster, and all its motions, are seen against the otherwise tenantless sky.

THE SKY-LARK (*Alauda arvensis*).

The sky-lark, or, as is more accurately expressed by the specific name, the field-lark, (only that name has been misapplied to the field-pipit,) is the most universal of the British songsters. It inhabits near the dwellings of man, rather than in the bleak wastes, because neither the seeds nor the insects which are produced in these, are suited for it ; but it inhabits the peopled districts abundantly, in all their variety of latitude, soil, and climate ; and, though it might have been previously unknown there, when man has turned the furrow on the waste, and replaced the heath, the moss, and the rush, by a more kindly vegetation, the lark is sure to come with its song of gratitude, to *reveillie* him to the field betimes, and cheer his labours the live-long day.

Larks, from their vast numbers, flock much and fly far in the winter, and flock more to the uplands in the middle of England, where much rain usually falls in the summer, than to the drier and warmer places near the shores ; but so true are they to their time, that, be it in the south, the centre, or the north, the lark is always ready, on the first gleamy day of the year, to mount to its watch-tower in the upper sky,

and proclaim the coming of the vernal season. It is, in fact, more joyant in the sun, more inspirable by the life which the solar influence diffuses through the atmosphere, than almost any other creature: not a spring air can sport, not a breeze of morn can play, not an exhalation of freshness from opening bud or softening clod can ascend, without note of it being taken and proclaimed by this all-sentient index to the progress of nature.

And the form and manner of the indication are as delightful as the principle is true. The lark rises, not like most birds, which climb the air upon one slope, by a succession of leaps, as if a heavy body were raised by a succession of efforts, or steps, with pauses between: it twines upward like a vapour, borne lightly on the atmosphere, and yielding to the motions of that as other vapours do. Its course is a spiral, gradually enlarging; and, seen on the side, it is as if it were keeping the boundary of a pillar of ascending smoke, always on the surface of that logarithmic column, (or funnel, rather,) which is the only figure that, on a narrow base, and spreading as it ascends, satisfies the eye with its stability and self-balancing in the thin and invisible fluid. Nor can it seem otherwise, for it is true to nature. In the case of smoke or vapour, it diffuses itself in the exact proportion as the density, or power of support in the air, diminishes; and the lark widens the volutions of its spiral in the very same proportion: of course it does so only when perfectly free from disturbance or alarm, because either of these is a new element in the cause, and as such it must modify the effect. When equally undisturbed, the descent is by a reversal of the same spiral; and when that is the case, the song is continued during the whole time that the bird is in the air.

The accordance of the song with the mode of the ascent and descent, is also worthy of notice. When the volutions of the spiral are narrow, and the bird changes its attitude

rapidly in proportion to the whole quantity of flight, the song is partially suppressed, and it swells as the spiral widens, and sinks as it contracts ; so that though the notes may be the same, it is only when the lark sings poised at the same height, that it sings in an uniform key. It gives a swelling song as it ascends, and a sinking one as it comes down ; and even if it take but one wheel in the air, as that wheel always includes either an ascent or a descent, it varies the pitch of the song.

The song of the lark, besides being a most accessible and delightful subject for common observation, is a very curious one for the physiologist. Every one in the least conversant with the structure of birds must be aware that, with them, the organs of intonation and modulation are *inward*, deriving little assistance from the tongue, and none, or next to none, from the mandibles of the bill. The windpipe is the musical organ, and it is often very curiously formed. Birds require that organ less for breathing, than other animals having a windpipe and lungs, because of the air-cells and breathing-tubes with which all parts of their bodies (even the bones) are furnished. But those diffused breathing organs must act with least freedom when the bird is making the greatest efforts in motion ; that is, when ascending or descending ; and in proportion as these cease to act, the trachea is the more required for the purposes of breathing. The sky-lark thus converts the atmosphere into a musical instrument of many stops, and so produces an exceedingly wild and varied song,—a song which is, perhaps, not equal either in power or compass, in the single stave, to that of many of the warblers, but one which is more varied in the whole succession. All birds that sing ascending or descending have similar power, but the sky-lark has it in a degree superior to any other.

Every body knows the sky-lark, so that it hardly needs to

be described. It is about seven inches long, and twelve in the stretch of the wings, and weighs an ounce and a half. The upper part of the head reddish brown; the feathers elongated and erectable, the back passing into darker brown, the margins of the feathers edged with yellow brown. Wings and tail more dusk; the former wholly edged with yellow brown; the latter having the outer webs of the two external feathers on each side, and the tip of the outer one white. A light patch round the eye and the ear-covert forming nearly a counterpart to the brown feathers on the head. The under part pale brown on the chin, throat, and sides of the breast, passing into a reddish tinge on the middle, and into dull white, with a shade of pale yellowish brown, on the belly. The chin and breast mottled with oval brown spots, which are continued till they blend with the brown of the upper parts. Bill dark brown, and dull yellow at the base of the lower mandible. Feet yellowish brown, darker in the mature birds than in the young. Claws dark brown; the hinder one very long, and nearly straight.

The female differs little in plumage from the male, less than in most other birds of the order; and the chief distinction of the young birds, besides the more yellow tinge of the naked parts, is having the mottling on the upper part more distinct than in the old birds.

Sky-larks usually have two broods in the year on the same grounds. The nest is in the open field, or barely sheltered by the grass, or among the clods; it is wholly constructed of vegetable fibres, stronger in the outer part, and finer in the lining. The eggs are four or five, of a dull greenish white, mottled with different tints of brown. The first brood is usually fledged in June, and the second in August; but in the more upland parts of the country, where the snow lies long, it is probable that there is seldom more than one brood, which is fledged in July.

Notwithstanding the casualties to which the eggs and young of the sky-lark are, owing to their situation, subjected, both from enemies and from inclement seasons, the birds are exceedingly numerous, and in the autumn they collect in more numerous flocks than almost any other British species of land birds. The lighter soils, that receive a good deal of moisture without retaining much of it, and where, consequently, earth-worms are very numerous, are their favourite places of resort. In the midland counties of England, where they flock more than in perhaps any other part of Britain, they do not come much upon the retentive clays, or upon the hard impenetrable gravel, but remain more on the open fields near the chalk. At these times, as well as at others, they both feed and nestle upon the ground, and they are captured in vast numbers as an article of food; but as such they are costly, the price in London being about four shillings a pound, which, "sinking the offal," as the market phrase is, may be about the average weight of a dozen. The vast multitude of larks must be of great service to the places which they frequent in the winter, by clearing them of the germs of weeds, which hardly any art of man can keep under, and which, but for the labours of the birds, would increase with cultivation, and greatly diminish the value of the crops. But though the larks are thus useful, and though people should, and in general do, love them for their songs, their liveliness, and their totally harmless character during the summer, their power of multiplication is so great, that there is no need for desisting from the annual capture, so long as epicures choose to pay three-pence an ounce for a mess of larks. Indeed, it is doubtful whether they are thinned enough by artificial means, as when heavy falls of snow occur in their favourite resorts, many of them perish; and thus, as the question is one between feeding the epicure and the crow, it is easily settled.

As the seasons are more in extremes on the continent of Europe than with us, sky-larks flock in even greater numbers, especially on the light soil that extends from Hamburgh eastward, along the southern shore of the Baltic, towards the central marshes of Russia.

Though, from the small differences of sexual and seasonal plumage, and plumage of age, that are found among larks, it is natural to suppose that their colour will not run so often into variety in the individual bird, as that of those species in which the usual changes and differences are more conspicuous; yet still, from the vast number of the individuals, it is reasonable to suppose that the variedly-coloured ones will be more numerous, on the whole, than among rarer birds. Brown, reddish, yellowish white, and dusky, are the tints; and though any one of these may give the prevailing colour to an individual, that is not a sufficient ground for forming it into a separate variety, far less a separate species. Larks of a colour dusky almost to blackness, and also of a yellowish tint, have been reared from the nest; and there is no reason why any other colour that appears in the natural plumage should not predominate.

THE WOOD-LARK (*Alauda arborea*).

A figure of the wood-lark, one-third of the lineal dimensions, is given on the plate at p. 386, vol. i. With the exception of the feathers on the head not being so much produced, the general tint being a lighter and yellower brown, the breast a little more inclining to red in the middle, and the chin more clear of spots, the wood-lark bears a considerable resemblance to the sky-lark. It is, however, an inch shorter; the wings are rather shorter in proportion, and the bill, and indeed the whole air of the bird, have a slight, but very slight, resemblance to the warblers.

The wood-lark, though pretty generally distributed over

the British islands, is by no means so common a bird as the sky-lark. It is found on the borders of woods in wild places, and is not so much a bird of the cultivated fields as the other. Indeed, it is altogether of more solitary habits ; for while sky-larks congregate in flocks of many thousands, it is rare to see a dozen of wood-larks at the same time : and even in the small numbers that do appear in the winter, they are not found far from those wild localities in which they breed. They are early breeders, the nest being begun in March, and the brood hatched as early as May. The nest is more concealed than that of the sky-lark, being usually under a bush, or in a tuft of thick herbage. It is composed of the same materials, with sometimes the addition of a few hairs in the lining. The eggs, which are four in number, are smaller than those of the sky-lark, obscure brown in the ground colour, and blotched with darker brown and grey.

That wood-larks are not so numerous in proportion to their eggs as the other species, may be accounted for partly from the inclement season, and partly from the more barren places in which they breed. Their breeding-time varies considerably in different parts of the country ; but in all situations it is as early as the weather will admit. And thus, in the high grounds, on the skirts of the Grampians especially, the nests are liable to be destroyed by those storms of sleet or snow, which set in sometimes as late as the middle of May, or even the beginning of June.

On those upland places, this species is the only lark, and the song with which it hails the first approach of the tardy and somewhat doubtful spring, is a very delightful one ; the more so, that in those places, and at that season, it is the only songster.

The name is not very appropriate, for the bird is one of the waste rather than of the woodland. And though it perches, which the sky-lark does not, it has many of the

habits of that bird. It feeds on the ground, upon insects and seeds, and is probably more insectivorous than the other. It nestles on the ground, though under cover: and though it occasionally sings from the top of a tree or bush, its general practice is to sing in the air, swelling its notes as it ascends, and sinking them as it descends, in the same manner as the other. Its notes have also some resemblance to those of the sky-lark, but they are not so numerous, and they are soft and rather plaintive, while those of the sky-lark are the merriest of all the feathered race.

When the wood-lark is near trees, it varies its pitch and cadence probably more than the sky-lark. It comes from the ground to the tree in a sort of waving course, singing very low, and giving but a portion of its brief stave. Then it perches and sings in an uniform key, but not full and round. After a little time it wheels upward, more wildly and rapidly than the sky-lark, swelling its song as it ascends, and sometimes rising higher than the ordinary flight of the other, but not generally so high. When it takes the top of its flight, it sends down a volume of song which is inexpressibly sweet, though there is a feeling of desolation in it. The song, indeed, harmonizes admirably with the situation; and to hear the wood-lark on a wild and lone hill-side, where there is nothing to give accompaniment, save the bleating of a flock, and the tinkle of a sheep-bell, so distant as hardly to be audible, is certainly equal to the hearing even of those more mellow songs which are poured forth in richer situations.

The admirable manner in which the songs of birds are tuned to the characters of their general haunts, so that the song gives life to the scene, and the scene effect to the song, must equally strike and delight even the most casual observer:—

In the soft and bowery vales of the south,—where the soil

is rich and heavy, and the labour of the field drags rather slowly along,—where, unless fired by ambition, stimulated by the love of gain, or enticed by luxury, the spirit of man is apt to flag, and he to feel, and to a very considerable extent to be, wretched, from the felt but unspoken contrast of his own insignificance with the abundance in the midst of which he is set, and which magnifies with his advances, so that every day of his life he feels further from the goal of his happiness than he was the day before :—in those places, where it would seem as if the very wealth of nature involves one part of mankind in poverty, through the medium of indolence and improvidence, and the constant succession of leaves, and flowers, and winged creatures, as gay and as fleeting as the latter, inspires another portion with anxiety and gloom,—the warblers come with their soft songs, and the nightingale chants to soothe the restless mind in the darkling hour.

On the open champaign again,—where nothing breaks the waving green of the summer and the golden yellow of the autumn, save here and there a hedge, a farm-house, a burly hawthorn, or a gnarled oak, which has stood the winds, and stands the record, of centuries, where the furrow is free, and the produce rich but not rank,—where men and teams are out by the streak of dawn, the plough slicing away gallantly in one field, the seed-corn rattling against the furrows of another, and the harrow following, half buried in a well-prepared and crop-ensuring tilth ;—there, nothing can be more in character with the activity, and high health, and hope, and glee of the Georgic scene, than the sky-lark soaring topmost, and pouring his inspiring song over the whole farm. And he too has his hope. The earth-worms are rich and sweet in that well-manured and laboured earth ; and the roots which he loves for the bed of his family, though few in number, are all on the surface, clear of mould and ready dried. When

the harrow has performed its work, he may nestle in safety, as his young ones will be on the wing before another foot shall invade his chosen field.

Nor, though different, is it in worse keeping, if one takes to the upland, tracking the line where the grass and heather meet, in order to catch the first light breeze of March upon the hill. The moss by the streaking runnel is in the brightest of its verdure, the daisy on the sward has just shaken off the snow, and caught a drop of kindlier dew, through which its golden eye, surrounded with pearl and tipped with crimson, smiles on the day. The heath-cock has lain down to bask, the plover and ever-stirring lapwing are close, or have not arrived, and the crow and the raven are prowling in the copse below, to clear whatever may have perished there during the storm. There are only a few tiny day-gnats dancing over the pools, which are reeking up to form those clouds that will refresh the earth with kindly showers. Thus there is loneliness—perfect solitude ; but the air is fresh, the horizon is ample ; the pulse beats firm, the lungs play free, the steps lengthen, and one feels months adding to the term of life. While one is in this mood, up springs the dappled brown wood-lark, warbling his prelude, till he gains the top of that single bird-sown and scraggy tree, which winds from all points have bent and twisted, only to make its roots strike the deeper, and its wood become as iron, and then, wheeling upward, he redoubles his melody, till all the wild rings again, even when the songster is viewless in the sky,—and one becomes inspired with the free spirit of the hill.

To decide which of the three should have the preference, is not easy. They are like the seasons :—each derives much of its interest and charm from alternating with the others.

BUNTINGS (*Emberiza*).

Buntings are a numerous race ; and as the resident ones

all inhabit near houses, or resort thither in the winter, they are birds with which every one is familiar. There are at least seven British species,—the yellow bunting, the common or grey bunting, the reed bunting, the ciril bunting, the snow bunting, the lark-heeled bunting, and the ortolan bunting. The first three, generally distributed ; the ciril resident, but local ; the snow bunting, a winter visitant ; and the other two, stragglers.

The general characters are,—the bill very strong, short, conical, compressed laterally, stump edged, but without any tooth or notch ; the upper mandible narrowish, turned inward at the edges, and with a bony knob at the palatal end. Thus it is well fitted for breaking the shells or rinds of seeds, and ejecting them without losing any of the farinaceous kernel, which, from the way that the mandibles close, drops into the bill rather than out of it. The wings are of moderate length, the second and third feathers the longest, the tail spreading towards the extremity, and forked or lobed. The feet, with three toes before and one behind, all free. Those of the resident species have the claws short and hooked, and adapted for perching on trees, and also on the culms and stems of those herbaceous plants from which they pick the seeds. These live chiefly upon seeds, of which they consume a vast quantity, seeking them indiscriminately upon the plants that produce them, or on the ground ; but they also eat insects. The snowy bunting does not perch, but runs on the ground. It has the claw on the hinder toe produced, as in the larks, or rather intermediate between the larks and the other buntings. Birds of this genus have plenty of voice, but no song ; and as their vegetable food is best seen in the clear light, they are always active in the heat of the day, and keep up an incessant, though harsh and tuneless, clattering. Their air is rather heavy, and they are careless birds, easily snared by the fowler. They get very fat in the autumn, and the flesh of

some of them is highly prized. The common bunting has rather a sober plumage ; but the others are equally remarkable for the richness of their tints and the beauty of their contrasts. Their want of song, however, prevents them from being sought after as cage-birds, so that they are neglected, and persecuted as creatures formed only for destroying or being destroyed.

That, where small seeds are cultivated, the buntings commit very considerable ravages, is true ; and they also consume a portion of the corn, especially of any patch that gets ripe before the surrounding fields. But during the rest of the year, though they are not very welcome visitants in gardens, they are of very great service to the fields in consuming the seeds of the large weeds—ragwort, corn marygold, and the other pests of thin and ill-cultivated soils. Where small seeds are sown at all seasons, and seed time and harvest are blended together throughout the year, the wild birds which remain true to the seasons, while man forces his cultivation against them, are in so far mischievous ; but in places where there are only seasonal crops, that is not so much the case. The time at which the early crops are ripe, is, or should be, nearly that during which the graminivorous birds are undergoing their moult ; and as the little birds all prefer smaller seeds to grain, and consequently stubble lands to those on which there are crops, there should always be stubble for them against the time that they congregate in flocks.

THE YELLOW BUNTING (*Emberiza citrinella*).

The yellow bunting, yellow hammer, yowley, yaldrine, or many other provincial names, (the number of which prove its abundance,) is one of the handsomest of our resident birds.

A figure of the male in the breeding plumage, one-third of the lineal dimensions, is given on the plate at p. 386, vol. i.

The female has the yellow on the head and under part less bright, partially marked with a greyish tinge on the former, and with brownish orange on the latter. The bill of the female is also more dusky, and the feet not so yellow a brown. The males, in their first plumage, resemble the female. The female, though not so rich in plumage as the male, is yet a very beautiful bird. The brown upon the back is peculiarly warm, and the pale yellow and darker tints on the other parts run very softly into each other, while the markings on the back are clear and distinct, without any approach to hardness.

The yellow bunting is a bird of the corn-fields, or at least of the richer parts of the country; and though it is very common in England and the greater part of Scotland, it is not found in the Orkney or Shetland isles.

It nestles in low bushes, or in close herbage, and bestows considerable pains upon its nest, which is constructed externally of coarse dry grass and fibres, lined with finer ones, and finished with a coating of hair. The eggs are four or five, very pale purplish white in the ground, and marked with dots and lines of chocolate colour, the line often terminating in a dot, in the same way as tears or falling drops are sometimes represented. It breeds rather late, the young not being fledged till June. The love song is a repetition of the same tuneless note, ending in a sort of screech; the call-note, which is generally uttered on the wing, is a simple chirp; and when the bird is disturbed, it has a third cry,—a sort of complaining one; but all its cries are mere noises.

The abundance and beauty of these birds do not, in any way, win them favour. Boys destroy the nests of yellow buntings from mere wantonness, and in some parts of the country, break their eggs with a sort of superstitious abhorrence. The bird does not haunt cairns which have been collected over graves in the wilds, and thereby associate itself

with the terrors of these, as is the case with the wheat-ear ; neither does it abound most about those other places which popular superstition is prone to invest with supernatural terrors, and to link with the malignant powers of the spiritual world. It is a bird of the fields and the daylight, offending in nothing, except the want of song be an offence ; and certainly not so disagreeable in that way, or so destructive of small seeds in gardens, as the house-sparrow, but still it is a marked bird ; and the very beauty of its eggs are, in some places, made a ground for their wanton destruction. According to the absurd superstition, the parent birds are fed each with a drop of the devil's *blood!* on the morning of May-day ; and that infernal draught taints the eggs with those streaks and gouts, which, in truth, make them so beautiful. What first gave rise to superstitions so absurd, and so contrary to all that we are taught to know of the nature of spiritual beings, it is not easy to say ; but to the credit of the times, they are fast wearing out.

Instead of there being any thing repulsive about the yellow bunting, it is, song apart, one of the most interesting of our little birds, and one which we can study summer and winter. In the spring and summer, it frequents the hedges, bushes, and copses, but not the thick forests. It is very assiduous in the duties of its little household. The female sits so closely, that she will suffer herself to be taken rather than expose her eggs to the cold ; the male at times feeds her ; and when she flies out for a little, he takes her place during her absence, so that after the incubation begins, the eggs are never longer exposed than the time that the birds require to shift places. The unfledged young are attended to with similar assiduity ; and both parents toil hard in supplying them with food and keeping them clean.

When winter comes, the yellow buntings resort to more open places : and as they are swift winged, and alight in

finer style than most birds, they are continually dropping down on the beaten paths, in the farm-yards, and even in the streets of towns, when the fields are covered with snow. They do not flock so numerously to particular places as the sky-larks, because they subsist less upon worms and more upon seeds ; but they do collect on the open fields near the copses and other places to which they resort in the summer ; and though they cannot positively be said to migrate, they pass partially from the colder parts of the country to the warmer. On these excursions they mingle freely and harmoniously with the other graminivorous birds, especially with chaffinches, and they evidently have then an instinct for society without reference to their own species. When a single one is seen in the cold weather, it is usually jerking about swiftly on the wing, and uttering its call-note : and it will alight among pigeons or poultry, or even (forgetting the summer ravages) beside magpies, if there are no little birds in view.

Many of these little birds, which seek their food together during the winter days, divide into the different species before they roost, and meet and associate again in the morning. In these cases there is often a sort of welcome at meeting, and farewell at parting. They wheel together, making the air resound with their little wings ; and then they alight to feed, or separate to go to their respective perches or roosts. The yellow buntings, at parting from their companions of the day, generally alight upon some tree or hedge, in thick array, and chatter there for a little before they betake themselves to their repose, which, unless the day is very dark, they never do till after sunset. The perches which resident birds choose in these intervals between their feeding and repose, are generally of the same character with those from which the male delivers his love song in the pairing season. That is the case with the yellow bunting ; and what

he lacks in quality he labours to make up in quantity, as he will sometimes sit for hours repeating his chatter, without once changing his position.

THE COMMON BUNTING (*Emberiza miliaria*).

Though not so elegant in its form or so gay in its plumage, the common bunting is a larger, and, as it would seem, a hardier bird than the yellow.

The common bunting is about seven inches and a half in length, and eleven and a quarter in the stretch of the wings. It is a thick and rather heavy-looking bird, and weighs about two ounces. The centres of the feathers on the whole upper part are blackish brown, margined with olive colour on the body, and yellowish brown on the coverts and quills. The tail dusky, less produced, and more forked, than that of the yellow bunting. Under part straw colour, with numerous triangular dusky spots, except on the middle of the belly. An obscure straw-coloured streak from the gape down the side of the neck, and the space on the eye and ear having a dull patch of the same, with obscure dusky spots on the ear covert. Bill bluish black on the exterior or upper ridge, straw coloured the rest, very conical and having the palatal knob large. Irides and feet brown, the latter with a tinge of red. The colours of the female differ little from those of the male; but the general tint of both is subject to variety, being in some instances nearly black, and in others inclining to grey.

In the spring and summer, the common bunting is very decidedly a corn-field bird, and does not frequent the wilds, or even the pasture lands and copses. The cry of the male (for it is a screech and not a song) is uttered from the top of a hedge or of some tall herbaceous stem, rarely if ever from a tree; and like the former species he is not sparing of his harsh and jarring voice. The nest is among tall herbage,

or in a very low bush formed externally of straws or coarse withered grass, lined with finer fibres, and sometimes finished with long hair or wool. The eggs are from four to six in number, of a dull yellowish grey, with lines and drops of darker grey and reddish brown.

These birds are very assiduous in their nesting. The male continues his song during the incubation, and when the female leaves the nest, which in most close-setting birds is about mid-day, the male takes her place, and she is said to screech a stave to him in return. The one which is perching generally perches on the top of herbage, or on the outside twig of a hedge; and even when it settles on a stalk that has run to seed, which it does very firmly, how much soever the stalk may bend, it now and then gives out its cry. It not unfrequently bends down the stalk by its weight, and retains it on the ground till all the seeds are abstracted.

Though the nest is tolerably well concealed, the birds are so very anxious about the place where it is, that they are apt to reveal it. They, or rather the one that is on the watch, for the sitting one does not rise till the very last extremity, fly round any person that approaches, and plead with so plaintive a cry that one can easily tell that a nest is near. The young walk much sooner than they fly, and thus quit the nest to run and squat among the herbage, in part no doubt finding their own food; though the old ones continue to attend and feed them until they take to the wing, and are able to grapple with those stalks, the seeds on which are then beginning to be ripe. The common buntings commit ravages in the corn-fields, especially upon oats; but like the others they prefer the smaller and more oily seeds.

As cold sets in, they collect in flocks, keeping together during the winter, and often pass into places where they are never known to breed. They do not nestle except where there is moderately tall vegetation of some kind or other;

but in winter they resort to the bushless flats and islands, and are frequently seen in Shetland at that season, though there are none there in the summer. In the flocking season they become very fat; and the young ones are larger in size than larks, and not inferior in flavour. They are readily caught, and thus often sold for larks; but they are easily distinguished, by the short conical bill with the palatal knob, or simply by the colour, which is much darker on the under part.

Common buntings are of considerable service on lands that are not very skilfully cultivated. Their favourite food is the seeds of the stronger grasses; and these are the most stubborn weeds with which a slovenly farmer has to deal. Their services extend to the hay meadows as well as the corn-fields; and though they resort less frequently to the pastures, they do some service to these when the coarse grasses have run to seed. In countries where millet and similar small grains are cultivated, they do considerable damage. They get their specific name from their fondness for millet; and the people of the south of Europe, where grass is less abundant than with us, and small birds more in request as food, fatten them with millet for the table.

THE REED BUNTING (*Emberiza schæniclus*).

The reed bunting, sometimes, though improperly, called the reed sparrow, is a bird which has been confounded by authors, if not by observers, with another bird to which it has little other resemblance than their both inhabiting nearly the same places.

In structure, in habits, in their nests, their eggs, and even in the purpose that takes them to the thickly matted aquatic plants, these birds are quite different. The one already described is a genuine warbler, having a melodious and varied though feeble song; as such, it feeds upon insects, resorts to

the aquatic plants for them, and when the supply fails it quits the country. The bird under consideration is a genuine bunting, resident, like the other short-clawed buntings, among tall herbage, the seeds of which it eats, and hence it is found only where there are graminivorous plants ; while the warbler, which merely lodges in the herbage, but does not feed on any part of it, is found among all tall aquatic plants indiscriminately, though most among ridges and reeds, as these form the thickest matting in the shallows and margins of the waters.

The bunting is considerably the larger bird of the two, nearly the same size as the yellow bunting, and at least double the weight of the sedge warbler. The bunting's nest is seldom placed in the reeds ; but generally near, though sometimes at a considerable distance, in a tuft or under a low bush ; and when it is among the reeds, it is placed where they form a dry tuft or other support, and never suspended to them by a basket-work of leaves like that of the warbler. The eggs of the bunting are not quite so numerous ; and they are greyish white, with a tinge of pale pink, lined and dropped with chocolate red, like the eggs of the other buntings ; and those of the warbler are pale brown, mottled with darker, and without any lines. Farther, the bunting is as tuneless as its congeners ; and its note, such as it is, is given during the day, and from a visible perch, while the warbler sings unseen, seldom in the heat of the day, but rather, according to the general habit of insectivorous birds, early in the morning and late in the evening, and sometimes the whole night long, or nearly so.

It is probable that the buntings, and, indeed, all birds that feed upon the farinaceous portions of seeds in the healthy state, are guided to their food chiefly by sight. There is but little scent in those seeds, and we do not know much about the sense of smell in birds ; most of them appear to us to have

it very imperfect, and in those which have it very acute, as carrion-crows, magpies, and especially vultures, it is so much more exquisite than any thing of which we have experience in ourselves, that we can say little or nothing about it. The vegetable seed gives no sign of its presence by motion, either in producing sound or in any other way; and, therefore, sight is the sense upon which chiefly they must depend.

With insectivorous birds it is different—most insects and their larvæ smell, and some of them smell strongly: and many of those caterpillars which are quiescent during the day—concealed or sticking out from the branches like little unproductive or abortive twigs—are in active motion during the night.

Thus the hours of activity in the two orders of birds vary; and though, as all of them eat insects, and most of them vegetable matter occasionally, they meet on the confines in a sort of average of the two habits, yet, in the more marked genera of the orders, the times of feeding are almost reversed. In the clear light, and during dry weather, when the seeds are ripening apace, the buntings are all bustle, activity, and clatter, and the warblers are songless in the shade. On the other hand, when night sets in, or when the weather continues wet, and the sky cloudy, the buntings chirp dolefully about the hedges; but the groves and thickets are full of joy and song. The sky-lark is something intermediate, and loves best that weather which first inspires him with song—showering and shining by turns.

The head of the male reed bunting, and the nape and sides of the neck, the chin and gorget on the upper part of the breast, are deep black with a slight bluish tinge, except a streak from near the gape down each side of the neck. A collar of white joins the black, and heightens the contrast by

a hard outline. That collar passes almost immediately into pale yellow on the breast, gradually into brownish orange on the shoulders, and brown on the back ; and the pale yellow on the under part passes into brownish orange towards the vent. The margins of the feathers on the back and wings are orange brown, and the centres blackish brown. The quills a shade darker. The tail has the two middle feathers blackish with brown margins, and two at each side with the one half white, and the other half and all the remaining feathers of the tail nearly black. The rump and upper tail coverts are lighter brown than the back, and have a tinge of grey. The bill is dusk, the irides hazel, and the feet brown with a reddish tinge.

Such is the male in the breeding plumage. In winter the black on the head becomes mottled by the margins of the feathers turning rusty brown. The female and the young have the head yellowish brown, with black shafts to the feathers ; the under parts streaked with dull brown, the breast white, and a streak of pale reddish brown over the eye.

The reed buntings are rather energetic in the air, and active in many of their motions, those of the tail especially, which are more rapid than even in the wagtails. The tail is considerably produced and spread, and forked at the extremity. The habit which the bird has of clinging to the flexible culms of the aquatic plants, with free use of its bill, so that it may bruise the husks and pick out the seeds, renders the powerful and ready motion of the tail, as a means of balancing, absolutely necessary. The security and even the grace with which it rides, when the stems are laid almost level with the water, now on one side and then on another, are well worthy of notice. It not only adheres as if it were part of the plant, but it contrives to maintain nearly the

same horizontal position, with its head to the wind. In action, though not in song, it is the most interesting bird that inhabits the same locality.

When the winds of autumn and winter have shaken the seeds, and the floods borne down the reeds themselves, the reed bunting resorts to other pastures, associating with the yellow bunting and the other grain-eating birds ; and in company with them approaching houses and farm-yards when the weather is severe. With few exceptions, indeed, the resident little birds seek the neighbourhood of man in the winter, and come as instinctively to pick up the grains and crumbs which would otherwise be lost near his habitation, as they resort to other places, and destroy weeds and insects in aid of his cultivation during the summer.

THE CIRL BUNTING (*Emberiza cirlus*).

The ciril bunting is rather a local bird in Britain, having hitherto been found only in the warmer counties on the Channel. Indeed, as it is confined to the southern parts of the continent, it is not to be expected very far north in this country ; and it is only in those places where a southern aspect, the influence of the Atlantic tides, and shelter from the cold north and the blighting east, prevail, that we could hope to find a bird whose principal European localities are Italy and the south of France. It does not appear that these birds range beyond the first ridge of hills in the south of England.

In winter, the ciril buntings associate with the yellow buntings ; and they resemble them in their manners, their notes, and partially also in their appearance, only they are rather smaller, their air is softer, and their colours are more varied, and perhaps upon the whole finer. The voice, too, is not so loud or harsh, and the chirp of the female is particu-

larly soft. It appears to be rather more an insectivorous bird than the more common species.

The ciril bunting is about the same length as the yellow bunting; but the tail is rather longer, more slender, and not so well fortified by coverts. The whole plumage is, indeed, more soft and loose, and less fitted for contending with the winds than that of the other buntings, and much more so than that of the species which breeds in the distant north.

In the male bird, the bill is bluish above, and pale on the under part. The irides are hazel, inclining to brown. The throat and the streak across the eye greenish black, with a streak of bright yellow above, and a paler one below it. Gorget pale yellow. Sides of the neck and lower part of the breast pale olive-green, with a soft tinge of grey, passing into pale yellow on the belly, and again into mottled tints of reddish orange on the sides. The centres of the feathers on the head blackish, those on the scapulars reddish orange, passing into blackish brown on the back, and again into reddish brown on the rump. The darker ones margined with grey, the orange with yellowish white, and the red with greyish white. Quills greenish grey, with pale yellow margins. The outer feathers of the tail with white webs on the basal half, other feathers blackish margined with yellowish grey. Feet brown with a tinge of red. The female has the top of the head dull olive-green; the chin, where the dusk is in the male, pale brown with darker streaks. The flanks streaked with brown where they are mottled with reddish orange in the male; and the colours generally less bright and pure. The female rather less than the male.

The ciril bunting was first ascertained to be a British bird by the indefatigable and discriminating Montagu, in the winter of 1800, and its nest was soon afterwards found by the same ornithologist. It builds rather earlier than the

yellow bunting, at least than that bird does in the middle latitudes of Britain. The nest is in similar places (generally bushes), and the eggs are about the same in number, rather smaller, without the yellowish tinge in the ground, and with the lines which are mixed with the drops more waved. As these birds fly much in company with the yellow buntings in winter, they might be looked for in warmer places a little farther to the north than they have hitherto been found; though, as they are in a great measure corn-land birds in their habits, the sheep walks on the southern heights may impede their progress to the countries farther to the north, and they cannot be expected on the mountains.

THE SNOW-BUNTING (*Emberiza nivalis*).

The snow-bunting, "snow-bird," "snow-flake," and many other names by which it has been called, has been a sad stumbling-block in the path of those who do not combine a little knowledge of the principles of ornithology with the mere observation of individual birds. It has got various trivial names expressive of differences of colour, and specifically it has been called a lark and also a finch.

Now the fact is that it is a polar bird, inhabiting the arctic zone in both continents, and though not a mountain-top bird like our ptarmigan, yet subject, from the higher latitudes of which it is a native, to greater extremes of seasons than that: it is subject to similar change in its plumage. And farther, as, though it does not migrate very far to the southward, it is a wandering bird, it does not change its plumage so regularly, or so completely in the flocks that migrate, as the ptarmigan do which summer and winter on the same mountain-top.

The storms in the polar regions set in with very considerable differences of time in different seasons; and when they do set in, they lay the native pastures of the bird completely

under snow, which lies and renders food inaccessible for many months. They often come so suddenly, and with so little prelude of cold, that the bird is sometimes caught by them in its summer plumage, or with that plumage barely beginning to change. In that state it is the least able to endure the cold, and consequently it makes its way farther to the south than when it is caught later and more prepared for the cold. Thus, it is tawny-bunting, pied finch, snowflake, or white lark, according to the time of the year at which it happens to be caught in the storm and carried away from the regions of the north.

In the summer it inhabits the rocky and mossy places of the north, where there are no trees, and few bushes; and picks up its food from the seeds of the carex, and stunted rushes and hard plants which grow and ripen seed there; and its long and produced hinder claws adapt it for walking on the mossy, boggy, or otherwise loose surfaces upon which these grow. When it migrates to our shores, whether at one time and in one tint of plumage, or at another time and in a different tint, it frequents those places which are most analogous to its native pastures, shunning alike the wooded and the cultivated places, and resorting to the open wilds—the uplands of the south if it comes early, and the level wastes near the shores in the north, if it comes later.

The young, of early broods, if their wings are matured in time, are the first to migrate southward; and instances have been already mentioned in which the young have an autumnal migration to the south while the old ones continue in the breeding places. There are various reasons why that should be the case. The old ones have to undergo the renovation of their plumage, after they have worn it in providing for the young till these were fledged. The old ones are also better tempered to the weather than the birds of the first year, which have experienced no cold. Besides, though the

young are sufficiently fledged for flight in their first or nesting plumage, they have to get the winter additions, which all birds partially or generally resident in very high latitudes or very cold places, acquire at that time ; and the probability is that they do not get their additions so early in the season as the old ones, in which the autumnal change is, with the exception of such feathers as have been injured, more an addition to their covering than a displacing and renewal of it. The worn feathers are of course those of the wings and the tail, which have been entirely employed in the labours of the summer, and the ones which are thickened by an additional supply without a general loss of the old ones, are those which merely clothe the body of the bird ; and hence though the old birds are better clothed for the polar climate than the young ones, they are much less capable of flight and consequently of migration.

There is another trait in the natural history of birds, which although it may be observed in them all, resident as well as migrant, is yet so conspicuous in the snow-bunting, that this is the proper place for noticing it. The male is the most sensitive to heat, and the female to cold. That difference appears, whether the result of the action of heat be change of place or change of plumage. The males of all our summer visitants arrive earlier than the females ; and in all resident birds the change of plumage and voice of the male are among the first indications of the spring, taking precedence of most of the vegetable tribes, for the redbreast and the wren sing before the snow-drop flowers appear. It seems, too, that the song and the attentions of the male are necessities, in aid of the warmth of the season, to produce the influence of the season upon the female ; and even as the season advances, the female remains a skulking and hideling bird throughout the season, at least until the young have broken the shell, and require her labour to feed and her courage (which she some-

times requires to a wonderful degree at that time) to protect them. Whether it be that instinct leads the female to husband her heat for the purpose of hatching her eggs, or simply that the thinning of the under plumage which takes place at that time, and is the more conspicuous the more closely that the bird sits, it is certain that the female of most birds avoids the sun, and that all cover their eggs from the light during the period of incubation.

One can understand why the eggs should be covered, inasmuch as the germs of life, whether animal or vegetable, do not perform their first action unless in the dark, or at least in the shade. The sunbeams bring all living things to what may be considered as their highest state of development and perfection; but it is all too powerful for the first or rudimental stages; and if life continues in what we are accustomed to call a rudimental state, as in an earth-worm, an oyster, or the moss which grows on the walls of ruins, the clear and full light of day is too much for it.

In the female bird there is thus an avoiding of the solar influence as well as a want of excitability by it, and the one of these may be the cause of the other; and the two together, though their effect would at first seem to take the other way, show why the female should be the first to follow the sun in his southward destination in the autumn. If a bird is perched on a bush or stump that rises above the snow, the rays of the slanting sun beat more ardently upon it than if they came perpendicularly, while it perched on the succulent leaf of a tropical plant. They are augmented by reflection from the snow, and they strike the bird lower down, and not so much on the back, which from its gloss is the best calculated for deflecting off the heat. The hiding bird, on the other hand, would necessarily be subject to the excess of cold that prevails in the shade.

Besides, the plumage of motion is not so much worn in

the female bird as in the male, and the protecting plumage on the under part is much more. From the time that the male begins his song to that at which he retires to moult, he is much on the wing, and sometimes his feathers are injured in combat. But even in those species in which the male takes turn with the female in the labour of incubation, his turn is short in proportion, and he never loses feathers to the same extent, or generally to any extent that can be perceived. Thus he merely keeps the nest warm, in a more efficient manner than the same is sometimes done by dry leaves or feathers; but the feathers which are between prevent him from communicating much of his own heat.

Thus, if we study the general condition and habits of the two sexes, we should arrive at the very same conclusion which we find actually taking place. In the early part of the cold season, the female, like the young birds, is in better feather for migrating, but worse for staying, than the adult male; and hence in such migrations as those of the snow-bunting, the females come earlier than the males, and find their way farther to the south; so that they, as well as the young, are met with in places which the male, and especially the male in the winter plumage—in which it is the snowflake, or snow-bunting—never reaches. The same habit appears, though less decidedly, in all the autumnal migratory birds, even in those that merely shift from one part of Britain to another.

The male in the winter plumage, which is the only perfect plumage in which it appears in Britain, is pure white, with the exception of the back, the middle coverts, and partially the quills and central feathers of the tail, which remain black; but the change to white, like that in the ptarmigan, is more or less complete according to circumstances. They come in great numbers to the northern isles and north parts of the highlands of Scotland, always white in proportion as the

winter is more advanced. They come during, and apparently driven by, the violent north-east winds which precede or accompany the heavy falls of snow. On their arrival, they are sadly exhausted and emaciated; and, if caught in the *snow-drift*, many of them are whelmed in the *wreaths* and perish. But when the storm abates, those that are in the low countries near the sea—Shetland, Orkney, Caithness, and similar places—soon get very fat, as they also do upon the coasts of Lapland, when the storms drive them from the mountains. The inhabitants of the latter country capture them in great numbers for the table, and they are highly prized.

In summer the plumage alters; the white on the head, the breast, partially on the rest of the under part, and the margins of the feathers above, gives place to pale tawny orange, mixed on some parts with pale grey; and an additional portion of the upper feathers brown black.

The young are still darker, except in the black on the upper part, which is not so pure, and the females do not acquire the intense snowy whiteness of the other sex.

The young birds and females reach the south of England, and are probably more numerous in the middle latitudes of that country than in the north of Scotland; but the males in winter plumage are most numerous there—very numerous indeed if the winter is severe. The males that come early and with the plumage partially changed, and also the females (for females do come there), are birds of evil omen to the hill farmers, as they often foretell but too truly, that the snow will come before the late oats are gathered in, and the potatoe crop out of the ground; and those who are weather-wise quicken the hand of their industry, when they see the snow-flake early, with his pale tawny gorget, especially if on those halcyon days which are so treacherous in the autumn of high latitudes.

They even remain and breed in the extreme north. But

as they are naturally mountain birds, they are found in the mainland rather than in the isles. That dreary ridge of mountains which extends from the end of Caithness to Cape Rath, and which almost seems too cold and sterile for heath and bog-myrtle, is the place to look for them ; and any one who had the hardihood to summer and winter upon its bleak north side, would, duly employed, find something to add to the Ornithology of our *ultima Thule*. He might make sure of the nest of the snow-bunting and the snowy-owl, and he might search the crags for the jer-falcon's nest ; and the few low sandy tracts at the heads of the little wild creeks, for that of the turnstone ;—and if he should (as who does not when safe upon the trusty rock ?) love to look upon the deep in storms, he would have ample scope for knowing how sublimely the angry north can thunder ; or again, how soundly the arctic tide can sleep, and how gaily it can glitter, at that season when its night is more illuminated than noon in the southern fogs.

In nesting time, the snow-buntings are very solitary and retired. Their nests are in the clefts of inland rocks, constructed of grass and feathers, and lined with down, or with the fur of the arctic fox or the northern hare. The eggs do not exceed five ; they are nearly spherical, with reddish white grounds, and lines and dots of reddish brown. They do not breed in inhabited or even in habitable places ; and they breed late. The male, which, though a feeble songster, is a much more pleasing one than any other of the buntings, begins his song about the middle or towards the end of May ; and he continues it till the latter part of July. His note of invitation is pleasant ; but that of alarm is harsh and shrill, and rings among the crags. In the breeding-time the birds are very industrious, resting little in the night, and the male takes his turn in the incubation. They run

fleetly, but never perch, for which indeed their feet are not so well adapted.

In the statements of authors, there is some confusion in the accounts of the changes of plumage in the snow-bunting, which probably arises from the late period of the season to which it wears the winter plumage, and from the moult being perhaps gradual.

LARK-HEELED BUNTING (*Emberiza calcarata*).

This species, which is spotted with black on a fawn or straw-coloured ground, and has the throat and upper part of the breast black in the male, has occurred in Britain as a very rare straggler. It is, like the one last-mentioned, a native of the far regions of the north; and, in its native locality, it is said to inhabit the heaths and grounds covered with lichen.

THE ORTOLAN (*Emberiza hortulana*).

This species, so well known, and so highly esteemed by epicures in the south-east of Europe, has been noticed as a straggler in the north of England; but there are some doubts of its appearance; and, at all events, it has no character as a British bird, being at best merely a transient stray.

SPARROWS (*Pyrgita*).

The sparrows are sometimes classed with the finches, with which they certainly agree in many of their characters and habits, but they differ in some others. Sparrows do not flock, at least so much as the finches; they have no song, though abundance of clatter; they have the conical bill of the graminivorous birds, but they have it more decidedly notched than almost any of the others, which agrees with

their habit of being more insectivorous birds, especially during the breeding season.

The sparrows are often classed with the finches, and also with the grossbeaks; and, indeed, the scientific distinctions of many of the birds with hard and strong conical bills, which eat insects when they can procure them, and seeds and other farinaceous and albuminous parts of vegetables when insects cannot be had, are by no means clear. In the form of their beaks, the sparrows hold an intermediate place; their bills being thicker in proportion to the length, and more curved in the culmen above and in the outline of the lower mandible, than in the finches, but less so in both particulars than the grossbeaks.

There are two British species, the house-sparrow and the tree-sparrow; the former found in all parts of the country, but never far from human habitations, and the other rather thinly distributed, and avoiding the neighbourhood of villages and towns, though choosing places in which it can find insects for the supply of its brood.

THE HOUSE-SPARROW (*Pyrgita domestica*).

The sparrow needs no description, being found in all places and at all seasons, though less commonly in bleak and exposed places than in those that are low and sheltered. They do some harm to small seeds when newly sown, to these and to patches of grain when early ripe, in the neighbourhood of villages and towns, and also, at certain seasons, to the buds of shrubs and trees; but upon the whole, they do much more good, by the numbers of insects and caterpillars which they destroy. It is the house-fly, as well as the thatch, and the eaves and holes in the roof, that brings them so much about dwellings; and in the consumption of these, as well as of crumbs and other refuse, they are most notable and indefatigable scavengers. But for them, the house-flies would, in

some situations, multiply to such an extent as to be intolerable; and were they not so incessant in the destruction of those prolific pests, the cabbage-butterflies, it is doubtful whether one plant of the tribe could be reared in the market-gardens. The hunting of butterflies by sparrows trained for the purpose, is said to be one of the royal sports in Persia, and it accords well with what we are otherwise told of the soft luxury of that land of roses and nightingales.

The house-sparrow is rather more than six inches long, and weighs about an ounce and a quarter. The male has the bill, and a streak thence to the eye, dusky; the gorget black, more perfect and intense in the breeding season; the sides of the neck and flanks dull grey, and the feathers on the upper part dusky, and relieved at the margins with reddish brown. The female has the base of the bill pale, wants the black markings, is duller brown on the upper part, and whitish brown on the under. Both sexes have one bar across the middle of the closed wing; dingy white in the female, and rather brighter in the male. Sparrows are voracious, and withal energetic birds. They may be often seen holding assemblies with a great deal of noise and clatter. There is usually a dispute or quarrel in these cases; and, true to a very common if not an universal instinct of animals, the crowd always help the strongest. There are few exceptions to that law among gregarious animals, whether birds or not, and something very similar to it may be traced among the human race, when in that low state of society in which their impulses and actions are chiefly animal, and mind comes little into play. In matter, the law is, in fact, universal: the tree throws off the withered leaf and the faded flower, in order the better to preserve those parts that are vigorous; animal bodies, and animals in their instincts, do the same; and not sympathy for the weak and relief to the distressed only, but that even-handed Justice which holds the balance

fairly, have a higher origin, and are found only in those cases in which mental energy must be considered as the spring of action.

The writings of authors contain many not uninteresting anecdotes of sparrows; but any one who chooses can collect similar ones without any difficulty or labour.

THE TREE-SPARROW (*Pyrgita montana* (*arborea*?).)

The tree-sparrow is a smaller and more slender bird than the house-sparrow. It is more than half an inch shorter, and weighs half an ounce less.

Besides being smaller, it is easily distinguished by its air, its attitude, its colours, and its locality. It is more light and lively than the common sparrow, and perches with the axis of the body more erect. The top of its head and nape dark reddish brown, the black on the chin less in proportion; a conspicuous black patch on the ear coverts; the sides of the neck and the breast white, the white produced till it forms a narrow collar round the neck; bar on the closed wing, white with black spots on the anterior edge; two white bars on the expanded wings. The female more similar in colour to the male than in the house-sparrow.]

The nest of the tree-sparrow resembles that of the other, only it has often withered grass instead of straw. The eggs are about the same number (five), but they are smaller. The nest is usually formed in holes of decayed trees. Indeed, the bird seems as partial to these as the common sparrow is to houses; and the attraction is no doubt also the same—the abundance of insects which such places afford for the rearing of the young.

The tree-sparrow is found chiefly in the midland parts of England, which might be expected, as it is a bird of the central parts of Europe, and not one that migrates far from its native locality, or flocks much so as to be caught in

crowds and wafted by the winds. It is an active and industrious little bird in its locality; but it is one about which there is nothing very striking, so that its history is but short, and not very replete with interest.*

FINCHES (*Fringilla*).

The finches live more upon vegetable food than the sparrows; their bills are straighter in their outlines, more perfectly conical, and more sharp-pointed. The birds are consequently more of field-birds than the sparrows; and, in the course of the year, range over a greater extent of country. They are also birds of much finer plumage, both in their tints and their markings; and as the plumage of some of them varies considerably in the sexes or with age, there is a little confusion in at least some of the descriptions of them. That confusion is also increased by a multiplicity of local and provincial names. These names sometimes give rise to a double confusion, as the same bird, especially in its different plumages, is called by different names; and in different parts of the country the same name is applied to different birds.

Several of the finches are called *linnets*, and in Scotland, *linties*; which words have the same meaning, and simply mean, that the birds eat the seeds of *lint*, or *flax*, (*linum*,) of which, as well as the seeds of hemp, (*cannabina*,) and all the smaller mucilaginous and oily seeds, the whole genus are particularly fond.

As already hinted at, the whole genus change their habits, and, to a greater or less extent, their localities, with the seasons. They flock in winter, and some of them resort to Britain only during that season, and rarely, if ever, remain

* The tree-sparrow is a bird of retired habits. On the continent, it abounds in Holland, France, &c., extending its range southwards to Spain and Italy.—M.

to breed in the country ; others migrate southward when they flock, and northward when they separate to breed, within the island ; others again move to the uplands in the breeding season, and return to the cultivated fields in the winter ; and there are yet others which merely separate and nestle in the hedges, bushes, and copses, adjacent to the fields on which they flock during the winter.

These birds are all eminently useful to the farmer and the grazier, by consuming the seeds of all the taller and more troublesome weeds, which, but for them, would overrun the country beyond the preventive power of human art. That each bird eats 100 seeds every day, is by no means an extravagant calculation : which, however, gives to each the prevention of 36,500 weeds every year. The birds cannot be numbered ; but when the vast flocks which are seen every where are considered, one hundred millions must be greatly below the actual number. That would give the annual prevention of weeds by the finches alone, at the astonishing number of 3,650,000,000,000. Say that each weed would, upon the average, occupy one square inch, (and many of them occupy 100 square inches,) and the quantity of land which the finches annually prevent from being overrun, is little short of 600,000 acres, or more than one-seventieth part of the total surface of England and Wales, whether cultivated or uncultivated. It is true that many of the finches do not live upon seeds all the year round ; but when they are not destroying the seeds of injurious vegetables, they are probably still better employed, in the destruction of insects.

This calculation is much below the truth, and it applies only to one genus of the birds, which consume the seeds of noxious weeds. But still, it may serve to show the value of those interesting little creatures even in an economical point of view. Countries where the weeds get the better of the little birds, are in sure progress to sterility. The settlers on

the northern shore of Lake Ontario, in Canada, know what it is to have fields overrun with the Canadian thistle ; and many parts of the north of Scotland, where there were no bushes for birds, were sadly infested with the common field marigold, before belts and copses began to be planted. In garden-grounds the race may be destructive ; but where corn grows and herbs graze, their usefulness far more than compensates.

THE GREEN FINCH (*Fringilla chloris*).

The green finch, or green linnet, as it is sometimes called, differs from the other finches in the form of its bill, in which it more resembles the sparrows ; but its habits more resemble those of the other finches. Its bill is thicker and more convex, both on the upper and the lower mandible, than that of the sparrow, and much less perfectly conical than that of the finches ; but the air, texture of the plumage, mode of perching, nesting place, structure of the nest, and many other traits of character, are much more nearly like those of the other finches. Both the British species of sparrows nestle in holes, in preference to the shelter of leaves, while the green finch, though it is a bird of the shade, both with its nest and on its perch, never builds in a hole of the wall or a hollow tree. It is not so elegantly elaborate a nest-builder as the chaffinch, but the nesting places are similar ; and when nesting time is over, the two species flock together on the fields.

The green finch is about six inches and a half long, ten and a half in the extent of the wings, and an ounce in weight. Its appearance is very soft and gentle, and the tints of its plumage subdued and blending. The bill and feet have a pink tinge in the living bird, which, however, soon fades after it is killed, as is apt to be the case with the bloom tints upon those parts of all birds. The upper part

is olive green, rather warm and bright in the tint, passing into yellowish at the rump, and relieved by grey on the margins of some of the feathers. The wing-coverts and secondaries are grey, with the centres darker; the primaries the same as the centres of these, but with bright yellow on their outer webs: tail-feathers the same colour, the outer ones margined with bright yellow, the others with grey; the top of the head rather browner green than the back; the breast greyish yellow, and the vent and under tail-coverts the same. The female has the green and yellow less bright, and is altogether of a browner tint than the male.

In summer, the green finches frequent the hedges, bushes, and copses, in the neighbourhood of cultivated ground, and are often found nestling in gardens, especially where they have the shelter of ivy or of close hedges. The note of the male is mild and subdued, but it can hardly be called a song, though in confinement he may be taught to a certain extent; but in confinement, as in the free state, the birds are more recommended to notice by the gentleness of their manners than by their song.

For resident birds, they build rather late in the season, their eggs being seldom met with till June. The nest is placed in a thick bush, composed of vegetable fibres, moss, and wool, with a lining of hair and feathers: the eggs are four or five in number, of a very pale greenish white, with light reddish brown spots near the thick ends.

As the green finches have their nesting time in the finest part of the season, and their nesting places in those localities where both food and building materials are found in abundance, matters go on more smoothly with them than with many other birds. They go on much more quietly than their vocal neighbours, but quite as harmoniously if they are wanting in melody. The pair are very attentive to the young and to each other; and when the incubation begins,

the male takes his turn. The principal food of the grown-up birds is small seeds, especially those which abound in fixed oil, which are indeed the favourites with all the little birds, as they yield much more nourishment from the same quantity than those which are more dry. The seeds of some of the grasses are also eaten occasionally by these birds; and it is probable that, from the situations in which the nests are placed, the young birds are partially fed upon insects and their larvæ.

Severe weather sometimes drives the greater part of the green finches from the colder districts; and in all places they resort to the farm-yards, the highways, and generally to those places which men and domestic animals frequent, when the weather becomes inclement; and, in these cases, they skulk about, and do not brave the storm like many other species.

THE CHAFFINCH (*Fringilla cælebs*).

The chaffinch gets the name of *cælebs* (the bachelor) from the female moving southward for a reason similar to that which has already been explained in the article on the snow-bunting.

Chaffinches are very common birds, early in the season, and lively during the whole course of it, so much so that their gleesome activity has given rise to the proverb, "as gay as a chaffinch." They are distributed over the whole country, at least as far to the north as the Orkney Isles; but they are birds of the cultivated land and its margins, rather than of the thick forests or the upland wastes.

The chaffinch is about the same lineal dimensions as the house-sparrow, but more lightly and elegantly formed; the tail longer and forked, and the feathers on the crown of the head (in the male) a little produced. It runs with a swift and even motion without hopping, and skips very grace-

fully among the twigs of trees ; but when reposing, it squats on the ground as often as it perches.

The male in the breeding plumage has the forehead immediately at the base of the bill dusky, the crown and back of the head greyish blue ; the back chestnut brown with greyish yellow margins to the feathers, and the tint passing into sulphur yellow on the rump, and upper tail-coverts. The cheeks, neck, and throat, pale reddish brown, passing into dull purplish red on the breast and flanks, and again into white on the belly and vent. The wings have the lesser coverts white ; the greater coverts black, but those of the secondaries tipped with pale sulphur yellow ; the first three quills black, with white on the margins ; the rest with their bases and part of their inner webs white, and with pale yellow margins on half the outer webs. The tail with two grey feathers margined with yellow in the middle ; three entirely black ones on each side of them ; and two without those with their outer margins, and a spot on the inner web of each, white. The bill is black at the tip, and bluish grey at the base ; the irides are hazel, and the feet dull purplish brown. The female has the upper part pale greenish brown, tinged with grey, and the under part grey tinged with yellowish brown. The two bars on the closed wings and the margins of the quills and tail feathers are much more obscure than in the male bird, the two bright bars on whose closed wing are very conspicuous.

The winter separation of sexes in the chaffinches lasts only for a short time. The females separate and the males flock, from October to November, according to situation, earliest of course where the winter sets earliest in. The females reach the south of England in great numbers, many more than remain to breed there ; but there is no decisive evidence that any of them cross the Channel and return. The males also flock southward, though later, and in greater

numbers, if the season is severe. They soon, however, return to the breeding haunts; for with the exception of those birds that sing a little on fine days nearly the winter through, the chaffinch is, in all parts of the country, one of our earliest songsters. The females, which move off in flocks, return stealthily, and combats of gallantry sometimes take place between the males in the pairing season, the female, as is usual in such cases, falling to the lot of the victor.

The building of the nest is begun rather early; but as it is a more elaborate structure than the nests of many birds, some time is required to complete it. The body of it is usually formed of mosses or lichens, matted together with fibres of wool or hair, and lined with the latter substances (hairs especially), the whole being very neatly and compactly put together, so that it requires some force to pull the nest of a chaffinch to pieces.

Much has been written on the nest of the chaffinch, with regard to the materials, the mode of their union, and the object which the bird has in view in constructing a nest so superior in workmanship to that made by many other birds. But the truth is, that birds have in themselves no purpose in the building of their nests, or in anything else. They merely obey the instinct of rearing a brood, in which, as to foreknowledge and purpose, they are as void as a tree is in bearing fruit. The structures of nests have no reference to concealment from enemies, or to anything else that involves a knowledge of what may happen: they are all physiological, and form part of the nature of the bird, from which it can no more depart than a thorn can bear grapes or a thistle figs. The winter migration of the females shows that they are much affected by cold; and all birds of which the females are so, build warm nests, as, for instance, the snow-bunting; while those which are indifferent to cold, as, for instance,

the ptarmigan, build hardly any nest at all. In birds which during the breeding time are so very generally distributed, both the place of the nest and the materials of which it is composed must vary. In one part of the country they may be on fruit trees, in another in thorn hedges, in a third in furze, and in a fourth in the tops of heath, though more rarely in the latter, as the places where it grows are less abundant in caterpillars.

Chaffinches prefer insects and their larvæ, as long as these are to be found ; and they do great service in the destruction of them, not only while they have young, but after these are fledged, and the whole have come about the gardens ; nor is it till they have cleared the insects from the plants that they begin to eat seeds ; and soon after they betake themselves to these, they also betake themselves to the fields, and pick up those seeds that are better taken than left.

THE GREATER RED-POLE FINCH (*Fringilla cannabina*).

Though a very common and also a well-marked bird, this is one of those about which there has been some confusion. It is the *linnet*, the *grey linnet*, the *white linnet*, the *brown linnet*, and also the *rose linnet*, of England ; so also—as *lintie* is the lowland Scotch for linnet—it is the *lintie*, the *grey lintie*, the *white lintie*, the *brown lintie*, and sometimes, but not always, the *rose lintie*, of Scotland. The *lesser red-pole*, or *stone red-pole*, which does not build in England, at least in the south, is the true *rose lintie* of those parts of Scotland, in which the ancient language of the lowlands is most free from English or Irish admixture. The latter bird is, indeed, the more rosy of the two, as the female is in some places tinged with red as well as the male. •

The greater *red-pole* (it is not the *poll* but the breast that is red) is about six inches long, and ten in the stretch of

the wings, and weighs nearly an ounce. It is subject to considerable changes of plumage, not only in the sexes, but in the male birds at different seasons, which have, of course, been productive of the confusion of the popular names, and that confusion has been increased by the assertions of authors, and also by the difference between the plumage of the male birds in free nature, and in a state of confinement.

In the breeding plumage, the male bird is bright carmine-red on the breast, and pale brownish-red on the flanks (in which state it is also called the *rose linnet*); but in the winter, the red in a great measure disappears, and the breast is reddish brown, mottled with reddish white, and the flanks marked with large brown streaks.

In the breeding plumage, the crown of the head, nape, and sides of the neck, are bluish grey; and the back, scapulars, and coverts, chestnut brown, with pale margins. The throat and under part of the neck yellowish white streaked with brown; and the flanks reddish brown, passing into greyish white on the belly and vent. Quills black with white at the base, forming a distinct bar on the closed wing. Tail much forked; the two middle feathers entirely black, and the rest margined with white. The bill bluish grey, and the feet dull brown.

In the young birds the grey upon the head is mottled, and the red on the under parts pale and circumscribed. In winter, too, the red, and the grey upon the head, which are the livery of the breeding time, are obscure, the former becoming brown mottled with white, and the latter mottled with black, in the centres of the feathers. When the bird once moults in confinement, it seldom, if ever, recovers the pure grey or the bright red.

The female, which is considerably smaller than the male, has the upper part brown, with the margins of the feathers yellowish, and the wing-coverts a darker brown. The sides

of the neck and throat are yellowish white, with dull brown streaks ; the middle of the belly the same tint, purer, and the breast and flanks pale reddish-brown, with darker brown streaks. The plumage of the female, as is the case with that sex in most birds, varies little with the seasons.

The linnet (for notwithstanding the many names of this bird, that is perhaps its most appropriate, because its most general one) is partially a migrant within the country, though the sexes do not separate in the same decided manner as the chaffinches. During the inclement season, the birds resort to the lower grounds, especially to those near the sea-shore. They appear in considerable flocks ; the young birds appear earliest, then the females, and lastly the mature males, which may be said to be the order of movement with all autumnal birds, how limited soever may be the distance to which they do migrate.

In the flocking time, against which the male has lost the red on the breast, linnets fly very close and crowded, but with a smooth and straightforward flight. On the ground they hop, and have not so much command of themselves as chaffinches, and they accordingly spend more of their time on the wing. They wheel about in masses and perch on trees, and though they have no song in the winter, they all chirp at the same time. When the weather begins to get warm, their short but pleasant song commences, before they retire to the breeding grounds, or the plumage of the male changes ; and though their song is not so full then as after they have betaken themselves to the wilds, the crowds that are in song on the same tree make a lively concert.

The singing of the males while yet in the brown plumage, and the fact that it is difficult to have caged birds in any other, appear to be the chief causes of the confusion that there is about the species. If the males are taken young, they moult into the winter plumage, and do not change it ;

if they are taken in the flocking time, they retain the brown plumage in their moults; and if they are captured in the summer, which, from the wildness of their haunts and the wild habits of the birds, is not a very common case, they lose the red on the first moult, and never regain it afterwards. In summer, too, the female is very apt to be mistaken for the male. When one comes suddenly upon him, attracted by his song, which in the wilds is particularly cheerful, he instantly drops into the bush, before his plumage can be very carefully noticed; and if one beats the bush, out hops a brown bird, the female, and gets credit for the song of her mate.

The deception, or the mistake, is farther increased by the male ceasing his song and raising his alarm-call as soon as he is seen, and until he disappears in the bush, for he does not generally fly out; but the female does, and, as is the habit of the female in many birds, she offers herself to the enemy, that is, tempts him by short flights, to wile him away from the nest; and when the coast is clear, she again flies into the bush, chirping softly the note of safety; and soon after the male resumes his song. Thus, though it is the male that is heard, it is the female that is most frequently seen.

Linnets inhabit a little higher, or more inland, more into the open wild, than chaffinches; and they prefer the closest low bushes for their nesting places. Their general distribution, however, renders that species of accommodation not always accessible; and hence the nests are sometimes found in garden-bushes, in hedges, or in low bushy trees. The nest is composed externally of dry leaves and fibres, mixed with wool or hair, and lined with the same, or with feathers. The eggs are from four to six, of a dingy bluish white, with short lines and numerous specks of flesh-colour. There are usually two broods in the season; the first hatch taking

place in May, and the second in July ; but if any casualty occurs, the female will continue breeding till August.

Linnets are birds of very gentle dispositions, easily tamed, and capable of very considerable attachment to those who feed and attend them ; if taken young, the males can be taught to sing ; but the females have no song, and the old males do not utter their note. The young, however, may be made to imitate the songs of several other birds ; and there have been instances in which they have been brought to articulate a few words.

THE LESSER RED-POLE FINCH (*Fringilla linaria*).

This species is known in the south of England as a winter migrant only, though at that season considerable flocks make their appearance, and are called stone red-poles, or storm red-poles, by the bird-catchers.

They are small birds, not exceeding four inches and a half in length, and weighing about one-third of an ounce. The bill is much longer in proportion, and more finely pointed than that of the last species, with the upper part dusky brown, and the cutting edges and under mandible yellow. The prominent tints of both sexes are blackish brown, edged with yellowish brown on the upper part ; the lower part white, less or more marked with a yellowish or reddish tinge ; the male with a trace of red on the crown, and a paler one on the rump, the latter appearing, though still more slightly, in the female.

In the breeding season, the male becomes more richly tinted. The forehead, immediately at the base of the bill, a streak from the bill to the eye, a patch on the ear-covert, and the chin, are then deep brown. The crown of the head is tinged with pure red, but not very deep in the shade ; and the same colour, gradually becoming lighter in tint, tinges all the light parts of the sides of the neck and breast,

and passes into a pale peach-blossom on the flanks, and that again into white on the belly, crest, and under tail-coverts. The rump and upper tail-coverts, which are pale yellowish brown in the winter, also receive a pale tint of red ; and the same colour appears, but very faintly, on the rump, breast, and flanks of the female.

The brightness of those nuptial tints, or rather tint,—for the change of colour is the addition of red to the lighter parts,—varies a great deal, both in extent and intensity. The seasonal red, like that on the common linnet, does not appear till the birds are in song, and have arrived at their breeding places ; and it seems to acquire brightness in proportion as these are dry, warm, and sheltered. It is probable also that the tints are brighter in those that breed farther to the north, and later in the season ; that is, supposing the situations equally sheltered. When the fine weather has once set in on the southern slopes of the dry secondary ridges of the mountains,—the favourite abodes of the birds,—the heat is not only much greater, but more continuous, day and night, than in richer and more southerly places ; and in those places, accordingly, the colour on the male is not only rich, but the breast and flanks of the female have a rosy tinge, as deep certainly, and nearly as clear, as the blush rose. It is in such situations in Scotland, that the rose linte is known to every cowboy as being a much smaller bird, and having a nest in different places, and of different materials from the common linnet. The natural copses of alder, hazel, birch, or other stunted and bushy trees which grow in the ravines near the edges of the moors, and also the plantations of timber trees, when these are young, are the places in which to look for these birds and their nests. The nest is in a low fork of one or other of these, and more rarely in furze, or any low or close bush. The external part of it is formed of slender twigs, then moss and feathers, with

sometimes an admixture of wool, if the place affords it. The lining is of vegetable down, taken from the willow, often the small creeping mountain willow, or the thistle, or any other of the compositæ that have downy ends; these last affording the little bird both building materials and food. On some occasions the lining is wool, fine feathers, or animal down; but in Britain, at least, vegetable down appears to get the preference, probably from the same places that supply it, supplying food also.

The birds build late in the season, intermediate between the broods of the common linnets, but rather nearer the time of their latter one. The eggs are four or five, of a pale greenish blue, with brownish orange spots, especially towards the larger ends. In the southern parts of the breeding ground, the young are fledged about the middle or towards the end of June; but in the north of Scotland they are two or three weeks later; and in the arctic countries, where the birds are more numerous, they are later still.

The lesser red-poles live more exclusively upon vegetable matter, even in the breeding season, than the linnets; and that may be one of the reasons why they do not breed till the seeds of the more early vegetables are ripe. Their assiduity, and the attitudes which they assume while culling their food, are equally amusing; and they, like all birds that have very great command of themselves on their perch, will allow an observer to watch them closely for a considerable time. They are admirable perchers, and equally expert in preserving their balance; so that their action resembles that of the bright-crested wrens and the tits. They hang with the head or the back undermost, as best answers their purpose; and as they cull the seeds, and sometimes the buds (buds are more firm and farinaceous the colder the climate is), upon the extremities of the most slender twigs, they have often a very unstable perch, but they keep it firmly. It is

very pretty to watch one picking the calkins on the long pendulous twigs of a weeping birch over a mountain stream. Those twigs are often twenty feet long, and little thicker than packthread. On the points of these the little birds may sometimes be seen, swinging backwards and forwards like the bobs of pendulums, busy feeding, and never losing their perch.

THE MOUNTAIN LINNET (*Fringilla montium*).

The mountain linnet, or twite, nestles and inhabits still farther in the wilds than the last-mentioned species. It is, in fact, a heath-bird, and the only one of our little birds that can be strictly considered as a tenant of the cold and bushless moor; and on that account, one feels an interest in it, which it would perhaps not have if it dwelt and reared its brood in richer places.

In winter, these birds migrate to the lower and warmer parts of the country, as the places which they most frequent in summer are, in winter, covered with snow. They associate with the other linnets; and as they are subject to a change of plumage somewhat similar, they are apt to be mistaken for, or confounded with, the female red-poles. The species are, however, easily distinguished by a little examination. The twite is rather larger, and more compact and firmly built; the bill is a little longer, and the culmen and under side are both perfectly straight lines. The tail is firmer, and not quite so much forked; the two bars on the closed wing are smaller and nearer to each other; and the whole plumage is more dingy. In colour, the winter plumage of the twite more nearly resembles that of the female sparrow; but the two bars on the wing, the light margins on the quills and tail-feathers, and the greater strength and spread of the latter, easily distinguish them.

In summer, the tinge of rose-colour on the rump, and the

slight reddish tint on the brown of the chin and sides of the neck, render them much more easily distinguishable. The expression of the birds is, however, the best and most certain means of distinction. The sparrow, accustomed to shelter, has a soft appearance, and perches with the axis of the body raised in front: the *twite*, accustomed to the free air in places where there is little shelter, has its plumage closer, and perches or stands with the axis of the body more horizontal. The last are very certain distinctive characters of birds of sheltered and exposed situations; so that when we find a bird habitually perching so that the wind does not get under it, we may be sure that it perches in the blast. That does not apply to the repose of the birds, for most birds squat when they repose in the fields; but to that which may with propriety be considered as the *natural* standing attitude.

The usual note of the *twite* is not unlike the sound of its name, and may have been the origin of it. The bird nestles in the heather, though not so much in the thick dark extent of it as the grouse, but rather in the tufts which are interspersed with coarse grass, near the marshy and boggy places. Over these it flies low, and upon gloomy and drizzling days rather dismally, uttering its single and complaining note, unanswered by the voice of any other living creature; and, with the exception of the owl,—and that is a matter of fancy more than of fact,—it is perhaps the only land bird which makes the place of its habitation feel more desolate and sad. As one goes mountainward, the lark, the linnet, and other bush-birds, and the lesser red-pole, give an air of liveliness, either by the blitheness of their songs, or the activity of their motions; but when one comes to the cold unbroken moor, where no vegetable rises higher than the knee, the mountain linnet inspires a very different feeling.

The nest is usually on the top of the thick heath tufts, and

composed chiefly of vegetable fibres, though sometimes these are mixed with wool in the lining, if the locality of the bird afford that material. The eggs do not exceed five, of a pale greenish blue, with markings of reddish brown. From the nature of the locality, the brood is produced late in the season; and there is seldom a second one, at least in the more northerly habitats.

Though a migratory bird, it is one of short flights, each leap accompanied by its note, and with frequent alightings; hence, though it gets on, stage by stage, and from the one end of Britain probably to the other, it does not appear to cross the Channel in winter, neither does it reach the Shetland Isles in the summer. Wherever it goes it utters its cry, as well when in flocks and mixed with other flocking birds in the winter, as when each pair is living apart on the wild moor in summer. The linnet, which agrees most nearly with it in habit, and is a near neighbour in the summer, is the bird with which it associates the most during its winter migrations.

THE GOLD-FINCH (*Fringilla carduelis*).

The gold-finch is certainly the most beautiful, and it is also among the most useful, of all our resident birds. A figure of the male, in summer plumage, will be found on the plate at page 194, vol. i., of one-third the lineal dimensions. The colours of the female gold-finch resemble those of the male, both in their distribution and their markings, only they are not so brilliant in the tints, and the red on the forehead and chin is sometimes clouded with a few black spots; the young have the head brownish. There is not much seasonal change in the plumage, only it is less bright in winter, and the full beauty is not acquired till the birds are in song.

The gold-finch is a small bird, but powerfully winged, and very energetic in all its motions. Its length is about four inches and a quarter, the extent of its wings between nine and ten inches, and its weight about half an ounce. Its flight is straightforward and smooth, without any undulations or jerks, though, from its habit, it never flies at any great elevation above the ground. The air of the bird is extremely sprightly, more so, perhaps, than that of any of our little birds, except the tits, and they have a sort of irritable expression in them which the gold-finch has not: still it is somewhat of a battling bird; and, from the strength and sharp-pointedness of its bill, the power of its wing, and the admirable command that it has of itself on very slender perches, few birds of its size can combat with it upon equal terms. In the free air, however, the combats of birds are few, unless among those of which the males fight at pairing time.

The plumage of the gold-finch is as fine in texture as it is beautiful in colour: the flying feathers are equally remarkable for the strength of their shafts, and the firmness of their webs; and the body feathers lie so very close, that when the bird is fluttering about in all positions on a breezy day, hardly a feather on it turns.

It is a bird very generally distributed over Britain, wherever the nature of the soil is such as to afford it a supply of food, in the early season, when the first broods are hatched.

The plants upon the seeds of which gold-finches feed, and feed with more assiduity than almost any other species, are those which are the most noxious to the cultivator; docks, bistorts, sorrels, wild mustards, marigolds, mountain daisies, chick-weeds, and especially the whole of that branch of the *compositæ* that have winged seeds, and keep the air powdered all the summer over with the excess of their productiveness, taking possession of every nook and corner of the

cultivated land, whenever it is neglected for even a short time.

Of the seeds of these plants there is a constant succession all the year through, for the wind has not shaken the autumnal thistles bare by the time that the early groundsels are in flower ; and to these the dandelion and many other species are soon added. The numbers of those seeds are beyond all counting ; and the means with which they are furnished for floating about with the lightest wind that stirs, are most effective : they are, at the same time, fitted for laying hold, and their oily nature renders them not easily destructible by the weather. Hence they are everywhere ; and one who examines the quantity of down that floats off from a single bed in a neglected garden, must see that one acre of cultivated land allowed to run to waste, would suffice to infest a whole parish. It is a maxim in farming, that where the hedges and lanes are foul, the fields never can be clean ; and countless instances may be seen in England, and in Middlesex *not less* than in more remote places, where the farmer gives half of what his land might produce to the weeds, just because he will not grub up some green lane or inconvenient corner, but retains it as an ever-productive nursery of the most destructive species. But though these accumulations of unseemly plants spoil or diminish the harvest of the farmer, they yield an ample autumnal and winter supply for the gold-finches ; and the margin of the wild is often made gay with the colours and the song of the gold-finch, simply because the farmer on the richer ground is a sloven.

When they disperse for the summer, the gold-finches do not retire very far outward on the bleak moor, or far upward on the hill, or into the forest. If the state of the land is slovenly, they remain among the lower fields, in numbers proportioned to the food that there is for them ; and, as no

human art can fully extirpate, or keep extirpated, plants, the seeds of which career over the country at nearly the same rate with the winds, there are always gold-finches nestling in the gardens and copses, and among the bushes, and even the thick tufts of nettles on the lower grounds. But the gold-finches do not inhabit the marshes, the naked leas, or corn-fields that are free from composite and cruciferous weeds ; nor do they give the preference to places near the margin of waters, or otherwise, where insects may be presumed to be most abundant. Hence, it is reasonable to conclude that the gold-finch is more exclusively a seed-bird than any other bird of the order, and perhaps it is entirely so ; but although its food is vegetable, it does not eat the seeds of the grasses, or of grain plants, though it does sometimes commit considerable ravages upon those of the cruciferous plants, and also the trefoils where these are cultivated. Its chief food, however, consists of the seeds of plants which are equally injurious to corn-fields and to pastures ; and therefore it is one of those birds which, altogether independently of its own beauty and its song, claims the protection of the farmer, as one of the grand natural conservators of the green carpet of the earth.

One chosen habitat of the gold-finch is the line where the cultivated fields meet the upland waste or the game preserves. [The weeds disseminated from the latter, by the way, do even more injury to the surrounding farms than the game birds do.] That boundary is one at which there is a good deal of knowledge to be acquired ; and the more so, the greater the contrast between the territories which it divides. Some portion of the tilth is blown by the winds of March upon the margin of the wild, and along with a surface grass a little more kindly, there comes a host of thistles and other plants with winged seeds, which stand in battle array upon the frontier, ready to invade the fields with legions of seeds, whenever the wind blows from the hill. Among the tops of these,

the mature gold-finches may be seen labouring with the greatest assiduity the whole day and the whole season ; and by the time that the summer has advanced a little, the young may be found on the ground below, as busy among the groundsels, chick-weeds, and plants of a smaller growth, which, although not so formidable in appearance, are, from their numbers, and the rapidity of their growth and successions, fully as destructive. But though the gold-finches are very industrious, and though they multiply at the rate of three broods in the year, the natural tendency of the plants on which they feed is to multiply many hundreds of times faster ; and man cannot perform a more ornamental or a more useful labour in such places, than by walling his field round with a belt of planting, which will be shelter and protection both to his crop and to the gold-finch.

That is the act to which man is admonished by Nature, if he would heed her operations ; and it is one to which he is the more admonished, the more skilfully and successfully that he cultivates on the edge of the wild. If he merely scratches with the plough, and manures scantily without drainage, the wild invades him with its ungenial cohorts of carex and moss, covering his grass-land in the winter, and blighting his grain-crop in the autumn ; and it is only when he so drains and otherwise prepares his land as that there is a blowing tilth in the spring, that he brings the thistles up in arms on his frontier, and will be invaded by them, if he does not plant the protecting belt of trees, (larches, pines, or spruces, in cold situations, alders in boggy ones, and birches on the extreme of cultivation,) which will defend him far more certainly from the hordes of the desert, than the empire of the descendant of the sun was by the Chinese wall. Any one who examines the lands on the confines of a common, even in the home counties of England (where there is often an unseemly proportion of waste), may see proof of these observations. Where

the ploughed land margins on the bushless waste, and there is no bird save the twite, with its dull plumage and dismal note, the two literally run into each other, the grass-land starves the cattle, and the corn is not worth reaping ; but where, even on soil naturally of the same quality, there are bushes and belts, and linnets and gold-finches carolling away in full activity, the grasses are kindly and green, and the corn plays in the summer wind with those beautiful wavings which proclaim there shall be plenty.

Though gold-finches labour cheerily and with songs, they labour more diligently than most other birds. They are early on the breeding-grounds, and their nests are constructed with great care and much neatness ; the materials of course vary with the locality, as the birds never range very far from the nesting-place till they have reared the last brood for the season. The song of the male generally begins in March, and continues improving till the middle of May, at which time it is in the greatest perfection. He sings from the perch, but prefers one which is not very lofty ; begins at daybreak, and continues, with little intermission, till sunset. The nest is placed in a branch, and the foliage of evergreens is preferred to that of deciduous trees, which is another proof that the finding of caterpillars (which are comparatively few on evergreens) is not one of the inducements in the choice of place. A flexible branch seems to be preferred to a stiff one ; and thus the nest of the gold-finch is literally a cradle, and the young are rocked by the winds in their hatching place, nearly as much as they are afterwards to be on the tall and flexible stems, from the tops of which they are to find their food. That situation requires a compact nest, and accordingly the materials are very carefully united, or worked together, so that the wind has little tendency to tear the structure. The external parts are vegetable fibres, mosses, and lichens, mixed with wool or hair, when these can be obtained ; finished with

hair and feathers, and very generally with vegetable down, most frequently that of the thistles and other *compositæ*, but sometimes of the willow or other plants. In the neighbourhood of cotton or flax manufactories, gold-finches (and many other birds) find an ample supply of nesting materials in the mill-wastes, whether these consist of cotton-wool or of the more light and flocculent parts of the flax.

The female begins to lay about the middle of May, and the number of eggs in each of the three hatches (in very cold and backward places there are only two) varies from three to six; they are of a pale bluish white, with little reddish-brown specks thinly scattered, except at the larger end. The mother sits very closely and determinedly—no violence of the weather will drive her from her nest: and considering the way in which they are sometimes shaken by the winds, it is rather surprising that so few of the nests are blown down, even in gales and whirlwinds. The male is also very attentive, and continues his song later than almost any bird; indeed, he may be heard in the winter, and sometimes even when there is snow upon the ground. That might be expected, as the best livery of the plumage and the energy of the bird are kept up with little variation throughout the year.

It is worthy of remark, too, that the harvest of the goldfinch is more continual than that of almost any other bird, as there are always some of the plants upon which it feeds in seed. But the birds feed mostly on the wing, or perched on the plants (except in the case of the broods when very young), and rarely pick up seeds from the ground. The removal of the crops does not, therefore, make the stubble-fields such rich pastures to them, as they are to many other birds; and hence, in Britain at least, they do not assemble in such numerous flocks. The packs in which they are found during the winter, rarely exceed the number which might be expected from the three broods of the season and the parent

birds ; and it is not improbable that they may be restricted to these.

The gold-finch is one of the favourite cage-birds, as well as one of our finest birds in a state of nature. They are easily tamed, hardy, lively, capable of being taught many little tricks, and, when properly attended to, almost continually in song ; and they live longer in confinement than almost any other of the little birds. They breed in confinement, and mules may be bred between them and the canary-finch ; the best of which are those between the male gold-finch and female canary : they have the bill, head, and wings of the gold-finch, and the rest of the body more resembling the canary. These do not, of course, breed with each other, though there is little doubt that they would breed back to the pure blood of either parent.

These are all the finches which can be regarded as regularly summering and wintering in Britain ; but there are other three which visit the country, in the winter chiefly ; and as they have not the same cause for their departure at a particular season, as those birds have whose food fails seasonally, they *may* remain and breed occasionally. These three species are, the siskin-finch, the mountain-finch, and the haw-finch.

THE SISKIN-FINCH (*Fringilla spinus*).

The siskin, which is called the Aberdevine, though it has not the bright colours of the gold-finch, is still a very beautiful bird. Its prominent colours are black, bright yellow, sulphur yellow, and a peculiar shade of green, approaching to sage green, but yet so unlike any named shade of the colour, that it has been taken as a named tint, under the appellation of siskin-green.

The siskin is larger than the gold-finch, and not so firm and compact in appearance. It is about five inches in length,

eight and a half in the extent of the wings, and its weight about three drachms. The bill, though hard and conical, is not by any means so powerful as that of the gold-finch ; and the bird is altogether of softer manners, and more resembling the canary, except in colour, and in being smaller. It also breeds more readily with the canary than the gold-finch does, and the hybrids are said to breed again more freely.

These birds are, like gold-finches, subject to some variety (perhaps climatal variety) in the colours of their plumage ; but the following are the tints of the male, as usually seen in this country ; and probably, from their relation to birds which are subject to few seasonal changes of plumage, they do not vary much all the year round :—bill and claws reddish white, the former brownish at the tip ; feet reddish, inclining to pale flesh-colour ; upper parts siskin-green, with the centres of the feathers deep olive-green ; crown of the head and chin black, with a slight greenish tinge, and mixed with green on the nape ; a broad streak behind the ear, the neck, breast, and margins of the quills, greater coverts, and tail-feathers yellow, in some places pale sulphur yellow, and in others the brightest gamboge tints ; the bars of the greater coverts, and centres of the quills and tail-feathers black, with a slight tinge of deep brownish green ; the flanks greyish white, the belly white, and the under tail-coverts white, with dusky streaks and markings. The green and greenish black are the most permanent tints, the *yellow* varying considerably both in clearness and intensity. In the female, the markings are not so decided, and the upper part is rather brown, and the lower more inclining to greyish white in the general tint. There is no authenticated instance of the nest being found in any part of the British islands ; and the ornithologists of the continent, where the bird certainly does breed in considerable numbers, do not seem to be altogether agreed about the peculiar locality of the nest.

The wooded parts of the continent appear to be its principal haunts; but it is rather confined to the middle latitudes, than extended either to the extreme north or the extreme south; and when it visits this country, its habits agree with such a locality, as it perches on shrubs and trees, and feeds on the seeds and buds of these, rather than on the seeds of herbaceous plants. The nest is said to be placed, in accordance with the habit in feeding, much higher above the ground than that of the gold-finch, but in a fork, or against a stiff branch, so as not to be exposed to the same violent rocking during winds as that of the other.

The siskin cannot be considered as a very rare bird, because it is met with in many parts of Britain, though seldom, if ever, in the extreme north; and when it does appear, it is not in solitary straggling individuals, but in flocks, or at least in packs; but as little can it be considered as a regular winter visitant, having an equatorial migration, and in consequence of that, appearing and disappearing at nearly the same times every year. Its migration is rather a migration in longitude, and an involuntary one, produced by the winds, which waft the birds to different parts of the country at different times of the year, according to their direction, their intensity, their continuance, and probably whether they be or be not accompanied by falls of snow on the continent. In no instance have they been observed so early in the season as our regular autumnal birds, which are known to breed within the arctic circle in the western part of the continent. They are said to make their appearance in flocks in the lower parts of Germany, about the same time of the year at which our grain-eating birds leave the wilds, and flock on the cultivated fields; but with us they appear considerably later, and sometimes not till the summer birds have begun to arrive. Analogy would lead to the conclusion that they breed with us, but that, like the haw-finches, they hide themselves in the

depths of the southern forests at that time ; but with us, their history in a state of nature is very imperfect. They are chiefly known as cage-birds, and as such they are esteemed for their beauty, their docility, their healthiness, their song, and the readiness with which they produce a mixed breed, either way, with the canary-finches. Their song is not unpleasant ; it bears some resemblance to that of the canary, but it is less powerful.*

THE MOUNTAIN-FINCH (*Fringilla montifringilla.*)

Like the siskin, the mountain-finch is irregular both in the times of its appearance and in its numbers. It is, however, much more frequently seen than the siskin, and resorts to more parts of the country.

As the snow-bunting has, in some stages of its plumage, been called the mountain-finch, that has occasioned a little confusion between it and the species under consideration ; but the two are so distinct in all their characters, that the one cannot be mistaken for the other. The proper mountain-finch is sometimes called "the bramling."

It is not quite so large as the snow-bunting ; but it is a stout-made bird, which would lead one to conclude that, though it may, as is reported, nestle in the pine-trees, it is in its manner of feeding more a bird of the open air than of the forest. While in this country its habits correspond, as it does not resort so much to the trees and copses, and feed on those buds, as the siskin ; but keeps more to the open fields, with the chaffinches and yellow buntings, though, like the chaffinches, they frequently alight in trees, and consume the

* The siskin is known to breed in some of the pine woods in the Highlands of Scotland; the nest is placed at a great elevation on the topmost branches, and is not accessible without risk and difficulty. This bird is common in Sweden, Norway, and the north of Germany. We have kept it in captivity, but have never heard it sing.—M.

various fruits and seeds that are found on these, but rarely the buds, and prefer evergreens for roosting at night.

Mountain-finches are rather arctic birds, and have, perhaps, few of the order inhabiting north of them except the snow-buntings; the finches being on the northern verge of the forests, where these begin to subside in height or to become straggling, and the buntings where ligneous vegetables are still more rare and stunted. As is the case with many of the arctic birds, it is said to be subject to seasonable variations of colour, though these are slight compared with what takes place in those birds which inhabit as far northward or upland as to be without the shelter of even shrubby vegetation. There is also more difference between the colour of the sexes than in the two species last mentioned.

The length is about six inches and a half, the extent of the wings ten and a half, and the weight rather more than an ounce.

The male, when it visits Britain, has the bill yellowish, and black at the tip; the head, cheeks, and nape, with the centres of the feathers, mottled with different tints of yellowish brown and grey: the throat, breast, scapulars, and lesser coverts, reddish brown; the coverts of the secondary quills black, with pale orange brownish tips: the greater quills black with a white spot at the base, and the outer webs margined with pale whitish yellow; the flanks and sides buff orange with dusky spots; the rest of the under parts yellowish white; and the tail-feathers black, edged with yellowish grey, except the exterior ones, which are edged with white.

The principal change in the breeding season consists in the disappearance of the brown and grey mottling on the head and neck, which then become pure black, and in a general deepening of tint in the whole upper part, as well as of the brown on the breast; and where the head becomes pure black, the base of the bill changes to a bluish colour.

The female has all the tints considerably paler, and that part of the head and neck which is black in the summer plumage of the male is grey in the female. The young in their first plumage resemble the female on the other part; but the breast is much paler, being a sort of brownish white. The males which arrive early in the season have the head much blacker than those which arrive after the season is farther advanced. But in all their varieties of plumage they are handsome birds, and they are lively and energetic in their motions.

THE HAW-FINCH (*Fringilla coccothraustes*).

The haw-finch is the largest bird of the genus that appears in the British islands; and it has hitherto been observed only in the southern parts of the country.

The plumage and air of the haw-finch are indicative of a bird of soft manners and mild skies, rather than of one which has to contend with the winds in bleak places. The bill is very large in proportion to the size of the bird, and resembles in shape that of the green-finch; indeed, except in the tints and markings of the plumage, the green-finch is the other British bird with which the haw-finch has the most points of resemblance. But the haw-finch is much more a woodland bird than the other, feeding chiefly on the seeds of trees and the kernels of their fruits.

The colours are: round the base of the bill, from that to the eyes, and also the chin, black; the crown of the head and cheeks pale chestnut brown, with a slight tinge of grey, which disappears in the breeding time; and a broad collar of delicate bluish grey on the nape and upper part of the neck. The back very deep reddish brown, passing into pale chestnut on the rump and upper tail-coverts. The lesser coverts deep reddish brown, with a row of white towards the greater coverts, forming a long and very distinct oblique bar on the

closed wing. The general colour of the quills glossy black, with a slight glaze of purple ; the secondaries and part of the primaries with the points truncated as if shortened by art, and an oblong white spot on the centre of each inner web. The tail, which is not very much produced, and nearly square at the end, with the four middle feathers, except their bases, and the last half of the inner webs of all the rest, except the two outer ones, white, and all the rest of the tail black. The breast and belly pale brownish purple ; and the vent-feathers and under tail-coverts white. In winter the bill and feet are flesh-brown, in summer they are lead-grey, with the tips of the mandibles and claws much paler.

Though at variance with the characters of the genus, as well as with the laws that regulate the general migrations of the feathered tribes, the haw-finch is, in most of the books, described as a winter visitant. Now that a bird should come to the warmer parts of the country in winter, and not be found then or at any other season in the colder, might have been regarded as conclusive evidence against its being a migrant in latitude ; and more recent and careful observation has established the fact of its being a resident bird, but one of very retired habits in the breeding season. The nest has been met with in Epping Forest, at Windsor, and in some other places, but always concealed in the depth of close forests, to which the bird retires about April ; and it is equally hidden on the continent during the summer.

The nest is among the close foliage, five or six feet from the ground, and sometimes in the thick top of a pine or other evergreen. It is a shallow fabric, formed of sticks and lichens, and lined with fibres of roots. The eggs are from four to six, of a greenish white, mottled with greenish grey and brown. The birds are nearly as silent as they are retired ; and their note is soft and inward, something resembling that of the bull-finch.

GROSS-BEAKS (*Pyrrhula*).

In their general characters, the gross-beaks bear considerable resemblance both to the sparrows and the finches ; but they have other characters which, in the British species at least, make them readily distinguishable.

The gross-beaks have the bill, taken in all its dimensions, rather less than that of the majority of the finches ; but it is very thick in proportion to its length, dark in the colour, and very strong and peculiar in its form. The exterior of the upper mandible makes a sort of ridge, which is continued for some distance on the forehead, and forms a sort of hook at the tip ; the line of the under mandible is also very much curved, and the tip of that mandible is rather shorter, so that the upper one closes over it something in the same manner as the bill of the parrots. The tarsi are short ; but the toes long, and the claws well adapted for perching on slender twigs. The wings are rather short and rounded ; the tails are rather produced and strong. The whole organs of motion indeed indicate a power of rapid short flights in all directions ; and such is the general habits of the birds. They leap about among the extreme twigs of trees, and extract the kernels of seeds from their hardest receptacle. Two species are mentioned as British, the bull-finch gross-beak, a resident, and the pine gross-beak, which can hardly be regarded as anything but a straggler, and even then as a rare one.

THE BULL-FINCH GROSS-BEAK (*Pyrrhula vulgaris*).

A figure of the male bull-finch, one-third of the lineal dimensions, is given on the plate at page 194, vol. i. The colours of the female are less bright. The under part is pale reddish brown, and the upper part brownish grey. The remaining parts similar in the distribution of the colours, but paler in the tints. The young, in their first plumage, have

considerable resemblance to the female, only they want the black upon the head and the red on the under part of the males ; but they acquire those tints in about two months after leaving the nest. As is the case with all birds in which there is a considerable difference in the plumage of the sexes, the mature birds are also subject to varieties of colour.

The bull-finch is a bird, with the form and appearance of which, and also with its softly modulated whistle, every one is familiar as a cage-bird ; but as a wild tenant of our woods it is perhaps more rarely seen or heard, at least for the greater part of the year, than any other bird which is as generally distributed, and as numerous in all its localities.

Though called a finch in common language, it has neither the appearance nor the habits of the finches. In shape it is the most compact and neat, and expressive of energy and strength of all our little birds. The outline of its head and bill is as fine as that of the most handsome of the hawks ; but the bright black eye has a good deal of the prying expression of that of the magpie. The bill is, with the exception of that of the eagles and hawks, much stronger in proportion than the bill of any other British bird. The attitudes and motions of the bird, while busy picking buds or berries, are also very elegant ; and it has a great command of itself on its perch.

It inhabits almost all thickly wooded places, and also brakes and hedges, if they are not in very exposed situations ; but it every where inhabits hideling, till necessity drives it from its cover. It is not generally found in the very tallest trees, but rather in the largest branches of those that are of very close growth ; and its nest is placed in the thickest shade, and at no great elevation above the ground. The structure is rude and artless, as the shelter of the bird while sitting, and of the young, consists rather in the situation in which the nest is placed than in the nest itself. It is formed of twigs, and

finished with small vegetable fibres, with rarely, if ever, any admixture of wool, feathers, or any other animal substance. Indeed, the habits of the bird do not lead it to the places where such substances are to be found. It lives in the shade of the tree, and uses such materials as that shade affords.

Bull-finches breed rather late in the season, as, though the building of their nest is not a very elaborate matter, it is not begun till the end of April or the beginning of May. The male bird sings at that time ; but his song, though mournfully soft, is so low that it is not heard but in the close vicinity ; and the bird is so apt to drop into the bush and be silent, on the least alarm, that to scramble through the trees in order to hear the native note of the bull-finch, is almost the surest way of being disappointed.

The birds are very much attached to each other and to their young, and it is possible that they pair for life ; but their habits while in the wood are not easily observed or much known ; and when they first quit the shade, they apparently come in families, though even these skulk near each other, rather than associate freely and openly like the flocking birds.

When the stores of the hedge and the coppice fail, and the weather is severe, the bull-finches resort to the gardens, and commit very considerable ravages upon the fruit-trees, especially the early cherries, plums, and other sorts that have their buds in an advanced state, and with a considerable quantity of farinaceous matter accumulated in them. They are equally expert at nipping off the buds, and in separating the hard scales of the hybernaculum, which are scattered round the root of the tree, and are sometimes the only remains that are left of what promised in the autumn to be a fair or even an abundant crop of fruit. They attack the buds of hawthorns and many other trees, such as the birch, and even

the pine tribe, the cores of the buds of which they separate very dexterously from the scales and turpentine. As the bull-finches seldom attack the buds on the tops of even rather low trees, they do not much disfigure the forests, and probably their pruning of the hawthorns may assist the hedger in his labours ; but to the fruit-trees, especially one solitary tree of an early sort, they often do very considerable damage ; and as they slink away as soon as they are observed, other birds are sometimes apt to get the blame. But they are birds whose habits require a good deal more careful examination than appears to have been bestowed on them.

THE PINE GROSS-BEAK (*Pyrrhula enucleator*).

The pine gross-beak is a very beautiful bird, but it is of such rare occurrence that it can barely be considered as a British bird. I have been a good deal in the native pine forests, and also in the extensive pine plantations in the northern parts of Scotland, where, from the short distance to the Scandinavian woods, where it is abundant, it would be brought most readily by the winds, and I never saw the bird, or met with any person that had seen it. These birds are liable to considerable variations in their plumage, both with the seasons and at different ages. At present, the detail even of their appearance is not probably a part of British ornithology, though the numerous plantations of pines that have of late years been made in the northern parts of Scotland, may possibly bring them. They feed upon the seeds of pines, and on those of alpine and arctic shrubs, and also upon buds.

CROSS-BILLS (*Loxia*).

Cross-bills are another species of birds, natives of, and chiefly inhabiting, the vast pine forests of the high latitudes.

They are singular birds, both in the form of their bills and in some of their habits.

The bill is of considerable length for the size of the bird, very strong, and the mandibles are, towards the points, which are very strong and sharp, curved in opposite directions, so that when the bill is in a state of repose, they lie across each other with the points projecting towards the opposite sides. The cutting edges of the mandibles are bent inward on their inner or convex sides, so that the one can slide upon the other with a very firm support, and yet an easy motion.

One accustomed only to see the action of ordinary bills, whether straight or curved, which have only the common vertical motion, or that slight lateral or grinding one, which all birds that have the tomia of the mandibles turned inwards, and the habit of shelling seeds with tough husks, possess, would be very apt to regard the^d crossed mandibles of these birds as forming a very ungainly instrument for any useful purpose. But it very often happens that, in the animated creation, those organizations which, to our partial and superficial view, seem awkward, are really the very best adapted for their several purposes. We have many instances of that in the feet of birds, especially in the *anisodactylic* feet, such as those of the creeper, among finches, and in the feet of the grebes among swimmers; and the bills of the birds under consideration are just as admirably adapted for the obtaining of their peculiar species of food.

The seeds of the pines, which, until the cone has been exposed to the action of the weather for a considerable time after the seeds are ripe, are so firmly enclosed between the ligneous scales as that the bill of no ordinary bird could reach them, are the chief food of the cross-bills: and the bill consists of a very powerful pair of levers, by means of which the scales can be wrenched open, and the seeds arrived at in

a manner the most effective. When the two sharp points are brought together, they can be entered into a very small opening, in which, the instant that they begin to operate, each takes hold like a hook, and tends to draw itself in; thus cutting open in the direction of the face or plane of the scale, while by their action upon each other, they press it open by the power of a double wedge; and by the time that the mandibles have crossed to their full extent, the scale is so completely raised, that the seed can be taken from under it with the greatest ease. The position into which the oblique action of the bill brings the head, enables the bird to see the seed under the scale, and while the mandibles keep the scale open, the tongue of the bird scoops out the seed. The tongue is as curious as the mandibles. It terminates in a horny gouge, supported by a bone and furnished with muscles, by which it can be raised or depressed so as to act as an independent instrument. The motion of the bill divides a soft and pulpy substance with remarkable facility; and when the birds visit orchards, which they are apt sometimes to do in the autumn, they cut the apples asunder in order to get at the pips, with almost as much celerity as one could cut them with a knife.

The season at which these singular birds breed, is another curious trait in their character. They do not breed in the depth of winter when the snow is falling, but they do it so very early in the spring, that they must in some places have nests, eggs, and perhaps even hatched young, before the snow has wholly left the surface of the ground. With the ground they have indeed little connexion in any of their operations or excursions. Their food is in the trees more abundant in the winter than in the summer: the second year cones, which had been matured in the preceding season, are then completely ripe and full of seed, and want only the action of the mandibles to open them. The older cones have

by that time either fallen from the trees or had their seeds removed by the gross-beaks, and other birds which build late in or near the same places.

The scaly fruits of these trees give way sooner in the cold northern countries than in places farther to the south, in consequence of the intense cold of the winter, and the suddenness with which the heat of the summer sets in ; so that by the time the weather becomes hot, the food of the cross-bills, in the peculiar state in which it is their habit to seize it, becomes less abundant. Then they move southward, about the same time that the migrants, which have left the north during the severe weather, are again arriving there for the purpose of nidification. Their regular migration on the continent of Europe, is along those districts where the coniferæ are abundant, in the whole line from the mountains of Scandinavia to the Pyrenees.

Whether they come to us in a southward migration from the northern part of their continental range, by a northern one from the southern, or are drifted laterally when on a middle course, has not been very satisfactorily ascertained ; but at all events their migration is irregular : and though there is not perhaps a season during which a few are not found in some parts of the country, the large flocks come only occasionally, and at different times of the year in different seasons. Those which may be considered as the more regular migrants come in May or June, and when they land on the eastern side of the island, their progress is northward, so that they may possibly reach the forests of Norway and Sweden by the time that the cold weather has set in, or rather after the first and violent falls of snow, and when the winter has become tranquil, and they can set about the constructing of their mossy nests.

Those which visit the south of England, are either more numerous or have been more carefully observed towards the

eastern part ; and so they may possibly be from the Pyrenees or the pine districts of the south of France. When they arrive in numbers in these places, they pass the summer among the pine plantations ; but when the seeds or pips of the apple begin to ripen, they lay the orchards under very severe contributions.

There are two species which have been noticed as visitants in Britain, the common cross-bill, which, although very singular in its appearance, can hardly be considered as a rare bird, and the parrot cross-bill, which is a mere straggler.

COMMON CROSS-BILL (*Loxia curvirostra*).

A figure of this bird is given on the plate at p. 386, vol. i., one-third of the lineal dimensions. The red on the young males, especially on the breast and rump, is often darker than that represented in the figure. The female is deep greenish grey, with the rump and throat mottled with pale yellow.

The strong muscles necessary for producing the very curious motions in the beak of the cross-bill, give the head and neck something of the air of those of the parrots ; but the cross-bill has that side of the head towards which the lower mandible slides larger than the other side. There are also some agreements in the habits of the birds. The cross-bills have not the same sort of foot as the parrots, any more than they have the same sort of bill : but they are excellent perchers, and can hold on by the one foot while they employ the other as a hand. Clinging to the slender twig with one foot, the cross-bill grasps with the other the fruit, or cone (especially the cone of the larch, which is on a much more flexible support than that of the pines and spruces), and thus produces a reaction of the first motion of the mandibles, for which the strength of the twig and weight of the cone would not be sufficient. When the hooked parts of the mandibles

have once taken hold, their oblique action, as they cross each other, tends to draw the cone or other fruit towards the bird ; and the foot is always ready, if necessary, to hold on. In all its actions, indeed, the sliding notion of the one mandible upon the other is far more powerful than could, by equal muscular energy, be given to any bill or beak, the mandibles of which simply shut the one against the other. A slight lateral or grinding motion may be observed in the bills of all birds that shell hard seeds ; and parrots grind hard substances, and hawks divide tough ones, by sliding the point of the lower mandible against the strong hook on the tip of the upper. But though the tongue, as has been said, is probably used in scooping the seeds of cones, the tips of the mandibles can be brought very nicely into contact, so as to seize the smallest substances.

As the cross-bills feed undisturbed in the depths of their native forests, they are by no means shy when they visit this country. They are so intent upon their cone-pecking or apple-splitting, that they will not only allow their motions to be watched more closely and for a longer time than most other birds, but they may also be taken by a noose at the end of a rod ; and the capture of one does not alarm the rest, so that, if they are abundant, one who is expert in managing that species of snare may take them in considerable numbers. In confinement their dispositions are placid, and they can be rendered very familiar, and taught a number of little tricks.

They are said to nestle high in the coniferous trees, to construct their nests externally of tree-moss, and line them with fine dry lichen, worked in the tomia of their beaks till it be soft. It has been said that they line their nest with feathers, but feathers are not very plentiful in the northern woods, while the snow is on the ground ; and it has been said also that they cement their nests with the turpentine which

exudes from the pines, and thus render them water-proof. That, however, is also very doubtful. Turpentine does not exude from trees in cold weather; and as the nest is merely a hemispherical one and without a dome, the rendering of it waterproof would do it harm rather than good. Nests do not get wet from below, unless they are flooded; and that would be a very violent thaw even in Sweden, where summer sets in so rapidly, which would flood the pine forests to the height of the cross-bill's nest.*

THE PARROT CROSS-BILL (*Loxia pytiopsittacus*).

This bird is larger than the former, more like a parrot in shape, not so generally known on the continent, probably a more northerly or easterly dweller, and exceedingly rare as a straggler in Britain. It is not longer than the common cross-bill, but the tail is shorter, and it is altogether a much thicker and stronger bird. The bill is much thicker and more crooked in its outline, but shorter, and the points are not so sharp and do not cross each other to so great an extent, the upper one merely appearing to hang over the under as in parrots, when the head is viewed laterally. The colour of the young male is not so red as in the former species, and more mottled, and in the mature bird it changes more into grey.

In winter these birds are very abundant in the pine forests on both shores of the Baltic. Like the former, they nestle very early; and they are said to retire to the swamps in the spring, and prey first upon the buds, and subsequently

* The cross-bill has been observed to breed in plantations of larch and Scotch firs on the Cotswold Hills, Gloucestershire, and also in Holt Forest, Surrey, where considerable flocks have been seen. Nidification commences early; generally in March or the beginning of April. The nest is made of grass, and placed in the thick top of a young fir. The eggs are white, transparent, and slightly speckled. The male bird has an agreeable song.—M.

upon the fruits of the deciduous trees and shrubs. They come much more rarely into the cultivated places. In Britain they have never been seen so far southward as the common cross-bills.

It is worthy of notice that the cross-bills, which are to a considerable extent the reverse of most other birds in their time of breeding, are also the reverse in the change of the male plumage. In most birds the mature and the breeding plumage of the male are deeper, or at all events more entire in their tints, than the young and the winter plumage; but so far as has been observed, the cross-bills are duller in their colours both in the mature and the breeding plumages.

O R D E R XII.

GRALLÆ.

WADING BIRDS, OR BIRDS WHICH SEEK THEIR FOOD CHIEFLY IN THE SHALLOWS, OR ON THE MARGINS OF WATERS, OR OTHERWISE IN HUMID PLACES; AND WHICH NEVER OR SELDOM FEED IN THE AIR ON THE WING, OR FISH ON EXTENSIVE SURFACES OF WATER.

THE birds which compose this order vary so much in their forms, their habits, and their haunts, that their general characters are equally few and vague; and though they do agree in some particulars, it is by no means easy to express what those particulars are. But if it be difficult to find general characters descriptive of the order as distinguished from other orders, it is just as difficult to find any one character by the variations of which they can be satisfactorily divided into groups.

One means of subdivision has been the general structure of the bill, as "coultter-shaped," or as "compressed;" and though neither of these terms is very descriptive of the form of the organ, they are expressive of certain general characters of the birds. Those that have the bill coultter-shaped, find their food chiefly in the waters, and it consists, for the most part, of fishes and reptiles. Of these there are only two resident British species, the common heron and the bittern, though individuals of about a dozen more species have been met with in the country, as stragglers, however, rather than

as even occasional visitants, coming in seasons of a peculiar character, from the recurrence of which a second visit of the birds might be expected.

The straggling of birds must depend upon natural causes, as well as their periodical migrations, or their residence in the same spot ; but the law or succession of those causes, is a matter of wider and more difficult observation ; and the difficulty is increased when the straggling is much in longitude, as is the case with most of the coulder-billed grallæ.

Of the remaining and far more numerous group of British birds formed by this division, the bills are so different that no common name can be accurately or very usefully applied to them, so that any attempt to subdivide the order from the form of the bill is of comparatively little use in facilitating the study of British birds.

The wings and tails do not form good means of subdivision ; as, though the whole of the order are well-winged birds, they do not use these organs of flight in the chase of their prey, but merely in transporting themselves from place to place ; and their wings are more powerful in proportion as the places in which they find their food are more widely scattered, and also as the supply depends more upon the season.

Many of the order can swim, some are good swimmers, and some can dive readily ; but as these motions are only occasional, they cannot well be made distinctive characters of any groups more comprehensive than genera. Indeed, any characters more extensive than generic ones, are of comparatively little value in the order.

The habit in which they all agree the most, is that of finding their food on or below the plane upon which they stand, and not using their wings like the air birds, or a perch like the bush and tree birds, in the immediate reach of it. It is in that habit chiefly that the general character of the order

lies ; and though their feet, and also their necks, heads, and bills, vary much with the kind of place in which the food is found, and the way in which it has to be taken from that place, there is in all cases a corresponding variation of the two ; so that when the feeding-place and food of the bird are known, it is always apparent that the feet, as the immediate means of conveyance to the food and of support while it is taken, and the neck, head, and bill, as the immediate organs of capture, are so well adapted for acting in concert, that if the one were changed without a corresponding change in the other, the bird would be far less efficient than it is. The principal food of the whole order consists of animal substances, so that they have membranous stomachs and not gizzards, though some have a slight approach to that character. These last occasionally eat vegetables when in a state of nature, might be wholly or chiefly fed on them in confinement, and would no doubt, in that case, partake more of the gizzard structure. In all birds, indeed, the texture of the stomach can accommodate itself less or more to the nature of their food ; so that when the food requires grinding,—an operation which only the grain-eating birds can perform, and that, too, in a very imperfect manner,—the stomach becomes in time a grinding apparatus.* Even in its most perfect gizzard form, however, it becomes only half the mill—the nether millstone, as it were ; and hence the necessity that the gallinæ are under of picking up gravel to assist the gizzard in the attrition of their food. The necessity and efficiency of these substances in the process of digestion are proved by the fact, that the birds, when they can pick up

* If the author means to say that in process of time the organic structure of the stomach will become changed, we cannot assent to his proposition. It is always adapted for the food upon which the bird is destined to live, and to change that food would be to destroy the bird by starvation, for the stomach would never change.—M.

gravel naturally along with their food, can be maintained and continue equally fat upon half the quantity of grain.

The British birds that come nearest to what may be considered as the commencement of this order, are the lowland gallinæ and the runners; but though these feed much on the surface, they also feed higher up than is the general habit of the grallæ. Those pick seeds from the tops of high plants, and eat the leaves and tops of some green vegetables, which the birds of the present order very rarely do. The habits of the bustards approach the nearest to those of the grallæ; but then the bustards are so exclusively birds of dry pastures, that it is a contradiction in terms to class them as grallidæ, or birds *like* waders,—and much more so to class them as *grallæ*, or *actual* waders.

The bodies of all the order are poised with the direction of the centre of gravity so much within the base formed by the feet, that they have great power over the neck, and can thus command a large portion of space with the point of the bill, while the axis of the body remains in nearly the same position; and, especially in those species that fish, the extent and rapidity of motion to the bill, by means of the extension and flexure of the neck, are very remarkable. Their legs are also more developed than those of birds that feed even occasionally on the wing or the perch. The tarsi are long and in general clean and light in their structure, as is the case with most animals which use their feet only for swift progressive motion, and not for clutching or hopping. The femur or thigh-bone is more free; the articulation of the tibia with the tarsus more firm; and the whole leg comes more into action than that of other birds, the running birds only excepted. They are thus enabled to take longer steps with the same muscular exertion; and they get over the ground fast and with little fatigue. When they fly, they extend the legs backwards, and at the same time stretch the

neck out forwards ;* and as the lengths of those bear a proportion to each other, the balance of the bird is preserved, and the flight rendered more easy.

Nor is that all ; for the feet, which, from the stiffness of the tarsal joints, cannot be so conveniently folded as those of perching birds, answer many of the purposes of a tail. When the bird descends they come down ; so that, in alighting, the weight presses first on the points of the toes, and the bird is let to its footing on the ground by its own feet as elastic springs.

When the bird is on the ground, and the axis of the body nearly horizontal, which is the average position when feeding, the centre of gravity is so far forward of the articulation of the toes, that the pressure upon them is nearly in the same ratio to their power of resistance through their whole length ; and thus the whole foot is stable. If the centre of gravity were thrown backward, the stability would be diminished, just as that of a man is when he attempts to lean back with his body straight and stiff ; more so, indeed, for as soon as the points of the toes are relieved of part of the pressure, the elastic ligament begins to contract, and its tendency is to throw the bird obliquely upwards and backwards. But as the chief action of the birds while on their feet is either walking or running, in which the anterior part of the body is depressed and the head generally advanced, or seeking for their food below the axis of the body, their footing becomes the firmer the more that they exert themselves in either way.

In taking wing, in which case the anterior part of the body is always elevated, and the centre of gravity consequently thrown backward, the action of the spring of the foot aids the bird in getting into the air, a motion which, as the tail has

* The neck of the heron during flight assumes a sigmoid flexure.—M.

little action as an organ of flight, would otherwise be much more difficult.

In alighting, these birds have some difficulties to overcome which are not felt by those orders which are better furnished with tails, or do not use their feet as a balance and a rudder in their flight. When the legs are brought downwards, the anterior part of the bird becomes heaviest, and there is, in so far as gravitation is concerned, a tendency to come down head foremost. But the wings are so formed as to counteract that tendency. They are hollow on their under sides, especially towards the anterior parts, where all wings are stiffest; and thus they both take a much more buoyant hold on the air as a resisting medium, and produce a reaction to their stroke obliquely upwards and backwards, in consequence of which the bird is enabled to alight with the axis of its body in a more upright position than those birds which have not their wings so formed. In that way the birds can let themselves down very gradually, so as to feel no shock when they alight upon hard surfaces, and not to sink when they descend, even with their greatest rapidity, upon surfaces that are moist and soft.

In all cases, a concave wing takes a better hold of the air than a flat one; and some of the grallæ can, by means of their wings, work the body into a vertical position, in the same way as some of the swimming birds can do when they elevate themselves out of the water; while others can convert the partially expanded wings into very efficient auxiliaries when they run rapidly.

These habits vary much in different species, but they belong in a greater or less degree to all the birds of the order.

HAUNTS OF THE GRALLÆ.

Several foreign species of this order not only inhabit near

the dwellings of man, but are among the most familiar of the feathered tribes, frequenting the streets of cities, and reposing and nestling on the house-tops with more apparent confidence than house-sparrows with us. In those places, they are esteemed and protected on account of their services as scavengers, and in the destruction of noxious creatures ; and though they are not very elegant in their forms, they impart a peculiar and not an uninteresting character to the place ; but it is not a British character.

The British grallæ, whether resident or migrant, are all, with the exception of some of the stragglers, birds of the wastes and uncultivated places ; and birds which harmonize less and less with the country in proportion as improvement extends over it. Hence, the species are less numerous with us now than they were in former times ; and of many of those that remain, the numbers are gradually lessening. There is, however, little chance or danger of the extinction of any of the present species. The sea-beaches, the fens, the moors, the upland marshes, and the banks of the rivers, will continue to afford them retirement and food, though several of them do get gradually more out of the range of general observation.

But though the grallæ are, in their general haunts, thus in so far associated with wildness and infertility, they are not less interesting than those birds which are the concomitants of improvement and fertility, and which multiply as these extend. In some respects they are even more interesting than these. They give life to those places which man neglects ; and (as they are almost all preyers upon plant-destroying animals) they preserve vegetation upon places where otherwise it would perish, and the consequences to the general climate of the country would be much more serious than those who do not reflect upon those matters in their connexion would be apt to suppose. There are many parts

of the country which but for them would become driving dust in summer, and so susceptible to cold in winter, that they would be continually drawing the moisture from the surrounding fields in the hot and dry months, and chilling them with nipping winds at the other times of the year.

Sunbeams never fall idly : and if the nature of any surface is such that they cannot fall upon it for good, they are certain to fall for evil. If there is a vegetable covering, it clothes as a mantle, or cools by its evaporation ; and if there is vegetable matter in the mould, the decomposition of that finds the sunbeams in employment, and the gaseous products which they evolve enter into new combinations, and the waste which takes place there is merely a transfer to other places.

But if there is nothing but the powder of the earths, or of metallic and other mineral substances, there is nothing but the idle operations of nature's chemistry—heating and drying, cooling and wetting, both running to extremes with the seasons, and both tending to spread their effects.

Any one who has observed, but for one season, the progress of vegetation upon the margin of a plantless waste, and compared it with that upon ground of the same quality, elevation, and aspect, which had not the misfortune of so bad a neighbour, must have seen what would have been the advantage of having that ground covered with vegetation of any kind. When matters are in that state, there are of course no destroying insects ; for they too must perish in the ruin of which they are the authors, and which they would always accomplish to a certain extent, were it not for the birds that feed upon the ground.

These birds take up the ground where the field birds end, and occupy it as far as there is food and as a walking foot can go, to the uppermost part of the hill that will bear bent and rushes, to the farthest shallow in the lake and the river,

through the sedges and reeds by the marsh, and on the beach as far as the ebbing tide retires. Mountainward, they approach the haunts which are occupied in succession by the black-game, the grouse, and the ptarmigan; fieldward, they border with the partridge and the rook; and near the waters, they are the immediate neighbours of the swimming birds.

The pastures which they occupy are more under the influence of the seasons than either the richer or the more elevated parts of the country. Both of these afford shelter, and even food all the year round. The leaves, it is true, fall, and the annual stems are gathered in or die, down in the rich places; but the tree and the shrub remain, and the clearing of the ground of foliage discloses no small portion of food for the birds which inhabit there. It is indeed the store to which they all collect from their breeding grounds, and on which they become strong and wax fat, preparatory to the labours of a new season. The mountain vegetation is also perennial, and it is so in leaf as well as in flower. There are, indeed, few succulent hybernaculating buds there; but the tops of the heaths and mosses are always in a state of growth, so that they support the birds which nestle among them, even when the whole are clad with snow.

The plants among which the grallæ reside are, on the other hand, almost wholly annual both in the leaves and the stems, so that they supply very little food in the winter months; for when the vegetation falls, and the autumnal winds and frosts sweep and chill the surface, the mollusca and other small animals retire downwards beyond the reach of the birds. Hence there is a very general migration, and the tendency of that migration is towards the sea, the shores of which afford a constant supply to those birds which feed on small animals. The supply along the shores is indeed most abundant in the winter, as the waters, being in a state of stronger agitation,

detach and cast to the strand a greater number and variety of esculent matters ; and though the birds are driven inland for shelter during the violence of the storm, they speedily throng back to the beach when that is over, to feast on the supplies which it has collected. That supply consists of various matters ; of the spawn of fishes, which has been ploughed up from the banks, or wafted ashore in cases where it is committed to the open sea ; of fry in the very young state ; and of innumerable small marine animals that come ashore upon uprooted sea-weeds, loosened stones, and in the general accumulations of sand, ooze, and other débris, which the troubled waters roll about while in agitation, and ultimately leave on the beaches deposited in the order of gravitation, and consequently with the organic portion uppermost, as being lighter than the earthy matters.

Nor are the land floods unserviceable in adding to these winter stores ; for they sweep from the beds, and out of the torn banks of the rivers, a vast multitude of little animals which had got beyond the reach of the birds ; and these are found in great abundance on the oozy banks, and in the oozy beds of the shallows of estuaries and creeks. But these latter accumulations of winter food are in places rather soft for the feet of the grallæ ; so that they fall more to the lot of the swimming birds, which crowd to such places during the winter season.

In Britain, the grallæ which subsist chiefly by fishing, and which are the true waders, are not so much subjected to those migrations. Their prey being in the clear water, they frequent the banks of rivers, and the shallow margins of lakes, where these are comparatively clear of reeds and other tall herbage ; and as there is no cover for them there, they usually nestle in trees ; and unless when the sky is very lowering, or when a flood has left the meadows partially covered with pools in the hollows, which act as so many

traps for the smaller fishes, they are not much upon the feeding grounds during the day. Indeed, they are far from numerous in Britain; the common heron may be said to be the only resident species; and that, though very generally dispersed over the country, is not an abundant bird, even in those districts which are most congenial to its habits. In countries where the seasons are more marked by alternating droughts and floods, the species of true waders are more numerous, and the whole are more migratory. During the drought there is little food for them, except in the inhabited places, where they, as already stated, ply as scavengers; but when the rain sets in so heavily as to beat numbers of small animals out of the trees, and foster the production of others in the humid soil, and much of the surface is covered with stagnant water, the wading birds come in numbers, disperse themselves about, and find a plentiful subsistence, thereby consuming substances which would, in all flooded countries, taint the air, and in very hot ones render it absolutely pestilent, when the heat and drought return.

It is in such countries only that the full value of the grallæ can be estimated, or the part which they act in the grand economy of nature can be properly seen. They are birds of the extremes of seasons; and as the progress of improvement in Britain tends to equalize the temperature of the year, their interest with us partakes a little of the melancholy character of that which is gradually fading away: and they are fading faster, the nearer that they approach to the characters of birds of the thirsty desert, or birds of the pool and the flooded land.

Their wings being merely organs of motion from place to place; and the pastures, in many instances, being far apart from each other, requiring length of wings more than any form that fits them for the chase of prey in the air; the feet and bills become the principal means of distinction. The

feet are adapted to surfaces of all kinds, from the arid waste to the softest mud that will support the weight of a bird. Thus some resemble the feet of the running birds, in wanting the hinder toe ; others have the hinder toe articulated on the tarsus higher up than the other toes, as in the gallinæ ; and others again have the feet approaching to those of the wag-tails, and other insectivorous birds that run on the margin of the waters ; but there is not, in the whole order, anything that can be considered as a prehensile or a perching foot ; for though the heron roosts in trees, it stands rather than clings as on a perch ; and though some of the order use the foot in pressing their prey to the ground, and others (as is said) in beating the ground to bring it out, none of them make use of the foot in clutching. The bill, which is the only instrument with which the food is taken, is adapted for capturing it in a great variety of places : as on the bare dry ground, out of holes in the earth, from under stones, from the leaves, stems, and roots of plants, from sand, sludge, and shallow water. Thus there are many forms of the bill ; and as the place on which the bird stands does not always correspond with that from which the food is taken, the feet and bill are sometimes of different characters ; so that the feet are more indicative of the general haunt, and the bill of the habit in feeding.

The only subdivision of the order to which we shall attend, is that of wanting or having the hinder toe, as the total want of that member indicates a bird of dry and bare places ; and the more that the hind toe is produced, and its articulation on the same level with the other toes, the better is the bird adapted for walking on soft surfaces, whether these are formed of herbage or of mud. Between these extremes there are many gradations ; and there are differences in the form of the bill, with the same degree of production in the hinder toe ; so that the distinction applies only to the haunt, and not to the species of food. The genera,

and in some instances the species, are the only accurate distinctions.

GRALLE WITH THREE TOES.

The species of these are not so numerous as those with the hinder toe. Their general characters are: the body compact, well-shouldered, and tapering backwards; the plumage firm and close; the wings strong, reaching to the end of the tail, (which is distinctly wedge-shaped,) and in some species beyond it; the head round, or with a curved outline on the upper part, and with the eye farther from the gape than in the gallinæ or the running birds; the bill generally longer than the head; and the lengths of the bill, neck, and feet, varying together, but not in exactly the same proportion. The bill straight and strong, compressed towards the tip; the upper mandible with a keel on the ridge, and the lower one angular at the tip; the outline of both nearly straight for a portion at the base, and convex towards the tip; the nostrils lengthwise near the middle of the bill, and opening in front by a cleft; the legs long and slender; the toes united by a membrane at their bases, and partially margined with the same their whole length; the claws short, and the feet not at all adapted for clutching or perching. The birds run and fly swiftly, and can turn readily on the wing: they run best upon surfaces bare of vegetation.

THE THICK-KNEE (*Edicnemus crepitans*).

This bird has been called the Norfolk plover, the stone-plover, the stone-curlew, and other names, none of which is very definite. It is the largest three-toed species of the order, being about a foot and a half in length, two feet two inches in the extent of the wings, and upwards of a pound in weight. The bill is about two inches, and the tarsi between five and six inches in length; the neck is rather long; and

the bird, when standing up in the bare fields, which it frequents, appears larger than it is in reality. The naked parts of the legs, which extend to some distance above the articulations of the tarsi, (usually, though improperly, called the *knee* joints,) are yellow: and the orbits and irides of the eyes, and also the basal part of the bill, are yellow, the last of a paler shade than the others; the arched part of the bill towards the tip, and the claws, are black.

The colours of the plumage, though sober, are pleasingly marked. The head, neck, and all the upper parts of the body, are dull orange-brown, with a well-defined dusky streak down the middle of each feather; the neck and breast are of a paler shade of the same ground colour, mottled in a similar manner; and the belly, thighs, and vent, are pale yellowish white. One streak of dull white above, and another under the eye, nearly form an oval boundary about that organ; and the chin and upper part of the neck in front are dull white, with a line of the same on each side extending towards the nape, but not meeting behind, so as to form a collar. The quills of the wings, excepting a white bar across the first and second, to the tips of the tail-feathers, and a bar across the middle of each tail-feather, are black, and the remainder of the tail-feathers, which are short, and form a blunted wedge, are white. The tarsal joints, or knees, are remarkably thick, as if they were enlarged by gouty concretions, from which circumstance the bird gets its name.

The thick-knee is found, as a British bird, only in the dry and open places of the south and east of England, and not even in the midland counties. These birds are, upon the whole, migratory, though in mild winters a few of them remain all the year. They keep the open fields, avoiding copses and covers of all kinds, and rarely even feeding in enclosures, except these are very large. They arrive in England in the early part of April, but a little sooner or later,

according as the weather is more or less favourable. The cry of the male is rather loud, but grating, and something resembling that made by an ungreased iron axle. They spend little time or labour in the construction of their nests; indeed, the finding of food in the dry and barren places, which are their natural pastures, keeps them in abundant occupation. The sand or earth scraped and levelled a little, is the place where the eggs are deposited. These are two in number, of a light ashen grey, with reddish brown blotches; and the incubation lasts about thirty days. The male takes no part in the labour of incubation, but he remains all the time in the close vicinity of the nest; and while the female squats close on his giving the alarm-call, he uses his art to tempt intruders to a distance.

The young, as is the case with those of all birds that deposit their eggs on the earth without any nest, are at first covered with thick down, of a greyish colour; they can run as soon as they break the shell, and the mother usually conducts them to some stony place, and for some time assists them in finding their food, by turning over the smaller stones, under which they find earth-worms, slugs, and other small animals.

The down upon the young of those birds which lay their eggs on the bare earth, appears to be part of a very general law in the animal economy. Of all animal coverings, down, or, which is nearly the same thing, fur, or hair in a state of very minute division, appears to require the least assistance from heat in its production, and to be the best preservative against the effects of cold after it is formed. Perfect feathers, on the other hand, appear to require the most heat; and hence all birds which have the young without down, construct warm nests, in which the young remain for some time quite helpless; and in cases where the feathers are in a forward state, the male birds either alternate with the females

in the incubation, or the eggs are carefully covered with feathers, dry leaves, or some other imperfect conductor of heat, when the sitting bird leaves the nest.

The feeding time of the thick-knees is in the morning and the evening, especially in the former, as their prey is longer out in the damp of the morning than in the evening. During the heat of the day, they squat so closely that one may pass very near to them on the stony wild without observing that they are there.

In autumn they assemble in flocks, and continue feeding for a greater part of the day, probably because the darkness lasts longer. At that season, they may, in the mornings, be surprised nearer the margins of the fields than at other times; but even then it is difficult to get near them, unless by surprise, and there is commonly one on the watch against that. Towards mid-day, they are in the more open places, and if the sun is very hot, they squat. They are noisy for even the greater part of the night; and if the weather is clear, they roam about, and sometimes approach near the houses on the margin of those large downs and moors where they breed.

If come upon by surprise, the call is given by the sentinel, upon which they all elevate themselves to reconnoitre the danger, and then run off, always towards the bleaker and higher part of the pasture; but if the distance to the height is considerable, they will squat several times before that is reached, but always rising and running as they are approached. If hard pressed, they take to the wing in any situation; and when followed to the top of the height, they take a longer and higher flight to the next one.

From their shy habits they are not easily shot, although they present a good mark to the sportsman. The young are relished as food, and even the old birds, though rather tough and dry, are eaten. In all countries which they frequent,

they are inhabitants of the arid places ; and those which leave our downs and wastes, retire to analogous places farther to the south, while the few that remain do not resort to the marshes, even when the weather is severe. They are still pretty numerous in some of the counties along the Channel ; but their numbers are everywhere on the decline, and they flit before the progress of enclosing and planting, their place being occupied by the partridge and the pheasant.*

THE LONG-SHANKS, OR STILT (*Himantopus melanopterus*).

In appearance, this is one of the most singular of birds, equally remarkable for the length of its legs and wings, and having the neck and bill produced, though not in a degree proportionate to the legs. It appears to be a wandering bird everywhere, for which it is admirably fitted by the lightness and compact form of its body, the great length of its legs, and the power of its wings. In England, it is only a rare straggler, and little is known of its habits ; but from the places in which it has been found, as well as from the structure of its feet, it appears to be a wading bird, though, from the form of its bill, not a fisher, or one which seeks its food in the ooze at the bottom of the water.

Its length, when the legs are stretched out, is about eighteen inches, of which the bill occupies about two and a half, and the feet extend fully five beyond the tail. The bill is slender, subcylindrical, a little flattened at the base, compressed towards the point, and black or dusky. The nasal channels extend half the length, the nostrils themselves being long lateral slits. The legs are very slender for their length,

* The thick-knee is a nocturnal feeder, and its eyes are singularly large and prominent. Its food consists of small mammalia, reptiles, worms, and insects. The geographical range of this species is very wide. It is common in the southern parts of France, in Germany, Italy, Sardinia, and in parts of Africa and Asia. It is not found in the American continent.—M.

and more flexible at the joints of the tarsi than those of most of the order; the toes are of moderate length, the middle and outer ones joined by a broader membrane than in the last-mentioned genus; and the claws very small, and apparently not at all adapted for scraping. The legs are bare of feathers for two or three inches above the tarsal joints, and of a pale blood-red, as are also the irides.

The head and neck, exclusive of the bill, are about four inches in length, and the tail about two inches, which leaves only about four inches and a half for the body of the bird, which is not much above a third of the total length of the legs. The forehead is high and rounded, and the neck and body very graceful in their outlines. The wings are long and pointed, the primary quill being considerably longer than any of the others.

The top of the head, the back, and the wings, are black; the tail blackish-grey, with the exterior feathers partly or wholly white; all the other parts are pure white, with the exception of some dusky streaks on the back of the neck, which are supposed to be characteristic of immature birds. The weight of the bird is about five ounces.

Little is known respecting the nest, the general habits, or the style of walking, of these very extraordinary birds. Analogy would lead us to suppose that they feed upon insects and mollusca, which they pick from the tall and thick aquatic herbage on the margins of permanent lakes, or of places which are seasonally flooded; but the structure of the bird is so very peculiar, that all analogy respecting it must be vague.*

* The stilt-plover occurs as a bird of passage in France, Germany, and the southern parts of continental Europe. Its chief habitats, however, are the borders of the vast saline lakes of Hungary and Russia, where it breeds. It is common in various parts of Asia and in Egypt. In North America this species is represented by the *Himantopus nigricollis*, for an account of which see "Wilson's American Ornithology." In

THE OYSTER-CATCHER (*Hæmatopus ostralegus*).

Though the oyster-catcher differs much from the stilt in the length of its legs, and in its habits, so far as those of the latter are known, yet there is, besides the similarity in the structure of the toes, some correspondence in the general air of the birds, and also in the tints, though not in the markings of the plumage.

The oyster-catcher is, however, a much larger bird, weighing fully a pound, and measuring nearly a foot and a half in length, and more than two feet and a half in the stretch of the wings. It is common on all parts of the British shores, from the Channel to the Shetland Isles.

The bill of the oyster-catcher is about three inches long, with nasal grooves half the length, and the nostrils longitudinal slits; it is broad at the base, compressed for the rest of its length, very much so and wedge-shaped at the tip, and in the old birds it becomes very thick and obtuse: It is very strong, nearly straight, and of a bright red colour, inclining to scarlet.

The legs are rather long, bare for about an inch above the tarsal joints; the toes of moderate length, firm, partially united with membrane as far as the first joint between the middle and outer one, and margined with the same for their whole length: they and the naked parts of the legs are orange-red; and the claws, which are strong, a little hooked, and hollow on their under sides, are black. The under sides of the toes are remarkably well furnished with small tubercles, so that the bird can walk without injury upon rough surfaces, or hold on upon slippery ones. The forehead is high, the head full and round, and the neck free, but powerful

the southern parts another species, *H. Mexicanus*, takes its place. New Holland has also one species, *H. leucocephalus*; and New Zealand another, *H. Nova Zealandæ*.—M.

in its motions. The wings are long and pointed, and the tail is longer and more square at the extremity than that of any other of the three-toed grallæ. The outlines are finely curved, and the whole plumage is close and compact, glossy on the upper part, not easily wetted or ruffled, and bearing a very great resemblance to that of the swimming birds. The birds can, indeed, swim easily, and without any injury to their plumage, even when the water is in considerable agitation; but swimming is not their general habit.

Their general colours are black and white; but there are occasional differences in the markings, and the black is sometimes blended with brown, dusky brown being the general tint of the dark parts of the young.

The perfect plumage is generally,—the head, neck, upper part of the back, the scapulars and lesser coverts of the wings, the quills, except portions of the inner webs, and a portion of the tips of the tail-feathers,—black. The lower part of the back, the greater coverts of the wings, the tips of the row immediately over these, the rump, breast, under parts, and base of the tail, and also a small spot under the eye, white. There is also sometimes a crescent-shaped gorget, wholly white, or mottled with white, on the lower part of the neck in front, but that marking is peculiar to the adult in winter.

The young have the upper plumage dusky, with brown margins; the orbits and irides brown, and the feet blackish grey; but these change with the mature plumage, the feet to orange red, the orbits to orange, and the irides to crimson.

The shores of the sea are the proper haunts of the oyster-catchers. They are found only upon these in the winter, and when the situation is sequestered enough, they remain there to breed, giving preference to any lonely sandy islet near those shores upon which they find plenty of food. But some retire inland in breeding-time, though they never resort to

the dry moors, or to places at a distance from rivers, as is the case with some of the other genera which frequent the same shores in the winter. The inland places where they are the most likely to be found, are near the confluence of rivers, where these deposit banks and islands, and bring down animal matters, and leave them there. Fresh-water muscles are said to attract them; but in the inland places, they eat the smaller-shelled mollusca, as well as slugs, earth-worms, and various small animals tenanted humid places.

The inland-breeding birds find their way to the nesting-places in pairs, so that they are little observed. It is probable also that they keep to the lines of the rivers, and feed along the retired banks in the reaches; and as, when they are on the breeding-ground, they do not range far or appear much on the wing, the numbers that breed inland may be greater than is commonly supposed.

Wherever they breed, the oyster-catchers make no formal nest. They deposit their eggs, which are always four in number, on the bare dry surface, though generally in the shelter of a tuft. The eggs are pale olive-brown with dusky patches, and when the full number are found, they are always arranged in cruciform order, with two and two opposite, and the small ends approaching each other equally in the centre. The female sits closely during the night, and when it rains; and while she sits, the male is always near, ready to scream and fly off on the appearance of danger. The female also makes off, by running to some distance, at first crouching, and then erect; after which, she also takes to wing, and the two fly clamouring about till the danger is past. On warm days the female leaves the nest to feed. The incubation lasts about three weeks, and the young are covered with down. They walk with some difficulty immediately on coming out

of the shell ; but they soon run well, and are not very long before they are able to fly.

In autumn they flock in considerable numbers, and in the event of an extraordinary flood washing away their eggs *en masse* (which happens sometimes, though rarely), they are said to flock immediately, though in the summer ; but whether for a new pairing, is not known.

The shelled mollusca are the principal food of the oyster-catchers when on the shores, and from that it gets its name, although with us it feeds less upon oysters than on other species, as the oysters are generally beyond its depth ; and though it swims occasionally, it is not a diver. Limpets, muscles, and cockles, are common prize with it. The former it can twitch from the rocks with great certainty, by an oblique tap with its bill. Bivalve shells, when closed, it opens by striking them at the hinge ; and in the case of the cockle, holding the shell steady with its foot, and wrenching with its bill as with a crow-bar. When the shores are flat and of a retentive nature, so that the surface remains covered with a small stratum of water while the tide has ebbed, the oyster-catcher finds its prey readily, as the shells of the bivalves are then partially opened, and it can insert its wedge-shaped bill and wrench them asunder ; but where the sand soon dries, and there are no rocks on which limpets can be had, it follows the line of the water, both in its retreat and its advance ; and in those cases, it is sometimes caught in the waves, and floated out a little way, but it has the power of always gaining the land. From the quantity and closeness of its feathers, it wades rather deep in the water ; but as its toes are not webbed so that it can raise the body by a downward stroke of the feet, it cannot take wing from deep wading.

The flesh of the mature oyster-catcher is tough and some-

what harsh; but the young birds and the eggs are much sought after as food, in the islands far to the north, the Faroe islands especially, where sea-birds are very numerous, and form no inconsiderable part of the food of the people.

SWIFT-FOOT (*Cursorius*).

The cream-coloured swift-foot, *Cursorius Isabellinus* (*Africanus* would be a more appropriate trivial name, as indicating its native habitat), is one of the rarest stragglers, not only in Britain, but throughout Europe. Five specimens only are recorded as having been seen, three of which were in England, but wide apart both in space and in time, one in France, and one in Austria.

The native regions of the bird border upon those of the ostrich, though it partakes more of the characters of the plovers than of those of the ostrich or even of the bustards. The wide and wild plains of north-western Africa, which are in part flooded by the rains, or the melting of the snow on the mountains of Atlas, are supposed to be its nesting-places and its usual haunts: but very little is known of its habits, farther than that it runs with great celerity, and picks up its food on the ground.

Its legs are long, and naked to a considerable height above the joints of the tarsi; the toes are short, all three turned forward, and the inner and middle ones united by a membrane at their bases. The structure of the foot indicates a walker on the bare earth, and not on grass, and the junction of the middle and inner toe would lead to the conclusion that the surface on which it walks is occasionally soft with humidity or loose sand. These birds are equally swift on foot and on the wing. The form of the bill, which is short, or of moderate length, and bent, is fitted for pecking on the ground, and the tomia are fitted for bruising; but whether they bruise the elytra of beetles, the shells of mollusca, or the

testa of seeds, has not been ascertained. The middle claw is that which would lead one to suppose that the bird holds against the ground some smooth or slippery kind of prey. The specimens observed in England were found running about on the ground; and, as is by no means uncommon with the birds of desert places, they showed so little alarm on being seen, or even fired at, that if there had been less haste in procuring them as cabinet specimens, probably more of their manners would have been known.

The length of the bird is about ten inches. The general colour, yellowish cream colour, rather paler below. The markings are,—a black patch behind each eye, divided by a pale streak, that passes over the eye. The greater parts of the coverts and near outside quills of the wings, and a spot on each of the tail-feathers, excepting two in the middle, black. The tips of the tail-feathers white. The naked parts of the feet yellowish white; the bill and claws black. The few that have been met with in Europe do not appear to have belonged to any migration.

PLOVERS (*Charadrius*).

There are only three resident British species of this genus, though, as they change their abode seasonally in the country, and some of them have the plumage different at different seasons and different ages, one of them has sometimes been described as a different species. In addition to this confusion, the thick-knee, the long-shanks, and even the lapwings, have also been popularly styled plovers.

The general characters are these: the bill is shorter than the head, straight, slender, and compressed, with the mandibles protuberant and arched towards the tips, as if a portion of each mandible were armed or shod with an additional layer of horny matter. The nostrils are longitudinal openings in the membrane which lines the nasal grooves. The

legs are moderately long ; the feet have the inner toes free, and a small membrane uniting the others at the base. The tail rounded or bluntly wedge-shaped in some, and more square in others. The wings of a medium length, and armed with a spine or tubercle.

They prefer bare places, along which they run with much celerity ; and they repose upon the ground, and never perch or roost for the night in trees. They cannot be considered as waders, though they pick up their food mostly in humid places and in humid states of the weather, or where the evaporative power of the atmosphere is weak, and the worms and molluscous animals make their appearance on the surface. They have received the name of plovers, "*pluviers*," "*pluviales*," from the fact of their being most active when rain is impending, and the supposition (of old) that they were instrumental in bringing rain, whereas it is the rain that is the cause of their activity ; or rather, the cause is that state of the atmosphere which usually brings rain.

The British species are the *golden plover*, the *dotterel*, the *ring-dotterel*, and the *Kentish plover*. The dotterel is a very peculiar summer visitant, the others are resident ; but the Kentish plover is local and rare.

THE GOLDEN PLOVER (*Charadrius pluvialis*).

In the popular vocabulary, and even in that of authors, the plover is a bird of many names. It has been called *green*, and also *yellow*, from its colours, and *whistling*, from its voice ; all of which names are applicable at some stage or other, and yet it remains all the while the same bird.

The length of the plover is between ten and eleven inches, the extent of its wings more than a foot and a half, and its weight about half a pound.

If the native region of birds be considered, as it certainly should be, that in which they are produced, the golden plover

is a bird of the cold and arid heights, and never nestles on the close margin of a lake or stream, or in any place among aquatic plants. Absolute elevation is not so much a matter of importance with them, as that peculiar description of moorland soil on which, though there are pools and marshes interspersed, the intermediate places are dry, and clothed with so scanty an herbage that the bird can run about with its feet on the ground. Cold ridges, where there is a settlement for pools and a slope both ways, but not an abrupt one in either, are the favourite haunts of this plover,—neither in the region of heath nor in that of the mountain grasses, but about the natural ground, which is equally covered by both, though fully covered by neither. I am not certain that they extend so far up the hill in the very wild parts of the country as the lapwings; but when the two are found in the same locality, the plover is generally farther up the height, or at all events upon drier ground—ground farther from the pool or the marsh.

They generally arrive on the breeding ground towards the end of March, or early in April; and though as they are generally in open places of some extent, there are usually a number of them in the same locality, they do not come in flocks, or even so many together as the lapwings. Soon after they arrive, the whistle of the male begins to be heard at very early dawn: and, unless there are groves in the neighbourhood, it is the matin call on the moor. It is shrill, and by no means unpleasant; and as it begins before there is much vegetable action, it is a sound of promise and of hope. The female makes no nest, but merely scratches and levels the surface a little, sometimes on a spot entirely bare, and sometimes in a ragged and open heather, but never in what can be called either cover or concealment. Indeed, the eggs (for there is no *nest*) are always in that spot where a person accustomed to look for nests in the lower and richer grounds,

would be least likely to seek for them. They are four in number, of an olive grey, blotched with dusky, and arranged with the four small ends in the centre. The female sits and the male keeps watch during the night; and when the sun becomes hot, the female creeps warily from the nest to some place where she can feed; but though that is the tempting time for feeding, she returns to her eggs whenever it gets raw and cloudy, or rain begins to fall. When upon the nest, she sits so close, crouches so low, and so resembles in colour the mixture of heath and grass with which the surface is covered, that she is not easily seen; and when she takes the wing, it is always at a considerable distance from the nest, and when she rises, she turns and flies back again at an angle, so that one would be apt to suppose that the nest is in a direction quite different from the real one.

The male very often assists in those practices for the misleading of an enemy, especially of a dog, before which he will alight, fly a little, alight again, drop a wing as if it were broken, run haltingly, but always rise and be off a little when nearly caught, and so entice the enemy to a considerable distance; and having done so, he will peal his whistle of defiance over the moor, take a long and wheeling flight, and return to his wardership by another route.

The young when they leave the egg are covered with a dusky coloured down, and they are a considerable time in acquiring their plumage to such an extent as that they can fly; but they soon run swiftly, and skulk and conceal themselves so that they are but seldom seen. The parents feed them for some time; and are assiduous in continuing the arts by which enemies may be enticed away.

After the young have become able to fly, their plumage differs so much from that of the old birds, that they have been described as different species; and as the plumage differs both in the males and the females, the finding of both

sexes in each of the two states, gave a semblance of truth to the mistake. The young have the plumage on the upper part grey, with yellowish brown spots, and have thence been called grey plovers; the winter plumage of the old birds is often brown and yellow on the upper part, in which state they are golden plovers; and when they are in the prime of their summer plumage, which they do not recover till they are on the breeding grounds, they are black (or dusky) and green on the upper part, with black on the breast, in which state they are green plovers, although that name has been sometimes given to the lapwing.

Plovers are usually described as among those birds that are subject to two moults in the course of the year, one in the spring and one in the autumn, as at those times they change their colours. With respect to resident birds especially, this is a subject which demands the greatest caution, even though, as is the case with plovers, the birds should resort to lower and warmer parts of the country during winter. Birds in confinement, that have no labour to undergo in search of their food, do moult extensively at certain periods; but that the same always takes place to the same extent in free birds, is assumed rather than proved.

On the subject of moults, changes in the colours of plumage, and all those differences in the appearances of birds which we have reason to ascribe to seasonal rather than to sexual causes, we are always in danger of carrying our generalizations too far, and applying the known causes to explain the new cases, without due attention to the differences of climate, latitude, and other circumstances, which must have an influence upon the result.

Analogy drawn from any other class of organized beings, cannot be conclusive proof, or even good argument, as applied to birds; but, on the other hand, there are general analogies arising from the climates and seasons of the different lati-

tudes, which appear to influence all nature ; and we must be careful that the partial theories which we form of birds or of any other class of beings, do not run counter to, or violate, those general analogies.

Now it appears to be a general analogy in all animated nature, that thicker clothing, and clothing of a paler tint, is produced, even upon the same animal, when removed from a warmer climate to a colder.

With quadrupeds that is the case. The change of Captain Sabine's dog, in the Arctic regions, is equally well known and remarkable. When that animal was first exposed to the intense cold of the north, he felt greatly incommoded, and crept almost into the fire ; but, after a time, the roots of his hair became so thickly matted with fur, and the hair over that so long, that he was proof against all temperatures, whether the extreme of cold or of heat. To the former he was exposed without any experiment ; but when tried, he bore the latter equally well, and the men used to amuse themselves by tumbling hot cinders on him, to which he was perfectly indifferent, even though they burned holes to a considerable depth in his coat. From that, as well as from many other instances, we must conclude that the local distribution of any animal depends chiefly upon its food ; and that where the proper food for it can be found, it would in time accommodate itself to the climate. No doubt there must be a limit to that accommodating power, and perhaps that limit may be sooner arrived at in the case of cold-blooded than in that of warm-blooded animals, and that birds, as being warmer than quadrupeds, can more speedily adapt themselves to climates.

In these northern climates, quadrupeds have two sets of clothing upon them during the winter months, and most of the trees have two sets of leaves till the summer be so far advanced

as that the young leaves are secure from the frost by the protection of the old ones.

The analogy would lead us to suppose that the northern birds too should have two sets of feathers upon them during the inclement season, one of which begins to be produced in each year after the breeding is over; and as the new ones grow, the old ones fade and dry by slow degrees; and as they dry their colours fade, even to white where the cold is severe and sufficiently prolonged. That has been already hinted at in the case of the ptarmigan, the snow-bunting, and several others; and observation proves that while the upper feathers are fading and losing their colour, new ones are growing, which are more coloured in their rudimental stages, and which become deeper and deeper in the tint as they become more produced, and ultimately appear between and mottle the paler livery which the bird has worn in the winter. And though the change can be traced, in the very same feather, from the dark tint to the pale while the winter is becoming colder, there is no evidence that the same feather which was once pale becomes darker by more seasonal action, though a seasonal bloom may come upon some of the feathers, just as sexual feathers are produced and decay upon some birds, with little or no reference to the general change of the plumage.

Upon those resident birds that undergo seasonal changes in their whole plumage, there is, therefore, an upper plumage which is fading, and an under plumage which is growing, during the winter, just as there is upon hill cattle one coat of hair which is getting dry, and another under it which is growing. The hair, which in the quadruped becomes hard and dry to the feel and dingy in the colour, does so preparatory to a total though gradual falling off during the summer, sooner or later, in which the whole of the old pile is removed,

and there is only one coat till the new one begins to sprout in the autumn. The manes and tails of quadrupeds do not show those changes so obviously ; and they are not clothing, but ornaments.

The analogy, and some of the facts are directly in support of it, leads to the conclusion that, at least in the resident birds which change their colour, what we call the autumnal moult, or the moult that takes place when the breeding is over, is more the production than the shedding of feathers ; and that the feathers that have been in use in one breeding season, and bleached by the ensuing winter, gradually fall before and leave the new plumage exposed the next breeding season. With these birds it should seem that there is only one growth of feathers,—namely, an autumn sprouting, growing till the breeding time, and that the fall begins in the spring.

With migrant birds the case may be different ; and no doubt exists that it is different with the flying feathers of all birds, which fall at intervals and generally in pairs, one from each side. If we did not suppose a casting of feathers in the spring and early part of the summer, we should find some difficulty in determining where the myriads of feathers that are used in lining nests come from ; and, if we supposed a general deplumation of all the birds in the latter part of the season, we should find some difficulty in explaining what becomes of all the feathers.

As the season advances, the plovers begin to flock and move southward, usually making the journey by short stages, but accelerating it if they are followed by severe frosts or falls of snow. When they stop and lodge for the night, they squat upon the ground, to which, as well as to their feeding in the morning, they are said to be called by the whistle of one of their number ; and they are sometimes drawn into nets, or otherwise within the power of the fowler, by imi-

tating the call. As they seldom take very long flights, it is probable that not many of the British ones leave the country; but they throng in great numbers to those humid places which are not apt to be frozen, and especially to the flat shores of the sea. In the higher grounds, they have all the characters of summer visitants, as none stay there during winter; and on the sea-shore they have much of the character of winter visitants, as few or none remain there to breed, though they breed on the elevated wastes of some of the southern parts of the country.

THE DOTTEREL (*Charadrius morinellus*).

A figure of the dotterel, in the breeding plumage, is given at the bottom of the plate opposite, on a scale of one-third the lineal dimensions, or twice as much in line as that of the lapwing, which stands immediately above; and from that the colours and form of the bird can be better understood than from description.

Dotterels get both their common English name and their specific one of *morinellus*, from their supposed stupidity. Dotterel is nearly the same word as "dolt" or "dotard;" and there are places in the north where it is used by the common people as a synonyme for both. *Morinellus* is from *morus*, "a fool." The bird is certainly easily shot or betrayed into snares; but it appears to have that character only when it comes to the lower grounds; for, from the numbers that appear on the low ground near the coasts, in the southern and eastern parts of the country in autumn, and even from those that appear as if on their way to the south-eastern part of the Grampians in the spring, and thence back again in the autumn, numbers of them must breed somewhere in the country; and yet the old birds are not often seen in the breeding time, and the eggs are seen very seldom.

Their habits in the breeding places (at least as British

birds, the only character in which they fall within the scope of these pages) are very little known. They certainly breed much farther upland and inland than either the plover or the lapwing, and circumstances would lead to the supposition that they remain much closer during the breeding time than any of our birds which rear their young in the wild moors. Their eggs have not been seen (at least there is no satisfactory proof of the fact) in any part of England, or in Scotland, southward of the Tay, or northward of the Grampians. If they resorted to the hills north-east of the great glen that divides Scotland by the line of the lakes and the Caledonian Canal, they would be seen on their return southward, on the flat grounds from Culloden eastward into Moray; but I never heard much of them there, though they have a name in Gaelic, and are known and occasionally seen, though not in flocks, in the highlands farther to the south.

They come rather late to the south of England, and return early. April, early in the month, is the usual time of their appearance in the south of England; but they continue to come as late as the beginning of June: for it is not easy to believe that the same flocks can halt for two months on their passage northward.

The only place in Scotland in which I have had continued opportunities of observing them for successive years, is the cold range of high ground which extends from the Seidlaw Hills north-eastward in the direction of the precipitous and cave-worn promontory of the Redhead. They used to arrive there, upon the edges of the moors and the cold upland fields, without halting on the lower and richer ones, generally during the first three weeks of April, unless the season was very backward. The flocks were not large at that season, but the birds kept together and flew about, so that one could not positively say that they either came from the south or went to the north. In September they returned again,

earlier in the month if snow appeared on the summits of the Grampians, which is often the case even early in that month. On the return, the flocks were much more numerous, and the birds flew much closer together. They seemed heavy with fat; and though the country people did not capture them for food, they had a common saying, "As fat and stupid as a dotterel." They moved about by short flights; and though one could raise them by shouting, they merely wheeled about a little, and alighted on the same spot. When a boy, I have often given chase to them for some way into the moor, almost within arm's-length of the closely serried pack, the last ones merely rising, flying over the rest and again alighting, as if a broad wheel of birds had been rolling on before me. But they always kept at the same distance; and after they had fairly worn me out in the tempting but fruitless pursuit, they would all rise in a body, wheel backwards over my head, almost touching it, and, by a longer flight, return to the very spot from which we set out.

At nearly the same period of the autumn, they appear in thick and crowded flocks in the southern and eastern parts of England, upon the commons and unenclosed wastes and sheep-walks. There they are equally indifferent to the near approach of man; and if the pack have alighted across a foot-path or road, they will merely open their files till the traveller passes, and then close them behind him; or if the pack is of considerable extent, they will close behind him while they are opening in front; so that when seen at a little distance, he appears to be merely raising the dust of the road as he passes.

To dogs they are not a little perplexing, as these do not raise the whole pack, but have a portion of it on the wing all round them; and though the dog is always near them, he is so equally near on all sides, that he gets bewildered and tired with an equally tempting and fruitless chase.

But the same habit renders them easy sport with the gun, more especially if there are two sportsmen in company. It is easy to get a good shot at a portion of them on the one side. The report rouses them, and they fly to the other side, where an equally good shot may be had, and the report of that will drive them to the first sportsman. Thus, two barrels right and two left, discharged alternately, are sure to bring down a considerable number: and the birds, as if they absolutely liked the sport, alight till the sportsmen load, and then the same alternation of shots can be repeated; and even if they do fly off they come back—"when called for." In November, the whole of the birds disappear; but at what time of the day they take their final flight, has not been ascertained.

This habit of rising with more reluctance, and flying to a shorter distance, than most birds do in the flocking season, may in part account for the infrequency with which both the birds and the nests are seen in the breeding places. All the ground birds are indeed seen only accidentally in breeding time. A field may abound with partridges, and yet one may cross it in all directions without seeing either a bird or a nest; and on many of the heaths, where the voices of the grouse-cocks in the early morning show that there are plenty of birds, one may wander through the whole day, and not see a single wing, or even a head, appearing above the heather. I have more than once crossed Minigag, from Blair to Loch Inch on the Spey, and gone out of the foot-path (there is no road either made or makeable across that wild summit) on purpose, without ever seeing any bird, save wagtails about the passage of the Bruar, from the lapwings on the skirts of Athol to those on the skirts of Badenoch; and yet there is no want of grouse or of plovers there, and I should suppose none of dotterels.

Dotterels always feed upon the ground, even when they

are in the southern parts of the country ; and hence one may easily suppose that they can “keep close” on the hill. The name of the bird in the original language of the place where it breeds, generally tells something more appropriate than the usual scientific names. The Gaelic name for the dotterel is *An támadan mòintich* ; which literally means “peat-bog fool ;” but *mòintich* has a more extended meaning—it signifies the “water-shed,” or “summit-level,” between the heads of rivers which run in opposite directions, and where the water stagnates, and the ground is in consequence mossy, consisting of “tumps” or “hassocks” of turf, alternating with pools of water and naked patches of black peat earth, where sheep cannot pasture or even mountaineers pass without caution and difficulty.

That such are the breeding places of the dotterel, the name would lead us to conclude ; and in those rare instances in which the eggs have been seen, it has always been upon the margin of places of that description. There is as little artificial preparation for them as for those of the plover ; they are the same in number, arranged quatrefoil, point to point, in the same way, and very like in their colour and marking, only smaller in size. The eggs of the two species are very nearly in proportion to the sizes of the birds. The plover is about eleven inches long, and nearly two feet in the stretch of the wings, and the dotterel about nine inches by nineteen. If the bodies were of the same form, and the weight of the plover eight ounces, the dotterel should weigh rather less than four ounces and a half, but it weighs rather more than five, so that it is relatively a much thicker and heavier bird than the plover. It is a “dumpy” bird ; and one might almost take a type from it, and say, “dotterel-shaped.”

THE RING-PLOVER (*Charadrius hiaticula*).

This is by no means a rare species, though it keeps all the

year round to the same localities, the beaches and flat shores of the sea, particularly the banks in extensive creeks and bays ; and along the estuaries of the larger rivers,—in those places especially where rivers from mountainous districts have been long carrying on the work of attrition, have cut passages through the strata, emptied mountain lakes, dispersed some of the elementary part of the rocks in the air, reduced others to clay, which, mingled with the remains of vegetation, has become the rich soil of the lower vales and meadows, and borne the silicious part to the confluence of the land tide with the sea, there to remain in part as a bar between the two, but to be thrown in greater part towards the shores, and form accumulations of sand shingle, too little retentive of moisture for growing almost any vegetable save bent. It is of such places that the ring-plover is an appropriate inhabitant, though not the only one. Of running birds it is, however, the appropriate and almost the only permanent inhabitant of such places ; for it remains in them all the year round, unless during those storms of more than ordinary violence, which literally pelt it from the shelterless beach and force it inland ; and it quits not its pebbly or sandy ground as long as the gull can keep wing above the tideway or the petrel ride on the unbroken wave far at sea.

The ring-plover is thus a bird of peculiar interest to the British ornithologist, as marking as it were the boundary of the sea and land, and remaining there in every state of the weather in which man would be likely to go voluntarily to notice it.

It is a bird, to the form, size, and markings of which considerable attention must be paid, inasmuch as there is not only some confusion in its multiplicity of local names,—a confusion which is perhaps inseparable from a bird not ranging over the island, but appearing only on the shores, at places where the language and habits of the people are alike

different ; but there is an especial local confusion because this species has been, by naturalists of deserved name, confounded with a smaller, more delicate, and more beautiful species, which, though hitherto observed only on particular places of the coasts of Kent and Sussex, is distinctly marked as a species ; and also, because the mistake of these eminent persons is continued to the uninformed part of society by those "feeble folk," who, haply because of the perishable nature of their own conglomerates of dust and slime, go about to "make themselves holes" in the monuments of the mighty.

The difference in the plumage of those two birds will be mentioned afterwards ; but it may here be proper to state, that the ring-plover has more the air and character of the dotterel ; and the Kentish plover (in that case there is no impropriety in the trivial name being a localized one) has more of those of the golden plover. The basal half of both mandibles and the feet are, in the ring-plover, *yellow* in both sexes, at all ages, and under every change of plumage. The entire bill and feet of the Kentish plover are under all circumstances *totally black*. The Kentish plover is also not only a cleaner made bird, with its plumage more delicate and less thickly set, but its feet are adapted to a different description of ground ; and though as well winged for its weight, it is not so much so in proportion to its length. The closed wings of the ring-plover reach at least to the tip of the tail, if not rather beyond it ; while those of the Kentish plover are more than one-eighth of an inch shorter than the tip of the tail.

The tarsi of the Kentish plover are longer and stronger than those of the ring-plover, so that the bird stands higher on its legs ; and the toes are, on the other hand, about an eighth of an inch shorter, but firmer in their structure, and altogether more resembling the feet of those inland birds which inhabit dry and stony places. Those of the ring-plover

are more slender and expanded, and indicate more a habit of walking on soft sand, or the more firm and consistent banks of ooze and mud.

The haunts of the two species correspond with those differences of structure, the Kentish plover having been found only upon the accumulations of shells and shingle, while the ring-plover is met with upon most of the flat beaches, whatever may be their composition. Both birds have, however, the bills of true plovers; and thus neither of them dabbles in water or mud for its food, but rather picks up small animals in the firm places. The ring may, indeed, be considered as a sand-bird; the Kentish as a shingle-bird; and as such, the shores of Kent and Sussex, strewed as they are with flint pebbles, intermingled with broken shells, are much more in accordance with the structure of the Kentish than those portions of the shore which, from the nature of the strata through which the rivers have cut their way, are covered more with sand in a state of minute division, than with pebbles.

The ring-plover is about seven inches in length, and sixteen in the extent of the wings; its weight is about two ounces.

The male, in the summer or breeding plumage, has the crown of the head and the back brownish ash; the cheeks black, meeting over the base of the upper mandible, and with a band of white passing over the forehead and eyes, and a black patch above that of a triangular form, with one angle forwards, and one towards each eye, so that the line where that meets the ash colour on the fore part of the crown is straight; the chin white, the points extending backwards nearly to the nape; a gorget of black on the neck, broad in front, and reaching the upper part of the breast, but narrowing backwards on the under sides till it forms a very narrow collar on the back of the neck; the scapulars and wing coverts brownish

ash ; the greater coverts with white tips ; the quills dusky, with a white spot about the middle of each, forming a white streak on the closed wing ; the tail, of which the points of the feathers are wedge-shaped ; the outer ones and tips of the rest white ; the remainder dusky brown. All the under parts, from the black gorget to the tail feathers white, without any tinge of other colour.

In the female there is less white in the forehead, the black gorget is less pure, the upper plumage wants the brownish tinge, and the colour is more broken by light margins to the feathers ; the coverts have also more white in them, and the outer webs of some of the primaries are white.

The eggs, which are four in number, and arranged quatrefoil, are deposited on the bare sand, or other dry surface, without any nest, or even without any shelter ; and in walking along a retired sandy beach, just above high-water mark, one is apt to trample on and break the eggs without seeing them, they so nearly resemble the colour of the sand on which they are deposited. From the powerful action of the sun on those surfaces where these eggs are laid, it is probable that on dry sunny days the process of hatching is carried on without the aid of the birds, for on such days one never starts the female from the nest ; she is found running about on the sand, and alternating her coursing with those short flights which these birds take when they are not much disturbed ; if chase be given, they make off in a longer flight. During the night, in all weathers, and during the day, in dull and rainy weather, the female sits ; but she runs upon being approached, and turns and doubles, alternately running and flying, and uttering a twittering sort of complaint.

The eggs are of a brownish cream colour, spotted with black. The young birds, upon breaking the shell, are covered with a thick down, much resembling the eggs in colour ; they can run almost instantly, but their wings are then little more



Phalaropus lobatus



Phalaropus lobatus

than rudimental. It is some time before they acquire their plumage, and are able to fly ; and till then, they squat and skulk upon the sand, from which they are not very easily distinguished. The birds pair early in May, and the brood are in their unfledged state in the hottest and generally the driest time of the season—a time, however, at which small insects are particularly abundant on the sands,—so much so, that they rise in absolute clouds from the surface as one walks along.

During the breeding season, the pairs and their broods disperse themselves along the line of the beaches ; but when the seasonal labour is over, they assemble in small flocks, and, during the winter season, associate freely and peaceably with many others of our littoral bird.

Instead of there being, as has sometimes been said, several varieties of this species, it really appears, if we except the sexual and seasonal changes of its plumage, to be less liable to varieties of colour than the others. The birds are very generally distributed over the shores of the northern parts of the world, and their plumage in Greenland does not differ from that in the south of England ; indeed, they are admirably fitted in their colours to such changes of temperature as take place in their haunts. The white plumage of the under part equally protects them from the great cold that is sometimes produced by evaporation in the dry-frost winds of winter, and from the joint action of the reflected and radiant heat of the dry sand on the hot days of summer.

THE KENTISH PLOVER (*Charadrius cantianus*).

The description of this smaller, and more beautiful, and, because local, more interesting species, has been in part anticipated ; and the appearance of the male in his summer plumage will be better understood from the figure on the

plate opposite, than from any verbal description. That figure is one-third of the lineal dimensions of the bird, and it was copied with the greatest care from a very fine specimen procured in the summer of this year, (1833,) in the height of the breeding time ; so that it may be considered a faithful representation of the bird in its richest attire.

From the figure it will be seen that this bird differs as much from the ring-plover in the markings of its plumage, as in those characters that have been already noticed ; and as is the case with the former species, it is probable that, in the same sex, at the same age and season, there is little difference in the plumage.

The bird is without that mark in the plumage, on which the trivial name of the other is founded, having only a patch of black on each side of the neck towards the shoulders, not meeting in front so as to form a gorget, or behind so as to form a collar. There is no black on the forehead over the base of the bill, and that on the side of the head is merely a streak. There is a black spot on the forehead over the white, and a small detached white spot over each eye backwards. The black streak from the gape to the eye is narrow and waving ; the crown and nape are rufous ; and the upper parts reddish ash, of a much warmer tint than the upper part of the ring-plover. The white on the chin, forepart of the neck, and indeed on all the under part, is more intense, and on the belly it is glossed with a roseate tint, so delicate as equally to defy words and colours. The quills are dusky with the shafts pale or dull white, and a little white on some of the outer webs. The tail-feathers reddish ash, darker towards the tips ; but the outer ones, and part of the margins and tips of the others, white.

The female wants the black on the head and sides of the neck, has the cheeks and head mottled ash, the upper part darker ash, without the reddish tint of the male, the wings

with more white, and the white on the under part marking the roseate tint.

There is no formal nest, the eggs being deposited upon a smooth place among the shingles, from which it is difficult to distinguish them. They are four in number, rather smaller in size than those of the former species, ranged quatrefoil, as are all those of the genus, of a whitish cream colour, with minute spots and streaks of black.

The habits of the female in the nest have not been discovered ; but it is probable that they are similar to those of the last-mentioned species, as the other habits of the birds, and their haunts in those places where the present species is found, nearly correspond.

The young, which run as soon as they come out of the egg, are covered with down nearly of the same colour with the eggs, though perhaps a little yellower in the general tint. The legs are very long in proportion to the size of their bodies ; and they skulk and hide themselves among the stones. It has not been ascertained whether the parents feed them ; but in the warm season at which they are produced, small animals are very numerous in their haunts.

In winter, the plumage of the male changes considerably, —the rufous tint on the head goes off, the black on the head disappears, and that on the shoulders becomes dull and lessened in extent, the upper part also loses the reddish, and the under part the pale roseate tinge. The whole bird becomes like the female, only the upper part is paler in the tint than the female in the summer plumage ; and the black is seldom entirely obliterated. The young also resemble the female, when in their first plumage ; and the old males may, in the course of the season, be found in all the intermediate stages, between the plumage shown in the figure, and that described as the nearest approach to the female.

Though the feet of the Kentish plover are better adapted

for running among stones on the shingly beaches than those of the ring-plover, yet the two are, in the places where the Kentish have been seen, very generally found mixed with each other; and that may be one of the reasons why, to common observation, they have appeared to be the same birds.

Both species are handsome birds, though the Kentish is by far the more elegant bird of the two. If it were met with inland, its slender and graceful form, and the delicacy of its plumage, would lead one to suppose it a fair-weather bird, a bird that would seek shade and shelter rather than remain exposed to the wind and rain on the naked beach. It is, of course, a little more delicate than the ring-plover; because, as a British bird, it is local on the warmest shores in the island that have beaches of shingle; but probably, as is the case with most birds (and indeed with animals of all kinds), the nature of its food may determine its locality much more than the weather.

If the transition be gradual, the power which all animals have of adapting their covering to the climate and the season is very great. Many of the birds which are migratory, and have their colours pale while in the polar locality, acquire a plumage richer in the tints, but less abundant in quantity, as they proceed southward; but if they are from any cause compelled to linger in the north, the feathers remain during the winter, become pale in whole or at the margins, and are thickened by the production of young feathers below. As formerly hinted, that change is so conspicuous in the wheat-ear, that the last males which are found in the extreme north of England, are so very different in their dress from the same birds as found in the summer, that, judging from the plumage alone, any one would take them to be a different species.

The shores upon which, in this country, the Kentish plover

has been found, are peculiar in the set of their tides, and must be the same in the substances (including among them a portion at least of the food of the littoral birds) which those tides waft along and deposit.

The tides of the Channel and the British Sea meet on some part of these shores, and the place, and also the time of their meeting, varies with the state of the weather, so that the point of confluence shifts along the coast, and the relative turns of the two tides shift along with it, thereby producing several alternations of flood in the time of one regular tide of the open sea; and, though the Channel tide generally carries a portion of the swell of the Atlantic along the continental shore, which occasions the tumbling sea on the coast of the Netherlands, and the great eddy which formed the cod-fishery banks, yet the tide has much of an alternating character upon the shore of England, and must keep the small animals which are floodable by the water continually in motion there, thus furnishing an abundant supply to those birds that seek their food upon the beaches. Some circumstance of these tides, or of the matters which they deposit, and the small animals which they foster on the shores, no doubt determine the locality of the Kentish plover; in the same manner as the drier atmosphere, the milder climate, and the greater number of soft caterpillars, in the south-east of England, determine the locality of the nightingale. A very minute and accurate study of all the branches of natural history is, however, necessary, in order to arrive at anything like certain conclusions on the very curious, but, in the present state of our knowledge, very vague subject of the local distribution of birds.

THE SANDERLING (*Calidris arenaria*).

The sanderling is another of our shore or beach birds, agreeing with those already mentioned in the general form

of the feet and the body, but differing from them in the air and expression of the head, and the structure of the bill, which have, at least, some resemblance to those of the snipes, only the bill is not nearly so long in proportion to the size of the bird.

The bill is about an inch in length, straight, slender, and flexible throughout its whole length, and without any hardening towards the tip, as is the case with those of the other three land birds of the order. It is compressed laterally at the base, and depressed or flattened towards the tip, where it ends abruptly, and is rather broad. The nasal channels, bored with the membrane in which the nostrils form longitudinal slits, extend to a considerable length in the bill: the whole organ indicating different food from that of the plovers, while the feet are adapted to haunts nearly similar to those of these birds.

This compound character, partaking of that of the plovers and also that of the snipes, or rather perhaps the sand-pipers (only the bills of the sand-pipers are slightly curved), renders the sanderling a little perplexing to the systematist. Its walk should be on dry, or, at all events, on firm surfaces, though its feet and toes are more slender than those of the plovers generally, and its tarsi shorter in proportion than those of the Kentish plover. The toes are almost entirely divided, and without membrane.

The margins of the little pools that are left when the water has ebbed, or the line of the water as it advances or recedes on the beach, are the chief places in which the sanderling seeks its food. In these places, it can stand on the firm surface, and pick up its food in the edge of the waters, especially when the return of the tide brings the smaller soft or naked animals out of the sand. The beaches of pure sand which dry immediately as the water retires, of course admit of a free passage of the water; and thus as the tide rises,

they become saturated with water up to the height to which that ascends. The flowing tide bears upon its forward margin a number of exceedingly small animals which are detached from the bottom when the ebb carries the miry conflict between sea and shore to the greatest distance seaward ; and, as the tide rises, these are brought towards the shore, and partially left, on the reflux of each of the successive waves in which the tide, in most states of the weather, advances. A part of the water in which they are borne shoreward, oozes into the sand, leaving those minute creatures entangled between the particles as in a net. Worms and other larger animals than the prey, though still but small in their absolute size, come up at the signal, and feed upon the more minute ones which the sand catches ; and the birds run along the margin of the water, and in their turn pick up the preyers.

During the greater part of the year, sanderlings appear in small flocks. These flocks are most numerous and also largest in the autumn and winter, though a few linger till the summer is far advanced, and probably all the season. They are met with on the beaches upon all parts of the coasts ; but they either migrate to breed, or they remain in close concealment during that time.

The latter may be the case, although the eggs have not been seen, for the birds are not very numerous ; and those that are seen along the coverts when they flock would probably not make one nest to the square mile of the flat wastes along the sea. In these wastes, too, there are often shallow pools of salt or of fresh water, left by high tides and rain floods in those hollows that have been rendered water-tight by oozy matters carried into them and deposited ; and those pools may probably supply both hiding and food to these (and to some other) birds.

The extreme rarity of the dotterel's eggs compared with

the number of the birds which must breed in our hills, and the comparative rarity of the eggs of the ring-plover (to say nothing of those of the Kentish plover), should make us pause ere we describe as migrant any bird which is simply lost to common observation for a few months about the time of breeding. Want of attention to the facts, and the deception of a loose analogy of the habits and migrations of inland birds, have led to many mistakes in the history of our shore birds. The ring-plover is, for instance, described as a bird migrating from the British shores to breed, in the edition of "Bewick's Birds" dated 1832; whereas everybody, save the common compilers of books, who most ingeniously contrive to know less, or less accurately, than anybody else, knows that, if the shores are adapted to its habits, it breeds on all parts of the coast, from Kent to Shetland.

The sea as a pasture is perennial; and therefore the birds have no occasion to quit its shores unless when these are covered with ice; and thus, the migrations of sea birds, although they no doubt depend upon the same general laws as those of land birds, depend upon those laws as modified by an element, the temperature, the productiveness, and the accessibility of which, are all, without the polar zones in which it freezes, much more uniform than those of the land. The purer white on the under part of the shore birds also enables them to bear with more indifference the changes of temperature; and all of them, the sanderling among the rest, in all states of their plumage, have the part which, in their ordinary attitudes, is exposed to the action of the ground (or the water) under them, white.

There is another source of error in estimating the numbers of those birds which inhabit only the shores, and do not range into the interior of the country even in the breeding season, against which it is necessary to guard. Those birds are seen *in line*, drawn out, as it were, along the shores, and

therefore they show a front consisting of the whole of their numbers; whereas the birds which spread inland are seen only on the side, or rather at a point of the surface which they occupy; and if we do not attend to that, we are sure to over-estimate those which appear in line, and under-estimate those which appear *en masse* or equally distributed in length and breadth.

The sanderling is a bird of light make, fully eight inches in length, and about sixteen in the stretch of the wings; and it weighs barely two ounces.

The plumage varies with sex, age, and season. The bill, feet, and irides, are black or dusky in all states of the plumage. In the winter season, the male has all the under part, the forehead, and a narrow streak over the eye, white; the top of the head and nape bluish ash, less or more streaked with brown; the back, scapulars, and greater coverts, brownish ash, with lighter margins, and mottled with spots of dusky brown. The lesser coverts, bastard wings, and primaries (except the outer webs of some which are white), of the same dusky brown as the spots on the back. The white is near the base of the quills, and forms one elongated triangular spot, broadest at the tips of the coverts. The secondaries are brown with white tips. The tail, which is wedge-shaped when close, is brownish ash, darkest in the centre, inclining to white at the sides. The whole of the upper plumage is, indeed, sometimes nearly a dull white on the margins of the feathers. The prevailing colours of the under part are reddish brown in summer, mottled in spring and autumn, and almost white in winter.

The plumage of this bird is thus a sort of index to the seasons; but it must be borne in mind, that the turns of the seasons on the sea, or (which to our present purpose is the same) on the shores, do not occur at the time stated in the calendar. That is for the land; and the sea, being a worse

conductor of heat than the land, not only resists the same extent in the change of its temperature, but resists its progress so as to delay it in time, and hence the waters continue cool after the return of the season has begun to warm the land.

The difference between the sea and land seasons in any place depends upon a variety of circumstances, some of which are very difficult to be estimated, and others have probably not been at all mentioned. The maximum variation may be stated at about two months, and the minimum at probably not less than one month. So that if the ptarmigan on the Grampians acquires its perfect winter plumage in November, and its full nuptial tints in April, the sanderling on the beach should recover its in January and July respectively.

GRALLÆ HAVING FOUR TOES.

The birds in this division are far more numerous, and also more varied both in their haunts and their habits, than those in the former. Generally speaking, they have more the habit of wading, either in the shallows of the permanent waters, or in places that are inundated. Their bills and feet vary much in form, and their wings are not used in the capture of their food, so that they have no characters more general than the generic ones, and even these are sufficiently loose.

THE CRESTED LAPWING (*Vanillus cristatus*).

The crested lapwing is one of those birds that require little description, as, wherever it inhabits, especially in the breeding season, it is sure to make itself known by its incessant wailing cry of *pee-weet*, its curious and tumbling flight round the head of the visitor, and the beauty of its streaming crest, and the lively contrast of its colours.

A figure of the male in the breeding plumage is given on the plate at page 112, immediately over that of the dotterel, and one-sixth of the lineal dimension, or one-half as much in proportion to the length of the bird.

The bill of the lapwing is rather short, compressed for the whole length, thickened at the tip, and though slender rather firm and strong. The feet are slender, and the hinder toes very small; the middle and outer front toes are united by a membrane at their base. The wings are powerful, and very hollow on their under sides, so that they take hold on the air in almost any position of the bird, thereby enabling it to tumble about in many other postures than most birds.

These birds are very common in all parts of the country that are adapted to their habits; and their chief migration is from the shores of the sea to the moors in summer, and from the moors back again to the shores in the latter part of the season. They may, however, be said to disperse themselves rather than to migrate in the summer; for they breed in all suitable places, from the salt marsh to that part of the mountain between the wet and the dry which is their favourite ground in the uplands. Their eggs are four, of a pale greenish olive, with black blotches. They are laid on a place merely scratched like those of the plover, which is usually the next neighbour above, and disposed in the same manner. The young can run as soon as they are out the shell; but they are not fledged for some time, but remain skulking under the tufts of heath or other herbage.

Mud-worms are understood to be the principal food of the lapwing in all its localities; and as these hide themselves during the day, the birds have to be at their pastures early in the morning, especially during the breeding time. In the later period of the season, when the earth-worms, which at other times live in their holes apart, come out of these to form their double unions, they remain longer on the surface, and are in better condition than at any other time, so that then the birds find an abundant supply of food; and as the worms follow the seasons of the waters more than those of the land, they pair and are out earlier towards the hill, and

gradually later and later towards the sea, till within flood-mark: they pair in winter after the habit of many of the fishes—of almost all the fishes, indeed, which bury their spawn in the banks. The birds thus migrate upon their food; and therefore they are at all times of the year in good condition.

Anecdotes of the lapwing may be met with in great abundance in the writings of authors and the conglomerates of compilers; and any one who chooses to walk observingly across a place which the birds inhabit, may easily add to the number. Their stratagems, in enticing any animal that they dread away from their nests or young, are often amusing. They will strike with the bend of the wing so near to one's head, that the stroke may be distinctly heard, and they actually hit crows and other prowling birds, and even dogs. I was once crossing a lonely moor, half heath, half quagmire, upon which lapwings were more than usually abundant; they were also more than usually clamorous; for a countryman was crossing it a little before me, accompanied by one of the yelping curs of which country people are in some places too fond. The cur seemed very resolute in lapwing-hunting, and the birds as willing to give him sport. They limped before him, they flew low in twitches, and came close upon him, by all sorts of motions, both on foot and on the wing, and the dog was fatiguing itself by alternately making hopeless leaps at the flyers, and hopeless starts after the runners. At last, one came twitching down; and, whether with the bend of the wing or the bill I cannot say, hit him an audible bang on the ear, which sent him yelping with his tail between his legs to his master, and he hunted lapwings no more while in my sight.

It has been said that the lapwings beat the ground with their feet to bring out the worms, and the process has been described with most circumstantial minuteness. The bird, it seems, removes the casting thrown up by the worm, and then

beats the ground with its feet till the worms feel the shock and come out, escaping from the imagined jaws of the Scylla mole into the real bill of the Charybdis lapwing. Now no bird, from any height to which it can leap without the action of its wings, can, in consequence of the hold which its feathers take of the air, strike the ground with much force even with both its feet; and the bound of a bird like the lapwing, which weighs barely half a pound, upon one foot, must be light indeed, not one-tenth of the tap which a man could give the ground with his little finger, the other three fingers and the thumb remaining on the ground all the time; and the earthquake that could be made in that way, would not materially disturb any inhabitant under the surface. The lapwing catches many worms when they are wholly above ground; others it seizes by the exposed end, and it pinches that with its bill, till the writhing occasioned by the pain works the worm wholly out of its earth; and instead of alarming the worms with the force and concussion of its tramp, the lapwing treads very lightly even for a bird, and does so, perhaps, that it may not disturb its prey: in the same manner as other animals, whether quadrupeds or birds, that feed upon prey apt to hide itself in holes, are formed for coming upon it stealthily, and without either concussion or noise.

THE GREY PLOVER, OR GREY LAPWING (*Squatarola cinerea*).

This bird, which is not very common as a British species, holds a sort of intermediate place between the plovers and the lapwing, partaking a little of the characters of each, and yet not strictly admitting of classification with either. It is not quite so large or so weighty as the lapwing, and not so powerfully winged in proportion to its length and bulk. The lapwing is between thirteen and fourteen inches in length, measures fully two feet and a half in the extent of the wings,

and weighs eight ounces. The grey plover is about twelve inches long, two feet in the stretch of the wings, and seven ounces in weight. It is longer than the plover, but not quite so heavy in proportion to the length. The bill is longer than that of either of the species whose names are given to it, and its feet are also different from both: the hinder toe is merely rudimental, the claw upon it almost close to the tarsus, so that it can be of no use in walking. The wings are pointed, and not so hollow or broad as those of the lapwing, which are also very round, the fourth and fifth quills being the largest, while the first is the longest in the present species. There is some confusion in the accounts of the different plumages, which appear to vary not a little; and though small flocks are not unfrequently met with on the coasts of different parts of the country, very little is known of its habits as a British bird. In England it appears only in winter, when the under part is nearly all white, and much of the upper part ash grey. In summer, the under part is black, on the chin, fore part of the neck, and down the middle of the breast; and the feathers on the upper part dusky, relieved with more or less of ash grey on the margins.

THE TURN-STONE (*Streptilas collaris*).

The turn-stone is another of our choice birds, about the breeding place of which there is the same uncertainty as about that of the sanderling. It is the neighbour of that bird as well as of the ring-plover, but it does not frequent exactly the same kind of shore, neither is it, perhaps, so numerous on the same parts of the coast. The turn-stone is more a bird of the north and west than of the south and east, which would lead to the conclusion that, if it does migrate in the breeding season, it migrates to the northward; and it is certainly found in the countries to the north-west: but

whether it migrates between those countries and Britain, has not been determined.

A figure of the male turn-stone in the breeding plumage, on a scale of one-third of the lineal dimensions, is given on the plate opposite; but, as is the case with the other birds which dwell *long*, if not all the year round, upon our shores, it is subject to considerable variation in its plumage; but the shape of the bird, and its size and habits, render it easily known in any of the varieties of its plumage, whether depending upon age or season.

The length of the bird is about nine inches; the bill about an inch long, very slightly bent upwards, black, strong, and very hard at the tip, which is abrupt, and the ridge of the bill is flattened; the nostrils are lateral, and half covered with membrane; the tarsi are of moderate length; the tibia bare for a little way above the joint; the three front toes are connected at their bases by a short membrane; and the hinder toe, which is short and articulated upon the tarsus, is bent inwards. The feet, as is the case with the lapwing, are differently coloured from the bill. The feet of the turn-stone are orange: the claws, which are not much produced, are black.

Turn-stones appear on some parts of the British shores during the greater part of the year, remaining till the season is considerably advanced, and making their appearance again as early as August. In the north of Scotland, at least on the islands (for the northern coast of the mainland is not very favourable for littoral birds), they are found all the summer over, though less frequent in the heat of the season than in the cold months.

These facts, which are quite well authenticated, render it very probable that some of the birds breed in those northern parts in which they are seen during the summer, if not in more southerly parts of the British islands. If they were

generally migratory breeders within the country, we might expect to find them, as is the case with those other species which are known to breed northwards, most abundant in the north at the time when they disappear in the south. Such, however, is not the fact; for those that appear in the Shetland isles in summer, are then in small flocks, and much fewer in number than in the winter. The probability is, that those seen in Shetland retire to the rocky coast of Norway, where the birds breed in great number, depositing their eggs under the juniper bushes, and on the shelves of the rock, without even the rudiments of a nest. The eggs are four in number, placed in the quatrefoil form, and, but for that, not easily distinguishable from the pebbles among which they are deposited. Their ground is a sort of a pale greenish stone colour, spotted with rich brown.

They also breed far north in the Arctic regions; but that they must quit the extreme north in winter, before the sea and land are equally covered with snow, and food for them ceases to be accessible, we may almost take for granted. It does not, however, thence follow that the same birds leave our shores at an advanced period of the spring, retire to the extreme north, rear their broods, and return again with those broods plumed by the month of August. That would be at variance not only with the general practice, and therefore with the law (for the laws of nature are nothing but general practices) of migration *from* the polar regions—at least in birds that do not swim. Some birds are late before they set out for the north; but those that are so, may be in general considered as European migrants, that have not far to fly; and they linger chiefly on the east side of the island; and not in Cornwall, or on the British Channel coast of South Wales, where turn-stones are seen till the season is pretty far advanced.

That, in consequence of the long rest during winter, and

the protection which the snow and ice afford to all that can subsist under them, and also in consequence of the rapidity with which the Arctic summer sets in, and the almost continual action of the sun after the water becomes liquid and the shores clear, the Arctic regions are remarkably prolific of *small life* in the summer, is true. It is also true that vast multitudes of birds resort thither to nestle and rear their broods for themselves; and they find a supply of food more easily, and are less disturbed by enemies there, than in perhaps any other region of the globe.

But, in order to return to the south of England by August, or even by September, the turn-stones must be supposed to leave the north when the season there is at the best, if not before: for as the young do not, any more than the other littoral birds, come to maturity in their plumage till a considerable time after they break the shell, the incubation would require to be begun by the time that the birds disappear from the British shores, which is, in the same individual birds, impossible.

As little can we rationally suppose that the birds alternate between this country and the north; arriving early with us one year, departing late the same: breeding late in the north in the prime of the season; remaining there, or nearly there, for the winter; breeding early the next season, and having their broods so far advanced as to make their second appearance in this country as early as August or September.

These observations are not, of course, conclusive of the fact that these birds do breed on the mainland of Britain; but they are sufficient for exciting to a diligent search for the nests, and the excitement is heightened by the recent discovery of the nests of some of our other resident birds, especially of those species of the present order that have been already mentioned.

Turn-stones do not in general inhabit the bare and beaten

sands, but rather those places which are covered with small stones, and partially with marine plants of the shorter growth, and with the roots of weeds cast up by the sea. They are strong and energetic birds for their size, and not only turn over small stones with their bills (as their name implies), for the sake of the little animals that are under them, but they scrape with their feet in the shingle and weeds in the same manner as is done by poultry. The portion of their bill next the lip, though not quite so sharp at the point, is not unlike that of the gallinaceous birds, or rather it is intermediate between the bills of those and of the plovers. A proper history of this bird is much wanted, and would not be difficult to obtain in those parts of the coast where the birds are common. Even in winter, they appear only in small flocks, not more than one might suppose to be two or three broods; and that again is in favour of their breeding in the country, as birds which migrate to long distances, neither come nor go in families.*

THE HERON (*Ardea*).

There is only one resident species of heron in Britain, though stragglers of other species are sometimes met with in the country.

The characters of the herons are different from those of any of the grallæ hitherto noticed. They are more decidedly wading birds, fishing in the shallow waters for a considerable part of their subsistence, but eating indiscriminately many

* The turn-stone is found on most of the shores of Europe, and is very abundant in Norway, and along the coasts of the Baltic. It is extensively distributed through Asia; and is met with in Africa, from the northern strand to the Cape of Good Hope. It is found also in America; and was seen by Captain Sabine breeding in the North Georgian islands. It is common in New Holland. In fact, it inhabits the sea-shores of every part of the globe. It is the *Strepsilas interpres* of ornithologists.—M.

other animal matters which they find on the banks of the lakes and streams, such as naked or even shelled mollusca, the spawn of fish, worms, insects, water reptiles, and water mice. Their bills are long, strong, compressed tolerably, very sharp at the points of the mandibles, capable of being darted out with great celerity, and closed with very considerable force, so as to take a sure hold of eels and other slippery prey which they capture in the waters. The nostrils are placed in grooves near the base of the bill, lengthwise, and half covered by a membrane, which prevents the entrance of water when the bill is forcibly darted in the process of fishing. The legs are long and slender, naked to some distance above the joints of the tarsi, and well adapted for wading or standing in the water, though less so for walking along the ground, on which their progressive motion is slow, and far from graceful. The neck is very long, and during flight is partially folded over their back, so that they do not appear with its whole length. When they stand on the ground, or on the tops of trees where they nestle (for they stand on the trees rather than perch), the neck is folded partially downward on the breast; and when they extend it in such situations, they do so generally upwards, erecting the body at the same time, and expanding the wings, which gives them a very conspicuous, if not formidable, appearance.*

THE COMMON HERON (*Ardea cinerea*).

The common heron, though not nearly so abundant now as in former times, when the country abounded more with solitudes and stagnant waters, and the bird was protected by parliamentary enactments, on account of the sport which it

* In all the herons, the inner edge of the claw of the middle toe is dilated, and deeply pectenated, but for what purpose is not very satisfactorily explained.—M.

afforded in hawking, is by no means a rare bird, or confined to any particular part of the country; and as it is a bird of peculiar and conspicuous appearance, and, though not very useful anywhere, rather ornamental in some situations, it is a bird known to almost everybody.

Whether watching its prey by the waters, standing on the tops of trees, or making its way through the air, which it often does at very considerable elevations, and with a peculiarly hoarse clangulous sound, it has an imposing appearance, and would induce those who have not the opportunity of seeing it closely, to suppose that it is a very large and powerful bird; and in its lineal dimensions it is very considerable, being four inches longer than the golden eagle, and only about a foot less in the stretch of the wings. Its length is about forty inches, and its breadth about five feet and a half; and though when it flies the neck is doubled up in the manner that has been stated, the feet are thrown so far backward, that the body altogether seems almost as long as if it were the neck, and not the feet, that gave additional length. That habit too takes off the goose-like form that it would have if it flew with the neck extended, and so gives it a more compact, and, consequently, formidable appearance.

If its flight is seen nearly from below, it appears to be by no means ungraceful; but the case is different if it be seen obliquely, and especially if nearly on a level. Estimating from the cube of the breadth, its weight, to give the same steady flight as the eagle, without taking the different structure of their muscles into the account, should be about five pounds, and it weighs only about three pounds; being thus the lightest of all British birds in proportion to its lineal dimensions: for the barn-owl, which is the lightest of the owls in proportion to its wings, should, estimated in the proportions of the heron, weigh only half a pound, and it

weighs twelve ounces ; or the heron, estimated according to the proportions of the owl, should weigh about four pounds three ounces, while, as already stated, its weight is only three pounds. Besides, the soft feathers of the owl take hold of the air, and thus form a sort of fulcrum for the wings, by means of which it can fly smoothly ; whereas the feathers on the body of the heron are close, formed for throwing off rain, something like those of a water-bird, and hence its body takes no hold of the air. The wings of the heron are also hollow, and take a strong hold, or rather meet with a strong resistance in their downward stroke, so that, at every downward stroke, the body of the bird jerks upward, as if there were two joints, near the scapular articulation of the wings, on which the lineal breadth of the bird played as on two hinges. The hollow wing, which is of course as much convex or raised on its upper side, enables the bird to raise it with less effort than if it were more flat ; but still, there is a jerk of the body downwards every time the wings are raised. Thus the body of the bird see-saws or bobs through the air, in a manner which is anything but graceful.

But these peculiarities, though they give the heron what may be considered as rather an ungainly style of flight, are very useful to it in its habits, as a bird which is alternately on high flight and fishing on the banks of the waters. The hollow wings, assisted by the bending of the neck backwards, which throws the centre of gravity rather on the rear of the femoral articulation of the legs, jerk the body into the air at the first stroke, so that it could take wing not only from frail ground, but when it is standing in water up to the articulation of the tarsi.

Its pastures often lie far between ; and even from the places in which heronries, or assemblages of nests, are sometimes built, it has to range for miles before it can find food either for itself or its young : and as, in clear weather espe-

cially, it must be on the fishing ground at an early hour, it must fly so high as to command a wide horizon. Its size too makes it an object of attack to the larger hawks, against which its chief safety consists in the loftiness of its flight; and so, on its long flights in clear weather, when it ranges to great distances, its habit is to keep the sky of all other birds. It seldom meets with the golden eagle, as its pastures lie lower down, and as hawking on the wing is not the forte of that majestic and powerful bird, she would probably not contend for the sky with the heron: and as the hawks and falcons are not in the habit of flying very high above the range of their quarry, they do not give chase to the heron, unless when it has just taken wing, or is only at a moderate height; and though it is not nearly equal to some of them in forward flight, it can climb much more readily. When on the ground, it has not much to apprehend from them. Hawks at close quarters are not so formidable as they are in their rush; and as the eye and the bill of the heron are equally quick and certain, it is not very safe to go in upon him.

The bill of the heron is nearly six inches in length, of a dusky colour, except the base of the lower mandible, which is yellowish; the irides are yellow, and the orbits, round which there is a naked space, and also the naked parts of the legs and feet, are of a greenish colour; the middle claw is serrated.

The adult male has the forehead and crown of the head white, with a pendant crest of glossy black feathers towards the hinder part; the neck dull white, with two rows of black or dusky spots down the fore part; the sides of the body from the breast to the thighs are black, but the central part from the middle of the breast is white; the thighs are white, but tinged with rust colour. The upper part is black ash, mixed with white on the scapulars; the tail, which is

short, is of the same colour ; and the quills of the wings and feathers of the bastard wings are black. The feathers on the lower part of the neck, and the scapulars, are much produced, and there is a tuft of long soft feathers on the breast.

The female has the head ash-grey, is without the crest, and has the feathers of the lower part of the neck, and the scapulars, less produced. The males, in their first plumage, resemble the female.

In the breeding time herons are gregarious, building their heronries in trees, generally near some piece of water, not regarding much the seclusion of the situation, though not quite so familiar as rooks. When they once take up their abode in any place, they do not quit it readily ; and if their trees are cut down, they take possession of those that are nearest ; but at other seasons, they often roost in situations where they do not breed, if they find trees to their purpose near the margin of waters which abound with fish. They are seldom, indeed, seen solitary, but in pairs, or larger numbers, according as the places where they seek their food are nearer to the breeding places, or more remote from them. The nest is large and flat, the platform composed of sticks, and covered with rushes, dried aquatic grasses, wool, or other soft materials. The eggs vary from four to six, but are rarely the larger number ; they are greenish blue, and about the size of those of the duck.

During clear weather, they are not often seen on the wing, as they fish in the very dawn of the morning, that being the hour of the day when, in such weather, the fish come most readily within their reach ; and during the heat of the day they may be seen in their heronries in the breeding time, and at other times standing on the tops of the trees, and now and then slowly raising their long necks, and spreading their wings, with not a little of the air which the indolent

have when they yawn and stretch themselves under the oppressive burden of unoccupied time.

But when the sky lowers, they are more on the alert ; and after rain-floods, especially in the spring and autumn, they range along the meadows by the smaller and more upland streams, in quest of such fishes as may have been carried out of the channel by the flood, and left in the hollows of the meadow. Their toothed, or rather barbed bills enable them to hold the most slippery tenants of the flood with great firmness. When they fish at their full depth, which is up to the produced feathers around the neck, they often keep the head for a considerable time under water, pressing the fish to the bottom till they can get so secure a hold as to lift it to the dry land with certainty ; and as, during fine weather, the time that they can fish successfully is very short, in comparison with that during which they cannot, they swallow the fish entire, and immediately return to the fishing, and so load their stomachs with a considerable number. Of the smaller fish, which come most readily to the banks of ponds, a heron will catch more in one hour than a moderate angler would catch in three ; and besides the number that they catch, they injure many others by striking with the bill and missing their hold.

It is vulgarly said that small eels pass through the heron, so that it swallows the same individual several times in succession ; but that is, of course, not true. Eels are, however, rather more troublesome to them than fishes which are not so lithe in the body, or so tenacious of life ; and unless they can seize the eel by the head or gills, in which case the pressure of the bill soon deprives it of the power of wriggling, they retire with it from the water, lay it on the ground, hold it with the serrated claw of the foot, and so, by the action of the bill, speedily reduce it to a state in which it can be got into the stomach. The young are, like

the full grown ones, very voracious, though capable of enduring hunger for a considerable time, and the parents are very diligent in carrying food to them; so also is the male, in carrying food to the female during the period of incubation.

Though herons roost in trees, they partake more of the character of water-birds than many others of the order which nestle and repose on the ground, and nearer to the water.*

THE BITTERN (*Botaurus stellaris*).

Though the bittern takes up its permanent abode much nearer the water than the heron, it is not so much a water-bird in its character and habits, does not subsist so exclusively by fishing, and has even some of the characters of the gallinaceous birds, or, at all events, characters bearing some resemblance to them.

The bittern is, in many respects, an interesting bird, but it is a bird of the wilds—almost a bird of desolation, avoiding alike the neighbourhood of man, and the progress of man's improvements. It is a bird of rude nature, where the land knows no character save that which the untrained working of the elements impresses upon it; so that, when any locality

* Besides fish, the heron feeds on small mammalia, as water-rats; also on young birds, as water-hens; and aquatic reptiles, as frogs, &c. It is not generally known that the heron can swim. Its progress is slow, but the carriage stately. Probably it is not often that the heron takes to the water, and then only in quest of the nests of aquatic birds, hid among the reeds and flags. We may here observe, that the emu of Australia, and the two species of South American ostrich (*Rhea*), swim well, and cross broad rivers. We know a heronry in close proximity to a rookery, but never could see any hostility between the herons and rooks, illustrative of the account given by Bewick. The heronry to which we allude is in the meadows along the Holybrook, at the bottom of Coley Avenue, Reading. There is a fine heronry in Windsor Great Park.—M.

is in the course of being won to usefulness, the bittern is the first to depart, and when any one is abandoned, it is the last to return. "The bittern shall dwell there," is the final curse, and implies, that the place is to become uninhabited and uninhabitable. It hears not the whistle of the ploughman, or the sound of the mattock; and the tinkle of the sheep-bell, or the lowing of the ox (although the latter bears so much resemblance to its own hollow and dismal voice, that it has given foundation to the name), is a signal for it to be gone.

Extensive and dingy pools,—if moderately upland so much the better,—which lie in the hollows, catching, like so many traps, the lighter and more fertile mould which the rains wash and the winds blow, from the naked heights around, and converting it into harsh and dingy vegetation, and the pasture of those loathsome things which wriggle in the ooze, or crawl and swim in the putrid and mantling waters, are the habitations of the bittern: places which scatter blight and mildew over every herb which is more delicate than a sedge, a carex, or a rush, and consume every wooded plant that is taller than the sapless and tasteless crow-berry, or the creeping upland willow; which shed murrain over the quadrupeds, or chills which eat the flesh off their bones; and which, if man ventures there, consume him by putrid fever in the hot and dry season, and shake him to pieces with ague when the weather is cold and humid: places from which the heath and the lichen stand aloof, and where even the raven, lover of disease, and battener upon all that expires miserably and exhausted, comes rarely, and with more than wonted caution, lest that death which he comes to seal, or riot upon in others, should unawares come upon himself. The raven loves carrion on the dry and unpoisoning moor, scents it from afar, and hastens to it upon his best and boldest wing; but "the reek o' the rotten fen" is loathsome to the sense of

even the raven, and it is hunger's last pinch ere he come nigh to the chosen habitation—the only loved abode—of the bittern.

The bittern appears as if it hated the beams of that sun which calls forth the richness and beauty of nature which it so studiously avoids; for, though with anything but music, it hails the fall of night with as much energy, and, no doubt, to its own feeling, with as much glee and joy, as the birds of brighter places hail the rising of the morn. Altogether it is a singular bird; and yet there is a sublimity about it of a more heart-stirring character than that which is to be found where the air is balmy, and the vegetation rich, and nature keeps holiday in holiday attire. It is a bird of the confines, beyond which we can imagine nothing but utter ruin; and all subjects which trench on that terrible bourn, have a deep, though a dismal interest.

And to those who are nerved and sinewed for the task, the habitation of the bittern is well worthy of a visit, not merely as it teaches us how much we owe to the successive parent generations that subdued those dismal places, and gradually brought the country to that state of richness and beauty in which we found it, but also on account of the extreme of contrast, and the discovery of that singular charm and enchantment with which nature is, in all cases, so thoroughly imbued and invested; so that where man cannot inhabit, he must still admire; and even there, he can trace the plan, adore the power, and bless the goodness, of that Being in whose sight all the works of creation are equally good.

On a fine clear day in the early part of the season, when the winds of March have dried the heath, and the dark surface, obedient to the action of the sun, becomes soon warm, and turns the exhalations which steal from the marsh upward, so that they are dissipated in the higher atmosphere, and cross not that boundary to injure the more fertile and

cultivated places,—even the sterile heath and the stagnant pool, though adverse to our cultivation, have their uses in wild nature ; and but for these, in a climate like ours, and in the absence of culture, the chain of life would speedily be broken.

Upon such a day, it is not unpleasant to ramble towards the abode of the bittern ; and, to those especially who dwell where all around is art, and where the tremulous motion of the ever-trundling wheel of society dizzies the understanding, till one fancies that the stable laws of nature turn round in concert with the minor revolutions of our pursuits, it is far from being unprofitable. Man, so circumstanced, is apt to descend in intellect, as low, or even lower, than those unclad men of the woods whom he despises ; and there is no better way of enabling him to win back his birthright as a rational and reflective being, than a taste of the cup of wild nature, even though its acerbity should make him writhe at the time. That is the genuine medicine of the mind, far better than all the opiates of the library ; and the bounding pulse of glowing and glorious thought returns all the sooner for its being a little drastic.

None, perhaps, acts more speedily than a taste of the sea. Take a man who has never been beyond the hum of the city, or the chime of the village clock, and whose thoughts float along with the current of public news in the one, or stagnate with the lazy pool of village chancings in the other ; put him on ship-board on a fine evening, when the glassy water has that blink of greenish purple which landsmen admire, and seamen understand ; give him offing till the turn of the night ; then let the wind be loosed at once, and the accumulating waves heave fathoms up and sink fathoms down ; let there be sea-room, and trim the bark to drive, now vibrating on the ridge of the unbroken wave, now plunging into the thick of that which has been broken by

its own violence, and hissing as if the heat of her career and collision were making the ocean to boil, as when the nether fire upheaves a volcanic isle ; temper his spirit in those waters for even one night, and when you again land him safely, you will find him tenfold more a man of steel.

A calm day in the wilderness is, of course, mildness itself compared with such a night ; but still there is an absence of art, and consequently a touch of the sublime of nature in it ; it suits the feeble-minded, for it invigorates without fear.

The dry height is silent, save the chirp of the grasshopper, or the hum of some stray bee which the heat of the day has tempted out, to see if there be any honeyed blooms among the heath ; by and by, you hear the warning whistle of the plover, sounded perhaps within a few yards of your feet, but so singularly inward and ventriloque, that you fancy it comes from miles off ; the lapwing soon comes at the call, playing and wailing around your head, and quits you not till you are so near the marshy expanse that your footing is heavy, and the ground quakes and vibrates under your feet. That is not much to be heeded, if you keep the line of the rushes, for a thick tuft of these sturdy plants makes a safe foot-fall in any bog. You may now, perhaps, start the twite, which will utter its peevish chirp, and jerk off ; and if there be a stream with banks of some consistency, you may see the more lively wagtail, which will jerk and run, and flirt about, as if showing off for your especial amusement. Should there be a wide portion of clear water, you may perhaps see the wild duck with her young brood sailing out from among the reeds, like a vessel of war leading the fleet which she protects ; or if the pool is smaller, you may see the brown and yellow of the snipe gliding through the herbage on the margin, as if it were a snake in the grass. Not a wing will stir, however, or a creature take much heed of your presence, after the lapwing wails her farewell.

In the tuft of tall and close herbage, not very far from the firm ground, but yet so placed near or rather in the water that you cannot very easily reach it, the bittern may be close all the time, wakeful, noting you well, and holding herself prepared to "keep her castle;" but you cannot raise her by shouting, or even by throwing stones, the last of which is treason against nature, in a place solely under Nature's dominion. Wait till the sun is down, and the last glimmer of the twilight has got westward of the zenith, and then return to the place where you expected the bird.

The reeds begin to rustle with the little winds, in which the day settles accounts with the night; but there is a shorter and a sharper rustle, accompanied by the brush of rather a powerful wing. You look round the dim horizon, but there is no bird: another rustle of the wing, and another, still weaker and weaker, but not a moving thing between you and the sky around. You feel rather disappointed—foolish, if you are daring; fearful, if you are timid. Anon, a burst of uncouth and savage laughter breaks over you, piercingly, or rather gratingly loud, and so unwonted and odd, that it sounds as if the voices of a bull and a horse were combined, the former breaking down his bellow to suit the neigh of the latter, in mocking you from the sky.

That is the love-song of the bittern, with which he serenades his mate; and uncouth and harsh as it sounds to you, that mate hears it with far more pleasure than she would the sweetest chorus of the grove; and when the surprise with which you are at first taken is over, you begin to discover that there is a sort of modulation in the singular sound. As the bird utters it he wheels in a spiral, expanding his voice as the loops widen, and sinking it as they close; and though you can just dimly discover him between you and the zenith, it is worth while to lie down on your back, and watch the style of his flight, which is as fine as it is peculiar. The sound

comes better out, too, when you are in that position ; and there is an echo, and, as you would readily imagine, a shaking of the ground ; not that, according to the tale of the poets, the bird thrusts his bill into the marsh, and shakes that with his booming, though (familiar as I once was for years with the sound, and all the observable habits of bitterns) some kindly critic, on a former occasion, laboured to convert me from that heresy. A quagmire would be but a sorry instrument, even for a bittern's music ; but when the bittern booms and bleats over head, one certainly feels as if the earth were shaking ; but it is probably nothing more than the general affection of the sentient system by the jarring upon the ear—an affection which we more or less feel in the case of all harsh and grating sounds, more especially when they are new to us.

A figure of the bittern one inch to the foot, or one-twelfth of the lineal dimensions, is given on the plate opposite, from which it will be seen that the shape of the body, the structure of the feet, excepting that the hind toe is longer, and even the form of the bill, bear some resemblance to those of a gallinaceous bird.

The length of the bird is about twenty-eight inches, and the extent of the wings about forty-four. It is heavier, in proportion to the extent of its wings, than the heron ; and though it flies more steadily than that bird, it is not very powerful in forward flight, or in gaining height without wheeling ; but when once it is up, it can keep the sky with considerable ease ; and while it does so, it is safe from the buzzard and harriers, which are the chief birds of prey in its locality.

The nest is constructed by both birds, in a close tuft or bush, near by and sometimes over the water, but always more elevated than the flood. Indeed, as it builds early, about the time of the spring rains, which bring it abundance of food, in

frogs, snails, worms, and the fry of fishes, it has the food higher at the time of commencing the nest, than it is likely to be during the incubation. The nest is constructed wholly of vegetable matters—rushes, the leaves of reeds, and those of the stronger marsh grasses. The eggs are four or five, of a greenish brown colour; the incubation lasts about twenty-five days, and three weeks more elapse before the young are fit for leaving the nest. When they break the shell, they are callow, and have a scraggy appearance; but they are laboriously fed by the parents, and acquire better forms at the same time that they gain their plumage.

The bittern is both a solitary and a peaceful bird; and excepting the small fishes, reptiles, and other little animals on which it feeds, it offers harm to nothing, animal or vegetable. Unless when the male booms and bleats, or rather bellows and neighs his rude song, the birds are seldom heard, and not often seen, unless sometimes in the severe weather, when they are frozen out, and descend lower down the country in quest of food. They keep in their rushy tents as long as the weather is open, and they can by their long and powerful bills find their food among the roots of these; and they probably also in part subsist upon the seeds, or even the albuminous roots, of some of the aquatic plants; but their feet, which are adapted for rough and spongy surfaces, do not hold well on the ice; at all events, in the places where I used to know them, when the interstices of the plants and the margins of the pools were so far frozen that they would bear, and the wild-goose had been driven from more northern haunts by the severity of the weather, the bitterns were not to be found by the most diligent search in the withered tufts, though if they had the habit of converting the earth into a musical instrument, these would be the times at which it would sound the best. On their departure from the upland moors, they proceed gradually and skulkingly by the margins of the

streams to the lower swamps and marshes, where, from the warmer climate and the thicker mantle of dry vegetables, the frost is much longer in taking effect.

Though the bittern is an unoffending and retiring bird, easily hawked when on a low flight, and not very difficult to shoot when out of its cover, as it flies short, and soon alights, it is both a vigilant and powerful bird on the ground. It stands high, so that, without being seen, it sees all around it, and it is not easily surprised. Its bill, too, is so strong yet so sharp, and the thrust of it is given with so much rapidity and effect, that other animals are not very fond of going in upon it; and even when it is wounded, it will make a very determined resistance, throwing itself on its back, so that it may use both its bill and its claws.

It would not be very consistent to regret the diminished and diminishing numbers of the bittern, a bird which, wherever it appears, proclaims that there the resources of the country are running to waste: for such is the indication given by the bird. It is not an indication of hopeless sterility. It does not inhabit the naked height on which the fertilizing rain not only falls without producing fertility, but washes away the small quantity of mould which the few starving plants produce. The elements of a more profitable crop are always in existence in the abode of the bittern; and, though the quantity of skill and labour required from man varies much, those elements *can* always to a certain extent be claimed to man's use. The place where I used to hear the bittern every evening during the first month after the storm broke, for it began before the short supplemental winter, the fleeting storm of flaking snow which used to season the lapwing, has been in great part under crop for years. Where that is not the case, it has been planted; and the partridge and the ring-dove have come close upon the margin of what remains of the mere. The winding stream—"the burnie

wimplin doon the glen,"—with its little daisied meadows, its primrosed banks, its tangled thickets, its dimpling pools, and its dark nooks, each having a name, and altogether dear to trout, to bird, and to boyhood, has become a straight ditch between bushless banks, and runs so low and shallow in the dry season as hardly to have depth for the minnow and the stickleback, and the very tadpoles lie stranded, dead and dry, by the little runs of sand. There might be more *breadth* in the country ; but, to me at least, there seemed to be, in every sense of the word, less *depth*. The crops too were thin and stunted, and the domestic beasts which were nibbling among the stems of the scattered rye-grass, which looked very like a thin bristling of copper wire, had certainly as many and as easily counted bones as the smaller breed which were wont to roam in freedom over the moor. To me, the plaint of the dove brought more of melancholy than the booming of fifty bitterns, even with the gloom of the twilight, and a lingering dread of beings of the darkness to boot. But change is the course of nature, and the foundation of art ; and in all places, and under all circumstances, *mors janua vitæ*.

STRAGGLERS.

There are several species of birds belonging to the herons, the bitterns, and some other analogous genera, of which specimens are, at wide intervals, found in various parts of Britain ; but all of these are so rare that they cannot be considered as visiting the island at any regular intervals, or according to any uniform laws ; and, as far as discovery has gone, none of them breed in the country, so that they cannot, in any strict sense of the term, be considered as British birds. It is generally understood, though of course there is no precise evidence upon the subject, that they were once much more abundant than they are now ; and that if they did not actually breed in the country, they came so regularly every

season, and in numbers so considerable, that they were entitled to a place among our feathered tribes, as subjects of popular observation. The evidence which we have of those remote times, is, however, far from being precise; and as more modern ornithologists have sometimes confounded species of birds which are permanently resident, and thus open to every-day observation, it cannot well be supposed that the elder observers could be perfectly accurate in their distinctions, or that we can implicitly trust to their traditional statements, without some collateral proofs.

It must, no doubt, be granted that, in earlier times, the people generally were better acquainted with our native animals in the wild state, than they have been in times more recent, or than the majority of them are even now. The progress of improvement, the consequent diminution of the numbers of the animals, more especially of those which, like the birds in question, frequent only (or chiefly) wild and uncultivated places, the more general collecting of the people into towns, their more constant occupation in labour, especially in-door labour, and, perhaps also, the separation of natural history from popular language by the introduction of scientific names, have tended alike to banish many parts of natural history equally from the study and the language of the people.

There is no doubt also that the physical changes in the country itself, to which frequent allusion has been made in the course of these volumes, has had more influence upon the wandering Grallæ, than upon most other of the feathered tribes. It is their habit to range seasonally over large tracts of country, in such a way as to be in those places where the waters are, not so much in permanent lakes and streams, as in seasonal inundations, or where those inundations have just subsided and left upon the surface supplies of food for the birds.

The economy of these birds forms a very interesting part, or rather is the index to a very interesting part of the general succession of seasons, and also the state of different portions of the globe; though the investigation of it forms no part of British natural history, excepting in so far as it shows that Britain, from its insular situation, the form of its surface, and the extent to which the improvement of that surface has been carried, is exempted from those laws which are still in operation in other places.

In those parts of the world which are within or near the tropics, more rain probably falls in the course of the year than in any other latitudes; but it falls only during certain periods, which, though they return very regularly, form but a small portion of the year, and during these it falls in much greater quantities than in the more temperate climates.

Towards the regions of the poles again, the summer, except on the shores and small islands, is comparatively dry, and great part of the humidity of the year comes down in the early winter in heavy falls of snow. These remain on the surface till the return of spring, or in high latitudes till the summer is far advanced, and in proportion as it is late in melting it melts rapidly.

Each of those circumstances of the climate causes a flooding of the rivers, or an overflowing of the flats on the banks and towards their confluences with the sea. Indeed, it is the matters brought down by the floods, and deposited wherever the current becomes slow, which originally form those flats, and gradually increase them. In the tropical countries, the rains and overflowing take place at different times of the year; but in the northern hemisphere they are, generally speaking, autumnal. In the polar countries again, they take place in the spring and early part of the summer. The two are, as it were, the opposites of each other in season, and there is no doubt that they influence the migration of all

those birds which shift their residences with the seasons. But the manner in which they do influence the birds depends on the habits of the birds themselves, the general guides to which are the food of birds, and the places where that food is found. The warblers, for instance, migrate from grove to grove, from brake to brake, or from reedy stream and pool in one latitude to the same in another. Other races flit from marsh to marsh, or from moor to moor, when these become periodically dry in the milder latitudes, or covered by ice or snow in the colder.

The Grallæ, and more especially those genera to which the wanderers in question belong, may be said to unite more completely the characters of land and water birds, than any of the others: they find their food either directly in the water itself, or immediately on the banks; and yet their feet are so formed that, most generally speaking, they stand on the ground while they seize it. Some of them have been known to swim for short distances, and it is probable that all of them can swim a little upon emergency; but swimming is not their habit, and they are not found launched upon broad expanses of water like the regular swimming birds. They wade as far as the tarsi, which are generally long, and also the naked part of the leg (which is called the garter), will allow them; but the greater number of them find their food without wading even to that depth; and though that food, consisting of fishes, reptiles, small quadrupeds, worms, and the large aquatic insects, be all of a kind which is most abundant in humid places, or moist states of the weather, they as frequently catch it near as actually in the water. They are thus intimately connected with the periodical inundations to which allusion has been made; and they are adapted for migrating over the whole or the greater part of the quadrant, so as to be always on the different grounds

adapted for them at the seasons when food on these grounds is most abundant and most easily obtained.

The lower valley of large rivers, especially when these form extensive accumulations of banks, intermingled with pools, are the favourite places, and they are rarely found in the dry countries. The East of Europe from the White Sea, and the flats to the eastward, through Russia, along the shores of the Black Sea, and thence to the valley of the Nile, as far upward as that river overflows its banks during the rains in Central Africa, form almost one continuous pasture for such birds; at least, places where they can feed abundantly, according to the season, are at so little distance apart from each other along the whole of it, that the birds (which are, generally speaking, of powerful wing when once they gain their migratory elevation) have easy flights from pasture to pasture. The American continent, from the north, down the valleys of the Ohio and Mississippi, and southward to Guiana, and even farther to the southward (for the summit level between the southern branches of the Amazon and the northern ones of the Plata are flooded during the rains), affords them even a more ample range than they have in the place of their eastern migration. The American continent is also much more humid and much more in a state of nature, so that it is still better adapted to their habits.

Britain is thus situated, as it were, between two lines of the migrations of those birds, divided from the western one by the wide expanse of the Atlantic, over which we may suppose that the birds have no natural tendency to pass, and that consequently the American ones do not come, and never at any period could have come, except as mere stragglers, which had been drifted by cross winds, or had lost their way in the fogs about the Newfoundland banks. The eastern ones are less completely separated from us by any one bar-

rier; because the sea on the east is nowhere too wide for the flight of even a moderately winged bird. But the west and centre of Europe are not so well adapted to the regular migration of these *Grallæ*, as the eastern parts of the continent, because the Carpathian and Bohemian mountains divide them in the north, and the dry mountainous parts of France, and the Alps in their continuation, divide them in the south. Thus the directions of their migrations are changed more into those of the basins of the great rivers; and, though in their summer migration they appear to be abundant in Holland, and the other flat countries on the lower part of the Rhine, there is little difference of climate to induce their journeying in any great numbers from these places to the corresponding portion of the British shores; and as they come more from the south-east in their progress northward, and return more to it in that southward, than if their polar and equatorial pastures lay on the same meridian, there are fewer stragglers that reach us, than we should be apt to suppose, if we did not take these circumstances into consideration.

Before the country was so much improved by drainage and culture, while the land around the coast was, to a great extent, fenny waste, while the uplands were full of brakes and pools, while, from the state of the surface, the extremes of season were much greater, the snow lay heavier and longer upon the whole of the uplands, and the fens were flooded both by the autumnal rains and the spring rains, and melting of the snows, those parts of the coast of England which lie opposite the Netherlands were, of course, so much more in the state of those countries which the *Grallæ* under consideration still frequent, that we may very naturally suppose them to have been much more abundant then than they are now. But the examination of the laws according to which their numbers have diminished, till they have all become rare

stragglers, would carry us back to periods at which the history even of our own species is fabulous and vague; and therefore we can hardly hope for any thing like certainty in the history of animals, or in that of the physical state of the country, during the fabulous and traditionary period of the history of man. It is true, that as nature records the changes of country in those remains which are accumulated by floods, or otherwise buried in the earth, she never falsifies the record to serve any particular purpose, as is sometimes done by human analysis; but the difficulty of reading those records of nature is generally much more than equal to that of misrepresentation in the other case, that wherever we find the history of man obscure, the history of nature always involves equal, if not greater obscurity. Thus the progressive history of those birds which resort seasonably to districts which are in peculiar states, is a subject requiring the greatest discrimination and nicety; and though it be one which, properly worked out, would throw much light upon other subjects—it is also one which cannot be worked otherwise than by throwing the light of many other subjects upon it. Its importance is great, however, and we have thrown out these hints, not to inform the ignorant or to guide the inquirer, but for the humbler, though perhaps more important and useful object, of drawing attention to the subject.

Our notices of the birds which have led to these remarks will be brief, as ampler details can be found in the general systems of ornithology, and as those readers for whom these pages are principally intended, have but small chance of meeting with the birds in question. Of these stragglers, some more resemble the common heron, others more the bittern, and for others again there is no exact type among our native birds, whether resident or regularly migrant, so that it will be as well to notice the several genera in succession.

STRAGGLING HERONS.

There are five species of heron, the appearance of which in Britain is rare, and even doubtful.

THE CRESTED PURPLE HERON (*Ardea purpurea*).

This is a very beautiful species ; and, though rare, specimens of it have of late years been found in England in the early part of the summer. It is very common in the marshy parts of Eastern Europe and Western Asia, and by no means rare in Holland. It also extends over the whole length of Africa to the Cape of Good Hope, and on its passage it is very common in Malta and some of the other islands of the Mediterranean. It nestles in tall reeds and thick underwood, but not in trees, and it does not perch. The eggs are generally three, rather smaller than those of the common heron, of a greenish ash-colour, and lustreless.

The length of the full-grown bird is about three feet, and the extent of the wings about four feet eleven inches. The tarsi and toes are slender, the claws long, flattened, and the whole foot adapted for walking on soft mud. The bill is brown on the ridge, and bright yellow on the other parts ; the naked spaces round the irides, the garter, the under part of the tarsus, the under parts of the toes (which are reticulated), are the same colour ; and the fronts of the tarsi, and upper parts of the toes (which are covered with scales), are brown. The crown of the head and crest dependent from the occiput, the latter formed of beautiful pointed feathers, are deep black, but with very rich and peculiar reflections of green and purple. The upper part is reddish green, with various shades of brown and purple, the throat greyish white, the rest of the throat purplish red, the neck with produced purplish white feathers, and the scapulars with feathers of the same form, but of a brilliant purple red. These produced

feathers and the crest are characteristic of mature birds, the young being without them, though the places in which they grow are gradually indicated by tints of a similar colour, as the bird arrives at its third year, the age at which it receives those ornamental additions.

In former times the feathers of the heron were worn as characteristic emblems of chieftainship; and the crest, as being the most beautiful of the whole, was considered as the most ornamental. It was styled, "aigrette" or "egrette," and as that word was often used as the name of the bird to which the crest belonged, it probably led to some confusion of the species.

THE GREAT WHITE HERON (*Ardea alba*).

The appearance of this bird in Britain is exceedingly rare, and even doubtful. The bird is known in eastern Europe, where its crest feathers, which are very long and exceedingly beautiful, are highly prized for ornament. They are strong, capable of being erected, rising from the back rather than from the head, and when in a state of repose reaching beyond the tail; but there is also a short crest pendent from the hinder part of the head. The rich plumes along the back belong to the summer plumage of the male only. The plumage of the bird is altogether pure white, the bill dull brown, blackish on the ridge, and yellowish at the base. The orbits of greyish green, the irides yellow, and the legs and toes reddish brown. In the young, the legs and bills are blackish-green. The full-grown bird is nearly three feet and a half in length, with a bill about six inches long. It stands high on the legs, the tarsi being at least eight inches long, and the naked parts of the tibia nearly five inches more. This, like the former, nestles in thick herbage, and not on trees; the eggs are four or five, and of a bluish-green colour.

The young and also the old birds in their winter plumage are without the produced feathers on the back.

THE LITTLE CRESTED HERON (*Ardea garzetta*).

This is a small but beautiful species belonging to the eastern line of the migration of these birds, and has never been found alive in Britain, so that its name should be expunged from the list even of occasional visitants.

THE BUFF-BACKED HERON (*Ardea russata*).

This is also an eastern bird, and though one specimen of it occurred in South Devon in 1805, it is barely admissible into the list of British birds. That specimen was a female, supposed to be in the plumage of the first year; and with the exception of the upper part of the neck in front, and the crown of the head, which were buff-coloured, it was entirely pure white. It was found in October; but owing to what cause it performed so extensive a migration is not known. It was not found in a marsh or beside water, but in a field, feeding upon insects; and it was not alarmed at the presence of cattle which were grazing there.

THE SQUACCO HERON (*Ardea ralloides*).

This species has been more frequently met with in England than any of the former, but still not in such numbers, or so regularly, as to entitle it to a place among those birds which may be periodically expected. It is a bird of the old continent, and in some of its characters resembles the bitterns, being shorter in the tarsi and the neck, and having the latter clothed with longer feathers than the other and more characteristic herons, but it is said to nestle on trees like the herons.

It is a bird of very beautiful plumage. The feathers along the head are dull yellow, margined with black; the crest,

which is long and pendent, consists of eight or ten awl-shaped white feathers, margined with black. The feathers on the back are produced, and have flocculent webs; they are of a deep buff yellow, and tinged on the upper part with greenish purple, and they extend as far as the tail. The lower part of the neck and breast is dull yellow, and there are a few slight markings of the same on the scapulars and wing-coverts. All the rest of the plumage is white. The mature plumage is similar in both sexes, only the crest is shorter in the female. The young are without the crest and long feathers on the back; and their colours on the head and upper part are grey and brown. Specimens of these birds have been met in the early part of the summer; but they are not birds for which an ordinary observer can look: indeed, the whole of the stragglers included in this section belong to the curious department of our ornithology rather than to the useful.

STRAGGLING BITTERNS.

Of these there are two recorded as having been seen; the one belonging to the eastern or European migration, and the other to the western or American. They are both rare, but the American is much the rarer of the two.

THE LITTLE BITTERN (*Botaurus minutus*).

This is a small species, resembling the herons in the form of the bill and the length of the neck, but more like the bitterns in the general form of the body and the structure of the feet. It is a small species, not exceeding fifteen inches in length. In the male, the head, back, and tail, are black, with green reflections. The lesser wing-coverts are buff, the larger whitish, and the quills black. There is a chestnut-coloured spot on the scapulars; the neck, breast, and thighs, are buff, and the rest of the under parts white. The female is brown above, with rust-coloured margins to the feathers;

the buff on the under part is lighter, and the feathers are margined with pale whitish buff.

Its native haunts are in the marshes of the temperate portions of the eastern continent, upon the hummocks or thick tufts of herbage, surrounded by water, in which it builds a large nest of withered rushes and other aquatic plants, and lays five or six white eggs. With us it is a rare visitant, but occasional specimens have been seen throughout the whole length of the island, as indeed might be expected from its haunts on the continent. It does not so decidedly belong to the eastern migration as do the herons, but is found abundantly along the basin of the Rhine, from Holland to the Alps, though always in watery places, and its habits, like those of the bittern, are retired.

AMERICAN BITTERN (*Botaurus lentiginosus*).

This is an American species, and has some resemblance to our European bittern, only it is much smaller, more minutely freckled, and, though a night bird, as are all the examples of the genus, it does not rise and boom like our native bittern, though it drums when alarmed. In America, its migration extends from the Gulf of Mexico, or the swamps on the lower part of the Mississippi, to Hudson's Bay, on the swampy shores of which it arrives in the beginning of summer. It appears to migrate more to the north and east than the American herons, which may in part account for the appearance of those rare specimens that straggle into Britain. It is very generally distributed over the swamps of North America; and, from its retiring habits and the difficulty of exploring its haunts, is probably much more numerous than one would infer from the numbers seen. Its seasonal movements in America resemble more the autumnal collection and spring dispersion of those birds which display their habits within the compass of Britain, than the actual

migration of those dry-land birds which range far in latitude. Cold is the chief cause which drives marsh birds either southward or downward to the warm places. They can find food in all latitudes while the water remains open, and they retire only as these begin to be shut up by the frost. With the forest birds it is different. As the fruit of the deciduous trees ripens, the leaves become dry and unfit for supporting those insects upon which the forest birds live, and thus the birds are driven off even before the severe cold sets in.

Of those American birds that are confined to the northern division of that continent, we can hardly expect even stragglers during the northern migration, because the American coast bends so much to the north-east, that a bird from even the Floridas is not likely to make so much leeway as to get eastward to sea. Besides, the wind, especially in the spring and autumn, blows north or south along the central valley of America, and the wind of the eastern shore is influenced northerly by the current of the Gulf-stream, the tendency of which is to keep the northward-bound birds inwards to the land. The set of the winds must indeed influence the southward migration of the birds also; and it is only random stragglers from very northerly places which can at all find their way to Britain.*

To what extent the intercourse by shipping between countries that lie at a considerable distance from each other, may affect the migration of birds from the one to the other, has

* According to Bonaparte ("Birds of Europe and North America"), the *Botaurus lentiginosus* is not the American bittern, which Wilson describes as *Ardea minor* (*Botaurus minor*, Bonap.). Bonaparte does not give the locality of *Botaurus lentiginosus*, but states that it is "accidental in Europe." It is to the *Botaurus minor* that the foregoing description refers. If this accidental European bittern and the American species be truly distinct, they are at least very closely related to each other: but in truth, we know not to what species the specimen described by Montagu as *Ardea lentiginosa* is referable; it might have been the true American bittern.—M.

not been ascertained, or indeed even enquired into, although it is a subject not unworthy the attention of professed or professing ornithologists. That pelagic birds do follow ships, is well known, and some of them, as the petrels, get small thanks for their society, as the sailors accuse them of raising those commotions of the waters which bring up their food, and of course render them active upon the surface. Land-birds also often take refuge in ships when beaten and exhausted by the weather; and that occurs so often as to give at least some probability for concluding that migrant birds may generally have at least a tendency to follow ships, and thus be led a little out of the line of their ordinary passage. But the subject requires to be studied before any certain conclusion can be drawn from it.

NIGHT-HERON (*Nycticorax*).

Of this genus we have no British bird, either resident or regularly visiting the country; but there is at least one species of which specimens have been met with as very rare stragglers. These birds have the bill long and very strong, a little enlarged at the base, and slightly curved at the tip; their legs are of moderate length, naked a little above the tarsal joints, and with the outer and middle toe united by a membrane at their base. Their necks are shorter than those of the herons, or even of the bitterns; they have a few produced feathers on the occiput; the lower part of the neck is downy behind, and covered by long soft feathers on the sides and front. They feed at night, are gregarious, and very noisy, their sounds being harsh and guttural. Their plumage is not so mottled as that of the bitterns.

COMMON NIGHT-HERON (*Nycticorax Gardeni*).

This species is very common in the extensive wooded marshes and swamps of all parts of the world, and especially in North America, where it is called the "qua bird," that

word having some resemblance to the husky and croaking sound with which it makes the swamps dismal during the night. They nestle in large assemblages like rooks; and though they are easily thrown into momentary alarm, they do not readily quit their breeding-places, unless the trees in which they nestle are cut down. Their size (and probably that is the case with many other birds, and may have led to confusion of species) appears to vary with the abundance and productiveness of their pastures, as they are larger in the extensive swamps of America than in Europe, where the soil, generally speaking, is less humid, and the swamps covered with less luxuriant vegetation. In the mature bird, the head, back of the neck, scapulars, and upper part of the back, are black, with blue and green reflections; the sides of the neck, the wings, the lower part of the back, and the tail, are fine whitish grey; and the rest of the under part is pure white. To the hinder part of the head there is attached a very elegant crest, which the birds can erect when excited. That crest is pure white, eight or nine inches in length, and consists of three feathers, which sheathe each other like tubes, so that the whole appears as if it were one conical feather, tapering gradually to a point. The young are without the crest, and have those parts brown which in the mature birds are black with glosses; and, indeed, more or less of brown over the whole of the upper part, and partially also on the under, where it is mixed with yellowish white. The plumage varies gradually from the yellowish brown of the young to the richer tints of the old birds, so that they are apt to be mistaken. As British birds, they are exceedingly rare: one individual has been met with in the upper part of the valley of the Thames, and another on the banks of the Tweed: but whether these straggled from the continent or from America, is not known.*

* Bonaparte distinguishes between the European night-heron (*Nycticorax Gardeni*) and the American night-heron (*Nycticorax americanus*,

All birds which are subject to great seasonal changes, or changes from age, in their plumage, and which appear in the country only as rare, or, as one may say, accidental wanderers, require to be examined with much caution, and described with the greatest minuteness; and the time at which they are observed should also be carefully noted down. If these circumstances be not duly attended to, there is much danger of the same bird being multiplied into as many different species as the varieties of dress in which it appears. The hasty conclusion of one person may, in such case, mislead a host of those provoking copyists, who, though they can purloin, are altogether unable to correct, or even discriminate, till the error extends so widely as to be all but incurable; and the ardent but inexperienced inquirer is sent in pursuit of that which cannot be found, as it does not exist in nature.

STORK (*Ciconia*).

Birds of this genus, though they form a very interesting feature in the ornithology of many countries, appear with us only as stragglers; but specimens, both of the black and the white stork, have been seen in the country: and therefore, though it belongs not to us to notice their manners as forming a part of British natural history, we must record their names among those birds which occasionally make their appearance.

THE WHITE STORK (*Ciconia alba*).

This bird has been met with in different parts of the south of England, but never at any considerable distance from the

Bonap.), which have hitherto been regarded as identical. Both species, however, agree in habits and manners. The European species is abundant in Hungary, and in the southern and eastern parts of Europe, and in India and Asia generally; it is of rare occurrence in the north, and merely an accidental visitant to our islands.—M.

sea, chiefly in the autumn or winter ; which would lead to the supposition that it has been blown westward on its migration from Holland, where the birds breed in abundance, to the south. Storks are birds of familiar and gentle dispositions, very cleanly in their habits, and great promoters of cleanliness in those places which they frequent. They are in consequence very much encouraged in towns and cities, where they walk about the streets, and roost and breed on the house-tops. They stand upon one foot, the other being drawn up so that it does not appear. Though peculiar in shape, they are handsome birds. The bill and feet are red, the naked space round the orbits black, and the irides brown ; the scapulars, larger coverts, and quills, are black, and all the rest of the plumage white. The young have the wings and part of the back brownish, and the bill and feet reddish-brown. The length of the bird is about three feet and a half, the spread of the wings is about six feet, and the size of the body about the same as that of the turkey.

The white stork holds nearly the same place among the migratory birds of the East that the night-heron does among those of the West. The birds flock before they begin their autumnal journey ; and as they approach the southern limit of their range, the flocks become very numerous. The flesh of the stork, when in good condition, is excellent food ; but the birds do not breed in confinement. They are the associates of man, but not, like domesticated animals, his slaves.

THE BLACK STORK (*Ciconia nigra*).

The black stork belongs to a more easterly migration than the white, and is more a bird of the retired and wooded marshes. It ranges as far north as Finland, but not to any part of the western coast of Europe ; and only one specimen

has been seen in England. It has the whole of the upper part black, with rich glosses of blue and green.*

WHITE SPOONBILL (*Platalea leucorodia*).

The white spoonbill arrives on the south-east of England rather more frequently than most of the other stragglers which have been enumerated in this section, though not so much so as to render a detailed description of it necessary for the popular student of our native birds. The birds live in marshy places, and make their nests in trees, or in the close tufts of aquatic plants. It is more a marsh bird than any of the genera just mentioned, and it has the outer and middle toes webbed to the second joint, and the hinder claw produced and resting on the ground for a considerable portion of its length. The foot is thus well adapted for walking on the surface of soft and sludgy mud. The form of the bill, which is peculiar, and supplies the popular name, is alone sufficient to characterize the bird. The bill has the tip yellow, but the rest of it, and the legs, which are bare for fully four inches above the articulations of the tarsi, are black. The body is pure white, with a yellow gorget on the breast, and a crest on the hinder part of the head, formed of sheathing feathers. The bird feeds on the spawn and young of fishes and reptiles, and on water insects and their larvæ, as well as on the albuminous roots of some of the aquatic plants. In quest of these it dabbles in the water and mud; and, as is the case with many others of the long-necked birds which dabble, it has a double flexure of the windpipe, probably for holding a supply of air when the head is submerged. Spoonbills occasionally straggle to England, both on their northward and their southward journeys.

* The black stork is found in central and southern Europe, and in western Asia. It tenants marshes, but breeds in forests, building on the tops of the highest pines and other trees; the nest is of large size, and

CRANE (*Grus*).

The common crane (*Grus cinerea*), which is the only bird of the genus that appears in Britain, even as a straggler, is in many respects the reverse of the preceding species. The bill is long, strong, and pointed, and the feet have the hind toe articulated on the tarsus, the whole structure of the foot having a considerable resemblance to those of the birds that walk upon firm surfaces, and use the foot for scraping.

For popular purposes in British ornithology, it is now of little consequence to point out the relations of the crane to other birds, or to localities, for it only appears as a straggler; though, from the old statutes for the protection of its eggs, it appears to have been in former times well known as a native bird breeding in the country. The crane is a bird of the wastes that lie on the edges of marshes, or are subject to seasonal overflowing by rivers; and as in England those places are now generally enclosed, or otherwise divided, and under culture, the country affords no fit pasture for the crane. The crane is not, however, a bird of solitude, for in those southern and eastern countries which suit its habits, it is said to build not only in inhabited places, but on the tops of houses.

IBIS (*Ibis*).

The glossy ibis (*Ibis falcinellus*) is the only species of this genus of ancient fame of which even a straggler comes occasionally to Britain. It is a bird of long flight, and ranges seasonally far and wide over the continent, even to the remotest north; and thus a solitary straggler not unfrequently drops upon our shores.

The plumage of this bird is exceedingly rich, from the composed of sticks. Eggs two or three in number, of a greenish white. "As for the stork, the fir-trees are her house:" Psa. civ. 17.—M.

indescribable brilliance and variety of the metallic glosses, which more resemble those upon the wing-cases of the finer beetles, than anything usual among the feathered tribes. The feathers on the sides and top of the head are rich greenish-black, with metallic reflections of purple; the lower part of the back, the tail, the scapulars, the coverts, and wings, are of the same tint but greener, and with exquisitely brilliant and varied reflections of purple-green and gold colour.; the neck, upper part of the back, ridges of the wings, and all the under parts of the body, are rich purplish brown. The bill is long, and though slender in the distal half of its length, it is a well-formed and powerful organ. The feet are adapted for walking upon soft surfaces. These birds follow the line of periodical inundation; and during the summer range as far to the northward as those countries where the summer inundations are produced by the melting of the snow. They are generally social in their habits, and migrate in flocks.

CURLEW (*Numenius*).

There are two British species of curlew, the common curlew and the whimbrel, and both of them are permanently resident in the country, although they shift their ground within it according to the seasons. Both species, when in good condition, are very palatable and wholesome food.

COMMON CURLEW (*Numenius arquatus*).

A figure of this bird is given on the plate at page 151, about one-twelfth of the lineal dimensions of nature; but curlews are subject to much variation both in size and in weight. The greatest length is about eighteen inches exclusive of the bill, which is between six and seven, and the extent of the wings about three feet.

Curlews are very common birds, visiting all the flat and

shelving shores in the winter, and the moist and marshy moors in the breeding season, and often halting a little on the ploughed fields in the course of their journeys. That any of them come to Britain from the south, or leave it at least to a farther distance than the northern and western isles in the summer, is not very probable, but they have both an inland and a northward, or rather a north-westward, motion within it at that season. The moors of the southern parts of England are too dry for them in the summer, and the same may be said generally of the lower moors all along the east side of the island. Their great breeding ground commences about Westmoreland, and runs along the western side of Scotland and the isles.

They tend much to enliven the more dreary and desolate of those marshy moors; as during the breeding season they whistle and scream, in wild and varied notes, till all the place rings again; accompanying their cries by wheeling flights which are not ungraceful.

The nest is a very rude couch of withered grass or rushes; the eggs are four, of a pale brownish green with spots of different shades of brown. They are placed quatrefoil, like those of the plovers. The young run as soon as they break the shell, but they are then covered with yellowish down, and it is some time before they are fledged. Their principal food at that season is earth-worms, and the young of fishes and frogs; and though (as is the case with all birds that nestle in the wilds) they nestle apart, they are often very close to each other. One foggy evening I lost my way, or rather the bearing, for there was no way to lose, in the dreary district of Ross Mull; and as I was trying for "the blink of the sea" the greater part of the night without success, though I found plenty of water, I had no lack of the music of the curlews; and certainly it was, under the circumstances, far from being disagreeable. In those places

the birds are by no means shy, though they do not play the same tricks as the plovers and lapwings.

If the season is more dry than usual, they suffer considerably from want of food ; but as the rains usually set in early they have abundance, and get fat as they return to the south and the shores. There they flock, and are very shy, and run and fly about with much celerity. They are also tide birds, following the line of the water during the ebb, but retiring to a distance during the flood. They do not add so much to the interest of the shores as to that of the inland moors, as they have more neighbours ; but even on the best birded shore, the curlew is a bird worth watching.

The common name for the curlew in Scotland is the *whaup*, which is the name also for the pod of a leguminous plant before the seeds begin to swell. The allusion is to the bill, or, as it is called, the *neb* of the bird ; and the term 'whaup-nebbed' is applied to express a long, thin, arched nose, and also one who is cunning ; it is likewise one of the attributes of those beings with which superstition peoples the night : "ghaists an' whaup-nebbed things" are very generally associated as equally to be dreaded ; and there is no doubt that the allusion is directly to the curlew, as it whistles and screams in those places in which the *ignis fatuus* is most likely to appear, and where, from the want of paths or landmarks, the people are most likely to wander and lose their way in foggy weather.

THE WHIMBREL (*Numenius phaeopus*).

The whimbrel very much resembles the curlew in its colours, its haunts, and its habits ; but it is a smaller bird, being about seventeen inches long (of which the bill takes up fully three), and about two feet and a half in breadth. The colours also run more on black and white, and less on brown,

than those of the curlew. The chin, throat, and belly, are white, without the brown lines which mark those parts of the curlew ; and the lower part of the back and the rump are also white. The mottlings on the other parts are not so minute, and the bill is more slender, as well as only half the length.

The bird is found on the same shores as the curlew in the winter, and has nearly the same habits, only it is not quite so shy, and not nearly so abundant. It migrates farther to the north in the breeding season, and rears its young in places which are still wilder and more retired. Like the other, it spends but little of its time in nest building. Its eggs are four, arranged in the same manner, and the young are covered with down having a slight greyish tinge.

THE SAND-PIPER (*Totanus*).

There is a succession of birds which inhabit and find their food upon all the varied surfaces near the fen, the river, and the sea, from the hard bank or beach of sand or gravel, to the soft sludge in the morass or the water-course, and which are all remarkable for the fleetness of their walk, generally for the rapidity and the wheeling and doubling of their flight, and especially for the length and often for the peculiar structure of their bills. They are, generally speaking, birds which live rather remote from the dwellings of man ; comparatively few of them appear resident in Britain throughout all the year ; many of them make their appearance only occasionally as stragglers, some come as spring or summer, and others as autumnal or winter migrants ; but they all feed upon animal substances, which they find on the surface or in the earth. None of them by possibility do any harm to man, and the whole or nearly the whole are, when in proper season, very highly prized as food. The loneliness of their haunts, the swiftness of their motions, the shrill and

wailing sound of their cries, their appearance and disappearance, and the desire of procuring them for the table, all conspire to give them an interest.

From the structure of their bills, the nature of their food, and the places where that food is found, they may be said to be, in a peculiar degree, birds of temperate climates; and so, when the climate of any one country ceases to be suitable for them, they shift to other countries. Unless in the case of those which chiefly inhabit the shores of the sea, localities which have in most latitudes a more uniform temperature than the inland places, and which are in consequence more fertile all the year round, they are equally obliged to remove when influenced by excessive drought or excessive cold. The impenetrable earth is equally barren to them whether its barrenness arise from its being parched or being frozen. The north, with its extensive marshes (and where it is not rock or cultivated ground it is very generally marsh, even in the apertures between the mountains), is their grand summer pasture. And it is a rich one. Aquatic larvæ, and other small aquatic animals, and animals that love the humid earth more than the vegetation with which the earth is covered, are especially abundant in those parts, so much so that one can hardly walk in the neighbourhood of a swamp in a northern forest (and there are few of these without intervening swamps) without being tormented with buzzing, stinging, and biting; and then if one gets under a tree to escape from those that are reeling about in the sun, down they come like a shower, as if the whole country were one insect nest. Any one who has tried a Canadian swamp, or even a swamp in the northern parts of Europe, can tell something of the "plague of flies." Lepidopterous insects, butterflies, and moths, with their bright wings playing in the sun, or their soft ones in the shade, and showing beauty but not giving annoyance, are few. They are creatures of the

sun, cradled in the luxuriant but soft vegetation which the solar energy produces ; and, therefore, their numbers diminish as one approaches the cold latitudes. In our own country, the total number, and especially the number of species south of the Thames, is greater than north of the Tweed. But the Neuroptera increase vastly towards the north.

Where there are many winged flies, there must be more larvæ, and, generally speaking, the larvæ are bred and the winged ones finally deposited in the marshes. The sludgy shallows, which are congealed to a considerable depth in the winter, and are not at any time very fit for swimming in, contain few fish ; and, therefore, the produce of the summer, and a very abundant produce it is, is left to the marsh birds, which resort thither in incredible numbers. In the autumn they find their way southward, and seek their food in various localities, according to mutual adaptation.

Taken altogether, these birds, throughout both summer and winter, inhabit a zone of considerable breadth, so that some of them only reach the one extremity of Britain in the one season, and some the other extremity in the other ; while certain species, which migrate in other countries to a greater length than that of this island, come in laterally as stragglers ; indeed, as there is no land well adapted for these birds, either directly north or directly south of Britain, the whole of their migrations may be said to be rather oblique, than directly upon a meridian.

Their migrations are not regulated by exactly the same law, or carried on to the same extent, as those of the warblers. The marsh continues to yield food until it is sealed up by the frost ; but the leaf falls before the ground is frozen, and the caterpillars disappear long before the fall of the leaf. Thus there are species of the marsh birds which do not migrate far in any country, and which with us only change seasonally between the inland marshes and the marshes by the sea, or

in some particular places remain nearly on the same ground all the year.

The sand-pipers are perhaps the least aquatic of our marsh birds, and their structure agrees with their habit.

The bill of the sand-piper is flexible in the basal half, but it becomes hard and firm towards the point, with bruising edges to the mandibles, and the upper one slightly hooked at the tip, and bending a little over the extremity of the under one, so that the action of the two could break a small shell, or crush the crust of a shrimp, or the wing-cases of a beetle. To some, it may seem that the flexibility of the bill is a means of weakness in these birds; but it is, in truth, a means of safety: they have to strike rapidly at their prey upon the hard ground, and also to wrench and twist among the stones, both of which operations would give considerable concussion to the head, if the bill were inflexible; besides, in living animals a flexible substance is always stronger than a rigid one; and hence the boring and scooping bills of the analogous genera are flexible for their whole length.

The legs of the sand-pipers are rather long, and bare of feathers to a considerable height above the tarsal joint, not so much for the purpose of wading (though it adapts them better for that operation in case of necessity) as for running more freely over sand and among stones. Their wings are long and pointed, the first quill being the longest; and thus they are as well furnished for wheeling about in the sky, and seeking proper feeding-places, as they are for running along the sandy and gravelly banks and beaches. They are rare birds, as indeed are those of the analogous genera. Their eggs are always four, placed in the same manner as those of the plovers. The eggs are large in proportion to the size of the birds; and, indeed, although there are some exceptions to it, it seems a pretty general law, that the eggs of those

birds which have only one brood in the season, are larger in proportion to the size of the birds than are those of the species which have more than one.

THE RED-SHANK SAND-PIPER (*Totanus calidris*).

This is an indigenous, and by no means a rare species in those parts of the country which suit its habits. These are the fenny and boggy grounds, to which the birds resort about April or May, making rude nests in tufts, and depositing four eggs of a pale olive colour, blotched with dusky brown, especially towards the larger ends. In England, its breeding places are chiefly confined to the fens and marshes at no great distance from the sea ; but in the north it resorts farther inland, to the cold upland bogs which remain buried all the year round, though even there it does not go so far inland as the lapwing. It is even more clamorous than that bird, when any one approaches the place of its nest, and it flies and wheels about something in the same manner, though without those curious turns and twitches which characterize the flight of the lapwing.

Red-shanks do not assemble in flocks in the winter, but range themselves along the coasts, and lead a solitary though by no means a silent life, till a new season calls them again to the breeding places, in which also each pair reside at some distance from the next.

The feet of the bird, from which it gets its popular name, are orange red, and so is the basal half of the bill, the remainder of that organ being dusky. The bill is about two inches long ; the tarsi are also long, and all the three front toes partially webbed, the first and second nearly to the first joint ; the second and third merely rudimental. The irides are hazel, and the naked spaces around the eye greyish white.

The length, when full grown, is about eleven inches, the

stretch of the wings twenty-one, and the weight five ounces. In the summer plumage, the head and back of the neck brown ash-colour, with dusky streaks along the feathers, and a white streak over the eye. The back and scapulars are dusky, with dull grey spots; the coverts ash-colour, with spots of brown and white; the quills dusky, the secondaries with white tips; the rump white, more or less marked with small spots, and bars of dusky; the tail barred with black and white, and the under part white, with large oblong dusky spots on the centres of the feathers of the fore part, but passing into pure white on the belly. In winter, the plumage of the back changes to ash-brown, with dusky streaks, and that of the breast to pale greenish white, with slender brown streaks. The young have the upper plumage brownish, the plumage on the breast ash-colour with brownish streaks, and the tail feathers with reddish brown tips.

THE GREEN SAND-PIPER (*Totanus ochropus*).

This is an inland species, appearing on the margins of the fresh water, rather than on the shores of the sea, and being more retired and quiet in its habits than the red-shank. It is not very abundant, or, at all events, it has not been very much seen in any part of the country, and it has not been met with in the north. It has not been seen between the end of April and the beginning of August, but it may possibly, in the intermediate months, retire into the thick herbage by the brooks to breed; and thus, as it is found only in the warmer and richer parts of the country, where food is plentiful among the aquatic herbage, it may be able to feed and rear its young without exposing itself much to observation. Hitherto its eggs have not been found in the country.

The length is rather less than ten inches, and the weight about three ounces and a half. The bill is about an inch

and a half in length, very slender, but firm, and sharp-pointed at the tip, where it is dusky, though the basal part has a dull greenish tinge, as have also the feet ; they have short membranes uniting the middle and outer toes only. The nest is in lonely places on the banks of pools and streams, rudely formed in the grass, or simply in the sand : the eggs are four, greenish white, with brown spots.

In summer, the head, neck, and breast, are streaked with ash-colour and dusky, the streaks on the breast being most conspicuous ; the scapulars and back are brown, with green reflections, and dropped with small spots of white ; the wing coverts are brown, with green reflections, but without white spots ; the quills are dusky, and so are the under coverts of the wings, but marked with chevron-formed lines of white ; chin, lower part of the breast, belly, and vent, are white. The tail feathers, which are even at the tips, are white, with dusky bars ; the first over all the feathers, and the one nearest the tip extending only over two, the second bar crossing eight of the twelve feathers, and the third six. In winter the plumage is paler, and the spots on the breast less defined. The young birds have yellow spots on the back, the back of the neck rust-colour, the breast more spotted, and more black in the tail.

THE WOOD SAND-PIPER (*Totanus glareola*).

This bird, which, like the last-mentioned, is by no means a numerous species, is an inch shorter, and an ounce and a quarter less in weight, than the green sand-piper. The legs are longer in proportion, the tail wedge-shaped at the tip, barred with brown and white, and the under coverts of the wings are without the white chevron-shaped bars. The form of the body is slender, and the legs, when extended backwards, reach two inches and a half beyond the point of the tail.

The colours are, a dusky streak from the gape to the eye, and a whitish one over the eye ; the head dusky, streaked with white ; the back and scapulars dusky, with purple reflections, and an obscure yellowish spot on each web, near the tips ; coverts of the wings dusky, with whitish spots, and without any gloss ; greater coverts black, with white tips ; quills black, the first with white shafts, the rest, except three or four next the first, tipped with white ; the upper part of the rump black, with streaks of white ; the lower part of the rump and upper tail-coverts white, but with black spots on those next the tail feathers ; the breast, belly, and under tail-coverts, pure white ; tail feathers with eight brown bars on the outer webs, and six on the inner, alternating with white ones ; tip and cutting edges of the bill blackish ; the rest dusky green, and the feet the same ; they are bare an inch above the tarsal joints. The winter plumage is a little paler in the colours, and that of the young is grey and brown on the breast, with obscure reddish spots on the under part. The bird inhabits marshy woods, but its manners are little known. It is usually described as a winter visitant, coming to this country from the marshy forests of Sweden ; but as it appears in the south of England early in the month of August, that cannot well be reconciled with an autumnal departure from Sweden. The probability is that, like some of the others, it is a resident bird, though a very rare one, inhabiting places which are not easily examined.

THE SPOTTED SAND-PIPER (*Totanus macularia*).

This species is also a very rare one in Britain, a single specimen being all that has hitherto been observed in the country. It is an American species, very plentiful along the shores of the rivers in the central states, not proceeding very far to the north, but remaining to breed, and retiring

to the southward in the autumn, to return in April. Its proper migration does not, therefore, extend so far north as the parallel of the British islands ; and therefore the circumstances by which even a straggling individual can be wafted so far out of the line of its regular passage, must be peculiar indeed.

The feet and base of the bill are reddish ; the tip of the latter dusky ; the upper part greenish brown, spotted with dusky, the spots larger and three-cornered on the back and scapulars ; quills of the wings dusky ; the secondaries and greater coverts tipped with white ; rump and two middle feathers of the tail plain greenish brown ; the exterior feathers white with brownish bars ; the front of the neck and upper part of the breast marked with well-defined round dusky spots on a pure white ground, in both sexes, when mature ; but the young are without the spots.

THE GREEN-SHANK SAND-PIPER (*Totanus glottis*).

The green-shank is the largest British bird of the genus, measuring about fourteen inches in length, and nearly two feet in the stretch of the wings. Though not the gayest in its plumage, it is perhaps the most elegant in its form, which is peculiarly light and graceful. Comparing it with the red-shank, in the ratio of the cubes of the lengths, which is the method of judging of similar birds, the weight of the green-shank should be about seven ounces and a half : but it is only six ounces, or four-fifths the weight of the other, as compared with the length. The bill is about two inches and a half long, very slender, black or dusky, except the base of the upper mandible, which is reddish ; the head, nape, and sides of the eye, ash-colour, streaked with dusky ; the sides of the head relieved by a white streak from the upper mandible to the eye ; the back ash, glossed with bronze-brown on the centres of the feathers ; the scapulars, coverts, and some of

the quills next the body, the same, but glossed with bronze-green ; the quills dusky, with white spots on the inner webs ; the chin, a narrow band down the front of the neck, the lower part of the breast, the belly, the upper and under tail-coverts, and the rump, white ; the tail white, crossed by irregular lines of dusky ; the legs of a deep green colour, and bare of feathers for between one and two inches above the tarsal joints. In winter, the mottling on the breast becomes very faint, and the colour on the upper part more inclining to brown.

In Britain, these birds are chiefly seen in small flocks along the shores of the sea, or in marshy places only a little way inland ; and thus those that are usually described may not be in the full lustre of their nuptial plumage. That some of them remain and breed in the fens, has been long supposed, and it agrees with the general analogies of the genus.

THE DUSKY SAND-PIPER (*Totanus fuscus*).

This species is rather larger in its dimensions and weight than the red-shank, but it bears a considerable resemblance to that bird in the form of its body, and also in its plumage in the winter. Its bill is about the same size, length, and colour, but its feet are red ; the head and back of the neck are dusky, mottled with ash-colour, especially on the latter ; the back, scapulars, and wing-coverts dusky, with grey spots ; the first six quills dusky black, with a white shaft to the first one, the others barred or scolloped with white on both webs ; the lower part of the back and the rump white ; the upper tail coverts barred with dusky ; the tail wedge-shaped, the feathers barred with black and brown, and the edges of the webs scolloped with white ; the chin and throat white, and the rest of the under part mottled brown and white : such is the plumage in which the bird has been found in August.

When it resorts to the vicinity of the sea at a later period of the season, the colour of the head has faded to pale ash, with small dusky lines; the grey spots on the back and scapulars have faded to dull white, and the dusky tint on the latter to ash-colour; the mottling on the under part also becomes very obscure, or wholly disappears. The young have the colour on the upper part olive brown, with dark triangular spots on the coverts and scapulars, and the under part of them is marked by zigzag lines, and mottlings of brownish ash.

The natural habitat of this species is said to be on the banks of rivers, where it lives in concealment during the breeding season, subsisting more upon the fresh-water shelled mollusca than on insects and worms.

Some authors have confounded this species with the godwits, from which it is readily distinguished by its bill; and others have said, "it is on the coast during winter," the fair inference from which is, that it is a winter visitant; but it is, in truth, a resident bird, and breeds in the fens of Cambridge and Norfolk.

THE COMMON SAND-PIPER (*Totanus hypoleucus*).

The common sand-piper is much more abundant in Britain than any of the others, and therefore a much more interesting bird, so far as popular observation is concerned. A figure of the bird, on a scale of one-third of the lineal dimensions, is given on the plate at page 112, from which a judgment may be formed of the shape and the colours and markings of the plumage.

The feet of the common sand-piper are well adapted for running upon soft surfaces, whether of loose sand or sludge. The toes are webbed to the first joint, flat on the under sides, and margined with membrane throughout their whole length. It uses them with great dexterity in running; and

when necessary it can swim a little, its feathers being, to a certain extent, waterproof; it can also dive upon emergency, though neither swimming nor diving is a common habit with it.

Its wings are also powerful, being double the length of the body, measuring them from tip to tip, which is longer in proportion than the wings of any other of the genus; the tail, too, is fan-shaped. As the bird runs about, it is continually flirting and jerking the tail, as a counterpoise to its motions, as it picks up its food; and when it is on the wing, similar motions of the tail assist it in its ascents and descents.

These birds are regular migrants, and resort, during the summer, in great numbers, to the banks of rivers and the borders of lakes, in all places of the mainland of Britain, and to several of the Hebrides; but they are not found in the most northerly islands. They enliven the wilds with their shrill and plaintive voices, and are birds of no small bustle and activity, always apparently in a hurry, whether on foot or on the wing. The nest is usually formed under a dry bank, of a little moss and some dry leaves and fibres—not a very elegant or elaborate structure, but still more carefully constructed than that of most birds of the same or of the analogous genera. This is not, however, always the case, for the eggs are sometimes deposited in a slightly scratched cavity among the sand or pebbles, which they so much resemble in colour that they are not easily discovered.

The eggs are four, of a flesh-coloured white, mottled with dark-red brown, especially at the thick ends. The young are some time before they can fly, but they can run almost as soon as they come out of the shell, though the habit is to squat and skulk about among the sand and stones till they are able to use their wings. The young, in their first plumage, have reddish margins to the feathers on the upper part.

The nests are rarely seen, in proportion to the number of the birds, as, when raised, they run and double so quickly, that it is not easy to find the places from which they start.

TRINGAS (*Tringa*).

The birds which, with perfect propriety and justice, are separated from some others which they resemble in certain of their characters, and are included in this genus, have no common English name; they have been popularly called sand-pipers, or snipes, or alternately the one or the other; sand-pipers, because they run about piping, in some key or other, upon nearly the same ground as these birds; and snipes, because they have long bills.

But popular names cannot be rendered accurately expressive of those nicer shades of distinction that are required when we come to discriminate, in anything like a scientific manner, between the haunts and habits of one animal, and those of another; those names must always be, to a considerable extent, local, because they are merely conventional, and there can be no conventional agreement where there is no intercourse. Besides, the more minute distinctions,—and they are absolutely necessary in order to obtain anything like a knowledge of those animals that resort chiefly to uninhabited places,—are not taken cognizance of by the common people; and thus similarity is confounded with identity in some cases, and changes of place and of plumage (which very generally occur together) are in other cases the cause of one species, nay, probably one individual bird, being named, and popularly considered, as two.

The tringas have certain peculiar characters, especially of the bill, and their haunts and food are, of course, in accordance with those characters. Their bill is as long as the head, or longer, slender, straight, or very slightly curved, a little

soft and flexible for its whole length, enlarged and smooth at the tip, channelled as far as the tip in both mandibles, and with the nostrils pierced in the grooves of the upper mandible. It is not so hard as that of the sand-piper, and therefore not so well adapted for picking the food of the bird among gravel; and it is less sentient than the bills of the snipes, so that in finding its food the bird must be, in part at least, guided by the eye.

The legs of the tringas are of moderate length, the three front toes only slightly bordered with membrane, and the hind toe very short, and articulated on the tarsus, above the junction of the others: the foot is thus not a wading foot, neither is it fitted for walking upon gravelly, or even hard and firm surfaces. Soft earth, the margin of a morass, the banks in the eddies of a river, or where a thin deposit of sludge is left by floods or by the tide, is the feeding ground best adapted both to the feet and the bills of the tringas.

Their structure and powers vary considerably in the different species; but, generally speaking, their feeding places are richer than those of the sand-pipers, and less so than those of the snipes; they are therefore not so much fitted for running as the one genus, and they are more so than the other: still their bodies are what may be termed "clean made," well fitted for getting through the air; and their legs also are well set for running, the tibia having much freedom, and the step being long, and the motion smooth and graceful. Their wings also are powerful and pointed, so that they can dash onward for a considerable distance in rapid flight, and also wheel and double with much ease.

Tringas are pretty widely distributed over the temperate and cold latitudes, and though they have not the same extent of annual migration as those birds which catch insects on the wing, or even those that eat caterpillars from the foliage,

none of them, so far as has been observed, summer or winter in exactly the same places. Generally speaking, their motions are northward and upland in the summer, and southward and seaward in the winter, but they are regulated by surface as well as by climate; for though they do not go to the absolute sludge, or the ground which is inundated, they love humid surfaces, and therefore they are on the margins of such localities.

Of the seven species that have been found in Britain, only one has been ascertained to breed in considerable numbers, though there is little doubt that some of the others do remain and breed in peculiar localities, probably more in number, and also a greater variety in species, than has yet been ascertained by observation.

Hence their arises a remark which seems not unworthy of being recorded, and not the less so that its application is far more extensive than to any one genus of birds, or even to the whole of the feathered race. The man who knows and writes (for the writing ought never, at all events, to *precede* the knowledge), always knows less than there is to be known; and the man who writes without observation, always knows more—takes more *credit*, in short; but still, as is the case with all who live on credit, whatever appearance he may make, he, in reality, lives a beggar. One finds melancholy proofs of this in the books on natural history. In many instances this is difficult to be avoided, and none more so than in the genus *tringa*, which comprises birds which, as British, are so rarely seen, even in museums.

THE PURRE; OR DUNLIN (*Tringa variabilis*).

The remarkable difference between the summer and winter plumage of this bird, on account of which it well merits the

name of *variabilis*, or 'changing,' is such that it has often been described as two distinct species.

In the winter dress, or that in which it is found on our southern coast nearly all the year round, the plumage is much paler in the colours than in the summer or breeding season. The top of the head, back of the neck, scapulars, and back, are ash grey, tinged with brown, and the shafts of the feathers dusky, inclining to black. The coverts dull blackish brown, with greyish margins, and the tips of the greater ones white. The rump and upper tail-coverts dusky brown, with the margins paler brown. The middle tail feathers, which are the longest, brown; the others grey with whitish shafts, and the lateral ones larger than the others. A brownish line extends from the gape to the eye, and thence across the eye backward there is a streak of white, and the rest of the cheeks is white streaked with brown. The chin and throat are white; the front of the neck and upper part of the breast grey, with brown shafts to the feathers, and all the rest of the under part pure white. It is in that plumage (but the tints vary a little with the time of the winter) that the bird is the *purre* of authors.

In summer, the crown of the head, back of the neck, scapulars, and upper part of the back, become black, with reddish brown margins to the feathers; and the lower part of the back, the rump, and tail-coverts, become brownish black. The chin remains white, and so do the flanks and under coverts of the tail towards the sides, but with black streaks. The cheeks, fore part of the neck and breast, become black, with well-defined white margins to the feathers, and the rest of the under part becomes almost entirely black. The wing-coverts remain nearly the same as in the winter, and so do the quills, which are of a dusky brown colour. In this plumage the bird is the *dunlin* of authors.

The young birds have a coat of intermediate plumage, which gradually fades off into that of the winter, but returns to the deeper tints of the breeding plumage in the summer.

The purre is between seven and eight inches in length, and about fifteen in the stretch of the wings. The bill is the same length as the head, and of a black colour; the legs are dusky, with a greenish tinge.

In winter, these birds are very abundant upon all the oozy and more humid sandy shores of the country, where they follow the reflux of the sea and pick up their food. They are in small flocks, and when raised they utter a sort of wailing scream, but when they are running and feeding they have a more murmuring note. Numbers of them breed on the shores, and also near some of the inland lakes and marshes in the north of England, and especially in Scotland. As is the case with all the analogous genera, their nests are very rude, merely a shallow cavity scratched in the earth, and lined with a little lint, withered grass, or any other rude but dry vegetable matter that may come in their way. When in good condition, these birds are reckoned palatable and wholesome food.

THE PURPLE TRINGA (*Tringa maritima*).

This species, like the former, certainly breeds in some parts of Britain, though the nest and also the birds during the breeding season have been more rarely seen, and seen on the rocky islets rather than the low banks.

It is a larger bird than the last species, being between eight and nine inches long, between fifteen and sixteen in the extent of the wings, and two ounces in weight. Its bill is an inch and a quarter long, more tapering to the point, and rather harder than that of the former, of a dull brownish red, except the edges and tip, which are dusky. The tarsi

are shorter, the toes longer in proportion, and more free to their articulation ; the foot being better adapted for walking upon rocky or other hard surfaces. The feet are the same dull red as the basal parts of the bill, and the claws dusky and blunt at the points.

The plumage, like that of most of the genus, is subject to considerable seasonal variations, which has led to a multiplicity of names. In winter, the head and neck are dusky, inclining to black ; the back and scapulars black, margined with ash colour, and glossed with purple reflections ; the rump, tail-coverts, and four middle feathers of the tail, are black, with the same reflections as the back ; the remaining four feathers of each side of the tail are pale ash colour. The coverts and quills are black, with white tips to the coverts, most conspicuous in those over the primaries, narrow white webs to the quills, except two of the secondaries, which are almost entirely white, and in the expanded wing range with the white tips of the coverts, forming a narrow oblique line. The ground colour of the chin, throat, and all the under part, white, but more or less striped and spotted with black on the breast, shoulders, and flanks. In summer, the upper part of the breast becomes dusky grey, and the sides of the breast black ; the bill and feet also become reddish orange. There is little difference in the plumage of the sexes, either in the winter or the summer dress. The winter plumage has the purple gloss fainter than the summer, and the grey on the margins of the feathers duller. The young have the margins reddish, or rust-coloured.

In winter, these birds are not rare on the British shores, and they are plentiful on those of Holland and the south of the Baltic ; but their nests are as rare in these localities as they are in Britain. Their principal food is the smaller crustacea, and the young of various shelled mollusca, which they pick up among the sand and gravel, or from the rocks,

and swallow entire. The number of young of these soft-bodied animals is very great, the shells especially are found by myriads, adhering to the rocks and stones, between the high and low water lines; so that in the breeding season, the birds may conceal themselves and their young in the inequalities of the rocks, and find plenty of food without being on the wing or otherwise exposed.

As they are found not only on the other European shores that have nearly the same latitude as those of England, but on those of the Mediterranean, and on the west side of the Atlantic as far north as Hudson's Bay, and as their nests are rarely seen anywhere, it is not inconsistent to suppose, that they may disperse themselves over the more inaccessible parts of the shores, in all those places where they are found in small flocks in the winter.

There is one analogy between the seasonal productiveness of the sea and that of the land, which should never be lost sight of, as it forms, as far as analogy (which is our only guide to the unknown) can form, a sort of guide to the history of those birds which appear on our shores at certain seasons and take their departure during others, without our being able to bring them within the operation of those laws by which seasonal migration is in general regulated.

The rocky shores or the stony ones, where the stones are not moved and rolled by the tide, bear to the flat beaches of sand or rolled shingle nearly the same relation which woods, groves, brakes, and other vegetable covers, do to the open fields, downs, and commons, upon land. On them, summer is the time of plenty with the birds, as they are then full of the young of the smaller marine animals, which, in the still water, or only washed by the summer spray, and warmed by the summer sun, adhere to the stones, so as often to form a complete incrustation, and present to the shore birds as copious a supply of food, and one which can be found in as

quiet and hideling a manner, as the warblers find caterpillars in the groves. That does not hold in the case of the *littoral* birds only, which run upon the beaches, and never launch themselves on the tide, but with the swimming birds, even with those species of them which at other seasons career over the wide ocean; for even the storm petrels, the range of whose seaward flight exceeds that of any other birds, remain quiet among the rocks, in the holes of which they nestle, in the breeding season.

But, in order to keep up the succession, the rock, where it is not progressively built by the creatures themselves (as is the case with the coral worms which build from the bottom of a shallow sea, the sepulchres of one generation affording a base for the dwellings of the next, till they reach the surface), must be annually cleared for a new crop, just as the fields are cleared of annuals, and the deciduous trees of leaves.

Thus there is, on the tideway rocks, and all against which the roll of the waters bears strong, what may not improperly be called a fall of the shell, something analogous to the fall of the leaf upon land. When the equinoctial gales set in during the autumn, and all the shallow portions of the sea are in turmoil and fury, ploughing up the sand, scattering the pebbles, tearing up the sea-weed, and assailing the cliffs with battering fragments and washing surges, the number of shells, and other little animals, that are loosened from their moorings, dashed to pieces, or accumulated on the beaches, is beyond calculation, nay, almost beyond fancy. Those animal matters are specifically lighter than the sand and gravel, and, consequently, they are thrown high on the beaches, to the very top of the spring tides, which are then at their *maximum*, and the littoral birds find them spread out along the shores, just as the field birds find the seeds of plants, which the autumnal winds scatter; and the accumu-

lation of birds with the season is not greater in the one case than in the other, though from the one class being seen in line, and the other in column, as already mentioned, the accumulation on the shore may appear greater in proportion than that on land.

These autumnal scatterings of young life and its germs do not partake of the characters of wasting and destruction, though in the course of them much is destroyed. The seeds and germs, both in the sea and on land, are many hundred-fold what is required for the continuation of the races, so that the proportion that can be spared for the birds is far greater than the produce over and above the seed of the most productive vegetable that man cultivates. Autumn is, in fact, the grand seed-time of nature, both in the sea and on the land; and those gales which lash the one into foam and fury, and sweep the other till it is bleak and leafless, are the messengers of nature, upon whose wings the germs of life are borne to all places where they have the chance of coming to maturity. The littoral birds, even those species of them that are not seen in the very heat of summer, appear so immediately after these autumnal gales, that it would require more knowledge than the mere fact of their being seen or even found breeding in countries farther to the north, to bear out the conclusion that they must all come from thence. But the subject is one which requires the most comprehensive and at the same time the most careful and minute investigation.

THE KNOT TRINGA (*Tringa Canutus*).

The common name of this bird is said to be a corruption of that of Canute, who, as the tradition runs, was partial to it as food, though whether he feasted on it the same day that he erected his throne within flood-mark in order to reprove the adulation of his courtiers by a somewhat ostentatious

and not over-credible display of his own wisdom, has not been said. There is no doubt that the knot was in the country before Canute ; that it was as familiar with the tides as it is now, and that the king might, had he been so minded, have learned from it the necessity of flitting before the returning flood.

This species is larger than either of the former. It is more than ten inches long, nineteen in the stretch of the wings, and weighs from four to five ounces. The tail is square and very broad at the end. The bill is straighter and rather shorter in proportion than that of the purple tringa, the tarsi are longer, and the hind toe turns inward like that of the turnstone. The general structure of its feet adapts it to softer surfaces than those upon which the purple species is chiefly found. In the winter season, these birds flock in very considerable numbers, and run very swiftly upon the sands, which, with the fens, are their principal haunts. Like most others of this and the analogous genera, they change their plumage with the seasons, and on that account have got various names. In former times, they were more plentiful in England than they are now, since the fens have been reduced by drainage ; but they still assemble in considerable numbers in Lincolnshire, Cambridgeshire, and other fenny parts of the country, the period of their congregating being as early as August. Flocking at that particular time of the year, and that, too, not on the sands, but on the fens, upon which the birds remain till the frost prevents their feeding there, is not very consistent with breeding and moulting in the arctic regions (and birds usually moult, more or less, in the same places where they breed), although, being widely distributed, these birds are found far to the north. It seems from the accounts, that they appear simultaneously on those parts of the east and west coasts that are adapted to their habits ; and that though their numbers are every-

where in the country fewer than the old accounts represent, they appear in the south of England earlier than in the north of Scotland. Dr. Fleming mentions having shot one in Sandæ, or Sand Island, in Orkney, in the middle of June, 1808. That island, as the name implies, is, with the exception of the western side, low and sandy, with many flats extending into the sea, and the soil is light and fertile, and the climate mild, so that the birds have there a locality not very unlike that on the Wash, where they used to be so abundant in former times. They are also to be found on the extensive sands between Aberdeen and Peterhead; and there is not the least doubt that they breed in various parts of the country, though dispersed and hideling, as is the general habit of the order.

The summer plumage on the upper part is black, with rusty red margins to the feathers, and spots on the scapulars; the breast rusty, passing into white, mottled with spots of dusky and rust colour. The wing-coverts dusky, tipped with white, the tips of the greater ones forming a bar on the wing. The quills dusky, with narrow white margins. The upper tail-coverts white, barred with dusky, and spotted with rusty brown. The tail feathers dusky ash, with a little white on the margins. In winter, the general tint of the upper plumage is dusky ash; and the under white, with streaks of brown on the flanks, and sides of the breast. The young resemble the winter plumage more than the summer.

THE CURLEW TRINGA (*Tringa subarquata*).

This is rather a rare species; and from several of its characters, it is more of a sea-side bird than some others of the genus. Though it has often been described as only an occasional visitant, there is no doubt that it sometimes breeds in England, as the young have been found in the month of July, which is perfectly incompatible with the notion that

they could have been stragglers, hatched in another part of the world, and wafted to our shores by the winds. It does not, from the accounts, appear to be very numerous anywhere, though more abundant on the continent of Europe than with us; but still we have so unequivocal evidence of the fact, that we cannot for a moment doubt that it is at least occasionally hatched in the country.

Its characters, independently of colour and size, which are not very certain data, are well marked. Its size and weight are about the same as those of the purple species, and in the winter state of its plumage it resembles the purre; but its legs are longer, more slender, bare to a considerable distance above the tarsal joints; and its bill is a quarter of an inch longer, and curved something in the same manner as that of the curlew, from which it has obtained the trivial name of that bird. The bill and feet are black. It has altogether more the character of a wading bird than most others of the genus.

In winter, the forehead, streak over the eye, and throat, are white, more or less tinged with rusty brown, according to the season; the crown, nape, and back, black or dusky, with more or less of rusty brown on the margins of the feathers. The breast pale cream-colour, and the rest of the under parts white, with few or no streaks on the flanks. The tail slightly wedge-shaped, of a brown ash colour, the shafts streaked, and the webs tipped with white. The quills dusky, with pale margins to their inner webs, the upper tail-coverts white, with pale dusky bars. The feet and bill at that season have a bluish tinge.

In the summer, the white on the head is replaced by dusky ash, the cream colour on the breast by reddish brown, with some dusky spots, and brown and dusky spots on the flanks, and bars of the same on the under tail-coverts. The black on the upper part becomes more intense, and the margins of the feathers redder and mixed with black. The changes

both ways are gradual; they are changes of colour, not changes of feathers; and hence, the birds may be met with in every intermediate stage. But the feathers which variable birds get after the moult, are never so finely coloured as the breeding plumage; they are intermediate between that and the colour of the young. The birds build near the margins of the water; the eggs are four, of a dull straw colour, with brown spots.

TEMMINCK'S TRINGA (*Tringa Temminckii*).

This is a rare as well as a small species; and the few specimens which have been observed in England, have occurred in the autumn or winter, and not far from the sea; but having been found at different periods of the season, they have been in different states of plumage; and thus, from the natural desire of every observer to add something new, they have not unfrequently been described as distinct species. The bird has been called the least snipe, and the little sand-piper; but if the character of the bill (the best of all characters when sufficiently marked) is to be depended on, it is neither snipe nor sand-piper, but has, like all the genuine tringas, a bill something intermediate between the two.

It is a lightly and elegantly formed little bird, about six inches in length, and weighing about six drachms. Its bill is rather less than three quarters of an inch long, very slender, very slightly bent, and a little thickened towards the point, and of a dusky brown. The irides are nearly the same colour as the bill; the feet are browner.

The colours of the breeding plumage are,—the head black, with rust-coloured margins, a light streak over the eye, and a dark spot before it; back and scapulars dusky black, the feathers margined with greyish white on the exterior, and rust-colour on the interior webs; but in some, all the margins rust-coloured. The quills dusky with white margins;

the tail, which consists of twelve feathers, has the two middle ones dusky, the next on each side ash coloured, with rufous margins, and the exterior feathers entirely white. The breast is yellowish ash with brown streaks ; the chin, belly, vent, and under tail-coverts, white. In winter, the plumage above becomes brownish, and the margin grey ; the breast becomes white, with only a few streaks of brownish. The young have the upper part more mottled with reddish and grey, and the white on the under part not so entire.

MINUTE TRINGA (*Tringa minuta*).

This species is nearly of the same size as the preceding, only the tarsi are longer ; the bill and feet are black, the tail is double forked, and the markings of the colours are different. In the summer plumage, the margins of the feathers, on the upper part, are redder, and the black upon the head forms spots. The colour on the sides of the neck and breast is also more inclined to red, and marked with triangular spots of dusky brown ; but it does not quite meet on the middle of the breast, which, with all the rest of the under part, is white. The rump and two middle feathers of the tail are black, the other brownish with white margins. In winter, the upper plumage becomes greyish and brown, with a dusky streak on the shaft of each feather, and the red on the sides of the neck and breast becomes ash-brown.

BUFF-BREASTED TRINGA (*Tringa rufescens*).

The buff-breasted tringa is a very recent addition, not only to the British Fauna, but to that of Europe. Only three specimens of it have been found in Europe. One of these is in the museum at Paris ; another was taken at Melbourne, in Cambridgeshire, in September, 1826 ; and a third, which is now in the Norwich museum, was taken on the coast of Norfolk, in (if I remember rightly) the autumn of 1831. It

is an American species, and, from the accounts, it appears to be a rare bird even in that country. The few specimens that have been seen are not sufficient for enabling any judgment to be formed respecting its haunts or habits, farther than may be inferred from its agreement in structure with the rest of the order.

The form of its bill obliges it to seek its food upon soft surfaces, or, at all events, to seek soft food in humid places; but whether chiefly in the inland marshes or on those nearer the sea, it is of no avail to speculate.

It is about the same size and shape as the curlew tringa, and as, when seen at a little distance, all the tringas have a considerable resemblance, it *may* have been mistaken for it, at the time when birds flock. The bird found in September had the following tints in its plumage; head mottled with brown and buff, upper part blackish brown, with lighter margins. Chin, throat, neck, and upper part of the breast, buff yellow, and all the rest of the under part white, mottled with buff. The mottling with buff on the under part affords a strong presumption, though not an absolute proof, that the specimen in question was a young bird, and its plumage, as is not unfrequently the case with young birds, something intermediate between the summer and winter plumages of the adults. But so little is known respecting them, that it would be unsafe and unfair to hazard any opinion. America is the best place in which to study the habits of these birds, and of all the analogous genera. The marshes to the northward of the St. Lawrence and the lakes, offer a pasture for the Grallæ, to which there is nothing equal in any other part of the world; and as those marshes freeze during winter to a depth which no bill can pierce, even if it had the sweep and power of a pick-axe, the birds must move southward. There is ample room and also ample provision for them in the southern marshes, both along the shores of the Atlantic

and in the central valley ; but those swamps are in many instances so concealed by trees, and so extended and difficult of passage, that the examination of them is no easy matter.

THE LONG-BEAK (*Macroramphus*).

Only one species of this genus is known as a British bird, the *brown long-beak* (*Macroramphus griseus*), and it has been popularly described as a snipe, the brown snipe of authors. It is not a snipe, however, neither is it a tringa ; it is something intermediate ; and though as a British bird it is a mere straggler, of which a specimen cannot be confidently looked for in a year, yet it is important, as showing the beautiful gradations that may be traced among the feathered tribes.

The long-beak has in shape the body of a tringa, but partly the markings of a snipe, and the feet are not of quite so wading a character as those of the snipes. The bill, like that of the snipes, is sentient at the tip, where it is enlarged, but it is more slender and less depressed than that of the woodcock, the species of snipe which it most nearly resembles in character and habits.

The bird is about ten inches long, eighteen in the stretch of the wings, and weighs between three and four ounces. In summer, the crown, nape, back, and scapulars, are black, mottled with rust-colour and yellowish white of various shades. The wings are olive brown, with white centres and margins to the secondary quill, and a white shaft to the first primary. The tail, consisting of twelve feathers, white, thickly spotted with black. Sides of the head yellowish white, mottled with small black spots ; throat and breast reddish buff ; sides white with black bars ; vent and under tail-coverts the same ; all the rest of the under part white ; feet dull yellowish green ; bill dusky black at the tip, bluish at the base ; irides deep dusky. The female is paler in the

upper plumage, and in the red on the breast. The following extract from Wilson's delightful book will show the habits or the bird in its native regions: It "arrives on the sea-coast of New Jersey early in April; is seldom or never seen inland: early in May it proceeds to the north to breed, and returns in the latter end of July, or the beginning of August. During its stay here, it flies in flocks, sometimes very high, and has a loud and shrill whistle, making many evolutions over the marshes; forming, dividing, and reverting. They sometimes settle in such numbers, and so close together, that eighty-five have been shot at one discharge of a musket. They spring from the marshes with a loud howling whistle, generally rising high, and making several circuitous manœuvres in the air before they descend. They frequent the mud-lines and mud-flats at low water, in search of food; and being less suspicious of a boat than of a person on-shore, are easily approached by this medium, and shot down in numbers. They usually keep by themselves, being very numerous; are in excellent order for the table in September; and, on the approach of winter, retire to the south." Wilson adds, that they are the most numerous and delicious of all the sea-side snipes in North America; and infers, from physiological indications, that they cannot breed very far to the north. It would be very desirable if similar physiological observations were made upon those birds which remain even stragglingly upon our shores till the season is far advanced.

There can be no question that the species under consideration is a mere straggler from those numerous flocks that migrate.

SNIPES (*Scolopax*).

The snipes are quiet and retiring birds, which inhabit moist places, where water partially stagnates, or the soil is otherwise so soft, that they even bore into it with their bills.

They either live in concealment among the rank herbage of marshy places, or conceal themselves during the day, in the woods, and come abroad to feed in the dusk, or during the night.

The bills of the snipes are curious organs : they are soft, long, straight, flattened, and slender ; blunt at the tip, with the upper mandible larger than the under, and forming a knob on its under side, against which the tip of the lower mandible acts. The nasal grooves extend nearly the whole length of the upper mandible, and the nostrils are narrow longitudinal slits, covered by membranous valves. The bill is copiously supplied with nerves, and highly sentient ; and the membrane with which it is invested, and which becomes shrivelled after death, in the same manner as the organs of sensation in all animals, are the first to shrink or shrivel, is probably endowed with more than one sense—smells the food in the soft earth, and feels it, after boring down ; as the birds bore down upon their prey, whether worm or aquatic insect, and do not dabble along, as if merely guided to it by touch, as many swimming birds are. The form of the head is also peculiar. Its profile is square, and the eyes are placed much farther backward than those of most birds, so that they see better laterally than forward, and probably command nearly the space behind them. Their eyes not being much wanted in the immediate capture of their prey, are placed so as to guard best against enemies, and to allow the bill to bore in the mud for its whole length. The feet are adapted for walking rather upon soft mud than on grassy surfaces, as they have the hinder toe very little produced or extended. They moult twice in the year, but with little difference in the markings, only the tints are richer in the breeding season. From their localities and habits, they enjoy a more uniform temperature than most other land birds.

Two species are found in the country, periodically or occasionally, but one only remains to breed, at least in any considerable number. From the manner in which their food is procured, they are of course driven southward as the ground begins to freeze, and the time and extent of their migration depend on the time and intensity of the frost.

THE COMMON SNIPE (*Scolopax gallinago*).

The common snipe is about twelve inches in length, of which the bill occupies three; the extent of its wings is about fourteen inches, and its weight about four ounces. Bill, brown at the tip, yellowish in the middle, and reddish toward the base; smooth in the living bird, but becoming furrowed and dull in the colour after death. Crown of the head, dark brown, with a yellowish white or straw-coloured line down the middle, and an obscure one at each side over the eye. A brown line from the gape to the eye, continued by a row of spots down the side of the neck. The back black, with a gloss of bronze colour, and the scapulars striped on the one web and barred on the other with yellow. Wings dusky, the quills tipped with white, and some parts of the wing barred with brown. Tail-coverts reddish brown; and the tail feathers, so far as they appear from under the coverts, the same; irregularly barred with black. The chin and front of the neck are yellowish white, barred with brown. The belly is white. The feet, which are naked above the tarsal joints, are greenish ash. It is not, however, possible to describe the colours of the snipe in words, or to fail in knowing the bird after it has been once seen.

In winter, the common snipes are very numerous in those low marshy places which yield them food and concealment; and the native numbers are generally recruited by supplies

from the north of Europe. When snipes have settled in any place, either in the breeding time or during the winter, they are raised with difficulty ; but when they are shifting about for a pasture, they are not so close. When raised on short flights, they traverse, but do it so quickly that, although they do not get away fast, it is not very easy to hit them, and they keep hawks in play for a considerable time. When removing to any distance they fly very high, and their calls can be heard when they are beyond the reach of ordinary vision. Their greatest natural enemy is the marsh harrier.

In the spring, the birds retire from the low grounds as those begin to get dry, and seek their way to more northern or upland places, where the winter lasts longer, and the surface continues more humid ; and probably some of them leave Britain for more northerly places. A few, however, remain in most parts of the country, but they are most numerous in the north and north-west of Britain, and especially in the bogs of Ireland.

The seasonal cry of the male begins in the end of March, or sometimes in April, according to the place and the season, and it continues as long as the female sits. Until he finds a mate the male often cries during the day, but after pairing he is heard chiefly in the evening. The call is a mixture of piping and bleating, always uttered on the wing, and swelled and hurried as the bird ascends. While uttering it, the bird, if visible, is always in a state of great excitement, with the wings quivering ; but whether the action of these upon the air occasions any portion of the sound, as some allege, is a point not easily denied or proved.

The nest is hidden among the thick herbage, and consists of a small hollow, carelessly lined with withered plants. The eggs are four, of a pale greenish grey with brown blotches, some lighter, some darker ; and they are arranged quatrefoil.

The young quit the nest immediately, at which time they are covered with down of a greyish brown colour; and their first plumage, which they acquire rather rapidly, is darker than that of the old birds. Their bills are at first short, and do not gain their full length till two or three months, or their full consistency till the following spring. The female is seldom seen during the incubation. Indeed, both the birds are so close during the heat of the day, that one may walk about for hours, in places where they are abundant, without seeing one; and even if seen they do not readily rise (or *flush*), but skulk among the herbage, rather quickly, but at the same time so stealthily, and with so many deviations from the straight line, that they are soon lost sight of. A snipe gliding through the aquatic plants, alternately hidden and half displayed, is a very pretty sight. Unless during the breeding season, snipes are constantly changing their ground, and appear to have considerable labour in the finding of food; but the probability is, that it is the effect of the weather upon their food, and not upon the birds themselves, which is the cause of their shifting.

Snipes, though retiring birds, have not the solitary habits of the bittern; and though cultivation has made them change their localities in the breeding season, it is doubtful whether it has diminished their numbers, especially in the winter, as the enriching of the soil tends both to augment the quantity of their food and to render it more accessible, and I have seen them nestle within a few hundred yards of a farm-house, in a situation not very elevated, or far from the sea-coast.

THE WOODCOCK (*Scolopax rusticola*).

The woodcock is perhaps the species most prized for the table, partly no doubt on account of its superior size and weight, and partly on account of the *sport* which the shoot-

ing of it affords. It must be considered chiefly, though not wholly, as a winter visitor, coming to Britain when it is frozen out in the countries that lie farther to the north, and have their winter less open. There are, however, some well-authenticated instances of its breeding in the country. These are not numerous, it is true, but they are at least as much so as the visits of some of the straggling birds that have of late years been added to the British Fauna; and if two or three random visits constitute a British bird, two or three breedings naturally taking place in the country, should, by parity of reasoning, elevate the bird to the condition of a native.

There is no question that one species of improvement, and that not an unimportant one, has a tendency to encourage the breeding of the woodcock. The chief difference in habit between the woodcock and the common snipe, is in the cover in which they conceal themselves during the day at all times, and conceal their nests in the breeding season. The snipe prefers a cover of tufted herbage, or hassocks of heath and grass, alternating with sludgy pools: the woodcock seeks the cover of trees, and nestles among the tufts at their roots, but always on or near a soil very similar to that which the snipes prefer. All that has to be done, therefore, is to plant the nesting-place of the snipe, in whole or in part, and it becomes an adequate nesting-place for the woodcock.

It is sometimes said, that one of the causes of the northward or polar migrations of birds in the spring, is the lengthening of the days, which affords them longer time for their daily labours; and in the case of those birds that feed during the day, that may be true, but it cannot apply to the woodcock, which reposes during the day, and feeds at night, or in the twilight. No doubt the twilight is longer as the latitude increases; but in the north of Scot-

land, it is twilight all night long in the summer ; and therefore there is no want of anything but proper cover for the birds.

Plantations of deciduous trees, in the southern and warmer parts of the country, would not suit them, because the ground under them is either dry or covered with grass and other rank vegetation ; but there are very many places along the bottoms of the hills that have been planted with pines, which are interspersed with small pools and springs, which remain humid in the summer, and seem to be fit pastures for the birds, at the same time that they break the sweep of the hill storms, and are of great service to the cultivated fields. Along the secondary hills on the south side of the Grampians, and also on the "Braes of Moray," and many other places, very extensive plantations of the kind alluded to have been already formed ; and as in winter, or at least to a very late period of the autumn, woodcocks are very numerous in these, there is little doubt of their remaining there to breed in much greater numbers than has been supposed. One ground of corroboration is, that the woodcocks show symptoms of pairing before they quit the southern parts of the country, as early indeed as the month of February, by which time they lose all their delicate flavour, and are not fit for the table.

Our information respecting their habits in the breeding-places is neither precise nor complete ; but that as well as their habits when they are with us, shows that they are hiding birds ; and that, as in the case with the dottrel, they may even now nestle in numbers in the remoter wooded parts of our own mountains without being observed. The old birds are very voracious feeders ; and where such is the case in other birds, the young are always more so ; and as they do not take the wing even in winter unless they are compelled, or when they are shifting their ground, they may remain for

the whole breeding season without being once in the air or once seen. The nests are understood to be in the closest underwood, on or near the ground, so matted up with the surrounding vegetation as not to be easily seen, though containing but few artificial materials. The eggs are dull yellowish white, blotched with reddish brown, and *understood* to be four in number, like the rest of the snipes and the analogous genera.

But though some woodcocks have been known to breed both in Scotland and in the north of England, and though many more, in all probability, do breed in the island, we certainly receive large autumnal supplies by migration, and that directly from the swampy portions of the Scandinavian forests, as the birds come in the greatest numbers with north-east winds, not driven by the fury of tempests, as the tree-birds of that part of the world often appear to be, but when the wind is moderate, and before the weather begins to be very severe. Starved-out the birds are not, for they usually land in high condition, very little fatigued, and can hardly be said to improve upon their southern pastures.

The snipe family in general, and woodcocks in particular, seem to be among the most meteorological of birds. That sudden, and, to our observation, capricious shifting of their ground, to which allusion was made in noticing the common snipe, shows a feeling of the changes of the weather which, to our comprehension, is absolutely prophetic; and though that must, no doubt, in part, be attributed to the delicate sensibility of those creatures on which the birds feed, it must also be in part owing to the sensibility of the birds themselves, inasmuch as they are not starved or even exhausted after their longest migrations.

And when we consider how very sensitive an organ the bill of these birds is, that it answers many of the purposes of

a nose, an eye, a tongue, and a hand, we may cease to be puzzled about the exquisite sensibility of the birds to the most minute atmospheric changes. An organ of sense is not a detached being, sentient in itself, and confined to that perception of which it is more immediately the organ ; it is an organ of sensation generally, and of a particular modification of that general sensation, according to its structure. We find in ourselves,—though, as our sensations are in a great measure controllable by our trains of inward thought, we may suppose them to be as detached from each other as they can be, consistently with *our* animal system,—that our organs of sense are very easily affected by causes which do not apply to them as the instruments of particular senses—that they sympathize with each other, and are pleased or offended in concert, and that they are also remarkably sensitive to atmospheric changes. We all, more or less, feel the coming changes of the atmosphere, though, when we are high in health and activity, we do not always heed them ; but when, from any cause, the sensitive system is in a state of irritation, and we have leisure, or are compelled (for it is often too powerful for both reason and necessity) to listen to it, we are as meteorologic, live as much at the mercy of even the minor changes of the atmosphere, and prognosticate them as early, as the woodcock.

The whole economy of that bird, and indeed of all the snipes and birds which have their bills tipped, margined, or otherwise covered by nervous and sentient membrane, is highly useful, as well as curious, in a meteorological point of view : they all have the bill much in water, or in earth which is rendered soft by the admixture of water ; and cold, drought, and light, seem equally painful to them, probably by stiffening the membrane, and rendering the circulation in its delicate tissues interrupted and laborious. The noise made by ducks and geese before rain, and the glee and joy which they

express when the drying power of the atmosphere begins to relent, are direct proofs of the principle here contended for : and there is another corroboration ; woodcocks and snipes generally perform their migrations when the air is humid, often when there is fog upon the ground. If dry frost suddenly overtakes them, they perish ; and by analogy, which in this case is not a vague assumption, they seek humid and shady places for their nests, impelled thereto by the action of the drought upon their delicately sensitive bills, which thus serve the double purpose of finding their food by boring into the soft mud, and guiding them *instinctively* to the places in which that food is to be found.

Thus, though to the sportsman and the epicure, woodcocks are very interesting birds, they have a much higher, and, if properly followed out, a much more practically extensive importance, as part of the grand system of nature, in which all the productions of creation, and all their phenomena, work together, so that no individual exists, and no event happens, singly and of itself.

This very curious subject would admit of much latitude of inquiry, and lead to many very striking results ; but we have no space for entering upon it, as it is one of which a partial view would mislead ; as little is it necessary to give any particular description of the woodcock, a bird which, when in the country, can in general be seen only by the sportsman, to whom to offer any instruction, would be treason against the canons of Nimrod.*

* Both snipes and woodcocks breed more abundantly in our island than has been supposed. The woodcock generally deposits four eggs on a dry bank, and the young, as soon as hatched, are conveyed to wet, swampy grounds. We have ourselves disturbed this bird while incubating, within the precincts of a small wood near the banks of the Bollen, in Cheshire. The neighbourhood of Woolmer Forest is among their breeding-haunts, and many other places might be cited. The old birds remove the young by taking them up one at a time in their feet, and

THE GREAT SNIPE (*Scolopax major*).

The great snipe is a migrant bird on the continent, breeding in the marshes of the northern parts, but belonging to the eastern migration, and therefore visiting the British shores only occasionally, as a straggler on its return southward in the autumn. The marsh birds of that migration appear to be most dispersed by dry seasons in the marshes of Finland and Russia, which are their chief breeding-places. In these cases they are scattered at an earlier period than usual, and some of them are caught by the east winds, and drifted to our shores. It has been called the "solitary snipe," from the few specimens that have appeared in the country being found alone; and as its appearance and manners are nearly the same as those of the common snipe, it has sometimes been regarded as a variety of that. Its form and the markings of its colours are very similar to those of the common snipe, but it is fully one-third larger in the body, and at least double the weight. Its nidification in the eastern marshes is said not to differ much from that of the common snipe in this country.

SABINE'S SNIPE (*Scolopax Sabini*).

This is another occasional straggler, of more rare occurrence in this country; neither has it been clearly ascertained whence it straggles, or of what part of the world it is a native. The places which snipes inhabit are, however, in all countries difficult, and in some countries impossible, to explore; and the habits of the birds themselves conspire, with

flying away with them. White, in his "Natural History of Selborne," says: "Numbers of snipes breed every summer in some mossy ground on the verge of this parish. It is very amusing to see the cock-bird on the wing at that time, and to hear his piping and humming notes." They always hum as they are descending, and probably the noise results from the action of the wings.—M.

the difficulties of their haunts, to render them less easily studied than many other birds. It is only of late years that the bird has been observed; one specimen in Ireland, one in Kent, and one in the north of England: but when the discovery of the fiery-crested wren by the cat, as a native bird, is borne in mind, it need not be matter of wonder though this snipe should be found to be a native, and even a permanent resident in the more retired and inaccessible morasses of this country. It is smaller than the common snipe, darker in the colour, and has the bill at least half an inch longer in proportion. Its general colour is brownish black, relieved with chesnut and rust-colour on the margins of the feathers. The size most nearly corresponds with that of the jack-snipe, only it is a little larger. The number of feathers in the tail is also the same, being twelve, while the common snipe has fourteen, and the great snipe sixteen. The narrower the tail, the more woodland, generally speaking, is the habit of the bird; and the same rule which applies to the perennial vegetation of the forest, applies to the tall annual vegetation on the marshes and banks of rivers. From the time at which the Irish specimen was found (August), we cannot well regard it as a stray one from any migration. If those who record the notices of new or rare birds, would record also the state of the weather for some time previous, they would thereby greatly facilitate the progress of natural science.

THE JACK-SNIPE (*Scolopax gallinula*).

Of this regular winter visitant a figure, one-third of the lineal dimension, is given on the plate at page 112. It is a small species, being only about half the size and weight of the common snipe; that is, about two ounces in weight. It is a very beautiful little bird; the scapulars, rump, and other

parts of the back, glossed with rich metallic reflections of purple, bronze colour, and green.

The account usually given of this very interesting little snipe is, that it arrives in Britain, by foreign migration, about the month of September, seldom, if ever, later than the middle of the month; that it remains with us during the winter; and that, as early as March, or even as February, if the season be mild, it retires again towards the *polar* countries, where it breeds.

Now, that the bird appears and disappears on the coasts and warmer parts of the country at the times stated, is, no doubt, true; but the times themselves do not answer well with a migration to the "polar regions"—the general place of exile for all birds of whose haunts, during the breeding time, writers on natural history are ignorant. These birds do not build on the shores; and it is not summer in the interior of the arctic lands before May, or even June; so that the birds would have a very lingering journey northward. On that journey we might expect to find them resting in great numbers upon all the marshy parts of the Orkney and Shetland Islands; but that is not the case. In Orkney, they are mentioned as having been seen in the island of Wester-æ; but even there they are not numerous, and the time of their appearance does not answer to that of a halt upon a migration. There is also no known place in the north where such numbers of inland birds from Europe could breed, as are reported to resort to the extreme north for that purpose.

On the other hand, when we consider the habits of the jack-snipe, while with us on the low grounds in the winter, we may thence see that it *could* remain and nestle in the heart of the larger bogs and morasses, without being observed. Even at that season, when almost all birds fly readily, and some species, which are dispersed, obscure, and hideling, in the breeding season, congregate together, and are much in

sight and upon the wing, the jack-snipe lurks and conceals itself in the herbage, and allows itself to be almost trampled upon before it can be raised. In winter, it keeps much more under cover, and further into the marsh than the common snipe, though even that bird rarely *flushes* of its own accord, or indeed is seen, unless when it is forced up. I have seen a family of snipes squatted and basking in the sun, with their tails to the light, and their heads in the herbage. That, I believe, is to be seen only on the small bog-streams, where there is a square yard or two of sod between the rill and the tall herbage. It is, I should suppose, rare even there, as the moment that there is the least rustle, the birds vanish like magic, and you may seek long enough before you can get another sight.

The eggs of the jack-snipe have certainly been found on the cold bleak moors of Yorkshire; and we have no other instance of a bird, which resorts generally to the polar regions to breed, remaining and breeding so far south. The habit of the genus is also something: all the snipes resort *inland* to breed, and that is not quite consistent with a voyage to the arctic regions, at nearly the same time when our other birds, of the most analogous habits, are beginning to move to our own upland wastes to breed.

The whole question of the breeding places of the genus wants revision. As the birds move chiefly during the night, both on their longer and their shorter migrations, or at least are seldom seen moving by day, which, in so far as knowledge is concerned, amounts to nearly the same, we know very little of their motions. It is generally understood, however, that, among some of them, there are symptoms of pairing before they retire, and that may supersede the necessity of any nuptial song like that uttered by the common snipe. In the shooting season, jack-snipes prefer what is called "hassocky bogs," that is, bogs where tufts of herbage

are scattered over a sludgy and watery surface; and by retiring into the fastnesses of these, they could, during the breeding season, be safe from most predatory animals, and also find food both for themselves and their young, with very little exercise of the wing.

It must be admitted that, in northern and humid countries, the progress of waste and ruin is almost as unfavourable to snipes and the analogous species of Grallæ, as the progress of drainage and improvement. As long as the bog, or accumulation of mosses, dying at bottom and growing at top every year, can retain pools of water, and support rushes and coarse grass, snipes will resort there; but, in the course of time, longer or shorter according to circumstances, the mosses destroy all else, die themselves, and the surface becomes sterile, naked, and black, impervious to water, and therefore, during every shower, sending down the spores of the moss, which, though latent, are not destroyed, to invade the lower grounds; and as such a surface is wholly at the mercy of the atmosphere, it cools like an iceberg in winter, and heats like a volcano in summer.

GODWITS, OR OOZE-SUCKERS (*Limosa*).

The birds of this genus have some resemblance to the snipes, and also to the tringas, but they differ from both in so many particulars, that they cannot probably be classed with either.

Their legs are longer, and perhaps also stouter in proportion to their size; their bodies are more lightly made, and their necks are longer and more lithe. The chief difference, however, is in the bill, which, in birds that in their haunts are such close neighbours, is the most important. Their bills are very long, soft, and flexible for their whole length, rather compressed and triangular at the base, depressed in the rest of the length, and dilated and obtuse at the tip, but

not enlarged into a knob like that of the snipes, nor having the upper mandible in the least hooked or projecting over the under. It is not a snapping bill, nor a boring one, neither is it a scooping or a dabbling bill. It is not very easy to find a single epithet descriptive of the function that it performs, or rather of the manner in which it performs that function: it is not shovelling or scooping, for it does not remove from its place the sludge and sediment of the water among which it seeks its food; and it does not dabble or wash the mud as ducks do, till it finds out the substances of which it is in quest. "Poking" is the nearest epithet, but does not express the action exactly, as the bird "tries about," and selects its food by the sense of touch in the bill, and not by the sight.

The birds are more of a wading habit than snipes, as the other snipes are more of waders than the woodcocks; but still the food is not found in the water, but in the ooze; and if that ooze is soft enough for being penetrated by the bill, the fact of its being with or without a small stratum of water over it is of little consequence. That food is chiefly mud-worms, mud-insects, and mud-larvæ; and the places which the birds frequent are those in which these abound the most—the banks in the eddies of slow-running streams, or the accumulations of sludge that are left bare in the estuaries and creeks upon the shores of low and rich land on the ebbing of the tide; and especially the runs of mud from the richer grounds into the pools of fens are the favourite places with these birds. They breed in the fens, at a considerable distance inland, if the ground is suitable, but they descend nearer to the sea in winter. In their inland haunts, they hide themselves during the heat of the day among the long grass, where they have their nests; and when they are near the sea, their resting time varies with that at which the tide leaves their favourite banks in the best condition for them.

Godwits run very fast, more rapidly than snipes or tringas, and make their escape to a considerable distance on foot before they take wing; when they do, they yelp and clamour in a very loud and rather a harsh and bleating strain.

There are two species that may be considered as British birds, the black-tailed godwit, and the bar-tailed godwit; but as they are subject to varieties of plumage, and also to differences of size, they have sometimes been multiplied into three or four species.

THE BLACK-TAILED GODWIT (*Limosa melanura*).

There is some "confusion of tongues" in the account of this species, for which the bird itself appears to be, of late years, making reprisals, by becoming rather more capricious in its appearance than it used to be. It still breeds in the fens, though much more rarely than in former times, and recently it appears as if it sometimes alternated with the other and migrant species.

The most distinctive characters of the black-tailed godwit, and those which it most decidedly retains in all the changes of its plumage, are the form of the bill and the colour of the tail. The bill has so slight a curvature upwards, that it is hardly perceptible without applying a straight edge to it; and the tail is black for two-thirds at the distal end, and white the other third at the bases of the feathers. The other godwit has the bill more recurved, and the tail with numerous bars of black and white, and it is also rather shorter in the tarsi in proportion to its size.

In its summer or breeding plumage, the black-tailed godwit has the head reddish brown, streaked with dusky and black; the lower part of the neck behind, the back, and the scapulars, black, barred or margined more or less with brown. The coverts of the wings brown, the lesser edged with white; the quills dusky, with white at the bases. A dull white streak

passes over the eye, below which the cheeks, neck, and breast, are pale reddish brown, and all the rest of the under part is white.

In winter, the brown on the clothing feathers of the upper part fades to grey, and the black to brown ; the dark colours in the wings and tail become a little dingy ; the reddish brown disappears from the cheeks, neck, and breast, leaving all the under parts white. In spring and autumn, when the colours are changing, but especially in the former, the breast and upper part are mottled. The young have the whole plumage more mottled and dingy than the old birds in either of their plumages, or even during the changes.

The size and weight are subject to considerable variations, but the average length is about seventeen inches, of which the bill occupies about four, and the stretch of the wings is nearly two feet.

Godwits are shy and retiring birds, generally concealing themselves during the day among the tall herbage of the fens, and coming out to feed only in the twilight, or indeed during the night. As they find their food by the touch of the bill, and not by the eye, light is less necessary to them in their feeding. They eat indiscriminately the small animals that have been mentioned, and the spawn of frogs—more rarely that of fishes ; but though it is sometimes said, it does not appear that they eat the albuminous roots of aquatic plants, as their bills are not very well fitted for such purposes. They are sometimes found within floodmark on the oozy shores ; but the fresh-water fens are their favourite places, in which they rear their broods. The nest, like that of the whole tribe to which they are related, is very simple ; the eggs are four, of a dull brownish olive green, marked with obscure blotches of the same, a little darker.

These birds, as is the case with all the fresh-water marsh birds which feed upon soft and gelatinous animal food, are

highly prized as food when in good condition. In former times, they were captured in considerable numbers and brought to the London markets ; but they are now comparatively rare. Their diminished numbers render them less an object to the fowler, and their retired habits conceal them from common observation, so that they may appear to be fewer than they are in reality.

THE BAR-TAILED GODWIT (*Limosa rufa*).

The bar-tailed godwit is not known to breed in England, though it comes as a winter migrant, and is said to appear in greater numbers in those seasons in which the other species is rarest. Neither of them is to be considered either in part or in whole as a regular migrant, shifting its latitude with the seasons. The red one generally, and probably also a portion of the winter numbers of the other, are to be considered as lateral visitors from the opposite part of the continent, which resort to us when their own pastures at home are flooded, or otherwise not suited to their numbers, or simply because the wind catches them on the wing, and wafts them across the short passage between Holland and Norfolk. Besides the differences already mentioned, this species has the top of the head in the summer plumage more entirely reddish brown ; more reddish brown on the upper part ; the colour on the neck and breast redder than in the other species, and is without white on the base of the quills. The brown upon it fades to greyish white in the winter, and the general plumage inclines to grey ; but the bills, the tails, and the lengths of the tarsi, afford distinct specific differences.

THE SCOOPING AVOCET (*Recurvirostra avocetta*).

The avocet is a handsome bird, though the length, upward curvature, and apparent texture of its bill give it rather a singular appearance. The length of the bird to the tail is

about a foot and a half ; but when the legs, which are very long, and bare to a considerable height above the articulations of the tarsi, are stretched out, they reach at least four inches further. The wings, which when closed extend rather beyond the tail, measure two feet and a half in the stretch. The legs are stout as well as long, the hind toe nearly rudimental, the three front ones all webbed for more than half their length, the webs extending in straight lines to the roots of the claws. The bill three inches and a half in length, bent upwards with a curvature gradually increasing to the point, so that, when it is brought in contact with the ground, a portion towards the tip is horizontal, and the tip rather inclines upwards.

With the exception of the irides, which are hazel, and the feet and naked parts of the legs, which are blue, all the rest is black or white. The latter is the prevailing colour, and it is beautifully clear and pure, the plumage being very smooth and compact, resembling that of swimming birds. The bill and head as far as under the eyes, and the nape, are black ; but relieved with a white line or white spots, more or less conspicuous, over the eye, and sometimes with a little white on the forehead. The bastard wing, the turn of the wing, part of the scapulars, the middle coverts, and the quills, are generally black, and all the rest of the body white ; but the quantity and also the distribution of the black varies in different specimens. The bird cannot, however, be mistaken. The bill is alone sufficient to distinguish it ; and it is altogether so different from any other British bird, that if once seen it never again can be mistaken.

The avocet is one of the most beautiful instances of adaptation in the whole range of animated nature ; and it is not the less so that it is somewhat out of the way of our ordinary speculations and conclusions upon that subject. According to ordinary observation, and familiarity with the tools which,

in very humble and distant imitation of the mechanical contrivances of nature, human artists use, we at once admit that the beaks of hawks and parrots, and the bills of ravens and bitterns, must be efficient instruments; but the peculiar organizations with which the cross-bill and the avocet are furnished, are apt to strike us at first sight as awkward and ungainly. When, however, we come to study their application, we find that the real subject of our criticism is our own ignorance, and that we pity or despise only because we do not understand; and that, in everything which nature produces, be it a single organ, an entire animal, or whatever it may, we always must admire, and not admire only, but be delighted, to the full extent of our knowledge. The doctrine of *optimism*, or "all is best,"—the sentence of approbation which the Creator pronounced upon the new-made world, still holds true, and will, throughout every change, hold true to the end. Nor can it be otherwise; because organization goes hand-in-hand with instinct—the very law and constitution of the nature of organic beings—from which they can no more deviate than lead can swim or air sink in water. But man, proceeding by reason, or, which is the same thing, by analogy or comparison, in which his own knowledge is always the standard, cannot well be right beyond the bounds of that knowledge, and may be wrong within them.

What we, for want of a more appropriate name, call the powers or energies of life, are all greatly in excess above the matter on which any one without the others would have to act; and the natural means by which the one consumes the surplus of the other, is the grand principle by which the whole are preserved.

When the predatory animal kills prey, be that prey what it may, the animal has no purpose, it merely obeys an instinct, and therefore it is neither kind nor cruel; but the

result is kindness to all. It is well known that if a meadow is neither grazed nor mown, the kindly sod sooner gives place to inferior vegetation—to moss, ragweed, dock, sedge, or something else according to the situation. If a fish-pond or a game-close is over-preserved, nature avenges the breach of her law, and sends death in a way which we do not understand. We call it *epizoöty*, that is, something which falls “upon the life;” but what falls, or how it falls, we know not.

Were it not that the tribes of the living world restrain each other, the duration of the whole would be brief—far more so than those who have not reflected on the subject would readily imagine. It is in the mutual destructions (which are in truth *preservations*) that we can best see the wisdom and goodness of the Creator, as it is in the principles which render these necessary to the system, that we can be most impressed with (for nowhere can we *understand*) the infinitude of his power.

When the lesson arises naturally, it is always a delightful as well as a salutary one; and nowhere is there perhaps a more striking instance than in one of those powers over which the avocet is in part placed as a check—the power of multiplication in fishes. If that power could act without limitation for the space of a very few years, the produce of the fish in any one of our rivers, nay of any one species of them, would build the valley of that river mountain height with fishes.

The average rate of increase in river fishes is more than fifteen thousand-fold to the single fish, at one single spawning; but we will call it ten thousand: then let us propose the question, “In what time would the productive power of a single pair of fishes, if it could act unrestrained, convert the matter of the whole solar system into fish—on the supposition that they spawned at the age of three

years, and that all but the last brood died in the course of the time?"

The sum of the diameters of all the bodies in the solar system, sun, planets, and satellites, is about one million of miles; and as the average of the matter which these bodies contain is not very much heavier, bulk for bulk, than water, the cube of a million, instead of the sphere inscribed in that cube, will be more than enough for expansion, in order that the matter might be as light as fish. It should be *the sum of the cubes*, which is only a small fraction of the cube of the sun; but no matter.

From 150 to 200 fishes to the solid foot will be ample allowance, and that will require for the solid mile

1,000,000,000,000 ;

or for the whole solar system,

1,000,000,000,000,000,000,000,000,000,

that is, a larger number than the whole human race could have counted ever since the creation. But let us apply the productive power of our two fishes to it. They multiply by 10,000 every three years; and therefore, every four 0s in the former number will answer to three years. There are between seven and eight; take the larger, or eight; and in twenty-four years, the productive power of fish would, not in the whole number, but the last brood from a single pair, convert into fish as much matter as there is in the whole solar system, sun, planets, satellites, altogether!

The conclusion is abundantly startling, and yet it is far—to our comprehension infinitely far—below the truth. It is one of the lowest rates, in a single one out of countless myriads, and that one greatly under estimated. What, then, shall we think of the whole!

When we apply our mathematics to matter in the dead and inert state, we may feel a little exultation at our science; but "the energies of life" defy the line, set at nought the

balance, outsum all number, and outsoar and wholly confound and bewilder imagination itself. When we think of those energies, we are forcibly reminded of that sublime challenge—that most forcible of all rebukes to human vanity, which the inspired writer addresses to the Patriarch as from the mouth of the Almighty himself: “Who is this that darkeneth counsel by words without knowledge? Gird up now thy loins like a man; for I will demand of thee, and answer thou me. Where wast thou when I laid the foundations of the earth? declare if thou hast understanding. Who hath laid the measures thereof, if thou knowest? Or who hath stretched out the line upon it? Whereupon are the foundations thereof fastened? or who laid the corner-stone thereof? when the morning stars sang together, and all the sons of God shouted for joy.”

Such are the conclusions to which, when followed out aright, the contemplation of nature leads; and when, in the proper frame and temper of mind, we get even such glimpses of what there is to be known, as the imperfections of the mortal part of our frame enable us to take, we feel the ardent desire and the exulting hope, of that time when we shall quaff the stream of knowledge—the river of the water of life—pure, fresh, and full, at the eternal fountain, and uncontaminated by pitchers of clay,—when the train of our contemplation shall not be interrupted by the dimness of eyes, or the deafness of ears; and, inspired and inspirited by that glorious hope, we feel all the paths of life becoming smooth and easy, and all the little rubs and obstacles of this world as no more hindrance to our course, than gossamer is to the bound of the lion, or the lightest rack of the summer sky to the wing of the eagle. But we must, for a little, leave those heights, and return to the avocet, beside the still waters.

The avocet is always an interesting bird from the peculiarities

of its form and manners; and of late there is added to it the additional interest of comparative rarity as a British species. Till within a comparatively recent date, to find a dozen of avocets in Leadenhall Market in one week, or even all at once, in the season of the fen birds, was no uncommon occurrence; but now there are only one or two in the course of the year.

As is the case with the other fen birds, the avocet breeds in the herbage on the borders of the fen; but its feeding grounds, and also its mode of feeding, are peculiar. The little runs, or water-courses, which cross the loose sand or sludge, and which always contain a considerable quantity of spawn, larvæ, or other animal matters, according to the time of the year, are the places which it frequents. It can swim, as indeed all birds that have close plumage on the under part can do, less or more; but it perhaps does not swim voluntarily in any instance, and it never swims when it is feeding. It is not adapted for that, as the action of both the body and the bill require a fulcrum of something more stable than water. Swimming in still water, the bird could not scoop, as the stroke of the bill would merely drive the body backwards; and as it feeds against the stream, its moving would be like that of a man attempting to force a boat against the stream by placing his pole upwards, and by that means adding his own exertion to the downward force the current.

The avocet wades up the shallow stream; and, only that its strokes are equally effective right and left, its action is not unlike that of a mower. Its legs are long, and placed far asunder, and it proceeds by long and slow strides. Suppose the foot on one side advanced and planted, and the one on the other side in the rear to the full extent of its stride: the axis of its body will, in that position, be obliquely across the run, with the head towards the side of the rear foot, and the tail to that of the advanced one, both feet being nearly

in the line of the centre of the run ; and if we suppose the left foot to be the one in advance, the bill will be over the right side of the run. The bird then bends its neck a little to the left and downwards, and immediately advancing the right foot, it swings the body upon the left as a pivot, the bill scooping a traverse curve, and impelled by the swing of the body. As soon as the right foot is planted, or rather simultaneously with the planting of it, the bird elevates its bill, in order that whatever food has been scooped up by the bill may be conveyed to the mouth ; and that part of the process is very soon over, as the curve of the bill is not a portion of a circle, but of what geometers call the "curve of quickest descent." The bill is immediately lowered with the point towards the right, and the advance of the left foot, and the swing of the body upon the right one, make another sweep in the opposite direction. In this way the bird advances up the run, scooping alternately left and right, with ease, with effect, and even with a grace, almost unparalleled in the action of birds. It is indeed one of the most beautiful instances of animal mechanics that can possibly be imagined, and the motions are performed in such a manner that they can all be seen.

Avocets are restless and lively in their manners, more sportive than most of the other fen birds. They have not the hideling disposition of the snipes, nor the demureness of the godwits : in some of their habits they more resemble the lapwing, especially in the finesse shown by the female to entice strangers away from her eggs or young. She meets the traveller, and flies round him in rapid circles, screaming "*quheet, quheet,*" but aspirated in a manner that cannot be expressed by letters. She also runs, and limps, and drops one wing occasionally, as if it were broken ; but in her evolutions upon the wing, she does not give those twitches in turning which are so striking, and, as formerly men-

tioned, sometimes do strike, in the lapwing. The eggs are olive brown spotted with black; and as is the case with most of the grallæ, they are large in proportion to the size of the bird.

From the sand-piper to the avocet, there is a regular succession of birds with bills gradually increasing in elasticity and length, and the habitats of the birds gradually approach nearer and nearer to the water—the sand-pipers picking up the small animals that inhabit the gravel; the tringas those which are on the surface of firm sand and mud; the snipes boring in the mire; the godwits poking in the sludgy deposits; and the avocets scooping the beds of the shallow water-courses. So that a regular continuation would now lead us to the stream or the pool itself: but here the chain becomes a little entangled; and it is not our purpose to unravel it, but to get, if we can, at the popular characters of the species.

That there is in the Grallæ a regularly approximating series of species, from those tenanted the dry land to those tenanted the water, where the bird must wade deep or swim, or dive before it can feed, is true; and it is also true, that all the links of the succession harmonize very beautifully with the localities in which they are found: but the chain is one of a more complicated nature than we can understand. It is two-fold, three-fold, many fold; so that, if the continuity is broken by the extinction of one species, the place of the last bird is supplied by another, differing from the former in proportion to the change of circumstances that caused the extinction. There is change, but there is no desertion or abandonment. With every change of the food, there is a change of the feeder—partially and gradually, even though that feeder is of the same genus; but while there is food, there always is a feeder; and if, by any means, one race becomes extinct, there is another ready

to fill its place. Every link in the chain of nature is thus "legion," as inexhaustible by human inquiry as the whole. Some of these successions appear mysterious to us, because we are unable to fathom the means and modes of their coming, but the bird comes on wings through the open sky, and therefore we, at least, fancy that it is more within the reach of our observation.

Yet, take one of our most able and unsophisticated Ornithologists,—one of those men who have measured their own ken and capacity against the pages of the opened, and the gigantic volume of the unopened book of nature,—take him to any one kind of locality, field, forest, or fen, and ask him, "What bird should nestle here?"—take one of the *artificers*, and he will muster his hard names, erect his horoscope, and become "a soothsayer without saying sooth;" whose words would less inform you than the silence of the other.

One would wish to speak with great hesitation and diffidence on a subject, the datum for the investigation of which is the knowledge of all nature; but in accordance with the geographical aspect of countries there seems to be two distinct tendencies in birds—a tendency to wander, and a tendency to be staid. The former leads through a succession of species to the storm petrels perhaps, or any race that may be more discursive—the latter to the Gallinæ, which dwell in the same field, the same jungle, or on the same mountain, for life. On an island like Britain, the former tendency is to the seas—the pelagic bird, which rides on the far sea-wave, being the last link that we know; the latter tends to the hill, and the last bird is the ptarmigan. The marsh birds are geographically upon the confines of both; and they seem to be so physiologically. The heron and the bittern, though they may seem to be anomalies, and, where we have placed them, to have broken the chain, which otherwise is traceable from the stilt

plover to the avocet, form one of the doubles. The heron leads our thoughts to the storks and cranes, some of which summer in the one hemisphere and winter in the other; the bittern leads us almost immediately to the grous; for in many places they answer to each others' cries; and in the locality to which I alluded in the notice of the bittern, as being familiar to my own observation, the grous quitted the dry heather at the same time that the bittern quitted the mire. If I mistake not, their cries ceased in the very same season.*

This is a mere hint, which I have not space or capacity to work out; and the requisite data are not before me. An arrangement would require all the localities of the world, in all their varieties, and all their birds; and Britain is only one insulated little spot, comparatively uniform in its whole climate, and artificial from culture in great part of its surface. Besides, it is "an inn for the wayfaring birds;" and some of our guests are so familiar, that it is not easy to distinguish between them and members of the family. To me, these difficulties feel insurmountable; and therefore I must enumerate the remaining genera of this very curious but perplexing order, without the slightest pretension to system.

THE RUFF (*Machetes pugnax*).

The ruff, although a marsh bird, is one in which the gallinaceous character is very conspicuous. The males are polygamous, or at all events pugnacious, and fight as gallantly for their dames as ever knight-errant did, in those ages of

* Why the bittern should "lead us almost immediately to the grous," even in thought, we cannot tell. There is no affinity in any one respect between them; and their food, habits, manners, and locality, are utterly dissimilar.—M.

chivalry, when the highest ambition of man was to imitate the conduct and even assume the name of the game-cock.

Their gallinaceous characters are indeed so striking, that they might, with no very great impropriety, be called "fen poultry." The males are considerably larger than the females; they are furnished, in the breeding season, with a large accession of produced and glossy feathers, forming a ruff or mantle over the breast and neck as far as the scapulars, and with a long erectable tuft of similar feathers behind each eye; and though they have not combs and wattles like the males of the common fowl, the face becomes covered with naked fleshy tubercles of a reddish yellow colour, at the same time that the produced feathers of the ruff and ear-tufts appear. It is true that, in the moult after the breeding time, the seasonal appendages of the ruffs disappear, while those of the common poultry remain. But that may be considered as a climatal difference. Poultry (genus *Gallus*) are natives of the evergreen jungles of the south of Asia, and they are with us only in a domestic state, and sheltered during the winter. Ruffs, again, belong to the latitudes of *deciduous* vegetation, and they, like the trees of their native localities, have a seasonal repose; while the great production of seasonal appendages, shows that they feel more the influence of the season of reanimation. I will not be positive, but I think I have observed greater differences in the seasonal plumage of the males of common poultry, in the bleak and exposed situations of the north of Scotland, than in the south of England; and that generally, in proportion as animals of one climate are more freely exposed in another, they assume more the habits and characters of the native animals of that one. Ruffs are more easily fattened in confinement than most other wild birds; and their flesh tastes more like that of poultry.

They have partly the form of the sand-pipers, and they are migratory; but they have less of the running or wading cha-

racter than even those. The bill, although a little flexible towards the base, is very firm and hard at the tip ; and the feet are properly walking feet.

Their colours can hardly be described ; at least there would be but small use in the description, as they vary almost as much as in domestic fowls. The length of the male is between eleven and twelve inches, of which the bill occupies one inch ; the female is one-third less. The axis of the body is more elevated in front, and the neck more upright in walking, than in the other marsh birds, and they walk with a strut, the male especially, when he assumes the Spanish cloak and feather, and mounts his *hill*, determined to fight boldly for the sovereignty of the dames.

They are rare in England, compared with what they were formerly, and appear only on particular spots of the fens. They arrive in spring, the males before the females ; and while there are none but males, they dwell in peace, feeding in the night or at early dawn, and reposing during the day. But (*causa teterrima belli!*) when the females begin to arrive, all the Dons are in motion and in arms. They “*hill*,” as it is called ; that is, they assemble on a rising knoll, and battle for the surrounding spot and the lady,—not in bands under leaders as some have alleged, but each single-handed, or rather single-billed, for himself. The contest often lasts for several days, or is renewed on several mornings ; but whether the victor of each day leads off a female at the close of the warfare of the same, or whether the same female occasions a contest of several days’ operation, has not been said. The battles of the hill continue, however, till all are mated to their desert ; by which time the hill itself is often trodden like a pathway.

The nests are rudely formed of withered grass, in the hassocks or tufts, which are separated from each other by sludgy or miry places ; the eggs are four, olive-brown spotted with

darker brown ; and the young are hatched about the middle, or towards the end of June. During the whole of that period, the males "hill" in the morning ; and they stand accused of some Don Giovanni-ism ; but as the period of the young breaking the shell approaches, they hill in fewer and fewer numbers, combat less energetically, and at that time cease from their combats altogether. It does not appear that the males take any share in the building of the nest, the incubation, or the feeding of the female while sitting—nor have they been seen tending the brood after. They are but little seen during the moulting month ; and when they again make their appearance, they are without their insignia of war, and withal very peaceable birds, and harmonious with each other. Their breeding feathers are indeed as fleeting as the anthers and corollas of some flowers : they do not acquire their full *bloom* till the middle or towards the end of May, and they begin to fall in June, so that the growth of them is posterior to the time of the spring moult, and their fall anterior to that of autumn. The winter plumage of the birds has none of those bright tints and glosses which appear on the ruffs and even tufts, but with so much diversity, that the description of any one would hardly be expressive of even another individual. Formerly, so many of these birds used to be taken in the fens towards the middle and end of September, that the capture of them was a regular trade ; but now they are confined in their localities, diminished in their numbers, and the trade is not so profitable, though fat birds fetch a much higher price in the market. Generally speaking, they quit the country in the latter part of autumn, although stragglers remain all the winter ; or at least did so when the birds were more abundant than they are now.*

* The ruff is polygamous. It is remarkable that scarcely two males agree in the colours of the temporary ornamental plumes. We have

CRAKE (*Crex*).

The birds of this genus resemble the Gallinæ in some of their characters, even more than the one last mentioned; and they have also much of the appearance of running birds. The bill is shorter than the head, compressed, conical, the depth at the base exceeding the breadth, compressed and pointed at the tip, and both mandibles of equal length. The upper mandible ridged on the exterior, the nasal grooves wide, the nostrils lateral, half way down the bill, half covered by a membrane, which defends them in part. The head and neck are small; the axis of the whole body horizontal in running; the shafts of the feathers on the fore part ending in webless and thickened points, which keep the feathers down like so many little weights; the whole form of the body admirably fitted for getting through tall and close herbage. The legs long and strong in proportion to the size of the birds, naked to a little distance above the tarsal joints. The three front toes long and fine, slightly bordered with membrane, the hind toe short and articulated on the tarsus above the others. The whole leg and foot formed for rapid progressive motion, and having much elastic spring in the toes, which act by the tarsal joints being bent as the foot begins to be raised, and the tendons being strongly drawn over the large processes of the tarsal joint as over a pulley. Tail short, narrow, and rounded, and wings of moderate size.

They inhabit tall herbage, preferring places where the surface is rather humid, and which abound with worms, slugs, and ground insects, which form the principal part of their food. They chiefly repose during the day; and feed and

seen them black, white barred with black, yellow, yellow mottled with black, pure white, &c. It is also singular that the same bird will seldom have the plumes of the same colour on the succeeding season. The female is termed the *reeve*, and is much inferior in size to the male.—M.

utter their cries chiefly from sunset to sunrise. Their note is very nearly the same, constantly repeated, very audible, but so ventriloque, that one cannot easily tell from what particular part of the field it issues. There are four species enumerated as British birds, none of them resident in the winter.

CORN-CRAKE OR LAND-RAIL (*Crex pratensis*).

A figure of this bird is given on the plate at page 151, one-sixth of the lineal dimensions. That figure will save the necessity of describing the markings of the plumage, which are very minute, and cannot be very intelligibly expressed in words. The male and female are very similar in their plumage.

The corn-crake is a summer visitant, arriving in Britain about the latter end of April, the males, as is the case with most summer migrants, being the first to appear—no, not to appear, to hide themselves, for these birds never appear if they can possibly avoid it. They do not alight on the shores, or flock on the open places, but make their way stealthily, one cannot tell how. They do, however, diffuse themselves over the whole country in very considerable numbers, more of them resorting to the northern than to the southern parts, and more to the cold and humid upland districts, than to the more dry and warmer ones near the sea. Dressing fields with lime has been known to banish the crane, possibly because that species of dressing destroys the worms and slugs on which they feed.

Though the males are seldom seen on their progress to the breeding grounds, they are soon heard after they arrive there. Their love-song is a peculiar sort of roll of short notes, all in the same key, and of the same length; and they continue that in the corn-fields, or sometimes in the tall grass, for a week or two, probably till the females arrive. These come

in the same quiet and stealthy manner ; and nothing more is known of them, unless their cover is cut down by the mower : save their regular evening cry of *creeq, creeq*, which continues probably till the brood are hatched.

The nest is rude, formed of a little moss and withered grass, and placed in the thickest of the cover ; but it, like the birds, is seldom seen, and when seen, it is generally only to its destruction. If the cover over it is cut down, the birds desert the nest though it should remain untouched. Indeed the female sits so close that, if the cover is mown there is some danger of her being killed by the scythe, unobserved by the mower. The eggs are very numerous, resembling more in that respect the field Gallinæ than any of the marsh birds. As many as sixteen eggs have been found in one nest ; but sometimes there are not half that number. They are of a dull reddish white, blotched with ash colour and rusty brown. The young run as soon as they break the shell : but it is some time before they are capable of flight.

Flying is not indeed a practice either with old or young, while they remain in this country. I have been, for the whole time that they are with us, in places where they were very numerous, and yelping incessantly on every side (for even among them it seems that the males strive with each other in their cries), but I never saw one on the wing—or (often) any other way. There is, in fact, no raising of them ; nor is it much better to invade their cover and storm them. The form of their bodies is such, that they glide among the roots of the corn without occasioning the least move or rustle ; and though one march as if direct upon the sound, that sound ceases for a little, and then begins again as far in the rear ; and if you turn to it in its second place, it is not long before it comes nearly from the direction of the first. The corn-crakes take their departure generally in the month

of September. They are silent for some time before they depart, and do not then keep so closely in cover (indeed there is not so much cover for them), but they feed during the night, or twilight, and squat and lurk during the day, so that they are not often seen even then.

Though there is no music in the cry of the crake, which is far more monotonous than that of the cuckoo, and though there is great difficulty in getting a sight of the bird itself, yet there is a liveliness about it ; and there are many of the northern places where the summer evenings would be as dull without the crake, as those in the south of England would be without the nightingale. In those open places, half cultivated, half wild, the air of the summer twilight, which lasts all night long, is peculiarly pleasant and favourable for a journey ; and after a long stretch over the hill, with nothing to see and little to hear, save now and then a started grousecock, or a snipe or bittern, rising without any starting, it is pleasant to come within hearing of the crake, as the sound of its voice always tells of cultivation and cottages.*

THE SPOTTED CRAKE (*Crex porzana*).

The spotted crake is also a summer visitant, resembling the corn-crake in many of its habits, but said to be more aquatic, and thus somewhat intermediate between the corn-crake and the rail. It is much more rare as a British bird than the other ; and confined chiefly to the south and west of England. It arrives earlier and remains later than the other, frequents the tall herbage by the sides of pools and streams, rather than the corn-fields. It is a bird of retired disposition ; and therefore its manners as a British bird are

* Rich meadow-grounds, near water, and of a humid character, are the favourite localities of the corn-crake, and it threads the tall grass with singular ease and rapidity. It can seldom be flushed without the aid of a dog trained to the sport. Its flight is low and short, with the feet hanging down.—M.

not very well known. It hides itself during the day in the sedge, reeds, and rushes, among which it is said to build a nest of withered plants, and to lay six or seven white eggs, spotted with dark red.

It is a smaller and more elegantly shaped bird than the corn-crake. It is not a great deal shorter, but considerably more slender, and not exceeding two-thirds of the weight. Its colours are, on the upper part, greenish olive brown, with spots and lines of black and white very pleasingly distributed; on the under part, pale ash colour, marked with white. Feet and bill greenish yellow, the latter with a tinge of red on the basal part. In the autumn, before it takes its final departure for the year, it is in fine condition, and highly prized for the table.

BAILLON'S CRAKE (*Crex Baillonii*).

This species is so rare, and the discovery of it as a British bird is comparatively so recent, that in the present state of our knowledge of it, it cannot be considered in any other light than as a straggler. It is said not to be uncommon in some parts of France and Italy, where it dwells in retirement, almost indeed in concealment, among tall herbage on the banks of streams, and does not appear to be much of a migrant, or even of a ranger in the places which it does inhabit. The shortness of its wings does not indicate a bird much given to long flights. In the specimen which was obtained from Norfolk, in 1812, the stretch of the wings was only eighteen inches and a half, while the length of the bird was seven inches and a half. Its colours are much more entire and free from mottling than those of the last species: top of the head olive brown, nape lighter and yellowish. The rest of the upper part and wings black or dusky, with olive brown margins to the feathers; rump and upper tail-coverts mottled olive brown and dusky; tail olive brown,

with yellowish margins to the exterior feathers. The chin, throat, and sides of the neck, pale ash; the forehead, cheeks, and all the rest of the under parts, dusky ash, with some dull white markings on the under tail coverts and sides of the thighs, but all the rest plain. The feet olive brown, the bill greenish with a tinge of red at the base; and the orbits and irides orange red.

The shortness of the wings, which, when closed, do not reach above half the length of the tail, is perhaps the most remarkable character of this very obscure species, one which, from the peculiarity of its habits, and the fact of its being met with close upon the breeding season, *may* perhaps be one of those native birds, few in number, and confined to peculiar localities, which escape general observation, and elude even moderately careful research.

THE LITTLE CRAKE (*Crex pusilla*).

Of this small species, of which only a few specimens have been found, the history is as obscure and puzzling as that of the preceding. Like that, it has been met with only in the south of England, near the banks of streams that were margined with thick vegetation, and, like that, it has been found at a particular season (the month of May) when it is not easy to see that any particular cause should have brought it to the country as a wanderer.

This species is rather shorter than the former; but it is longer in the wings, and the colours are quite different, at least on the under part, and in the feet, the structure of which is different—different indeed from all the rest of the genus, the hind toe being considerably produced. Head brown, dusky on the top, paler on the sides, with an ash-coloured streak over the eye; hind part and sides of the neck pale olive brown; rest of the upper part black with olive brown margins. Chin and throat white, passing through

cream colour into fawn colour on the breast, and again into olive brown, marked with white, and darker brown on the lower part of the belly, the sides of the thighs, the vent, and the under tail coverts. The bill and legs bright green, the latter bare to a considerable height above the tarsal joints.

The three species last enumerated have all been named and described as gallinules, on account perhaps of their being found in haunts similar to those of that genus ; but the form and all the essential characters of the birds entitle them to be classed with the crakes.

This species, like the one immediately preceding, is said to inhabit the thick herbage by the sides of streams and waters in the south of Europe, the places to which, in all probability, the crake retires when it takes its departure from Britain. As their history stands at present, they appear somewhat anomalous : and on that account they are at least worth searching for. The whole genus are so fond of concealment, that even the corn-crake, if its clatter did not betray it, might come and go in thousands and one never be a whit the wiser. There is little probability that either of the smaller species, which, judging from the entireness of their plumage, are birds of a more tropical character than the corn-crake, spend the winter with us,—inasmuch as that crake which ventures northward in the summer, to join the chorus of gulls and other wave-taught vocalists in serenading the Udallers of *Ultima Thule*, spurns the roses and myrtles of Dorset and Devon in the winter, and seeks the land of olives and oranges ; but really the times, places, and circumstances, although they cannot be received as evidence of the fact, all point strongly to the probability, that both birds are summer visitants, of which a sprinkling at least may be expected in the south of England every season.

RAIL (*Rallus*).

From the last-mentioned rare, or at all events obscure and imperfectly known, species of crake, to the rail, the transition is natural and not very great. In the crakes themselves there is a gradation, from the corn-crake which hides itself in the humid field covered with tall herbage, but does not enter the marsh, or breed in herbage decidedly aquatic, to the little crake, which, keeping more constantly in warm localities, dwells so close among the aquatic herbage on the margins of pools, and the banks of slow-running streams, that it is rarely seen, and which can take the water upon emergency, which the corn-crake is not known to do.

A flat surface and a cover of annual or herbaceous vegetation—vegetation rising upon culms, and not branching stems, so that they can make their way through it with ease and rapidity—are thus the place and the furnishing for the crakes; and as the birds quit whenever the furnishing fails, in the course of the season or otherwise, we are warranted in concluding that the kind of place and the kind of plants are alike necessary for the supply of their food.

In respect of season, therefore, though not of locality, the crakes are somewhat analogous to the warblers. The warblers can inhabit only where the groves, the brakes, or the marshy holts, are in foliage, and they feed among the leaves.

The crakes can inhabit only where the surface is clothed by a thick crop of tall stems, which exclude the action of the sun, and thus favour the growth of those small but, under favourable circumstances, very prolific animals upon which the birds feed.

It is only at very particular spots on the surface of the globe, that birds of such habits can find perennial haunts. In the polar climes, there is not sufficient cover for them at any season, and in the tropical countries, those portions of the

shores and banks of the rivers which are perpetually humid, produce a vegetation too exuberant for any birds to find their food among its roots. In those climes of the excess of solar action, the growth of the single year on the marshy bank—the bamboo, and even the grass, rivals our groves in altitude; and the mangroves by the margin of the sea surpass our forests in loftiness of growth, and entanglement of branches. Therefore it is only at the middle temperature between those extremes that such birds as the crakes could find a permanent dwelling; and then, as water is an essential element in the adaptation of the place to them, the line of those haunts which approach the most nearly to being permanently suitable to them, varies more in curves and zig-zags northward or southward, than even the isothermal lines, or lines of equal temperature, irregular and hard to be determined as these are.

Thus it may with truth be said, that the crakes, like the warblers, have no permanent abode upon the globe; but that they must have their declinations northward and southward with that sun, the variations of whose influence call forth their cover and their food at different periods in different latitudes. But though, in consequence of that very simple, and therefore exquisitely beautiful, motion of the earth, which produces the seasons, the summer may be (and is) as hot in Lapland as under the equator, the season and the vegetation are not the same. The equatorial plant feels no winter; has never to overcome to inertia of a temporary death; and thus it grows apace till one leaf would cover a tent, and one tree overshadow an acre. In the extreme north, again, half the action of the summer sun is expended in calling forth the annual vegetation from the temporary death of the winter.

Thus the migration of such birds as the crakes is confined both northerly and southerly; and as they have different

natures and habits in themselves, some pass over a greater range and some over a less. The corn-crake reaches to the northern isles, the spotted crake (with us at least) probably not farther than England, and the smaller species only perhaps to the south of that part of the island, and few in number even there. The more discursive migrant has, as we may suppose, the greatest aptitude to vary its food, just as the resident bird, which with us passes one part of the year in the shade of the forest or on the upland waste, and the other in the fields by the farm-house or on the shore of the sea, can have a more extensive range in its food than another bird of the same genus which resides permanently in one place. In corroboration of this, it may be mentioned that Dr. Fleming, who resided in the northern isles, and who must, as a professed and systematic naturalist, be presumed to have made dissections there, describes the corn-crake as a *gizzard* bird, ("its muscular gizzard intimates its gramivorous habits," *British Animals*, p. 99,) while in England it is considered a *trail* bird, and as such feeding chiefly upon animal matter. The warblers also which range farther to the north, feed more upon vegetable matters than those that confine themselves to the south; and there is no doubt that the crakes follow the same gradations.

The argument must not, however, be misunderstood; for there is a double in it: the inducement to migrate at all, and the inducement to migrate far, are so far from being associated, that they are each strongest in a different character of bird. The nightingale, for instance, which appears capable of feeding upon insects and caterpillars of the broad-leaved groves only, must be sooner compelled to migrate from any locality than the white-throat, which is not only more miscellaneous in its insect food, but can also subsist upon berries. But the limitation of its food limits the migratory range of the nightingale within far narrower

bounds than those of the white-throat. The same argument applies to the crakes, and indeed to all migratory birds that find their food upon the land, or along the margins or in the shallows of the inland waters.

With sea-birds it is different, though even among them, and more especially among the wading species of them, the law can still be traced, though far more faintly. That, however, is easily explained; the more uniform temperature of the sea renders the productions of its shores more uniform; and those currents of the sea which are produced by the tides, distribute the products of the equatorial, and more productive parts, to the very confines of the polar sea. The currents, put in motion by the joint action of the trade wind and westward wave of tide in the equatorial parts of the Atlantic, strew the whole shores of the north with the produce of that ocean; so that food which is grown in the West Indian seas may be laid down upon the shores of Newfoundland, Iceland, or even Spitzbergen, to feed the littoral birds in the summer season; nay, even the food of the whales themselves, in the "green water," along the margin and in the openings of the polar ice, is no doubt, in great part, the production of more southern parts of the Atlantic.

These remarks may, to systematists, appear to be interpolated somewhat out of place; but the interpolation (which is of course meant for the student, not for the master) is intentional. Placing them here, after we have noticed the habits of these birds, to which they apply, and from the study of which they naturally and almost necessarily arise, gives them the persuasive form of instruction, and not the apparently arrogant one of assumed hypothesis: and though there may be more glory to the author in bringing forward general principles in large and imposing masses, there is more use to the common reader in breaking them down into manageable pieces, if the points of connexion are so

marked, that the whole, after they are understood singly, may be put together.

The characters of the *rail*, in which it will be found to differ considerably from the *crake*, though they have been popularly called by the same name, or sometimes scientifically—no, *simply* classed together,—are briefly as follows: the bill longer than the head, slender, slightly arched, compressed in the basal part only, and cylindrical at the tip, and the upper mandible channelled, and longer than the under one; the nasal groove not much dilated; the nostrils lateral, longitudinal, and half covered by membrane, but nearer the base of the bill than in the *crake*. The whole bill is, in fact, fitted for going more immediately and deeply into the water for food. The legs are long, naked to some distance above the tarsal joints, and stouter in proportion than those of the *crake*. The toes are all free, and without membranes, and the foot is altogether more gallinaceous, fitted for walking on a greater variety of surfaces, and even for perching. The wings are short and rounded; the body short, compressed, and generally fat; the tail susceptible of much and rapid motion; and the plumage smooth and close, and capable of being immersed without being wetted. There is but one British species, an inhabitant of rushy, sedgy, and bushy margins of streams; shifting its ground with the season, but not generally, if at all, migratory. It has, indeed, at all times, a reluctance to flight, for which, from the weight of its body, the shortness of its wings, and the way in which it carries its feet (hanging down while it flies), it is not very well fitted. This species is

THE WATER-RAIL (*Rallus aquaticus*).

Also called the “water-ouzel,” the “velvet runner,” and various other names.

The average length is about ten inches; the breadth about fifteen, the weight answering to these dimensions, between

four and five ounces. The bill rather more than an inch and a half, dusky at the tip, reddish orange at the base of the upper mandible, and along the greater part of the under irides orange red; feet, which are naked to some distance above the tarsal joints, and have the toes long and slender, reddish brown. Upper plumage olive brown, the centres of the feathers black or dusky; under plumage ash, with brown streaks on the hinder part, and bars of black and white on the sides and thighs. Wings dusky, with some white bars at the bends; bastard wing armed with a horny spine. Tail short and black, margined with brown, strongly fortified with coverts. The under ones white, which it shows as it flirts up the tail in jerking along. There is very little difference of sexual or seasonal plumage; only the reddish tinge in the bill is paler in the female than in the male, and paler in winter than in summer.

The nest is formed in thick herbage, or in holts or brakes by the side of the stream, very near the water. It is formed of the long and broad leaves of water plants, loosely put together. The eggs are pretty numerous, but variable. They are white.

The water-rail is rather generally distributed over the richer and warmer parts of the country, where the streams are much bordered by cover; but it is a bird of hideling habits, and not often seen, so that it is probably much more numerous in reality than it appears to be.

It is both a shy and a wary bird, running with much swiftness in the open places, threading the herbage like a serpent, skipping along the thin flooring of aquatic leaves, wading in the shallows, running across the brook, and plying every means of escape save that of flying, to which it does not resort unless pressed to the last extremity. From the nature of its haunts, and the number and nimbleness of its evolutions, it is difficult to shoot, and it is not easily raised by a dog, especially if there are shrubby brakes, which he

cannot thread, or water, which he hesitates a moment ere he takes. Its food is more rank than that of the crakes; and therefore, though generally fatter, its flesh is muddy in flavour, and not so palatable. The flavour, and also the size of the bird, differ, however, a good deal with the nature of the haunt. The more upland and clear the stream, the smaller and better flavoured the bird. Similar variations take place in all animals, wild and tame; and therefore size, and, in the edible ones, flavour, are not fixed and definite characters.*

THE GALLINULE (*Gallinula*).

There is but one British species of gallinule, the *common gallinule*, (*Gallinula chloropus*—so called because its feet are greenish,) which is also called the water-hen, the marsh-hen, the moor-hen, and many other names: (in Scotland, the female grous is the moor-hen.) Like the water-rail, it is permanently resident, and it is much more generally distributed, numerous, and frequently seen, than that bird. It is also much larger and heavier, and it is more a bird of the waters, swimming easily and from habit in search of its food, while the rail appears to swim only when driven to it.

The size of the gallinule is about that of a pigeon, and the weight about a pound. The upper plumage is dark olive green, inclining to black; the under plumage deep bluish grey, with white on the under tail-coverts, the edges of the wings, and some dull white on the belly and thighs. The colour is dark round the base of the bill, fading a little towards the hinder part, and relieved by a white spot under

* The food of the water-rail consists of aquatic insects and their larvæ, aquatic shelled snails, and also the seeds and leaves of aquatic plants. When moving quietly about, this bird has a habit of flirting up its tail, like the water-hen. It occasionally swims, traversing brooks or pools, on the margin of which it finds concealment. This species is abundant in Holland, Germany, and France.—M.

the eye. The feathers on the flanks, which are loose and pendant, and hang over the upper parts of the thighs, are black, with streaks of white. The bill, which is about an inch in length, is thick and strong, arched in both mandibles towards the tip, and with the upper projecting a little; is greenish at the tip and reddish towards the base. The upper mandible advances in a horny shield upon the forehead as far as the eyes; and it is in the colour of that plate and of the basal part of the bill, that the breeding time is chiefly indicated. At that time the shield is bright red, and the base of the bill of a brighter tint than at other times. When this season is over, the shield fades to a dull reddish white, and the tint of the bill becomes very pale. The irides are red, and so is the naked part of the tibia. The tarsi and toes are various shades of green, from yellowish to dusky; the toes very long, (the hind one considerably produced as well as the others), all the toes free, but bordered with membranes. The tarsus is shorter in proportion; and the whole foot more stunted in proportion than that of the rail.

The general appearance of the bird indicates an increase of the characters of the gallinaceous and the swimming birds; and perhaps no popular name is more expressive of the real characters of a bird than "water-hen" is of this one. It inhabits the fresh waters rather than the marshy places, and never resorts to the shores of the sea. The slow streams, pools, and large ditches, among the ruder lands, which are thickly margined with sedges, rushes, and other tall plants, are its favourite localities; and as it reposes during the day in the shade of the herbage, and comes out to feed only in the night, or the twilight, which it often does by swimming, and feeding the while, (as the small fishes which are in the ponds and streams are near the surface feeding at that time,) it often haunts and breeds in the vicinity of houses. The nest is rather large, but very rudely formed of reeds and

rushes, close by the margin of the water ; and generally concealed among the herbage. There are often two, sometimes three broods in the year, the most numerous seldom exceeding seven ; but the birds are not so abundant as might thence be inferred, as the young are subject to various casualties : the eggs are often washed away by summer floods ; the young are sometimes taken by the heron, which, contrary to its usual habit, is said to swim a little way, in order to capture the young of the gallinule. In places where there is water for pike, or even for trout of sufficient size, these also make prey of the young birds. In that, however, there is a little more poetic justice than in the ravages by the heron, as both old and young of the birds are in a great measure fed upon the young of fish. The period of incubation lasts about three weeks ; and the young are very soon able to accompany their mother to the water. She leads them there in the morning, and towards evening ; but during the night and the heat of the day she returns with them to the nest, and gathers them under her wings.*

THE PRATINCOLE (*Glareola*).

Of this singularly swift-winged genus, only one species has hitherto made its appearance in any part of the British islands, and then only as a very occasional straggler. That species is the collared pratincole (*Glareola torquata*), of which a representation is given on the plate at page 135.

The general characters of the genus, of which there are

* The gallinule, or water-hen, is common on most ponds or ornamental sheets of water surrounded by a belt of dense, tall herbage. It often perches upon a bush, its long toes being endowed with considerable power of grasping. It often visits smooth grass-swards adjacent to the water, and may be observed walking about in search of worms or slugs, ever and anon flirting up its tail, and displaying the white under-coverts. It is by no means so shy as the water-rail, and may be readily watched by a quiet observer.—M.

two other species, both inhabitants of the southern parts of Asia, are,—the bill short, convex, the upper mandible curved for half its length, compressed, and without a notch. The tibia feathered to the tarsal joint ; the tarsi long and slender, the middle and outer toes joined by a short membrane at their bases, but the inner toe free ; the claws long and awl-shaped ; the wings very long and pointed ; and the tail forked.

The native habitat of the collared pratincole is in the east of Europe, especially in the humid parts of the valley of the Danube, and the south of Russia. The banks of the large rivers and lakes, and the margins of the salt lakes and inland seas, are its favourite places ; but it ranges occasionally into some parts of Germany, France, and Italy ; and also makes a dash into Britain, on the west side of which, and in the western and northern isles, are the chief places where it has been found. Its flight is exceedingly rapid, more so perhaps than that of any other bird, so that when it is once on the wing, a flight of two or three hundred miles is not more to it, in point of time or of fatigue, than walking the length of London is to a man. In its native localities, its nest is formed in the thickest of the aquatic herbage, and the eggs vary in number from three to seven. Aquatic insects, especially the coleopterous ones, form its principal food, and it catches them with equal ease on land, on the surface of the water, or in the air. The *dytisci*, or plunging beetles, do not remain long at the surface, or raise much of their bodies above it ; the *gyrini* whisk about upon the smooth and glassy surface of the pools, with so much rapidity, that their paths appear to the human eye as looped curves and circles of fire ; but the pratincole dashes over the water with such swiftness, that it twitches them up on the most momentary of their ascents and the most rapid of their wheelings. No speed of foot, length of leap, nor quickness of wing, can save the

insect tribes from the bill of this most dashing of all winged hunters. We think it no ordinary instance of expedition for a vessel to sail from London to Leith, and return, in the course of a week; but the pratincole, at the full stretch of its speed, would fly round the globe in the same time! From the valley of the Danube to Unst, the most northerly of the Shetland isles, where a specimen was obtained by Mr. Bullock, is therefore a mere morning flight for the pratincole; and when we consider the power and swiftness of its wing, we may cease to wonder that a bird which is really tropical in its habits, should be found in company with birds of the North Sea, almost within the polar circle.*

* In the genus *Glareola*, the beak is short, hard, convex, compressed towards the point, with a wide gape.

The legs are moderate, slender, and naked, for a little way above the tarsal joint. The outer of the three anterior toes is united to the middle one by a basal membrane. The wings are very long, the first quill-feather the longest. The tail is forked.

Linnæus, guided by the similitude of this bird to the swallows, placed it amongst his Hirundines; in which respect he was followed by many subsequent naturalists. Latham, however, placed it in juxtaposition to the rails; and Cuvier, in the macrodactyle section of the waders (*échasiers*). Selby assigns it a situation among the *Charadriadæ* (or plovers), as does also the Prince of Canino.

Mr. Gould, in his "Introduction to the Birds of Australia," says: "I have for many years questioned the propriety of placing the Pratincoles in the same group as the Plovers, or even in the same order, believing them, as I do, to be a terrestrial form of the Fissirostral birds (Swallows). Linnæus placed them near the Swallows, and I think he was right in so doing; and Mr. Blyth, one of the most philosophical of ornithologists, entertains, I believe, the same opinion: but as nearly all other writers have placed them with the *Charadriadæ*, I have adopted their view of the subject, and have accordingly placed them in that group."

The first known British specimen of the collared pratincole was received by Mr. Bullock from Lancashire in 1807. It is preserved in the museum of the late Earl of Derby. In 1812, Mr. Bullock killed a second specimen in the Island of Unst, one of the Shetland group, a description of the manners of which appeared in the "Trans. Linn. Soc."

The collared pratincole is very abundant in Hungary, Tartary, and the central parts of Asia, where it frequents lakes, inland seas, and marshes, associating in flocks of hundreds together. It visits Western

THE COOT (*Fulica*).

There is also only one British bird of this genus, the *common coot*, *bald coot*, or *black coot* (*Fulica atra*). Like the gallinule, it is a resident bird, generally distributed and common, though its haunts differ a little from those of the other. It is more a water bird in structure, in appearance, and in habits; so much so, that the water may be said to be its proper element. Large ponds, small lakes, the quiet and sedgy nooks of the larger ones, and the placid pools of the broad rivers, are the favourite summer habitations of the coot. In the lower and warmer parts of the country, where the water is not apt to freeze in the winter, and even in the tarns further upland, which have sufficient depth to resist the winter, the coot is resident all the year. But many are driven, especially during severe and protracted winters, from those more shallow and easily frozen pools where they bred, and forced to seek their food in the estuaries of rivers, and in creeks and openings of the coast. They quit these again in the spring, and pass the summer in those pools of the uplands, where they find that shelter and seclusion which accord with their habits.

and Southern Europe as a bird of passage, or rather, perhaps, as an occasional wanderer. It takes its insect prey both on the ground and during its flight, and skims the surface of the water like the swallow.

Species of the genus *Glareola* inhabit India, the Indian islands, Europe, and Africa. Mr. Gould figures two, *G. grallaria*, Temm., and *G. orientalis*, Leach, in his "Birds of Australia."

In the collared pratincole, the upper surface generally is yellowish-brown, with a metallic lustre; the throat and fore-part of the neck reddish white, bounded by a narrow list of black, which proceeds upwards, and joins a black streak between the bill and the eyes. Breast pale brown; abdomen and upper tail-coverts white; tail greatly forked, blackish-brown, the basal half of the feathers excepted, which is white; under wing-coverts brownish red; quills blackish brown; edges of the bill, and base of the lower mandible, scarlet-orange; legs brownish purple-red; irides light orange-brown.—M.

From the varied climate and supply of food in the places which they haunt, and especially of those in which they are bred, they vary considerably in size, so that a coot of one part of the country might, according to circumstances, appear either a giant or a pigmy among coots of another. They are all, however, so much alike in their form and plumage, that they can hardly be mistaken. There is little difference in the plumage of the sexes, in that of the old and the young, or in the breeding time and the rest of the year.

The size is nearly the same as that of a common fowl (though the standard is in that case as variable as the thing measured). The average length is about eighteen inches; the extent of the wings about twenty-eight; and the weight, from a pound and a half to two pounds.

The bill is of moderate length, straight, strong, conical, compressed, deeper than it is broad at the base; the exterior of the upper mandible dilated into a plate or shield on the forehead, which is considerably larger in the male than in the female, and forms one of the external means of distinguishing them. Towards the tip, the exterior of the upper mandible is arched, but it does not project beyond or hang over the under one. In the breeding season, the bill is pale yellowish red, increasing to bright red on the frontal plate or shield; but when the breeding season is over, the colours of these parts are reversed; the plate is then white, and though the red on the bill has also faded, it looks darker from the contrast with the colour of the plate. The birds conceal themselves in the breeding season, and are consequently most frequently seen when the frontal plate is white; it is on that account that they are called *bald* coots.

The general tint of the upper plumage is black, pure on the head and nape, but marked with less or more of dusky and obscure ash on the other parts. The under part is dusky ash, paler on the belly, and there is a white line on the bend

of the wing, and a small white spot under the eye, which are the only decided and conspicuous markings in the whole plumage. The legs are greenish, darker in the toes and lower part of the tarsus, and often yellowish in the garter or naked portion of the tibia. The tarsi are of moderate length, but the toes are very long, with sharp hooked claws, and bordered on each side by lobed membranes of considerable breadth.

The coot retains so much of the characters of the gallinule, that the two genera may be considered as conterminous, for the pratincole, though we have given a slight notice of it as an interesting stranger that has been seen, and that may be seen again, has no appropriate habitat in this country, and therefore cannot enter into any arrangement by which it is attempted to place British birds in the order of their degrees of natural affinity.

In some particulars there is a resemblance between the coot and the fowl (*Gallus*); like the latter, it gathers its brood under its wings, puts on gayer colours in some of the featherless parts of the head, and feeds partly on the seeds of aquatic plants, and the hybernaculating and farinaceous or albuminous roots, when the latter are left exposed by the decay of the annual stems in the autumn. There is also a trace of resemblance to the fowl in the point and gape of the bill, and also in the outline of the under part backwards; but the general contour is more that of a duck.

The legs are placed farther backwards than in any of the birds that live chiefly on land, but they appear to be farther back than they are in reality, from the degree to which the tarsal joint is extended when the bird walks.

It has been said (and the saying has no doubt been founded on that very bending of the tarsal joint, and the tendency that the toes have to collapse the instant that the foot is off the ground) that the coot walks with great labour and diffi-

culty. But the foot of the coot is another of those instances, of which there are not a few in the structure of birds, in which the very master-pieces (so to speak) of nature's mechanics are considered clumsy, for no other reason than because we will not examine them, and find out why they are thus constructed. The coot's foot has a compound function to perform, and therefore it must be a compound instrument. We look at it only in one of its uses, or rather we look merely at its form, (for when used either way, it is used cleverly,) and hence we draw the conclusion—from our own ignorance.

In order that the coot may properly fill that place which appears to be assigned to it in the economy of nature, it must swim, and also walk, and even perch upon a tree upon emergency; and, though it is not launched upon the broad waters like those pelagic tribes that fish, nor is it capable of procuring its food by the touch of a dabbling bill like the swimmers in the shallows, it must swim to considerable distances, and with some rapidity. In order to do this, it must have the centre of gravity considerably in front of the articulation of the legs, so that these may act in the wake of the body, and have the advantage of the eddy. It must also swim clean, and without those projecting feathers which are found on the sides of the gallinule, and which, though they assist in making it buoyant when moving slowly, would either impede a quick motion, or be flattened to the sides, and have their buoyancy destroyed by it. The form of the body, the position of the legs, and the extent of the toes, with their lobed margins, answer these purposes remarkably well, so that the coot is a very efficient swimming bird.

But, again, the coot has to walk, and as that is a *lifting* motion, while swimming is merely *pushing along*, the weight being supported by the water, some modification is required. The swimming foot is converted into a very efficient walking

foot, by that very bending of the tarsal joint which, to us, makes the leg appear so awkward. The bending of this joint, without any muscular effort, pulls the tendons that compress the toes, and slackens those that resist that compression, because the former tendon passes over the outside of the bend at the tarsal joint, and the latter along the inside. The toes are very long, and the tendon pulls them to their extremities, so that the centre of support in the foot is thrown far before the articulation of the tarsus, and by the action of the same spring the weight of the body is, at every step, discharged from and received by the points of the toes, which it could not be, if the tarsal joints were not bent. The toes being free, too, and not joined by a continuous web, enables the spring of each to act to the full range of its articulation, and the foot to adapt itself to any form of surface upon which the bird may have occasion to walk. Even the produced hind toe has its use, in throwing the foot upwards, and also in walking upon grassy or other elastic surfaces.

Farther, the same bending of the tarsal joint converts the swimming foot of the coot into a perching one, because the toes have the same tendency to clutch round a branch that they have to press with their whole length against the ground, and the divided web enables them to adapt their clutch severally to the form of the branch, whatever that form may be. When all these circumstances, even in the imperfect view of them which has been given, are taken into account, it will readily be perceived that the coot's foot is an instrument of far more varied application than any of those feet which we, in the simplicity of our ignorance, are apt to consider much more handsome and perfect.*

* The nest of the coot consists of a large, compact mass of decayed aquatic herbage, sometimes placed upon a tuft of rushes, but more commonly among reeds; and not unfrequently having its base at the bottom of the water, from which it is raised up to the height of ten or twelve

THE RED-NECKED PHALAROPE (*Phalaropus hyperboreus.*)

The feet of this bird resemble pretty nearly those of the coot, but the bird itself is considerably smaller, and longer in proportion in the wings. The shape of the body is far more light, elegant, and adapted for rapid flight, than that of any of the crakes, rails, gallinules, or coots. It has no expression of the heavy character of the gallinaceous birds, or of any of those that look at first sight as if they were loath to use their wings, and which, if we put them to the test, verify the physiognomical expression by running, skulking, hiding themselves, or, as is the case with the gallinule and the coot especially, taking to the water, as if more german to the element of fishes than to that of birds. The present species, on the contrary, if we disturb it, will instantly vault into the air, and defy us in that element, over which we have the least power.

Yet the bird is more of a swimming bird than even the coot, but its form and habits link it with swimming birds of very different character,—to the gulls, and similar birds, which can turn the wide sea-waves into a pasture, and snatch their finny prey while it is tossed and bewildered in the foam or the surge, and which can also, when occasion serves, run fleetly along the beaches, and pick up their food there. So little resemblance has it, indeed, to the ducks and geese, and other punt-bodied birds, which we are in the habit of seeing dabbling about in mill-ponds and other small pools, that, until we look at its lobed feet, we would never imagine it to be a swimmer. The land bird, with which one would

inches above the surface, the total depth of the mass being from eighteen to twenty-four inches. It is sometimes torn from its mooring and washed down the stream by floods, the female still continuing her incubation, as if aware that it would soon float into a place of safety. The eggs, seven to ten in number, are of a dirty greenish-white, freckled and spotted with brown.—M.

most readily associate the phalaropes, is the pigeon.* The legs are, indeed, placed farther backward and wider of each other than in birds which do not require to swim, and the joints of the upper part of the leg are more bent ; but the bending is more at the articulation of the tibia, so that the tarsus is more perpendicular and free, and the bird can run, a motion which birds constructed and using their legs like the coot are not very well qualified for performing. This bird combines rapid flight with the operations of running and swimming, and it accordingly has the body of a bird of flight. The peculiarities of structure which best adapt a bird for the performance of all these operations, we shall perhaps find a more appropriate occasion for noticing afterwards.

The length of the bird is eight inches, the breadth fourteen, the bill is about one inch long, slender, straight the greater part of its length, but bent a little at the tip. The crown of the head, nape, cheeks, and sides of the breast, ash colour ; the back black, with rusty brown margins to the feathers ; a white bar across the wing, and white mottlings on the upper tail coverts ; the chin white ; the front and sides of the neck reddish brown ; the rest of the under part white, with dusky brown spots on the sides and flanks ; feet and bill dusky, with a greenish tinge. This is the breeding plumage of the males. The female has the reddish brown less bright, and broken by patches of ash colour. In winter, the black fades to brown, the brown to pale buff, and the spots on the sides become obscure. The young are mottled brown and reddish above, and white and pale ash grey on the under part. The bird thus follows, in the changes of its plumage, the law of those other birds of the order which it most nearly resembles, while the rails and coots follow the

* This is a most fanciful association ; but we will not waste time in discussing so palpable an error.—M.

law of those which they most nearly resemble, and have the principal change in the colour of the naked parts.

This beautiful species is a winter migrant, and not a very common one in the south of England ; but it breeds around several of the fresh-water lakes in Orkney and Shetland. The nest is formed of grass, in the best concealment that the bird can find near the margin of the water.

THE GREY PHALAROPE (*Phalaropus lobatus*).

This is also a very handsome species, but one which is exceedingly rare in England, even as a winter visitant, and hardly known to British observation in its breeding plumage. It is very discursive, and breeds in the extreme north, our voyagers having met with it on Melville Island ; and they also say it summers among the icebergs in very high latitudes. It is perhaps the most northerly bird, having any decided characters of a land bird, which visits the British shores. A figure of it in the breeding plumage, on a scale of one-third the lineal dimensions, is given on the plate facing page 1 ; but no specimen, in such perfect plumage as the one of which that figure is a portrait, need be looked for even in the most northerly of our islands.

In winter, the rich reddish brown of the plumage entirely disappears, and is replaced by white, more or less marked with greyish ash on the sides of the breast near the turn of the wing ; the buff on the margins of the coverts fades to grey, as also does the general tint of the back ; the black on the head changes to white ; the white round the eye to black ; the bill changes from yellowish to dusky, and the feet become lead colour. In the extreme north, it is probable that the whole winter plumage becomes pure white.

In the perfect summer plumage, no specimen has been met with in this country, though one old bird was found in Wiltshire in August, with so much of the summer dress as

completely to establish the identity of the species through all its changes, much as they differ from each other. In consequence of the extent of change, the perfect plumage of the bird has seldom been accurately described or faithfully represented.

Young birds, in their first plumage, are most frequently met with, as being not only the most discursive, but the first in feather. They have a slight tinge of brown on the throat, pale mottlings of grey and brownish at the bend of the wings; the scapulars grey; the greater coverts dusky with buff margins; the white bar, on the middle coverts of the primaries, more conspicuous; and the bill and feet not so deep in tint as the mature birds.

That the grey phalarope should be at once the most northerly of birds, and the one in which the seasonal changes of plumage are the most remarkable, is a very strong proof of the connection that there is between heat, or perhaps it is more accurate to say *light*, and the colours of birds. As this bird can keep either the land or the sea to the very last hour that they are open to any living creature, it acquires, on much of the body plumage, the whiteness of snow; but in the summer, when it enjoys the continual sunshine within the Arctic circle, its colour resembles that of a tropical bird.*

* In the Phalaropes, the toes are edged with lobated membranes, by means of which their utility as swimming organs is greatly increased. In the red-necked Phalarope, the lobated membranes have finely-pectinated edges; in the grey Phalarope, the membranes are scalloped. These birds not only frequent lakes and rivers, but the shores of the sea, and swim lightly amidst the roughest waves. Both are natives of the high northern latitudes.

ORDER XIII.

NATATORES.

SWIMMING BIRDS.

THE birds of this order bring to our contemplation the characters of a new, a wide, and a wonderful field—the world of waters. Many of the last order may be considered as in fact water birds, and some of the species can not only swim, but swim well, and are far discursive over the ocean, resting, if need be, on its surface, and thence again arising refreshed for their journey. The phalarope, for instance, which comes straggling to our shores in the winter, pauses to breakfast with the whale in the lee of an iceberg, as it is on its journey to those regions where, during half the year, water becomes both the home and the harvest-field of the few human beings who inhabit wretchedly, though not dismally, on the extreme confine of existence. But still, though the phalarope can “take shelter” on the sea—such shelter as an ice-berg and an angry wave afford—when caught in those violent gusts and storms in which the winter and the summer contend upon those seas, and though it can “keep the life there,” by picking up the small crustacea, mollusca, and radiata, with which the water of the all-productive deep is so replete, yet there the phalarope is only a way-faring bird, pausing till its wings are rested, and

its hunger appeased, and then dashing onward with renovated speed to explore the Arctic lands with quicker, more certain, and more extensive range, than human navigators. Its "march is" *over*, rather than "*on* the mountain wave," and "its home" is the land—to our feelings, a dismal and a dreary land, but still the appropriate and chosen land of the bird, and not upon "the deep."

Various birds of the order Grallæ also are land, or rather fresh-water birds, and when the treasures of the north are sealed up by the rigour of the winter, some species make their way to our fens, marshes, and lakes, and many more to our estuaries, creek, and shores; but still the general character of the order is german to the sea. Their forms are boat-like; their plumage is proof against humidity and cold—no rain mats, and no wind ruffles it; their feet are paddles, or oars; their whole air is marine, and their very voices are tuned, if tuned it can be called, to the wailing wind, the thundering surge, or the hissing foam.

The number of these birds is vast. There is hardly a lone rock in the ocean, or a small islet just lifting its head above the water, but which, in the breeding season, is so thickly peopled with them, that it alone might seem to be the city of the sea birds. On some of the remotest of our own islets, one can hardly, at that season, plant a foot without breaking an egg, and the clouds of parent birds actually thicken the atmosphere, and hide the sun. The cliffs, too, those gigantic barriers which nature has set to the driving of the winds and the dash of the waters, are tenanted in every cranny and crevice; and when one thinks of St. Kilda, and even of many points of the bold shores that are nearer and more accessible, one is almost tempted to fancy that nature has thus reared them, and rifted them with breaches and fissures, because the level surfaces of the shores are not sufficient nesting-room for the sea birds.

When man rears a tenement of some ten or twelve stories in height, we are apt to speak of it as something wonderfully elevated in building, and the Muses are supposed to come more freely with their songs to those who tenant the thin air of the upper chambers of such buildings, than to those who reside more softly and substantially farther down. What inspiration, then, must there be in a tall sea-cliff, upon the summit of which one inhabits the thousandth story from the base, and all the nine hundred and ninety-nine families below are dwelling in perfect freedom, enjoyment, and joy? Altitude is, by prescription longer than all record, held to be the mother of inspiration; and though an inland Parnassus may be sublime, yet it is a lifeless sublimity; but on the tall sea-cliff, Dulness herself may find inspiration.

Let it be some remote isle, rising green and gradual from a quiet beach on the east, as quiet as you can procure, for among the wild islets in the deep, where alone the sight can be enjoyed in full perfection, the ocean—the Atlantic at least—will not rest, let the air be as tranquil as it may. Well, you land, and ascend gradually to the height of some fifteen hundred feet (though I believe Conagra in St. Kilda is about fifty feet less), and during the whole ascent you have no forward view. The place is without a tree, or even a shrub; but the temperature is mild and the sod is green. (It is a curious fact, by the way, that the Atlantic seems to be the only ocean whose breezes clothe the fields with perennial greenness without the assistance of art.) You gain the summit: the western sea appears *at your feet*, notwithstanding that you feel fatigued with the ascent. But that sea is glassy in the offing, though it ripples on the rocks; and you must look at the profiles of the jutting crags right and left, and also at the expanse before you, in order to be sensible how high you stand.

It is “the midnight of noon,” the dead hour of the sultry

day, the cormorant is nodding on the peak, all the birds have fed themselves full on the fatness of the sea : not a wing is to be seen, not a sound to be heard. You came to see the city of the birds : it is their sepulchre—the city of the plague. Those lanes in the little village paved with feathers and down, must have been rendered so soft to the tread by the slaughter of all the winged wanderers of the deep, and nestlers in the rocks.

Never despair. That sea which now lies so glassy under you, would, at the call of the west wind, bound in volland spray up that fearful precipice, and drench and even dash you from your footing ; and the contrast between the repose and the activity of its inhabitants may, for aught you know, be as great. Sound the tocsin. Your cry—the shout of a multitude on the height—would not avail. Tumble down one of those masses of stone. But, if you are not accustomed to such places (and if you are, you will feel the poverty of words), step back instantly, lest you follow it. Crash ! It has hit once ; but the sound is single. Again ! Thunder ! There is rolling, booming, and echoing. The stone has taken effect ; the cliffs are smitten. A shrilly wail rings along the upper ledge, as if it were the war-cry of some savage tribe ; and the storm petrels dart outward simultaneously like a flight of arrows. But the din below is as if you had awakened the elements ; and the bellowing of the sea, the thunder of the sky, and the hurtling sound of the tumbling earth, were confounded together. Anon, forth fare the phalanx, hiding the sea, and agitating the air, till they produce a wind even where you stand. The fulmars in myriads, like a grey smoke ; here and there a shag or a cormorant, like a dark cinder of the disturbing fire. They widen, they close, they wheel, they tumble, they scream, they wail, as if chaos were come ; and as the sound spreads over the sea, up spring the gannets from another islet, like the white steam

from a volcanic jet in the act of being drowned and quenched by the tide just at it nears the surface. But the scene will not admit of description: those who love nature in her mightier modes, should see it.

One ocean scene, to give it breadth, one sea bird, to give it wing, would require a volume. There are about four score species of these swimming birds, we have but a few pages to spare, and, therefore, we can give little else than a mere catalogue. Indeed, the manners of sea birds remain in a great measure unknown; though the sea, if deprived of its feathered tribes, would be to human observation much more desolate than the land, as the other multitudes of its animals which inhabit, race under race, to a greater depth, perhaps, than any line can fathom, are all for the most part concealed under the surface.

The productive powers of the ocean are, though concealed from our common observation, utterly astonishing. In the notice of the avocet, occasion was taken to instance the rate at which even the least fertile of our river fishes could multiply; and though the result there was reduced to a very small fraction of the reality, it was abundantly great. But it is nothing to the fertility of the tribes in the sea. One brood of the cod fish is between four or five millions; so that ten of these fishes would in the course of one year furnish a fish a-piece to every man, woman, and child, in the three kingdoms. The smaller races are equally prolific; and thus when we come to think of the matter, we can easily perceive not only that there is abundance for the countless multitudes of sea birds that are scattered over the ocean, but that the millions which often resort to the same islet or single rock in the breeding season, can easily find in the near vicinity of that a plentiful supply for themselves and their broods. Further, when we bear in mind that the sea birds congregate to breed, and the greater part of the land birds disperse, we

must be convinced that the land is really the least productive portion of the globe; and that the sea, taking its breadth, its depth, and the energy of the powers that are in it, into consideration, is more rich in proportion to the dry land, than the valley of the Nile is in proportion to the adjoining wastes of sand. The same, though in an inferior degree, may be said of the permanent accumulations of fresh water—those that are inhabited generally by a few, and visited occasionally by a few more, of the swimming birds. They not only nourish a vast number of small animals in the water itself, but they fertilize the banks, and render them productive of animals as well as of plants. Therefore, taking the whole of the swimming birds, we may say that they are more abundantly and securely provided for than any others of the feathered tribes. They are also more free from casualties; for among sea birds there are few preyers—predatory quadrupeds there are, of course, none; and though in the lakes and rivers, some of the more voracious fishes do capture a bird now and then, the number so captured is small there, and there is seldom any such capture on the high seas.

Natural powers are always so much in excess in proportion to the scope that there is for their operation, that they instantly supply any blank that may be occasioned by what, because we know not its cause, we call contingency. But still there is no waste; and there is an exact proportion between the energy of the powers and the average necessity that there is for their operation. Accordingly, as the sea birds are subject to fewer contingencies, their broods are less numerous in proportion. Those which dabble on the shores are exposed to more foes and contingencies. The common teal has as many as twelve in a brood, and the common wild duck eighteen. These breed on the margins of fresh-water lakes, in countries rather temperate, and where there are many destroyers. The fulmar petrel, which nestles in the

cliff, and skims the wide ocean for its food, only lays a single egg; and yet, the fulmar is, perhaps, the most numerous of birds.

All the birds of this order can swim, and with many of them swimming is the principal motion; but there are many of them that fly more than they swim; and others which walk freely, rapidly, and gracefully. Their food is on the surface, in the volume of the clear water, at the bottom in the ooze, and along the beach, and in whichever of those places it is to be found, or of whatsoever it consists, their organization adapts them for procuring it in the easiest and most successful manner.

The under part of all of them is differently constructed from that of land birds. The breast bone and ribs extend along the whole of that part which is in the water; and thus, that part of them does not move in the act of breathing, but remains perfectly steady, and of the same shape. If the under part were moveable during that operation, the expansion would be impeded by the weight of the body, which would have to be raised at every inspiration; and the feathers would be opened by the distension of the skin; therefore, they would breathe with difficulty, and the water would penetrate the feathers. They are thus ribbed as the lower part of a ship is, and any change which the form of their bodies undergoes while they are swimming, takes place in the portion which is out of the water.

But though the under parts of all of them may thus be compared to the hulls of vessels, they are not all of the same form. They are fashioned to the kind of motion that they are to have in the water, and also to that in the air, or on the land. If the principal action be to remain floating and dabbling, the lower part of the body is a punt; if they are to get rapidly through the air, the body is narrowed backwards, like that in the swift-winged land birds; and if they

are to shoot along wholly immersed in the water, the fore part is pointed. There is much to be learned from the study of their structure, in the shape of the body itself, in the feet, the wings, and the bill, but we have space only to recommend to the subject.

The number even of British birds in the order and the diversity of their modes of life, render some subdivision necessary, more especially in a short sketch, as the general notices will save repetition with the individual. Perhaps the subdivision most accordant with the habits of the birds is that of *Cuvier*. But we shall alter the arrangement, so as to conclude with the pelagic or wide-sea birds. He makes four families: *divers*, *long-wings*, *entire-feet*, and *flat-bills*. We shall take the last of these second, and the second last, and then we shall have:—

1. **DIVERS.**—Birds, with the wings short and rounded, the head generally small and produced, the legs placed far back and acting wide from each other; and capable of getting wholly under water, and making less or more progress in motion while immersed.

2. **DABLERS.**—Birds with the bill flat and covered with a sentient membrane, wings of moderate length, bodies punt-shaped, finding part of their food by dabbling in the ooze at the bottoms of the shallows while the body is afloat.

3. **FISHERS.**—Birds with powerful wings, some of them descending on their prey from a considerable height in the air, and all of them having the feet so constructed as to *walk* upward to the surface of the waters when they plunge below it for their prey.

4. **SKIMMERS.**—Birds which glide along the surface of the water, sometimes resting on the surface by means of their feet, but generally using the wings, which are very long and pointed.

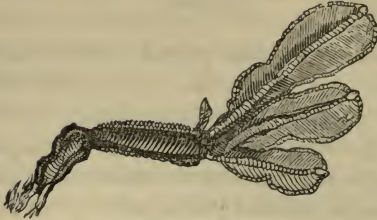
DIVERS.

There are about fourteen British species, resident or visitant, belonging to this division. The genera differ in their capacity of flight, and the form of their bills, but they all agree in the far backward position of the legs, the nearly erect position which they must assume when they stand or walk upon the ground, and the capacity of diving. Some of them have the toes lobed like the coot, others have them fully webbed. When they rest upon land, they generally do so on the whole length of the tarsi, by which means they obtain an extensive base, and the tightening of the tendons over the tarsal joints the one way, and the tibial joints the other, gives great firmness and stability. That mode of standing is not very common among birds; but many quadrupeds do it, and even man in the rude state with the joints bent as a way of reposing, though in our common standing or walking position the application of the foot to the ground is the same. When the toes only are on the ground, these birds balance themselves with difficulty.

GREBES (*Podiceps*).

This is a singular genus, having some resemblance to the coot, yet differing in many of its characters. The bill is of middle size, conical, pointed; a little bent down at the tip of the upper mandible, compressed in the whole of its length, and hard and firm. The legs are placed far backwards and of considerable length. The tarsal joints admitting of a slight degree of oblique or rolling motion, the tarsi compressed, with a margin on the thin edges, the toes much flattened, connected at their bases by membrane, and with broad scolloped margins. Tail altogether wanting. Wings short

and rounded. The foot, of which the following is a sketch,



is a very singular instrument, and perhaps the best formed of any of the feet even of swimming birds for getting through the water, and for acting both as oar and rudder, when the bird is under the surface. The bird does not paddle, but row, striking out both feet at once, and turning them so that the flat side of the tarsus and the webs of all the toes strike the water at the same instant; and, by means of the rolling motion, the stroke can be given obliquely in any direction. To construct a paddle that could act wholly in the water, upon the model of the grebe's foot, would be a vast acquisition in the art of propelling vessels.

When on the surface, the grebes swim swiftly and beautifully, and under water they use their wings in swimming; and their motions resemble those of frogs. The feet are placed wide, and they are recovered with the edge turned, as rowers "feather" their oars. The birds have the most perfect command of the water. They can take wing from it, alight in it, dash along the surface heedless of wave or foam, dive, shoot along below, come up again, and play about just as they list. They are, perhaps, also, the most completely waterproof of all the feathered tribes. There is never a humid feather or the least trace of wet upon a grebe, unless there be a dead feather or a wounded place, even though it has been driving about for an hour under water. In the course of its under-water excursions it comes up to breathe,

but only for an instant. It need hardly be added, that all the grebes dive with their eyes open, because on account of the hardness of their bills they can prey only by sight; and their motions under the water, although playful in appearance, are not play, but the regular business of finding their food.

That food consists of the spawn and fry of fishes, water beetles, and other insects, crustacea and mollusca, and sometimes, it is said, of vegetable substances. They are also said to pull out and swallow their own feathers, as soon as they feel them beginning to decay. In this country they inhabit the fresh waters, at least the resident ones do, and only resort to the shore when they are frozen out; but salt and fresh water are equally indifferent to them; and they sometimes are entangled in fishing-nets at the depth of two or three fathoms. Those which are more marine in their habits, build their nests in holes on the shore; and the more inland ones form large but rude nests of aquatic plants close by the water. The eggs are usually three or four. There is not much difference in the plumage and appearance of the sexes. Grebes are generally plump and fat from the abundance of their food, and their agility in the capture of it; but their flavour is oily and rank. There are five British species, one visitant and four residents.

THE RED-NECKED GREBE (*Podiceps rubricollis*).

This species is rather rare, and has hitherto been met with only in the winter. It is thicker and less handsome in shape than any of the others. Its length is about seventeen inches, and its weight a pound and a half. Feet, except the insides of the tarsi, which have a yellowish tinge, dusky, bill the same at the tip, yellowish at the base, irides hazel, naked space round the eye brownish black. Upper parts brownish black, with the secondary quills and a part of the base of the

primaries white. The feathers on the nape a little produced, forming the rudiment of a crest. The cheeks and throat grey; the breast reddish chestnut; the rest of the under part white, with a fine satin gloss, and some obscure dusky mottlings on the sides and flanks. The female has nearly the same plumage as the male, but the young want the reddish colour on the breast, and have the colour on the upper part paler. This species eats the seeds of aquatic plants. It may be a native, as there is nothing to induce grebes to migrate northward in summer; and as all the other species are resident. The shortness of the wings of these birds would not, however, prevent them from migrating, because they could both repose and feed upon the water; and their wings are not shorter than those of some of the regularly migrant swimmers.

THE CRESTED GREBE (*Podiceps cristatus*).

The crested grebe, though not a very common bird, is found in various parts of the country. It breeds in the fresh-water pools, but is sometimes found on the shores. Its nest is formed of a large bunch of reeds and other dry aquatic plants, placed near and sometimes actually on the water, though still hidden among the reeds and other tall herbage, and not detached or floating, unless loosened and set adrift by the rising of the water or some other accident after it is constructed. Indeed, a bird can no more build a nest *on* the water than a man could so build a ship. If the grebe could nestle *under* water, and build there of materials heavier than that fluid, the task might be accomplished; but on the surface of the water, it is not possible. The eggs are four in number, about the same size as those of the common pigeon, and of a white colour. Some caution is requisite in judging of the colour of grebes' eggs. They are all white when laid; but they are soon soiled by the feet of the birds, to

which a portion of the softer mud and slime of the water adheres, and thus they are soon tinted of a greenish or brownish colour, but that colour is a stain, and not the natural tint of the eggs. The birds are very seldom seen on the wing; indeed, they are not much seen in any way, as they breed in the sides of the beds of reeds next the water, and are generally either fishing or concealed among these.

The crested grebe is much larger than the red-necked one. The length is about twenty-two inches, the spread of the wings more than thirty, and the weight from two to three pounds. The female is rather less than the male and has a shorter crest.

The bill is about two and a half inches in length, dull red at the base, and pale brown along the exterior of the upper mandible and at the tip. The irides and naked circle round the eyes are crimson, the legs and feet dusky black, with a yellowish tinge on the inside of the former. The naked stroke from the gape to the eye, crimson in the breeding season, and dusky black at other times. Crown of the head and crest, which is divided into two rounded lobes, dusky black; cheeks white, with a dark streak from behind the eye to the crest; ear tufts, which form a sort of short ruff, rusty, deeply bordered with black. General colour of the upper part dusky brown, with the secondary quills and part of the bend of the wing white. Chin dusky brown, and all the rest of the under part silvery white, with an exquisite satin gloss. The texture of their feathers is as fine as their lustre, and they have the advantage of not being easily ruffled, so that in countries where the birds are more abundant than they appear to be with us, that part of the skin is used as an article of ornamental dress. Besides being smaller than the male, and having the crest shorter, the female has all the colours paler. The young, in their first plumage, are without

the crest and ear tufts, and have the sides of the head marked with waving lines of dusky brown.

Crested grebes are very industrious and successful fishers, and destroy vast quantities of prey in those places which they frequent. They also feed much, at the times when they are on the shores, upon the fry of white fish ; and they also eat great numbers of the smaller crustacea—shrimps, prawns, and small crabs. Specimens are not easily procured, as the rapidity with which they dive renders the shooting of them difficult.

THE HORNED GREBE (*Podiceps cornutus*).

This species is less common than the former, though, like that, it is seldom seen in proportion to its numbers. It is a smaller bird, but better winged in proportion to its length. The length is about fourteen inches, and the extent of the wings more than two feet. Bill only about an inch long, but very stout, reddish at the base, dusky in the other parts except the tip, which is greenish grey. Irides with a double circle, the inner crimson, the outer white ; naked part round the eye white, naked space from the eye to the gape crimson (in the breeding season). Crown of the head and crest, which is divided and the lobes pointed and called horns, black, ruff chestnut, passing into black, and both that and the crest tinged with deep green. Upper part brownish black, point of the neck and breast rust colour, sides and flanks the same paler, belly white ; young without the crest and ruff, colour on the upper part more inclining to brown, streak from the bill to the eye dull white, bill without the reddish tinge. The red on the lore or naked space between the gape and eye, and that on the basal part of the bill, are the peculiar tints of the breeding season. The double circle of the iris is the invariable distinctive character of this species.

The nest is in places similar to that of the former, and the habits of the birds are nearly the same. The eggs are also the same in number and colour till they are soiled by the feet of the bird.

THE EARED GREBE (*Podiceps auritus*).

This is a smaller species than the former, being about two inches shorter and three inches less in the expanse of the wings. The most remarkable distinction between the two species is in the form of the bill. The bill of this one appears to turn upwards at the tip, in consequence of the upper mandible being very straight there, and the under one turning much upward; the culmen and tip are also much paler than in the last species. The head, nape, and all the upper parts sooty black, with some obscure brownish mottling on the scapulars and upper part of the back; the sides are chestnut brown, and the under part glossy white. The coronal tufts (ears) which rise from over and behind the eyes, and are quite separated by the black on the head, are pale chestnut, inclining to orange. The ruff, which is very short compared with that on the other crested species, is dull chestnut near the eye, and black at the extremity. The irides are scarlet, and the streak from the gape to the eye crimson, at least in the breeding season. The form of the bill, the colour of the ear tufts, and the whole form of the head, give to this species a look of fierceness which it does not show in its habits. As is the case with most of the others, this species is very generally distributed, at least over the northern hemisphere; but not very abundant in any place, and not much seen unless looked for intentionally, and sometimes not even then, though search be made not only in the places where it is likely to be, but in those where it really is.

THE LITTLE GREBE (*Podiceps minor*).

A pair of little grebes with their nest and eggs are represented on the frontispiece to this volume. They are birds which are, perhaps, more generally distributed than any of the others, though like them they inhabit the seclusion of lakes and pools, in a quiet and unobtrusive manner.

The number of local names which are given to this species, such as "dab-chick," "ducker," and a variety of others, is sufficient to show how generally it is distributed. It is not so common in those upland parts of the country where the margins of the waters are in general destitute of cover; but it is to be met with in all the rivers, lakes, streams, and large pools, in the richer parts. It is not, however, very generally seen, and when seen it instantly dives and disappears, as it makes under water for the cover of the reeds and other tall aquatic plants, where it hides itself, not in the herbage, but immersed in the water, and with the bill only above the surface for respiration. It is a handsome little bird, and very quick in its motions under the water, perhaps more so than any other bird. It is gentle in its disposition, and may be tamed and kept in a garden pond, in which it dives and plays about, heedless of the number of spectators that may be around it. It is very voracious, and consumes a vast number of fry and small fishes, as well as of aquatic insects; and failing these, it eats the seeds of aquatic plants.

The length of the little grebe is about ten inches, the stretch of the wings about sixteen, and the weight varying from five to seven ounces. The nest is constructed like those of the other species, of a great number of aquatic leaves, forming a bunch or little hillock on or near the surface of the water, but concealed in the cover of the reeds unless these are removed by accident. Indeed, the nest is as often placed on a small "hummock" in the herbage, as on the support of the

herbage itself ; but it is generally so placed, as that, in case of the attack of an enemy, the bird can instantly take the water ; though if an enemy does not appear, the female is a resolute sitter. The eggs are five or six, of a white colour when laid, but soon becoming darker from being soiled by the feet of the bird. About the time that the last one is deposited, there are as many shades of colour as eggs.

In describing the colours of the eggs of birds, whatever may be the species, the circumstance of their being recent or not should be attended to, especially in the case of those birds which are the most apt to soil their feet in seeking for their food ; and also in eggs, which, in the absence of the parents, are exposed to the action of the sun, or even of the light—for light alone is sufficient to alter the tint of some eggs.

Grebes are among those birds that cover their eggs when they leave the nest to feed ; and it has been said that they do so for the purpose of concealment from enemies. Those who make such assertions forget that the rupestral quadrupeds which are most likely to destroy the eggs of the grebes, especially of the little grebe, do not hunt wholly, or even principally, by sight, and that therefore the covering would be no concealment. That the birds sit upon the eggs for the purpose of concealing them, is the fair and legitimate continuation of the prudential hypothesis ; but it is rather more rational, and more in accordance with the fact, to let the weightier reason lead the way. The bird covers the eggs from the same instinct by which she sits on them—and then, not from any foreknowledge, that they would be addled if exposed to the cold air, or from any foreknowledge whatever, but simply because it is her nature. It is also sometimes said, that the grebe collects so large a quantity of materials, and places them in such immediate contact with the water, in order that the heat, occasioned by their fermentation, may

assist that of her own body in hatching the eggs. Now it is true that vegetables, which have been cut down with the sap in them, do, when closely packed together and moistened, produce a considerable degree of heat; but it would puzzle a conjuror to warm himself by a bundle of dry leaves, put together in the same manner as the nest of the grebe, even though he were to launch it on the Atlantic.

Those “feelings *for a purpose*,” which persons of limited knowledge and yet more limited understanding, are so prone to assume upon all points connected with the economy of animals; and the zeal, often the fierceness, with which the “follower” labours to destroy the *purpose* of the “leader,” and substitute another *purpose* in its place, are so perfectly analogous to the gratuitous fierceness with which one ignorant nation wars against the idols of another, and in favour of its own, even though more rude or ridiculous,—so like the hammer of Thor smashing the thunderbolts of Jupiter, or the sages of one part of ancient Egypt girding on their armour, and going forth to overturn the altars of the dog so that they might set up those of the monkey, or the wars of stone against block, or block against stone, among the American Indians,—that it is impossible not to impute them to the same cause—the fumbling of the imbecile mind in the darkness of ignorance. If the grebe has a *purpose*—a scheme planned by forethought, with a view to a certain end, in the covering up of her eggs when she quits the nest—then, by all means, let it be for coction rather than for concealment. Let her proceed by chemistry, not by craft; for if she must needs be made “a man of,” (for that is the tendency of the assertion either way,) by all means make her a philosopher rather than a smuggler, as it costs no more, and is more creditable both to the bird and the bestower.

This same “assumption of a purpose,” is one of the most important points in the whole range of natural history, espe-

cially to the uninformed and the young, for whom chiefly these pages are intended ; and therefore the better-informed reader will perhaps pardon me if I add one or two sentences more.

If we ascribe purpose to animals, what more can we ascribe to man ? and how can we refuse it to plants and stones ? It is unnecessary to draw the conclusion, for it stands broadly declared in the premises ; if those premises are true, then there is no immortal spirit in man, and no Creator of the world. The *purposes* of matter are in matter itself,—and all else is a delusion.

That would be a gloomy and hopeless state of things ; but as it is the irresistible conclusion from the premises, if these have been fairly assumed, gloomy though it be, it must nevertheless be true ; and if true, we must accede to it manfully, notwithstanding its gloom : for he who would not relinquish even mind and immortality for the truth, is unworthy of the one or the other. Let us see—coolly and calmly.

How do we know the purposes of our fellow-men ? Is it before they in some way reveal them to us, by word or by action ? No. And do the words always set forth the purpose, or does the end always answer the forethought ? Assuredly not, otherwise there could be no deception and no disappointment ; and yet the most cautious among us meet with enough of both. We know nothing of the purposes of men farther than they tell us, and we have no means of finding out whether they tell us all, or if what they tell us be true. And it is well for us that such is the case ; for if all the purposes of mankind were revealed, even for a single day, it would so bring them into collision, that there would be a general massacre, from each one striving to defeat the purpose of another. In this case, “ignorance” truly “is bliss,” and knowledge would be misery—destruction. This, by the way,

is the very species of knowledge which is so beautifully clothed in allegorical language in the Scripture account of "the fall;" a doctrine, of which there are gleams in the mythologies of all the more enlightened nations.

"But, we find out the *purpose* from the *event*?" We find *our own opinion* respecting it, and *nothing more*; and the soundness of that opinion depends on the extent and carefulness of our experience. If the young grebes are hatched, the eggs have neither been chilled for the want of fermentative heat, nor taken by enemies, and so both hypotheses are equally borne out, and neither of them is to the *purpose*. All the actions of animals are physiological, taking place under certain circumstances, but not in consequence of anything in the least like forethought purpose on the part of the animals. Were that the case, we should have the unhatched chicken, nay, the chicken, before its grandmother were hatched, settling whether it should be black or white, and whether a March bird or an autumnal one.

Therefore we cannot know, neither can we rationally believe, anything of purpose or forethought in animals; and when we incautiously express ourselves to that effect, we, in truth, do nothing more than put ourselves in the stead of the animal, and reason how we should have planned and conducted matters, if placed under the same circumstances.

Nay, when we consider the matter, there is no forethought even in us; for though we form plans for future execution, those plans are all made up of that which has been previously known and experienced; or if they are not, the chances are greatly against the probability of their execution. Though endowed with mind, we have no knowledge of the future, except from its presumed similarity to the past; and, unless we are taught, we display little, if anything, beyond animal instincts. But the animal acts without any example or in-

struction ; and though some are solitary and others gregarious, there is not a single authenticated instance of one of them schooling another, or of any one standing in need of such schooling, in order to perform all that it is the habit of the species, in a state of nature, to perform. When we train them, the case is different ; and in proportion as the animals are gregarious or social in a state of nature, they may be the more easily trained : but in training, the art and the purpose are ours, not theirs.

To suppose otherwise, is to suppose that mere matter knows its own nature and its own history, a degree of knowledge which we feel does not belong even to mind itself. We know not of ourselves whence our minds came, when they were created, or whether they were in being anterior to the organization of our bodies. Knowledge of that nature is an attribute of Godhead—can be obtained only in so far as it is revealed ; and though we can feel that that which is revealed is accordant with our wishes, and highly gratifying to our hopes, and though we can judge of the credibility of the witnesses to the revelation, we cannot, in the nature of things, demonstrate the abstract truths that are revealed, by any process of merely human reason.

But I must leave the subject, earnestly recommending this short digression to my young readers, whom it may (if they follow it out in their own thoughts) assist in rendering the study of nature, in a sound and philosophical manner, wholesome, instructive, and pleasant.

DIVERS (*Colymbus*).

The general resort of this genus of birds is the sea, though they, especially in the young state, occasionally resort to the mouths of rivers and the inland lakes. They bear a considerable resemblance to the grebes, both in their structure and their habits, and therefore are naturally enough placed con-

secutively to them even in a natural arrangement ; but they differ in so many particulars, that they cannot with propriety be included in the same genus.

Their general characters as a genus are—the bill of moderate length, straight, compressed in its whole length, and very sharp pointed ; the nostrils, at the base, oval, and half closed by a membranous valve ; the legs articulated far backward, with the tarsi compressed ; the three front toes very long, and connected for their whole length by a membranous web, and the hind toe very short, with the web loose and merely rudimental ; the wings are short in proportion to the size of the bird ; and the tail is very short and rounded. The entire webs of the feet, and the possession of a tail, are the most obvious external characters, in which they differ from the grebes.

As is the case with the grebes, the water is the proper and peculiar province of the divers, on the surface of which, or immersed in its volume, they have as much command of themselves as any land birds have in the air. The water is to them much the same as the air is to the swifts, and even more so, for the divers repose on the water, which the swifts cannot do in the air. They do not come to the land, except in the breeding time, and even then they come as little landward as possible. Small islets, jutting points, and headlands, (places which have more sea than land in their horizon,) are those upon which they breed. They are exposed to few enemies or casualties, and therefore their broods are not numerous : their eggs are not more than two, rather large for the size of the birds, as the young are so far grown when they come out of the shell, that they are almost instantly able to take the water.

These birds are, indeed, much more independent of contingencies than any of those that make the air their chief element ; and generally, than their brethren of the waters.

The eagle can keep her place on the rock during any storm ; but there are states of the atmosphere in which she is not able to keep the sky ; and if those states were to continue, the eagle, notwithstanding the extent to which she can endure want, would at last die of starvation. There have been instances of eagles being reduced to such extremities, that they have gnawed a portion, not only of the feathers, but of the flesh and bones of their own wings. The tempest, too, sweeps the swallows and swifts from the sky, and the far-ranging petrels from the face of the ocean ; and the dabbling sea-fowl at those times huddle together in the sheltered creeks ; and even the gull and the cormorant are fain to take their passage inland.

But when all else that breathes the free air of heaven are quailing before the tempest, and in some way or other confessing, by their subdued action, the commotion of that element upon which they so immediately depend for life, the divers are in the full tide of enjoyment ; and the only effort that they have to make, is to keep themselves at sea : for if they drift to land, they are as helpless as a rudderless vessel on a lee-shore.

In those times of elemental anarchy, the waters of the ocean, to the mean depth of the swell of the waves, that is, about as far below the "trough of the sea" as the ridge rises above it, are in turmoil and agitation, and all the fishes, and other small marine animals that are caught in that swelling surface, soon lose command of themselves. The fishes have but one grand swimming instrument, the tail ; and though their fins and scales hold on, and assist the action of that up to a certain point of agitation in the water, they are at last overcome, and driven at the mercy of the surge. This is proved by the fact, that after violent gales, when the fry of any particular species of fish are numerous in the offing, they are cast to the depth of one or two feet in

water, on the lee-shore : but if the diver is "taken cross" by the surge upon one foot, he has the other to counteract ; and if on both, he has still the wings. The action of the four extremities, too, enables the bird to "get down" to the smooth water to rest itself, while it can ascend and breathe in the lee of the ridge. To see them from a promontory, against which the air and the sea are setting full wind and tide, and drifting myriads of the fry of herrings, and every other surface fish, is (good footing and heart and hand braced to hold on) no inglorious sight. They dash along the surface, they dart under it, they bounce up again, they bore through the ridge, and when the wave breaks in foam and thunder over them, and one would naturally conclude that, if they are not dashed to atoms, they are buried for ever in the deep, —up they spring to the surface of the unbroken water, farther from the land. The breaker indeed always finds them facing it ; and while it is falling, they plunge and get to sea, safe from the coil of water on the surface. Taken with all its circumstances, it is one of the most spirit-stirring displays in the whole of the animal economy.

There are three species of divers, resident or visitant, upon the British shores.

THE NORTHERN DIVER (*Colymbus glacialis*).

This species is often considered to be merely a winter visitant ; and there is no doubt that it is only such upon the more southerly shores of our island, though every analogy leads to the conclusion, that it breeds in the more remote islands. It breeds rather inland, and in the most sheltered and secluded places ; and as none of the birds rise or show themselves, and many of those northern morasses are not very easily explored, it may breed in considerable numbers without being seen.

The northern diver, or ember goose, as it is sometimes

called, is a very large and powerful bird, and withal of very vigorous wing. The individuals of course vary in size, but specimens have been found about two feet and a half in length, more than five feet in the stretch of the wings, and weighing twelve or fourteen pounds. Thus, though formed for another kind of diving, it is not much less powerful, if size and wing be elements of power, than the eagle itself. As is the case with most large birds, when they are merely passing from place to place, it flies high; and this may be one of the reasons for its not being seen in its passage between the breeding haunt and the sea.

The bill, in the larger specimens, exceeds four inches in length, is black in the colour, and very strong. The upper mandible bends very slightly down on the culmen; the lower one, which is channelled and enlarged at the middle, bends much more upwards, giving the whole bill an appearance of being turned up. All the divers, and also the grebes, have the bill of that form, which no doubt assists them in raising their prey out of the water.

The head and neck are black; the latter with two white collars, thickly mottled with small black lines. A portion of the side of the neck, below the entire black, marked in the same manner as the collars. The whole of the upper part black, thickly studded with white spots, as if snow-flakes had fallen upon it. The rump and tail mottled like the collars, but with a greater proportion of black, and a tinge of dull yellow. All the under parts, in the mature bird, pure white. The young have the upper plumage brownish, with grey spots and margins; grey on the cheeks, and the neck grey and dusky, with the collars less or more shown according to their progress to maturity: but they are not perfect till the third year. The eggs are two, of a dark brown colour, with black spots; they are about the size of those of the common goose. The note of the bird is a loud bawl. From

its size and strength it is perhaps the most powerful in the water of all British birds with which we are acquainted. Besides the almost impenetrable covering of feathers, this bird is coated under the skin with a thick layer of fat; indeed an accumulation of that substance, which is a very imperfect conductor of heat, and therefore well calculated for preserving uniformity of temperature, and a consequent healthy state, is common to most warm-blooded animals that live much in the water.

THE BLACK-THROATED DIVER (*Colymbus arcticus*).

This, like the former, is a rare bird, and rather a straggler than a regular visitant upon the English shores; but it breeds upon the shores of the secluded lakes and pools in some of the more remote islands.

The length of this species is between two feet and two feet and a half, and the breadth from three feet to three feet eight, but it is more slender, and not so heavy in proportion to its length, as the northern diver. The bill is more than three inches long, rounded and rather blunt at the tip. In the mature bird, the forehead has a stripe down the front of the neck; the back and rump are black. The sides of the neck, the scapulars, and coverts, thickly spotted with white. The crown and back of the neck grey; the quills dusky; the tail black, the feet dusky brown with a pale tinge on the inner sides; the under part white. The young, like those of the last species, do not receive the mature plumage till the third year. The under part is at first all dusky brown; the grey on the head, and the black marks on the sides of the neck, appear the second year; and the black on the throat, and the black and white on the back and scapulars, appear the third year. Birds in all the three plumages, and in the intermediate stages, are seen together, so that the bird has sometimes been described as three distinct species. Its

habits are nearly the same as those of the former species, only it perhaps is more abundant in one or another of its plumages.

THE RED-THROATED DIVER (*Colymbus septentrionalis*).

A figure of this species, in the mature plumage, is given on the plate opposite. It is the most handsome British bird of the genus; only a little less in weight than the black-throated, but more slender in proportion. The under part is white in all the changes of its plumage. The upper part is dusky the first year, becomes mottled in the second, and in the third year, the red on the front of the neck appears. It is, like the others, rather rare upon the southern shores, though it sometimes makes its appearance in the estuary of the Thames; but it breeds in Orkney and Shetland, and also in some of the western isles, much more plentifully than either of the other species. The lovers of white bait may be thankful that this bird comes rarely, and in the winter season; for it is a very bold, active, and successful fisher, and, heedless of the fulminations from the Mansion-house, the black looks of the Conservators of the river, or the *lachrymant* palates (for spoiled palates weep like spoiled children, and for similar reasons) of the high-tasted *Ichthyophagi* of the metropolis, it would sadly thin the numbers of those much-extolled fishes.

Around the shores, and in the bays of Orkney and Shetland, these birds capture an incredible number of small fishes; and, true to the instinct of nature, in consequence of which the wild animals feel changes of the weather before any signs of change become apparent to the senses of man, they scream exultingly in anticipation of that storm which is to bring the fishes more within their power. To the fisherman, accustomed as he is to heed all the appearances of the sea and the sky, the discordant screams of the divers are often the first admonitions of danger.

GUILLEMOTS (*Uria*).

The guillemots are not quite so handsomely shaped as the divers. They are thicker in proportion to their length, not apparently so fit for getting swiftly through the water, not so long in the wings even in proportion to their diminished length, and still less fitted for walking. Accordingly, they do not breed so far inland as the divers, but rear their broods in the holes of the rocks, or even on the bare tops of the rocks, immediately by the sea, and are seldom, if ever, found on the inland lakes. They are much more abundant on all the British shores, especially the more southern shores, than the divers; but, like those, they lay only one egg for each brood.

The characters of the genus are—the bill of moderate size, stout, straight, compressed, sharp at the tip, the tomia with incurvated margins, and a distinct notch near the tip of the upper mandible. The nostrils lateral, longitudinally cleft, and half covered by a membrane of considerable breadth, which is feathered. The legs short, placed far backward, the tarsi slender, no hind toe, the three forward toes webbed. They have some seasonal change of plumage, but the sexes do not differ much from each other, neither do the young differ much in appearance from the mature birds when in their winter dress.

THE FOOLISH GUILLEMOT (*Uria troile*).

The foolish guillemot is about eighteen inches long, twenty-eight in the expansion of the wings, and from a pound and a half to a pound and three-quarters in weight. In appearance it is a heavy lumpy bird, of an oval form in the body, and of nearly equal thickness at both ends. The neck is short and thick as compared with the lithe and elegant necks of the grebes and divers, but part of the thickness arises from the mass of feathers with which it is clothed. Its

head is, however, much produced, and its bill pointed, so that it rows along the surface, or glides through below, with very considerable velocity. The bill is black externally, and orange in the inside, and it appears twice as long when opened as when closed. The reason of that is, the feathers upon the membrane which covers the nostrils. These are continued to the middle of the gape, so that while the bill is only an inch and a half from the feathers at the apparent base of the upper mandible, it is three inches from the tip to the gape. The head, neck, and throat, upon which the feathers are remarkably smooth, and close as well as thick, are of a dull blackish brown. The remainder of the upper part brownish black, the primary quills paler at the base, and the secondaries with some white at the tips. The whole of the under part pure white, extending upwards on the fore shoulder round the turn of the closed wing. The colours now mentioned are those of the summer or breeding plumage; the only difference in the external appearance of the sexes being that the female is smaller than the male. In winter, the blackish brown fades to white on the front of the neck, the throat, chin, and cheeks, but with occasionally a few dark streaks remaining on the latter, and in the progress of the change the changeable part appears more or less mottled. The black on the rest of the upper part at the same time fades to a dull blackish grey; so that, if we were to judge from colour alone, the summer and winter dresses would appear to be different birds. There is another circumstance that sometimes helps to increase the confusion. The young have the winter plumage; and they have it before the old ones have put off the livery of summer, so that it is possible to find both males and females in each of the different plumages at the same time.

There seems a sort of anomaly about the migration of these birds; they are said to move north at the season when most

other birds are moving towards the south ; at all events they quit the southern parts of the British shores in the latter part of the season, and a few are found about the northern islands all the winter over. No doubt their winter dress is much better able to bear the cold, at least the part on the upper surface of their bodies, than the summer dress ; and there is little difference in the temperature of the sea at the two ends of the island.

The fertility of the sea in food suited to diving birds, may be the cause of their partiality for the north ; and the want of suitable places for their multitudes to nestle and breed, may be the cause why they disperse themselves southward in the summer.

It appears that the northern part of the Atlantic is better supplied with food for diving birds than those portions of it that are farther to the south. Much as they differ in form and size, the food of the common black whale and the guillemot more nearly resemble each other than one who has not reflected upon the subject would be apt to suppose. They both subsist upon small animals that are found at no great distance from the surface, and, as we have already said, the accumulation of those animals is near the polar ice. But the guillemots breed on the cliffs of rocks, and there is small scope for their nesting in those arctic latitudes, unless they were to range so far as to be at too great a distance from their food. There are also small fishes upon our shores in the summer, which take to the deep water in the winter ; so that these birds find both nesting grounds and food with us at that season. Further, the current in which the great float of animal matter is contained, must, in consequence of the freezing of the northern part of the sea, shift as far to the southward in winter as the sea freezes, and thus, while the diving birds, who do not at that time want to come to the shores, move northward to more abundant food, that food is

moved southward to meet them. These hints may not meet the argument upon the anomaly, but they may, perhaps, lead to the data by which the question, which is certainly a curious one, may be decided.

Guillemots breed upon the clifly parts of all our shores. They cannot be said to nestle, for they construct not even the rudiment of a nest. The female deposits her one egg upon the ledge or in the hole of a rock, sits very closely upon it, and is in general fed by the male. The egg is large, and beautifully marked with a variety of colours; but these colours are seldom the same in any two eggs. The birds rise with reluctance; and if, when a number of them are sitting, (for they are social in the breeding time,) they be forced up by any alarm, many of the eggs tumble down and are broken.

THE BLACK GUILLEMOT (*Uria grylle*).

This is a smaller bird than the former, and it displays, to a greater extent, the change to a less deeply-tinted plumage, which the birds that winter in the north undergo in that rigorous climate. It is proportionably thicker and shorter in the body; but the neck and bill are more produced and slender. The length is about fourteen inches, the breadth twenty-two, and the weight fourteen ounces. When in the summer plumage, the whole colour is brownish black, less intense upon the wings than the other parts, and having a large patch of white on the coverts. The bill, which is an inch and a half long, slender, and without any notch in the upper mandible, is black; the inside of the gape reddish orange; the feet vermilion; the irides hazel.

In winter, the plumage depends something upon the latitude. Those that remain on the northern shores of Britain, are white on the under part, and mottled with black and white on the upper; but in the higher latitudes they become

entirely white. The plumage of the young birds resembles that of the old ones in winter. It is more mottled with black in the southerly than in the northerly breeding places ; but whether the young are entirely white in their first plumage in any latitude, has not been observed. It does not appear that either of the changes of the plumage is the effect of a moult ; for if that were the case the birds would, with the exception of a few months in summer and a few weeks in winter, have to be continually moulting. As soon as the cold weather begins to set in, the white begins to appear, and gradually extends itself over the feathers, which were previously black : and it is probable, that as these feathers become white, they become more dry in their substance, which will render them still better protection against the cold. The young feathers continue to grow in winter between the old ones : and about the turn of the year—the end of January or February—the dark points of them appear from under the white ones. It is probable that then the white feathers begin to moult off ; for we have no fact from which we can conclude that pale feathers in the common plumage of birds, ever turn to dark ones ; and analogy—the analogy of all nature—points to the opposite conclusion.

We must not confound these seasonal changes in the general plumage of birds with the sexual, which take place in particular portions of the plumage only, are most conspicuous in the male birds, and bloom and fade with the breeding season. These nuptial changes, whether they consist of new and finer tints, produced feathers, or feathers which belong to that season only, are no doubt results of that season ; but they are not occasioned by it directly, but by its influence upon another part of the organization of the bird ; and their nuptial ornaments, in some cases, fade not only before the winter begins to set in, but before the summer bird has arrived at its maximum. The change which takes place in

the plumage of northern birds, such as the guillemots, may, on the other hand, be considered as more immediately produced by the seasons.

THE ROTCHE (*Mergulus melanoleucos*).

The common rotche, or little black and white auk, is still smaller than the black guillemot ; and though, like the guillemots, an expert diver, it differs from them in many of its characters. When it appears with us, it inhabits nearer the shores than the divers and guillemots ; and as its bill is less of a fishing spear than theirs, and more resembles the bills of the Gallinæ, it is probable that its food is more littoral, and, as such, more under the influence of the seasons. At all events, its migration appears to depend upon or to be modified by other causes. It visits the British shores in the winter, and generally retires to more northerly places to breed. In the summer plumage, the breast, belly, tips of the secondary quills, and a spot above the eye, are white : the rest of the plumage is black. In winter, the throat, sides of the neck and flanks, become white, though seldom entirely pure upon our shores ; the black on the upper part also becomes greyish ; and it *may* become white in latitudes where the winter is more severe and prolonged.

The length of the rotche is about nine inches, the extent of the wings about sixteen, and the weight about five ounces ; so that it is much better adapted for flight than the guillemots, and it accordingly spends much more of its time on the wing. Its bill is only half the length of the head, very little arched ; and from its resemblance to that of poultry, the bird is presumed to feed upon small crabs, and other little animals, that float near the surface. It breeds in the holes of rocks, in which it deposits two eggs, which are of a spotless bluish green colour.

Along the margin, and in the openings between the fields

and flocks of the polar ice, the rotche is a very abundant, and by no means an uninteresting bird. It combines, with equal facility, the three motions of flying, swimming, and diving, though it does not appear to perform the latter to so great a depth, or in water so troubled, as the guillemots and the divers properly so called. It is found flying about in large flocks ; these flocks are often captured in considerable numbers by the crews of ships upon distant northward voyages, and they are much relished in those dreary seas, as not having the rank and fishy flavour so general among the birds that are found there. The crews of some of the discovery ships caught them in vast multitudes, and made them into soup, which they represented as more resembling hare soup than anything else.

These birds indeed form a curious feature in arctic ornithology ; for though they are decidedly sea-birds, or perhaps, to speak more strictly, ice-birds, in their locality, they form a sort of connecting link between the other sea-birds and those land-birds which inhabit the northern mountains on the confines of the ice and snow. They resemble these in the form of their bills, and also in the flavour of their flesh ; and although they seek their food in the same waters with the proper divers, both the form of the bill and the flavour of the flesh lead us to conclude that that food is different. That it really is so, has not been accurately ascertained ; but whatever it may be, it must, from the great multitudes of the birds, and the circumstance of their not migrating to any very great distance southward, be very plentiful, and found at all seasons. The circumstance of their moving southward in the winter, when the other divers are supposed to move northward, is another peculiarity in their character. Some of them remain on the remoter shores of our more northerly islands to breed ; but the number of these is small compared with those that are seen during the winter ; the number of

which is always greater in proportion as the weather is more severe.

THE AUKS (*Alca*).

The birds of this genus live almost exclusively in the water, and are not so much seen upon the wing, their wings being in general small, and in some of the species, not fit for the purposes of flight. The characters are—the bill straight, flattened, much curved at the tip; both mandibles feathered for the half of their lengths, the upper one hooked, and the under with a sharp angular point acting against the hook; the upper mandible grooved nearly to the tip, and the nostrils lateral, almost entirely covered with membrane, and hidden under the feathers near the distal extremity of the feathered half of the mandible. The legs are very short, placed far backwards; furnished with three toes, all turned forward, and completely connected by a web. As is the case with most sea-birds that remain in the cold latitudes, they are subject to seasonal changes of plumage, though these can hardly be considered as sexual, or depending on sexual causes; and the plumage of the two sexes differs little at any season. There are two species which may be considered British birds,—the razor-bill, which is common on many parts of the coast, and the great auk, which appears in few localities, and is not so abundant even in these.

THE RAZOR-BILL (*Alca torda*).

The size of this bird, when full grown, is about sixteen or seventeen inches in length, twenty-seven in the spread of the wings, and it weighs from twenty to twenty-two ounces. It is a bird of the northern seas, but distributes itself along the shores for the purpose of breeding, which it does in the most lofty and precipitous rocks; the single egg, which is white spotted with black, being deposited, without any nest, upon

those shelves and ledges of the rock which overhang the sea. A question has been raised as to whether these and other birds, which place their eggs upon shelving rocks, do not cement them by some means or other, so as to prevent them from falling ; because, when those who visit such places lift the eggs, they find some difficulty in again balancing them steadily upon the rock. Now it may be stated as a universal habit with all birds to turn their eggs during the process of incubation, and among domestic poultry, the goodness of a brood-hen is estimated by the frequency with which she rolls about the eggs under her ; and those hens which do not perform that operation so diligently, are incapable of hatching a numerous brood without adding some of the eggs. The sea birds, no doubt, turn their single egg in a similar manner : which would of course be incompatible with the operation of cementing, even though the impossibility of that operation were not, as it is, apparent enough upon other grounds. These single-egg birds sit constantly during their incubation, the males feeding them the while ; and if they are not forced up by some alarm, on which occasions they are exceedingly clamorous and agitated, they probably do not once quit the egg from the time that it is dropped till the young bird breaks the shell. The general means, therefore, by which the egg is made to remain on the shelving ledge, is the pressure and adhesion of the parent bird ; and when the birds are suddenly forced up, numbers of the eggs, if they are abundant and the situation very unstable, always fall down ; and the prevention of that fall, either by jostling the egg while leaving it, or by the action of the wind in her absence, may be one of the reasons why the female of these birds sits so constantly.

The razor-bills resort to their breeding situations in the month of May. They nestle, or rather breed, higher on the precipices than perhaps any other of the shelve birds, though

not on the flat summits of the rocky islets. The eggs are very large, being about three inches in length ; and the inhabitants of the clifly places, where they are to be found, seek for them in a very daring and even perilous manner. Taken simply, they are not very palatable ; but the Orcadians, and other inhabitants of the islands, dress them with salt, pepper, and vinegar, and esteem them both a wholesome and a nutritious mess. The birds themselves, even when young, are rank and fishy, and can hardly be rendered tolerable by the usual method of curing the rankness of sea-birds, which is burying them some time in vegetable mould. The number of sea-birds is so great in those northern places, and they are so staple an article in the subsistence of the people, that a little science would be well expended in investigating the best means by which their rankness might be corrected. Were that successfully done, (and there is little doubt that it might be done,) a great addition would be made, not only to the comfort of those remote people, but to the commercial importance of their wild localities, and to the general wealth of the country. A hundred thousand tons of sea-birds might be easily captured for exportation every year, if they could be so treated as to be made palatable ; and that at ten pounds a ton, or little more than a penny a pound, would produce an annual revenue of a million sterling : which is at least as well worth trying for as many of the other projects upon which our Solons now and then unprofitably squander their own wits and the funds of others.

Soon after the breeding season, the old birds retire wholly from our southern shores, and generally from some of the northern ones ; or, at all events, they spread themselves, and are not found anywhere in such numbers as when they are breeding. The young remain a little longer, and sometimes winter in places where the old birds are seldom seen, at least during one part of the season ; and that has occasioned some

confusion in the descriptions ; a confusion which is easily avoided by a little attention to the different plumages.

In summer, the bill, which is two inches in the gape, has five furrows in the upper mandible, and two in the lower, is black, with a white band across the middle. The feet and claws are black ; the irides chestnut brown ; and the gape orange. The head (except a narrow white stripe in front of the eyes), the hinder part of the neck, and the scapulars, are black ; the throat and front of the neck brownish ; and all the rest of the under parts, and also the tips of the secondary quills, white. In the winter plumage, the throat, fore part and sides of the neck, fade to white, and the black on the upper part becomes dull and brownish. In both these plumages the males and the females very nearly resemble each other ; but the young birds differ from both. In them the bill is much shorter and narrower than in the mature birds, and without the furrows and the white band. The chin and part of the throat are also mottled with white ; and the white stripe in front of the eyes is not so well defined. Those characters gradually alter, however, and the young bird may be traced through all the gradations, especially those of the bill, which are the most remarkable, up to the perfect character of maturity.

THE GREAT AUK (*Alca impennis*).

This is a much larger species, and inhabits much farther to the north than the former. It is the Penguin, or wingless bird of the northern hemisphere, and does not approach any of the British shores, excepting the most northerly and remote ones, and these only for a month or six weeks in the heat of summer. It appears early in May, and disappears again about the middle of June, and while it is on the coast of St. Kilda and other remote and lonely places it is but seldom seen.

It never ventures far from the sea ; and it has not the means of doing so, as it is altogether incapable of flight, and by no means good at walking.

Its size is about equal to that of a goose ; but its wings barely exceed four inches in length, each are without produced feathers, and are swimming flaps rather than wings. They, as well as their feet, the tarsi of which are very short, are placed farther back than those of any other bird which is found even occasionally in the British seas. It cannot stand or walk, except on the entire lengths of the tarsi, and thus it shuffles along, rather than walks, in an erect position, and balancing itself by its flaps.

Its bill is entirely black, of large dimensions, with seven ridges in the upper mandible, and eleven in the lower. The culmen of the upper mandible is considerably arched, and so also is the gape ; the under mandible has its outline formed of two concave curves with an angle between, rather nearer the tip than the naked part of the base. The length of the gape is about four inches and a half, and the depth of the bill more than an inch and a half. The irides are chestnut ; the feet, claws, and margins of the eyes, black. In the summer plumage, the head (except a large oval spot of white in front of the eye), the nape, the back, and upper parts generally, are black ; the chin, throat, and sides of the neck, blackish brown, the rest of the under parts white, the quills (such as they are) are dusky, the tips of the secondaries white, forming an oblique band. In winter, the brownish black on the throat and neck fades to white ; the young are said to have that part mottled.

The great auk, like most of the analogous birds, lays but one egg ; but that is a very large one, being six inches in length, or twice the length, and consequently eight times the volume, of that of the razor-bill. It is deposited in holes not very high above the tide, as, though the bird can climb, the

operation is somewhat laborious. Sometimes the bird avails itself of natural holes ; at other times it excavates a chamber for incubation with its powerful bill. Though the great auk does not come on land except for the purpose of breeding, it does not leave the remoter parts of our seas in the winter ; it is, indeed, so much in the water at all times that it is not often seen.

The female of this and other sea-birds which deposit their eggs in holes rather than on the exposed ledges, are not understood to sit so closely during the incubation, as those which have the eggs exposed, but to resort occasionally to the water, for the purpose of feeding themselves, instead of being fed altogether by the males. The food of this species is understood to be the smaller fishes, which the size, form, and power of its bill enable it to capture by wholesale.

THE PUFFIN (*Fratercula*).

There is but one British species of puffin, the coulter-neb puffin (*Fratercula arctica*), of which the following figure is a representation in the summer plumage.

The length is about twelve, the breadth twenty-one inches, and the weight twelve ounces ; the colours of the plumage are nearly the same as in the figure, the black being peculiarly bright and glossy in the summer, and the only tint, except black and white, being dusky brown on the quills. The naked parts are, however, more varied in their colours. The base of the bill and a portion of the cheeks are covered by a coloured membrane. The bill gradually compressed in its whole length, but with arched outlines to both mandibles, the upper one hooked at the tip, and projecting a little beyond the under. A membranous ring or ridge, yellowish white, and perforated with small punctures, surrounds the base of the bill. Beyond that the basal half of the bill is bluish black and smooth, the half towards the tip yellowish

red, with four oblique furrows in the upper mandible, and three in the under. The party-coloured and furrowed bill are indications of maturity; the young of the first year have the whole bill smooth and bluish black; the second



The Puffin.

year it grows larger, paler towards the tip, and has the rudiment of one oblique groove; in the third and succeeding years, the bill acquires its full size and lustre.

The bill of this bird is an instrument of great power, with which it easily crushes the smaller crustacea and thinner-shelled mollusca, which are understood to form its principal food.

These birds are not only very numerous in the northern latitudes; but they range farther southward in their migration in quest of breeding-places than some others of the arctic birds. They do not nestle in holes of the rocks so much as in burrows in the sands and other soft and dry

beaches, though they also can accommodate themselves in rocky situations. Rabbits and they are sometimes found inhabiting the same localities ; but whether they live in peace or dispossess each other, is not clearly ascertained. As is the case with most other diving birds, they lay but one egg ; and as is the case with other hole birds, the female does not sit so closely as do those species which perform their incubations upon the open shelves. The male alternates with her on the nest while she is feeding. The egg is white. The birds defend their nests with great boldness and resolution, and the pinch that they can give, and the hold that they can keep with their bills, are both very powerful, and there are few enemies that can attack them in their strongholds with impunity. The people of some countries, however, draw them from their burrows in considerable numbers, using the young as food, and the old as bait for fish. Many anecdotes of them are recorded in the writings of authors, and many more might be added ; but we have no space further to continue the history of the very curious family of diving birds, or birds which chiefly seek their food *in* the water.

FLAT-BILLED BIRDS, OR DABLERS.

This is by far the most numerous division of our swimming birds, and the one which is the most useful to man in an economical point of view ; but it is also the one with the structure, characters, and habits of which we are most familiar in the domestic race, the geese, swans, and ducks, so that very minute details are less absolutely necessary.

The most remarkable as well as the most general distinguishing character of these birds is the structure of the bill, which, though it varies considerably in shape in different species, still preserves the distinguishing character. It is flattened, thick, and the mandibles are covered with a skin

or membrane, having laminæ on the sides, bearing more or less resemblance to small teeth, and its surface generally, but more especially towards the edge and the tip, beset with papillæ, from which it is natural to infer that the bill is an organ of sensation, but whether of a sense resembling that which we call touch in the human body (without knowing very clearly what we mean by the term) we are unable to determine.

In proportion as this character is more complete in the bill, the birds find their food more generally and habitually by that operation which is commonly called dabbling; and which consists of a sort of washing or sifting soft and watery sludge with the bill, so as to separate the eatable substances that are in it. This habit is not exclusive perhaps in any species; and, indeed, many of them live much more on vegetable food than do the birds of the preceding division, and not only upon soft seeds and albuminous roots, but also upon green leaves, of which we have a familiar instance in the common goose. The internal structure corresponds with the variation in the bill and the food, the gizzard being stronger, and the intestine longer in proportion as the natural feeding of the bird is more vegetable. Such as feed upon shellfish have the gizzard enormous. Some species can live with very little access to water; but water is their proper element, and when deprived of it they are never healthy. They often catch substances in the water as well as pick up others on land, and in both these cases, they are partially at least guided by sight; but in proportion as they seek their food more exclusively in the sludge, whether in shallow water where they can wade, or in deeper water where they must swim, or in deeper still where they must dive (for some of them have that habit), they appear to find their food with less assistance from the sight. But those which swim or dive appear to do so more for the purpose of reaching the sludge and ooze, than for preying

in the body of the clear water, though they readily enough approach and seize subjects which they find floating on the surface.

There is another peculiarity in their structure as connected with their mode of feeding which is worthy of notice : those which dive, and which have the wings short and rounded so that they may act better under the water, have the enlargement at the pulmonary extremity of the trachea membranous, supported to small fibres of bone ; and those which merely dabble, but always have some portion of the body above water when they are feeding, have it bone, or a cartilaginous flexure. The reason seems partly at least to be, that the bird, which is entirely cut off from contact with the atmosphere, may have a supply of air in a contractile reservoir, to sustain it while under water, but which is unnecessary in those which have a portion of the body above water, and can derive, at least, some supply of air through the breathing pores in that part, while ordinary respiration through the trachea is suspended. At all events, that is a more rational supposition, than that the enlargement of the trachea is connected with voice or with the regulating of the specific gravity of the bird. Even the use of the air-bladder in fishes as a means of buoyancy is vague and doubtful, because some species that have it remain habitually near the surface ; and, altogether, the ascending and descending of animals in water, appear to depend chiefly upon muscular effort rather than upon specific gravity.*

The habits of these birds in the procuring of their food, lead by easy and obvious inference to their principal haunts. They feed only where they can reach the bottom, and consequently they cannot be birds of the high seas, and need not generally be looked for on the rock shores, or the beaches of clean sand gravel. The wide sea is adapted for birds that

*. See Note, page 430.

skim the surface, or dash horizontally after their prey in the water in the manner of the divers, and not to those which seek the bottom. A bird may get down several feet, or even two or three fathoms ; but to descend to the depth of half a mile, which is shallow compared with the profundity of some seas, and feed there, is beyond the power of any known inhabitant of the air. The rocks, the gravel, and the sand, again, are fitted only for birds that have hard and pointed bills. Consequently the inland lakes and pools, the slow-running rivers, and their estuaries, the accumulations of water in the fens and marshes, and the level and oozy beaches where the water is shallow, and yet does not generally clear away so completely as to afford a proper pasture for the Grallæ, are the principal places where the dabbling birds are to be found. As that marshy state of the country is seasonal, the birds under consideration have seasonal migrations. Those migrations, the numbers of the birds, and the times of their appearance, of course, vary ; but they are all subject to a more extensive winter migration southward than the divers. The reason is obvious ; they do not, generally speaking, get so far to seaward as that line of green water which is so fertile in the arctic sea ; and the inland lakes and also the shallows become frozen much earlier in the season and much farther to the south, than the open sea, or the deeper water. Even where they do not freeze, the northern lakes become less fitted for these birds in the winter. Their banks are at all seasons less thick with vegetation than those of the waters in warmer and more southerly places ; and the vegetation northward is generally more frail, so that it is swept away by the winds and floods early in the season ; hence, as the water is exposed to the action of the wind, it lashes the banks like an ocean in miniature ; and, though it has not the lofty swell of the salt sea, it is, from its inferior specific gravity, more brawling and broken ; so that long before its motions

are sealed up by the frost, it ceases to afford either shelter or food for the dabbling birds.

As is the case with that division of the Grallæ which follow the progress of seasonal flooding and inundation in the warmer latitudes, this division of the swimming birds is adapted for performing migration on the wing, and by long and lofty flights. From their size and weight, and their wings being more the instruments of migrations than those of habitual use in the procuring of their food, none of these birds fly with so much rapidity as the swallows, or probably some of the other migrants; but still their speed compared with that of quadrupeds along the ground is very rapid. The wild swan proceeds at the rate of at least twenty miles an hour, and perhaps that of the common wild goose is not much slower. Such are a few of the more general characters, briefly and imperfectly sketched; but still, perhaps, sufficient to afford at least some general idea of the place which the birds fill in the general system and economy of nature.

We may, however, farther remark in passing, that, in so far as the nests and breeding places of these birds are known, they are much more prolific than the divers. The number of eggs varies considerably in the different species. In some, as in the wild swan, it is not more than five, while in other species it is as many as fifteen or sixteen; but taking the average of the whole, it may be estimated at about eight or ten. That might be expected, as both the haunts and habits of the birds expose them more to casualties and to enemies than those of the divers.

In giving a short notice of the genera, we shall omit the domesticated ones, as not belonging to the wild nature of the country.

GEESE (*Anser*).

The geese may be regarded as the least dabbling and the most vegetable in their feeding of all the division. They have the bill of moderate length, the height at the base exceeding the width, and the breadth diminishing towards the tip. The length of the bill is, in all the species, less than that of the head, the serratures on the margins of the bill are conical, and the bill itself has a slight resemblance to that form. Their legs are longer than are those of most of the order, and placed farther forward, so that they more immediately support the centre of gravity of the body, and the birds walk better; but the legs are wide apart, so that they may act free of the sides in swimming; and the weight in consequence swings from side to side as the bird walks, producing a zigzag or waddling motion. Geese reside in marshes and damp meadows rather than in the waters; they do not swim much, and they never dive. There is no external distinction of the sexes, and little or no seasonal change in the plumage. They migrate in packs which are not generally very numerous; and they fly in wedge-shaped or angular lines, with the one flank of the angle longer than the other, and from time to time shift the leading bird, and also the relative numbers in the flanks. There is generally a single bird in advance, and another in the rear and a little without the largest flank of the angle.

The geese may, in a state of nature, be all considered as only winter visitants in the more thickly inhabited places of all parts of the world, and in Britain they are all decidedly so: for, though some of the common grey species continue to breed in the fens in England, and also some of the smaller wild ones in the more remote parts of Scotland, they keep very close in the breeding season, and do not appear much

abroad till the winter. There is some obscurity about their breeding places. It is usually said, that they breed in the arctic regions ; and it may be true that those species which are the most marine in their habits, do disperse themselves on the shores of the remote islands far to the north ; but there are few arctic haunts that would suit the habits of those species that come periodically to the small lakes and pools in our inland places, and even those that resort to the estuaries and shores of the fenny districts. The great swamps that lie to the eastward of the Baltic are as likely to be their principal breeding places as others ; and they may follow the line of that sea westward as the winter sets in. In that part of the world, a westward migration bears, in the commencement of winter, some resemblance to a southward migration on some parts of the globe. The winter in the central parts of Russia is as early as severe, and as little adapted to the habits of geese as the winter in Iceland, or even the Faroe Islands ; and as the winter is later and milder as the Atlantic is approached, the probability is, that wherever they may breed, we receive our winter visitation of wild geese, immediately from the east or north-east rather than from the north.

THE GREY-LAG GOOSE (*Anser palustris*).

This species is generally described as the parent stock of our common domestic goose, of which the varieties in colour are supposed to arise from differences of breeding and treatment, as is not unusual among domesticated animals. The eastern and central parts of Europe are certainly the principal localities of this species, which has, of late years, nearly, if not totally, deserted the fens of England as a breeding ground ; and is not nearly so common, even as a winter visitant, as it was in former times.

Still flights of them are not uncommon in many parts of the country during the winter months, although they are generally better seen in their arrival flights than when they take their departure. They fly high, always during the day, arrayed in the order that has been mentioned, and producing a clangulous sort of gabble which is softened by the height from which it is sent down, which on a long flight is not less than 1500 or 2000 feet. The birds halt during the night; and seem (in winter at least) to be more intent upon resting themselves than feeding, though when food suits them they eat voraciously. They are generally arranged in line, and with a scut in their van, and on the appearance of danger they betake themselves to the water, where they pass the night. They use particular spots on the moors as caravan-saries, or inns, on their pilgrimages. On their arrival in this country, and during their stay in the colder districts, these birds are lean, and their flesh is rather hard and tough; but in the spring just before they take their departure, they are in good condition, and superior in flavour to tame geese. The size varies considerably; the length is more than two feet and a half, the breadth five feet, and the weight about ten pounds.

The colours usually are,—the bill and legs flesh-colour, the nail and claws whitish, the irides grey, the head, neck, and upper part generally grey, but the coverts edged with white, the quills edged with the same and with black tips, the secondaries with more or less black, and tail dusky, with the tip and margins white. The breast and belly white, more or less clouded with pale grey, and the feathers on the neck loose. In this species the closed wings do not reach the extremity of the tail, and the bird is more heavy and less given to migrate, and probably also a more southerly breeder than the smaller species, which are better winged in proportion to their weight. This species appears, indeed, to be

sometimes confounded, even in actual observation, with the one next to be mentioned.*

THE BEAN GOOSE, OR SMALLER WILD GOOSE (*Anser segetum*).

This species is the wild goose of the more northerly parts of the country, and it probably breeds in the secluded marshes of some of the islands, and even on the mainland in the north of Scotland. It is a more active and discursive species than the former, ranging more freely and extensively over the country, though far more abundant in the northern parts than in the southern.

It is an inch or two shorter in the body, and an inch shorter in the wings, than the grey goose, but a third less in weight, seldom exceeding six pounds. Its colours in general appearance are also different. The legs and middle part of the bill are orange; but the base of the bill, which is flesh-coloured in the other, and the nail, or bordered tip of the bill, and the claws, which are whitish in the other, are black in this species. The irides are brown, while the others are grey; the grey on the upper part has a brownish tinge, and the feathers on the wing-coverts have the margins paler; the rump is dusky; the quills dusky black, margined with grey on the outer webs, and the secondaries grey, margined with black; the forehead over the bill is partially marked with white; the throat and breast, as far as the legs, pale brownish grey, and the rest of the under part white.

These birds arrive in the autumn, range very generally over the country, frequenting the pools in the moors, and occasionally the fields of autumn wheat, on which they commonly commit considerable ravages. They fly in the same manner as the grey species; and numerous flights of them are seen moving southward over the central parts of Scotland in the early part of the winter; and many of the latest

* This is the *Anser cinereus* of Meyer.

ones used to continue there during the whole of the winter, if the small lakes and pools remained clear of ice. They lodged for the night in the water, were very watchful, and difficult to be got near, so that regular turf fences were erected for the purpose of getting shots at them ; but the sport was generally more tedious than successful, and the game, when obtained, tough, and of inferior value.

THE WHITE-FRONTED WILD GOOSE (*Anser erythropus*).

This is another winter visitant, not known to breed in any part of Britain, though it appears regularly in the season. It is understood to breed on the eastern parts of Europe, but farther northward than the grey goose, though little is known of its breeding ground in Europe. On the American continent it breeds in the marshy tracts around Hudson's Bay, which bear at least some resemblance to those of the north-east of Russia. This species has the bill and feet orange, and the nail on the bill whitish ; the forehead is white, head and neck greyish brown ; rest of the upper part brown, with the margins of the feathers paler ; primary quills and tips of the secondaries black ; tail dusky with white margins, under part white, with a few dusky feathers intermixed on the breast and belly. The young have the white on the front partially broken by dusky feathers.

This species arrives rather later in the season than the other ; and on the coasts of the fenny districts, and in the southern and eastern parts of England generally, it is more abundant than the bean goose, though much less so in Scotland or in the interior, being seldom found at any great distance inland on the rivers, unless when the weather is very severe on the coast. These birds disappear from our shores about March, a little sooner or later according to the state of the weather. One of the local names of this species is the laughing goose ; a character to which it does not appear to have much

stronger claims than the other birds of this proverbially grave and sage genus.*

THE BARNACLE GOOSE (*Anser bernicla*).

This species has the bill, the feet, the neck, the breast, and also the quills and tail feathers, black : the head is white, and so is the under part from the breast backwards, and the upper parts mixed with white, grey, and black. The young birds have the white on the head more or less dusky, and a dusky band from the gape to the eye. It has sometimes been confounded with the brent goose, which is also a black-footed goose ; but the brent goose has the head wholly black, and only a white patch on each side of the neck ; whereas the forehead, cheeks, and chin, of the barnacle goose are white.

The barnacle goose is rather less in its dimensions than the white-fronted goose, but it is about the same weight. It is one of those birds which sometimes arrive in vast numbers upon our shores, driven by storms, which, though severe in other places, are barely if at all felt by us. The birds, consequently, appear to come without any obvious cause, and they therefore, in the earliest ages, and before the manners and migrations of birds were so well understood as they are now, were naturally enough, though not in our estimation

* This is the *Anser albifrons* of Bechstein. We must here advert to another species of goose, closely allied to the bean-goose, but certainly distinct, which is described by Mr. Bartlett, in the "Proceedings of the Zoological Society," Jan. 8, 1839, under the title of "the pink-footed goose" (*Anser phœnicopus*, Bartlett), and of which specimens were then living in the menagerie of the Zoological Society. This species is evidently merely a winter visitant to our island, and till recently has been confounded with the bean-goose. As a full description of this species and its differential characteristics would occupy more space than is allowable, we must refer to the publication alluded to, in which the distinctive peculiarities of the four species are detailed at length.—M.

very wisely, attributed to extraordinary, if not supernatural, causes.

This same barnacle goose was represented as growing out of the transformed acorn-shell, which has thence, as if to perpetuate the fable, been called *anatifera*, or "goose-bearing." We are sometimes in the habit of giving ourselves airs, of more vanity than discretion, in turning the guesses and conjectures of the men of former times, upon points which they did not understand, into ridicule; but these triumphs over the dead are as ill judged as they are unmanly. According to Lord Bacon, we are the ancients of the world, and the men of former times were children in experience as compared with us. Be it so. But the sages among us do not mock at the ignorance of children—they teach them to know better; and as we cannot school our forefathers in that way, the wisest plan that we can follow is, to take heed lest some of our own theories be not as wide of the truth as those which we are so prone to censure, and that we do not doubly merit the ridicule of those who come after,—first, on account of the absurdity of our opinions, and secondly, and retributively, because we have ridiculed those who are equally beyond our instruction and our reproof. If half the time which has been spent in exposing this absurdity, which, in the nature of things, really stood in need of no exposure, had been bestowed upon investigating the habits, and inquiring into the breeding haunts of the bird, its history might, by this time, have been rendered as perfect as it is still obscure.

In former times, when the north of Europe, as well as many parts of this country, were far more humid than they are now, and the winters were, in consequence, much more severe, and the storms much more violent, these birds often came in vast multitudes, and in a state of such great exhaustion, that they were floated to the shore perishing or dead.

The state of knowledge then did not enable people to trace them farther than that sea on which they made their appearance; and the metamorphosis of the acorn-shells was probably the most likely explanation that occurred, and many of our conjectures have not a much more rational foundation. The mistakes of former times should teach us humility, not pride,—distrust in ourselves, rather than triumph. We ourselves were born as ignorant as the most abject savages on the face of the earth; and had it not been for the labours of those very men whom we thus criticise, we should have remained in that ignorance. Some of us take the lesson, and give no thanks; others purloin the work, and libel the author; and thereupon we pride ourselves, and exult.

From the early period of the season at which the barnacle goose leaves our shores, it is probable that it breeds at some distance, though the month of February is not the time at which birds, that are known to breed in the arctic countries far to the north, take their departure.*

THE BRENT GOOSE (*Anser brenta*).

This species is still smaller than the last mentioned, and less weighty in proportion to its lineal dimensions. It makes its appearance in the winter, and frequents the humid meadows on the estuaries of the rivers, especially upon the north-west coast of England and the east of Ireland. It is, however, found over the whole range of those coasts and estuaries that are much frequented by the other migrant geese. The bill is short, and that and the feet are black; though in the young birds the latter are said to have a tinge of dull reddish colour, and also to be without the white patch on the side of the neck. The head, neck, and upper part of the breast, the

* The barnacle-goose breeds in Iceland, Spitzbergen, Greenland, the northern parts of Russia and Asia, on the shores of Hudson's Bay, and in other polar districts of the American continent.—M.

quills, the rump, and tail, are black. The rest of the upper plumage is reddish ash colour, more or less mottled ; but the upper and under tail-coverts, the vent feathers, and the belly, are white. The same species is found in the northern parts of the American continent, but it has not been ascertained in what particular place, either of that or of the eastern continent, the greater numbers breed. The nest has, however, been found in that dreary and marshy country (to which I would again call the attention of Ornithologists) that lies in the shore of the Northern Ocean, to the eastward of Cape Rath, which establishes the fact of its being a native bird ; and it is highly probable that a careful search of the same district would add several others of the northern swimming birds, and probably also of the marsh-breeding Grallæ, to our indigenous Fauna.

The whole history of the geese, in their wild state, is indeed imperfect and obscure ; we merely know them as winter migrants, and probably in their winter plumage ; and are, in a great measure, ignorant of their summer haunts, their habits while breeding, and their moults and the changes of their plumage.

THE RED-BREASTED GOOSE (*Anser ruficollis*).

The red-breasted goose arrives so rarely in England, that it can be considered only as a straggler. It is shorter and thicker than the brent goose, and weighs nearly half a pound more, if we can fairly estimate the average weight from the few specimens that have been seen in this country. The bill is brown, except the nail, which is dusky black, as are also the feet. The front, immediately over the base of the bill, is white ; there is a white spot between the bill and eyes, and a white streak down each side of the neck, but with a tinge of rust-colour in the middle. The top of the head is black, which is continued in a narrow stripe between the white

markings on the sides of the neck to the back. The back and wings are black, the coverts tipped with grey; the tail coverts white. The chin and throat are black; the neck bright rust colour; a white band and a black one across the breast; and the hinder part of the belly, the vent, and the under tail coverts, white. The brown bill, and the bright rust colour on the front of the neck and the upper part of the breast, are the most conspicuous distinguishing characters; but the bird is of so rare occurrence in this country, that it is not one for which ordinary observers need to look. The specimens hitherto found have been on the east side of the island, and in the central and southern parts rather than in the north, which is at least a sort of evidence that the bird does not breed in the northern parts of western Europe. The east of European Russia, and Siberia, are said to be their summer haunts; and in winter, the birds migrate by the marshes of Central Asia on the Caspian and the Lake of Aral, as far as Persia. But their history, like that of most of the rest of the genus, is very imperfect and obscure; and even the descriptions given of the specimens met with in this country, are a little contradictory in some of the particulars. In Asia, they are said to migrate as far to the northward in the summer as they do to the southward in the winter, their nests being in the marshes, along the banks of the great Siberian rivers, and even near the confluence of these with the Arctic Sea. But, notwithstanding the labours of Pallas and some others, the natural history of that portion of the globe still wants elucidation; but it does not much connect itself with any portion of British Natural History.

SWANS (*Cygnus*).

Though the tame swan, or mute swan (*cygnus olor*), is found upon most of the larger rivers, and on many lakes, ponds, and ornamental pieces of water in Britain, and

though in some places it may be considered as a native, yet it hardly comes under the denomination of an indigenous bird. As domesticated, or rather as in a sort of semi-domesticated state, it is beautiful, and highly ornamental. No specimens of it resort periodically to this country at the time when the other seasonal swimming birds make their appearance. Its native localities are indeed too distant in longitude, as well as too far to the south, and its disposition to roam is too limited, for the probability of its appearance as a migrant. The other species, which reside more northerly, do advance, though only in small packs, to the southern parts of the country, but are much more abundant in the islands and along the extreme north of Scotland, where they often appear in vast numbers in the winter; a few sometimes remain and breed in the more remote and lonely places.

The distinguishing characters of the swans are,—the bill higher than broad at the base, depressed towards the tip, but continuing nearly the same breadth, and not tapering or approaching the conical form so much as that of the geese. The nostrils are pierced about the middle of the length of the bill. The neck very long, and carried in a graceful curve in swimming. Swans do not walk very well, but they swim with much ease and grace, and they occasionally make use of their broad and hollow wings partially elevated, as a sort of sails, by means of which they drift before the wind. When moving to a distance, they fly high and swiftly; but the tame ones seldom make long flights.

They are much more aquatic than geese, being generally upon the water, in which their long neck enables them to dabble to a considerable depth. They eat indiscriminately vegetable food and the small animals that inhabit the waters, or the ooze at the bottom of the shallows. But in the case of the tame swan, at least, with the habits of which we are most familiar, they are not known to dive, and though they

drift about when there is a considerable swell upon the water, they prefer feeding when it is tranquil. The tame swan requires no description, further than a reference to the specific differences between it and the wild ones. The plumage of the tame swan is white; the bill red, with the tuberculated membrane at the base and the margins black. The trachea is not enlarged or convoluted at the pulmonary extremity. The length of the full-grown male is from four feet to four feet and a half; the extent of the wings about seven feet; and the weight about twenty-five pounds. In their mature plumage, there is no external difference of appearance in the sexes. The nest is built of reeds and sedges, on a dry spot near the water; the eggs are from five to eight; and the incubation lasts about six weeks. The female sits closely, and the male keeps guard the while with much vigilance. In defence of their young they can hit a very severe blow with the bend of the wing, much more severe than they, who think merely of the mass, and do not take into account the velocity which muscles of flight are capable of producing, would be apt to suppose, though perhaps not so great as has been alleged of a bird with which authors have very generally been a little poetical.

The young are grey at first, and do not acquire their white plumage till the second year.

THE WILD, OR WHISTLING SWAN (*Cygnus ferus*).

This species differs from the tame one both in its external and its internal characters. Its bill is subcylindrical and black, with the base and margin yellow, and the head and nape have a slight yellowish tinge: the rest of the plumage is white. The dimensions and weight are nearly the same as those of the former species, only the wings are rather shorter

in proportion, and more rounded. The trachea is very much enlarged and convoluted.

The wild swan is very abundant upon all the large rivers, lakes, and extensive pools, in the more northern parts of both continents, but it never breeds in the south, and rarely migrates very far in that direction. It is, however, a discursive bird, and ranges seasonally over a great extent both of sea and of land, and flocks assemble in Iceland and the Faroe Islands in the early part of the season, some remaining there to breed, and others dispersing farther to the north, chiefly perhaps to the north of America, where they are very abundant in the breeding season. They also assemble again in the same places in the autumn, and thence proceed southward, dividing into smaller parties as they advance. Great numbers of them are often seen on the lakes in the northern parts of Sutherland; and report adds that, in former times, they used to breed there as well as in Orkney and Shetland, and in some of the more remote and marshy of the Hebrides. Of late years, however, it does not appear that many have been found breeding in those localities, and the passing flocks are not so numerous now as they are represented to have been in former times.

When on the wing, these birds emit a sort of cry, which is perhaps a little more sonorous than that of the wild goose, but it is anything but musical, or even whistling, unless to the same tune as a fitful and thumping wind whistles through leafless trees or along broken crags,—“Who, whoo:” hoarse, long drawn out, and somewhat guttural, is the music of the “tuneful swan.”

The nest is constructed in the same manner as that of the tame swan; the eggs are about the same number, or perhaps rather fewer; they are of a dull uniform greyish white, and they require about the same time in hatching.

The flesh of adult swans, whether tame or wild, is hard,

and not very palatable; and that of the wild ones, from the greater exercise that they have on the wing, is less palatable than that of the tame. The eggs are eaten, however; those of the tame swan being esteemed in all countries where they can be procured, and those of the wild ones being much sought after by the northern nations. The skins and down are also very valuable in those cold and northern climates. From its cry, the wild swan has been called the "whooper," which has naturally enough been corrupted to the "hooper."*

BEWICK'S SWAN (*Cygnus Bewickii*).

This species, which bears externally a considerable resemblance to the former, has no doubt been often confounded with it, though the specific characters of the two are quite distinct. Its lineal dimensions are a few inches less each way than those of the common wild swan; and its weight, in proportion to the dimensions, is less. Like that species, it has a black bill with a yellow base, and the general plumage of the body is white; but instead of the yellowish tinge on the head and nape, it has the forehead tinged or mottled with rusty. The principal distinction is in the trachea, which in this bird forms an elongated horizontal curve between the bony plates of the sternum itself, instead of the short vertical curve within the keel of the sternum, peculiar to the hooper.†

* The *Cygnus ferus*, or *Cygnus musicus* of Bechstein, is represented in North America by the *Cygnus Americanus* of Sharpless; the two species are closely allied, and were formerly regarded as identical; they are, however, distinct.—M.

† It is to the acumen of Mr. Yarrell that we are indebted for the discovery of a new species of swan, *Cygnus immutabilis*, which is one of our winter visitants. In his notice of this species, in "Proceeds. Zool. Soc. 1837," p. 19, Mr. Yarrell observes that this swan "had been known to him for some years past as an article of commerce among the London

DUCKS.

The very numerous family of the ducks have so many diversities of character, that it is difficult to find any general description that will apply with equal accuracy to the whole. There are about twenty-eight species, which generally or occasionally frequent the shores, estuaries, and fresh waters, in different parts of the British Islands, mostly in the winter season, and on the flat and fenny shores where there are mud deposits and oozy shallows, rather than where the shores are of a bolder character, and the water deeper. Of these, not more than seven or eight are known to breed regularly in the country, though a few more have been occasionally found on the more remote islands. Many of the visitants are evidently natives of the northern countries, and appear in the greatest numbers on the northern parts of the British coasts; but there are others which appear more abundantly, or, at all events, have been more attended to upon the shores of the flat parts of England, or in the estuaries and creeks of the fenny tracts; and of the retreats of these when they

dealers in birds, who receive it from the Baltic, and distinguish it by the name of the Polish swan. In several instances, these swans had produced young in this country; and the cygnets, when hatched, were pure white, like the parent birds, and did not assume at any age the brown colour borne for the first two years by the young of all the other white swans." "During the late severe weather, flocks of this swan were seen pursuing a southern course along the line of our north-east coast, from Scotland to the mouth of the Thames, and several specimens were obtained." The specimen exhibited was shot on the Medway, where one flock of thirty, and several smaller flocks, were seen.

In this species, the legs, toes, and webs are of a pale ash-grey, the beak is reddish orange, the lateral margins, the nail at the tip, the nostrils and hose of the upper mandible being black; there is a small basal tubercle on the upper mandible, which never acquires the size of that ornamenting the head of *Cygnus olor*. This species is easily reconciled to captivity. For some anatomical points of difference between this and the tame swan, we refer to the "Magazine of Nat. Hist. 1839," p. 178.

quit our shores, or of their breeding places, we are not so well informed.

The history of most of the race is, indeed, imperfect and unsatisfactory. Many which have been described as breeding in the arctic regions, have not been seen there by those who have had the best opportunities of observing. But, as was formerly said of the pine-forests in the case of the crested tit, the marshes of the arctic regions, and indeed of places without the arctic circle, are not very easily explored. From the few of whose habits we do know something, it may be inferred, that all the inland-breeding species keep themselves very close in the breeding season. The species which have more of the sea character, collect at their favourite places on the shores to breed, and are found in considerable numbers in the same locality; but if we may judge from the example of the common wild duck, or mallard, those which breed inland, disperse themselves over the country, find their summer food among the roots of the same aquatic plants in the cover of which they have their nests, and thus pass the summer unknown, not only in the fastnesses of the more extensive and inaccessible marshy pools, but on the banks of rivulets when these afford cover, without being much seen. I have known a mallard to be taken by an angler's hook, on the sedgy bank of a small stream, in the breeding season; though, to ordinary observation, the birds had all quitted the district for several weeks. But we have to do with them only in so far as they are British birds, open to common observation—and that is as winter visitors, appearing and disappearing in their seasons, but of whose retreats, while they are absent, we know not very much. Thus we are unable to generalize them in anything like a satisfactory manner, but must take those traits of each genus that are best known, and leave their history to future observation.

The whole race appear to be more exclusively dabblers than either the geese or the swans ; and though some of them pick up their food from the humid earth as well as out of the water and the weed, they live more upon animal and less upon vegetable matter than the geese, or even than the swans. Their bills are in general more flattened and broad at the tip, more pectinated or toothed at the margins, and perhaps more sensitive in the covering membrane. They are all, in general, of richer plumage than the geese and swans, and the males have generally some external distinction from the females, such as larger size, brighter colours, or some of the feathers peculiarly shaped. One character in the plumage of the whole, or nearly the whole, is a patch upon the secondary quills, of different colours in the different species, but with a sort of metallic lustre ; and thence called the "speculum," and also the "wing spot," or the "beauty spot."

There are also two distinct formations of the foot, which are worthy of attention, as they point out some difference of haunt and habit, and are also accompanied by other differences of formation. The obvious distinctions of the feet are—those that have the hinder toe plain, and those that have it bordered with a deep membranous web extending partially to the inner toe.

WITH THE HIND TOE PLAIN.

Those which have that character, have the foot also smaller, the web of the toes not so much produced, but the tarsus longer, and the feet placed farther forward, so as better to support the centre of gravity in walking. They also have the neck longer ; the bill not so much widened towards the tip, the wings longer, the tail less stiff, and the trachea furnished with a labyrinth of bone. They are more birds of the fresh waters, lakes, the rivers, and the estuaries, find the

aquatic part of their food chiefly by dabbling in the shallows without diving, and feed more upon vegetable matter. Those with the margined hind toe are more of sea-birds, live more by fishing under the surface; and the flavour of their flesh is more rank and fleshy. We have space for only a brief catalogue.

THE COMMON SHELDRAKE (*Tadorna vulpanser*).

This is a resident species, and in its plumage one of the most beautiful of the whole. It is about two feet in length and three and a half in the stretch of the wings; and it weighs from two pounds and a half to three pounds. The feet, and also the principal part of the bill, are reddish; but the tubercle at the base of the bill, the openings of the nostrils, and the nail of the tip, are black. The bill has a slight bend upwards, and the forehead is narrow and compressed. The head and neck are very deep glossy green. The lower part of the neck, the back, rump, upper tail coverts, and basal front of the tail feathers, white. A band of reddish bay on the breast, which forms a narrow collar on the lower part of the neck, and proceeds along the sides and flanks under the wings; and through this band, a list of brownish black extends towards the vent. Outer half of the scapulars and quills black, the secondaries glossed with green and bronze reflections, forming a wing spot. Tips of the tail feathers, which are fourteen in number, white. Female marked like the male, but rather less in size, and the colours not so bright.

This species nestles in holes, on the retired beaches, and near the lower estuaries of the rivers, which it seldom quits. Eggs ten to fifteen, and of a white colour. The female covers them with down pulled from her own breast; though the male takes her place morning and evening, when she leaves the nest to feed. The nest is usually very near the water, to

which the young are almost immediately led, and they soon begin to pick up the smaller marine animals. Marine insects, small crustacea, and the spawn and young fry of fishes, appear to be the principal food of these birds. They have in consequence a rank and fishy taste. They are generally found in pairs; and though they are dispersed over a very considerable range of latitude, they do not appear to flock or migrate, farther than spreading themselves in the summer, and leaving those places where the shallows freeze in the winter.

They are quiet birds, and not difficult to tame; but they do not breed readily in confinement.

THE RUDDY SHELDRAKE (*Tadorna rutila*).

This species is understood to inhabit more northerly places on the continent than the common sheldrake, and appears in Britain only as a straggler. It has the same elegant form of the body as the other, and the wings equally long and pointed; but its bill and head are smaller in proportion to its body. The front and cheeks are white, extending backward over the eyes; the rest of the head and the upper part of the neck rusty brown; the body pale reddish chestnut; the coverts white; the primaries, lower part of the back, and tail, black; and the wing spot green, with bronze-coloured reflections.

THE SHOVELLER (*Spathulea clypeata*).

The shoveller, though it sometimes breeds in the country, and is rather plentiful in Holland and Belgium, is not a very common bird with us. It inhabits more inland than the sheldrake, in the marshes and on the muddy banks of rivers, feeding on worms and other small animals, which it dabbles for, and for the capture of which its bill is well adapted. It is black, about three inches long, and increasing in breadth

towards the tip, which is rounded, and has the nail small and turned inward. The margins are closely pectinated with their laminæ, which fit into each other, so as to retain very small substances, while they allow the water to escape. It is, indeed, one of the most perfect dabbling bills in the whole family.

This bird is smaller than the sheldrake, or even than the common wild duck. It is about twenty-one inches in length, and weighs the same number of ounces. The feet are reddish orange ; the irides bright yellow ; the head and upper part of the neck green, with blue and purple reflections ; the lower part of the neck, the breast, and scapulars, white ; the back brown ; the greater coverts brown, tipped with white ; the lesser coverts blue ; the primaries brown ; the secondaries glossy green on their outer webs, forming a wing spot ; the belly chestnut brown ; the vent black, and the tail dusky, margined and tipped with white. The birds are, however, subject to considerable variations in their plumage, both in the individual and with the season ; and in the breeding season they are shy and retired, hiding themselves in the tall herbage, in which the nest is concealed. The nest is formed of rushes, or other aquatic plants, and the eggs are from ten to twelve, of a rusty brown colour. The young have the bill, at first, very large in proportion to the size of the body. As the birds live in the fresh water rather than in the sea, and feed upon substances analogous to those on which the Grallæ of the marshes feed, their flesh is free from fishy flavour, sweet, juicy, and much relished.

THE GADWALL (*Chauliodus strepera*)

The gadwalls spend the summer and breed in the extensive marshes of both continents ; but on the approach of winter they migrate towards the south, and appear as winter visitants in Britain, though not in great numbers, or in situ-

ations where they have not cover. They are, indeed, not very frequently seen, as they feed chiefly during the night, at which time they make a sort of hoarse quacking or jarring noise, which betrays their presence ; but they generally hide themselves during the day, and when they are surprised, they conceal themselves by diving. From their habits, indeed, one might infer that these birds are inhabitants of the eastern marshes of Europe rather than of the regions of the north, and that, as is the case with the other fresh-water swimmers of that part of the world, though they find their way in considerable numbers to the western shores of the continent by overland flights, they more rarely take the sea-voyage to our shores, and then only to those that lie the most contiguous to the Netherlands.

Length about nineteen inches, breadth about thirty-three. Bill two inches long, flat, and black. Feet reddish orange, irides brown. The markings of the plumage are exceedingly minute and not easily described. The head and neck grey, marked with brown points ; lower part of the neck, back, and breast, with small black crescents ; and the scapulars and flanks with zigzag lines of black and white. Lesser wing-coverts chestnut ; greater coverts of the wings, rump, and upper and under coverts of the tail, black. Primary quills dusky. Wing spot white, bordered with reddish on the one side and black on the other. Belly white, tail reddish, and white at the tip. Bill black, irides reddish brown, tarsi and toes brownish orange, webs of the feet dusky.

The nest is in humid places near the inland lakes and marshes, being carefully concealed in the thick herbage, sometimes in a tangled shrubby bush, or even in a hole of a tree. The eggs are about eight or ten in number, of a greenish ash colour.

THE COMMON WILD DUCK (*Anas boschas*).

The common wild duck is so abundant in all the fenny parts of the country, that it hardly needs any description. In the breeding season they are dispersed over the interior, almost to the greatest height, on the inland pools and streams that can afford them cover. At that time, though their cries are often heard, especially in the evenings before rain, they are not much seen ; but when the cold weather sets in, they flock towards the shores and estuaries in vast numbers. One of the most conspicuous characters of these birds, is the four middle tail feathers of the male or mallard, curved upward ; and they retain that character in a domesticated state, however much difference of food or treatment may alter their size and the tints of their plumage. They are the parent race of all the common tame ducks ; and they often claim kindred, visiting, on their migrations, tame ducks that live remote from houses, and sometimes enticing these off to the fens, or to a considerable distance on the rivers.

The length of the male (the drake or mallard) is about twenty-five inches, the extent of the wings nearly three feet, and the weight about two pounds and a half. The bill is greenish yellow, the irides hazel, the feet reddish orange. Head and neck deep glossy green, bordered with a white collar. The lower part of the neck, the breast, and the shoulders, purplish brown. Scapulars silver white and rust colour, delicately pencilled with waving lines of brown, coverts of the wings ash, tipped with white and black, quills dusky black ; wing spot on the secondaries rich purple, with blue and green reflections. Lower part of the back, rump, tail-coverts, and curled feathers of the tail, black, with green reflections on the rump, and purple on the tail ; the other feathers of the tail dusky brown, fading into dull white at the edges. The under part from the breast whitish grey,

with slight mottlings of dusky brown. The female is smaller, wants the curled feathers in the tail, and the green and white on the head and neck. The whole of her plumage is rusty brown, spotted and lined with dusky black, only the wing spot has much similarity to that in the male. The young in their first plumage resemble the female.

The nest is usually formed in the situations which possess, in the highest degree, the joint qualities of concealment and proximity to the water. Annual herbage, when that affords cover enough, is preferred; but the nest is sometimes in a tangled bush at the distance of several feet from the ground. There have been instances of their breeding in hollows of trees, situations to which many of the duck tribe are known to be partial; so much so, that some of those species which are not known to breed naturally in this country, could not be made to breed in the ponds of the Zoological Society's garden until they were accommodated with boxes on the tops of poles, and then they bred freely. When the nest is elevated above the ground, it is in part formed of small sticks, though openly and rudely. When on the ground it is composed of a few straws and withered stems, or of rushes; and in moist places the bird partially lines it with down from her own breast. The brood are numerous, often as many as sixteen; the eggs are obtuse and blunt, of a whitish colour when recent, and with the yolk almost red. They breed early; but have only one brood in the season, unless where some casualty happens to the nest. The pair live apart at that time, and the female is very watchful both of her eggs and her brood.

It is doubtful whether those improvements that have thinned the numbers of many of our marsh birds have had the same effect upon wild ducks. If they find water and cover, it does not appear to signify much whether it is in the wild, or in the cultivated district. They breed in the

herbage by the streams among corn-fields, and sometimes resort in severe weather to the margins of woods and coppices ; and they eat not only vegetable seeds, but the briard of wheat and other grain. The flesh of the wild duck is superior in flavour to that of the tame, and those which inhabit the rich countries and find part of their food upon land, are superior in juiciness to those which reside more exclusively in the marshes. In England, the grand resorts for them in the winter are the shores and estuaries between the Thames and the Humber ; though they are found plentifully in all parts of the country that are adapted to their habits. They do not keep out from land upon even the inland broad waters, nor, though excellent and graceful swimmers, do they swim across these. They transport themselves by flight. From district to district their flight is high, like that of all large birds on their migrations ; but on the same piece of water their flights are low, hurried, and fluttering, though at the same time very rapid ; and in these cases they sometimes fly and run at the same time, so that their footprints may be seen as distinct ripples before they run into each other and form a continuous wake. When they rise of their own accord they come gradually from the floating posture, through wading and running on the water, till they entirely clear the surface on the wing, and they generally alight in the same gradual manner ; but when they are forced up by any alarm, they can bring their bodies to an erect position, and take wing at once. Their manners are altogether interesting, and not the less so on account of their value in an economical point of view, but they are easily studied. The vast numbers of wild ducks which are annually taken in decoys or otherwise, are, on account of the number of the broods, probably more protective than destructive of the race, as they prevent *epizooty*, which falls upon all races of animals, but first and most severely upon

the most prolific ones, when their production is encouraged, and the thinning of them suspended beyond a certain limit. It would seem that the wild duck is nearly the same economic bird in the humid places of the cultivated country as the partridge or the pheasant is on the dry ; and in the proportion as the improvement of the country increases, the quantity of their food renders the winter less severe to them, drives off their natural enemies, and thus tends much to increase their numbers, it becomes the duty as well as the interest of man to thin them at that season, when they can not only be spared, but are in the best condition, and flock in countless multitudes to those places where they are most easily captured. But, on the other hand, protection in close time is as necessary to preserve the economical value of the birds as it is in accordance with the economy of nature. To trample down the green corn may differ in degree from destroying the eggs of wild ducks in the marshes and pools ; but the two operations are the same in kind, and arise from the same disposition.

THE PINTAIL (*Querquedula acuta*).

This is a very elegant species, more graceful in its form than perhaps any of the others, and the produced feathers on the tail, which are of considerable length, pointed, and of a black colour, glossed with green, give it the appearance of being better balanced on the legs than any other of the ducks. The produced tail feathers, as is the case with the curled feathers in the wild duck, belong to the male bird only.

The bill is moderately long, black in the middle and bluish on the edges. The head rather elevated and round, but the neck slender. Head and throat rich dark brown ; nape and hinder part of the neck dusky, with a narrow white line extending down the front sides, and meeting, broadening,

and forming a white collar on the lower part of the neck and upper part of the breast. The rest of the breast, the sides of the neck, and upper part of the back, finely marked by alternate lines of black and white; the sides, flanks, and lower part of the back, are of the same colours, but more clouded and mottled. Scapular feathers long and pointed, black in the centres, and distinctly margined with white. Coverts brownish ash, with pale orange tips. Wing spot purple, with greenish reflections. Greater quills dusky, as are also the tail feathers, except the two produced ones. Vent feathers black, belly white, but the breast and forepart of the belly understood to acquire a tinge of buff or brownish in the breeding season. The female is considerably smaller, and has the colours more inclining to brown.

The pintail is rather more numerous in winter in the southern parts of the country than in the northern. It is, indeed, so rare, even in the southern districts of Scotland, that it can hardly be considered as belonging to any northern migration; but it is probable that a few breed every year in the fenny districts of England. They are birds subject to considerable seasonal variations of plumage; and from the different forms of the tails, they are liable to be mistaken.

THE COMMON TEAL (*Querquedula crecca*).

A figure of the male of this species is given on the opposite plate, one-sixth of the lineal dimensions. The female has the head, neck, and upper parts, brown, the wing spot green, though not so bright as that in the male, and the under part of the body white.

This species is not uncommon in some of the more retired morasses, or rather the fresh-water lakes in various parts of the country; but as it is a bird of concealment, and the cry of the male ceases before the female begins to sit, it is rarely

seen in summer, and on that account it is one of those birds which have sometimes been rather inconsiderately described as leaving the country in the breeding season, whereas in reality it seems to be less migrant than most of the family, and only to shift about from place to place as food fails it in those which it leaves. Indeed, as the small lakes margined with reeds, which are dispersed through the flat and fertile tracts are its principal haunts, and as it does not quit these until the cover is completely destroyed or the water frozen, it often remains on the same spot all the year round, and little is known of its presence, except the clacking whistle of the male in the breeding season. That cry is heard in March, and the eggs, which vary from seven to ten, are deposited in April, in a nest of the leaves and stems of water plants, larger and more carefully made than that of many other of the swimming birds, but so hidden among the herbage as to be but seldom seen. The eggs are about the size of those of the pigeon, of a dull yellow. The nest is often in a hole under a bank or bush. The males assemble in small parties in the latter part of the season, before the females and the young make their appearance.

THE GARGANY, OR SUMMER TEAL (*Querquedula circia*).

The gargany is about the same weight as the common teal, but it is a little larger both in the body and the extent of the wings. It resembles the other in many of its habits, and especially in being a hideling in the breeding season; but, in accordance with its more elongated and slender form, it appears to be rather more discursive. It is chiefly known in Britain as a winter migrant, and as such it is found on or near the coasts suitable to its habits, in all parts of the country from Cornwall to the northern isles. It probably ranges farther to the south than its congeners: though it appears rather to shift seaward than southward in the winter.

It breeds in France, and repairs, or at all events appears there, on the inland waters, about March, and immediately commences the business of nest-making. As it has been met with in England a month later than the time at which it pairs in France, there seems not the least doubt that it breeds in the country, but it is one of those birds of which the summer history is imperfect. Its breeding cry resembles that of the corn-crake, only it is hoarser and not quite so loud. The nest is in the thick herbage on the ground, beaten smooth with the feet of the bird, and strewed with a little withered herbage. The eggs are of a greenish fawn colour, and rather more numerous than those of the common teal.

The bill is black, the irides brown, the feet dusky grey, and the wing-spot greyish green, bordered with white. Crown, nape, and chin, dusky, spotted with white; a conspicuous white streak from the eye down the side of the neck; breast and back purplish brown, with half-moon dusky spots; belly pale cream colour, sides and vent covered with dusky, coverts grey with white margins, quills and tail feathers dusky. The upper part of the female is brown with dusky streaks, the white line on the neck obscure, and the green of the wing spot nearly obliterated.

THE BIMACULATED TEAL (*Querquedula glocitans*).

This species has been so rarely seen even in the winter, that it cannot be considered in any other light than that of an occasional straggler. It is an inland breeding bird, and its principal haunts are in the marshy parts of Eastern Europe, and throughout the whole of Northern Asia; but its habits are little known. In its form it resembles the pintail more than the common teal and the gargany, the females of which, with the exception of the obliterated wing-spot in the gargany, may be very readily mistaken for each other.

Length about twenty inches, extent of the wings about thirty-two. Bill leaden grey, with the nail and margin black ; feet dull yellow, dusky on the hind edges of the tarsi and the webs. Head and the upper part of the neck black, much glossed with green and purple reflections. A bright rust-coloured spot before and another under the eye, from which it gets the name of bimaculated, or two-spotted. Lower part of the neck and breast reddish brown, mottled with dusky. Ground colour above ash, that below the same, paler, and continuing to the rump, both minutely marked by cross lines of dusky, and on the sides with waving lines. The scapulars dark ash, bordered with blackish purple, and thin pale reddish brown ; the coverts dark ash, with the tips first black and then pale reddish brown ; the wing spot glossy green, crossed by a black line, and bordered by white ; quills dusky ash, lower part of the back drab brown, tail coverts black ; two middle feathers, which are a little produced and pointed, the same colour glossed with green ; and the other tail feathers dark ash tipped and margined with white.

THE COMMON WIDGEON (*Mareca penelope*).

The widgeon is another bird, respecting which the question of breeding or not breeding in the country is not settled. It is, however, known to breed in those parts of the continent which are immediately adjacent ; and, therefore, it may, as it is a regular winter visitant in England, be presumed to breed in the country, though the nest and eggs have not often been found. On the eastern part of the continent they range far to the southward, and are found on the other side of the Mediterranean ; so that their general habitat must be considered as a middle latitude rather than a polar one. They haunt nearly the same places as the wild duck ; but with us they appear in smaller flocks,

and fly during the night, uttering a sort of hoarse and clacking whistle as they pursue their course.

In the outline of its form, the widgeon bears more resemblance to the wild duck than to the larger species of teal; but it is smaller and differently marked. The length is about twenty inches, the breadth about twenty-eight, and the weight less than a pound and a half. The bill and feet are bluish, the latter with a rudimental web to the hind toe, indicating a slight approach to the other division of the ducks; the nail of the bill is black or dusky; the irides brown; and the wings peat black, with a green bar across the middle. The ground colour of the head, neck, and breast, is reddish brown, with a purplish black on the breast. The forehead, which runs high and narrow, is cream colour, with the feathers slightly produced, and there is a small spot of the same under the eyes. The chin and throat are mottled with dusky, and the head less distinctly with the same. The neck and breast are separated by a collar of very fine bars of white and black; the colours of which are continued along the sides to the thighs. The back and scapulars are marked with nearly the same; the coverts are brown, with more or less of white, and black tips, the primaries are brown, with the secondaries black, with some white, and the spot green. The tail is ash colour, bordered with yellowish, the two middle feathers being pointed and larger, and darker than the others. The upper and under tail-coverts are black, the belly and vent white. The upper part of the female is brown, with the middle of the feathers dusky, the young are of a brownish grey colour, and so is the male in the winter plumage, though he retains as much of the character of his gayer plumage as makes him easily distinguished from the female or the younger birds; the neck bears a considerable resemblance to that of the common teal. The eggs are about the same in number, and of a

dull greenish grey. The widgeon is most plentiful in the southern parts of England, and migrates more abundantly to the western shore than some others of the duck tribe, that make their chief appearance with us in the winter.

WITH THE HIND TOE WEBBED.

The birds which have a membrane margining the hind toe, are more exclusively aquatic in their habits, and more prone to sea migration, than the species which have that organ plain. They have the legs farther asunder and backward, the tarsi shorter, the web larger in proportion, and the feet altogether less adapted for walking, but better for swimming and diving.

They have other characters which also indicate more of a swimming habit. They have the head thicker, the neck shorter, and both that and the body more fortified with down among the shafts of the feathers; the enlargement of the trachea membranous; the wings smaller, rounder, and hollower, and the tail stiffer and more fitted for acting as an organ of ascent and descent when they dive, an operation which they perform more frequently, and to a much greater depth, than any of the former. They consequently can find their food in deeper water; they more frequent the sea; belong to more northerly latitudes, and, generally speaking, appear in the greatest numbers in the northern parts of the country, and there chiefly on the shores. Some of them breed in the northern parts, but the greater number appear only as winter visitants. There are about eighteen species of them, belonging to different genera, recognised as British birds. Most of the species, considered as food, are inferior to the birds of the former subdivision.

SCOTER (*Oidemia*).

The birds of this genus are about the size of the common

wild duck ; they have the bill more or less turgid or enlarged at the basal part of the upper mandible ; the wings very hollow, and both these and the tail stiff, and fit for action under water. They dive much, seldom resort to fresh waters, and feed chiefly upon shelled mollusca, which they procure by diving. Their flesh has a rank and fishy flavour ; and on that account it is allowed to Roman Catholics in Lent and on meagre days. Their breeding places are little known ; and it has not been ascertained that any of them breed in the British Islands.*

THE BLACK SCOTER (*Oidemia nigra*).

The length of this species is about twenty-two inches, the breadth about twenty-four, and the weight from two pounds and a half to three pounds. The plumage is entirely black, without any wing spot. The upper mandible has an indistinct knob at the base, which is yellow, sometimes with a reddish tinge, and the yellow is produced on the middle of the bill beyond the knob, but it does not extend to the tip. The rest of the bill is black or dusky. The orbits of the eyes are yellow ; the irides brown ; the tarsi and toes dusky, and the webs black. The tail is wedge-shaped at the extremity, very stiff, and contains sixteen feathers. The mark of a nail on the tip of the upper mandible is wanting, as well as the wing spot. The female is rather smaller, has the knob at the base of the upper mandible still

* In all the *diving-ducks*, which feed principally upon shelled molluscs, and on the roots of tough marine plants, as *Vallisneria*, the gizzard is of enormous size and density, and its internal lining is thick and leathery—it is preeminently constructed for crushing the shells of molluscs, by a grinding action. In general, the flesh of these birds is rank, but the canvass-backed duck of America (*Anas vallisneria*), which fattens upon the roots of a long grass-like water-weed, is unrivalled for tenderness and delicacy of flavour. Most, if not all, the British diving-ducks are natives of North America, as well as Northern Europe.—M.

less distinct, and the black of the plumage with a dusky grey or rusty tinge. This species ranges pretty generally over the sea-coasts in the winter season; supports itself apparently by diving; and is sometimes caught in the fishermen's nets: but its summer retreats and breeding-places are little known, only it is supposed that they are in more northern latitudes.

THE VELVET SCOTER (*Oidemia fusca*).

This species is a regular winter visitant, though not perhaps quite so common as the former. The whole plumage of the male is velvet black, with the exception of the wing spot and a crescent-shaped spot under the eye, which are white. The protuberance at the base of the upper mandible, and the margin of the bill, are black; the nail at the tip reddish, and the rest of the bill dull yellow. The irides, tarsi, and toes, are reddish, the webs of the feet dusky black. The female has the upper plumage dusky, the under whitish, and the protuberance at the base of the bill less conspicuous. It resorts to our shores regularly, but not very abundantly, in the winter, supporting itself by fishing and diving. Authors mention that it breeds in the arctic regions and inland; but they are not stated to have been found by those who have actually visited the northern parts either of the eastern or the western continent.

THE SURF SCOTER (*Oidemia perspicillata*).

This is an American species, very rare in Britain, and its history as a British bird is thus even more obscure than that of the others. It has been seen only in the extreme north of the British islands, and as a very rare straggler even there. Its plumage is in general black, and without any wing spot; but the nape, and a band across the forehead, are white. The bill is yellowish red in the middle, blackish

at the margins, and dusky grey towards the tip, and pectinated in the margins; the irides yellowish white; the tarsi and toes blood-red; the webs of the feet dusky black. The female is blackish brown. These birds are abundant on the shores of the United States in the winter, but retire towards the northern parts in the breeding season. They are found on both shores of the American continent.

POCHARD (*Fuligula*).

The birds of this genus have no very remarkable distinguishing characters. They have the bill broad and flat for its whole extent, and the body thick in proportion to its length. They resort more inland, and to the fresh waters, than most of the others that have the hind toe margined by a web. So far as is known, none of them breed in any part of the British islands; and only three species may be considered as regular winter visitants. Their flesh is better flavoured than that of any of the other of the British diving ducks.

THE RED-HEADED POCHARD (*Fuligula ferina*).

This species is about twenty inches in length, thirty in extent of the wings, and twenty-nine ounces in weight. It is rather a heavy-looking bird; and although the markings upon some parts of its plumage are very delicate, its plumage is by no means brilliant. The bill, which is very flat in its whole length, is dull grey, with black on the margins and the tip, and a bluish band across the middle. The feet are dull bluish; the irides bright orange; and there is no wing spot. The head and neck are reddish brown, with a rich gloss; a collar round the lower part of the neck, the throat, the upper part of the back, the rump, and the under tail coverts, are black. The scapulars, wing coverts, and belly, greyish white, finely lined and mottled with dusky.

The quills and the tail feathers, which are fourteen in number, are dusky. The female has the head, neck, and breast, brown, marked with some white on the throat and near the eyes. The young resemble the female, and do not receive the black till the third year. The nests are understood to be in the northern marshes, placed among reeds; the eggs to be from ten to thirteen in number, of a dull greenish white. The birds do not arrive on our shores very early in the autumn, and seem to belong to an eastern or north-eastern migration. They appear in the estuaries of the fen rivers, and a little inland rather than on the sea coasts. They are very expert divers, and for that reason supposed to be inhabitants of the northern lakes rather than the marshes.

THE SCAUP POCHARD (*Fuligula marila*).

Like the former, this species is a winter visitant, and comes indiscriminately to the shores, and the fresh waters near the sea, though on the estuaries of the larger rivers rather than on the banks of lakes. Its bill is broad and rounded at the tip, and well adapted for searching in the ooze and sludge for those substances on which it feeds; and, from that form of the bill, it is sometimes called the spoonbill duck.

Length about eighteen inches, weight rather more than a pound and a half, bill bluish, feet leaden grey, wing spots white, and the irides golden yellow. Head and neck black, with green reflections; upper part of the back, rump, vent, and breast, plain black; lower part of the back, wing coverts, and sides, variegated with black and white; quills dusky, secondaries white, forming the wing spot, but with black tips; tail dusky, consisting of sixteen feathers, wedge-shaped at the point. The female is more inclining to brown in the plumage than the male. Though in general found near the sea, and supporting themselves chiefly by diving, these

birds are easily tamed, and feed readily upon vegetable substances.

THE WHITE-EYED POCHARD (*Fuligula nyroca*).

This species of pochard is not quite so common as either of the former. When found it is usually on the fresh waters, but at no great distance from the sea. It is about the same length as the scaup, but not so heavy a bird; and the white irides are alone sufficient to distinguish it. Feet and bill bluish, the latter rather produced, and with a black nail. Head, neck, sides, and breast, rust colour, with a darker collar of the same, and a spot of white on the chin. Back and wing coverts black, with purple reflections, and small obscure reddish spots; primary quills dusky, secondaries white at the bases and black at the tips, forming a wing spot of white and black. Tail dusky brown, containing fourteen feathers. The female has the back dusky and the head brown.

THE TUFTED POCHARD (*Fuligula cristata*).

This species, which gets its trivial name from a pendent crest about two inches in length, that hangs over the nape in the male, is much more common than the last mentioned; and may be regarded as a pretty regular winter visitant in the southern parts of the country. Very little is known of its haunts in the breeding season; but as, in some parts both of Europe and America, it is found upon the fresh waters inland in the autumn, and near the shores in the spring, it is probably an inland breeder. With us it remains, on fresh water chiefly, as late in the season as March; and as many of the analogous genera are known to breed about that time, or not much later, the probability is that its breeding places are at no very great distance. Length about a foot and a half, weight twenty-six ounces, legs black, bill

the same colour, broadened towards the tip, and with a black nail; irides dull yellow; head, neck, and crest, black, with purple and green reflections; upper part and breast plain black; scapulars and sides of the back very minutely freckled with black and grey; primary quills black, some of them white at the bases; secondaries white at the middle, forming the wing spot, and black at the tips; tail dusky; wedge-shaped, consisting of fourteen feathers; lower part of the breast and middle of the belly pure white; flanks and vent feathers black. Female and young dusky brown, when the male is white, and without crest.

THE RED-CRESTED POCHARD (*Fuligula rufina*).

The red-crested pochard is a very beautiful duck, but in Britain it can be regarded only as an occasional visitant. It is a bird of the inland waters, and not of the sea; and one which was brought from Boston to London in 1821, was found on fresh water in that neighbourhood, in company with widgeons. For nearly two weeks previously there had been very severe frost, by which, no doubt, the bird had been driven from the Continent, though flocks of ten or a dozen have been casually seen on the east of Kent.

There is indeed a very discursive species, by no means uncommon in Italy in the winter, and ranging as far eastward into Asia, as the Himalaya mountains. It has been known, by name at least, to British Ornithologists, ever since the days of Willoughby, but little is even now known of its breeding places and nidification.

The male has the bill and feet red, the nail of the former white, and the webs of the latter black. The nail is pointed, and projects considerably over the tip of the lower mandible. The head and crest of silky feathers, which are considerably produced and very handsome, are of a rich chestnut colour, with purple reflections. The occiput, breast, and middle of

the belly, are brown, and the vent feathers black. The sides are white, the marginal parts delicately mottled with brown. The back is brownish ash, with two crescent-shaped white spots on the scapulars, which nearly meet. The basis of the quills and the wing spot are also white. The rump and upper tail coverts are green, with purple reflections.

The female has no crest. The upper part of the head and back are generally brown, the cheeks ash colour, the scapulars and wing spot white, the bill, tarsi, and toes, brownish.*

THE LONG-TAILED HARELD (*Harelda glacialis*).

This species is not uncommon upon the shores of the northern parts of both continents, retiring to the most northerly places that will afford it grass or other cover near the sea in the breeding season, and migrating into warmer latitudes in the winter. Considerable flocks appear on the shores of the northern isles from October to April; but few appear to the southward, and they disappear from even the extreme north of Britain in the summer. They live chiefly upon the smaller crustacea and shelled mollusca, which they procure by diving. They have a loud clangulous cry, consisting of three or four harsh notes. Length twenty-two inches, breadth thirty-six. Bill black, with an orange line in

* A new pochard was introduced to science by Mr. Bartlett, in 1847 (in "Zool. Proceeds.," p. 48), under the name of Paget's Pochard, *Fuligula ferinoïdes*. "This bird," says Mr. Bartlett, "may be readily distinguished from the common pochard, which it most resembles, by its smaller size, darker colouring, the conspicuous *white speculum* on the wing, and the straw-colour of the eyes. The female is unknown;—but I presume it will much resemble the female of the pochard, and will doubtless possess the white speculum on the wings." The individual from which Mr. Bartlett took his description was killed near Yarmouth, and was probably a straggler, accidentally stranded on our shores. It barely comes within the list of British birds. For a full account, we refer to the "Zool. Proceeds., 1847."—M.

the middle of the distal part, and a bar of the same across the tip ; irides red, feet slate grey, with a reddish tinge on the tarsi and toes when recent. Front, cheeks, and sides of the neck, greyish brown ; crown and nape cream colour, the former tufted ; a black patch on each side of the neck ; lower part of the breast, back, and wings, black ; scapulars and lesser coverts bluish white, produced and dependent partially over the wings. Throat and front of the neck white, extending a short way on the back at each side ; sides and belly white, nearly meeting at the rump ; tail of fourteen feathers, all pointed, the two middle ones three inches longer than the rest ; they and one on each side black, the rest dull white. The female is smaller, and wants the produced feathers in the tail and over the wings ; has the top of the head and spot on the neck dusky, the upper part of the neck white, the lower reddish brown, with white spots ; the general colour of the upper part rusty, with some mottlings ; the under part pure white. The plumage is very close, and the down pure and elastic.

THE EIDER DUCK (*Somateria mollissima*).

One of the most distinguishing characters of the eiders is the base of the bill prolonged in two flat plates on the sides of the forehead, and the mandibles diminishing in breadth towards the point. They are also among the largest of the duck tribe, soft in their appearance, and gentle in their manners.

A figure of the male of the common eider is given on the plate opposite, which will render description unnecessary. The female is much smaller than the male, has the plates of the bill not so far produced on the forehead, and wants the pendent feathers that hang over the wings. The colour is a pale yellowish brown, mottled with lighter and with black ; the wings dusky, with rust-coloured edges and

the greater coverts and some of the secondary quills with white tips ; tail brownish black, belly dusky, mottled with black.

The eiders are less migratory than most others of the sea ducks. The ice drives them to the south in the winter, but they do not move far, and those which inhabit places where the sea is never frozen remain in the same places all the year round. They are rarely, if ever, seen on the southern shores of England, though a few inhabit the Fern Islands, and also some of the islets in the Firth of Forth. They are much more numerous in the more northern and remote places, the Orkneys, the Shetlands, and some of the more distant and lonely of the Western Isles. Sulas-skerry (the Gannet's rock), and its stack, which stand wild and lonely in the North Sea, about thirty miles to the northward of Hoy-head in Orkney, contain a number of these birds ; but there, their eggs and young are liable to be destroyed by the skua gulls, as they are by jackdaws on the islets farther to the south.

To the people of the remote north, whose only possession, save a rock upon which to found their hut (which is chiefly formed of materials that the sea produces or wafts), the eiders have much of the character of domestic animals ; and they have this advantage over the domestic animals of more southern places, that they put the people to no expense for food. If the eggs are left undisturbed, the brood of the eider duck does not exceed four ; but if the eggs are removed, she will continue to lay for several weeks. The nest is on the ground, upon one of the islets not far from the main island, or otherwise near the sea. It is formed of marine plants, and lined with exquisitely fine down, which the bird pulls from her breast ; and as the eggs are deposited, she covers them with more of that down. The bird is so tame, that she allows the people to lift her from her nest, remove the down and eggs in

part, and again replace her, where she lays afresh and pulls more down. This process is continued, not only till the female can furnish no more down, but till the male also is in part denuded, as he comes to assist as soon as the supply of the female becomes exhausted. Half a pound is the average quantity obtained from one female in the course of the season; and the product is said to be greatest when the season is rainy. The down of the eider is the lightest and softest of animal coverings, and perhaps the worst conductor of heat, and therefore the warmest clothing that is known. The prepared skins of the eider also make light and warm clothing; and their flesh is wholesome and much more palatable than that of most of the sea ducks.

They are large birds. The male is about two feet three inches in length, more than three feet in the spread of the wings, and weighs six or seven pounds. In the latter part of the winter and the spring, they swim in flocks, and their motions on the water are peculiarly graceful. Though they generally return to their haunts at night, they often make pretty long excursions during the day; and they are well adapted for such flights, for, soft and heavy as they are, it has been ascertained that the rate of their motion on the wing is not less than eighty or ninety miles an hour. Altogether they are among the most interesting of our sea birds.

THE KING EIDER (*Somateria spectabilis*).

This species inhabits farther to the north than the former, being abundant on the polar shores of both continents. It is rare as a British bird, and can hardly be said to appear upon even the northern shores of the mainland in any other character than that of a straggler; but in some of the more remote islands it breeds, at least occasionally,

and, therefore, it is entitled to a place in the list of our native birds.

It is rather less than the other, and easily distinguishable from it both by the bill and the plumage. The lateral prolongations of the bill on the forehead are arched, ridged, and furrowed; and the bill and feet are bright reddish orange, but the terminal parts of the plates towards the forehead are black. The feathers at the base of the bill, over the eye, and partly down the sides of the neck, are bright green, meeting in front, and passing gradually into dull white on the chin, which is marked with a chevron bar of black; the crown and nape are ash colour; the middle of the back is black, the coverts dusky, with a white patch in the centre; the quills black, and the tertiaries produced and pendent over them as in the common eider. The tail is short, wedge-shaped, and black; the lower part of the neck and the breast whitish; the belly and vent black. The female is brownish on the upper part, with the centres of the feathers dusky; the plates of the bill are not so prominent, or so highly coloured; the produced feathers in the wings are also wanting, and the size is smaller. The males of this and the common eider do not get their distinguishing character till the second or third year.

THE WESTERN EIDER (*Somateria dispar*).

This bird is so rare with us that it can be considered only as a very accidental straggler; but it deserves notice as being a stranger from a far country, or rather as an aërial voyager from the most distant sea. It has sometimes been classed and described as a pochard, but its characters, its haunts, and its habits, nay, even its very colours, are those of the eiders. It is a native of the northern part of the Pacific, towards Behring's Straits, and is found on the north-west coast of America, on that of Kamtschatka, and on the intermediate

islands ; so that in reaching this country, it must cross the whole breadth of Asia and Europe on the one side, or the whole breadth of America and the Atlantic on the other. A single specimen only has reached the country in a wild state, apparently across the breadth of the eastern land, as it was found near Yarmouth. Some insinuations were made, tending to deprive it of the glory of its long flight, upon the ground of its being a tame bird which had escaped ; but its whole air and plumage showed it to be a wild bird, and one not exhausted, but in the very best condition.

The bill is black, with the nail pointed and hooked ; the irides chestnut ; the head white, with a waving green band across the forehead, and another across the nape. The neck is also white, with a black collar, and the chin black. The general colour of the upper part is black, pied with white. The tertiaries are much produced, and curve gracefully downwards over the wings ; they are black at the bases and centres, with white margins. The turn of the wing is white, and the quills, which are black in the greater part of their length, have white bases, and a white bar across. The under part is white forwards, and posteriorly brown. The feet are large, strong, and of a leaden colour. The body and neck are also lengthened, and the head slender, the whole having, as already mentioned, the expressions of the other eiders,

GARROTS (*Clangula*).

Bill short and narrow ; feathers on the scapulars produced, distinct, and pointed ; tertiaries crossing the primaries in the closed wing, but not pendent. Two species, both of which are natives of the north, visit the British shores in the winter, one not uncommon, the other rare.

THE COMMON GARROT, OR GOLDEN EYE (*Clangula vulgaris*).

These birds appear on our shores, and occasionally on the inland waters, in the winter season, though not in any considerable numbers ; and though the majority of them retire far to the north in summer, a few are supposed to remain and breed in more temperate places. They are handsome birds, very strikingly contrasted in their plumage, and light and active in their motions.

Length about eighteen inches, breadth about thirty-one, weight about a pound and three quarters. Bill bluish ; head and upper part of the neck (the feathers of the former thick and produced, forming a sort of crest) deep glossy green, with purple reflections ; the iris bright yellow, appearing very conspicuous in the deep green ; a conspicuous white spot immediately behind the gape ; green on the neck, terminating in front in a collar of velvet black. The lower part of the neck and all the under part white, excepting a few black feathers on the flanks and thighs ; wings brownish black, the coverts and secondaries white, crossed in the middle with a black line ; some of the scapularies white and produced, others and the tertiaries black ; back and rump black, the margins of some feathers on the latter brownish ; tail brownish. In the female the head is brown, and the plumage of the upper part dusky, relieved with ash colour on the margins. The white spot at the gape does not appear in the males till the second year. They are graceful swimmers, and expert divers, living on small aquatic animals, including reptiles and even water-mice. They fly swiftly, but low, and with a whistling noise.

THE HARLEQUIN DUCK, OR HARLEQUIN GARROT

(*Clangula histrionica*).

Inhabits more northerly than the former ; is smaller in

size, more striking in the contrasts of the plumage, appears in the northern isles only, and there it is by no means common. Length about seventeen, breadth twenty-six inches, weight rather more than one pound. General colour of the upper part very deep green, almost black, glossed with lighter green and purple, and peculiarly marked with white and black. A curved white line passes from the lower part of the cheek, by the gape and over the eye, nearly to the nape, becoming narrower along the top of the cheek, and terminating in a reddish tinge. That white line is bordered all along the inner edge next the eye, by a narrow black line which has no gloss or reflection. There is a circular white spot immediately behind the eye, and a white line from a little behind that, passing down the side of the neck. Another narrow line of white, bordered by one of black, nearly surrounds the lower part of the neck as a collar. A third line of white, made up of three distinct arches, with their hollow sides upward, passes from the shoulder to the breast, with a black margin on the under side of the arch next the shoulder, and on the under side of the other two. The portion of the breast between these lines is bluish ash with lighter margins to the feathers. The rest of the under part is brown, with a reddish tinge towards the sides and flanks. The scapular feathers, which are rather produced and well-defined, are white, with black margins. The wing spot on the secondary quills is blue, with purple reflections. The tail and its coverts are dusky black, the bill the same colour, the irides brown, and the feet dusky blue. The female is brownish above, whitish on the under part, with a rusty tinge on the head and neck.

Both species are said to breed on the marshy shores in the arctic countries, to form their nests in the low shrubs on the margins of the lakes and pools, to lay from eight to twelve

whitish eggs, and to subsist on insects and their larvæ, and on the spawn of fishes and reptiles.

The last-mentioned species has been seen (in winter) in the island of Lewis,—the extensive and dreary flats and moors of which are worth searching, not only for the rarer species in winter, but for the nests of some of the northern birds in summer.

GOOSANDERS (*Mergus*).

Birds of this genus have the bill more slender and cylindrical than that of the ducks, serrated with sharp reflected teeth along both mandibles, and with the nail at the tip hooked ; so that the bill is altogether less of a dabbling, and more of a prehensile instrument. The internal structure also indicates that they feed more exclusively upon animal matter ; and the position of their feet, the form of their wings, and the great enlargement of the lower part of the trachea, all adapt them well for diving in quest of fishes, which form the chief part of their food. The difference in plumage between the males and females, and the males in the young and the adult state, has, as in the case of many other birds, led to some confusion in the descriptions. Four species are enumerated as British—one resident, the others visitants or doubtful. They all belong to the northern ornithology.

RED-BREASTED MERGANSER (*Mergus serratus*).

These birds are very awkward walkers, in consequence of the shortness and backward position of their legs ; but they swim and dive well, and are of powerful flight, ranging over a great extent in latitude in the course of the year. The

majority of them breed in places farther to the north ; but a few breed, not only in the more remote Scotch isles, but on the mainland, in the marshy and humid districts of the north-west of Sutherland and Ross. The nest is on the margins of the fresh waters, composed of withered grass and down from the breasts of the birds ; the eggs are from eight to twelve, of a smooth and shining buff.

The length of the mature male is about twenty inches, the breadth about thirty, and the weight nearly two pounds. The bill to the gape three inches, closely toothed, hooked at the tip, dusky on the ridge, reddish in the other parts ; the irides, feet, and middle of the breast, red, the latter more or less mottled with dusky. Head and upper part of the neck (the former having a loose crest pendent over the nape) deep green with purple reflections ; the upper part of the back black, the lower and the sides mottled with brown and grey ; a white spot on the fore shoulder ; the scapulars next the wing white ; the wing black at the margin, with a large white spot in the middle, shaded by two lines of black ; the tail dusky ; the front of the neck white ; the breast reddish chestnut ; the belly white, but with some dusky mottling on the thighs and flanks. The female has the head and neck brownish, the back greyish ash ; the breast mottled with grey ; the wings dusky brown, and only one black line across the wing spot. The immature male resembles the female more than the mature male.

THE GOOSANDER (*Mergus Merganser*).

This species is also only a winter visitant in the southern parts of Britain ; but it probably breeds in the same places of the north, where the females and the young appear to have been sometimes confounded with each other.

This is a much larger bird than the preceding. The male

weighs about four pounds, and is twenty-eight inches long and thirty-eight in the stretch of the wings. The feet are red; the bill rather larger in the gape than that of the former species, but not quite so long on the ridge, rather more slender, slightly recurved, but very much hooked downward at the tip, and thickly toothed in the margins; the colour dusky at the nostrils, down the ridge, and on the nail at the tip; red in the rest of the external surface; and the insides of the gape orange. The head, crest, (which is less produced, but more elevated, than that of the last species, or of the female in this,) and upper part of the neck, deep green, passing into black on the chin and fore-neck; lower neck, shoulders, breast, and all the under part, white, with a tinge of salmon colour. Back black, becoming greyish at the rump; tail grey, consisting of eighteen pointed feathers; scapulars next the back black, those next the wings white; quills and coverts brownish black, except the middle secondaries and the terminal parts of those coverts which form a white wing spot. The female has the head and neck (the former with a long loose crest) rust colour; the upper part greyish and the under yellowish white. She is the "Dun diver" of authors; and the immature male, which resembles her in colour, is the male of the same. The nest is placed in situations similar to that of the red-throated diver; the eggs are from eight to twelve, and white, with a slight tinge of yellow.

THE HOODED MERGANSER (*Mergus cucullatus*).

The hooded merganser is an American species, frequenting the fresh waters of that country much more than the sea; retiring to the north in summer to breed, but in the winter ranging as far southward perhaps as the Floridas. In Britain it appears only as a very rare straggler.

The length is eighteen inches, and the breadth about twenty-four. The bill is narrow, very much toothed, hooked at the tip, dusky on the ridge and nail, and dull red on the other parts. Irides yellow, the eye being very small; the feet reddish: top of the head furnished with a large crest, which can be erected or spread over the head like a hood. The crest black in part as far as the eyes, the rest white with black tips. Neck, and part of the back, black, the black relieved in two points towards the breast; all the rest of the under part white, passing into reddish brown, finely marked with black on the sides. Smaller coverts pale ash, greater coverts and secondaries forming two black and two white lines on the middle of the wing; tertiaries long, hanging partially across the wing, black, with white streaks in the centres of the feathers; primaries and tail feathers, which last are twenty in number, brownish black. The female is smaller, and has the crest of a pale rust colour; the upper part of the neck pale brown, and is altogether smaller.

THE SMEW, OR WHITE NUN (*Mergus albellus*).

The smew, white nun, or white merganser, is, like the others, a bird of the northern climates, abundant in both continents, and perhaps the most discursive of any in its migrations. It is more abundant on our shores in the winter than any of the other species, but it has not been known to breed in the country. On the eastern part of the continent, and also in America, it ranges much farther southward than in our longitudes, because there the waters northward are earlier, and to a greater extent closed up by the frost. The consequence is, that many of the arctic birds are as common in the Mediterranean as they are on the southern shores of England, to which it is in very severe weather only that any of the mergansers are driven in even moderate numbers.

The markings of the smew are very striking, and distinguish it readily from every other bird.

The length of the male is eighteen inches, the extent about twenty-six, and it weighs rather more than a pound and a half. It is a bird of elegant form, and the pure black and white of its plumage render it a very conspicuous object, as it alternately plays on the surface and dives in the water.

The bill, which is about two inches long, rather tapering to the hooked tip, and serrated, but not quite so deeply as in the other species, is bluish black ; the feet are the same, and the irides dark brown. On the eye there is a large oval black spot glossed with green, and the under side of the crest backwards is also black, defining the hinder outline of the head, and giving the white upper part of the crest the appearance of a floating plume of white. The neck, as far as the shoulders, and all the under part to the vent, are pure white. The sides under the wings, and partially below the closed wing backwards, are beautifully mottled with small curved lines of black. The back is black, and the scapulars white, with a few thin oblique black lines. From the upper part of the black on the back, there are a few short curves of black across the white on the shoulder, the upper one of which extends in slight arches or scollops nearly to the middle of the breast. The other two curved black lines proceed from the back, by the top of the white scapulars, under the bend of the closed wing, and turn forward on the lower part of the breast, but do not approach each other so nearly as those on the upper part. The ridge of the wing and the primary quills are black ; the middle coverts white ; and the greater covers and secondaries black with white tips ; thus forming a broad patch and two narrow bands of white. The tail is dark ash colour, and contains sixteen feathers.

The female is considerably smaller than the male, has the

crest similarly formed, but smaller, and reddish brown, the dark spot dusky, the chin and throat white, a pale brown collar round the neck, the shoulders and breast pale brown and white ; those parts which are black in the male dark ash, and the feet pale blue. The young males are like the female, which has occasioned the same mistakes as in the rest of the genus.

FISHING BIRDS.

The birds included in this division are not the only ones that fish—for the heron and many of the divers, some of the swimming ducks, and also many of the birds that remain to be noticed in the following division, fish occasionally or habitually. But the birds of this division fish in a peculiar manner, have feet of a peculiar structure, and bear nearly the same relation to the other birds that feed in the waters, that the eagles do to other birds that feed upon land.

There is no display in the manner of the diving and dabbling birds ; they remain quiet on the surface or hidden under it, while in search of their food ; they retire to marshes and places which are not easily examined, and have little of interest in them, and there they disperse themselves to breed ; they are in the air only while they are journeying ; and they journey with us only at those seasons when, to common observers, the places which they frequent are the least inviting ; hence their history is comparatively brief and obscure : and though their manners deserve attention, they do not eminently command it.

The birds of the present division are tenants of the rock ; they congregate in vast numbers in nesting time, breed in the free air of heaven, and make the shores echo far and wide with the rustling of their wings and the clamour of their cries. They do not in all cases build so high upon the cliffs

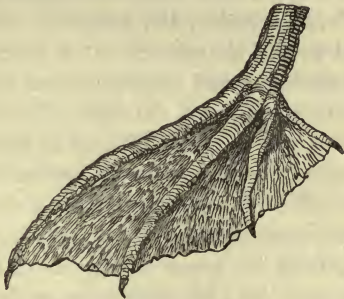
as some other birds, and they do not extend their flights so far to seaward, but they descend upon larger game, and do it with more energy. They beat the waters as an eagle beats the wilds, and descend on their finny prey with great impetuosity and force,—plunging into the water till it closes over them (though they have common few of the attributes of the divers), and again *walking* upward to the surface, taking wing and returning to the cliff to feast themselves, or to feed their young. Though they find their food in the waters, and generally descend for it on the wing, they are shore birds rather than sea birds, and some of them occasionally visit the inland waters, levying their contributions pretty heavily upon the finny inhabitants.

And they are well furnished for their peculiar way of life, in all the attributes of strength, power of wings, and structure of bill and feet. None of the British species equal the golden eagle, either in weight or in extent of wing; but one of them is larger than the osprey, and they are all comparatively powerful birds. Their wings are hollow, so that they take a powerful hold of even a thin stratum of air, and thus they are enabled to mount at once from the water, without any of that fluttering, and quick and laborious motion of the wings, to which most of the dabbling birds must have recourse before they can gain the sky. Their sight is keen—keener perhaps than that of eagles, as they can fish, and consequently see their prey from a height, when the curl of the surface so scatters the light, that human vision, aided by all the contrivances of science, could not penetrate a single inch.

Their bills are very long and very powerful; and though they have not the deadly character of the bills of some land birds, as simply lifting out of the water is death to their prey, they are perfect models of prehensile instruments. In some, the bill is straight, sharp at the point, and serrated in

the margins ; and in others, it is plain in the edges and strongly hooked at the tip. In both, it thus has one of the characters of the bill of the diving mergansers ; but the absence of the other indicates that, when the bill is used, it must be thrust home with more power than any bird can give to its bill immersed in water, and having the resistance of that to overcome. Of the two, the straight bill may be considered as the more dashing instrument, the one which is sent down from the greatest height, and for the capture of the largest prey.

The feet are, however, perhaps, the most characteristic organs, and they answer many purposes, and, among these, one which no other of the variedly formed feet of birds appears to be expressly formed for answering. They are not placed quite so far backward as in the swimmers and divers, though, as the weight of the body lies farther forward than in those, they answer well for swimming when that is necessary. The tarsi are stronger and more tendinous than in the swimmers ; they are straighter set ; the toes collapse



Cormorant's Foot.

more ; and thus the birds can walk better, and also stand firm on the slippery points of rocks. The peculiarity in form

is the web continued to the hind toe, and the general position of the web being inwards rather than forwards, as may be seen in the annexed figure of the right foot of the cormorant, with the side outwards which is turned towards the centre of the bird.

If the prey is on the surface and small, these birds can capture it by a snap of the bill, and ascend again without losing the wing, in the same manner that the skimming birds take the greater part of their food ; but, if the prey is under the surface and larger, the wing must not only suspend its action, but be considerably closed ; and the bird must thus enter the water, using its wings as agents in again ascending. In this operation, the head and gullet (the latter often loaded with the prey) are thrown back by the flexure of the neck, which is long and very elastic ; the feet are at the same time brought forward till they are under the centre of gravity, and by acting against the water, like two inverted cups, jerk the body upward till the points of the wings clear the surface, and the bird is on the wing in an instant. In the gannet, which comes from the loftiest heights and with by far the most velocity, the ascent is facilitated, the fall broken, and indeed the plunge to so great a depth as the rush of the descent would produce is prevented, by the peculiarly buoyant structure of the bird. This buoyancy is produced by a quantity of air distributed in cells under the skin, not exclusively for the purpose of respiration certainly, for the gannet never has the head so long under water as to require a reservoir of air for such a purpose. The descents of the gannet from its greatest heights, (and as it descends from these upon its prey, it has always the greatest initial, and consequently by far the greatest final velocity,) head-long as they are, and delivered upon the breast, very differently from those of the osprey, would be sufficient to stun the bird, and even to immerse it to a depth from which

it could not again ascend, if they were not received upon something more elastic than feathers. But the resources of nature are always true to the purpose, and the gannet is let down, and assisted in again ascending, upon that finest of all springs, the air.

The cellular tissue immediately beneath the skin, on the under part of the gannet, is formed into air cells : or rather, the skin is attached to the muscles by a number of membranous points, so that it can be inflated to a very considerable extent, or reduced by the contraction of the muscles, at the pleasure of the bird. Those external air cells form a sort of three divisions, one on each side the breast, and one anteriorly of the furcal bone (or merrythought), on the neck of the bird. The two lateral ones have a sort of septum along the keel of the sternum ; and they receive air from the air cells within, through apertures beneath the great pectoral muscles ; but they communicate with each other, so that one side of the bird cannot be inflated or reduced without a similar effect taking place in the other. Such an inflation would, indeed, be very awkward ; as in case of a wound in one side, the bird could not keep its balance. The anterior cell is unconnected with the rest, opens into the interior cells further forward, is globular, and about four inches in diameter when expanded, and has a beautiful fan-shaped muscle for its contraction.

The particular action by means of which the gannet inflates those cells, the occasions upon which they are inflated or contracted, and their uses in the economy of the bird, are not perfectly known ; but, as has been already said, they *could* have the effect of making the bird descend upon the water like an elastic balloon, or rise in like manner when it plunges.

CORMORANTS (*Carbo*).

The general characters of this genus as British are—the bill long, straight, compressed, smooth at the margins, much hooked at the tip of the upper mandible, serrated with a naked membrane at the base which reaches the throat. The nostrils basal, linear, and hidden. The face and throat naked. The feet short, strong, placed far backwards, all the four toes united by a web. The position in walking much more erect than that of the gannet, and the walk more difficult. The wings of moderate length, and the tail composed of stiff, elastic feathers, rather produced, and wedge-shaped or rounded.

These birds fish from the wing, though not from so great heights as the gannet; they also fish swimming, and are expert divers; they do not range very far from the shore; sometimes frequent the fresh waters; and frequently perch, or even build their nests, on trees. They subsist by fishing, and a principal part of their food is eels, after which they dive. They are very voracious feeders; and the smell of the living birds, and also the flavour of the flesh of the old ones, is exceedingly rank and offensive. The young are less so, and may be rendered palatable, if drawn, skinned, wrapped in a cloth, and buried for some time in the earth.

THE COMMON CORMORANT (*Carbo cormoranus*).

A figure of this species, one-twelfth of the lineal dimensions, is given on the plate opposite. It is a large bird, larger (on account of the tail being more produced) than the common grey goose, but a foot less in the extent of the wings, and only about two-thirds of the weight. It is an energetic and powerful bird, found in most latitudes, and not quitting the northern seas till frozen out. Its sight is keen;

and it plunges upon its prey from a considerable height, dives after it, and is equally bold and successful. It can gorge an immense quantity ; its own weight of fish, at least, in the course of one day. Its stomach and gullet are capable of great distension, the latter of as much as the naked skin on the front of the neck, which skin appears merely to accommodate the enlargements of the internal passage better than they could be accommodated by a skin covered with feathers, and not having, as has sometimes been said, a pouch or reservoir in which to carry a store of provisions.

The cormorant builds on the high ledges of the rocks, generally in or near the currents in which an ample supply of swallowable fish may be obtained ; though as the bill of the bird is fully five inches long and very wide in the gape, and the gullet dilatable to anything that the bill can capture, it can manage fishes of considerable size. Whether it descends upon them from the rock, where it often sits on the watch, or from the wing, or skims after them in the water by swimming or diving, at both of which it appears to be equally expert, it seizes them crossways with its bill ; but it does not, like the heron, bring them to land in order to turn them into that position in which they can most easily be swallowed. It can turn them in the water, or if it fail in that, it can jerk them into the air, catch them as they fall head foremost, and so swallow them with ease. It will sometimes fish till it is so loaded that it gets on wing with difficulty, and the process of energetic digestion so stupefies it, that if its seat on the rock can be reached, it is not difficult to capture. In winter it sometimes follows the fishes up the estuaries of rivers, and in flat countries perches on trees, or, in some parts of the world where it is not disturbed, on the house-tops. The nests are generally on lofty and insulated rocks, often a number of them together, and made of a few sticks and sea-weeds. The eggs are

three or four in number, of a whitish colour, rather rough on the surface, and not large in proportion to the size of the bird.

The cormorant is subject to some changes both with the season and with age. In winter, the crest feathers, which are never very much produced, drop off, as do also most of the white feathers on the neck and the outsides of the thighs; the upper plumage also fades to a dull brownish black. The young are without the crest and the white feathers, and are browner than the old ones in their winter or faded plumage.*

* The cormorant (*Phalacrocorax carbo*, Auct.) is distributed throughout Europe, Asia, and North America. It breeds on our shores. The cormorant swims so low in the water, that nothing but the head, neck, and top of the back appears above the surface; its tail, composed of stiff elastic feathers, is submerged, and used as a rudder in its subaquatic evolutions, while the wings serve the office of oars. The address with which it dives, and the rapidity of its movements, are wonderful; nor less so the pertinacity with which it pursues its victims. The cormorant is easily tamed, and becomes very docile. Formerly, it was trained to fish, and to bring its prey to its keeper. Whitelock tells us that he had a cast of them, manned like hawks, which would come to the hand; and states that the best he had were presented to him by Mr. Wood, master of the cormorants to King Charles the First. Trained cormorants were imported from Holland to England. In China, at the present day, an allied species, *Ph. sirensis*, is trained to fishing. Sir George Staunton, who observed them on the southern branch of the canal, in his journey to Han-choo-foo, says: "On a large lake close to this part of the canal, and to the eastward of it, are thousands of small boats and rafts, built entirely for this species of fishing. On each boat or raft are ten or a dozen birds, which, at a signal from the owner, plunge into the water, and it is astonishing to see the enormous size of the fish with which they return grasped between their bills."

The shag displays all the manners of the cormorant. It is, however, not found in America, but is widely spread over the north of Europe. Both are unwearied, active fishers, pursuing their prey beneath the water, like the otter, occasionally rising to take breath, and renewing the chase. The gullet is wonderfully dilatable.—M.

THE SHAG (*Carbo graculus*).

A figure of this bird is given on the plate at page 334, on a scale of one-sixth of the lineal dimensions, or twice as large in line, in proportion to the natural size of the bird, as the cormorant on the plate at page 362. In form, character, habits, and general haunts, the birds very much resemble each other, only the shag is smaller, differently coloured, and remains more habitually upon the shores, being rarely, if ever, seen inland.

Though these birds can both swim and dive, the water is not their element; their feet are better adapted for raising them out of the water than for enabling them to make their way through it;* and as their eye is keen, their dart upon their prey unerring, and the hold that they ever take with their bill secure, they do not need to remain long in the water. There is no waste in nature any more than there is want. Accordingly, the birds of this genus, which require but a short time in the water to gorge themselves, and which would absolutely get so overloaded as to be unable to rise from it at all, were they to continue long, have the feathers less able to stand the water than those birds which spend the greater part of their time in swimming or diving. They are thus compelled, as it were, to ascend to the rocks, and, while the whole of their animal energy is engaged in the

* We do not quite know what the author means, when he says the water is not the element of the cormorants. Few birds are more expressly formed for diving and pursuing their prey under the surface; and it is from the water alone that they derive their sustenance. They can rest at ease upon the water; they can swim, though semi-submerged, with alacrity, and dive with arrow-like rapidity and suddenness. They spend the day in fishing for themselves, their mates, and young; they leave their roosting-places in the morning, hastening seaward, and return after their labours in the evening. Their habits may be studied with advantage on Southampton Water.—M.

digestion of their load of food, spread out their wings to dry.

The birds build high, and lay two rough-shelled eggs. In winter the colour on the back fades, the white feathers on the cheeks disappear, and the green crest is nearly obliterated. The young have the throat ash coloured, and a tinge of brownish ash upon all the upper plumage.

The crested shag of authors, is merely this bird in its breeding plumage.

THE GANNET, OR SOLAN GOOSE (*Sula bassana*).

A figure of the gannet in its mature plumage is given on the frontispiece of this volume, with one more distant and on an oblique descent, for the downward rush of the bird no pencil can delineate. The bird is about three feet long, of which the bill, including the naked skin at the base, occupies about half a foot. The nostrils are obscure and nearly closed. The expanse of the wings is at least six feet, and the weight of the bird between six and seven pounds. Excepting the tinge of buff on the crown, and the black primaries and the bastard wings, the whole plumage of the mature bird is white. The young are brownish black the first year; have a white spot at the end of each feather above, and a dusky spot crossing the shaft of each, in the second year. In the progress of these changes of the plumage, the irides change from brown to yellow.

In summer they betake themselves in immense multitudes to particular cliffs, and especially to rocky islets at a small distance from the land. The geology of rock-building birds, though a curious subject, has not been much alluded to; but the gannets appear to prefer those of the trap formation to any others, probably because the inequalities of these are more flat and tubular than the schistose and granitic rocks. It may, in some instances, appear that the birds are capri-

cious in their choice of particular spots ; but it will in general be found that they give the preference to places which have the best command of fishing grounds, and the more they are surrounded by these the better. Their fishing grounds in the breeding time are not the beaches and shallows upon which fishes deposit their spawn, and where the fry appear when very small ; but they are not at very great distances from these ; and are, as one would say, near certain *runs* of the water, where the young fishes may be supposed to congregate intermediate between the nursery banks and the deeps. The Fern Islands, the Bass, Ailsa, Sulas'-skerry, and many of the jutting headlands in the Hebrides, may be instanced, all of which are in runs of the tide or current, and none of them very far from banks or shores on which spawn is deposited. We want, however, a correlative history of congregating birds and shoaling fishes upon the different parts of our shores ; and as the work would be one of great economic value, surely some of those gentlemen who have talents, leisure, and all other requisites, for the task, might instruct and delight us by performing it in a style worthy of themselves.

The gannet forms a sort of nest, though a rude one, of a few pieces of withered bent, floating reeds, dry sea-weed, or what it can get. The female has two eggs, or only one, elongated in the form, rough and glossless in the shell, whitish in the colour ; and, different from the diving birds, very small in proportion to her size ; being very little longer than that of the common duck, though the mother bird is at least three times as heavy. Both gannets are engaged in the incubation, each sitting alternately as the other fishes for food. A colony of them is a busy, gay, and interesting, though rather a noisy, scene ; but the rocks where sea birds crowd are but slippery footing, and not very suitable for holiday attire.

When the broods are reared, and the young fishes leave the breeding grounds, the gannets disperse themselves over the sea, rather than migrate. In the intermediate time, before the smaller surface-fishes come near the shores for the purpose of spawning, they are put a little to their shifts, and they may be seen hovering over, and always now and then driving down at, the shoals of cod, which cause a white spray on the water where they are numerous ; but though they wound a considerable number, by their powers, that species of fishing, at least in the cases in which I have seen it, does not appear to be very productive. Sprats and herrings suit better, especially when "taken in the set of the current," as they are then captured by the birds while swimming. We are not very well informed respecting the seasonal economy of the surface of the sea ; but it is probable that the fishes, and the surface fishes especially, have a southward motion in the winter ; and that the gannets move seaward and southward along with them,—as we can hardly suppose that birds, in which the colour and texture of the plumage, as well as the quantity of air in the cellular tissue under the skin, all conspire to resist changes of temperature, can have any occasion to shift southward on account of the cold. Dispersion rather than departure seems to be the chief cause why they are not seen in the winter. As they float like balloons, they have less occasion to come on land, except in the breeding time, than most other birds ; and great as the numbers are which collect at their favourite rocks in the summer, they would make but a sprinkling over the sea to the distance of fifty or one hundred miles, and the points of that wide surface which can be contemporaneously viewed are exceedingly few.

SKIMMING BIRDS.

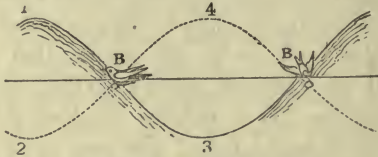
The general habit in which the birds of this division agree the most, may be said to be that of rather low and varying flight along the surface of the water, during which they appear to be merely playing over the waters, though they are very industriously and successfully feeding all the time.

They are the birds which give the greatest interest to the sea, in as far as birds can increase the interest of that wonderful element. They are dispersed indiscriminately around all the shores, whether these be bold or tame in their characters. They range far to seaward, and some of them are met with almost at mid ocean. Their wings are never wholly at rest, if there is light by which a wing can be seen; and their voices are not often silent. When the tempest sweeps with its utmost fury, and the *congregated* waves rise mountain high, now hiding the ships in the compound valleys, now disclosing them keel out on the accumulated ridges, when cordage parts like cobwebs, masts snap like dry twigs,—the chain cable stiffens like a rod, the shank of the best bower “comes home from the fluke,” and man is as powerless in his best sea-boat as an infant in a basket,—no wing can keep the sky or endure the sea. But as long as the waves are *single*, the skimming bird can not only remain, but find food, let the wind blow as it lists.

Its footing, too, is much more steady than those who have not attended to the motion of waves would be apt to suppose. Waves, instead of rolling with the velocity of the wind, roll very little, and they are always highest, of course, when the motion of the water is contrary to that of the wind. When one looks on them from shore and with a side wind, they *seem* to roll on, and (which of itself might convince us that the apparent rolling is an optical deception) they always appear

to move the slower the fresher the breeze. They heave and sink, the times being as the square roots of their lengths, so that, if a wave four feet broad changes from ridge to trough in four seconds (which is not very far from the truth), one of sixteen feet will change in eight seconds. Now, as the apparent forward motion is half the width, the four-foot wave will appear to move at the rate of rather less than a mile and a half in the hour, the sixteen-foot one at rather less than three quarters of a mile in the hour, which is a very slow motion ; and if one could see one of the mountain seas of the southern ocean on an end view of the waves, they would appear to have hardly any forward motion at all.

Thus, in the case of single waves, the middle of the slope is a point of rest, on which the sea bird can sit with little more difficulty than on the calm surface. That will, perhaps, be made plainer by the following diagram of



A bird at rest on the wave.

a. b. is the mean level or calm line of the sea, cutting both the black and the dotted curve on the points *o. o.* 1 is the ridge, and 3 the hollow, at the one end of the vibration ; and 4 the ridge, and 2 the hollow as shown by the dotted line, at the other. The bird at B on the turning point is not moved either up or down ; and as that point is alternately on the windward and leeward of the wave, the wave keeps it from drifting in the first case, and affords it shelter in the second. There are some other optical deceptions with regard to the motion of the bird or of anything else that floats on that part of the wave, but they are not easily

described, though they can be readily understood by any one who sees them in nature.

There are, however, some other inducements for the bird to take this position on the wave. This is the point to which the agitation of the water tends to drive the small animals upon which the bird feeds; and they lose command of themselves in the tumbling water, and accumulate there, so that the birds catch them more readily than when the surface is smooth. "Troubled waters" are thus the best to fish in for birds as well as for men; and they are also the best for the larger fishes to feed in. The skimming birds, and also the fishing birds proper, may be seen on the alert, twitching their prey from the mid slopes of waves on the wing, especially in those long seas without broken water, which are, perhaps, the most beautiful states of the ocean.

The skimming birds are so numerous and so varied, that no general characters can be very descriptive of them. They swim, many of them dive, and not a few walk well; but the wing is their principal organ of notion, and the bill their only (or chief) prehensile instrument. The body follows the principal action: it is a flying body with a fishing bill and swimming feet; and that is, perhaps, the only character more general than the generic ones.

SKUAS (*Lestris*).

The birds of this genus get the name of *lestris* from the habit they have of robbing the gulls of the prey which they have swallowed. They have sometimes been called the "eagles of the sea;" and their power, their rapacity, and their daring, entitle them to that name, much more than the gannets and the cormorants, which, though most voracious in their fishing, and often dashing in the performance of it, are tame and peaceable birds in other respects. The worst that one gets in the haunts of the gannet and the cormorant is a

hearty scolding ; but the cradle-castle of the skuas is not to be stormed with impunity. All who have visited it, confess there is danger, and some of the accounts add that there has been death—those who have had the hardihood to attempt the plundering of the skuas' nests, with the head unprotected, have had their skulls broken by the reiterated dashes of the parental beaks. Even the eagles keep aloof from the habitations of the skuas ; and they, singly, so alarm the gulls, that they disgorge their load of fish, which the skua seizes during its fall. They are also great robbers of the nests of other birds.

They have, indeed, many of the characters, and some of the action, of eagles. The bill has a cere to the upper mandible. It is of moderate length, hard, strong, cylindrical, compressed, very sharp in the cutting edges, and hooked at the tip of the upper mandible, and having the under one fortified by a salient angle at the middle. The legs are stout, with part of the tibia naked, and the hind toe nearly rudimental ; but the claws are strong and much hooked. The head, neck, and body are strongly and firmly made ; there is the same power of spreading the tail as in the eagles ; and the flight is by jerks or rather dashes. They are chiefly found in the north, collecting at the breeding grounds—seldom more to the south than Orkney and Shetland ; in the summer, ranging as far as Spitzbergen, and making prize of fishes, eggs, young birds, shelled mollusca and crustacea on the shores, and the “krenge” or carcase of whales and other large animals in the sea. It seems to be chiefly for “holding on” while they tear the floating carcasses piecemeal with the bill, that they have the formidable hooked claws. The North Sea often supplies a rich harvest of dead carcasses, as seals and other animals are subject to *epizoöty*, and float dead in thousands ; and in these cases, the skuas lend a hand in playing the vulture. Most of the species breed both in the Orkneys and in Shetland, but only on peculiar spots. The

nests are sometimes down near the water, and at others at the height of several hundred feet; and it is a curious fact, that the eggs, even of the same species, are always lighter in the colour when placed high than when down near the level of the sea. They disperse in winter, and range more in breadth over the ocean.

There are four species of skuas known as British birds, though one of them is of rare occurrence; and these four have not only the general appearance, but the gradations in size, in the colours of the plumage, and in form, of the birds of prey. Of the diurnal birds of prey, there is a regular gradation from the golden eagle to the merlin; and in the nocturnal ones, from the great-eared owl to the little owl. The skuas feed by day, and thus the tints of their plumage resemble the diurnal accipitres more than the nocturnal ones. The common skua has the same deep brown, and the same unbroken colour as the eagle, and, like that bird, it has the beak black. The others are light, and more or less marked with spots on the under part; and as their size diminishes, their wings and tails become proportionally more produced, so that they have more the character of the hawks, and possess the means of more rapid and varied flight, but without the same strength and daring.

THE COMMON SKUA (*Lestris catarractes*).

A figure of the common skua, on a scale of one-sixth of the average dimensions, is given upon the plate at page 364. It is there represented in the attitude which it assumes on the water; but, as is the case with birds of prey, it is seen to greatest advantage when in pursuit on the wing. A bird in motion is, however, a very difficult subject for an artist, much more so than a quadruped; yet, even in these, the *expression* of motion is not often well represented, though in most species the artist has at least some advantage of the

muscles. Indeed, the chief fault in animals, and also in the human figure, consists in making too much of the muscles—giving such equal action to the antagonist ones, that the figure could not possibly move, and thus indicating paralysis rather than action. In birds, the form of the muscles is not seen, or indicated in any way but by the general outline; and thus, whatever shape may be given to the figure, the idea of motion must be wholly supplied by the imagination of the spectator; and it is only a little farther stretch of that imagination, to suppose the bird which is represented in a state of quietude to get up and fly.

As is the case with the more powerful of the accipitres, this most powerful of the skuas inhabits the cold latitudes. It is found in all parts of the northern seas within and near the polar circle; and it is also found in the south. New Holland and Africa are situated rather near the tropics for its habits; but Cook met with it while skirting the polar ice, and Captain P. P. King found it abundant while recently exploring the southern extremity of the American continent.* Though rather discursive in its habits, it is not very often seen on the southern shores of England; it is, however, very common in the Northern Isles, in some of which the people call it the herdsman, from a notion that it protects the young of their flocks from the eagle. This may, in part, be imagination; but the birds are very powerful both in the wings and the beak. They are, in the breeding time, as bold as they are powerful; they charge *en masse*, and they charge in a manner against which the eagle is not well prepared for defence. Though their claws are strong and much hooked, more especially that on the inner toe, yet the webs prevent them from acting so efficiently as the free toes of the acci-

* It is most probable, as Mr. Gould observes, that the Skua gull of the Southern Seas, which he figures in his "Birds of Australia," will prove to be distinct from the European species.—M.

pitres, and therefore the beak is their offensive weapon ; and when the male birds are roused in defence of the females and the young, neither eagle nor eagle-owl can venture upon their ground with impunity. It is, indeed, rather a hazardous business for man ; and instances are mentioned of those who went into the breeding ground of the birds without sufficient protection to their heads, having their skulls fractured by the repeated thrusts of the bills. The country people who find it necessary to traverse the breeding haunts of the skuas, use a defence against them, something similar to that which the heron uses against hawks, when they gain the sky of him. They carry a long stick armed with a spike or spear at the top ; and when they approach very near the nests, the birds sometimes descend with so much fury and force, as to transfix themselves on the spike. Such birds have, of course, their breeding grounds as much to themselves as the eagle has her mountain ; and if their habit were to breed as dispersedly as eagles, they would, considering their numbers, drive all the other sea birds from the shores. They do not, however, attack the other birds for the sake of killing them, and eating their flesh, but to make them disgorge the contents of their stomachs, which they regard as a delicacy. This the common skua accomplishes even with the largest of the gulls, though these also are powerful birds, and show fight to the smaller species of skua. Indeed, from the gradation that has been mentioned, there are skuas adapted for levying their contributions upon all the other sea birds which fish on the wing, and rise to a moderate height with loaded stomachs. The flight of the skuas is a bounding and jerking flight, and they appear to know instinctively when the gulls have been successful, and are loaded. In these cases, they drive at the gull with the rush of birds of prey ; and the gulls scream, discharge their load, and make off, the skua descending like an arrow, and seizing it ere it reaches

the water. It is this habit in the gulls of parting with their property without a struggle, which has given rise to the terms gull, guller, and gulling, among men, the active parties in which, though not popularly termed skuas, are certainly the most dangerous, and at the same time the most contemptible, of all the wingless *lestres*. These *lestres* have their gradation of species, as well as the winged ones; so that while no wingless gull, however great or otherwise powerful, can escape the larger ones, if he once ventures within their peculiar breeding ground, there is no gull so small but that, if he take not heed where he goes, he will find a *lestris* to make him disgorge, as certainly as any of his winged namesakes. There is another point in the parallel: the food of which the sea-gulls are robbed is very frequently that which should go to the maintaining of their wives and families,—and it is even so with the wingless gulls.

In the plumage of the common skua, the individual feathers have the same firmness and decision as in that of the eagles, and they have also the feathers on the neck produced and pointed. Their wings are long and pointed, the first quill being the longest, and the two middle feathers of the tail are about an inch longer than the others. The only white upon the mature bird is on the shafts of the primaries, and partially on the webs.

There is every reason to believe that, like the eagles, they pair for life, as, when one is seen, another is seldom far off; and though the male is not so easily distinguished from the female as in the eagles, the sexes being very similar both in size and in plumage, yet there is no doubt that these pairs breed together.

In the breeding season they are social, or select their own ground, from which, for the reasons already stated, the other birds keep aloof. As British birds, they are not very numerous, even at that time, though they nestle in the

northern islands, both in rocks and in the upland wastes. The nest is rudely formed, and the eggs are generally two, of a paler or darker olive, according to circumstances, and marked with a few spots. When the breeding season is over, they disperse, and range the ocean along with the other sea birds, upon which they continue to levy their contributions all the year round. But though they depend chiefly on the gulls for food, they have other resources, which lead one, by very obvious analogy, again to their wingless brethren. When they can come unawares upon a defenceless bird, they do not hesitate to dispatch him both with beak and claws, and (the smaller species in particular) are great plunderers of the nests of other birds, more especially of those of the shore and marsh birds which breed on the islets near the northern coasts.

THE POMARINE SKUA (*Lestris pomarinus*).

The pomarine skua is the next largest species, and bears some resemblance, both in its general appearance and its plumage, as well to the sea eagle as to the larger hawks. As a British bird it is rare, and can be regarded only as a straggler from the north-western seas. Specimens do, however, sometimes occur, and one in particular was sent from Devonshire, alive, to the Zoological Society of London, in the winter of 1831. The bird is about eighteen inches in length, with the wings long, and the tail not so pointed or wedge-shaped as in the common skua; the tarsi also are long, but the toes short, and the webs small. The bill instead of being black, as in the former species, is greenish yellow, the irides yellowish brown, and the feet black. The head is blackish brown; the feathers on the sides of the neck slender, produced, silky, and of a yellowish colour. The general colour of the upper part is blackish brown, and the under part dull greyish white, mottled with rather obscure

dusky spots, of a triangular or crescent shape, not unlike those on the under parts of some of the falcons. The young, in their first plumage, are dull brown on the under part, and much more closely mottled, and with smaller spots, than the mature birds.

This skua is an American species; but its appearance in this country shows that it is a bird of powerful wing and discursive range. Its habits resemble, to a considerable extent, those of the common skua, only it is not so large and strong, and consequently does not levy its contributions upon such large birds as that species does. Its greater comparative power of wing enables it to range more to seaward than the other, following the lesser gulls and terns; and it also passes into lower latitudes, though its breeding places are, generally speaking, in the north. Altogether, it is a bird of more graceful form than the common skua, though in that respect inferior to the remaining and smaller species.

RICHARDSON'S SKUA (*Lestris Richardsonii*).

This species, which is by no means rare as a British bird, especially on the more northerly shores of the country, has been, by most writers on British birds, confounded with, or rather described as, the Arctic skua, a bird with which it has little in common, save the generic characters of the skuas, and the same length, measuring from the beak to the extremity of the produced feathers of the tail.

Richardson's skua, though not common in the south of England, is by no means rare in North Britain, and it is found as far in the south as Yorkshire. The birds appear on the nesting ground, which is generally in some sort of cover near the sea, but as elevated as possible, in the end of April or in May; and they disperse seaward in August, or, at all events, before the autumnal equinox. The reason of their congregating in the early portion of the season, partly depends

upon natural impulse, and partly upon the necessity of their following other birds upon which they so much depend for their food; their dispersion in the latter part of the season, is more exclusively for the purpose of feeding—for it does not appear that climate has very much effect upon them. It is probable that these birds pair for life, as well as the common skuas; but the fact of their pairing has not been so well ascertained. They do not keep so exclusively at sea as the common species, but sometimes range to considerable distances inland, at which times their chief subsistence is upon worms and molluscous animals.

These birds have not the decided feathers or the hawk-like mottlings of the species that have been already noticed. They have the head blackish brown, with the dark colour covering the cheek a little below the eyes. The general colour of the upper part is also brown, but with a slight trace of ash colour. The sides of the neck are buff; the throat, breast, and belly, white, passing into greyish ash towards the vent. The cere is whitish ash; the bill bluish black; the feet, of which the tarsi are an inch and three quarters long, are the same colour; they have the webs large and the hind toe little produced, indicating a more swimming habit than that of the former species. Their instruments of flight are also much produced. The entire length is twenty-one inches, of which, however, nine inches are taken up by the feathers of the tail, of which the middle feathers are so much produced, that they extend fully three inches beyond the others. The young birds have the tail feathers produced; and they are of a brownish colour.

ARCTIC SKUA (*Lestris parasiticus*).

The true Arctic skua sometimes breeds in the remoter parts of the British islands, but much more rarely than Richardson's, or even than the common species. It is by

much the lightest and most handsomely made bird of the genus. Its length, including the tail, is about the same as that of the last species, that is, twenty-one inches; but twelve inches of that are occupied by the tail, which reduces the head and body to nine inches, while those of the other species measure twelve. The cube of three to the cube of four, or twenty-seven to sixty-four, is, therefore, the proportion in weight of the two birds: and as the Arctic species is more slender in proportion to its length than the others, it does not weigh above a third as much. This circumstance alone might have prevented the one bird from being mistaken for the other, even though, in other respects, they were not so different as they are.

The Arctic skua has the cap of the head dark blackish brown, but not reaching below the eyes; the general colour of the upper part is clear brownish grey, the quills and tail feathers being darker. All the under part is pure white, except towards the vent and under tail-coverts, where it passes into greyish ash. The sides of the neck are of a delicate straw yellow. The plumage of the mature males and females is nearly the same; but that of the young birds is brown and mottled.

One of the most remarkable external characters of these birds, is the length and pointedness of the middle feathers of the tail and the quills of the wings. It has been already mentioned that the tail is a foot long, or three inches longer than the body and head; and the middle feathers, which taper to a point at the extremity, are six inches and three quarters longer than the others. This remarkable elongation and pointedness in the flying apparatus of these birds, gives them something of a tern-like appearance: and they can turn on the points of their wings something after the manner of swallows, though, like the rest of the genus, they live rather by robbing other birds than by fishing for themselves. It

need hardly be added, that they are the swiftest flyers of the skuas, and consequently the most discursive over the ocean. They do not attack the larger gulls, but they occasion no little annoyance to the smaller ones and the terns, which, especially the former, they often strike on the back to make them disgorge. They inhabit rather more northerly than the species with which they have been confounded, and the confusion has probably arisen from the description of the rare bird having been copied under the name of the more common one, and the blunder continued by those who had no farther knowledge of either of the birds than that which they copied from others.

The true Arctic skua is altogether one of the most elegant of our sea birds—light and handsome in its form, delicate in the colours of its plumage, and free and graceful in its motions. It is one of those birds, the rareness of which is matter of regret. Indeed, the whole genus are birds of much interest; they form a well-defined genus, and yet one which exhibits a very considerable range in size and in characters. To man they do no injury; and when that is the case, animals are always interesting in proportion to their powers.

GULLS (*Larus*).

The gulls are much more numerous both in species and in individuals, and also much more common on the British shores, than the skuas. Their bills resemble those of the skuas in their general form, but they are more elongated and slender, have the nostrils pervious, and are without a definite cere at the base of the upper mandible. Their legs are rather longer than those of the skuas, and better set for walking; but they are also bare for a considerable height on the tibia, and have the hind toe only rudimental. They are rather looser in the feathers, less weighty in proportion to their dimensions, have more of the flying form, and are smoother

in their flight, than the skuas. Like those, they congregate in the breeding season, often in immense and countless multitudes; some breeding on the rocks by the sea, and others in the lone and marshy pools and lakes, often at many miles inland, but seldom, if ever, in elevated or mountainous parts of the country. Many of them, the inland breeders especially, are instinctively weatherwise, and leave the sea before the storm comes. At these times, as well as on their marches to and from the breeding-grounds, they halt upon the fields, and may be seen mingled with rooks and other land birds, following the ploughs and picking up larvæ and worms as the earth is turned up. These marsh ones, indeed, support both themselves and their young upon the produce of the pools, and seldom range to any very great distance till the young are able to accompany them. At other times, they are distributed along the shores, industriously picking up not only small animals, but all sorts of garbage that may come in their way. In those fishing villages which range close by the beaches in many parts of the country, and are not remarkable for their cleanliness, the gulls are very familiar, and ply as scavengers. In the far-famed village of Buckhaven, on the southern shore of the kingdom of Fife, they used to be called by the domestic name of "our toon 'ens;" and once, when the Lord of the Manor took it into his head to exact pullets as part of his rent, the fishermen brought him sundry baskets of gulls, replying to the objections that were made, "We ken naither hens but thae, an' 'ow can we gie vat Providens 'as na gien us?" an argument which was unanswerable, as gardens within flood-mark, stocked with muscles and crabs, would have been but a sorry run for pullets. Abundant quantity rather than particular quality of food seems to be the object with the whole genus. If animal food of any kind or in any state can be had, they prefer it; if not, they will eat seeds and other vegetable matters. In all the species of

which the habits are well known, the young are mottled, acquire their mature plumage gradually, and not perfectly till the third year, and there is every reason to believe that the same difference of plumage with age runs through the whole of the genus. So that a mottled gull is always a bird under three years old.

The different species of gulls are sometimes separated into the subdivision of larger and lesser; but, unless in respect of size, that seems a distinction without any useful difference, as no difference in the habits of the birds accords with it.*

THE BLACK-BACKED GULL (*Larus marinus*).

This is the largest species found on the British shores, and it is one which is resident all the year, though rather at particular spots than generally along the shores. It is a marsh breeder, but breeds in those near the sea, and especially on loose marshy islands. It is exceedingly voracious, an expert fisher, but always on the watch for stranded fish, or any car- rion or garbage that it can find; and it is also accused of making prize of the young of some other water-birds, of rabbits, and even, it is said, of lambs. It is a large and powerful bird, measuring two feet and a half in length, nearly six in the stretch of the wings, and weighing nearly five pounds. The pairs generally keep together for the greater part of the year.

The feet are flesh-coloured, the irides white, and the bill yellow, the latter four inches in length, and with a red spot,

* The flight of these birds is peculiarly light, buoyant, and graceful; they often wheel around in circles, and making head against the wind, perform the most elegant evolutions. They do not dive, but they skim their food from the surface of the water, on which also they can rest; but they can scarcely be called swimming-birds. One species, *Larus ridibundus*, visits the lakes of the interior, for the purpose of breeding.—M.

dusky in the centre, on the angle of the lower mandible. Back and wing coverts slate grey ; quills black barred with white and with white tips ; all the rest of the mature birds white. The young are mottled with brown and white till the autumn of the third year.

THE BURGOMASTER GULL (*Larus glaucus*).

This species is nearly as long as the former, but six or seven inches less in the extent of the wings. It inhabits more northerly, or rather more exclusively northerly, than the former, visits only the more northerly parts of this country in the winter, and is rarely seen even there. It is understood to breed only in the north, the very extreme of which, as far as the water is at all open, it reaches in the summer. It is said to inculcate on rocks.

Bill brownish yellow, with the spot on the under mandible bright red ; irides yellow, orbits reddish, feet livid ; back, shoulders, and wing coverts, light bluish ash ; rest of the plumage white. The young mottled with brown and white.

THE ICELAND GULL (*Larus Islandicus*).

This, like the former, is only a winter visitant in the northern isles. It is a smaller and less powerful species, but more handsome in its form than the former, and proportionally better winged, the closed wings extending beyond the tail ; and, in accordance with these differences of form, it is a more active bird. Colours nearly the same as in the last species, only the ash colour on the upper part a little paler and clearer in the tint ; the bill half an inch shorter, and considerably more slender. The brown in the mottled plumage of the young birds is also paler. It inhabits far to the northward in the summer, and is presumed to nestle on the polar rocks, where numbers have been seen congregating, as

gulls usually do, at that season. Its history is, however, rather imperfect and obscure.

THE LESSER BLACK-BACKED GULL (*Larus fuscus*).

This species, which is resident, and not uncommon in some of the more northerly places, is easily distinguished from the other large gulls by its yellow feet, those of all the rest being reddish or livid. It is a rock-breeder; and, as may indeed be said of the rock-breeders generally, it subsists more by fishing, and less by picking up garbage on the shores, or dead animals floating at sea.

It is about two feet long, and four feet and a half in the extent of the wings. The irides and bill, like the feet, are yellow, but the orbits of the eyes are brown when young, and pale straw-colour in the mature birds. The back and scapulars are bluish black, the quills black; but the outer primaries are barred near their tips, and the others tipped with white, as are also some of the scapulars. The birds assemble very closely on the ledges of their favourite rocks in the breeding season, but disperse at other times: at all times, however, they are energetic in their fishing.

THE HERRING-GULL (*Larus argentatus*).

This species is about the same length as the last-mentioned, but rather more delicately made, not quite so heavy, and a little longer in the wings. It is also a rock-breeder, a resident on the shores, and subsists chiefly by fishing; although it is, like the rest, very indiscriminate in its feeding.

The feet of the herring-gull are pale flesh colour, the orbits of the eyes straw colour, the irides and bill yellow, the latter with a bright orange spot on the projecting angle of the lower mandible. In the mature birds, the back, scapulars, and coverts of the wings, are ash colour, the quills dusky with

black tips, and a white spot on each of four or five exterior ones near the ends. All the rest of the plumage is white, and there is no difference between that of the male and the female. The young of the first year have the bill dark horn colour; the irides and feet dusky; the general plumage of the body mottled with dull white and brown. The quills dusky, without any black or any white spot at the tips; and the tail dull white, with a dusky bar at the end, which is rather more rounded than in the mature birds. This plumage lasts for a year with little alteration. At the moult in the second autumn, or when the birds are about fifteen months old, the feet acquire a reddish blush, the bill and irides become yellowish, the white on the plumage a little purer, and the dark mottling more inclining to ash colour; the bar on the tail feathers becomes less entire, and partially streaked with white. In the third autumn, the entire white and ash colour, the black on the ends of the quills, and the round spots near the tips, are acquired, and the bill, irides, and feet, become of the colours already mentioned as those of the mature bird; after which, the birds undergo no farther change. There are also some slight changes in the first and second spring, but they are trifling, compared with those that take place in the autumn. As the changes in the plumage are the consequences, not the causes, of maturity in the birds, and the physiological change must take place in the more sentient part of the system, before it affects the feathers, it agrees with all the analogies of nature as well as with the facts, in so far as they have been observed, that these birds, and indeed all birds which are a year or two before they acquire their permanent plumage, breed before that is acquired. The herring-gulls, both in their first and their second plumages, assemble on the breeding grounds in the season, indiscriminately with those on which the plumage is mature; and as the assembling is part of the same law or instinct with the

breeding itself, there is every reason to conclude, that no birds resort thither except for the purpose of breeding.

The birds have their favourite spots, indiscriminately in the northern or the southern parts of the country, and they fish, pick up small insects along the shores, sometimes hawk for them on the wing, and, generally speaking, carry on the war with great assiduity against those creatures which it seems to be their peculiar province to thin.

THE IVORY GULL (*Larus eburneus*).

The ivory gull is by far the most beautiful of the genus ; and, indeed, it is one of the most beautiful of birds, though with us it appears only as an occasional visitant. Its habitation is far in the north, and its nesting place in the close vicinity of those enduring snows, the purity of which is rivalled by its mature plumage, which is all over spotless white, close, beautiful, and almost shining in its gloss. The feet are dark, the tarsi very short, and the tibiæ feathered down nearly to the joint. The length is about twenty inches, the wings rather long, and the body of the bird handsomely formed. The young are said to be darker in their first year's plumage, and the mottling to remain black in the second, although the white then predominates. The colours agree with, and at the same time indicate, a very northerly habitat, as, towards the extreme of latitude, the colours, both of animals and of vegetables, approximate more and more to the extremes of white and black ; indicating that there the light is either reflected off without decomposition, or absorbed and quenched. Some of the continental naturalists have described these birds as breeding on the inland waters, even in the middle or southern parts of Europe ; but they must be mistaken ; the ivory gull is formed for the extreme north, and it quits not that region except in the severest weather. All along the margin of the polar ice, from the American

to Spitzbergen, these birds are found in numbers, along with the fulmer petrels, reaping the harvest of the cold, but, to them, not unproductive, sea.

THE COMMON GULL (*Larus canus*).

The common gull is so well known, that a description of it is hardly necessary. Any one who chooses to resort to the sea-coast, may see it; and in many places of the country it ranges inland, and shows itself to those who will not.

It is less a sea bird than many of the other gulls, and frequents the lower estuaries of rivers and their offings, rather than the open shores, especially where the tide sets along the shore, turns the current of the "fresh" of the river, and holds suspended, or deposits upon the beaches (which are always flat and sandy, or muddy, near such places), the lesser animal matters that have been put in motion both by the river water and the tides. There they may be seen, walking along the margin of the water, and picking up the small animals and remains of animal substances that are to be found there, and at other times wheeling about with wailing cry, and capturing such substances as float; but they are not so often observed swimming. When the surface is very smooth, they generally seek their food on the beach; but when it is a little agitated, especially when the fresh of the river comes down red and foul, and consequently loaded with food suitable to them, (for they seem always to prefer land products when such can be had,) they are busy on the wing, now breasting the wind, now giving themselves to it, never rising very high, but twitching here and there, in no ungraceful style, and mingling their shrill and wailing cry with the boom of the wind, the hiss of the surf, and the hurtle of the agitated pebbles. The tranquil water of the summer does not appear to be quite so suitable to their habits. At

all events, they then leave the estuaries for the purpose of breeding ; and where the grounds are favourable,—which of course means, where they afford plenty of food,—they assemble in great numbers. Authors have, doubtless quoting some “authority” *seriatim*, as use is, described them as breeding on the “ledges of rocks.” Now, if by “ledges” the elevated banks and shelves of rocks be meant, I have great doubts if anybody ever saw a common gull there, even resting. Kitty-wakes, herring-gulls, the smaller black-backed gulls, gannets, and other birds which show a good deal of white, are found in such places, and do nestle there ; and as the sights of birds obtained in such situations are anything but microscopic, one is very likely to be deceived. But the common gull is not a bold shore bird, it is a beach bird in its general habits ; and true to these, it is not a rock-breeder, but a marsh-breeder. It is true that, if the place abounds in food, and there is no suitable breeding ground near it inland, it may breed on the lower islets, and even along the shores of the more elevated ones. But tens of thousands may be found on the same inland marshy lake, especially if spotted with islets, at the distance of twenty miles from the sea, and not returning there till they take their broods with them. Nay, they inhabit somewhat pertinaciously, and will haunt the same lake, though cultivation is carried close to its margin. Animals very often seek shelter in places analogous to those in which they are bred ; and though it be not exactly true that the hunted hare doubles in search of her mother’s form, it agrees with the analogy of nature, that a bird should seek shelter in danger, under the same circumstances of place (for these are the keys of instinct) in which it found safety and support when young and helpless. We ourselves have a touch of the same in us ; and perhaps there never was a man sick or wounded in a strange land, to whom the house of his nativity, even though a hovel

did not come in bright and refreshing visions, as hope began to sicken.

The common gull appears to have been confounded with the herring-gull in more respects than that of the breeding ground ; and in a merely passing observer it is not much to be wondered at. They often alternate with each other on the coasts, and mingle on the confines. The birds are not unlike in their plumages ; one does not take a very good estimate of the size of birds on shore or over the water ; and shades of difference in the colours of eyes and feet, require near inspection

The bills of the common and herring-gulls are about the same length (which, by the way, as the common gull is only about half the weight of the other, shows in it an approach to the long-billed shore birds), but the common is dusky at the base, the herring wholly yellow. The tarsi of the common gull are whitish, and rather larger in proportion than those of the other ; the orbits and irides are both brown, not red the one and yellow the other.

The common gull is about seventeen inches long and thirty-six in the wings, and weighs about a pound. In the mature bird, the back and scapulars are clear bluish grey, the primary quills black, with white spots at the tips ; and the secondaries grey with white tips. The young undergo most of the same changes of plumage as those of the herring-gulls, but at all ages they are only about half the weight. They attain their adult plumage sooner.

THE KITTY-WAKE (*Larus rissa*).

This is a rock-breeder, inhabiting the tallest cliffs in vast numbers in the breeding season, on various parts of the coast, but most abundantly towards the north. In winter, as is the case with the rock-breeders generally, these disperse themselves over the sea, and do not come inland in storms.

They cannot be said to be resident, as they quit the breeding grounds in winter ; neither are they strictly migrant ; they are " off and on " between the sea and land. The young, and also the eggs, are collected in vast numbers in many places as food. They are tolerable the first year, sufferable the second, and repulsive ever after.

A figure, in the mature plumage, is given on the plate opposite. Length fifteen inches, breadth more than three feet, weight about half a pound. The young have the bill and naked skin to the eye black, and some black on the ear coverts and nape. The upper plumage mottled with black, and a dusky bar on the tail. Second year, the bill yellowish, the black in the mottling changed to greyish, and all the black on the head gone over the ear spot. The hind toe, at all ages, is a small tubercle without any claw.

THE LAUGHING GULL (*Larus ridibundus*).

This is rather a discursive species, found over a considerable extent in latitude and also occasionally inland, though never at any very great distance from the sea. It is a light and handsome bird, formed for rapid flight, and weighing only between eight and nine ounces, though it measures fourteen and fifteen inches in length. Unlike many of our sea birds, it is more abundant on the English shores than in the north ; and though it ranges to Orkney and Shetland, and even farther northward in the breeding season, it finds its way to more southerly places in the winter. Its seasonal migrations thus bear some analogy to those of the marsh birds ; and, though it fishes and has other habits and also characters of the genus to which it belongs, it breeds generally, if not exclusively, in marshy places, and sometimes at considerable distances from the sea. There it mingles freely and in harmony with the other marsh birds ; and at those seasons finds

its food in the fresh waters, on the little islands among which it nestles. Those inland habits in the breeding time have procured it a number of names similar to those of land or marsh birds. It has been called peewit or lapwing gull ; the inhabitants of Orkney call it the sea-crow, and in some places it is called the mire-crow. Some of its habits are indeed similar to those of the crow tribe, more especially of the rook ; and when ground is newly turned up in the neighbourhood of their breeding places, these gulls and the rooks may be found together, picking up apparently the same food in the same manner, and neither of them offering hostility to the other.

The nests are found on the smaller hummocks, or "tumps" in the fens or marshes, the tops of which are paddled flat by the feet of the birds previous to the eggs being deposited. The eggs are two or three in number, of an olive colour, with darker blotches ; but they are liable to considerable variations of colour, both when dropped and after they have been soiled by the feet of the parent bird.

On the nest, the female sits quite exposed, but in such a manner as to command readily the whole horizon around her ; and thus she is as well protected as those birds which nestle in cover. These gulls make a great deal of noise previous to changes of the weather ; and when the air softens and promises rain after long-protracted drought, and thereby puts the lesser mire and sludge animals into motion, the gulls are all activity and clamour.

They follow the habit of most birds which are social among each other, and with other species in the breeding season, in being tamed without much difficulty ; but as they are, during part of the year at least, very discursive, it is not likely that colonies of them could be made to settle and breed, though in that case they would be highly ornamental, and also render considerable service in clearing gardens

and ornamental grounds of worms, slugs, and other earth animals.

Authors have made several species out of this one, from the seasonal changes of plumage to which it is liable, as has indeed been the case with most of the seasonal birds, even though the seasonal change of place is not greater than that from the fen or the solitary inland pool, to the nearest part of the shore. The mature birds of this species are not eatable, and the young are very inferior to those of the kitty-wake ; but they used to be served up at feasts, more for ostentation than for use.

In the breeding season, the mature birds have the feet, bill, and orbits, red ; the irides hazel ; the head and nape brownish black, except a few white feathers round the eye ; rest of the upper part grey ; the primary quills white, the first with one black web, the others with black spots ; the secondaries ash colour marked with white. In winter, the black on the head fades to white, excepting a patch in front of the eye and another on the ear covert. The young are mottled brown and white ; have the bill dusky, with more or less of a reddish tinge at the base, and the feet yellowish. In the second year they more approach the colour of the mature birds, but they have the head white in winter before it becomes dark in summer. As they are to be seen in all these states of plumage, they have been called by different names, and sometimes described as different birds. Their inland habits have caused them (the young, especially in their winter plumage) to be confounded with the common gull. Though only about two-thirds of the weight of that bird, they appear nearly as large, as, though a little shorter, they are longer in the wings.

THE BLACK-HEADED GULL (*Larus atricillus*).

This species is nearly of the same size as the laughing gull,

and the two have been sometimes confounded with each other, and also with the brown-headed, which is also nearly of the same size. One of the causes of that confusion is the fading of the dark colour on the heads of all the three species in the winter, and the consequent similarity to each other both at that season, and during the times that the changes both ways are in progress. The different red tint of the bill and feet, and the white on the primary quills of the laughing gull, in all stages of its plumage, whether arising from age or from season, are at once sufficient to distinguish them. The bill and feet of the laughing gull are bright vermilion red, while those of the present species are deep lake red. They are both birds of rather more southern localities than the brown-headed gull, with which both have been sometimes confounded, and the species under consideration seems to be the most southerly of the two. That species is a more seaward as well as a more northerly bird than either this or the laughing gull; and it has the feet and bill more slender, and approaching nearer in resemblance to those of the terns.

The present bird is handsome in the outline, and well contrasted in the colours. The crown of the head is very deep lead colour, which appears nearly black from the contrast with the under parts of the bird. This dark cape extends a little way down the nape, and also the neck in front. The rest of the upper part is also lead colour, but not quite so dark. The quills are deep black: the under part is white, with very delicate rose-coloured reflections, which fade soon after the bird is killed.

In the winter plumage the forehead becomes white, excepting a few grey feathers at the base of the bill. The whole of the upper plumage becomes olive grey, with the exception of the primary quills, which retain a dark hue. The smaller coverts become brown; the larger ones acquire

white tips. The first primaries become of a deep brown, but quite unbroken by any other colour. The next species are brown with a white spot on each, and from the sixth to the tenth are white with brown shafts. The under side of the wing becomes at the same time silvery white.

The range of these birds southward during the winter season is very considerable, and extends as far at least as the Mediterranean. In winter they do not seem to make their appearance on the northern islands, but the confounding of the species by common observers renders the accounts that we have of them open to some suspicion.

THE BROWN-HEADED GULL (*Larus capistratus*).

This species is nearly of the same lineal dimensions as the former, but it is more slender in the form, and has the bill and feet small, and approaching in character to those of the terns. The short and slender bill, and the diminished tarsi, toes, and webs, all point out a bird that catches smaller prey, and depends more on the wing for the capture of it.

The bill, tarsi, and toes, are brownish red, the webs between the latter chocolate brown. The top of the head broccoli brown, ending in black, but not reaching so far down the nape or in front as the cape of the black-headed species. A few of the feathers at the front margins have white tips; and the rest of the neck, the breast, and all the under parts, are pure white. The upper surface of the wings is pale ash grey, and the under greyish white. The primary quills are white, tipped and margined with black, which is broadest on the inner webs. The winter changes have not been very minutely examined; but it is probable that they resemble those of its congeners.

This gull ranges far over the North Sea, seldom makes its appearance on our southern shores, though understood to

be far from rare in the northern isles ; though from the causes that have been already mentioned, it has not been much attended to. On the North Sea it appears to range as far as that sea is open, having been met with in Davis' Straits, and even in Baffin's Bay. Its tern-like character gives it much more command of the sea than the larger gulls have, as it probably feeds much more on the small animals that float in the currents than on fish, for the capture of which, in their young state, the large gulls keep nearer to the shores.

THE LITTLE GULL (*Larus minutus*).

The little gull is less of a sea bird than even the laughing gull. It is a native of the lakes, rivers, and marshes of the eastern parts of Europe, and appears in Britain only as an occasional straggler. It is only ten inches in length, but two feet or more in the stretch of the wings. In the mature bird, the head and part of the back are black ; the rest of the upper part greyish ash, and the under part white. Not much is known of it even in its native haunts ; but judging from the very few specimens that have straggled to England, one would conclude that it is subject to the same changes of plumage in its progress to maturity, and also to seasonal changes resembling those of the kitty-wake ; but it is so little connected with British Ornithology, that it is not much worthy the attention of the merely popular observer.

There seems a climatal arrangement of the gulls, from the ivory gull in the extreme north, to the black-headed and the little ones in the middle latitudes ; and there seems also to be a disposition in them to range over the ocean, from the kitty-wake perhaps, which is one of the longest winged of birds in proportion to its size, and appears to winter on the seas, to the same inland species that have

been already named : and there is also a traceable relation between the heights at which they breed and the distances to which they range over the ocean.

SABINE'S GULL (*Larus Sabini*).

Has been seen as a very rare winter straggler on the coast of Ireland ; but as it has been seen only once, and does not in any essential particular differ from the others, a detailed account of it is not necessary.

TERNs (*Sterna*).

The terns have much more the form and character of air birds, than even the lightest made and best winged of the gulls. They are so continually on the wing, and so rapid and varied in the use of it, that they have been called "sea swallows." They have their wings pointed, and most of them their tails forked like the swallows ; and though they do not catch their food open-mouthed in the air as the swallows do, or have their bills adapted for such a purpose, yet they are very swallow-like in their motions. Over the surface of the sea there are few winged insects to capture, as there is neither food nor resting-place for them there ; but the number of minute creatures contained in the water is very great, and these are always coming to the surface, especially when the water is a little agitated. When the waves roll considerably, they are worked towards the lines of least agitation on the slope, and the terns hawk about and capture them, and alight on these lines even when there is a considerable swell. Their prey is smaller than that of the gulls, and they seldom need to swim, and never dive, in quest of it : but though they do not swim habitually, they are so constructed as that they can recover themselves and escape, if they happen to be caught in the water, or even in the breakers. The fry of fish, when in the younger state,

form a very considerable part of their food, and at certain seasons they follow these to some distance seaward. When on the shores, they are not only inaccessible upon the wing, but screaming and clamouring about without intermission, and that too in more loud and ear-piercing strains than, from their size, one would be apt to anticipate. It is difficult to ascertain whether their most shrilly and ear-piercing cry is a song of love or of sorrow ; for they have it equally in the breeding season, and during those long tracts of calm and stilly weather, when it may be presumed that the water furnishes them with only a diminished supply of food. At those times they alternately skim close to the surface, with level wing, and wheel upward, and pounce down again, leaving the water merely momentarily, and either catching nothing or catching something very small, for their wailing is not interrupted.

Still, though the terns are thus fleet and flitting over the waters, and seem to have the air all their own, they are not the birds that range farthest to seaward. The substances upon which they feed, all appear to be either inhabitants within the lines of sounding, or, if they are caught more to sea by the waves, to be in motion towards the shore. All that can float, and is capable of being wetted by the sea, which is the case with all animals in a state of exhaustion or dead, the sea casts ashore ; and such products of the farther and greater deep, as become terns' food, appear to be in that state. But there is an animal substance which is produced, or, if the term suit better, shed largely at sea, which cannot be whetted even by the ocean, and which, therefore, upon a well-known principle in hydrodynamics, has no tendency to come on shore ; the more so, that it is not acted on by the wind, which often drifts matters to the land, in spite of their own repulsions. This substance is oil, which is produced abundantly by various animals,

and shed by various means in the sea, and it has but little tendency to come to the land. It does not appear that fishes, from their structure, can feed upon it; and therefore, if there were not birds for that purpose, it would be lost. To collect it is not the business of the terns, but the business of those which live farther from the land, and are better adapted than are the terns for this species of food and the necessary mode of feeding. Of them we shall have to give a short hint by-and-by.

The generic characters of the terns are—the bill as long as the head or longer, slender, nearly straight, compressed, sharp in the cutting edges, pointed at the tip, at which the upper mandible slopes down a little; the nostrils longitudinally cleft about the middle of the bill, and open; the feet small, the tarsi short, and the tibia naked for some distance above the joint; the wings very long and pointed, and the tail sometimes much produced and forked, at other times of moderate length. The form of the body varies a little, but in general it is that which has been already described as the best adapted for getting through the air—firm at the shoulders, and tapering backwards. That form is connected with the development of large muscles for giving powerful motion to the wings; but it requires that the muscles of the legs should be correspondingly small, and hence birds which have it most, use the wing chiefly in their motions, and do not walk or swim much, which requires the moving apparatus of the legs and feet to be more powerful.

Though the generic characters of the terns are too obvious and well-defined for occasioning the least danger of their being confounded with birds of any other genus, yet the specific difference in appearance, and also in haunt, habit, and geographical distribution, are considerable.

Though we are too little acquainted with the straggling ones for knowing much of their habits, and the nesting-places of some of them are unknown altogether—at least to writers on Natural History—yet it is tolerably apparent that the terns may be divided into a sort of three groups, or perhaps even four, the first finding their food chiefly by fishing on the inland fresh waters, more especially during the breeding season, like the marsh gulls; the second discursive over the larger inland waters; the third breeding amidst the marshes, but catching insects and spiders as well as fish; and the fourth more of sea or shore birds, and, like the generality of these, laying their eggs upon the beaches and flats near the sea, and especially on the smaller islets. The last are by far the most numerous, and are those which belong more particularly to the ornithology of the British islands, though one of the native birds, at least, is a marsh-breeder, and two or three of those which are discursive over the inland waters, occasionally make their appearance in the country. These are all, or nearly all, birds of the east of Europe and west of Asia; for, although they have sometimes been confounded together, it is not clearly ascertained that any of the marsh species of America make their appearance in this country. The localities which they inhabit on that continent, and those in the east, are so different from each other, that one can hardly suppose them to be inhabited by birds of the same species, any more than covered by the same species of vegetation. These birds are, however, good indexes to many other circumstances in the natural history of the countries in which they breed, and over which they range; and, therefore, they deserve to be more intimately studied, and studied more in connexion with the rest of nature, than they have hitherto been. Even the bird which comes only accidentally has a story to tell, if we

could find it out, as they all come in consequence of natural causes,—causes which are always intimately connected with the state of the weather.*

Terns are abundant upon the shores of most countries, and the species also are numerous. There are about eight which appear regularly or occasionally upon the British shores.

THE GULL-BILLED, OR MARSH TERN (*Sterna anglica*).

This species has, rather inappropriately, got the name of *anglica*, or English, because it has been met with as a very rare straggler in that part of Britain. It is a bird both of the continent of Europe and of Asia, though in the former, from which the stragglers that have been seen in this country have in all probability come, its native localities lie much out of the direction of England. It inhabits the marshes in Hungary and along the valley of the Danube towards the Black Sea, nearly the same localities as those of the little gull. Length about fourteen inches, breadth thirty-four; bill strong and black, with a projecting angle at the middle of the lower mandible like the gulls; head and nape black; upper part greyish white, with white shafts to the quills and tail feathers; line from the gape to the eye, and all the under part, white; tail forked, wings extending more than two inches beyond the tail, feet black; young with the head white, more and more dusky as they approach to maturity; nest in the dry grass, eggs three or four, greenish olive with brown spots. In winter, the colour of the head fades nearly to white. It is but justice to add, that though this is both a continental and an Asiatic species, Colonel Montagu was the first to make it known to naturalists from a straggler

* The following species of tern are common to America and the Old World: *Sterna hirundo*, *S. arctica*, *S. Dougalii*, *S. stolidus*, *S. Boysii* (which is the *S. cantiaca* of Gmelin), and *S. nigra*.—M.

found in England, and it should retain the name which he gave it.

This species has sometimes been confounded with a marsh tern of America, which has much more the habit of a swallow than this one, and was observed by Wilson in that continent feeding upon spiders. The present one appears to be altogether an eastern bird, and to find its food chiefly by fishing. It is a heavy bird and a dull flyer, as compared with the rest of the terns ; and its bill is formed so like that of the gulls, and is so strong and firm, that it must live upon prey which can be captured in larger masses than that of the terns usually is.

That it should range as far as the south-east of England, is no argument against its being a duller flyer than most of the genus. It will be borne in mind that the stragglers, which come to our shores from that eastern and somewhat peculiar locality of migrant birds, of which the Black Sea or the Caspian may be considered as the centre, and which extends northward into European Russia and Siberia, south-eastward to the Himalaya mountains, southward by the Mediterranean to the valley of the Nile, and westward along the shores of the Mediterranean, along the great valley of the Danube, and also through Poland to the Baltic, have nowhere to travel for a great extent in longitude out of haunts congenial to them, and supplying them with abundance of food. A journey of two or three hundred miles, more or less, over places where the bird can rest and feed whenever it is necessary, is very different from a voyage of even one thousand miles across the ocean, without a single point of rock on which a bird can rest ; and in the whole extent from the shores of Britain to the mouth of the Ganges, or to those of the Siberian rivers, there is not, perhaps, at any one point, a space equal to half a day's flight of even a moderately-winged bird, in which an aquatic bird cannot find food.

When we consider the descent of so many great rivers, in so many directions, into that great basin, and that the upper streams of all rivers which are in mountain ridges, overlap each other in the flexures of these, we can see easily why birds of an Indian character may be found in that part of the world, or may even reach the shores of England from thence. The pratincole is one instance, the bird under notice is another, and the one next to be mentioned is a third. We have no perfect natural history of that very singular portion of the earth's surface; and some parts of it are vague and unsatisfactory, even in respect of that very slender information which is afforded by the common topographical map. The snows of the Alps, of the Ural, and the Hindû Coosh, if not of the Himalaya, are melted, roll down their several rivers, and again raised by evaporation, frozen, and cast anew in snow upon Caucasus; and where there is this singular meeting of distant waters, we may naturally enough look for some community among the creatures which these waters support, especially those families of them which are so discursive as the terns.

THE CASPIAN TERN (*Sterna caspia*).

This species also belongs to the eastern migration, as indeed its name imports; for it is abundant on the great salt or inland sea, after which it is called. The probability is, that the centre of its range in longitude lies more to the eastward than that of the former species, and it extends very near at least to the Indian mountains. It is a large species, measuring nearly two feet in length, with the wings long in proportion; so that while it has all the characters of a true tern in much greater perfection than the gull-billed tern, its size is nearly the medium of that of the gulls. It does not appear to be so discursive a bird as several of the smaller terns; but

a specimen sometimes straggles into the east of England, near Yarmouth, opposite to which the sea is narrow, and birds' food plentiful over the fishing banks, which the water both forms and disturbs by its currents.

In the summer plumage, the head and feathers on the upper part of the neck, which are produced, and long and silky, are deep black ; the upper part is ash colour, and the under part white. But neither its breeding place nor its breeding plumage is very well understood, nor strictly falls within the scope of a popular account of British birds. With us, birds from that quarter of the world in which the Caspian tern is at home, may be looked for principally in the winter, even though their situation on the continent should at that season happen to be several degrees to the southward of ours. The cold not only sets in earlier in these longitudes, but it sets in much more severely ; and as it is towards the heat that most birds migrate in autumn, and not upon the direction of the equator, which of course influences them only in so far as it heats them, we may reasonably conclude that there is a tendency in those eastern birds towards the Atlantic and its unfrozen divisions during the winter months ; and when the birds come as far westward as the sources of the Danube, it is fully more natural that they should descend the valley of the Rhine, than that they should pass the mountains and forests of the north-east of France, in order to reach the western plains and valleys of that country, which, from their characters, are not the best adapted for birds of this genus. In its winter plumage, in which we know it a little better, the forehead and part of the head are white, the rest of the head, the neck, and upper part, bluish ash ; the coverts brownish ash, barred with black and white ; and the tail pale ash. The quills, and all the under parts pure white. The bill is bright vermilion red ; the feet black. The male and female birds do not differ in their plumage,

but the young birds are mottled with black on those parts which are ash colour in the mature birds.

THE SANDWICH TERN (*Sterna Boysii*).

This species was first discovered in Kent; but it is probable that it breeds at different points along the south-east of England. It is smaller than the former, but not so well winged in proportion, and apparently not so discursive. It is said to be more a sea bird. Length eighteen inches, breadth thirty-three; bill two inches long, black with a yellow tip (the tips of terns' bills are subject to variations in colour); feet black, irides dusky, head from the bill over the eyes to the nape black, back and wing coverts grey, shafts and inner webs of the primary quills white, part of the outer webs powdered with black; all the under part white, the neck and breast with a faint rosy tinge. In winter, the rosy tinge vanishes, and the black upon the head becomes mottled with white.

The young have the head beautifully mottled with black, and the back, partially the coverts of the wings, and the produced feathers of the tail, marked with the same colours; and nearly in a similar manner. In that plumage they are, contrary to the habit of most birds, more handsome than when mature.

THE LESSER TERN (*Sterna minuta*).

The lesser tern is also in some respects an eastern bird, at least it is found in the east of Europe, and also in Siberia. It is likewise found in America. Indeed it is pretty generally distributed over the temperate and colder latitudes; and, although not a very common bird upon all parts of the British shores, it is far from rare upon some, especially on those of the fenny districts, or in the marshes, or even in the ooze, but rather on the beaches of sand and shingle, where it

breeds on the bare sand, depositing its eggs, which are two in number, of a pale brownish colour, with dusky and ash-coloured spots, just above the line of the highest floods. The long dull stretches of sand and shingle which it frequents, the hissing sound of the surge upon them, (for there often rolls a surf upon those sandy flats when all is quiet on the cliffy shores,) and the piercing wail of the bird itself, have not much of the elements of satisfaction in them; and yet the minute tern is a very beautiful bird, and light, lively, and graceful, in all its motions. It is about twice the weight of the swift, half an inch longer, and nearly two inches wider in the stretch of the wings. The bill and feet are orange, the former with the tip black or dusky. The forehead and a streak under the eye are white, the crown and nape, and cheek from the gape to the eye, black; the upper part and wings very soft grey, with the shafts of the quills brown; the whole of the under part white, equally remarkable for the purity of the colour, and the delicate texture of the plumage. They assemble in little parties in the breeding time, skim over the sands, and appear to catch the sand-flies as they rise, and also to twitch out the small water-beetles when they come to the surface. The hatch takes place about Midsummer, and the young are able to fly about the middle of July. They are at first brown on the upper part, with a yellowish tinge on the back and wings, and the white on the head and throat is not so pure as on the mature birds.

THE BLACK TERN (*Sterna nigra*).

This species also breeds in the marshes, and the seasonal changes of its plumage are greater than those of any of the others. It differs from the rest too in the structure of its feet, the webs of which are deeply notched or partially divided between the toes. It is a little longer than the

lesser tern, considerably larger in proportion in the wings, but has the tarsi shorter. The bill is black, the irides brown, and the feet blackish red. In the summer plumage, the head, nape, chin, throat, and all the under part, is greyish black, and the upper part deep ash colour, with the external margins of the tail, but not the webs of any of the other tail feathers, white. That is the breeding plumage, in which the only distinction between the sexes is a white spot under the chin in the male, which is wanting in the female. In summer, the forehead, throat, and all the under part, fade to white, and the ash colour on the back becomes pale. The young are brown above, with pale margins to the feathers.

The places of England where these birds chiefly nestle are the rushy pools in the salt marshes. The nests are placed in the reeds, or other tall herbage, close by the margin of the water. The nest is formed of coarse withered leaves, and the eggs are three or four in number, olive brown, spotted with black. During the breeding time, the birds keep chiefly to the marsh, beating over the pools and rivers of water; and, though they seldom retire far inland, they do not resort to the sea till their broods can accompany them; after which, they are seldom seen till April or May, when they are again in the marshes.

THE ROSEATE TERN (*Sterna Dougallii*).

The roseate tern belongs to a different character of locality than most of those that have been noticed. With the exception of the lesser tern, they are all, to a considerable extent, marsh birds, and even that resorts to shores not far from the marshes. The marsh ones can be traced into the eastern marshes by the lines of the rivers of Central Europe; and they do not spread themselves round the shores, or seem peculiarly attached to the sea.

The species under consideration appears to depend more

on the sea, tidal, or river waters, to nestle upon places that are drier, and to find its food more in the broad waters. It was first noticed on the islands in the estuary of the Clyde, which are near a long extent of sandy shores, and where the number of small animals moved about by the tide, as well as of the fry of different sorts of fishes, is known to be great. On the continent, the same species is said to range on the sandy shores of Norway, and along the southern shores of the Baltic, and to breed upon the *haafs*, or long banks of sand and shingle, which are found near the mouths of all the larger rivers that discharge their waters into that sea. These are the situations to which the common tern is most partial; and as, when the late Dr. Macdougall found this species, he found it living in peace among vast numbers of the common tern, there seems every reason to conclude that the two may be found pretty generally together, though, as has been often the case with similarly mannered birds, and one species more numerous than the other, the rarer one has been overlooked.

Length about fifteen inches, wings short, reaching to only within two inches of the end of the tail; feet orange; bill yellow at the base, black at the tip; cap on the head and nape black, upper part grey; the under part white, and a roseate tint on the neck, breast, and belly; some of the quills with the webs black or hoary, but all with the shafts white.

THE COMMON TERN (*Sterna hirundo*).

A figure of this species, one-sixth of the lineal dimensions, is given on the plate at page 392. The young birds have the bill and feet whitish, with merely a slight blush of red; the chin dusky where it is pure white in the old ones, and the plumage mottled with brown and ash. The birds generally do not breed at lofty elevations, but select in preference

dry places, frequently upon uninhabited islands, or remote parts of such as are inhabited. They make no formal nest, but merely level the sand a little, or simply deposit their eggs on the bare rock. These are usually two in number, pale olive brown, with dusky patches.

The numbers of these birds that are scattered over the northern parts of the Atlantic are very great; and those dry and comparatively low islands and holms, as they are styled in the north, that are suitable for their breeding, are in the season so thickly covered with their eggs, that it is difficult to walk without breaking them; and the wheeling in the air, tumbling along the ground, and wailing and screaming, which they make when one meets them in breeding time, are very remarkable. The eggs, placed on the sand or shingle, are, when the weather is dry and warm, left in part to be hatched by the action of the sun; at least, in such weather, the birds do not sit during the day. They are then abroad feeding; and it is not easy to imagine how so many as are huddled together upon the same spot, can find food within the range even of a tern's flight. But they do find it, and that too at no great distance; for the instant that one lands, though the eggs are all warmed, the cloud of birds are instantly wailing in the air. Before the dew begins to fall, they return and sit, and if it rains, they sit during the day. It is a great advantage to these birds that they hatch on the bare earth—that their food comes out much more abundantly on those days when one of the pair must keep the nest. How each knows her own eggs, and her young after they are hatched, in such a multitude, and all so much alike, is a matter that human speculation cannot fathom: but they do know; for after the young have grown a few days, the parents do not alight and feed them with the bill, but fly over them with a twitch, and drop the food into the bills, with the most unerring certainty,

and yet without ever appearing to pause on their rapid and circular flight.

Two other species of tern have been observed as occasional stragglers on the coast of Ireland :—

THE NODDY (*Sterna stolidus*),

Which is blackish brown, with the upper part of the head white, and the tail not forked, and of the same length as the closed wings. It is naturally a very seaward bird, and often alights upon ships in so exhausted a state as to be easily captured.

THE ARCTIC TERN (*Sterna arctica*),

Which has the upper part of the body bluish grey ; the forehead, crown, and long feathers on the nape, black ; the neck, the belly, and the under tail-coverts pure white, and the feet and bill (which is very slender) red. The tail is very much forked, and the entire length about thirteen inches. This species, as the name implies, inhabits the Northern Polar Seas, and it is found in every longitude where those seas are accessible.

PETRELS.

There are three modern genera of birds, which may be included under the common English name of Petrels,—*procellaria*, *puffinus*, and *thalassidroma*. They are all birds of the high seas, ranging far both in latitude and in longitude ; and the numbers of some of the species, particularly in the southern hemisphere, are beyond all counting. They are also birds of powerful flight, and have the feet equally well adapted for swimming or for bearing them up on the surface of the water. The toes are very long and the webs extended, so that the birds move along the surface as if they were

literally walking on the water. It is on this account that they have been called petrels, or little Peters. They lay only egg, of a large size.

The petrels are sea birds in the most literal sense of the word ; they live in the sea for the greater part of the year, and only resort to the shores in summer for the purpose of breeding. They may, therefore, be considered as summer vistants in all countries ; and not to claim more from the land than merely a place on which to deposit their eggs. The same species, and possibly the same individual birds, range along the whole latitudinal stretch of the sea, probably from the arctic circle to the antarctic, although in the extreme north and also in the extreme south, they trench upon the domains of birds of more polar character.

Of the genus *procellaria*, as limited by modern ornithologists, there is only one British species.

THE FULMAR PETREL (*Procellaria glacialis*).

The Fulmar Petrel appears in the north, but only in the remote islands, and in greater numbers than perhaps any other species of bird. The fulmar petrels are the grand scavengers of the sea ; they consume all the multifarious remains of animals and animal garbage, generally of a rank and oily character, which casualties are constantly committing to the water. They attend the fishing stations and fishing vessels, and fight for their share of the garbage of the fish and that of whales, being most daring thieves of the latter. They resort to the lofty cliffs of the remote islands, St. Kilda in particular, to breed ; but they also find their way to Shetland and Orkney in the winter, when the progress of the ice circumscribes their territorial range towards the north. There is hardly a place or a season, indeed, within the expanse of the North Seas, in which, if there be any thing animal, especially if oily or fat, to be eaten, but a cloud of fulmars will come to

it, sufficient to consume double—nay, a hundred times—the quantity.

Baron Cuvier is not quite correct in saying that the fulmar petrel is "*de la taille d'un gros canard*," for it is little more than half the weight of the common wild-duck; and the labours which the birds perform are done by numbers more than by the single effort of individuals. The nasal tube has but one opening; the bill is a formidable instrument, straight for part of its length, and brownish; but with a strong produced and hooked nail at the point of the upper mandible, against which a strong truncated yellow knob on the under one. The hooked nail is toothed, so that the hold which it can take in tearing is, perhaps, firmer than that of any other bill, the beaks of the falcons not excepted. The legs are dusky, the irides yellow. The upper part from the setting of the neck to the lower part of the back is grey, with a dusky tinge upon the wings, and all the rest is white. There is no difference in the plumage of the sexes; but the young are mottled with grey and brown, and have a dark spot before the eye. They are at all times so full of oil, that the people endeavour to catch them by a noose which draws tight round the neck to prevent that which is in the stomach from being lost. In some places, the produce of the fulmar rocks is pressed for oil in the same way as that of the olive yards in the south—and the oil is used for similar purposes.

The genus *puffinus* contains very discursive birds, one of which only has been ascertained to breed in the British islands; and of the other two that have been found alive on the shores, one is exceedingly rare, and the other by no means common.

The characters which distinguish them from the other genus, *procellaria*, to which they are nearly allied, are, the

bill rather produced and slender, both mandibles of equal length, and both hooked downward at the tip; the nostrils in a double tube advanced upon the ridge of the upper mandible. Their chief difference of habit when on land is, that they build near the level of the water, and not in the upper fissures of the very lofty rocks. Their corresponding habit at sea is, that they skim more along the surface of the water, and do not rise to lofty flights; and it is on that account that the name of shearwater has been given to the best known species. Their bodies are compactly formed and very close in the plumage; their wings very long, strong, and pointed; their tails rather short and conical; their feet rather slender, the tarsi compressed laterally, the three front toes very long and elastic, and completely webbed, and only a short spur on the tarsus in place of a hind toe. Egg single and large.

THE SOOTY PETREL (*Puffinus obscurus*).

Only a single individual of this species has been seen on the British shores, or indeed on those of any part of Europe. It is very similar to some of the species which have been observed in such numbers by navigators in the southern seas; but whether the individual in question came from those distant parts of the world, we have no means of ascertaining. Indeed, there is some confusion about the species of the birds of the wide and distant seas, the name of sooty having been applied to all those of which it expresses the colour, whether of the same species, or even genus, or not.

It was found, at the close of a severe gale, in the middle of August, 1828, reposing on the water like a duck, at the mouth of the Tees; so that, wherever it came from, it was evidently a storm-driven bird, and it does not belong to any species at present known in the northern hemisphere. Its length is eighteen inches; the length of each wing twelve;

the tarsi two and a quarter ; the middle toe two and a half ; the bill two and a half in the gape, and one and seven-eighths from the tip to the front. The bill is rather slender, and the nasal tube very little produced. The bill is horn-colour. The tarsi are compressed, dull yellow on the fronts and the webs, and brown on the other parts. A strong claw supplies the place of the hind toe. The colour on the upper part is dusky, or sooty brown, darkest on the middle of the head, neck, and back, and the quills ; a slight tinge of lead colour on the scapulars ; the under part paler brown, with a greyish tinge on the throat.

Nothing is of course known of the habits of so great a stranger, farther than may be inferred from the general habits of the genus to which it belongs ; but as they nestle and breed lower down than the other two genera of petrels, it may be concluded that this one does the same. In the antarctic seas they take up their habitations on the low and sandy islands where they can excavate holes, rather than on the bold shores.

THE MANKS PETREL, OR SHEARWATER (*Puffinus
anglorum*).

This species occurs rather plentifully on many of the islands on the western and northern shores ; and though few or none breed on the eastern coast of Britain, and none certainly on the opposite side of the North Sea, or on the Baltic ; stragglers are found on the southern coast occasionally during the winter, though, at that season, the greater number appear to have a motion southward.

The length of the manks shearwater is about fifteen inches ; the extent of the wings about thirty-three, extending when closed beyond the point of the tail. The colours of the plumage are calm ; black on the upper part, and white on the under ; the two colours broken into each other on the sides

of the neck, and the margins of some of the upper feathers with a greyish tinge, which is rather more conspicuous in winter than in summer. The bill is dark-brown, the nasal tube on the column about three quarters of an inch in length, the bill in point extending an inch more, rather slender, a little compressed towards the tip; the mandibles both bend downwards at the extremities, and their tips meeting so as to be able to seize a very small object.

In what manner their very singularly construed bill is used upon all occasions, is not very well known, because their motion along the water is so quick and peculiar, that it is difficult to observe what they are after. It is *said*, however, that at certain seasons they feed during the night upon the small phosphorescent animals with which the sea so much abounds.

Their motion along the water is not swimming, or walking, or flying, but a sort of union of all the three. It is swifter than any bird could swim, and only the feet touch the water, at least the under part of the body does not, and the wings have always as much air under them as enables the bird to use them both for buoyancy and for progress. But the points of the wings *tip* the water, and the feet and them appear to keep stroke in a way which can be understood when seen, but not very clearly explained, because there is nothing analogous with which to compare it. They have none of the splash and splutter which ducks and other birds of that character produce when they rise or take the water obliquely. They seem to make the same use of the water that a horse does of a good and firm highway—a fulcrum to spring from and nothing more—no lagging or labouring as if it were miry, or even spongy and elastic. At times, they appear to have the power of so “taking the wind” with their wings, that it gets between their oblique position and

the water, and keeps them up like a wedge without any perceptible stroke. When they have once acquired a considerable degree of velocity, one can easily understand how their own motion may, while they hold the wings oblique to the wind, buoy them up as a paper kite is buoyed, their own weight serving as the string, and their feet acting upon the water and continuing the rate which produces the wind; and as their flights or floatings are taken against the wind, one can guess at, though not explain, their most singular progress.

They resort to the breeding grounds about March, and though the brood is but a single bird, they take plenty of time in the rearing of it, as they do not depart till about August. The egg is white, and the young one, when it does make its appearance, differs not much from the parent birds. Upon what they feed themselves and it, is not very well known; but they do feed plentifully, for they are all very fat, and the young in particular (the old ones are rather oily and rancid) are sought after with considerable assiduity; and, after being cured with salt, the islesmen reckon them no bad food.

THE CINEREOUS PETREL (*Puffinus cinereus*).

This species, which is about one-third larger than the former, appears upon the British shores only as an occasional straggler. It is met with in the warmer seas,—in the Mediterranean, and the Atlantic, on the shores of tropical Africa, and as far as the Cape of Good Hope. Its bill is depressed towards the base, but compressed and margined at the tip, and channelled on the upper surface. The general colour of the upper part is blackish brown; that of the under part ash grey, but with a tinge of purplish brown on

the breast. The toes are of the same length as in the sooty petrel, and the tarsi also nearly the same; but the bill is rather shorter and stouter, approaching more to the character of that of the fulmar, only without the elevated and distinct nasal tube.

STORM PETRELS (*Thalassidroma*).

The name *thalassidroma*, "coursers over the sea," imitators, as it were, of the far journeys and fleet motion of the camel over the desert, is very expressive of the habits of these singular birds, birds which, unless during the breeding time, appear to make the sea more exclusively their dwelling-place, than perhaps any other of the feathered tribes. They skim the surface, and while the wings are expanded and acting in the air, the feet, which are then bent like little scoops, "tip" the water like paddles, and add the motion of walking to that of flying. The feathers of the breast generally also brush the surface during those excursions, which are skimming ones in more senses than one, as the birds not only skim along the surface, but skim the floating oil which that surface bears in very copious quantity, but on the wide sea and away from the remains of those oily animals from which it in great part proceeds, so thin and filmy that no bird could feed upon it by means of the bill. The feathers on the breast of the storm-petrel are, like those of all swimming birds, waterproof; but substances not susceptible of being wetted with water, are, for that very reason, the best fitted for collecting oil from its surface. That function is performed by the feathers on the breasts of the storm petrels, as they brush over the surface; and though that may not be the only way in which they procure their food, it is certainly that in which they obtain great part of it. They dash along till they have

loaded their feathers, and then they pause upon the wave and remove the oil with their bills.

The oil which they thus collect, is not, however, to be considered as a burden which either impedes their progress, or makes them sink deeper in the water. The effects of it are exactly the reverse: it is less specifically heavy than water, and thus it renders the bird more buoyant; and it also greatly diminishes the friction, and thereby renders the motion of the bird more free than it would be if performed with the naked feathers. The repulsion which there is between oil and water also increases the buoyancy of the birds. It acts as a power lifting them up, so that the immersed portion descends very little below the film of oil; and the water glides under them, so they do not produce any ripple or splash in the water, except when they occasionally "tip" the surface with their wings. The effect of oil in diminishing the friction of the air against the surface of the water is well known; and so is the great extent to which a very small quantity of oil will soon extend, and consequently the very thin pellicle of it which can calm the turbulence of the waves.

Whether these birds can discharge the oil from their stomach on the sea, and thereby procure a calm for themselves, in order that they may repose, has not been ascertained; and very little, indeed, is known of their position in repose, although there is no doubt that they and also the other petrels at some seasons, and during some states of the weather, repose upon the high seas. But there is, at least, some probability that all the different species do sometimes discharge oil in this manner, though not, of course, for this purpose. The least alarm when the birds are off the water, causes those of all the genera to disgorge from their stomachs a considerable quantity of oil, and they do so indiscrimi-

minately, whether they are disturbed in their nesting-places, in the air, or on board ship, where they often take shelter, both from apparent fatigue and from storms. If this is the case, they very ill deserve the character given to them by sailors, of being not merely the harbingers, but actually the bringers, of foul weather, under the stigma of which they have long lain as "Mother Carey's chickens;" though, if they discharge the contents of their stomach as readily when annoyed by the wind, as when annoyed by other means, they merit the name of quieters of the ocean rather than that of disturbers.

That they follow ships is true, because there is generally a quantity of oily matter left in the wake of a ship. They also come to ships in greater numbers, and rest on them more readily in stormy weather, or even before the storm actually sets in, than they do when the air is still and the sea smooth. But, in these cases, it is the storm that brings the birds, and not the birds that bring the storm; and, therefore, the birds are valuable for the warning that they give, rather than, in any way, objects of dislike or persecution.

One can easily see, from the habit of these birds in feeding, that they require smoother water, and are therefore less able to keep the sea when violently agitated, than birds which skim the surface for the purpose of fishing—than the terns, for instance.* Their superior buoyancy, and their form, both tend to give the wind more hold upon them; and the troubled water which brings the food of the others more

* The petrels make their way easily, even in the storm, and amidst the rolling billows. Strong as the wind may be, the trough of the waves, like a deep valley, is comparatively calm; here they find shelter, and while yet on wing, they trip with their feet on the slanting surface of the long wave, over which they dash as it sinks, and gain another trough. Small marine insects and molluscs constitute their food, together with the oil which, disengaged from dead animal matter, floats on the sea, and smears the feathers of the breast, which they draw through the bill.—M.

abundantly to the surface, disperses that of the storm petrels. Hence, they are rare upon the narrow seas, and do not come much within the breakers. When the sea is in a state of agitation, its surface is proportionally increased ; so that, if all the ridges, and hollows, and flexures, and dimples, are taken into account, it is no exaggeration to say that, even in a moderately severe gale, it is more than doubled. That farther increases the friction of the air, so that the trouble of the sea, like most other troubles, contains in itself some of the elements of its own increase, and the waves rise more rapidly in proportion than the wind freshens. The oil is thus dispersed over a large surface, and as, different from those small substances which are *in* the water, it is thrown to the ridge and the hollow, and away from the line on which the wave turns in its vibrations, it is rendered much less acquirable by the birds.

We can thus readily see that they must flit before the gale which agitates the water sooner than other surface birds ; and as they fly considerably faster than the wind does in ordinary storms, they keep before it, and court both the shelter of the ship, and the greater abundance of food which is to be found in its wake.

Storm petrels are very abundant birds : but though in the breeding season they throng in vast multitudes to their favourite nesting places, they inhabit the sea rather dispersedly during that larger portion of the year when they are Pelagic. In consequence of that, and also of the very few points of the sea which are seen at once, even by all the vessels which are afloat, they not only appear much less numerous than they are in reality, but much less so than many of the shore birds which they thousands of times outnumber

Looking at the petrels as a group, (and the species differ from each other little in habit, and not much in appear-

ance,) they inhabit the whole range of the ocean ; different latitudes having their respective tenants, whether on the north or south side of the line ; but, though they breed in various latitudes, they may all be said to have a tendency to move polarly as the season of incubation approaches. At this point there is a motion of the water, especially of the surface water, towards the equatorial regions, as is proved by the drifting of icebergs, and may be reasonably explained by the melting of the snow and ice, which, during the winter, are piled high, both on the surface of the land and on that of the frozen sea. On the latter, the hummocks are indeed much more elevated than those who have not considered the subject would be apt to suppose ; for when the ice has acquired considerable thickness, in the early part of the season, and before the tranquillity of the polar winter sets in, it is often shattered by the roll of the waters, and the boards, turned on edge, are driven against each other, where they not only stand high, but retain the snow which drives over the more level parts. The casualties which happen to life at that season are considerable, and many of the remains are preserved in the snow and ice, both at sea and on the land. These are loosened by the heat in spring ; and the land portion is, in a great measure, brought down by the "freshes," so that the sea becomes the common receptacle of the whole. The fatty part of these remains, especially, floats southward with the surface water, and meets the Pelagic birds as they collect northward to their breeding places. Nor is the fatty or oily matter the only food for birds which then floats with the motion of the sea ; for the fulmars, the gulls, and a variety of other birds—all the scavengers of the sea, indeed—then find an abundance ; and as the supply continues all the time : that the ice and snow are melting, which is nearly till they again begin to freeze, the birds find a continued supply for

themselves and their young during the whole of the breeding season. The spring thaw is, in fact, the surface harvest of the Polar Sea, just as the rains of autumn and early winter are the harvest of our estuaries, to which the birds resort, while the frost is sealing up and preserving a store for them against the breeding time.

The general current produced in the Atlantic by the tides, has, no doubt, some effect upon the distribution of the surface water, and consequently upon that of the skimming birds; but it will generally be found that they nestle where the land stands out to meet the current;—where the cliffs are bold and high, and the water deep, circumstances which usually accompany each other, and which thus have some relation to each other; but whether that be a relation of co-existence or of cause and effect, there are no complete data for determining, though probability is in favour of that of cause and effect, inasmuch as the sea assails the bold shores, and casts the debris upon the low and flat ones, where the water, from the shelve, has little force, and the sea wind sweeps inland without opposition.

The natural history of even the surface of the sea is, however, but imperfectly understood. The effect of seasons and tides, that of the variations of atmospheric pressure, of heat and light, and of countless other causes, in themselves little known, are whether in their single results or in the modification which they produce upon each other, so vaguely comprehended, that any conclusion drawn from them would be more bold than wise. If, however, human observation should ever be able to bring the subject within the scope of science, the Pelagic birds will form an important point of study, and none of them more so than the storm petrels.

Of the genus, there are two British species, not found upon the shores, even the rocky shores generally, but rather in those northerly and westerly places, which are more within

the range of that southward floatage in the early part of the summer, to which allusion has been made. The shallows, the contrary currents, and all the characters of the seas on the south-eastern parts of the island, where so much food is stranded for the shore birds, do not afford support or even scope for the storm petrels.

These two species are the fork-tailed and the common storm petrel, the former rather a recent addition to our Fauna, probably, indeed certainly, not a rare bird, though it has, no doubt, been often confounded with the other, from which, to common observation, it is not very different, whether seen on the wave or the wing, only the fork-tail is altogether longer than the common, the tail is much longer in proportion, and forked, and the bird appears to keep farther to seaward.

The chief distinctions between these birds and the other petrels, besides those of size and colour, are—the bill more slender, the nail of it less produced, the head rounder, the neck shorter, thicker, more abundantly feathered, and the expression of the whole body more that of an air bird than a sea bird, which in any way finds its food by using the head and neck under water. They have only one opening to the nasal tube.

THE FORK-TAILED STORM PETREL (*Thalassidroma
Bullockii*).

This species was first found by Mr. Bullock in St. Kilda, in the summer of 1818, and specimens have since been found in other parts of the coast, but chiefly in the autumn or winter, so that its breeding as a British bird is probably confined to the more remote western isles; but birds of this genus are seldom seen at the places where they breed, as they nestle in holes of the rocks; and, though they make a sort of

croaking noise there, it is made only during the night, as the birds are absent nearly the whole day in quest of their food when the weather is warm, unless till towards the close of the incubation, at which time the female sits closely.

This species is between seven and eight inches long, and nearly nineteen in the extent of the wings. The tail is forked, but not very deeply, and the tail-feathers are stiff, expansile, and oblique at the tips, so that the fork forms an obtuse re-entering angle. The tarsi are moderately long; and the toes, which are three, turned to the front and webbed, are so freely articulated to the tarsi, that the whole foot can turn backwards, almost till its position is reversed. The bill is longer, stouter, and more bent in the nail of the upper mandible than that of the common storm petrel. The cloud wings reach to the point of the tail, but not beyond it. The bill is black, and the general tint of the plumage black, with a brownish or sooty tinge. The scapular feathers are rather produced, and have white tips. The upper tail-coverts, the bases of the under ones, and some of the rump feathers, are also white. The tail feathers and primary quills quite black, but some of the wing-coverts brownish, and sometimes, as well as a few of the secondary quills, inclining to dull white at the tips. It is probable that the light parts incline to brown in summer, and to dull white in winter; but the fact is not fully established. The habits of the bird, either on the water or in its breeding-places, have not been much observed. The form, size, and termination of the tail, and the greater strength of the bill, would, however, lead to the conclusion, that the style of flight and habits in feeding are different from those of its congener. A figure, on a scale of one-third of the lineal dimensions, is given upon the plate at page 347.*

* This is the *Thalassidroma Leachii* of most authors. See Gould's "Birds of Europe."—M.

THE COMMON STORM PETREL (*Thalassidroma pelagica*).

This species is the true "Mother Carey's chicken" of the sailors, and also the "witch," the "spency," the "storm finch," and a variety of other names, the abundance of which shows, that it is at once a bird of common occurrence and of some interest.

During its pelagic period, it is seen on most part of the seas, especially those on the north, west, and south-west of Britain, where it is the last bird to leave the outward-bound ship, and the first to meet ships returning home. It plays about the vessels, and outstrips their swiftest course, skimming the surface of the water with equal ease and grace, and tipping so regularly both with wings and feet, that it appears as if running upon all fours. The wings do not, however, get wet or splash, and the bird can make wing in any direction of a moderate wind, apparently with very little fatigue. No part of the weight appears to be borne on the feet, while the bird is in progress forward. When the wings are raised, the weight is borne on the breast, supported by the repulsion of the water to the oily feathers; and the feet are drawn forward while the wings are descending, and give their impulsive stroke forward while the wings are rising, the two actions combining so well as to produce, not jerks, but a uniform skimming motion. They often alight on ships, and make them slippery with oil. Though it cannot, for the reasons that have been stated, feed so well in the troubled sea as when the water is smooth, it can keep its way, even though the waves run high, and it appears to skim along close on the surface, adapting its path to the flexures of the waves. In strong winds, however, both the speed and the undulations of the course, upward and downward, are in so far optical deceptions. In those cases, the motion of the bird is to

windward, and the waves have an apparent motion to leeward, in proportion to the rapidity with which they vibrate. In consequence of that apparent motion, the bird gets credit both for its own real velocity, and the apparent velocity of the waves; just as when two ships cross each other in different courses, upon a side wind, each appears to those on board the other to move at the joint rates of both.

The storm petrel is not very different from the common swallow, either in size or in appearance, only the bill and point of the tail are very different. The length is almost five inches and a half, and the stretch of the wings fully fifteen. The bill is about half an inch long, rather slender, and with the nasal tube short. The nail part at the tip is not so much bent as in the fork-tailed species. The bill and feet are black, the tarsi being shorter and more slender in proportion than those of the other species. The general tint of the upper plumage is black, very smooth and glossy, and with bluish reflections; the under part is deep blackish brown; the rump, some of the feathers at the base of the tail laterally, and the tips of the greater coverts, and some of the primary quills, are white. The young have the upper plumage with traces of brown. The nests are in holes of tall cliffs, the eggs two in number, and of a white colour.

Though generally at sea except in the breeding season, and very much during the day even then, these birds are sometimes driven inland in the winter months, though it does not appear that they ever find much food there.

They are bold and familiar birds, and may be tamed without much difficulty, their food being oil, in which they first bathe the feathers of the breast, and then take it off with the bill. They are exceedingly numerous in some of the northern islands; but their flesh is rank and unpalatable. They are, however, turned to some domestic uses by the islanders. In

taking them, the same precautions are used to prevent the discharge of the oil as in the fulmars ; and they are sometimes used as fuel. The Faroese convert them into lamps or candles, by drawing a wick through them, and setting fire to it, as in the following cut, in which a correct representation of the bird is given, dead, prepared, and lighted up, a winged flame.



Reverting to page 306, we may state that the connexion of the structural peculiarities of the trachea in so many of the natatorial birds, with the mode of feeding, is very problematical; inasmuch as in the males only, with certain exceptions, are these peculiarities displayed. Adverting to the ducks, we may observe, that in both sections the trachea presents in the male varied singularities. Many have the tube contracted, as the *Anas rufina*; in others it is more dilated in the centre than towards the beginning and termination. Nor is it to the ducks that these variable peculiarities are restricted, for they run more or less through the geese and the mergansers.

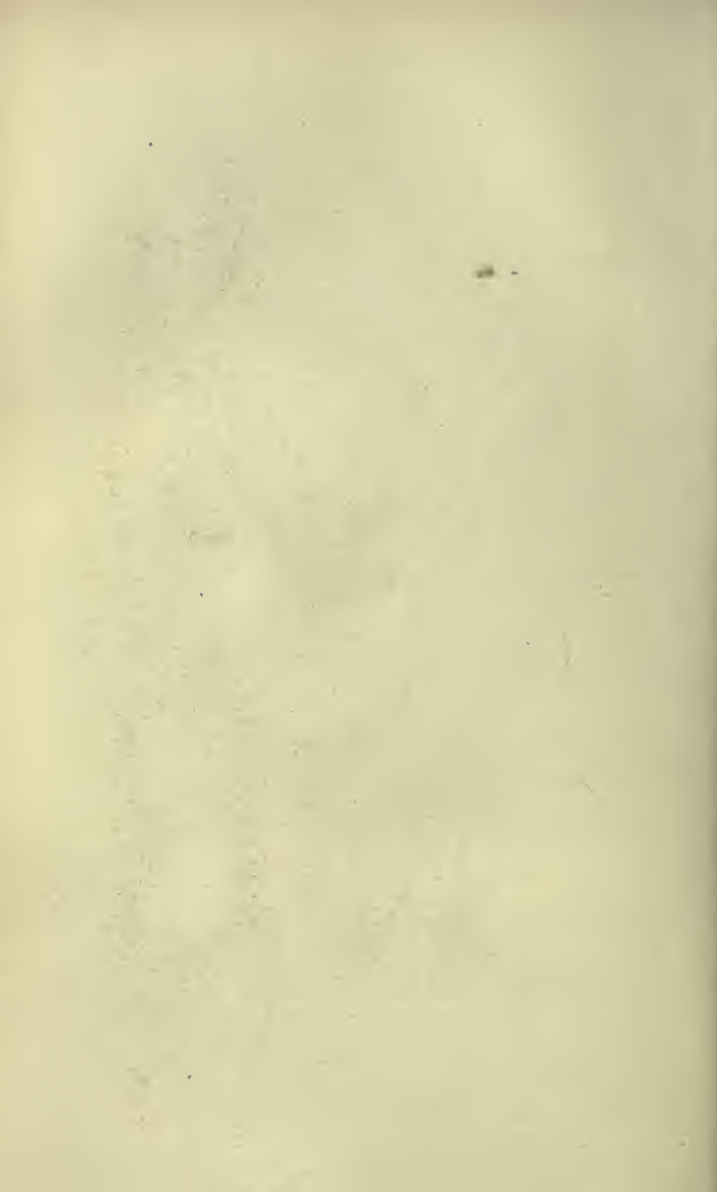
But the structural singularities (so far, at least, as the ducks are concerned) do not end here. In addition to the dilatations and contractions of the tube, it is divided, in the males of many species, at its bifurcation, into two bronchial tubes just within the chest, with a hollow drum, or *leulla*, varying in size and figure, generally composed of delicate bone, but sometimes of bone and membrane. We may refer to the male of the common duck, of the gadwall, of the king-duck, of the musk-duck, &c.

Passing to the swans, we find strange convolutions in the trachea, before it enters the chest. In the tame swan indeed, and in the Polish swan, the trachea is simple, and devoid of convolutions, as it is also in the black swan of Australia; but in Bewick's swan, and in the Hooper's, or whistling swans, the trachea forms a vast sigmoid flexure or loop, received into the keel of the breast-bone, which is hollowed for its reception: here the trachea extends backwards, between to the plates of the keel, nearly throughout its whole extent, then turning suddenly upon itself, it passes forwards, and emerging, sweeps round the apical portion of the merrythought, and so again turning back, enters the chest, and there gives off its long bronchial tubes, one to each lobe of the lungs. This peculiarity is not confined to the males of the swans in question, but the extent in the female (and young male) to which the trachea enters into the keel of the breast-bone is not so considerable as in the adult male.—M.



1 Song Thrush 2 Golden crested Wren 3 Chimney Swallow 4 Common Wren 5 Jay 6 King-fisher

1843





Linné del.

1. Water-Crow. 2. Raven. 3. Robin. 4. Wheatear. 5. Gold-Finch. 6. Nighthawk. 7. Magpie. 8. Snow Finch.



1. Mountain Finch, 2. Green Wood Pecker, 3. Grey Wagtail, 4. Common Nighthawk, 5. Hoopoe, 6. Common Bluebird, 7. Common Bee Eater & Cuckoo.

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