

THE BIRDS OF HELIGOLAND

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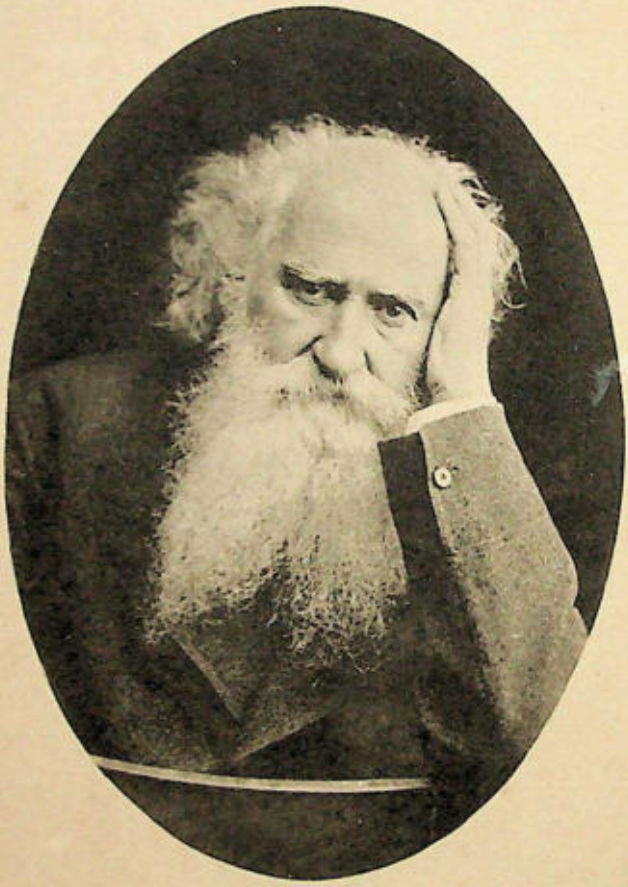
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HELIGOLAND

AS AN

ORNITHOLOGICAL OBSERVATORY

THE RESULT OF FIFTY YEARS' EXPERIENCE

BY

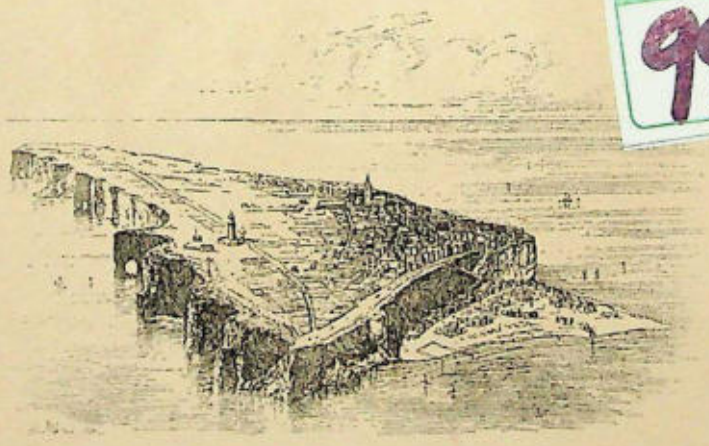
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TRANSLATED BY

RUDOLPH ROSENSTOCK, M.A. Oxon.

BOOK NO.
985



Rot iſt das Land, Grün iſt die Kant',
Weiß iſt der Sand, das ſind die Farben von Helgoland.

EDINBURGH: DAVID DOUGLAS, 10 CASTLE STREET

1895

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PREFACE TO ENGLISH EDITION

As I am, in a measure, godfather to this Edition of Mr. Gätke's Observations on the avifauna of Heligoland, it becomes a real pleasure to me to draw the attention of English-reading ornithologists to the true value and worth of the author's work. He has studied the subject of Migration of Birds and Bird-Life at all seasons at his great observatory, with little cessation or interruption, day after day, and night after night, for the last fifty years: and I consider that the unstinted gratitude of all fellow-workers in the same field is due to him for adding such a luminous and important contribution to our knowledge of the ways of Birds.

The plan of Mr. Gätke's work is excellent, and at once stamps it as representative of good work done both in the field and in the study. He tells us, and we can realise the fact, that Heligoland stands pre-eminent as an ornithological observatory in the west of Europe. It is the key, as it were, to the situation, so far as ascertained by these fifty years of observation and experience; and as such is expounded in the present volume. How different was the earlier age of superstition—not even yet entirely dispelled—followed by the age of theory which succeeded, and which latter still rears rather a hydra-head of trouble amongst the ever-improving means—'the growing Sciences

of Observation.' Let us follow the surer method, and, in the words of Lord Salisbury in his address to the British Association at Oxford, rather 'make a survey, not of our science, but of our ignorance.'

It is not my business to criticise—in this place—the deductions or arguments of our author, but only to point out very decidedly the important nature of a great and good piece of work, which cannot fail to take its stand as an invaluable guide-post to the better understanding, in many directions, of the great problems yet unsolved, connected with the Life-history of Birds; while amongst our wiser naturalists it is hoped it may also prove a warning Pharos against the sunken rocks and shoals of undigested theory and speculation.

It is with all the greater pleasure that I introduce this English translation to such of our British ornithologists as have been unable to master the German text, because, owing to a somewhat misleading article which appeared in the *Ibis*[1] after the publication of the original edition, I fear that the importance of Mr. Gätke's work has not been fully realised. The original list from which the said abstract was compiled is merely the sum of the materials upon which Mr. Gätke's facts were based; and the important earlier chapters of the book were ignored entirely by the compiler. These however possess far higher interest, and commend themselves to the appreciative study of ornithologists of every country to a much further extent than either the original list or its inefficient abstract.

Thus it has been that the subject, so ably illustrated by our author, has been practically a closed book to

[1] List of the Birds of Heligoland, as recorded by Herr Gätke (*Ibis*, 1892), p. 1.

by far the greater number of British ornithologists and English-speaking people; and one result has been a flood of theory, and incomplete and undigested material, instead of a practical accumulation of facts.

When the publisher wrote to Mr. Gätke in November 1893, not only was his hearty consent to the publication of this translation given, but he also courteously supplied whatever additions and corrections he deemed necessary to make the book complete at the time of going to press, and since that date he has revised the proof-sheets very thoroughly, though his state of health unfortunately prevented him from giving the first portion of the book the careful reading he was able to bestow upon the remainder of the volume. His additional corrections on these sheets, received too late for insertion at their proper places, will be found on page 589.

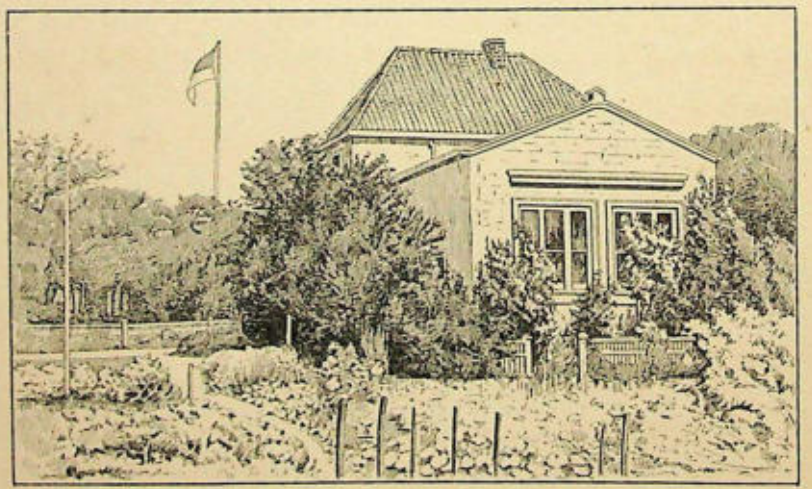
On the recommendation of Mr. W. Eagle Clarke, the services of Mr. Rudolph Rosenstock, M.A. Oxon., were secured, and he has carried out the literal translation in a very satisfactory manner.

The nomenclature in the List of Birds adopted by Mr. Gätke has been followed; but wherever it differs from the nomenclature recognised by British ornithologists, the scientific name by which the bird is known in this country has been added in a footnote. As in the introductory chapters Mr. Gätke has used indiscriminately both the popular and scientific names for many species, it has been thought desirable, for the sake of uniformity, to give the English names only for all the strictly British species; and both the English and the scientific names for all other British-Palearctic birds. In enabling the publisher to prepare the work for the printer, thanks in this respect are due to

Mr. W. Eagle Clarke for his kindness in revising the synonymy and reading over the proof-sheets, and also to Mr. John Cordeaux and Professor Newton for the use of Mr. Gätke's pen-and-ink sketches which have been introduced into the text. The other vignettes and portraits of the author at the beginning and end of the volume are taken from photographs sent from Heligoland.

JOHN A. HARVIE-BROWN.

DUNIPACE, LARBERT,
May 8, 1895.



AUTHOR'S HOUSE AND GARDEN

AUTHOR'S PREFACE TO GERMAN EDITION

Born in a small town of the Mark of Brandenburg, and enjoying only so much of school education as, more than sixty years ago, the choir-master, sub-rector, and rector of our native youth were able to instil into me, with the aid of a tough hazel rod, nothing in the world would have seemed farther removed than the thought of my ever 'writing a book,' had not Nature herself put the pen into my hand. My resolve to pass a number of years immediately by the sea, as a marine painter, led me to a spot which, from an ornithological point of view, is literally without a rival in the world.

Here my artist's attachment for open nature could not fail to bring me in contact with the wonderful variety of bird-life in which this island abounds; and my desire to possess some of these creatures, so charming in all their acts and movements, led to the formation of a small collection.

With the possession of these examples, however, there came a longing for a sound and fundamental knowledge of the material I had accumulated. Hence resulted many years of study of the bird-life of this island, and the comparison of its avifauna with that of other localities. From these studies and researches I was led to recognise that this little island presented an undreamt-of wealth of material valuable to Science, and indeed in this respect was superior to the proudest empire of the earth. At the same time, however, it became more and more plain to me that one to whom exceptional facilities had been granted for gaining a complete insight and knowledge in an important field of Natural History, ought not to let his experiences pass away

with himself, but was in duty bound to make them known to inquirers in the same domain of Science. It is the sense of this duty which alone has prompted me to publish these experiences.

In the following pages I shall endeavour, to the best of my ability, to discharge this duty. The manner in which I shall perform this task is of secondary importance, nor after what I have said at the outset of this preface am I likely to be subjected to a severe criticism in this respect. The facts alone are of importance, and these consist solely and exclusively of such material as it has been my good fortune to meet with here, without any kind of merit on my own part.

H. GÄTKE.

HELIGOLAND, *May* 1890.

Mr. Gätke writes on the 14th of May 1895:—'The number of the Heligoland birds has recently been increased by one, viz. the Great Bustard (*Otis tarda*), a female shot here April 18th, thus making the total number of birds observed in Heligoland stand at 398.'

[*This note was received too late for insertion at its proper place.*]

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I.

THE MIGRATION OF BIRDS



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I. COURSE OF MIGRATION GENERALLY IN HELIGOLAND

THAT strange and mysterious phenomenon in the life of birds, their migratory journeys, repeated at fixed intervals and with unerring exactness, has for thousands of years called forth the astonishment and admiration of mankind.

From times of hoary antiquity the shores of the Mediterranean have presented to the eye of the spectator and inquirer the picture of countless hosts of feathered strangers pouring into these sunny lands from the dark and dismal regions of the North, and after a few months' stay in a milder clime, returning once more to their mysterious homes. To the observer of early times this phenomenon seemed so wonderful, so full of mystery, that these bird-flights came to be believed as portending the fate of men and empires. How differently does our modern age view these movements! To us, the sight of our songsters, the familiar companions of the flower-laden summer months, hastening away before the raw winter days, cannot be otherwise than pleasing, for we know that it is their only means of escaping from the many hardships which winter brings in his train, and to which large numbers of them would unfailingly succumb. In the spirit we follow our feathered friends over the towering heights of the snow-clad Alps, sharing in their joy when some high mountain valley offers to a portion of the widely spreading host some temporary rest and refreshment. Next, our eye, like theirs, espies in the dim distance the deep blue, wide-stretching expanse of the Mediterranean; this too is soon passed over, and the scene shifts once more to the boundless sandy desert, trembling beneath the fierce rays of the African sun. Here we must take leave of our little favourites; though a few of them which have chosen the broad Nile route we may perhaps accompany some little distance further; but to these also must we bid adieu as we come in sight of the mighty Pyramids, to the borders of those

countries whose symbol, the Sphinx, still raises her weather-worn head from the lap of buried ages.

The months of winter depart; budding Nature heralds the approach of spring; already is she assuming her dress of green; and after one mild night the hedges and bushes of our gardens, our groves and fields, are once more crowded with our feathered friends. The homely Swallow busily flutters around her nest of the preceding year. We can tell by his gestures that the Whitethroat in yonder bushy hedge is an old acquaintance of ours, and when, a few nights later, the soulful song of the Nightingale is carried to us from the dense, dark underwood by yonder pond, we seem with glad surprise to recognise her as the same bird to whose notes we have already listened with rapture during many a fragrant night of spring. All have happily escaped the many dangers of their long journey.

Amid such charming scenes the migration of birds proceeds in nearly all latitudes of the globe. Far different, however, is the picture presented on this solitary island of the North Sea. In place of olive-groves and palm-grown oases, waste sandhills and desolate rock-chasms are all that now, as in the remotest ages, here meet the wanderer's gaze. None of them finds the goal of his journey on this bare and rugged isle—all pass it in untiring haste. Spring here is not ushered in by the jubilant return of the feathered songsters to the longed-for nesting homes, nor does autumn strew her golden leaves on the path of their departure; silently the flocks pass the inhospitable rock, where no wood or thicket or waving corn-field offers a homely nook for rearing the young brood. Only those grotesque members of the bird-world, the Auks and Guillemots, find an inapproachable dwelling on its steep and surf-beaten cliff, where on narrow crags and ledges, amid the fury of the storm, they hatch their eggs unsheltered by a nest, while their harsh, unmelodious voices mingle in manifold discords with the roar of the never-resting waves.

But though this storm-swept rock has thus been deprived of all those pleasing scenes which surround the migration of birds, especially in spring, in other lands, Nature, ever a loving mother, has here too endeavoured to make compensation; for though grace and ornament may be wanting, their loss is amply balanced by the extraordinary and unexampled grandeur in which the phenomena of migration are displayed on this island.

The main peculiarity of Heligoland, *i.e.* the almost Arctic character of its coasts, is made strikingly manifest by the manner in which the earliest precursors of re-awakening bird-life make their appearance on the island. These first arrivals are the Guillemots already mentioned as making their homes on the rocky ledges of

the cliff. They visit their breeding-places in flocks of thousands at the New Year, often even as early as December, as though they wanted to make sure of their former haunts being well preserved and ready for their reception. These visits are however limited to the hours of high water at the particular time, and mostly take place early in the morning. The whole face of the cliff is then as completely covered with the birds as in the height of the breeding season. Amid the exchange of endless obeisances and incessant altercations, they carry on an animated conversation, in which every one of them seems to be talking but not one to be listening. With the approach of low tide all have disappeared. Visits of this nature are repeated at irregular intervals until the true commencement of the breeding season—about the beginning of April.

Next to the Guillemots, the Skylarks and Starlings make their appearance, according to the state of the weather, from the middle of January, at first in small and afterwards in larger flocks. They present however mostly a very sorry appearance, and appear to have but little foreboding of the joys of spring; nor is this to be wondered at, seeing how extremely raw, dull, and short the so-called mild days of the first months of the year are apt to be.

Bird-life presents little change during the first weeks of FEBRUARY. Should, however, the weather be tolerably mild, Larks, Starlings, and Fieldfares make their appearance in already large numbers, more especially the two first named; and also Dunlins, Plovers, and Golden Plovers. During the last week however the migration begins to assume another character; unless frost or snow prevail the first of the Pied Wagtails make their appearance, sometimes also a Grey Wagtail, and possibly even a Stonechat. This latter species, as a rule, however, does not make its appearance before the beginning of March. Moreover, as regards the Fieldfares, which occur during the whole of the month, one is never certain whether they are merely roving companies or regular migrants, inasmuch as great flights of these birds are met with even as late as May. The Missel Thrush, however, passes through the island regularly at the end of February, though always in scattered companies.—This exhausts the lists of the few regular February migrants.

Bird-life becomes more animated in MARCH, even at its commencement; the Stonechat, just mentioned, which is here christened the Messenger of Spring, as well as the Pied Wagtail, are almost daily guests. The Linnet, Twite, and Greenfinch are met with pretty frequently, the Goldfinch more rarely; besides these, large flocks of Starlings, Skylarks—which, however, for the most part, are merely birds of passage—and small companies of the familiar

Woodlark begin to arrive, and the vanguard of the Shorelark appears on the scene. Large swarms of Snow Buntings make their appearance, and depart again after a brief and restless stay; while Yellowhammers and Common Buntings, in scattered companies, have been noticed to make a longer sojourn. The Rooks now begin their migrations, soon to be joined by small companies of Hooded Crows, which are, somewhat later, followed by flights of Jackdaws. The first named of these birds are fond of delaying their journey for a time on the fields of the upper plateau, which are sown with oats or barley; the Rooks, on the other hand, invariably pass across the island without interrupting their journey. The Hooded Crow, conscious of the possession of a vocal muscular apparatus, seems to regard herself as commissioned to announce to the natives of Heligoland the approach of spring, making at the latter season of the year a most extensive use of the gift with which Nature has endowed her; while in autumn, on the other hand, she invariably passes on her way in silence.

Snipe and Blackbirds are met with more or less frequently, according to the prevailing weather, from the beginning of the month. Fieldfares are still observed in great flocks; Redbreasts being also pretty frequent. That most confiding little bird, the Hedge Sparrow, quietly and busily disports itself in our gardens; the cheerful 'Bink, bink' of the male Chaffinch resounds on all sides; while isolated examples of the elegantly coloured black males of the Black Redstart, as well as the first males of the Common Wheatear, are now for the first time to be met with.

Later in the month the Fire-crested Wren appears in limited numbers; the Chiffchaff may be seen in every shrub, and the White Wagtail is found in company with the Pied Wagtail. The Rock Pipits, which, about the beginning of the month, appear in increasing numbers along the sea-shore, display in greater frequency the transitional stages towards their summer plumage, and at the same time the grassy plains of the island become more and more alive with the Meadow Pipit. The Reed Bunting makes his appearance, and the Shorelark, previously so rare, now passes in great flocks.

By degrees the Song Thrush is found associated in increasing numbers with the Blackbird, and the Woodcock is at the height of its migration—'Lätare.'[1] The Ringdove is seen in greater and

[1] [In Prussia the passage of the Woodcock occurs in spring, and the third Sunday in Lent is called Woodcock Sunday; hence the rhyme of the foresters—

Okuli—da kommen sie . . . . tr. (they arrive).
Lätare—ist das Wahre . . . . ,, (are truly there).
Judika—auch noch da . . . . ,, (are still present).
Palmarum—rarum . . . . . ,, (are rare).

Oculi is the third Sunday in Lent, from the Introit, taken from Psalm xxv. 14;

smaller companies from the beginning of the month, joined by solitary examples of the smaller black-eyed relative, the Stockdove. The Water Rail is of common daily occurrence.

Great flocks of thousands of Hooded Crows, Rooks, and Jackdaws may have been seen passing over the island during the whole month, while the migration of Snipe and Blackbirds continues to its latter end. During the last days of the month both the white and red-spotted forms of the Bluethroat have been seen in very rare and solitary instances.

Among the birds of prey, solitary examples of the Peregrine may be seen almost daily—old males of the Merlin also frequently occur, but male Kestrels are less numerous.

April unfolds a complete change in the phenomena of the bird-life of this island. This is the time of the pretty Ring Ousel, the Yellow Wagtail, the Hoopoe, and the Wryneck. All the gardens are alive with the Willow Wren, the Sedge Warbler, the Lesser Whitethroat, the Blackcap, and large numbers of Redbreasts. Of the Finches, the species Chaffinch, Brambling, and Siskin commence their migrations. Hooded Crows and Jackdaws, as well as Song Thrushes, are still abundant, but of Blackbirds only females and birds of the previous year remain, while the migration of the old males of the Common Wheatear is now at its height. Towards the end of the month, if the weather is favourable, old males of the Pied Flycatcher, the Redstart, and the Whitethroat are met with; the Lesser Whitethroat now gives place to the Willow Warbler; if the days are warm the first of the Ortolan Buntings and the Tree Pipit make their appearance. The Redshank and the Wood Sandpiper are heard at night, and seen scattered during the day; these are soon followed by the Green Sandpiper. Of Merlin and Kestrel only solitary males are still met with, soon to be replaced entirely by increasing numbers of female birds.

May is *par excellence* the month during which the number of birds, in course of their spring migration, reaches its maximum, presupposing of course that the weather is favourable to their occurrence. Among birds of prey there arrive the Hobby, Honey Buzzard, and Sea Eagle; the Red-backed Shrike is frequently very numerous; but the Golden Oriole is extremely scarce. The black-backed males of the Pied Flycatcher arrive in great numbers during the first weeks of the month; about the middle of it, fairly large numbers of the Spotted Flycatcher and solitary examples of the Nightingale appear. The males of the

Lätare (i.e. *Laetare*) is the following Sunday, the Introit for which is Isaiah lxvi. 10. *Judica* is Passion Sunday, Introit Psalm xliii. 7; *Palmarum*, Palm Sunday.—Rev. C. Swainson, *Provincial Names and Folklore of British Birds*, p. 189.—*Tr.*]

Red-spotted Bluethroat are seen in great numbers, sometimes in large masses; males of the Redstart are innumerable; while the Garden Warbler is less numerously represented. The Whitethroat is extremely abundant, and solitary examples of the Barred Warbler are met with on specially warm days. Of the Warblers, the Willow Warbler occurs in great numbers, but of the pretty Wood Warbler only isolated examples are occasionally met with. The Reed Warblers (*Acrocephalinæ*) are represented during the whole of the month by the Sedge Warbler in great numbers, while on the other hand the Marsh and Reed Warblers and Grasshopper Warbler are met with only in isolated instances. The Common Wheatear is still very abundant, but by this time the greater number of the birds present consist of females; while the whole island often teems with Whinchats. Among the thrushes, the Ring Ousel is now the most abundant; the numbers of Song Thrushes are considerably on the decline, while of Blackbirds only scattered stragglers may still be seen.

Great flocks of the Blue-headed Wagtail, among which scattered examples of the Black-headed Wagtail occur, are seen to frequent the pastures. Of the Pipits, the Tree Pipit occurs very abundantly; of the Tawny Pipit, on the other hand, only isolated examples are met with, while of the occurrence of Richard's Pipit only exceptional cases are known. With the exception of the occasional appearance of an example of the small, pretty, short-toed species from Greece or Asia Minor (*Alauda brachydactyla*), Larks are no longer seen. The Buntings are numerously represented by the Ortolan Buntings, and now and again by an example of the Black-headed Bunting (*Emberiza melanocephala*). Of the Finches, solitary examples of the Goldfinch only are still met with.

The Swallow, somewhat later the House Martin, and lastly the Sand Martin, now migrate in large numbers; and large flocks of the Swift pass in uninterrupted succession. The Cuckoo may be seen daily, and sometimes even heard. The Goatsucker is met with very frequently on all warm and calm days; the same may be said of the Wryneck; and the Turtle Dove, whose appearance seems to be less dependent on the weather than that of the birds just mentioned, may be seen singly or in groups of three or four individuals, up to the end of the month.

Among the May arrivals must be classed by preference the three species of *Totanus*,—the Common Sandpiper, the Greenshank, and Spotted Redshank. Of these, crowds of the first frequent the rocky shore of the western coast of the island; the Greenshank only occurs scattered in the same locality, while the Spotted Redshank is seen or heard only on very rare occasions. The Land

Rail is now very numerous, the Spotted Crake is met with pretty frequently, while the sprightly Moor Hen is caught now and again in the throstle bush. The appearance of the Common Coot is, on the other hand, quite exceptional.

On exceptionally fine warm days the cheerful *kütt-kütt-kütt* of the Dotterel, now on the wing in smaller or larger companies, may be heard, and in the course of the month these birds are shot abundantly while sitting about on the fields; at the beginning of the month the less handsomely coloured males only are met with, but from its middle onwards the females, noticeable by the handsome markings of the head, form the predominating majority. Very fine examples of the Golden and Grey Plovers, in full breeding plumage, are met with almost daily, though on account of their extreme shyness they are not often killed; examples of the Bar-tailed Godwit are seen only in exceptional instances, and the Black-tailed Godwit is equally rare. On the shore of the Dune, or Sandy Island, the Turnstone, the Dunlin, the Knot, and the Sanderling abound, though the two last species are but rarely seen in the pure summer plumage. The Turnstone occurs more frequently in this stage of plumage, and the remaining species in great abundance. While the small Black-breasted Dunlin predominates on the shore of Sandy Island, Schinz's Sandpiper frequents almost exclusively a small rain-water pond on the upper plateau, where also the small and pretty Little Stint is occasionally shot; in the summer plumage this bird is, however, extremely rare on the Dune.

Besides the above-named birds, the Whimbrel and the Oyster-catcher are seen very frequently, the latter even occasionally making attempts to breed on Sandy Island, though it never succeeds in rearing the young.

Of the Terns, the Gull-billed Tern is met with irregularly in the course of the month; the Sandwich Tern, the Arctic Tern, and the Common Tern, occur in great quantities, but of the Lesser Tern and Black Tern only solitary examples are seen.

All is now astir in the breeding-places of the Guillemots; while numbers of the breeding birds are sitting on their eggs, thousands not thus occupied fly in uninterrupted confusion down and along the sides of the cliff, unfolding a wonderful picture of Northern bird-life. The Razorbill breeds at a spot somewhat more remote, while the presence now and then of examples of the Common Puffin adds an additional charm to the scene. A few pairs of these last-named birds bred in the island about fifty years ago; this is unfortunately no longer the case, as the breeding birds were taken away from the nests.

If towards the end of May the weather be specially favourable, most of the above-named species pour in in incalculable numbers; during the hours of night, this great host of wanderers sweeps across and past the island without taking rest thereon—some of the birds travelling singly, others in smaller or larger groups, according to the nature of the species—all striving to gain their far-off homes. About sunrise, however, and during the early hours of the forenoon, thousands and tens of thousands of these birds break their journey: some, too, at sunset, in order to make a few hours' stay on our island. It is, however, absolutely impossible to ascertain the manner and method of arrival of most of these visitors, even by the most careful observation; this is specially the case with the small song-birds and similar species, whose number increases with each minute, without one being able to see a single bird descending from on high, or shaping its course in any one particular direction. Many alight on the fields while it is still dark, and are present in their thousands by the time it has become daylight; some, on the other hand, *e.g.* the Bluethroats, arrive shortly before sunrise; others, like the Whin- and Stonechats, arrive only after day has fully begun; from this time onwards their number increases steadily, and in so striking a manner that, by ten o'clock in the morning, all the pastures, fields, and gardens, and even the rubble at the foot of the cliff, literally teem with Blue-headed, Black-headed, and Yellow Wagtails, Redstarts, Chats, Wheatear, Whin- and Stonechats, Bluethroats, Warblers, and Reed Warblers. The common Wheatear is specially numerous on the shingle at the foot of the cliff, and thousands of birds, notably Warblers, lurk among the shrubs and sand lyme grass (*Elymus arenarius*) on the Dune.

Favourable conditions such as these not only provide the fowler and collector with an abundance of material in the shape of the more commonly occurring species, but he may, at such times, generally reckon to come across some rare and valuable stranger from the south-east. As instances I need only cite the Desert Wheatear (*Saxicola deserti*), Black-eared Chat (*Saxicola aurita*), and Eastern Pied Chat (*Saxicola morco*), Pallas' Short-toed Lark (*Alauda pispoletta*) Ehrenberg's Redstart (*Sylvia mesoleuca*), and Paddy-field Warbler (*Sylvia agricola*), *Emberiza luteola*, Red-rumped Swallow (*Hirundo rufula*), Caspian Plover (*Charadrius asiaticus*), and the Eastern Golden Plover (*Charadrius fulvus*), and many other more or less interesting treasures of my collection. Unfortunately, however, occurrences of this kind are conditioned by the co-operation of so many different meteorological factors, that completely successful results in this direction are extremely rare, and indeed have not been obtained for many years.

JUNE, as one might expect, is, so far as numbers are concerned, not so productive a month as its predecessor; nevertheless it may add to the collection an equal, if not greater, number of the rarer occurrences. Its first days, if fine, warm, and calm, convey to this island the Melodious Warbler, the Barred Warbler, Marsh Warbler, and Reed Warbler; isolated examples of the Lesser Grey Shrike and Woodchat Shrike are seen; now and again, too, the Short-toed Lark, which is, however, also met with during the latter half of May; also Cretzschmar's Bunting (*Emberiza cæsia*), and the Black-headed Bunting (*Emberiza melanocephala*), an example or two of the Rose-coloured Starling, and strangers of like sort from the far south-east.

Up to the middle of the month, besides the above named, the Spotted Flycatcher—once, on the 3rd June 1860, I obtained a fine old male of the White-collared Flycatcher (*Muscicapa albicollis*),—Willow Warbler, Swallow, Martin, Sand Martin, Goatsucker, and the Turtle Dove, still continue their migration, though in diminished numbers. The migration then gradually dwindles, and shortly after is completely arrested, for the old scattered examples of Plovers, Godwits, and Sandpipers, and the like, which are met with up to the end of this, and in the course of the next month, are not regular migrants, but stragglers, who either singly or in flocks rove about throughout the summer without going to their breeding-places. Simultaneously with these may be seen now and again one or more old birds of other species, such as Starlings, Thrushes, and the like; these, however, consist of individuals who have either lost their mates or whose nests or broods have been destroyed; as, however, it is too late to make another attempt at breeding, and as the time of their migration has not yet arrived, they likewise are compelled to fly about idly and without purpose.

The arrival of the young Starlings is the first indication of the reflux of the migration wave. These appear in smaller or greater companies as early as the last ten days of June, and increase in numbers daily up to many thousands, into July. Thus in 1878, during many days of June and July, hundreds of thousands of young birds of this species travelled across and past Heligoland.

JULY.—A considerable increase in the number of birds engaged on their return passage is noticeable in the course of this month. At its commencement, in addition to young Starlings, young Lapwings may often be seen during the morning hours in great numbers in potato-fields; they are followed by the first young birds of the Ringed Plover, and somewhat later by the Golden Plover, the Ruff, and the Dunlin, also the Whimbrel and the Redshank, to which the Greenshank is soon after added, all the birds

being young individuals. Old Cuckoos begin to return from about the middle of the month. The Guillemots which breed on the island, on calm evenings conduct their young ones out to sea; the young Sparrows, which have been bred here, disappear towards the close of the month; the first young of the Common Wheatear now make their appearance, and perhaps also a solitary young Cuckoo.

Hundreds of different notes of shore-birds, passing in large masses towards their winter quarters, are heard during the night. These invariably, at this time, pursue an east-to-west line of flight.

With the advent of AUGUST the phenomena of migration are again unfolded in all their grandeur. The earlier arrivals at the beginning of the month consist more especially of the various members of the great Snipe and Plover family—*Charadrius*, *Numenius*, *Limosa*, *Totanus*, and *Tringa*. These pass over the islands in endless flocks throughout whole nights, and in slightly smaller numbers during the day. Side by side with these, the first young birds of the Willow Warbler, the Pied Flycatcher and Spotted Flycatcher, the Whinchat and the Wheatear, accompanied by individuals of the Wood Warbler and Melodious Warbler, make their appearance. Young Cuckoos may now be counted among daily occurrences. The numbers of all these birds steadily increase, the Tree Pipit and Ortolan Bunting being joined to them about the middle of the month, while the first examples of the Redstart, the Whitethroat, the Garden Warbler, and the Red-Spotted Bluethroat follow during its latter half.

If the end of the month is attended by warm, calm, and clear weather, with light south-easterly and southerly winds, we shall find all the fields and gardens alive with innumerable young Flycatchers, Warblers, the Willow Warbler, Redstarts, Whitethroats, Whinchats; and countless young Wheatears merrily disport themselves at the edge of the cliff, and on the shingle at its foot. The sheep pastures teem with young Wagtails (Blue-headed, Black-headed, and Yellow). Young Red-backed Shrikes may be seen sitting on the look-out for prey on the dry outermost ends of the twigs of the throstle bushes and garden shrubs. Young Goatsuckers, as yet without the white decoration on tail and wings, are roused out of every hidden nook, and young Cuckoos rove over the fields in quest of caterpillars among the cabbages. Simultaneously with the latter, the Wryneck makes his appearance in large numbers, and may be seen cowering in the grass busily occupied in impaling ants. Swifts rove about, and pass over the island in large and noisy flocks; the hoarse 'etsh' of the Common Snipe is heard abundantly, more especially in the morning. In the last case, as well as in that of all the other species already enumerated, the birds are exclusively young individuals.

Crowds of Crossbills, grey, yellow, and red, are seen in the course of the month; singularly, their occurrence is almost, if not entirely, restricted to very stormy weather with heavy rain.

Among birds of prey solitary young examples of the Hobby arrive about the middle of the month; a week later young Sparrowhawks, Peregrines, Common Kestrels, and Merlins, as well as young Ospreys and Honey Buzzards make their appearance.

SEPTEMBER.—During the first half of the month, if the weather be fine, the number of the above-named species reaches its maximum, and the potato-fields teem with Song-birds, Flycatchers, Common Wheatears and Whinchats. The Ortolan Bunting and the Tree Pipit are very frequent; in the case of the former species old males are now found intermingled with the young birds. Isolated examples of the Tawny Pipit are met with, while Richard's Pipit is seen more or less numerously in the course of the whole month, the birds being in their still nearly pure light-bordered early plumage. All the Swallow species pass through in large flocks. The Blue-headed, Black-headed, and Yellow Wagtails are numerous, and young White Wagtails make their appearance. The majority, however, of all these migrants is still composed of young birds.

Towards the middle of the month the Meadow Pipit begins to arrive in numbers; Redstarts become more abundant, but the Flycatchers are on the decrease. Among the Willow Wrens the old less rich-coloured birds make their appearance, as well as solitary examples of Chiffchaffs, Golden-crested Wrens, Redbreasts, and Ring Ousels.

Towards the end of the month the number of young Wheatears and Golden Plovers decreases; large numbers of Song Thrushes and Chaffinches commence their migration, and isolated old examples of the Sparrowhawk, Merlin, Peregrine Falcon, and Kestrel make their appearance.

OCTOBER brings to the shores of Heligoland not only the largest variety of species of the whole autumn migration, but also by far the largest number of individuals of any period of the year. Throughout the whole of the month, Hooded Crows travel in never-ending swarms of hundreds and thousands across the island, and for a breadth of many miles, past both its coasts; cloud-like masses of Starlings pass at the same time. At the beginning of the month, if the weather is favourable, the island literally teems with Song Thrushes, especially during the morning hours. The number of Skylarks passing during dark nights across and past the island in one endless stream defies even an approximate computation. Fields and gardens simply teem with Meadow Pipits and Chaf-

finches, so that at each step, in whatever direction, one rouses clouds of them. Golden-crested Wrens, too, frequently simply flood the island in countless numbers. Chiffchaffs, Redbreasts, Whitethroats, Hedge Sparrows, Rock Pipits, Shorelarks, Bramblings, Twites, and Titmice make their appearance in greater or smaller flights, according to the state of the weather. This is more especially the month for the migration of the old birds of the Common Snipe, the small Jack Snipe, and especially the Woodcock; the same applies also to the Blackbird and Redwing; while the Song Thrush and Ring Ousel early begin to decrease in number, Fieldfares on the other hand appearing periodically in large quantities. The old birds of the Common Wheatear also migrate, more especially at this time, but only in inconsiderable numbers.

Those rarer occurrences from the far East, in which Heligoland is so rich, Thrushes, Warblers, and Buntings, are also met with in greater number in the course of this month; the same applies to the Greater Shrike (*Lanius major*), the Redbreasted Flycatcher, and Richard's Pipit, though the migration of the latter species is stated to commence as early as September, and to continue through the whole of that month. An indispensable factor for the appearance of all such strangers in any considerable numbers is the continuance of a light and warm south-east wind. Any considerable increase in the strength of this wind in the course of the month, or any veering round of it to a more easterly quarter, is attended by the exceptional appearance of the Common Jay, sometimes, as in 1882, in inconceivable quantities.

Of the Peregrines, Merlins, and Common Kestrels, only old birds in faded plumage are now met with, with which, however, a young Gerfalcon (*F. gyrfalco*) may now and again be associated. Old birds of the last named species have never yet been seen, or at any rate killed, on the island, though three or four cases of the more northern Greenland Falcon are recorded. Rough-legged Buzzards make their appearance, while the owls begin to leave,—the Short-eared Owl as early as the beginning of the month, but the Long-eared Owl not till near its end. Examples of Tengmalm's Owl have likewise now and again been shot towards the end of October, and in some cases even much later.

We must not omit to mention those nocturnal migration flights which, revealed by the light of the lighthouse, proceed on so stupendous a scale as to form one of the most characteristic and attractive phases of the whole phenomena of Migration as displayed on this island. They reach their grandest development

during the latter half of the month, especially towards its close. Predominating in numbers among these night travellers are the Skylarks; next come the Starlings and Thrushes, always accompanied by the many different forms of the great Snipe Family. Strange to say, the Golden-crested Wren occasionally, though rarely, makes its appearance in such migratory flights, as in the night from the 28th-29th October 1882, during which those tiny creatures swarmed round the lighthouse like so many snowflakes, while every square foot of the island literally teemed with them. The migration in this case lasted from about ten o'clock in the evening until nine the next morning. A similar exceptionally large migration of Larks took place in October 1883.

Though by reason of the changeability of the weather, migrations of this kind hardly ever extend beyond the duration of a single night, the one last mentioned continued through four entire nights, commencing, according to my ornithological diary, on the evening of the 26th at eleven o'clock with myriads of Larks and only comparatively few Starlings, and lasting with varying intensity until the morning of the 31st.

The landscape, which forms the background of so rich an unfolding of animal life, possesses in and for itself an extraordinary fascination. An equable calm dark night, without moon or stars, and attended by a very light south-east wind, are the conditions necessary for the grandest possible development of a migration of this nature; the presence in the atmosphere at the same time of a considerable quantity of moisture powerfully augments the intensity of the phenomena.

The darkness, equally dense on all sides, amid which the lighthouse appears to float like some great luminous body; the broad beams, which radiate from it in all directions, and in the dim air seem to stretch into infinite space; the consciousness of the near presence of the great sea around, and the complete absence of every sound in surrounding Nature,—all these combine to form a picture of the utmost solemnity and grandeur.

This wide silence is first broken by the solitary low 'Zeep' (*czip*) of the Song Thrush, and perhaps here and there the clear call-note of the Lark. Then again silence reigns for a minute or two, only to be once more suddenly broken by the far-sounding 'Ghük' (*ghee-eek*) of the Blackbird, soon followed by the manifold 'Tir-r-r' (*tir-r-r*) of a swiftly-passing flock of Sandpipers. The calls of the Skylark rapidly increase in number, smaller and larger flocks of the birds being heard approaching and disappearing near and far. The hoarse 'Etsch' (*Etsh*) of the Snipe is accompanied by the clear 'Tüth' (*tüt*) of the Golden Plover, the clear, loud 'Klü-üh'

(*Klä-äh*) of the Grey Plover, the wild far-sounding cry of the Curlew, the manifold 'Schack-shack-shack' (*Shack-shack-shack*) of the Fieldfare, the long-drawn 'Zieh' (*tsēē*) of the Redwing. Next, by the sound of hundreds of rapidly-ejaculated cries, 'Tütt-tütt—tütt-tütt—tütt-tütt' (*tütt-tütt—tütt-tütt—tütt-tütt*), we recognise a long-extending swarm of Knots hastily pursuing its journey, accompanied by an incessant din of countless piping, rattling, and quacking voices unknown to gunner or fowler, and often reminding one of the melodious strain of a creaking cart-wheel. Many of these, more particularly strident and harsher notes, however, evidently proceed from the Heron and its many different relatives.

The whole sky is now filled with a babel of hundreds of thousands of voices, and as we approach the lighthouse there presents itself to the eye a scene which more than confirms the experience of the ear. Under the intense glare of the light, swarms of Larks, Starlings, and Thrushes career around in ever-varying density, like showers of brilliant sparks or huge snowflakes driven onwards by a gale, and continuously replaced as they disappear by freshly arriving multitudes. Mingled with these birds are large numbers of Golden Plovers, Lapwings, Curlews and Sandpipers (*Tringae*). Now and again, too, a Woodcock is seen; or an Owl, with slow beatings of the wings, emerges from the darkness into the circle of light, but again speedily vanishes, accompanied by the plaintive cry of an unhappy Thrush that has become its prey.

Such a migration stream lasts through a whole long autumn night, and, under specially favourable conditions, may, as already stated, be repeated for several nights in succession. Nor is it by any means confined within the narrow limits of what is known as a migration route (*Zugstrasse*), for that which took place in the night of the 27th of October 1883, in a direction from east to west, in which the birds might have been counted by millions, was noticed by a young observer from Heligoland at Hanover, 112 geographical miles further south; the time of passage and the quantities of birds taking part in the migration being the same as were recorded for Heligoland. Further, the east-to-west migration of the Golden-crested Wren in October 1882 extended in one continuous column, not only across the east coast of England and Scotland, but even up to the Færoe Islands. When one thinks of numbers of individuals such as these, which cannot be grasped by human intelligence, it seems absurd to talk of a conceivable diminution in the number of birds being effected through the agency of man. In one particular respect man no doubt does exert a noticeable influence

on the numbers of bird-life, not however by means of net and gun, but rather by the increasing cultivation of the soil, which roots out every bush and shrub, great or small, as a useless obstacle, and thus robs the bird of even the last natural protection of its nest. Having thus driven the poor creatures into distant and less densely populated districts, we complain that we no longer hear their merry song, unconscious of the fact that we are ourselves responsible for the cause.

November has a distinct and peculiar character of its own. Its short, raw, and cold days now drive even the more northern species of land- and sea-birds from their homes. Among the former, large flocks of that very boisterous bird, the Snow Bunting, assume a particularly prominent place; next to these, Mealy Redpoles arrive in smaller or greater companies, which are sometimes swelled to countless numbers. The Linnet and Greenfinch appear in large numbers, but of the Hawfinch only solitary examples are seen. Scattered examples of the Common and Yellow Buntings are also met with. Shorelarks migrate daily in large numbers, reaching to hundreds of thousands. Large numbers of Rock Pipits frequent the shingle and the rocks by the seashore overgrown with sea-tang, and side by side with them the dull-coloured Purple Sandpiper makes its appearance.

Of October visitors solitary examples of the Great Shrike (*Lanius major*), with simple white speculum, are still met with. Hooded Crows, Starlings, Fieldfares, and Redwings continue to migrate as late as the middle of the month. Of Blackbirds, only old examples are still met with. Skylarks still migrate in masses by day and during the night; but the pretty Woodlark leaves in only small companies. The Golden Plover, the Common Curlew, Oystercatcher, and Dunlin still migrate in thousands during dark nights, while during the day larger or smaller flights of different species of Wild Geese and freshwater Ducks hasten past with uninterrupted speed. Among exceptional occurrences, at this time, one may expect the beautiful, large, eastern form of the Northern Bullfinch (*Pyrrhula major*), the Waxwing, and now and again an old Richard's Pipit, a Red-breasted Flycatcher, or a northern Black-bellied Dipper.

Among the Birds of Prey which now make their appearance, the Sea Eagle may be seen circling about in the air, especially during an east wind; most of these are young birds,—old birds with pure white tail being counted among the greatest rarities. Strange to say, for the first time, the few examples of the Hen Harrier and of Montagu's Harrier, which ever occur here at all, are usually observed this month, the majority being brown birds. Old blue

examples of the Merlin are often seen, but of old Peregrines solitary examples only are met with. The Short-eared Owl gradually disappears. Of the Long-eared Owl also only solitary specimens remain, while the small pretty Tengmalm's Owl is now only met with as a rare occurrence.

With the arrival of the northern strangers the sea begins to present a picture of strikingly active and varied bird-life. The numbers of the Kittiwake are beyond all computation. At all times, and in all directions, both old and young birds of the Common Gull, the Herring Gull, and the Greater Black-backed Gull may be seen roving or soaring over the sea. On stormy days that lovely bird, the Little Gull, collects in great multitudes under the lee-side of the island, but at once vanishes if the weather improves. The two handsome species of Skua—the Pomatorhine Skua and Richardson's Skua—appear annually in the course of December, the greater number of them consisting of young autumn birds. Isolated examples of the smaller species—Buffon's Skua—are also met with at this season. Among the peculiar family of the Petrels, isolated examples only of the Fulmar Petrel are for the most part met with, though the bird is frequently seen in large numbers at other times. The Fork-tailed Petrel is only of rare occurrence. That smallest of all the swimming-birds—the pretty Storm Petrel—is seen annually, and shot with increasing frequency; the same is the case with the Grey Phalarope. The Great Northern Divers and the Black-throated Divers are only among the very rare occurrences. The Red-throated Diver, on the contrary, is met with daily at greater or less distances from the island, and is very frequently shot. In a few isolated instances this bird has been observed migrating in hundreds of thousands. Before concluding, mention must be made of the small and trim Little Auk, solitary examples of which are shot pretty nearly every year during the latter half of November. It is only in exceptional instances that this bird has been met with more numerously; all the examples being, in such cases, in a very emaciated condition.

December.—During no month of the year is the influence of the prevailing weather on the migration of birds more strikingly felt than in the course of December. Should the temperature remain mild, Starlings, Blackbirds, Fieldfares, and Redwings, as well as Snipe and Woodcock, continue to migrate up to the close of the year; thus, in the year 1873, Thrushes and Snipe were daily met with on Heligoland, though in small numbers; while, according to a report in the *Field*, exceptionally large quantities of Snipe were exposed for sale in the London markets throughout the whole of December of the same year—a fact which

evidently proves that all these birds were still engaged on their normal autumn migration from east to west.

Matters, however, assume a vastly different aspect if, instead of a mild temperature, frost and a sharp east wind set in in the beginning of the month. Under these conditions all of the birds belonging to the before-named species—as well as the Curlews, Golden Plovers, Oyster-catchers, and Sandpipers, which have until then tarried in their summer habitations—rush in one night towards their winter quarters; during the day countless flocks of Swans, Geese, Ducks, and Mergansers are seen migrating across the sea. Sea Eagles, numerous Common Buzzards, and solitary Harriers are frequently observed; and now and again a Stone Curlew may be seen under similar conditions. The old birds of the Purple Sandpiper, Sanderling, and Knot appear in more or less considerable numbers. On the sea the Slavonian Grebe may be seen rather frequently; likewise old birds of the Black Guillemot, Black-throated Diver, and pretty often, too, Great Northern Diver. The Common Gull is abundant; young birds of the Glaucous Gull are fairly common, and the Iceland Gull is shot occasionally. The Long-tailed Duck dives merrily among the rocks to the north of the Dune, while solitary females of the Common Scoter may be seen swimming round the cliff.

If this sudden frost is accompanied by a heavy fall of snow, hundreds of thousands of Skylarks, Twites, Linnets, and Greenfinches, Goldfinches, and Mealy Redpoles arrive during the early morning and forenoon of the following day, and literally cover all such places on the island as are still free from snow. If the snowy weather lasts for any considerable time, and is accompanied by a strong east wind and severe cold, all the species of the northern diving Ducks very soon congregate in fairly large numbers on the sea. In addition to the females and young of the Common Scoter, scattered young examples of the Red-breasted Merganser are amongst the first to arrive. These are soon followed by young Golden-eyes, smaller or larger companies of which dive about in search of food quite near to the foot of the cliffs.

Scaups next make their appearance at a somewhat greater distance from the island; these keep together in large flocks and consist in great part of males in perfect plumage, in exceptional cases, and are, later, accompanied by one or several examples of the Pochard. The Goosander now begins his excursions, either singly or in companies of from three, seven, up to ten individuals, most of the birds being fine old males; the females, with rust-coloured heads, are more frequently met with swimming. During this stage of the bird-life of winter, a good sportsman, provided with

reliable weapons and good powder, may in the course of a morning manage to bag as many as twenty-five or even thirty birds. For this, however, it is necessary that one's boatman should have some acquaintance with sport, and know the way to approach the game.

However, for the development of this scene of northern bird-life in its utmost grandeur, a very severe frost and an easterly wind, lasting for some weeks, are necessary conditions. Huge masses of ice will then form during the ebb on the shallows along the coast of Holstein, from the mouth of the Elbe—here miles in breadth—westwards as far as the Weser. Covered by falling snow, and flooded by the waves which wash over them, these masses very soon attain a thickness of from three to six feet; the next flood-tides set the icefield afloat, and the east wind drives it out to sea. This process is repeated with each succeeding ebb and flood, so that the whole bay, from the coast of Jutland down to the Jahde Basin becomes covered by a sheet of closely compressed and superimposed masses of ice and snow. With every ebb current this icefield is driven nearer and nearer towards Heligoland, and finally touches the island. Indeed, the process has occasionally assumed such vast dimensions that the whole sea, even far out to the west, has become covered with ice, so that, as happened in the years 1845 and 1855, not the smallest surface of open water could be seen even from the eminence of the lighthouse.

The northern species of diving Ducks at the beginning of the winter congregate along the strip of coast mentioned above,[1] where they find shelter from the east wind and quiet feeding-places. These are now driven by the ice into deeper water. At first, indeed, the belt of ice is only a mile wide, and after being raised by the flood-tide is pushed out to sea by the east wind, so that an open surface of water is again formed between it and the shore, to which the ducks will then also fly back. In the course of a few days, however, the mass of ice increases to such an extent that the birds are shut out from this means of escape and, being henceforth compelled to travel out to sea in advance of the icefields, are very soon brought up close to the shores of Heligoland.

In the meantime the Baltic too has become covered with ice, and the numberless swarms of Ducks and Mergansers which had intended to pass the winter there now fly in a westerly direction across Holstein and join the already enormous swarms from the North.

The sea in the neighbourhood of Heligoland is comparatively shallow, a fact which considerably facilitates, for the birds frequenting it, the task of diving for their food; while of the food itself,

[1] *i.e.* the coast of Holstein, etc.—(Tr.).

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especially of small crustacea, there is in this district, abounding as it does in reefs and submerged rocks, an even extraordinary abundance. It is therefore not surprising that the number of individuals of the species congregating here should be such as to defy even an approximate estimate.

The species before mentioned are now joined by many old examples of the Golden-eye and the Red-breasted Merganser, enormous numbers of old males of the Common Scoter, and, lastly, of the Velvet Scoter; old males of the Eider Duck are less numerous. Finally, we must mention the Smew, though the number of individuals of this species met with near Heligoland is invariably small.

The view which now presents itself to the spectator for a distance of many miles beyond the island is one of wondrous beauty and of quite peculiar grandeur. Towards north, east, and south, farther than the eye can reach, there stretches the white, vast, and unbroken icefield. In lee of its—for the most part—sharply defined margin, a perfect calm prevails, and the smooth surface of the sea is covered with myriads of Ducks in glossy black plumage. Closer in shore, especially to the north of the island, smaller species make their winter home, whilst farther off, the handsome old males of the Red-breasted Merganser are swimming about in bands of from eighty to one hundred and twenty-five individuals.

At the same time, countless multitudes of all sorts of species are seen speeding towards all parts, and in all directions, in companies great and small, solitary and in pairs. Indeed, I have known days on which I have seen, far as the eye could reach, in all quarters of the sky, swarms of these birds crossing each other in all directions; and more astonishing still, on looking upward, have beheld above me a teeming multitude, so thick that the highest swarms presented the appearance of scarcely discernible clouds of dust. In fact, the whole vault of heaven was literally filled to a height of several thousand feet with these visitors from the regions of the far North. Here, flocks of the Common Scoter, in their green glossy plumage, hasten, with rapid strokes of the wings, and there, crossing their path, approaches a company of twenty Velvet Scoters, in their deep black plumage set off by wings with spots of dazzling white. Even in the far distance, by their beautiful dark green heads and the peculiar round white spots between beak and eye, we are able to recognise the beautiful Golden-eyes as they fly hither and thither, alone or in companies. Scarcely has our eye been turned towards a long chain of prettily-marked Scaups, when a group of splendid creamy-red Goosanders at once distracts our attention. Among all these are mingled, like swarms of insects, teeming

crowds of lighter or darker brownish-grey females and young birds of all possible species. Nowhere does the quick observant eye find rest. Suddenly are heard—first faintly, then in increasing loudness—sounds like distant trumpet-blasts, and once more our eyes are attracted upwards, where a long chain of Whooper Swans, eighteen or twenty in number, in snow-white plumage, calmly pursue their way with measured beatings of their wings.

These, indeed, are red-letter days for the ardent sportsman and ornithologist. Unfortunately, they are only too rare; for this wonderful phase of bird-life requires not only a very severe and persistent frost with snow, but also an uninterrupted spell of easterly winds, lasting at least four weeks. The same causes which then impart the aspect of an arctic winter to the surrounding sea also invest our little island with a similarly polar character. The united forces of winds and currents drive huge ice floes, from four to seven feet thick, upon the shore and on the reefs; these gigantic blocks tower in romantic shapes to a height of from twenty to thirty feet against the face of the cliff. Snow in part covers this chaotic barricade of ice, while the rugged and torn cliffs jutting out above it form, in the dull and wintry atmosphere, a background of deepest tone, and invest the whole scene with a beauty and grandeur such as cannot be painted by the richest imagination.

At the north side of the island, the upper portions of the cliff project somewhat beyond its base, which latter, being more or less subject to the erosive action of the waves, is excavated into numerous grottos and recesses. From the inclined strata forming the upper overhanging portion of the cliff, moisture trickles down throughout the whole of the year. On the setting in of severe frost, the drops of water collecting at the lower edge of this overhanging portion are frozen into icicles, which, soon attaining to a length of five or six feet, hang down at higher and lower elevations from the face of the cliff; and, continuing to be fed by the incessant flow of water from above, rapidly increase in length and thickness, until, reaching the base of the cliff, they form at irregular intervals columns or pillars of ice from twenty to sixty feet high, between which we may pass into the recesses and caverns behind. A more marvellous and fanciful work of nature than these remarkable ice pillars it is difficult to imagine.

At another part of the coast, again, the rocks, from about the middle of the height of the cliff, slope downwards irregularly—somewhat in the form of terraces. As the water which trickles down the side of the cliff freezes, these terraces become gradually covered by a thick sheet of ice. The whole scene then gives one

the impression of a waterfall with hundreds of branches, cast, as by some sudden spell, into icy stiffness.

Many solitary excursions, made at late hours in the afternoon, amid scenes such as these, while the great snowflakes were slowly and silently falling from the darkening sky above, recalled to memory that early, active sportsman's life which forms the object of my most frequent and powerful yearnings.



II. DIRECTION OF THE MIGRATION FLIGHT

Turning now from this general view of Migration to the various separate factors of the movement, the attention of an observer is attracted, first and foremost, by the direction in which the hordes of wanderers pursue their course. The whole process appears to be simple enough so long as the inquiry is not pushed beyond the horizon of the place of observation. When, however, one attempts to pursue the path of the wanderers to its goal, the problem often assumes an apparently insoluble aspect—more especially so in the case of the autumn migration, by which the birds are conducted from their breeding homes to their generally far distant winter quarters. The course of the spring migration, on the other hand, is a very simple one.

A large portion of the migrants travel within an east-to-west, another within a north-to-south, line of flight. Species which fail to find satisfactory winter quarters in the western countries of Europe, on arriving in these districts, deviate from their westerly course and pursue their journey in a southward direction. Those, on the other hand, whose autumn migration takes place in a southerly direction, persevere in their course from their breeding stations to the end of their journey, though some may make a more or less considerable deviation to the east.

The predominant mode in which the migratory movement is performed is in a broad front; or migration-column, which, in the case of species migrating to the west, corresponds to the latitudinal range of their breeding area, and in those migrating southwards, to the longitudinal extent of their nesting stations. The view, much discussed in recent years, that migrants follow the direction of ocean coasts, the drainage area of rivers, or depressions of valleys as fixed routes of migration, can hardly be maintained. Too many facts are directly at variance with this assumption. One of the most salient only—that of the flight of Richard's Pipit—may be cited here—a bird whose breeding home is further removed from

Heligoland than that of any other of its numerous visitors. A mere surface glance at the map shows, in the most striking manner, how many large rivers, in addition to the Ural chain, this bird has to cross, almost at right angles, in the course of its journey from Daüria to Heligoland every autumn.

Direct observations in Heligoland, either from watching the flight of passing migrants by day, or noting their call-notes during the night hours, have established the following main results in regard to the direction of the migration flight, viz., that in autumn the migration proceeds from east to west, and in spring in the opposite direction. Further, that in the cases of all the species and individuals noted on the island, these courses are rigidly maintained during the passage, and such rare deviations as do occur never extend beyond one or two points of the compass.

Not all birds, however, reach their winter destinations by an autumn passage proceeding in this simple westward direction. Many, on the other hand, are sooner or later obliged to turn southwards, in order to reach the lower latitudes in which their winter quarters are situated; in the case of some species the original westerly direction of flight is maintained throughout the whole of the immense stretch of road from the eastern countries bordering the Amoor river to the west of Spain, and it is not until they reach the latter district that such birds turn to the south for the purpose of crossing the Mediterranean near Gibraltar; others, whose breeding homes lie further north, turn to the south in England, either to pass across the Channel into France, or to reach Spain *viâ* the Bay of Biscay; while still others, originating from the far north of European or Asiatic Russia, turn southwards even still farther north in Upper Scandinavia. It might perhaps be supposed that it was the sight of the sea which induced birds thus to alter the direction of their migration flight, were it not that the hosts of wanderers change their course long even before reaching the sea; the Hooded Crow, for instance, does not get to the western parts of England, but turns to the south as soon as it reaches the central portions of that country.

Besides Buzzards, Starlings, Larks, Swifts, Plovers, Curlews, and Geese, the numberless bands of Hooded Crows which for the most part fly during migration at a very low elevation, most clearly demonstrate the western direction of the autumnal migration. The breeding area of this species extends eastwards as far as Kamtschatka. According to observations of Eugen von Homeyer, carried on for a large number of years, the flights of these migrants arriving in Pomerania come from the east and travel onwards in a westerly direction. Such of the wanderers as pass the night in Holstein arrive in Heligoland about eight in the morning. From

that time until about two in the afternoon, hosts consisting of hundreds and thousands follow each other in uninterrupted succession. All of them first become visible on the eastern horizon. Such members of the broad migrant column as come into view behind the northern point of the sandhills travel in a straight line across Heligoland, thus following a line of flight exactly east to west, and they disappear over the sea towards the west, shaping their course for the east coast of England. In the latter country, too, the direction from which they are seen to arrive is so exactly east that they are popularly known as Danish Crows. Even here, however, the western extension of their flight is not yet at an end. Mr. John Cordeaux—a most zealous observer—whose sphere of observation is situated on the east coast of England, in the same latitude as Heligoland, informs me that the bands of migrating Hooded Crows do not alight immediately upon reaching the coast, but continue their journey inland in a westerly direction; and Stevenson (*Birds of Norfolk*, i. p. 261) states that, even after reaching the more inland parts of the country, hundreds of these birds, during the autumn migration, continue their flight in a westerly direction. A portion of these arrivals pass the winter in the eastern parts of England, only a few appear to reach its western portions, for Rodd (*Birds of Cornwall and Scilly Islands*, p. 64) says that he can only record the Hooded Crow as an accidental visitant. Nor does the migration extend to Ireland. Hooded Crows, indeed, are found in the latter country, but these are regular residents, neither leaving the country nor receiving additions from without, since—according to Thompson's careful observations and reports (*Natural History of Ireland*, vol. i., Birds, p. 310)—their number neither increases nor diminishes at any portion of the year.

Now, the eastern and midland counties of England cannot by any possible means afford sufficient room for furnishing winter quarters to the millions of Hooded Crows which every autumn pass from this island across the North Sea; and since, according to Rodd and Thompson, they do not reach either the west of England or Ireland, while, according to Stevenson, their numbers in Norfolk are already reduced to hundreds, it follows that they must very soon after reaching England pass across the Channel to France, and accordingly terminate their long western flight by a final deviation in a southerly direction.

The foregoing considerations have, of course, gone no further than to prove that these Hooded Crow migrants have maintained a westerly line of flight over a stretch of some two hundred miles; this, however, ought to be sufficient to justify us in assuming that all the countless hosts of wanderers, whose numbers are beyond even any

approximate computation, have regularly maintained this direction from the first commencement of their migration. Indeed, a migration stream of such force as that which is constituted by these Hooded Crows throughout the whole of October and a great part of November, could only have been generated by a breeding area extending from the western boundary of Russia eastward to Kamtschatka.

These birds again, which, by reason of their low migration flight, are brought more easily than other species within the sphere of observation, afford a most striking proof of the patience, or rather obstinacy, with which migrants continue in the direction of their migration flight. During the autumn migration it frequently happens that when out at sea they are carried into air currents stronger than is suitable to their line of flight, a violent south-east wind being especially unfavourable to their normal progress. To escape the disagreeable experience of having this wind blowing through their plumage obliquely from behind, they turn their body southwards, and appear to be flying in this direction. This, however, is not the case. They do not make the least forward progress to the south, but their flight is continued in as exact a westerly course, and with the same speed, as though the birds were moving under favourable conditions straight forwards, *i.e.* in the direction of the long axis of their bodies. This is shown in the most convincing manner by such bands as happen to pass immediately over the head of the observer.

Besides Hooded Crows, many other, indeed perhaps all species are capable of executing a laterally directed movement of flight of this nature, not only under such compulsory conditions as they may encounter during the flight of migration, but also during the ordinary activities of their daily life, and are able to accelerate this movement at pleasure, both for temporary purposes as well as for prolonged periods. Originally, I used to think that Hooded Crows, not being particularly good flyers with a violent side-wind, drifted just as much to leewards as they progressed straight forwards, after the manner of a badly sailing ship, and that in this way their course came to assume a direction almost exactly west. Continued observations have, however, convinced me that this view cannot be maintained. Moreover, in innumerable instances, I have seen not only Crows, but also Buzzards, notably Honey Buzzards, maintain a similarly-directed migration course. Gulls, again—especially Great Black-backed, Herring, and Common—may be seen daily and hourly flying at a greater or less speed, now to the right, now to the left, in directions at right angles to the long axis of their bodies. A further proof of a migration in a direction from the far east to the

far west is furnished by the Honey Buzzard. The breeding zone of this species extends on this side of the Arctic Circle, from Scandinavia, through European and (according to Pallas) the whole of central Asiatic Russia. This bird in fact must breed in large numbers in the boundless forests of these two regions, for only nesting areas of this extent could produce the vast numbers of individuals which sometimes, in the course of September, pass by this island on a westerly course. In Germany and France it is met with as a breeding species only locally and irregularly, while in Spain it is never met with as such at all. If, therefore, the autumn migration of this Buzzard proceeds in a southerly or south-westerly direction, it should be seen in large numbers from somewhere near Lake Baikal to Greece and Italy; whereas, on the contrary, the bird at that time occurs only extremely rarely and exceptionally in Turkestan, on the Lower Wolga, and in Greece (Sewertzoff, Dresser, and von der Mühle). At Malta (Wright) only small companies of five, or at most twelve, individuals are seen. In Sardinia it has not been observed at all; and Major A. von Homeyer has failed to meet with it even on the Balearic Islands. In the north-east of Africa the bird has only very rarely been met with, and in Algiers only in solitary instances.

On the other hand, this Buzzard appears at Gibraltar and the opposite coast of Africa in large numbers. According to Favier (Irby, *Ornithology of Gibraltar*), droves of over a hundred individuals have been seen during the spring migration at Tangier flying towards the north, and Irby reports similarly from Gibraltar, stating that the migration extended over twenty days. Both observers at the same time remark that these birds are seen much less numerously in autumn, the flights then rarely exceeding fifteen individuals. Lord Lilford, however, observed in the interior of Spain large flocks in September, migrating southwards. This difference in the intensity of the spring and autumn migration is however merely an apparent one, since at the latter season the Honey Buzzards travel also during the night hours, and hence numbers as large as those seen so frequently in the spring by day at Gibraltar, in autumn pass across the sea unobserved during the night.

In Heligoland, for instance, Honey Buzzards are frequently killed in autumn, during the capture of birds at the lighthouse lantern at night. This has, however, never yet happened in spring.

The fact that the Honey Buzzard does not reach Portugal (Tait, *Birds of Portugal*, Ibis, 1887) also proves, what has been already called attention to in regard to Hooded Crows, that it is not the sight of the sea which induces birds migrating in a westerly direction to turn suddenly south, but that this deviation forms, from no

accountable cause, the concluding stage of the westerly course of the migration. A similar phenomenon is presented by the same bird in England. In that country the Honey Buzzard is met with as a breeding species only in solitary instances, but arrives in tolerably large numbers on the east coast during the autumn migration. Such examples as originate from the northern limits of their breeding zone in Europe and Asia bring their westerly flight to an early close in England, where, then turning south, they pass *vid* Western France and Spain to their winter quarters in Africa. It is hardly probable that more than a few fly across the Bay of Biscay, for, according to Rodd (*Birds of Cornwall*), these birds are a very rare occurrence in the most western portions of England, including the Scilly Isles.

Now and again, however, they do appear to take such a course, as, according to Thompson, a pair of these birds has been seen on three different occasions during the summer months in Ireland, one of the birds having been killed in each instance.

We have already, at the beginning of this chapter, mentioned Richard's Pipit as affording a striking instance of a migration flight from a location far to the east. The bird in question in the course of its autumn migration actually passes over the immense tract of country which lies between the Sea of Ochotzk and the Atlantic coast of Spain.

In treating of several species migrating in directions from north to south, and *vice versâ*, the view has been expressed that their migratory flights were confined within a definite number of degrees of latitude—further north or further south, relatively to the more northern or more southern situations of their breeding homes. The case of Richard's Pipit, however, proves, beyond question, that such gradations in the range of the migratory flights, measurable by degrees of longitude, do not apply to species whose migratory flights proceed in directions from east to west—for the breeding area of the interesting species referred to is strictly and exclusively limited to Daüria—Dybowsky having about twenty years ago succeeded in discovering its nests in that district; while not one of the many travellers of earlier or more recent times who have investigated the ornithology of European and Asiatic Russia has ever met this bird breeding to the west of Lake Baikal.

Truly astonishing as the migration journey of this small bird, from one end of the Old World to the other, may appear, there can be no doubt of the fact that the individuals observed in Heligoland, Holland, England, France, and Spain, during the autumn migration, originate from far-off Daüria. Nor must such individuals be in any sense regarded as isolated rarities or 'stragglers,' for not only

are they met with regularly every autumn, but they frequently attain to the comparatively large numbers of from ten to fifty, and in two or three instances of even a hundred individuals in a single day.

With Richard's Pipit might also be associated the small Yellow-browed Warbler (*Sylvia superciliosa*). This bird likewise has its breeding home in eastern Asia, but nevertheless, in addition to its normal southerly autumn migration, it migrates in fairly large numbers far towards the west. The bird appearing in Heligoland in favourable weather regularly every autumn, two, three, or more individuals being frequently observed in one day, it surely ought also to occur in Germany with equal regularity and in fairly large numbers; it thence undoubtedly continues its journey to France, and perhaps even farther. In England it has only been killed twice, but there can be no doubt of its having reached that country far more frequently *viâ* Heligoland without having been observed. When we reflect that it requires the coincidence of very many favourable conditions before so tiny a creature could be noticed, distinguished, and shot, amid the countless bushes and shrubs of gardens and river-banks, this scarcity of observations need not surprise us; more especially because, probably, but very few European ornithologists are acquainted with its call-note.

When we turn from the birds considered above to such others the direction of whose migratory flight we can verify by the direct perception of our senses, we find, that during the day, Larks, Starlings, many Waders, and especially the dense droves of the large dark-plumaged Hooded Crows, furnish us with clear, though, as regards the numbers of individuals, still limited supports for the conclusions as to the direction of the migratory flight which we enunciated at the outset of this chapter. The matter assumes, however, a quite different aspect on those dark autumn nights in which strong migrations take place; these nights offer far more extensive and interesting opportunities for conducting observations on the subject of our inquiry. On such nights the sky is often completely obscured by vast multitudes of Plovers, Curlews, Godwits, Oyster-catchers, Greenshanks, Sandpipers, and many other less vociferous species, such as Larks and Thrushes, whose voices, resonant from afar, proclaim clearly through the stillness of the night from what direction in the sky they are arriving, while the notes of the departing travellers, gradually growing fainter and fainter, announce, in a manner equally distinct, in what direction they are continuing their journey. The whole flight proceeds without pause or change in one incessant stream from east to west.

The most varied observations of others, conducted directly in the open air, have yielded similar results. Among such,

Naumann's weighty and unassailable authority stands pre-eminent. In his incomparable work he again and again proclaims in the most decisive manner, that 'birds on their departure travel from the direction of the rising to that of the setting sun, and in the opposite direction when they return in the spring,' or 'that their migration in autumn proceeds in a straight direction from east to west.' He shows by an ample number of instances under what conditions this may be noticed by day or perceived at night from the voices of the birds (*Vögel Deutschlands*, i. Introduction).

The highly interesting observations conducted since 1879 at the lighthouses and lightships on the English and Scotch coasts in regard to the species, numbers, and direction of flight of migrants have yielded similar results. From these observations it appears that all autumn migrants, with the exception of some northern swimming birds, arrive on the east coast of England by a westering flight. The same was observed on the east coast of Scotland, where, moreover, an opportunity was offered of observing how this course was continued in an unchanged direction across the mainland to the west coast. In many cases the flight in this direction did not even end there; thus at Cape Wrath, the most north-westerly point of the mainland of Scotland, the Gannet was observed passing in a westward direction for from six to eight days, its numbers being estimated at from two to three thousand. This westering flight must, however, of necessity have terminated in the northern Hebrides (*Migration Reports*).

Woodcock were likewise met with numerously on the east coast of Scotland. On eastern points of all the islands of the Orkney group they occurred more unequally and irregularly, but Saxby reports that they are also frequently met with on the Shetland Islands in the course of the autumn. This species is still found breeding beyond central Sweden, *i.e.* to the east, but only in isolated instances; hence all the birds above referred to could only have reached Scotland and its northern islands by a westerly course of flight; from thence, as a glance at the maps of the country at once will show, this westerly course of migration must of necessity pass into a southerly one.

The observations of the late John Wolley (reported to me by letter by Professor A. Newton) furnish the most northern example of an autumn migration proceeding in a direction from east to west. By the end of his first year's stay at Muonioniska in Lapland, 68° N. lat., this observer already felt convinced that migration proceeded in this direction. He first recognised this fact from the numerous arrivals of the Yellow Bunting at the close of the summer. These birds could not have arrived in such numbers in that locality during

the autumn migration from any other than an easterly direction. Henceforth the westerly course of these Buntings must have deviated towards the south, inasmuch as on the Shetland Islands only solitary instances of their occurrence have been reported (Saxby). They travel south as far as southern Sweden, where they again associate themselves with the westerly flights of members of their own species, whose breeding homes lie further south, and thus in part reach England, in the eastern counties of which country their number regularly increases with the approach of winter.

The case of the Shorelark is of similar kind; these birds arrive in autumn in East Finmark from the east, and are consequently known there under the name of Russian Snow Buntings. Collett says (see Dresser, iv.) that they travel from Norway east, and thence down through Sweden, and are seen in Lower Norway only in exceptionally rare instances. In southern Sweden they unite themselves with those coming from Asia: and thus have arisen the innumerable hosts seen in Heligoland within the last decades. The further migratory movements of this species will be treated of under its proper place in the middle part of this work.

In conclusion, we would mention the case of the Brambling. The nesting quarters of this bird lie in the northern part of Scandinavia, where they breed in great numbers, passing in autumn southward into the southern parts of the country. Here they evidently turn to the west, and fly across the North Sea, for they arrive in large flocks on the east coast of Scotland (*Migration Reports*). On the Orkneys and Shetlands, on the other hand, they occur far less numerously, which proves that on setting out from their nesting haunts they do not at once travel in a south-western direction, for in that case the main stream of migration would arrive on the above-named islands. Enormous numbers of these birds congregate in the interior of Scotland, and on the west coast, whence they continue their journey southwards; large numbers winter in Spain, and in exceptional cases even cross the Straits of Gibraltar.

During the autumn months countless droves of land-birds, both the larger and smaller species, as well as of Ducks, Geese, Swans, and other water-birds, may be seen on the coast and interior parts of the west of Scotland. All these are hastening to their winter quarters on a southerly or south-south-easterly course. These droves consist, in part, of birds which, like the Brambling, after arriving on the east coast, have traversed the country in a westerly direction, partly of birds resident on the mainland of Scotland, and partly of such whose breeding homes are in the Hebrides, and on the other islands of Scotland, situated nearer to the main-

land. The autumn migration of all these birds must of necessity proceed in a southerly direction.

The flight of these migrants has thus been followed from eastern Asia to the Atlantic shores of Europe. In the case of the most different species, and in districts so widely separated as central Germany, Heligoland, the eastern coast of Great Britain—including the Orkney and Shetland Islands—Norway up to a latitude of 70° N., in Finmark, the same results as to the direction of the migratory flight have been obtained. The latitudinal range of this migration front covers a stretch of no less than 960 geographical miles; and we may therefore consider as established, the view previously expressed, that a large, if not the largest, number of our autumn migrants pass over the longest stretch of their migratory journey in a direction from east to west; that while some may for a time change this course for a southerly one, the majority do not turn to the south before the termination of their westerly flight, and that in these movements they are entirely uninfluenced by the appearance and physical characters of the immense surface of continent they traverse.

In this long 'wave of migration,' however, each of the many hundreds of species which compose it does not follow a migration route, more or less narrowly limited, of its own, but all on setting out from the breeding area take up a westerly course which, within the latitude of their nesting stations, they pursue to its final goal, some making temporary digressions to the south in the course of the journey, others not turning south until the concluding stage of their migration has been reached.

Of course it may happen that some fraction or other of a broad migration column, having got over a line of sea-shore lying far below its path, may continue its flight uninterruptedly along the same, but this is only because geological conditions have given the shore-line a course corresponding to the direction of the migration movement, either from east to west or north to south, and ought in no sense to be attributed to any plan or purpose on the part of the wanderers.

In order to show the fallacy of such an assumption, we need only to examine afresh, and somewhat more closely, the migration route of Richard's Pipit, and of the many other species from eastern Asia, which visit Heligoland in such large numbers every autumn. All these birds cover the immense distance from the other side of Lake Baikal to the eastern extremity of Prussia without the aid of any of the alleged road-marks or guide-posts: are we, therefore, to assume that when arrived at the Baltic, they suddenly become utterly incapable of continuing their journey, except by following the comparatively small span of coast to Holstein? And when,

after having traversed this peninsula, they are in face of the North Sea, with every coast soon out of sight, what further guide is there left them for the rest of their journey? No doubt observers watching successive droves of migrants flying above the shore in the direction of the coast-line regarded these in the sense of one far-stretching host or stream of migration, little thinking that they themselves might possibly be stationed in the centre of a broad migration column extending for miles on either side to sea and land. Such, nevertheless, was undoubtedly the case: in proof of this assumption we may again cite the case of the Hooded Crows, which in endless hosts pass the island every autumn on an east-to-west course. The breadth of the migration column in this case may be estimated from the following considerations:—According to observations from fishing-boats stationed seven miles north of the island it had not reached its limit at that distance; while from the *Weser* steamer the birds were seen in undiminished numbers, and all pursuing the same westerly course, during the whole of her passage to the opposite coast, a distance of about six German or twenty-four geographical miles to the south. No doubt, had any of the above observers happened to be on any one of the islands on that coast, such as Wangeroog, Norderney, or Borkum, on a day like this, they would have at once appealed to their experience as furnishing a striking proof for their hypothesis—that migrants use shore-lines as marked-out migration routes, little thinking that they were really in the midst of a broad column or belt of migration extending from the point of their observation from thirty-two to forty geographical miles northwards out to sea, and an equal if not greater distance inland to the south.

Another example of an autumn migration proceeding in a broad front westwards was furnished by the Golden-crested Wren in October 1882. During the whole time of its migration the bird travelled past Heligoland in extraordinary large, in some cases quite uncountable multitudes. Observations made simultaneously at all the lighthouses, lightships, and many land-stations on the east coast of England and Scotland, proved that on the 7th, 8th, and 9th, among other days of the above-named month, innumerable hosts of this little bird were migrating westwards at all these points, from Guernsey northwards as far as Bressay, in the middle of the Shetland group. Thus, then, we have a migration column embracing nearly eleven degrees of latitude, or about 640 geographical miles; nor is there any reason to doubt that this enormous column may not have extended still further south, inasmuch as the breeding zone of the Golden-crested Wren by no means reaches its southern limit in the latitude of Guernsey—*i.e.* 49° N. latitude.

According to the English Migration Report for 1882, this astonishing mass-migration extended through the whole of England across the St. George's Channel to Ireland. It is, however, impossible to conceive that all these millions of birds could have wintered in Ireland; they must accordingly, after reaching the latter country, have turned on their course southward, and after once more crossing the sea, have landed on the coasts of Spain—a sea passage covering about the same distance as that between southern Sweden and the east coast of England—and accomplished the journey during long, pitch-dark October nights, under a sky overcast with dark clouds; such being the meteorological conditions requisite, at least in Heligoland, for mass-migrations of this character.

The fact that in more southern latitudes, especially during the autumn migration, some species are met with in large numbers at the banks or in the neighbourhood of streams, might at first sight appear to invalidate our conclusions as to migration movements in wide-reaching fronts or columns, and lend support to what is known as the theory of river routes. The explanation of this phenomenon is, however, a very simple one. Districts drained by rivers are generally endowed with a very varied vegetation, and a rich insect life; consequently they are welcomed by the majority of migrants as most desirable feeding-places. All rivers running north or south, from the Ebro to the Lena, are traversed along the greater part of their course by the numberless hosts of migrants travelling westwards in more or less widely extending columns. It is easy to see that they would be used as halting stations by such sections of the migratory host as are in need of rest, food, or water. Consequently one may expect to meet with large numbers, frequently even multitudes of birds, along such river tracts, while on the other hand, in districts remote from streams, on barren moors or over miles of bare and levelled fields, their occurrence would, with the exception of Larks and suchlike species, be extremely limited. Hence a superficial observation of such phenomena gave rise to the idea that migrants met with in the course of rivers and streams followed the courses of the latter —an idea which to all appearances seems more reasonable than the view that they had reached these quarters by a route crossing this direction.

It is of course quite natural that birds, particularly such as migrate in autumn from north to south, should; unless compelled to hasten their journey, in intermediate latitudes, follow for a time the direction of a stream, or, what amounts to the same, of a valley, in search of food. This, however, in no way touches the main question of the direction of migration generally.

In support of the theory of river routes, the large bulk of migrants met with during the autumn migration in such districts as the Rhone valley has been called into prominence. We have, however, shown by what has been said above, that a phenomenon of this nature is not only a possibility but an actual necessity, and that it is determined by causes other than those generally assigned to it.

The course of the Rhone from its confluence with the Saône lies, without any interruption worth mentioning, in an almost direct southerly direction. It lies accordingly in the path which would be followed by those southerly migrants travelling from Norway, Holland, and Belgium, across this part of France, in any case, even if there were no such stream flowing beneath this section of their migration front.

However, happening to lie where it does, the river and its valleys are used by the birds as suitable feeding grounds; and such species as in these southern latitudes are no longer obliged to hurry on, continue, after longer or shorter intervals of rest, to follow its course in their daily flights after food.

In a similar manner, again, migrants from England travelling south, make use of the banks of the Loire as resting- and feeding-places, although its course from central France onward is from east to west, and consequently is crossed at right angles by the line of flight of these droves of migrants; if, however, individuals are met with here, which actually follow the course of the stream, these can only belong to species, the main direction of whose migration flight is one to the west, and who persist in this course until they reach the west coast of France.

Naumann (vol. i. Introduction), in speaking of the influence of meteorological conditions on migration, refers to the tendency exhibited by migrants who have reached rather advanced southern latitudes to relax their speed of flight in order to look about for nourishment at their ease. His remarks are as follows: 'The fowler will notice this—*i.e.* the approach of bad weather—very frequently by the migratory movements of the smaller forest birds; these, under such conditions, instead of directing their migration-flight towards bushes, thickets, and the like places, as they are accustomed, pursue their flight without stoppage over the open country in a direct westerly course, their sole aim being to hurry forwards, without even giving themselves time to feed to the satisfaction of their appetite.' The great ornithologist is here speaking of the smaller forest birds of his own home—Central Germany—and what he considers an exceptional movement, *i.e.* 'the uninterrupted flight direct to the west,' is in fact the main movement of the autumn flight as instigated by the

migratory impulse, a movement which frequently becomes specially marked with a low and falling barometer; whereas, on the other hand, what in the above passage he alludes to as the customary migration-course of the birds is in reality a movement of a merely subsidiary character, though in this case one sufficiently powerful to attract notice in a latitude no further south than that of the district referred to.

We will next proceed to the consideration of the second great movement of the autumn migration, viz. that which proceeds in a direction from north to south. This course of migration is peculiar to a large number of species, more especially such as have their breeding quarters in high northern latitudes, and, in respect to the numbers of individuals taking part in it, fully equals the great east-to-west migration, while, as regards the distance traversed, it in many cases even surpasses the latter movement.

In proof of a migration proceeding in this direction may be cited many of the Warbler species, that of the Red-spotted Bluethroat being one of the most notable. This bird breeds in high northern latitudes of the Old World from Kamtschatka as far as the central and northern portions of Norway, while its winter quarters range throughout the whole of southern Asia and over the eastern half of north Africa. In Heligoland, as well as in Germany and Italy, it is of quite regular autumn occurrence; in England, on the other hand, only solitary examples of the bird have ever been met with, and these only at intervals of many years, while in France and Spain it has never been observed at all (Dresser).

It hence follows most decisively that the bird, in autumn, rigidly adheres to a southerly course of migration, and travels in a broad migration front which corresponds to the longitudinal range of its nesting area, and of which Heligoland forms the most western limit. Even a slight westerly deviation from their southerly course of such species as breed in the west of Norway could not fail to convey large numbers of these birds to the east coast of England, and their all but total absence there furnishes therefore an undoubted proof of the persistency with which the southerly course of migration is in this instance adhered to.

Another illustration of the north-to-south migration is furnished by the Red-throated Pipit (*Anthus cervinus*). This species also breeds in high latitudes from northern Asia to upper Norway, and in its autumn migrations likewise adheres to a most rigid southerly course, since it touches Heligoland only in the most exceptional cases, and has not been shot there more than six times within the last fifty years. Eversmann's Warbler (*Sylvia borealis*), too, seems

to direct its migration-flight in an equally unswerving southerly line. The breeding homes of this bird range through the higher latitudes of northern Asia and European Russia to Finmark, while in winter it migrates as far south as the Sunda Islands. Collett met with this species during the summer months at the Porsanger Fjord beyond 70° N. latitude; such individuals could therefore migrate from this locality only in a line direct south, inasmuch as the bird has only once been shot in Heligoland—in October 1854—and has never been observed in Germany. To these Warblers may be added the case of the Northern Nightingale (*Sylvia philomela*). The most western nesting stations of this bird are found in south Sweden and Denmark, and if it showed the least inclination towards a westward deviation from its southerly autumn course, it would not fail to touch Heligoland, if only in small numbers, every autumn. Quite to the contrary, however, only one instance of its occurrence on the island has ever been recorded, and even that is really of no value to the subject under discussion, inasmuch as the bird in question was caught at the lantern of the lighthouse on the night from the 4th to the 5th of May 1855.

The area next to be discussed comprises Finland and the more northern parts of European Russia. Here we find the most western nesting stations of the Siberian Chiffchaff (*Sylvia tristis*), the Yellow-headed Wagtail (*Motacilla citreola*), the Yellow-breasted Bunting (*Emberiza aureola*), the Terek Sandpiper (*Limosa cinerea*), and the Red-footed Falcon, the last-named species being met with numerously even as far north as Archangel. The rare appearance of these species in Heligoland, or their total absence from the island, proves that their autumn migration must be strictly confined to a southerly course, since any deviation from such a line of flight to the west could not fail to convey them to Heligoland in large numbers, as is the case with other species whose breeding homes lie in the same districts. The Siberian Chiffchaff has only once been caught in Heligoland, though it has been seen on two subsequent occasions. Of the Yellow-headed Wagtail I have only taken five young birds in autumn plumage within the last fifty years, and of the Yellow-breasted Bunting during the same period, two young birds in autumn plumage and a female in the spring. The Terek Sandpiper has never been seen in Heligoland; in Germany and northern France it appears to have been shot only once; while it has been met with in no other districts lying to the west of its breeding stations. The Red-footed Falcon has been shot five times in Heligoland, but invariably in the summer, and under conditions which would lead one to assume that the birds in question would have to be counted among

those breeding birds which, having lost their mates, happen to straggle to Heligoland from Greece and Asia Minor during the earlier summer months. This phenomenon will be treated more fully in the chapter on exceptional phenomena attending migration.

We cannot dismiss this subject of the great southerly movement of the autumn migration without referring to the truly enormous and wonderful stretches of road which some species are in the habit of covering during this movement. In this respect two species of Sandpipers—the Curlew Sandpiper and the Knot—are unsurpassed by any other. Up to the present we are unacquainted with the eggs of either species, though young in down of the Knot were brought home by Captain Feilden from Grinnell-Land in 82° N. latitude. The nesting-places of the Curlew Sandpiper, however, have not yet been reached, and can only exist in the islands or tracts of land situate within the Polar basin. For further details on this head the reader is referred to the separate descriptions of these species in the third part of this book. As these birds have been met with in the winter in New Zealand, they must have performed a southern flight equal to nearly half the circumference of the globe.

Besides the two great migration movements hitherto discussed—the one proceeding in a westerly, the other in a southerly direction—we are met with another most surprising phenomenon, viz., that more or less considerable numbers of individuals of many species whose normal autumn migration belongs to the latter (N.-S.) type, turn to the west on quitting their nesting stations, and migrate to western Europe instead of southern Asia. This tendency is by no means peculiar to those species whose breeding range extends to western Asia or north-eastern Europe, as is proved by the cases of the Siberian Chiffchaff, the Yellow-breasted Bunting, and the Terek Sandpiper. On the contrary, all our experience goes to show that it is more especially manifested by species whose breeding homes are farthest removed from Europe, as, for instance, in the case of the Yellow-browed Warbler, which breeds on the further side of the Jenesei; and still more so in that of the Richard's Pipit, whose breeding stations lie on the farther side of Lake Baikal. Moreover, this tendency is generally confined to particular species only of a genus, being entirely absent in others of the same genus. In proof thereof we may cite the case of the Yellow-breasted Bunting and the Little Bunting—two species breeding in the north-east of European Russia—whose nests may be found almost side by side. Of these the former has only been seen in Heligoland on three occasions within more than fifty years, and with the exception of an example met with at Genoa, has never

been observed in central or western Europe. The Little Bunting, on the other hand, appears in Heligoland every autumn, and is frequently shot. I have myself handled it on no less than twenty or thirty occasions. In Holland the bird has been frequently caught during the autumn migration, and in one instance at least is known to have occurred in England; several individuals have also been met with in Austria and Upper Italy. In the south of France, however, which seems to be the terminus of the autumn migration of the western migrants of this species, it is said to be 'the commonest of the rarer Buntings,' small companies of it wintering at Marseilles. Inasmuch then as both species are found breeding in about equal numbers in the neighbourhood of Archangel, both too belonging to species whose autumn migration is directed south, we are confronted by the question as to what may possibly be the cause which determines the one, the Little Bunting, annually in large numbers to turn to the west on starting for the common nesting home, while the other, the Yellow-breasted Bunting, is hardly ever induced to swerve in this manner from its normal southerly course.

There is no doubt that many species of birds have a tendency, apart from their normal southerly migration, to wander westward in greater or less numbers, while in the case of many others this appears never to be the case. The commoner, more widely distributed species, however, do not offer the same favourable opportunities for observing this phenomenon as those cited above, which are better adapted for an investigation of this kind by reason of their more showy plumage, or the more strictly defined range of their breeding quarters. That, however, many species from eastern Asia are subject to such a tendency is proved by the large number of examples already mentioned as having been either killed or observed in Heligoland, to which may be further added:—The Isabelline Shrike (*Lanius isabellinus*), White's Thrush (*Turdus varius*), Red-throated Thrush (*T. ruficollis*), Black-throated Thrush (*T. atrigularis*), and Pale Thrush (*T. pallens*); *Sylvia nitida*, *S. viridana*, *S. coronata*, *S. reguloides*, *S. fuscata*, Booted Warbler (*S. salicaria*), Olivaceous Warbler (*S. pallida*), Paddyfield Warbler (*S. agricola*), and Pallas' Warbler (*S. certhiola*); the Black Lark (*Alauda tatarica*), and the White-winged Lark (*A. sibirica*); the Rustic Bunting (*Emberiza rustica*) and the Pine Bunting (*E. pithyornis*); the Eastern Golden Plover (*Charadrius fulvus*) and the Caspian Plover (*C. asiaticus*), as well as many other less prominent members of the feathered tribe.

The majority of the above-named species have, it is true, been shot only once on the island; nevertheless some of them, such as

S. viridana, have occurred three times, the Rustic Bunting more than ten times, and White's Thrush more than fifteen times. Moreover, from a list of this length, comprising so many prominent species, we may conclude with certainty that many others not mentioned therein have visited the island without being observed; while the fact of such a large number of species having occurred within so small an area as Heligoland seems to show that occurrences of this kind must be far more frequent every autumn in a country so near as Germany, as well as in central and western Europe.

If, now, we turn our attention to the spring migration, we shall at once find that this is characterised, in all its various phenomena, by striking differences from the great autumn movement which we have just discussed. Here we nowhere meet with any attempt at dividing the long migration flight into short convenient stages, such as is often the case after the first great advance during the autumn migration; nor do the birds at this time anywhere exhibit a tendency for taking long spells of rest in the course of their journey. Unrest and an impelling haste are everywhere the prominent characters of the movement during its whole progress.

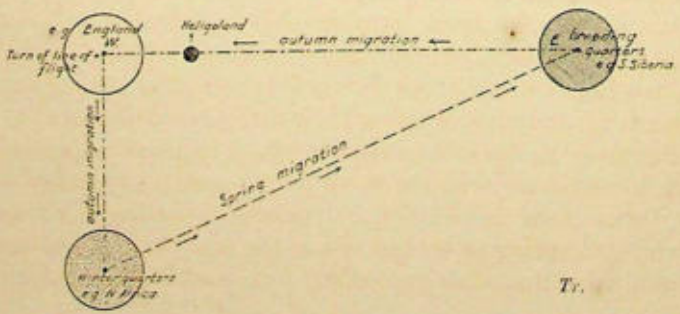
Of the migrants which have arrived before daybreak, or during the early morning hours, many continue their journey after only a few hours stay; by ten o'clock the majority have left the island, and soon after noon almost every one of them has disappeared. Should, however, the weather promise to remain favourable, many others will make their appearance in the course of the same day. Among them flocks of Swifts are seen hurrying on, while Hooded Crows continue to pass over till sunset. On calm sunny days, during the later hours of the afternoon, thousands of Curlews and related species may be seen, at heights of thousands of feet, tearing along in rapid flight from east to west across the island. Their clear calls are scarcely audible from the immense height; but not one of the wanderers hesitates in his course, or shows even an inclination to tarry for one brief moment.

Indeed, in fine and favourable weather there is at such times scarcely a break in the great onward movement, for the passage of the high-flying species towards evening is followed, during the quiet interval of twilight, by that of the Song Thrushes, Redbreasts, Hedge Sparrows, Golden-crested Wrens, and others which are resuming their journey after a stay of a few hours or more, though, from their having already repaired to the shrubs and bushes of the gardens, one might have supposed they were intending to stay for the night. Suddenly, however, through the stillness of the evening there resounds the call-note of a bird as he rises on the wing.

Some of his comrades answer, and follow in his flight. After a considerable elevation has been attained the whole flock assembles, and soon all, travelling eastwards, have vanished from sight. Such departures take place an hour after sunset, after which there seems to be a short pause. Soon after midnight, however, the migration commences anew with the arrival of countless wanderers, whose numbers increase with each succeeding hour of the dawning day.

In all the phenomena of the spring migration the motive of reaching a fixed goal within a strictly limited time, and for a definite purpose, is clearly manifested. It follows naturally that the direction of migration should be specially influenced by this aim, their nesting homes being generally situated in latitudes considerably above those of their winter quarters; the shortest route would be one in a direct line between these two termini, *i.e.*, for the majority of species, in one directed more or less to the north. Such a course is, in fact, at once adopted in spring by those species whose migration in autumn had proceeded in a direction to the south; but besides these we have the case of those migrants which, after at first following a main westerly course in their autumn migration, terminated their passage by a deviation to the south in England, France, and Spain, and in this manner also have reached latitudes lying considerably to the south of their breeding haunts. In the spring, however, such birds do not return to their nesting quarters by retraversing in the opposite direction the circuitous path of their autumn passage, but now travel in a direct line, leaving points touched at during their autumn migration far to the north of their new, less complicated route. In fact, if we represent the line of their autumn migration by the base and perpendicular of a right-angled triangle, the path of their return passage in spring will be represented by the hypotenuse of such a triangle.[1] This will at once explain the remarkable phenomenon previously referred to, that all eastern species reaching Heligoland in autumn by a westerly course, but subsequently turning south, are hardly

[1] As may be illustrated by the following figure:—



Tr.

ever seen again in the island during the spring migration. Nor is this the case only with the rarer occurrences from eastern Asia, but other birds also—such as Richard's Pipit, which are considered quite common autumn visitors here—are hardly ever seen in spring except in the most isolated instances, these latter being undoubtedly individuals which have passed the winter in the south of England or Ireland.

The same applies to the Yellow-browed Warbler, a bird which may be met with almost daily in favourable weather during the autumn migration, but which in spring has only been observed twice in the course of a long series of years. The Little Bunting, again, equally frequent in autumn, has never yet been observed in spring. Take, again, that very common species, the Hooded Crow; every autumn these birds travel *viâ* Heligoland to England in numbers so immense that a large part of them, unable to find sufficient room and food in the latter country, pass across the channel into the north of France.

But scarcely half of the autumn visitors return *viâ* Heligoland in the spring, and for the simple reason that the very birds which have crossed over to France travel on their return passage east, *viâ* Holland and North Germany; Heligoland and the North Sea being traversed only by such of the birds as have passed their winter in England.

The direction of the latter birds on their return passage in spring is naturally from west to east. There remains, however, the astonishing and scarcely explicable phenomenon that all the migrant hosts, observed by day or heard during the night, move in spring just as they did in autumn, solely and without exception between these two points of the compass, viz. E. and W. In Heligoland, and on the sea around the island at least, not a migrant is to be seen in the spring travelling in a direction from south to north. Nevertheless, there must be a large number of birds whose migration course in spring does proceed in the latter direction, as, for instance, the Bluethroats already mentioned, as well as Warblers, Wagtails, Chats, and many others. Such birds begin to arrive at dawn. By sunrise their numbers have increased to almost incredible proportions, but diminish with equal rapidity in the course of a few hours without our being able to realise by our senses the manner and direction of either their arrival or departure.

Moreover, in the case of species whose migrations proceed from north to south, and *vice versâ*, we do not notice so marked a difference between the numbers of individuals departing in autumn and returning in spring as is observed in the case of those species whose autumn migration, after proceeding from east to west, is terminated

by a southerly deviation. Thus the Bluethroats, Redbreasts, small Warblers (Willow Warbler and Chiffchaff), Redstarts, Chats, and others, return in spring in numbers as large as those in which they departed in autumn. In fact, one would hardly believe that many a one must of necessity have succumbed to the dangers of a long winter absence. On the 26th of May 1880, for instance, all the gardens of the island teemed with the Northern Bluethroat to such an extent that their numbers in the nearest gardens were adjudged by myself and my collectors at considerably above five hundred. Stonechats occurred in such quantities that Aeuckens estimated them at 'milliards,' while in my diary they are noted at the more modest but still respectable figure of 'many thousands.' I may remark in passing that, in the case of both species, old males were found in quite solitary instances only, which seems to show that the migration of the two species was approaching its close.

We have stated in the course of this chapter that the birds perform the journey from their winter quarters to the breeding stations, if possible, in one uninterrupted flight. This view is supported in a high degree by observations made here incidentally during the capture of birds at night at the lighthouse. It is a fact well known to every fowler here, that, in the spring, the feathered wanderers do not begin to make their appearance until after midnight, from about one to two in the morning; that their numbers, moreover, do not only increase with the approach of day, but that fresh birds continue to arrive for a long time even after sunrise. Snipe and Blackbirds, in fact, continue to arrive in large numbers during the whole of the morning, especially if there has been a sharp hoar-frost before daybreak, and the morning is calm, warm, and sunshiny.

Matters proceed quite in the opposite manner in autumn. The birds then arrive here as soon as it gets dark—from seven to eight in the evening. Their numbers do not increase as the night advances, but diminish with the approach of daylight. With the exception of the Hooded Crows and Finches—which only migrate during the day, and are joined during the morning by Starlings, who migrate both by night as well as day—the migration may be said to be virtually at an end by the time the sun has fully risen; so that the snipe-catcher for instance, in autumn, if the catch has not been a very good one at dawn, will take in his nets as early as seven o'clock in the morning, whereas in spring he will, under similar conditions, leave them out till noon and even later, with good results.

Inasmuch, then, as experience teaches us that of all the nocturnal migrants which come under consideration here, some

begin to start on their journey towards evening, others soon after sunset, we can only explain the at first numerous, and afterwards gradually diminishing, arrivals during autumn nights, by assuming that these birds must have originated from near, or at least not very far off, homes; while, on the other hand, the spring wanderers, arriving at one or two in the morning and increasing in numbers from that time onward, must have started from regions very far distant—the first arrivals, perhaps, from the south of Europe, the later ones from the northern or central regions of Africa. Among the latter, our old friend the Northern Bluethroat may be again cited as an instance; the fact that this bird is never seen during the night by the lantern of the lighthouse, but invariably makes its appearance here in Heligoland only towards sunrise, is a further proof of its long journey from northern Africa—a journey, performed in one uninterrupted flight, which may well excite our astonishment and admiration.

As we have shown in this chapter, the routes by which birds travel twice during the year in order to accomplish their special purposes, are as different from each other as those purposes are themselves. The autumn migration conducts the travellers in various directions to their winter quarters. These extend from west Africa through India to the Philippine Islands, some species from eastern Asia even advancing as far south as Australia and New Zealand. From this enormous migration-front, embracing half the circumference of the globe, flocks in their thousands pour forth in spring, in incessant haste and by a direct road, to their far-off homes at a greater or less distance from the Pole. At this time, the numbers migrating between west and east are considerably diminished. It makes, however, but little difference whether in autumn the number of those migrating from east to west exceeds that of the travellers from north to south, or whether in the spring those journeying from the Equator to the Pole form the predominant majority. Both phases of the great movement unfold a picture of bird-life of incomprehensible grandeur, presenting to our wondering sight myriads of these restless wanderers hastening during the long dark nights of autumn or the starlit midnight hours of spring, by many intersecting paths, to their far-off winter quarters or nesting homes; each species following, at higher or lower regions in the sky, a sure and definite road, not marked out for them along river courses or mountain chains, but one that leads them, independent of every physical configuration of the earth's surface, and at heights many thousands of feet above it, surely and safely to the distant goal.

III. ALTITUDE OF THE MIGRATION FLIGHT

The altitude at which the various species of birds fly during their migrations is another aspect of the phenomenon which has in a special degree attracted the notice of observers. Observations extending over many years have led me to the conclusion that, as long as migration proceeds under its normal conditions, this elevation is, in the case of by far the larger number, so great as to be completely beyond the powers of human observation; while we must regard as disturbances and irregularities of the migration movement proper, due to meteorological influences, such portions of it as are brought within our notice. Here I ought to remind the reader, that when I speak of migration proper, I mean those large, extensive movements which, on the one hand, in autumn, conduct our migrants from their breeding homes to or very near to their winter quarters in one uninterrupted, and for the most part, nocturnal flight; and on the other hand, in spring, convey them in the opposite direction from their winter quarters to their breeding haunts—the uninterrupted continuity of the flight being still more marked in this latter phase of the migratory phenomenon.

Quite of another kind from this main movement are those shorter peregrinations, at low elevations in the air, which many birds perform in greater or smaller companies during the day, chiefly in autumn. By wanderings such as these, which cease as the day declines, the birds pass from field to field and wood to wood, picking up food on their way. Companies of this kind are probably more or less mixed as regards the species composing them, and may be looked upon as consisting partly of members of the main body of migrants which are taking a temporary rest during their journey, or of birds from more or less neighbouring districts which are about to join the main stream of wanderers, all such individuals, though influenced by particular meteorological conditions, being nevertheless unable to resist the migratory impulse working from within. Short day-trips of this kind, how-

ever, are performed by the birds at their ordinary everyday speed of flight, and have nothing in common with the great and powerful migration flight which is here under consideration, and which, as it is displayed pre-eminently in Heligoland, proceeds at unknown heights, with a tremendous velocity, and, for the most part, during the dark hours of night.

Though observations on the extreme height of the flight of birds, so far as this can be ascertained directly by our power of sight, are naturally very limited, our experience in this direction nevertheless goes to show that birds can exist without difficulty in strata of the air at such heights and of such a low density as neither man nor any other warm-blooded creature could live in for any length of time. Birds, therefore, must be organised in such a manner as, on the one hand, to be uninfluenced by so considerable a diminution of air-pressure as one meets with at heights from 25,000 to 30,000 feet, and, on the other hand, they must be able to exist on the considerably reduced supply of oxygen obtainable in strata of such rare density. Or, again, their respiratory apparatus must be of such a nature as to be capable of abstracting from these rarefied air-strata the amount of oxygen required by the blood, as easily as it is able to remove it from the denser layers close to the earth's surface. An organisation of this kind would give to birds a completely distinct and unique position among all warm-blooded animals.

If, then, we are obliged to assume the existence of a special respiratory mechanism enabling birds to remain in strata of the atmosphere beyond the reach of all other organised living beings, how much more difficult is it to account for the means which render them capable of flying in an atmosphere whose power of supporting weight, *i.e.* buoyancy, is so considerably reduced. The first idea which here suggests itself is that birds are capable of taking in relatively large quantities of air, and of storing these for any desirable time, employing for this purpose not only the cavities of such of their bones as are devoid of marrow, but more especially, and in a considerably greater degree, the air-sacs which lie within the thoracic and abdominal cavities, as well as between the outer integument and the body walls. Air-sacs of this latter kind are found, so far as my own observations go, on all parts of the body devoid of quill-feathers, and reach their largest extent on both sides of the base of the neck, below the wings and behind the thighs. Anatomy proves that all these air-sacs are connected with the lungs, and are filled from the latter organs. Probably owing to the possession of these air-sacs, the flight of birds in the higher strata of the air is so much facilitated that they are enabled to apply the muscular

power of their instruments of flight almost exclusively to the execution of their forward movements. This results partly from the fact that by the filling of the air-sacs the volume of the bird is enlarged, and its specific weight consequently diminished, but also from the air taken in at any particular height being warmed by the heat of the body, and considerably rarefied in consequence, so that the contents of the air-sacs are always considerably lighter than the air which occupies surrounding space.

My own observations go to prove that the total volume of the outer air-sacs when filled with air in itself already exceeds that of the bird's body, and that if we add to this the volume of air contained in the thoracic and abdominal cavities, and in the bones and quills of the feathers, we may estimate the total volume of air contained by the bird as easily exceeding that occupied by the solid substance of its body. On the other hand, the temperature of the atmospheric layers in question is always considerably below the freezing point. Thus Glaisher at a height of 20,000 feet noted a temperature of −25° C. (13° F. below zero); and since the internal body-heat of birds is about 42° C. (107·6° F.), the difference of temperature between the outer air and that of the air contained in the air-sacs may reach 67° C. and above.

More exact calculations, based on physical laws, have undoubtedly compelled us to recognise that this warm charge of air in the air-sacs of birds is unable to facilitate their flight to any considerable extent. Nevertheless, long-continued observations in Nature have convinced me that birds must be endowed with a certain capacity for soaring or floating in the air which is independent of the use of their external instruments of flight. Such a thought at once suggests itself if we watch birds, like, for instance, the large gulls, who soar about for hours long over the sea, be the weather stormy or perfectly calm, at heights up to six hundred feet, advancing or turning about in whatever direction they please, without executing the least movement with their wings. It is impossible to conceive that excellent flyers like these should be able to maintain these soaring movements for so long a time, and without all apparent efforts, if they had not at their command other means besides the mechanical aid of their wings.

If, as I have had occasion to do for many years, one pays attention to the large numbers of Buzzards when they are about to depart, one cannot fail to be convinced of the existence of some such accessory means of locomotion. In one such instance, that of the Common Buzzard, the birds soared over the island at an elevation of about two hundred feet. I intentionally confined my attention exclusively to one individual. Without any motion of its wings,

this bird mounted higher and higher; when it had reached an elevation of about four hundred feet, it performed two or three strokes with its wings, and then soared upwards without any further wing-movements. There was a very light south-east wind—in fact almost a calm—at the time, and a light white stratum of cirrus clouds, miles high, covered the sky uniformly; the meteorological conditions being, in fact, as favourable as possible for observations of this kind. The bird's position in the air lay in a direction about south-south-east—in fact, very nearly south. Without changing the direction of the axis of its body, or even its horizontal position, it reached, soaring vertically upwards, in the course of a minute, a height of at least 1000 feet, and still continuing in its upward course, finally disappeared from view in the clear noon-day sky in company of from twenty to thirty other birds of the same species.

The fact that these birds soar upwards without wing-movements, and yet steadily and rapidly in unbroken lines, to heights where the human eye can no longer reach them—in the present case at least 12,000 feet—renders this phenomenon still more remarkable, and gives it a most striking likeness to the ascent of a balloon.

An attentive observation of the flight of the large gulls, soaring for hours at the same height in a perfectly calm atmosphere, without the least motion of their wings, is indeed sufficient to convince us that the expanded wing-surface alone could not be sufficient to prevent the bird from sinking, in virtue of its weight, after the fashion of a parachute. How much less, therefore, is it possible that an upward movement like that of the Buzzards noted above could be effected by an immovable expanded surface of this kind? For further remarks on this subject, see under Herring Gull, Part III. No. 358.

By executing a number of wing-strokes, repeated at longer or shorter intervals, birds may acquire a certain velocity of flight which would enable them, by slightly raising the forepart of their bodies, to glide, as it were, upwards supported by the resistance of the air. In this manner they would be enabled to ascend in a spiral path, as actually was the case with some Common Kestrels which were accompanying the above-mentioned Buzzards in their migration. Some birds, again, like many of the smaller species of Falcons, when engaged in what is known here as 'Rütteln' (*i.e.* shaking), or Larks during their song, are able by means of a rapid, almost trembling motion of the wings, to remain for a moment suspended at a particular point in the air; none, however, can, by the sole help of their outspread wings, remain soaring for any length of time in a calm atmosphere at the same height,—to say nothing of rising upward.

Instance after instance might be cited in support of what has been said above; we shall, however, let one suffice, and that the case of a bird which may appear little adapted for a soaring flight of this kind—to wit, the Golden Plover. In the autumn, when the young birds of this species are shot here, it is usual to decoy them within range by imitating their call-note. The birds, though in other respects not particularly distrustful, are rendered shy through being repeatedly shot at, and in consequence fly to heights beyond shooting range; nevertheless, they may be lured back to the desirable distance by the stratagem above referred to. When the birds decoyed in this manner have come into a position in the air nearly vertically above the head of the shooter, they almost invariably remain soaring, with calmly outspread wings, for a shorter or longer time over the same spot, spying downwards and answering the feigned call-notes, until, discovering that they are not those of their kindred, they quickly hasten off with rapid beatings of the wings.

These birds are almost without exception well nourished, and their weight is, in proportion to the surface-area of their wings, so considerable, that, unless they were supported by other accessory means, they would, in the absence of any movement of their wings, be at once obliged to sink. These means, in the present case, however, neither consist in any rapid movements on the part of the birds, as already stated above, nor in air-currents, since the shooting of these birds, as a rule, only goes on in fine and perfectly calm weather.

All attempts with which I am acquainted, to account for the flight of birds, are based on the assumption that birds are able both to maintain themselves suspended in the air as well as to move forward in it, either by continuous—more or less rapid—movements of their wings, in the same way as a man uses his arms in swimming, or that the same end may be attained without these continuous wing-movements, through the agency of a current of air of sufficient strength; but that, without either the one or the other of these conditions, flight is an impossibility. Captain F. W. Hutton says in his *Mechanical Principles involved in the Sailing-flight of the Albatross*: 'In a perfectly calm atmosphere an Albatross with outspread wings would drop unless it was also executing a forward movement.'

My own unremitting observations, however, extending over a lifetime, aided by an artist's eye specially trained for form and motion, and subjected to the most severe self-criticism, are so much at variance with all explanations based on mechanical laws, of the kind referred to above, that I am obliged to consider the question of bird-flight, as yet, as an unsolved and perfectly open one.

The habit of immersing a part or the whole of their bodies under water, which is peculiar to many, if not all, Divers, is related to that of aerial soaring, although this action is executed in an exactly opposite manner. Great Northern Divers, Grebes, Cormorants, Diving-Ducks, and other related species, if pursued—while swimming on the sea—for any considerable time by shooters in boats, gradually immerse themselves to such a depth that only their heads and the upper parts of the neck project above the water. If, however, they are very hard pressed, they sink completely below the surface, and swim for a distance of from a hundred to a hundred and fifty paces horizontally beneath it, only momentarily exposing their heads and necks for the purpose of breathing. Grebes, indeed, especially if they have been already shot at, will, under such conditions, expose nothing but their beaks up to the eyes.

All these birds when alive and undisturbed (as also do their carcases) float so lightly on the water that they scarcely make any noticeable depression in it. Nor is this surprising, for all of them have their undersides clothed with a covering of down and feathers; in the case of a somewhat shrunken specimen of a medium-sized Grebe in my cabinet this covering has nevertheless a thickness of 15 mm. (0·59 in.), while in a Great Northern Diver of the same size it reaches a thickness of from 20 to 25 mm. (0·79 in. to 0·98 in.). It is perfectly easy to understand how birds can, without difficulty, float on the water on an almost weightless support of this nature, which is, moreover, filled with warm air; but it is difficult to explain how, in spite of such a float, they are able to immerse themselves under the water, and to remain for any desirable length of time beneath the surface. Thus a Little Grebe managed to escape observation on a piece of water about sixty paces in diameter and from two to three feet in depth, by immersing itself up to its beak and eyes in the middle of the pond, and remaining quietly beneath the surface. What is still more surprising, the bird selected for its hiding-place a part of the pond where some dried grass-blades, and wood-shavings about an inch long, were floating about, which entirely diverted one's attention from the insignificant portion of its head and beak which were still visible above the water. On another occasion, a bird of the same species remained quietly immersed at the margin of the same pool, where the water was only about six inches deep, so that only its beak and eyes remained above the surface. It should moreover be noted that, in the first instance, the depth of the water, as well as the absence of any kind of vegetable growth, completely precludes the supposition that the bird might have obtained some kind of hold or attachment under the water, while in the last case the bottom was so level and hard that it is quite

out of the question that the bird could have held on to it with its feet. In both cases the birds remained perfectly motionless, since the least motion would, at so short a distance—at most some thirty paces—have at once betrayed their hiding-places. Naumann, in vol. ix. of his great work, relates similar experiences in regard to this small Diver.

Another extremely valuable opportunity of observing this quiet immersion of the body was presented to me many years ago in the case of a Cormorant in a pond in the Zoological Gardens at Hamburg. For the purpose of catching some of the swallows which were roving in fairly large numbers over the surface of the water, the bird had immersed itself to such a depth that only its head remained visible above the surface; in this position it remained perfectly motionless, for the least movement of its feet would have been at once betrayed on the perfectly smooth surface of the water. The swallows, foreboding no ill, frequently came up very close to it, and when the bird thought it could reach one of them, it would, quick as lightning, protrude its neck and make a snap at it. After four or five unsuccessful attempts, it actually did manage to catch one of them, which it swallowed after giving it a few shakes in the water. It then quietly re-immersed its body as before, and with neck drawn in continued to lie in ambush for further prey.

This immersion of the body in and below the water witnessed in such birds must not be confused with their diving for food, which may be seen every day. In the performance of this operation the body is placed in a nearly vertical position, and is then driven beneath the water by powerful upwardly-directed strokes of their swimming feet; hence the desired result is obtained simply by the expenditure of mechanical force, just as the ordinary flight of birds through the air is attained by rapid and powerful strokes of the wings.

To enable the bird, however, to immerse its body under the surface of the water slowly, and to maintain it in that position without movement, it is necessary that its specific weight should be increased considerably above that of the water, and it is quite impossible to see how this can be effected. The total bulk of the solid parts of the body of a Great Northern Diver may be estimated at about one cubic foot; hence, in order to be enabled to sink, the weight of this bulk should exceed that of the same volume of sea-water. It does not, however, actually amount to the fourth part of this weight; for the heaviest of these Divers I have ever examined weighed fifteen pounds, whereas a cubic foot of water from the North Sea weighs sixty-two pounds. This already considerable difference between the weight of the bird's body and that of an

equal volume of water is, however, still further increased by the covering of down or feathers, which, permeated by warm air, surrounds the body as already mentioned.

Hence, after all that has been said above, the question how the body of a bird is enabled to sink and remain for any length of time beneath the surface of a specifically heavier medium, like water, becomes as difficult of explanation as that of the capacity for soaring up into a specifically lighter medium, such as the air, unassisted as these faculties are, in both instances, by mechanical aids, or currents of air, or water, respectively.

The capacity of birds for rising to great heights in the air is undoubtedly turned to account to a certain extent by some or perhaps by many species, even during the ordinary activities of their everyday life. Thus Vultures, and—according to von Middendorff (*Isepiptesen*)—Common Ravens, ascend to astonishing heights for the purpose of finding food. In general, however, this peculiar faculty is brought into full and continued requisition only during the migration flight, which is in fact the only occasion on which it can be fully turned to account. It is consequently beyond denial that this faculty must have been imparted to birds solely for purposes of migration. Observations in Nature most convincingly testify to the truth of this conclusion, since birds, without exception, on starting for their great migration journeys, immediately rise to heights elevated far above the regions of their daily flights—heights, moreover, which in the case of the vast majority of species, are completely beyond the range of all human perception.

In the case of our small Warblers—Thrushes, and the like,—this limit of visible elevation may perhaps not amount to much. It is otherwise with the larger-sized birds, as, for instance, the Stork, or preferably the dark-plumaged Crane, a bird which rises into the clear sky with an expanse of wings of from seven to eight feet, until it becomes almost indiscernible to a keen eye (Naumann), at a height which can hardly be estimated at less than 15,000 to 20,000 feet. A dark-coloured flag, from seven to eight feet in length, on a ship, may still be distinctly recognised at a distance of a mile. At the same time it is well to remember that the conditions for seeing far-off objects are far more favourable in vertical than in horizontal distances.

The most astonishing results in regard to the heights to which birds will rise spontaneously, and at which they are capable of remaining for any desirable length of time, have been furnished by the observations made on the Condor by Humboldt in the Andes, according to which this bird wheeled about in the air in that district for hours at a height of 22,000 feet (*Ansichten der Natur*, ii. p. 52).

Humboldt, however, subsequently added that the bird probably attained even greater altitudes than those obtained by calculation, and states that on Cotopaxi, 13,578 feet above sea-level, he had seen it soaring above him at such a height that it appeared no larger than a small black 'dot.' This height cannot with certainty have been less than 30,000 feet. From calculation we find that an object eleven feet in diameter would require to be at more than double that elevation before it disappeared from view; and, according to Humboldt's statement, eleven feet may be assumed as the average expanse of the wings of the Condor during flight. An idea of the almost incredible distance at which objects may be seen in the clear mountain air of these regions may be formed from further reports of Humboldt, according to which he was able with the naked eye to observe Bonpland, who, clad in a white mantle, was riding along the dark face of a cliff at a horizontal distance of 84,132 feet.

Practical observations made in the open air in Heligoland have yielded similar results. The oyster bank, which lies to the east of the island at a distance of 22,000 feet, is frequently visited by vessels; if one of these on a clear day were to display a flag of the same breadth as the expanse of wing of the Condor, it would not only be at once seen from the island, but in a favourable light an eye of ordinary keenness might even be able to recognise its colours—say, blue, red, and white.

One is justified in assuming, that in the high clear mountain air in which Humboldt's observations were made, the distance at which the bird was visible was at least as great as that at which a flag of a breadth equal to that of the bird's wings could be seen in a low, mist-laden atmosphere, like that round Heligoland. Hence there can be no doubt that 40,000 feet is only a low estimate for the height of the Condor's flight above sea-level.

Results such as these tend to make one hesitate in pronouncing an opinion as to the altitude of the flight of a bird, such as, for instance, the Grey Vulture, with a wing-expanse of ten feet, one of which Dresser watched through a good pair of field-glasses, until the bird before disappearing from sight, was reduced to the size of a small dot.

In comparison with observations like these, my own experiences in this place in regard to this subject will appear insignificant. The main result deducible from them, however, is, that, with few exceptions, the altitudes of migration are far beyond the limits of vision of the sharpest eye. Of course, the various species differ as much from each other in the height of their migration as they do in regard to the direction in which the movement proceeds; but in the case of the vast majority of migrants, both on arrival and departure, the

vertical elevation at which they appear and disappear invariably represents the limit to which human vision is able to penetrate. On the other hand, the number of species whose normal migration flight does not exceed a few hundred feet above the earth's surface, is hardly worth mentioning; and even of these, some, like the Rooks and Curlews already referred to, will, under certain conditions, pass across Heligoland at heights as considerable as 10,000 to 15,000 feet.

I have seen Sparrowhawks arriving here during the autumn migration, which, as they became visible vertically overhead, appeared no larger than small specks of dust, and must, according to a fairly reliable estimate, have been at a height of no less than 10,000 feet. My scale of comparison in this computation is the distance of the extreme southern point of Sandy Island, amounting to 8000 feet. Among the large droves of Hooded Crows which fly across this point during the migration period it is possible to distinguish from the cliff, with the utmost ease, every single bird; whence it seems quite out of the question that the height at which the above-named Hawks became visible was in any way estimated too highly.

The arrival of these Sparrowhawks took place on a bright autumn afternoon; the sky was uniformly covered by the high, white, streaky kind of clouds, specially favourable for observations of this nature. For the space of about an hour the birds kept coming in sight at the height before mentioned, singly and in groups of three or four, wheeling about in circles as they descended to lower altitudes.

In the case of other species, this descent from heights at which the birds are not visible proceeds in a different manner. Ringdoves and Woodcock often precipitate themselves with the rushing noise of a rocket, but with far greater velocity, in an almost perpendicular line, or describe a zigzag—single or double—in their descent. The bird itself may not yet be visible; but if, attracted by the rushing sound, one looks in the direction whence it proceeds, one notices a small irrecognisable dot, which however, almost at the same moment, shoots past one in the form of a bird. Doves break their descent when they are still a considerable distance from the ground; but Snipe rush down to within two or three feet from the surface, and continue in a roving course at a very low elevation above it. Occasionally, too, they sweep with undiminished velocity right down to the rubble at the base of the cliff, where all of a sudden they are found sitting as quietly as though they had never been on the move. In each instance of this kind one is surprised that the bird had not dashed itself to pieces against the ground. Song Thrushes, also,

descend with a rush of this kind during the stillness of early morning; but, instead of being vertical, or nearly so, the course of their descent is very much inclined.

Quite different is the manner in which the small songsters, such as Redstarts, Warblers, Whin Chats, and similar species, make their appearance. One meets with these suddenly on fine sunny mornings in countless hosts, whose numbers go on increasing steadily without the arrival of any single one of them having been noticed; nor is it possible to say from what direction they had come. On the other hand, Chaffinches are seen to arrive in flocks at great heights, appearing like fine dust. After much wheeling about in the air, amid loudly-uttered cries of 'bink-bink,' they descend and hasten to what few bushes and shrubs the island can offer them.

In short, almost every species descends in its own peculiar manner, but almost all in the first instance become visible at very great altitudes as scarcely perceptible specks.

From the manner and mode of their departure, one is led to the conclusion that birds at once attain to a very high migration flight in this movement. Many of them travel as solitary wanderers at great heights; others, like the Cranes, in companies, ascend in a circling course until they disappear from view. Sparrowhawks and Common Kestrels I have seen making their way upwards on a similar spiral path, until they became totally invisible. The balloon-like ascent of the Buzzard has already been alluded to. In the case of Song Thrushes, Redbreasts, Hedge Sparrows, Golden-crested Wrens, and many other species, one of the birds, soon after sunset, rises before the rest, whom it summons for departure with loud call-notes. The remaining members of the band then congregate from all directions, and, with breasts directed upwards and rapid powerful strokes of the wings, fly almost perpendicularly upwards, describing whole or half circles at irregular intervals. When no other loiterers are attracted by the call-notes, these are silenced, and, soon after, the birds disappear in the deep blue of the far-off sky. (*See* Golden-crested Wren.)

The birds which, in respect to the height of their migration flight, come next in order to those already enumerated, consist for the most part of species allied to the Snipes, such as Curlews, Godwits, Plovers, and their relatives. These travel, especially on clear afternoons in spring, in flocks or smaller groups, almost always at very great elevations, and, for the most part, at the extreme limit of our visual range. How far above this limit their flight extends cannot be determined; but there can be no doubt about their exceeding it, for frequently their clear call-notes are

heard faintly, but still distinctly, from heights to which, despite every effort, it is impossible for the human eye to penetrate.

At night, also, immense hosts of these birds, as well as of the different species of Sandpipers, in scattered flocks as well as in endless streams, travel across Heligoland. In this case, however, the altitude of flight of the birds does not often exceed two hundred feet above the cliff, as may be partially ascertained by observation within the luminous circle of the lighthouse, but on a still greater scale from the sound of their voices. It must not, however, be assumed that birds migrate at lower elevations at night than during the daylight. Cases in which this occurs must be regarded as disturbances of the normal height of flight produced by meteorological influences. This will be discussed in further detail in the chapter on the meteorological conditions which influence migration.

Finally, the number of species whose migration proceeds usually only a few hundred feet above the surface of the sea, or, in many cases, in its immediate proximity, is extremely small. According to my own experience of many years, it does not go beyond the following three, viz. the Hooded Crow, the Starling, and the Lark. The last of these birds will, on clear days, rise to a height of from 600 to 1000 feet. Hooded Crows travel at such a height in exceptional cases only, and Starlings extremely rarely. All three species migrate at a greater elevation in spring than in autumn; but during both migration periods, especially in dull windy weather, Hooded Crows, and still more markedly Larks, frequently fly immediately above the surface of the water. I have never noticed this to happen in the case of Starlings; these, unless they intend to rest on the island, hasten across it at a height of from two to three hundred feet, in numerous densely-crowded swarms, and with a kind of impetus as though each bird was endeavouring to outstrip the other. In exceptional instances, Larks will on bright spring days travel at such heights that, even under the most favourable conditions of the atmosphere, one can only recognise them by their call-notes, the birds themselves being completely out of the range of vision. I have noticed the same phenomenon in the case of Jackdaws and Rooks.

A striking proof of the direct and important influence which meteorological conditions exercise on the height of the migration flight is furnished by the large numbers of migrants which are captured at Heligoland during dark nights, being in part attracted thither by the lantern of the lighthouse.

A necessary condition for this capture is a dark, uniformly overcast sky, especially if there be at the same time a very fine precipitation of moisture. Under such conditions, Larks and

Thrushes, which in part swarm round the lantern and settle everywhere on the plain of the Highland, are principally captured—sometimes in astonishing quantities. Thus, on the night of the 6th of November 1868, no less than 15,000 Larks were caught in the space of about three hours. Unfortunately, the moon rose at ten o'clock and put an end to the capture. No less than 3400 of these birds, besides innumerable Starlings, several Snipe, and many Blackbirds, were caught against the panes of the lighthouse lantern alone. It is therefore impossible to form even a remote estimate of the figure to which the spoil would have mounted if there had been, for the whole of this remarkable migration night, what is known as a 'dark moon.'

The appearance of a single star, or a fragment of blue sky through the dense and uniform blackness of the night, or the faint gleam on the horizon which announces the rising moon, is followed, as on the date above mentioned (6th of November), by the immediate disappearance of the crowds of wanderers with whose manifold voices the air had been filled but a few moments before: all having risen to heights to which it is impossible for the eye to follow: nor can even a single call-note be any longer heard from afar. Nevertheless, there is no interruption to the stream of migration itself; for if, half an hour, or an hour or two afterwards, dense and uniform darkness should once more envelope the sky, the birds may teem again on all sides, and the capture proceed anew.

What has been said above illustrates in the clearest manner how an apparently slight change in atmospheric conditions at once influences the height of the migration flight, and how little is required either to bring this flight within our powers of observation or to withdraw it from the perception of our senses. Here I must once more repeat my opinion as to the comparatively insignificant value of recording data of the occurrences of birds at definite points. To control a district about four miles in diameter, and presenting the varied features of wood, moor, corn-fields, meadows, and water, is in itself almost an impossibility. How would one be able to determine day by day what different species have occurred in such different localities? The case of Heligoland is, of course, different, for here we may say without hesitation that literally not a single bird escapes observation. Notwithstanding, the results of notes of this nature can never amount to anything more than a list of disturbances and interruptions of the main migration movement at the particular place of observation, although the investigation of the causes of such disturbances is undeniably a study of the highest interest. Any other results of such records, even if these have been kept for a long series of years in a favourable locality and with

unremitting attention, do not supply us with more than a knowledge of the period of time in autumn or spring during which such disturbances have taken place. From this, however, we are not able to form more than an approximate conclusion as to the actual duration of the migration, since we can never determine whether the first observed individuals of a species are, in reality, the inaugurators of the migration at that particular time, or whether they may not have been preceded, weeks before, by a vanguard, travelling, according to the normal manner of the migration flight, at great and impenetrable heights above.

On the other hand, it would appear to be extremely unsafe to base, on observations of this nature, the line of arrival or the migration-front of a species, or to draw conclusions from them, as to the velocity of the migration flight, as von Middendorff attempts to do. For in the first place it cannot be determined whether one is dealing with individuals whose spring migration is proceeding in a northerly direction, and not with such as are pursuing a westerly course; and, further, one cannot establish with any degree of certainty, whether the first observed individuals of a species are actually the breeding birds belonging to the particular district of observation or not. By means of data of this nature, one can never state with the necessary degree of precision, as to when a species arrives at or passes over a particular degree of latitude or longitude. In fact, such data only yield information in regard to such disturbances in the normal migration as may have occurred within the limits of the area under observation. These disturbances, however, being, as has been already intimated, solely determined by meteorological contingencies, might, just as well, have occurred four hundred miles farther north or south, east or west, or perhaps not have taken place at all, in which latter case the migration would have proceeded on its normal course, and the migrants, travelling far beyond the range of human vision, would have escaped the observer's notice altogether. We should then note down the migration as having been a very poor one, whilst all the time our feathered friends may be already building their nests in the far north and the far east, or preening their feathers in the warm sunshine of the south, and looking back with joyful feelings to a journey happily and safely accomplished, thus verifying the saying of our Heligoland shooters: 'Time gone by, birds gone by'—which means, that if, during the proper migration period of particular species, none of the birds have been seen in consequence of so-called contrary winds, it is vain to look for any to appear after the expiration of this time, however favourable the wind or the weather may be.

Before closing this chapter, I would mention another interesting

experiment in which the capacity of birds for living in extremely elevated regions of the atmosphere was submitted to a direct test. This experiment was made by Glaisher and Coxwell, with some pigeons which they took with them on their aerial voyage in England in September 1862. The first of these pigeons was put out after the balloon had reached a height of 16,000 feet; it spread its wings and appeared to sink, while the balloon was rising with a velocity of 1000 feet per minute. It is probable that it may have soared with calmly outspread wings. The second was put out at a height of 21,000 feet, and wheeled about in powerful flight apparently in a downward direction. The third, put out at a height of about 25,000 feet, dropped like a stone. The balloon reached a height of from 36,000 to 37,000 feet. While it was descending, at the rate of 2000 feet per minute, the fourth pigeon was put out at a height of 21,000 feet. Flying in circles, it followed the balloon as the latter rapidly descended, and perched on the top of it. Of the two remaining pigeons one was found dead at the end of the expedition; the other, a carrier-pigeon, a quarter of an hour after, flew with fairly powerful motions of the wings to the place whence the balloon had started, whither, two days later, another of the pigeons which had been put out also returned. If, in these experiments, captured wild pigeons could have been employed instead of tame ones, the results would undoubtedly have been entirely different. In the first place, it is impossible that tame poultry, not excluding even the best carrier-pigeons, should yield results in regard to flight which might furnish even an approximate standard of comparison in regard to what wild birds might achieve in this direction; secondly, in experiments of this kind, many different circumstances come into consideration which were probably not taken note of in the present instance. Thus, all birds obtained directly during the migration have not the least remnants of food in their stomachs: a few small grains of quartz are all that one finds. This is observed not merely in the case of such individuals as may have digested, in the course of a long migration flight, the food taken shortly before their departure; but also in the case of all such as are captured during the early evening hours of the autumn migration, and therefore probably after a very short flight, as well as in the case of such as are obtained early in the morning during the spring migration, after a flight extending through the night. It appears, therefore, beyond all doubt, that birds do not start on their voyage until the process of digestion is completed, as, for instance, is the case with the small Warblers and Thrushes which in Heligoland start on their migration in May, an hour after sunset or later. A full stomach in itself produces in every creature a disinclination

for active exertion; and for a bird starting for a long flight at a great elevation, it seems especially imperative that its weight should be as small as possible. The balloon expedition referred to above did not start till noon, and the pigeons which were taken up would therefore undoubtedly have their crops well filled; they would accordingly be so little adapted for the experiment they had to undergo that it is surprising that, in the case of most of them, the results were so favourable.

On the other hand, the various mountain ascents undertaken, since Humboldt's Chimborazo expedition, sufficiently demonstrated how little man—and unquestionably all other warm-blooded creatures—are capable of approaching even to the summits of the highest elevations of the earth's surface by the sole use of their corporeal powers. At heights of from 20,000 to 22,000 feet, the difficulties of breathing and the general exhaustion are such as to render even the least corporeal efforts impossible. Gay Lussac, on Chimborazo, was able to remain only a quarter of an hour at a height of about 20,000 feet. The brothers Schlagintweit succeeded, at Ibi Gamin, in reaching an elevation of 22,259 English feet, but became so completely exhausted as to be obliged to give up all further attempts to proceed higher. The men accompanying them were also utterly exhausted.

During balloon voyages for scientific ends, with the body kept in a perfect state of rest, it has undoubtedly been possible to reach considerably greater elevations; but in all such cases the investigators invariably did so at the risk of their lives. Thus Tissandier, Spinelli, and Siwel fell unconscious on attaining a height of 26,000 feet; the last two, in fact, never recovered consciousness. Glaisher reached a height of 29,000 feet before losing consciousness; his companion, Coxwell, on the other hand, though completely stiff with cold was yet able, while the balloon was continuing to ascend, to grasp the cord of the valve with his teeth, and by opening it cause the balloon to descend, without having lost consciousness.

The sum of our experiences accordingly proves that neither man nor any other warm-blooded creature is, while making corporeal exertions, capable of ascending to heights much above 22,000 feet; and that, in the case of man, the ascent to elevations beyond 26,000 feet is, even when the body is kept in a perfectly quiescent state, attended by the utmost risk of life; whereas birds, on the other hand, can, of their own complete free will, elevate themselves to heights of from 35,000 to 40,000 feet, and can at such heights sustain great muscular efforts for any desirable length of time without being affected either by the great rarity of the air, or its

poverty in oxygen, or the extremely low temperature which prevails in those regions. If they experienced even the least discomfort during such flights—which frequently, as in the case of the Condor, appear to be undertaken for mere pastime—they would either abstain from them altogether, or, at any rate, not extend them over such ample periods of time as they actually do.

Man is prompted by the thirst for knowledge to penetrate into regions for which his physical adaptation, however much he may be able to extend it, is no longer sufficient. Other beings, whose whole life and actions are directed to the maintenance of the individual and the species, are endowed with an organisation corresponding to the simple purposes of their being and the vital activities connected therewith, and each makes the most effective use of the qualities and capacities with which it has been thus provided. In the case of almost all, however, life ceases to be possible in and beyond the domain of eternal snow. The one exception to this rule we find, as already stated, in the case of birds. They too, however, would not be able to nourish and propagate themselves in regions bound in an unchanging state of icy frigidity; and hence, in their case, an additional condition of existence—the migration flight—is brought into play. We have attempted in the preceding pages to show that this flight proceeds at heights raised far above our perceptive faculties, and it remains for us to inquire what is the special purpose of this exceptional phenomenon.

In spite of isolated exceptions appearing to contradict our conclusions, this main purpose is, in the first place, to enable migrants to elevate themselves to such strata of the air as, for the time being, offer them the most favourable conditions for their migration, and hence make them independent of the numerous meteorological disturbances prevalent, especially during the autumn months, in strata of the atmosphere nearer to the earth's surface, and which might have the effect of temporarily suspending for a considerable period, or even entirely preventing, the migration of a species for the time being. In the second place, the incomprehensible rapidity of the migration flight, developed by so many species during their long and uninterrupted journeys, and which they are obliged to develop in crossing wide oceans, can probably only be attained at elevations where the atmosphere, by reason of its diminished density, offers a considerably slighter resistance to their progress. Undoubtedly with this wonderful phenomenon there are connected many other physical questions, the settlement of which may probably, for a long time yet, defy the most earnest investigation.

IV. VELOCITY OF THE MIGRATION FLIGHT

THE velocity of the migration flight forms another highly-interesting division in the consideration of the migration phenomenon generally. Just as the latter is in essence something quite *sui generis* in the life of the birds, so the separate phases under which it manifests itself bear no comparison whatever with the ordinary functions of their daily life. Thus, many birds are able to follow the different pursuits of their life only by daylight, and become the most helpless of creatures as soon as darkness has set in. With the advent of the migratory period, however, their whole nature is changed to such a degree that after sunset they will soar to heights hitherto entirely unknown to them, and on pitch-dark nights are able to fly towards the goal of their wanderings with unfailing certainty. Similarly, the speed at which their ordinary daily locomotions in the air are performed has not even an approximate relation to the wonderful velocity of flight attained by them during their migrations.

The subject of the speed of the migration flight of birds has for a long time engaged the attention of naturalists and observers, but no results consistent with the facts have as yet been established. A Falcon belonging to Henry II., which escaped from Fontainebleau and was recaptured twenty-four hours later at Malta, is still cited as a wonderful instance of the rapidity of bird-flight. 'Nine [German] geographical miles in an hour!'[1] people exclaim with astonishment (Dr. Weissmann, *The Migration of Birds*, p. 36). If more thought had been devoted to the matter, it would have been found that the speed of flight must in the above case have been at least double that of the first estimate; for it is certain that the bird did not fly unintermittently during the whole of the twenty-four hours, but that it rested during the night, and in all probability managed to secure booty on the way, which, after a full meal, it would digest

[1] Equal to thirty-six English geographical miles.

in peace before again taking up its journey. As we shall show later on, the bird, in spite of these various stoppages, would yet have had ample time to reach Malta within the period mentioned above.

Von Middendorff's observation led him to conclude that pigeons and other birds are able to perform four geographical miles in six minutes, and even in half that time. He adds, however, 'that birds fly at nothing like this speed during their migration journeys. The velocity with which they passed from one place to another probably did not fall much below this calculation; but they rested, where they found it convenient to do so, and consequently in the course of a day's journey did probably not advance more than from about sixteen to forty-eight geographical miles.' This result, arrived at by so profound and erudite an enquirer as von Middendorff, is the more astonishing inasmuch as the observations on which it is supported were made at the time of the spring migration, during which, so far as my experience goes, birds are considerably less inclined to interrupt their journey than during the autumn movement.

The next example of rapidity of flight, which far exceeds von Middendorff's statement, is furnished by a Carrier-Pigeon, which on the occasion of a flying competition from Ghent to Rouen, attained to a speed of one hundred geographical miles in an hour (Yarrell, *Brit. Birds*, 1845, ii. p. 296). The instance in question is cited in the account of the Rock Dove—of which species the Carrier-Pigeon is a development—and it cannot be doubted that the flight-capacity of the latter form, which had lived in a domesticated state for many generations, must have fallen far short of that of its primitive wild ancestor.

My own studies on this subject have yielded results which, in the most surprising manner, surpass all that has been said above. Even in the case of so apparently sluggish a flyer as the Hooded Crow, which it would be ridiculous to enter in a match against a Carrier-Pigeon, a speed of migration flight of no less than one hundred and eight geographical miles per hour has been established. Nor was this an exceptional performance, as was most probably that of the Carrier-Pigeon previously referred to, but the ordinary normal rate of flight persisted in by millions—nay, billions, of these birds during their annual autumn migrations. Such a performance on the part of the Hooded Crow, however, justifies us in assuming that birds with closer plumage, and provided with more efficient instruments of flight, such as the noble Falcons, Swallows, Pigeons, the larger species of Plovers and Sandpipers, ought certainly to be capable of incomparably greater achievements in this direction. This they

undoubtedly are, as is proved by an actual performance of this nature, which surpasses all that has been stated hitherto. Strange to say, the feat in question was not performed by a member of any of the species enumerated above as excellent flyers, but by a little bird which one would certainly not have regarded as endowed with more than moderate powers of flight—to wit, the Northern Bluethroat. Nevertheless, this little bird proved to be capable of flying, during its migrations, at the rate of one hundred and eighty geographical miles per hour.

An extraordinary velocity of this kind is specially developed during the spring migration. The time occupied in the latter movement must of necessity be as short as possible, for many birds, more especially species from high northern latitudes, have but a very short span of time allotted to them for the building of their nests, and the breeding and rearing of their young. Accordingly the majority under normal conditions, and in the absence of meteorological influences of a disturbing nature, accomplish their migration in one uninterrupted nocturnal flight. It has thus been shown that species, like the Northern Bluethroat already referred to, which winter in the Nile districts and in Central Africa, from about 10° to 27° N. latitude, extend their flight thence in the course of one single spring night, up to 54° N. latitude, and, doubtless, even considerably farther—thus accomplishing a distance of at least 1600 geographical miles within the space of nine hours.

The Northern Bluethroat leaves its winter quarters for its northern breeding home at the end of April or beginning of May, and Heligoland is the first point at which, in the course of this journey, it is met with unfailingly every year in very large numbers under favourable conditions of weather. In all intermediate latitudes—Greece, Italy, South Germany, and even in the neighbouring parts of North Germany—it is at this time so rare an occurrence that its appearance in any of these districts may be regarded as an extremely exceptional accident, or, in the words of Naumann, vol. xiii., as 'very isolated and rare.'

In Heligoland, on the other hand, it is not at all unusual to obtain from twenty to fifty of these birds on one day,—in fact, I remember having on one occasion some sixty specially-selected beautiful males brought me one May morning, while the brothers Aeuckens obtained an almost equal number. All such birds are caught in the gardens of the Highland (Oberland), while equally large quantities frequent the rubble and the natural grottos at the base of the cliff, and the bushes of the Dune island.

Like most birds, especially insectivorous species, the Northern

Bluethroat travels during the night, setting out at dusk and ending its journey at daybreak, or immediately after sunrise. Hence it accomplishes a flight of more than 1600 geographical miles from Egypt to Heligoland in the course of a spring night of scarcely nine hours, giving the almost miraculous velocity of one hundred and eighty geographical miles per hour. The species does not winter further west than Central Africa, nor do its breeding quarters extend farther to the westward than Norway; there can therefore be no doubt as to the identity of the examples found in Heligoland with those from Central Africa.

The fact that this bird is never seen among those which are captured here at night at the lighthouse, but invariably arrives only about dawn, furnishes a further proof that it does not alight for rest during the spring migration, nor reach this island from any stations nearer than its winter quarters in Africa.

Judging from its general habits, there is no reason for considering this Bluethroat as possessed of more than moderate capacities for flight. Its mode of life throughout the whole year, with the exception of the one particular migration night, is such that, according to the theories of Natural Selection and Heredity, its powers of flight should, through disuse, have long since retrograded to such an extent as to have rendered it quite unequal to perform feats like that mentioned above. Quite on the contrary, however, its powers of flight must have acquired an extraordinary development for the special purpose of migration; for, under ordinary conditions, the bird lives on the ground, hopping about all day with wide leaps, and only using its organs of flight under stress of necessity. If, therefore, a bird like this, among the varied activities of whose life flying is almost an exception, is nevertheless capable of accomplishing such wondrous feats on one single occasion in the course of a whole year, what extraordinary achievements in this direction may we not expect from such expert and energetic flyers as the Hobby, the Swallow, and the like. Future investigation will, without doubt, bring to light astonishing results in this field of inquiry.

From the above considerations it appears that birds not only are possessed of an astonishing and probably quite unsuspected power of flight, but, further, that their migration flights are accomplished at a rate of speed equally astounding and unconjectured. The wide divergency between the results of my observations and those arrived at by Dr. von Middendorff most probably has its explanation in the considerable difference of latitude in which our observations were respectively carried on. In Heligoland the migratory hosts are seen, at both migration-periods of the year alike,

in undiminished multitudes and while still subject to the full force of the migratory impulse, whereas in the high northern latitudes which it has been Dr. von Middendorff's good fortune to investigate, the spring migration of many species either terminates, or, at any rate, is approaching its close. It no doubt often happens that birds relax their normal migration speed and advance more slowly in these high northern latitudes, owing to their breeding quarters close at hand not yet being in the enjoyment of a summer temperature; but too many facts of a conflicting nature prevent us from accepting the statement of the last observer that the average distance accomplished by migrants per day is thirty-two geographical miles. If such were the case, species wintering, for instance, in Middle Egypt and breeding within the Arctic Circle, would require nearly three months for their migration journey, which, in itself, is out of the question, and, moreover, contradicted by the already instanced case of the Bluethroat. If this bird travelled at the slow rate above indicated, one ought to meet with it during its spring migration in Italy and the whole of Germany as numerously as in Heligoland; whereas, as already stated, it has been met with only as an extremely rare and exceptional occurrence in all the countries situated between this island and its winter quarters.

Almost all the instances of migration velocity hitherto adduced in evidence relate to the spring migration which birds are known to perform with considerable haste. The desire to reach the nesting homes is, however, by no means the only stimulus provocative of these extraordinary feats of flight; for the journey to the winter quarters, in which less haste is manifested, likewise affords a sufficient number of proofs, both as to the velocity of bird-flight generally, as well as to the actual daily speed at which their migrations are performed. In this connection we may consider somewhat more in detail the already-mentioned case of the Hooded Crow. This bird, which, without question, must be classed among the less expert flyers, travels in autumn in innumerable droves across Heligoland and past both sides of the island. The first flocks arrive at about eight in the morning, and are succeeded in undiminished numbers by flock upon flock until two o'clock in the afternoon, all travelling, without interrupting their flight, in a westerly direction.

According to the reports of my esteemed friend, John Cordeaux —with whose observations, conducted on the opposite east coast of England, I am in the habit of regularly comparing my own—the first flights arrive at that coast about eleven in the morning, and the last at about five in the afternoon, the latter being followed sometimes by solitary stragglers. It has been repeatedly shown,

and cannot any longer be subject to the least doubt, that the flights of these birds which, on this island, appear far off on the eastern, and disappear on the western horizon, are the same as those which arrive on the English coast from an eastern direction. Accordingly these sluggish flyers pass over the three hundred and twenty miles of German Ocean in three hours, which gives a velocity of nearly one hundred and eight geographical miles per hour. This instance of migration speed is the more surprising inasmuch as it is displayed in the case of a bird which one might almost call clumsy, and which certainly gives no evidence of corporeal dexterity.

A few other instances of migration velocity, considerably above the average rate of thirty-two geographical miles per day, may here be cited. The young autumn birds of the Richard's Pipit, in favourable weather, arrive in Heligoland as early as the beginning of September—that is, about two months after they have left the shell—half of which time at least they must have used in acquiring the powers of flight. The distance from Daüria to Heligoland amounts to about four thousand geographical miles; therefore, if this Pipit did not accomplish more than thirty-two miles a day, instead of arriving here during the first days of September, it would not make its appearance until about the end of December—that is, provided that during the whole journey the bird has encountered favourable weather, a contingency which, at that time of the year, may be regarded as virtually impossible. If, on the other hand, the migrants, through stress of weather, lost only a third portion of the days, or, rather, nights—a by no means excessive estimate—the time necessary for their journey, according to the above scale, would be so much protracted that all the birds would inevitably succumb to the inclemency of the weather. Supposing, however, they managed to survive this, and that they proceeded at the same rate to winter quarters in, say, the south of France or Spain, they would in this case, on their arrival there, have at once to start again for their breeding homes if they wished to reach their nesting stations at the requisite time. All this has reference only to the young birds of the year; old breeding birds do not arrive here until the middle of October and up to the middle of November.

The most striking and incontestable proof, however, of a migration carried out to its end at an extremely rapid rate of flight is furnished by an American bird, the Virginian Plover (*Charadrius virginicus*). The speed at which this bird travels during its autumn migration probably even exceeds that of the Bluethroat on its spring migration. Flocks consisting of thousands of these birds have been met with at a distance of four hundred geographical miles and more east of Bermuda, flying in a southerly direction on

the way from their breeding places in Labrador to Northern Brazil. The distance between the coasts of the two countries amounts to three thousand two hundred geographical miles, and since there is along this whole stretch of route not a single point on which the travellers could alight for rest, they are obliged to perform the whole length of this enormous journey in one uninterrupted flight.

We may probably assume fifteen hours as the longest spell during which a bird is able to remain on the wing without taking sustenance of any kind. On this assumption, the velocity of flight of the above-named birds would amount to two hundred and twelve geographical miles per hour.

Though an achievement like this is in the highest degree astonishing, there is no necessity for assuming it to be either exceptional or isolated. On the other hand, we are justified in concluding that good flyers, such as this Plover specially happens to be, may be able to accomplish even greater feats during their spring migrations, when we reflect that a small and feeble bird like the Bluethroat attains to so high a speed as one hundred and eighty geographical miles per hour during the latter period of migration. In the case of this bird, too, there is hardly a doubt but that the velocity of its migration flight may exceed even this already remarkable figure; for, in discussing its flight, we only took into account the rather moderate distance from North Africa to Heligoland as representing the whole distance covered in its migration. Now on the one hand, its winter quarters are known to extend to 12° and 10° north latitude: and on the other, those of the birds which for the moment alight on Heligoland can only form an inconsiderable fraction of the complete migratory stream setting from Africa to the Scandinavian peninsula, while the predominant majority of individuals continue their journey to at least as far as Central Norway, and therefore accomplish, during the same May night, a distance of from two thousand to two thousand four hundred geographical miles. This would, of course, give as result a velocity of four miles a minute. To an attentive observer in Heligoland, however, such a result would in no way appear beyond the bounds of possibility. He need, in fact, only consider the case of the numerous individuals of such species as Plovers, Curlews, Godwits, which, flying across the island at a rushing speed during bright warm afternoons in early summer, are observed to reach the oyster-bed, 22,000 feet to the east, within the space of a single minute.

The case of the American Plover just discussed further shows how little in need of rest birds are during their migration flight. Large sections of the migratory streams of these birds which are

directed towards South America fly across Bermuda in immense quantities. As long as fair weather prevails, not one of these birds rests upon its migration journey; only a storm will induce them to alight (J. M. Jones, *Naturalist in Bermuda*). This, too, in spite of the fact that they have already travelled over a distance of one thousand two hundred geographical miles from Labrador to Bermuda, and have still to cover more than eight hundred miles before they reach the northernmost islands of the Lesser Antilles; nor do they alight during this latter stage of the journey except when subjected to the stress of storms (*auct.* A. Newton; communicated by letter). As has been already stated on several occasions, the autumn migration differs from the spring movement in several respects, but especially in the velocity of the migratory flight. For the former movement is not, like the latter, determined by the object of reaching a definite goal in a rigidly prescribed space of time, but is merely concerned with enabling the birds, sooner or later, to reach winter quarters possessed of a sufficiently mild temperature. Accordingly, it is only in its initial stages that there is exhibited in the latter movement a velocity of flight similar to that which characterises the spring migration; for as soon as the various species have reached latitudes far enough south in their case to enable them to take a longer or shorter spell of rest, the birds cease to hasten forward at the normal migratory speed, but advance slowly, and at low elevations, by short daily stages, or sometimes for a time come to a complete standstill, until frost compels them once more to resume their journey at the normal speed of migration. In the case of a large number of species such a relaxation of migratory speed, or temporary interruption of the journey, takes place in latitudes no farther south than central or even northern Germany. In discussing the autumn migration of the Cranes, Naumann (vol. ix. p. 354) brings forward a very apt illustration of what has been said in the foregoing.

It has been supposed that birds are in the habit of breaking their migratory journey without any very powerful disturbing cause both in autumn and spring—at the former season on reaching latitudes not so far south as those of their normal winter quarters, and in spring before they have arrived at their breeding stations. With this assumption, however, my own experiences on this island, accumulated for many years, are at variance. Heligoland occupies a most happy position intermediate both between the far north and the central parts of Europe, as well as between the eastern and western portions of the latter continent. It follows, therefore, that the predominant majority of the myriads of migrants when observed here are still travelling at the full speed of their

migratory flight, but not one of these regular migrants has ever been known to tarry on the island for longer than the remainder of the day on which, or at the dawn of which, it first made its appearance. After a night's incessant flight, a greater or smaller portion of the succeeding day is all the birds need for satisfying their hunger or recovering from such fatigue as may have resulted from the exertions of their journey. I myself have never noticed cases of fatigue or actual exhaustion—such as people tell about birds of the Snipe family on this island—in regard to any birds which have landed here during their migration either by day or night, with the possible exception of three solitary but interesting instances in which I observed small land-birds resting on the sea half a mile from the island.

In the case of many Thrushes, Larks, Buntings, Finches, Sandpipers, and other northern species, the interruption of the autumn migration above referred to—and with part of them its actual termination—occurs, when the birds have not got further than central or even northern Germany. Very few species, however, make a stay of this kind on this rugged island rock. The few that do so are almost invariably Rock Pipits, Snow Buntings, Sanderlings, Purple Sandpipers, and Dunlins, and, in rarer instances, a few Larks, Coal Titmice, or Chaffinches. Fieldfares, and especially Blackbirds, may also be seen frequently for weeks together roving about here in the winter; these, however, are not birds which have brought their migration to a close, but individuals which have been driven out of the Scandinavian peninsula by frost and snow. Of these the old male Blackbirds immediately depart again for the north on the advent of milder weather. Still it can scarcely be said of any one of these species that they had intended to pass the winter here. The Rock Pipit and the Purple Sandpiper are perhaps the only ones of which this may be asserted, since they are represented without any break throughout the whole of the cold season. In regard to the latter species, however, it cannot be determined whether the birds that remain are always the same individuals or whether some of them do not travel farther and are replaced by others. It is, however, nearly certain that the Rock Pipit does actually remain throughout the winter. Moreover, one bird, the tiny, cheerful, little Wren, faithfully abides with us throughout the stern season, one or two of these winsome creatures being always met with throughout the winter months even during temporary spells of very severe weather. At these times the caves and grottos at the foot of the cliff offer it a shelter, and probably also food in abundance, for the bird preserves the same cheerful demeanour alike in a dense snowstorm as in the hours of brightest sunshine.

During the spring migration, in the absence of some specially exceptional cause, none of the countless wanderers prolong their stay here beyond the few hours previously mentioned; all of them speed onwards to their breeding homes in restless haste. Some, like the various Yellow Wagtails, do not even tarry till the close of the day on the dawn of which they had arrived, but resume their journey at about the middle of the forenoon. From the phenomena of migration as displayed on this island, we can, however, form no estimate as to how long or how far northward the wanderers continue their restless voyage; what we know for certain is that they push unceasingly forward as long as they are not hindered by meteorological influences, and that none would, unless compelled, break their journey for any length of time before reaching their nesting quarters. On the other hand, Seebohm's interesting observations at the mouth of the Petchora and Jenesei rivers go to show that all species breeding in very high northern latitudes may frequently be detained in the course of their spring migration shortly before its termination. On the disappearance of winter, and the break-up of the immense icefields formed upon these rivers, countless swarms of both land and water birds are seen to fill the air in the most motley confusion. Just as after the completion of the first great stage in the autumn migration many of the wanderers slacken their speed until cold and frost once more impel them onward, so in this case the persistence of wintry conditions has the opposite effect by causing the birds to relax the speed of their advance, or by bringing them to a standstill for a brief time, shortly before reaching their breeding homes. As long, however, as neither the one nor other of these influences comes into play, the Hooded Crow, the Bluethroat, and the Virginian Plover pursue their migration at the velocities which have been established in their cases respectively. In the case of the last of these birds this velocity is indeed so enormous that we are obliged to assume the assistance of other factors besides the mechanical instruments of motion with which the bird is equipped.

In treating of the height of the migration flight, we have considered in detail that birds, as distinct from other warm-blooded creatures, are provided with a respiratory mechanism enabling them to remain for any desirable length of time in regions of the atmosphere so rare in density and poor in oxygen as must necessarily result from elevations extending to 40,000 feet; and we have further seen that they are, in addition, provided with a very extensive system of air-sacs which they are able to fill or empty at pleasure. These peculiarities, either alone or in co-operation, appear of no ostensible use to the bird during its ordinary daily

activities, and yet cannot have been created to no purpose whatever. Their sole purpose, therefore, is evidently to enable it to perform those wonderful migrations—wonderful both as regards the height at which they proceed, and the velocity with which they are carried out. If birds were restricted during their autumn and spring migrations to the same low strata of the atmosphere in which they move during the rest of the year, such of them as have to perform their migratory journeys early in the spring or late in the autumn would in many cases be obliged, in consequence of stress of weather, to let the proper period of their migration pass without having been able even to make a start on their journeys. To withdraw themselves from the disturbing influences which are apt to prevail in these changeful lower strata, birds mount up into the more elevated layers of the atmosphere, in which more uniform conditions prevail, and which are less subject to powerful meteorological disturbances. In this way, however, they reach elevations at which the resistance of the air is so insignificant as to render possible the astonishing velocity of flight developed during the migration, while this velocity at the same time counteracts any tendency towards sinking, a slight elevation of the anterior margin of the horizontal wing-surface being amply sufficient to effect this object.

By considerations such as these we not only approach somewhat nearer to an explanation of the velocity of the migratory flight such as it has been proved to be, but we may also assume as an established fact, that these migratory flights are possible, solely and exclusively, under such conditions as prevail in paths at the immense elevations discussed in the previous chapter.



AUTHOR'S GARDEN.

V. METEOROLOGICAL CONDITIONS WHICH INFLUENCE MIGRATION

Though the meteorological influences which affect the migrations of birds are at the present time still very imperfectly understood, it will not be out of place here once more to collect and examine in detail the various references made thereto in previous chapters, even if such a recapitulation may only serve to attract a more general attention to this important subject.

We have already laid stress on the fact that such portions of the migration phenomenon as become apparent during its periodical recurrences, are brought within the range of our observing faculties almost exclusively by meteorological conditions which are exercising a disturbing influence upon the normal progress of the migratory movement. When this latter proceeds on its regular normal course, it lies far beyond the limits of either our visual or auditory capacities, and it is only by the development of meteorological disturbances in those inexplorable regions that it is brought within the range of our perceptive faculties.

The force and direction of the wind are however by no means the only factors which exercise a determining influence on migration. The various forms and phases in which this movement manifests itself are affected in a determinate manner by another meteorological condition, viz.: The greater or less amount of moisture present in the atmosphere, and the particular form which this moisture assumes; whether it is distributed throughout the air as a vapour of uniform density, or condensed into fog or mist, or takes the shape of clouds either loose and feathery of the cirrus form, or dense and rounded of the woolpack type; or again, in a clear, cold air, appears as dew or hoar-frost, or under other conditions, in the form of a thundercloud heavily charged with electricity.

In general proof of this may be cited the simple fact that whereas birds appear in great number when the wind is in a particular direction, they are scarcely seen at all when it is in some other quarter. The latter, for instance, is the case during south-

westerly winds, which are mostly accompanied by rain, and also during fogs, no matter in what direction the wind may be at the time.

The extent to which these conditions of weather prevail at the time of a particular period of migration positively determines the extent to which the birds appear; and should they prevail throughout the whole of the autumn or spring months, we may not reckon upon seeing either Snipe, Thrushes, or any other common or uncommon species of birds on the island. Whether, however, the migrations come within the sphere of our observations or not, there is no doubt that they proceed regularly under all conditions, during a period of time peculiar to each particular species. This is proved by the fact that if this particular migration time of a species has once expired, not a single one of its members will thereafter be seen, even though the most favourable weather for their appearance may set in immediately.

It is true that retardations in the migration of one species or another do sometimes seem to occur. I say 'seem to' intentionally, for the assumption of their being retardations is based on a wrong interpretation of the phenomena. Thus, for instance, if in spring the first half of the migration time of a species happens to be already past, without any member of the species having as yet been observed, and if thereupon the weather assumes a character favourable to the occurrence of this species, the latter will at once be found to make its appearance. From a mere superficial observation of a retarded appearance of this kind, one might be very easily led to suspect that the migration of the species in question was only just then commencing, and had been delayed until then by unfavourable conditions of weather. Such a conclusion would however be incorrect, for in a case like this the separate individuals of the species in question do not consist of fine old males, as ought to be the case if one were really dealing with the commencement of the spring migration of the species, but instead thereof such male birds as are seen are scattered, younger individuals, while the majority of the birds are females. This however only shows that the old males, who form the advance guard of the spring migration, have long since arrived undisturbed, and therefore unseen, at their breeding stations, and that these apparently later arrivals, instead of being, as erroneously supposed, the vanguard of the migratory host, are in reality the second division of the main body of migrants of that particular species.

What has been said above is amply proved almost every year by one or the other of such species as display more or less marked difference in the colour of the plumage according to age and sex,

and in no case more pointedly that that of the Northern Bluethroat, a bird which has already been brought into evidence on several other occasions.

In the chapter on the height of the migratory flight, we have—in briefly mentioning the night capture of Larks on this island—pointed out how largely the greater or less elevation, at which the migratory movement proceeds, is dependent on apparently slight changes in the condition of the atmosphere at the time being. Therefore, although under normal conditions the migrations of most species proceed at a height of at least 20,000 feet, they ought not, if they happen to become impossible at this elevation, at once to be regarded as interrupted, inasmuch as the birds, if compelled to abandon the highest limits of their migration-path, descend only so far until they reach a stratum of air in which they fall in with a current in the desirable direction and of the requisite strength, and it is only when they fail to meet with such a current that they finally alight on the earth.

Now this little island, where the whole vault of heaven constantly lies open to the view, furnishes very striking proofs of the variety of air currents prevailing simultaneously in different gradually ascending strata of the atmosphere. Thus we find that loose mist-like cloud-formations at a height of scarcely a thousand feet frequently deviate considerably in their course from the direction of the wind, which sweeps along the surface of the water, while it is by no means rare to find two further cloud-strata passing in dissimilar directions, interposed between the lower patches of vapour just referred to, and the cirrus streaks at immeasurable heights above them, so that very frequently the highest clouds move in a completely opposite direction to the air currents which sweep along the earth's surface.

Birds naturally choose for their migrations those strata of the atmosphere which offer the most favourable conditions to their progress. It is however a fact of peculiar interest, that during both migration-periods of the year, all species, without exception, approach in largest numbers to the earth's surface when very light south-easterly winds, accompanied by clear warm weather, happen to prevail for any length of time in the lower regions of the atmosphere. If autumn brings a long spell of weather of this kind, we may not only reckon on the appearance of large numbers of all our common visitors during September and October, but may also look forward with certainty to the frequent occurrence of species very rare in Europe, and originating from the far East, such as Yellow-browed Warbler (*Sylvia superciliosa*), Siberian Chiffchaff (*S. tristis*), and other Siberian Warblers, Richard's Pipit, Rustic

Bunting, Little Bunting, Shore-Lark in thousands, and many others, while Tengmalm's Owl, Bullfinches (*Pyrrhula major*), Redpoles (*Fringilla linaria* and *F. exilipes*) may, under these conditions, be expected from the middle of October onwards throughout November. It should further be mentioned that the Common Jay, an extremely rare bird in Heligoland, has also occurred here in large flocks after long-continued south-east winds, but only when these had increased to considerable violence and, at the same time, backed to a more decidedly easterly direction. It seems indeed surprising that one and the same direction of the wind should —other atmospherical conditions being the same—influence the autumn migration of species from the extreme east of Asia, in the same manner as that of species from the high northern latitudes of Scandinavia; but it is still more astonishing to find that on their return journey, in spring too, the birds, whether they arrive from the far South or from the distant West, are brought within the sphere of our observation under the same atmospheric conditions; even the rarer unusual occurrences from far distant south-eastern regions, such as Asia Minor, Arabia, and the area of the Caspian, form no exception to this rule, although their route of migration is almost directly opposite to that of the arrivals from the west.

From all these facts it appears that the meteorological conditions discussed above are those best adapted to the migrations of birds, and that the latter betake themselves to strata of the atmosphere in which such conditions prevail.

Seeing that migrations in bulk very rarely take place at low elevations, or—what amounts to the same thing—that in the vast majority of cases these movements proceed at elevations far removed beyond the range of our observation, we are justified in concluding that it is in these elevated regions of the atmosphere especially that birds meet with the meteorological conditions requisite to the proper performance of their migratory movements, *i.e.* a state of great calm and the presence of only a very slight amount of moisture. The correctness of this conclusion is supported by the phenomenon of cirrus clouds. In the most elevated of these it is extremely difficult to observe any change either of position or form; nor is this state of comparative immobility a merely apparent one, due to the enormous distance of these light masses of vapour, for supposing them to be at an elevation of eight geographical miles, the motion of a steamer proceeding at the rate of about twelve geographical miles per hour will, at the same distance, appear very considerable as compared with the almost imperceptible movement of these cloud streaks.

Considering the haste and precision with which all the

phenomena of migration proceed, we can hardly admit that birds seek such strata of the air as are favourable to their migration purely at haphazard; we ought rather to assume that they are possessed of an inherent presentiment or sensitiveness to distant, but approaching, phases of weather. We are supported in this view by the fact that many birds in confinement manifest much unrest, by fluttering and by the frequent utterance of their call-notes, on days which precede nights of strong migrations. This was the case with a Snow Bunting which I had kept for many years, and also with some Larks kept at the lighthouse here, the latter regularly predicting by their restlessness during the day the great catch that was to take place on the coming night.

The sensitiveness of birds to the first faint indications of an atmospheric change must at least be equal to that of a good barometer; at the same time, however, we must not forget that in the elevated regions in which their migrations proceed, birds are brought under the influence of the slightest signs of an approaching change of weather long before anything of the impending change is perceived on the earth's surface, where the earliest indications of it are probably not felt until about twenty-four hours later.

It can hardly be doubted that all changes of weather have their origin in the higher strata of the atmosphere. Observations have shown in any case that the first indications of a change of wind begin to make themselves felt in the highest cirrus streaks, and that the lower layers of vapour are brought under their influence gradually in a downward vertical succession. Thus, frequently during light easterly and south-easterly winds and fine clear weather, the highest and thinnest cirrus strata may be observed for days moving almost imperceptibly from west to east; or very faint striæ of vapour are seen rising on the western horizon, and, as the wind slightly freshens, advancing during the next twenty-four hours to about the zenith. In the course of another equal period of time they slowly overspread the eastern portion of the sky likewise, and finally, as the east wind rises to its utmost intensity, increase to one dense, elevated vault of vapour uniformly covering the whole expanse of the firmament. Below this canopy of mist, cloud-formations, which already begin to assume more or less definite shapes, are next seen to pass across the sky, while simultaneously with their appearance a downfall of rain takes place, the west wind at the same time rapidly gaining the ascendency near the surface of the ground. Such, at least, has been my experience here after many years of careful observations.

At the beginning of the series of meteorological changes just described, while light south-east winds prevail, migrants appear in

large numbers at low elevations. By degrees the migration passes into higher altitudes, its speed being at the same time strikingly accelerated. The number of birds which alight during the morning hours is at that time considerably diminished, and the few birds that do so, soon start afresh on their journey, so that by the time that the wind has completely changed to the west and rain has begun to fall, not another bird is to be seen. Migration phenomena of this kind have been frequently observed; among other instances, in October 1882. From the first week of that month up to the 22nd the prevailing winds were south-east; these on frequent occasions rose to a great strength, being in such cases accompanied by low, loose, swiftly-flying clouds. During all this time a powerful mass-migration, or so-called 'rush,' was in progress, and the call-notes of numerous migrants were heard during the night, and the birds themselves were seen daily, particularly during the early hours of the morning and forenoon, speeding across the island at a great height; but only very few of them were noticed to alight.

During this time the cloud-formations at intermediate heights in the atmosphere were moving from south-south-east and south; but at a very great altitude the air unfortunately was clear, though undoubtedly there too the air-currents were moving in at least a south-westerly direction; such, at any rate, was still the case on the evening of the 21st. Early on the 22nd a few loose isolated clouds, not of the cirrus type, were already moving rapidly at a great height from west-south-west, while the loose vaporous clouds below them were still being driven along before a very strong south-east wind. At the same time the Marine Observatory registered, as a storm warning, a deep depression west of the Hebrides. During the forenoon of that day a very powerful and extremely rapid migration was still in progress, the birds, so to speak, dashing across the island without one of them alighting thereon. At noon the migration completely ceased. Amid a powerful downpour of rain the wind, which had increased considerably in force, veered round to the west, and at midnight blew with great violence from the south-west and west, accompanied during the night by heavy sheet-lightning. On the 23rd stormy winds, accompanied by heavy rain-clouds, continued blowing from the west, and there was no longer a bird to be seen.

The birds, which travelled past and across the island in such vast masses and in such unusual haste during the last part of this period, had, as might be gathered from the movement of the elevated cloud-strata, been driven out of their normal migration tracks by contrary west winds. In consequence of these winds reaching the surface of the ground, the migration, which had been

proceeding in proximity to the latter, was completely extinguished; and though we cannot actually prove that it was continued in the higher strata of the air, which at that time might perhaps have returned to a state of calm, it is very likely that such really was the case, for on the next day—the 24th—when the west wind had considerably declined in force, and was beginning to give way to a strong south-south-east wind, large quantities of all kinds of birds at once reappeared. From the tremendous haste, however, in which these were travelling, or rather, as I noted it in my diary, 'dashing headlong across,' one was not as yet led to hope for a favourable change of weather. Nor was this surmise incorrect, for during the night the wind again changed to south-west, developing after midnight into a storm, which at about 3 A.M. on the 25th attained to a violence such as is but seldom experienced on this island. The unusual haste displayed by the migrants on the previous day was evidently the result of a presentiment of this storm, just as was the case one or several days before the bad weather on the night of the 22nd. Whether this presentiment was already developed even before the day preceding the event, I will not venture to decide here. It is, however, a fact that from so far back as the middle of the month all the migrants had displayed an unusual and extraordinary degree of haste in their movements. The Hooded Crows, for instance—whose migrations proceed only in the daytime, and which on their autumn passage never pass Heligoland later than about two o'clock in the afternoon, it being their object to reach the English coast before nightfall, certainly not later than 5 P.M.—on this particular occasion were seen to pass so late in the afternoon that they could not possibly have reached the coast of England before seven or eight in the evening, which means in complete darkness. During the early hours of the 22nd, at a time when the barometer west of the Hebrides—*i.e.* about 600 geographical miles west of Heligoland—was giving warning of the approaching storm, the flocks which arrived here at noon of the same day in such unusual haste, must have been at the said time at least at an equal distance to the east of this island, or, in other words, more than 1200 geographical miles from the area in which the signs of the disturbance were then becoming evident. Nevertheless, all the individuals of this immense migratory host manifested a decided presentiment of the approaching storm, each striving to reach the goal of the day's journey before the loosening of the elements.

In the above instance the birds hastened to meet the storm, of the imminence of which they had already become sensible in the elevated regions of their migratory path, it being evidently their object by extra efforts to reach in time some safe shelter or resting-place. On

the other hand, cases very frequently occur where birds, under the presentiment of approaching adverse weather, appear to travel in advance of it.

To this category belong the enormous multitudes of Larks, Golden Plovers, Lapwings, Common Curlews, and Dunlins, which, during the nights of the earlier winter months, make their appearance long after the expiration of the normal time of migration. To these may be added Fieldfares in considerably less quantity; and, lastly, Blackbirds in still smaller numbers.

Such migrations are followed, almost invariably, by an exceptionally heavy snowfall and very severe cold. In fact, when an abnormal night-migration like this is followed, about twenty-four hours after, by dense snowstorms and sharp frost, our fowlers may generally be heard expressing themselves to this effect: 'Ah, those birds! what cunning fellows they are, to be sure. They knew very well what was coming all along.' It is, however, also possible that the feeding-places of the birds in the regions where they had hoped to spend the winter may have been suddenly covered with snow, and the birds thus driven directly, by want of food, to seek safety in flight along the regular east-to-west route of their autumn migration, the winter slowly following in their rear. This, however, by no means excludes the assumption, which is indeed probably much nearer to the truth, that such flocks have been roused to a timely departure by a presentiment of the approaching weather changes. In any case, these late arrivals have not as yet experienced want; they are invariably in far too plump condition to countenance such a supposition.

Cases of this kind occur more especially at the end of December and beginning of January. Thus, on the night of the 23rd of December, a sudden mass-migration of Larks, Golden Plovers, Curlews, and Dunlins was observed, the wind at the time blowing lightly from the west, with a mild temperature. On the 25th a change of the wind to the north-west took place, hail and snow being at the same time experienced. These conditions were followed in the succeeding days by a violent south-east wind, accompanied by snowstorms. The north-west wind would not have induced the birds to abandon their temporary place of residence; this could only have happened in consequence of a presentiment of the approaching wintry south-east wind and snowstorm. The migration proceeded manifestly from the east, a direction from which wintry weather invariably reaches this island, for it was accompanied by the Northern Bullfinch (*Pyrrhula major*), a bird which is seen here on very rare occasions, and then, as a rule, only when there occurs a strong migration from eastern regions. Late migrations

ot this kind preceding wintry weather almost always consist exclusively of quite old individuals, for the most part males; thus, of about a hundred Larks obtained during that night, nearly all were remarkably large males, measuring, with few exceptions, 7½ inches from the forehead to the tip of the tail. Naumann mentions 7 inches as the greatest length of these birds. Such Blackbirds as are seen under these conditions are almost, without exception, in black plumage, with orange beaks, *i.e.* old males.

Retarded night-migrations of the kind just described still occur with a certain amount of regularity, though not on an equally large scale, in every year. These are, however, not to be classed with another exceptional migration-phenomenon, similar in character but of much rarer occurrence, and hardly ever witnessed before February. In this case, also, enormous flocks of migrants, principally seed-eating species, make their appearance quite suddenly; but instead of arriving by night, and before the setting-in of snowy weather, these birds make their appearance by day, after the wintry conditions have already set in, and mostly during very severe cold and snow. The flocks in question are made up of millions of Larks, Twites, Linnets, Greenfinches, and lesser numbers of Goldfinches, Yellow and Common Buntings; in some cases, flocks of Snipe are associated with these birds, flying about exhausted, like droves of Partridges. All these birds arrive during the early hours of the morning and forenoon, first appearing, if I remember rightly, from a rather more northerly direction than usual. Their flight is weak, they are all very lean, and appear to be very hungry, inasmuch as they at once alight on every strip of grass still free from snow, and on the green cabbages in the gardens; there they run about picking at every bit of green which is not yet covered by snow, with their feathers all on end, and presenting a generally sorry appearance. There is thus a vast difference between these birds and those other flocks previously discussed, whose arrival has anticipated the inclement weather. While these earlier birds are well nourished, especially the Lapwings and Golden Plovers, and hasten past in rapid and vigorous flight without requiring rest, the later ones have evidently been reduced to the utmost need through lack of food. It remains to be explained why these birds, unlike the others, did not obey the premonitory signs of the approaching weather-changes, or depart immediately on the occurrence of the snowfall. The reason probably is, that, owing to the advanced period of the year, having already either reached their winter quarters, or districts near them, these birds had lost in great part the instinctive sense of the necessity of an autumn migration; that they resisted such faint migration impulses as were still left them, until the utmost need

drove them to seek safety in flight; and that this flight took place, as one might have expected, in the normal direction of the autumn migration of their species.

Besides the birds above enumerated, there frequently appear, on occasions of this kind, other visitors whose numbers are specially increased during severe cold, viz., the Common Buzzard, the Rock Pipit, the Sanderling, the Purple Sandpiper, less numerously, the Knot, and, what is singular, at times also, one or two Hen Harriers. An exceptional winter migration of this kind took place on the 14th of February 1876, during a heavy snowfall, which continued incessantly throughout the day; and on another occasion at the beginning of 1881. The weather in the latter case had been mild until the middle of January; but from the 16th to the 22d, the thermometer sank to −10° C. (14° F.), an unusually severe degree of cold for Heligoland, on account of the warmth, radiated by the sea, which surrounds this island on all sides.

On the 17th, a mass-migration of Larks and Fringillidæ took place, accompanied, in this instance, by Shore Larks and Snow Buntings, as well as extraordinarily large numbers of Rock Pipits, and the before-named northern species of *Tringæ*. Goosanders, a few examples of the Smew, Swans, and northern Sea Ducks, also made their appearance, giving ample proof that winter had set in with great vigour in some region or other.

We must now mention a third exceptional phenomenon of migration, somewhat similar in character, which is likewise evoked by the occurrence of a sudden spell of wintry weather. In this case, birds already in full pursuit of their spring migration are compelled by frost and snow to recede completely from the journey to their nesting homes. This phenomenon is much more surprising than the migratory movements previously discussed, which though exceptional, nevertheless invariably proceed in the normal direction of the migration. One has, in consequence, much more rarely an opportunity to observe a real backward movement of the kind referred to. In fact, during the whole of my experience, I have witnessed only one instance of this kind, but that on a really grand scale. This happened in March 1879—the weather in the course of the first week of the month had been raw and cold, although the temperature remained all the time above freezing-point. During the second week a powerful migration took place. Blackbirds, and even Song Thrushes, were fairly abundant. The Pied Wagtail also was already seen in strikingly large numbers; the same was the case with the Linnet and Twite. From the 11th to the 14th, the wind was a stormy north-west one, accompanied by snow and hail, and the temperature sank to several degrees below freezing-

point. On the 15th, the wind changed to a very light south-west, and was followed by a thaw, which lasted over the 16th. During the intervening night, a migration on an enormous scale took place, such as I had never experienced before, nor have ever witnessed since. The air was literally filled with hundreds of thousands of Curlews, Golden Plovers, Lapwings, Snipe, Oyster-catchers, Sandpipers, and vast quantities of Geese. It is impossible to describe the babel of voices, resounding through the black darkness of night, from near and far. Prominently among these, the loud wild call of the Common Curlew, ringing through the darkness in a thousand varying tones, lent to the whole scene a weird, almost awe-inspiring character.

The whole phenomenon, combined with the sudden arrival of mild, calm weather, could apparently allow of only one conclusion, viz., that the winter was at an end, that the spring migration had commenced with rare and unusual vigour, and that the birds in joyful throngs were hastening to their summer homes.

All this, however, proved a delusion; a glance at the travelling flocks at once revealed to one's great astonishment that they were flying in a direction from east to west,—in other words, that they were turning their backs upon their nesting stations. I must confess that for a moment I felt completely taken aback at this discovery; for I repeat, that a migration in such extraordinary numbers, taken in connection with the advent of mild weather in the middle of March, allowed of but one conclusion, viz. that the following days would be warm, and accompanied by light south-east winds.

This powerful migration began after midnight, and lasted until the morning, though it was prolonged by large numbers of Lapwings throughout the whole of the following forenoon, while several Snipe and Blackbirds, which had arrived early in the morning, resumed their journey without delay.

The few Lapwings that alighted ran about in a sorry state, looking half-frozen and starved. The next few days brought a solution of the mystery. Winter had returned, bringing with it a stormy north-easter, frost and snow; and east winds continued to prevail up to the 28th, at times developing into storms, and accompanied by snow and frost. On the 29th and succeeding days, the wind changed to south, the sky was overcast, the air mild, with some light rain. The spring migration now commenced in full earnest. Throughout the whole day till late in the afternoon, great flocks of Hooded Crows winged their way high overhead, and with much noise, across the island. During the night of the 30th, 'millions,' as my journal has it, of Plovers of all kinds, as well as Curlews, Dunlins, and like species, travelled past. On the follow-

ing day, Redbreasts, Golden-crested Wrens, Pipits, Wagtails, Hedge Sparrows, and Chats, made their appearance. I even obtained a Wolf's Bluethroat (*Sylvia wolfii*), a fine old male. From that time onward the migration proceeded undisturbed in its usual course.

The meteorological conditions hitherto discussed, while undoubtedly influencing migration in a high degree, yet allow the movement to proceed, though in a manner departing from its normal course. The conditions now to be discussed, on the other hand, are actually the very worst enemies of our shooters and fowlers, inasmuch as they either completely prevent every kind of migration from taking place, or quickly put an end to any migratory movement which may have already commenced.

First and foremost among these deterrent influences we must place fog, during which not a bird is visible. As soon as it makes its appearance the stream of migrants at once rises into clearer strata of the atmosphere, and such of the travellers as may be staying on the island forthwith depart on its approach. Should, notwithstanding, any Snipe be met with at this time, these are invariably so shy and wild that it is next to impossible to get a shot at them.

It frequently happens in spring that during the early hours of the morning, and in the forenoon, not a bird is to be seen, although the weather is in the highest degree favourable for migratory purposes. The cause of this is well known here; every shooter at once says: 'There must be a fog somewhere.' In such cases the subsequent weather reports sent by telegraph from the nearest coast of the mainland invariably prove the correctness of this assumption by announcing the prevalence of fog in those parts: or the fog actually makes its appearance here in the course of the day.

Thus, on 10th March 1880, the conditions were: wind south, light; clear, warm—all of such a nature that one would have expected to witness migratory phenomena; whereas, on the other hand, my journal says: 'Nothing—there must be hoar-frost or fog somewhere.' Later on, at five o'clock in the afternoon, we accordingly find: 'Wind north-east and east-north-east, fog.' I could give hundreds of similar extracts, but will only mention one or two, which show that the migration does not always completely cease with fog, but in many cases is simply transferred to higher regions of the atmosphere. Thus, on the 9th of February 1878, there was a dense fog from one o'clock A.M. to half-past seven in the evening. At noon, however, the fog happened to clear for a short time, when large flocks of larks were at once seen travelling eastwards in the direction of the spring migration. In regard to the 3rd April 1880, my diary states as follows:—'Wind south-east, light; fog; rain—

Nothing.' In the night from twelve to three A.M. the fog had dispersed, during which time enormous numbers of Thrushes, Chats, Starlings, Golden Plovers, Lapwings, Oyster-catchers, and Sandpipers were observed; on the fog subsequently returning, not a bird was afterwards either heard or seen at the glasses of the lighthouse. In April, with light south-east winds and some rain, a powerful migration ought to have taken place, and the fog alone must have forced it for the time being to clearer strata of the air above. Frequently the height to which the fog extends is so inconsiderable that it is possible to distinguish the thousand different call-notes of the Larks travelling above the stratum of mist; sometimes, indeed, one may stand on the cliff two hundred feet high, in a perfectly clear and cloudless atmosphere, and look down upon one continuous heaving mass of mist extending to the distant horizon, and covering, in one uniform shroud, the whole expanse of sea.

Dew and hoar-frost, both probably traceable in their origin to similar causes, also manifest a similar influence on migration. Both are regularly accompanied by conditions of weather in all other respects most favourable to migration; yet, in spite of 'the most splendid opportunity,' as Heligolanders express it, not a bird is seen in the early hours of the morning, if there has been dew or hoar-frost during the preceding night. Both of these conditions almost invariably make their appearance concurrently with fair weather—*i.e.* with a calm clear air and light easterly and south-easterly winds, so that they are here regarded as the precursors and sustainers of fine weather. Accordingly, one finds oneself puzzled to know what it is that makes them so disagreeable to birds. Even moths are known not to swarm or migrate on evenings in summer on which there happens to be a fall of dew, though all other conditions may be favourable; this is the more surprising, inasmuch as a light warm rain does not by any means produce an immediate check on their movements.

As soon, however, as, during the hours of the forenoon in March and early April, the dew has given way before the sun, Blackbirds and Snipe almost regularly make their appearance, dropping down, as it were, from the sky. Such, for instance, was the case on the 2nd of March 1883. The morning was clear and beautiful, and, excepting for a scarcely-perceptible air-current from the north and north-north-east, perfectly calm. Unfortunately, however, there was a sharp hoar-frost; but for the latter, Blackbirds and Snipe would have unfailingly made their appearance during the early hours, but not a bird was to be seen. In the course of the forenoon, and later during the day, some Snipe and Blackbirds did make their appearance, and Cranes, too, were observed to pass over the island.

On the 21st and 22nd of March 1880, the wind was east, the air calm and clear; but again hoar-frost,—consequently, in the way of birds, 'nothing at all.' On the 23rd: wind south-east, calm, clear, hoar-frost, and nothing except a few Hooded Crows and some species of Finches. On the 24th: wind south-east; during the forenoon and later, Hooded Crows, Rooks, and Jackdaws, Wood Pigeons, a pair of Wagtails and Yellow Buntings. During all these days, neither Blackbirds nor Snipe were observed, although the weather was such that both species would have been numerously represented if this had not been prevented by the hoar-frost. On the 26th, 27th, and 28th: an easterly wind; cold fog; naturally nothing in the way of birds. On the 29th: weather perfectly calm, overcast, warmer; forthwith, in the early morning hours, Starlings in flocks of hundreds; Blackbirds and Redbreasts in fairly large quantities. Of Woodcocks, two hundred and fifty were killed, an unprecedented number for the spring migration. Claus Aeuckens and his nephew shot thirty-five of these birds, during the early morning hours, at the foot of the cliff.

We have just intimated that the movements of nocturnal butterflies and moths are likewise subject to meteorological influences; this view is supported by repeated observations, which show that these insects travel past this island under the same conditions as birds, and for the most part, in their company, in an east-to-west direction. They fly in swarms the numbers of which defy all attempts at computation, and can only be expressed by millions. Unfortunately, I have hitherto not been able to ascertain the time of arrival of these multitudes of western emigrants on the English coast, which might have enabled me to determine the velocity of their flight in the same way as was done in the case of the Hooded Crows. According to information received from my friend, John Cordeaux, whose country seat is situated on the east coast of England, opposite Heligoland, *Plusia gamma* is frequently seen there suddenly in such enormous numbers that only the assumption of an immigration *en masse* can explain the phenomenon.

In evidence of what has just been stated, I may be allowed to quote some notes relating to this subject from my ornithological diary:—On the night of the 25th of October 1872, during a very powerful migration of Larks, many thousands of *Hybernia defoliaria*, intermingled with hundreds of *Hybernia aurantiaria*, travelled over the island. In the following year, on the night of the 29th of July, the weather being warm and perfectly calm, thousands of *Eugonia angularia*, together with hundreds of *Gnophria quadra*, passed in the midst of a strong migration of young Golden Plovers and Ringed Plovers, and of many Sandpipers. So, again, on the

night of the 12th of August 1877, during a light east wind and very light warm rain, 'myriads' of *Plusia gamma* migrated in company with the shore-birds already mentioned, and many young birds of the Wheatear, the Willow Warbler, and other small species.

Of quite special interest is the occurrence here, on the 23rd of June 1880, during perfectly calm, warm weather, of the Desert Chat, a southern species extremely rare in Central and Northern Europe, side by side with *Papilio podalirius*, a butterfly which is rather rare in Germany, and in Heligoland had only been seen on one previous occasion. The weather previously from the 15th of the month had been clear and warm, with light-easterly and south-easterly winds.

On no previous occasion, however, have the migrations of *Plusia gamma* reached to such an extent as they did during the middle of August 1882. On the 15th of that month the wind was south-east, and the weather fine and warm. Of birds, the following had made their appearance:—the Redstart, the Whitethroat, the Willow Warbler, the White Wagtail, the Red Flycatcher, the Whin Chat, the Ortolan Bunting, the House Martin, the Sand Martin, and the Swift. During the night the wind was south, with a calm and warm rain; the small birds above enumerated continued to migrate in abundance, as well as large numbers of 'Waders,'—*i.e.* Plovers, Sandpipers, etc., and intermingled with these, from 11 P.M. to 3 A.M., myriads of *P. gamma*, like a dense snowstorm, all travelling in a direction from east to west. Early on the morning of the 16th, the wind was west, with rain; the afternoon was fine, sunny, and calm. In the evening, and during the night, the wind was south and the weather fine and calm; there was again a strong migration of small birds and 'Waders,' together with countless numbers of *P. gamma*. These migration-phenomena were repeated during the nights of the 17th and 18th, with very light southerly and westerly winds. On the 19th, with a south-east wind and fine weather, many Warblers, Flycatchers, and like species were seen during the day. During the night the sky was overcast, but large numbers of 'Waders,' again accompanied by *P. gamma* in millions, were still seen, all travelling from east to west. During the night of the 20th there was a thunderstorm at some distance, which put an end to migration of every kind.

This leads us up to the question as to the influence which powerful electrical changes in the atmosphere exert on migration. Thus, the regular migration of *P. gamma*, above referred to, had actually commenced as early as on the night of the 11th of August, during which a migration of birds also took place; both, however, were soon after interrupted by thunderstorms. My diary has the

following note in regard to these phenomena:—13th of August, wind south-south-east; on the previous evening, south-east. At the beginning of the night, before midnight, of the 12th, Redstarts, Wheatear, Plovers, Sandpipers, and similar species, were on the move. Later on in the night a violent thunderstorm broke out, putting an end to the migration. The morning of the 13th was clear, fine, warm, but no birds were to be seen; query, had the thunderstorm prevented their setting out on their migration journey? A day later, the migration of all birds due at the time was commenced afresh, and lasted, with light southerly and south-easterly winds and fine weather, until the 20th, whereupon, again, on the night of the 21st, a thunderstorm, followed by stormy north-west winds, put an end to all migratory movements. These conditions of weather prevailed until the 4th of September, on which day calm and fine weather set in, with a light north wind which veered round to north-east, and, later on, to south, whereupon Redstarts, Warblers, Flycatchers, Chats, Dotterels, and many 'Waders' made their appearance in the full prosecution of their migratory journey.

The sheet- or summer-lightning, which is often observed on evenings after very hot days, has a similar deterrent effect on migration, and the same may be said in regard to the powerful electrical discharges, not usually followed by thunder, which frequently take place during the nights of late autumn, and regularly precede and accompany violent storms.

Another very peculiar phenomenon also intimately connected with thunderstorms is the regular but temporary appearance, in millions, of the large Dragon-fly (*Libellula quadripunctata*) before such disturbances. Countless swarms of these insects make their appearance all of a sudden during the calm, sultry hours preceding the catastrophe, while thunder-clouds gather on the horizon, and, heaped upon each other, project into the blue ether beyond, like so many giant mountains of snow.

The directions whence these insects proceed cannot be ascertained, nor do they arrive in swarms or companies, but solitary individuals or scattered groups probably congregate on the spot in one vast throng. The assembling individuals or groups must, however, follow each other in very rapid succession, for in a short time the face of the cliff, still illumined by the sun, all the buildings, hedges, and dry twigs on the island, are covered with them. Nor is it necessary for the occurrence of this phenomenon that the storm should actually discharge itself over Heligoland, or even in its immediate neighbourhood, but only that the thunder-clouds extend over about two-thirds of the whole expanse of sky as measured from the horizon to the zenith. The insects vanish

as suddenly as they appear, so that hardly one of them is discoverable on the following morning. It is not known whether they proceed further west, though this is probably the case. It is certain, at any rate, that they do not remain here, otherwise one would undoubtedly find them lying about dead after the heavy rain of a thunderstorm.

We must, in conclusion, mention some other phenomena of migration of rarer occurrence, and only repeated at intervals of many years. These also are undoubtedly occasioned by meteorological influences, although it is not always possible to prove this to be actually the case. To this category specially belongs the sudden occurrence *en masse* of a species in parts of the world far remote from its home, and in which under ordinary conditions it is hardly ever known to visit. To such cases belongs the irruption of Pallas' Sandgrouse (*Syrrhaptes paradoxus*), an Asiatic species, over the whole of Europe, where it appeared in thousands in 1863, and again in tens of thousands in 1888. The causes of such phenomenal migrations may be assigned, with a fair degree of certainty, to similar meteorological events of exceptional character; in the instance last cited, possibly to a sudden very extensive snowfall, which, having covered all the nests of these early breeding birds, induced them to leave their nesting homes in such astonishing numbers. The cold spring months of 1888 would seem to lend some support to this supposition.

Next in order must be considered the sporadic and simultaneous appearance in numbers of different species originating from Eastern Asia, which, though not repeated at regular intervals, always takes place only under certain well-defined conditions of weather. A phenomenon of this kind on a most extensive scale presented itself in the autumn of 1847. The most noticeable feature of the migration of that season was the enormous and unprecedented quantity of Mealy Redpoles (*Fringilla linaria*) which visited the island, mixed with which, to the extent of about one-third, was the Eastern form, *F. exilipes*, a species which is somewhat smaller than *F. linaria*, besides having the shortest beak of this group of Red-breasted Finches, as well as a pure white unspotted rump. Redpoles are altogether of extremely rare occurrence here. A few specimens at most are taken at any one time, and even these cannot be relied on every year. In the year in question, however, which was also very productive of other Eastern visitors, these birds appeared from the middle of October to the middle of November in hundreds almost daily; while on the 4th and 5th of November these numbers increased to such enormous proportions that the whole island was literally covered with them. In fact, as Claus Aeuckens, who at

that time was still a boy, expresses it:—'One could not throw a stone in any direction without it hitting numbers of these birds as long as it was rolling along the ground.' During both of these months the prevailing wind was east, and frequently south-east. The same winds were experienced from the second half of December up to the middle of the following January.

Besides the above-named species, the Shore Lark appeared for the first time here during the same autumn in very large flocks. Up to that time the bird was almost unknown on this island, only three examples having been on one occasion met with and shot by those excellent authorities on anything ever seen here, viz., the three brothers Aeuckens. Since the autumn of 1847, however, the bird has appeared here with increasing frequency, having at the same time steadily advanced its breeding stations westwards from the extreme east of Asia, so that it has long since become a settled breeding species in northern Scandinavia, and will undoubtedly next extend its breeding area to the north of Scotland.

It has been hinted that this Lark may have probably occurred in equally large numbers previous to that time, but have been overlooked. This view, however, cannot be admitted in the case of Heligoland, where at that time there were resident three such observant and businesslike collectors as 'Old Koopmann,' Reymers, and Oelrich,—the eldest of the three brothers Aeuckens, generally called 'Old Oelk.' The last-named of the three, during the migration period of the Shore Lark, which, moreover, coincides with that of the Snipe, searched every square foot of the island at least twice every day, and it is quite impossible that the striking call-note of this restless bird, uttered both on the wing and when running about on the ground, should have escaped his observation. In the course of the last few decades the numbers of these birds which make their appearance here have steadily increased to such a degree that they are now to be counted every autumn by hundreds of thousands, while thousands of them now also alight here again in the course of their spring migration, these last being undoubtedly individuals which have passed the winter in England.

The autumn of this same year also brought to this island many Bullfinches, numerous Waxwings, and of course a rather large number of Richard's Pipit, with a fairly large quantity of Coal Titmice,—all these species affording proofs of an exceptionally strong migration from the far East. Besides, at the end of October of the same year, Sabine's Gull was shot here, while the Smew was observed very frequently. On the 10th of December nine examples of *Anser niveus* were observed flying past the shore,

and *Cinclus Pallasi* was identified at a distance of from four to six paces on the 31st of December, all of which instances afford further strong proofs of an exceptionally powerful mass-migration from east to west. The weather, moreover, was highly favourable to a movement of this kind, or, more correctly speaking, was its originating cause, for, as has been already stated, easterly, and more particularly south-easterly, winds predominated during the whole time of this migration.

I had long entertained the opinion, I might almost say conviction, that the calms and east winds prevailing here during these powerful migrations from the far East extended to the remote parts of Eastern Asia. For a long time, however, I was unable to assure myself of the truth of this conjecture. I have, however, quite recently been enabled to do so through the extraordinary kindness and assistance of Professor Neumayer, director of the Marine Observatory at Hamburg, who has supplied me with extracts from the records of the meteorological observations conducted on a large scale at the instance of the Russsian Government, not only through the European but also the Asiatic portions of that empire. I reproduce these data within a brief compass, and in a form best adapted to the object in view; calling special attention to the fact that, although only twelve points of the compass, from north-east through east to south, are adduced as favourable to the migratory movement in question, twenty points from south through west to north-east being consequently opposed to it, the result is, nevertheless, in all pertinent cases an exceedingly favourable one.

The year 1879 also was distinguished, both during the spring and autumn migrations, by very numerous occurrences of eastern and south-eastern species. This is the last year for which I have meteorological observations from Russia at my disposal; these, however, extend over nine stations from 21° to 82° 47′ longitude east of Greenwich. (See table, p. 95.) It is hardly necessary to mention that easterly, and more particularly south-easterly, winds and calms prevailed in Heligoland during both periods of migration, and the same was the case along the whole track of migration from here to Semipalatinsk and Barnaoul, beyond which the observations do not at that time seem to have been extended. The total results from these nine localities for the year in question gave for the months of May and June 319 days of favourable, as against 230 days of unfavourable travelling weather, while for the months of September and October the relations were 325⅔ favourable, as against 162⅓ unfavourable days. For the year 1847 already referred to, data from one place only have come to hand, viz., Lugau, south-east of Moscow; during the months of

September, October, and November, calms and easterly winds prevailed in that locality for 69½ days, the winds being westerly and northerly during the remaining 21½ days.

In 1859 the autumn migration was again characterised by the appearance in force of East Asiatic species, though on nothing like so large a scale as in 1847. Nevertheless I obtained three examples of the Yellow-browed Warbler (*Sylvia superciliosa*), two of Tengmalm's Owl, and many Richard's Pipit, while, lastly, one of the rare sporadic occurrences of the Jay in large numbers took place in the same year. The prevailing winds here during this period were south-easterly, and the results of the stations Lugau and Kursk for September and October were:—Favourable easterly winds and calms for 84¾ days, as opposed to 37¼ days of unfavourable westerly and northerly winds.

During the spring months of 1879 the following species were observed here: The Large-billed Reed-Bunting (*Emberiza pyrrhuloides*), Pallas' Short-toed Lark (*Alauda pispoletta*), the Eleonora Falcon (*Falco Eleonoræ*), *Sylvia viridana*, the Black-headed Bunting (*Emberiza melanocephala*) twice, the Rose-coloured Starling three times, the Serin Finch—which until that time I had only obtained once—five or six times, and also the Black-winged Stilt; though these last, as well as the Eleanora Falcon, were not shot, their occurrences were placed beyond all doubt. The four first-named species had, up to that time, not been observed on the island.

So favourable were the indications for the occurrence of spring visitors from the far East in that year, that I advised my friend, John Cordeaux—whose estate is on the east coast of England in the same latitude as Heligoland—by letter, to keep a particularly watchful eye on the wanderers, as I felt sure that rare occurrences like these would also find their way to England. My surmises indeed proved correct, for on the 27th of July one of two examples of a Swift, the Spine-tailed Swift (*Cypselus caudacuta*) were shot there, the home of which species extends through Eastern Asia to Australia and New Zealand. It can hardly be doubted that at the same time other interesting birds reached the British coast *viâ* Heligoland without having been seen, while others, having probably lost their way in Austria and Germany, were unable to continue their journey to this island.

In the course of the autumn migration of the same year the Yellow-browed Warbler (*Sylvia superciliosa*) was observed repeatedly, and on one occasion also killed. *Sylvia reguloides*, with its strikingly light-yellow rump was seen on the 8th and 9th of October, probably the same example on both days. The Red-

throated Pipit (*Anthus cervinus*) occurred repeatedly; of eight examples of the Little Bunting four were shot; of five of the Rustic Bunting only one unfortunately was killed on the 28th of September. Among these must also be mentioned the appearance in this place of the White-backed Woodpecker (*Picus leuconotus*). Whether the same remark holds good in reference to a Greenland Redpole (*Fringilla Hornemanni*), shot on the 24th of October, I am not in a position to decide. The Shore Lark, however, had occurred at that time in large numbers, and also one example of the Siberian Herring Gull (*Larus affinis*) on the 20th of the same month. During the night from the 24th to the 25th, as well as on the night following, flocks of Starlings, their numbers beyond all computation, were observed migrating, these vast numbers pointing to a breeding area of far eastward extent. The migration on these nights likewise included enormous flocks of Golden and Grey Plovers, species whose breeding stations are known to extend far east through Northern Asia. Under these conditions may we not also suppose, that the Greenland Redpole, possibly, has its breeding home in these eastern parts of the extreme north, and that the birds joined on this occasion the exceptionally powerful stream of migration which characterised that particular year?

The data given on p. 95 may therefore be regarded as a substantial proof of the views I have repeatedly expressed in the course of this chapter, viz., that easterly, and more particularly south-easterly winds, sometimes so light as virtually to amount to calms, form the most acceptable travelling weather for birds during both periods of migrations, and that if meteorological conditions of this kind prevail during the autumn months in the lower strata of the atmosphere as far as Eastern Asia, they bring in their train an exceptionally powerful migration, as well as rare and unusual occurrences.

Quite recently I have had the pleasure of being able to join another link to the long chain of observations bearing on this subject; inasmuch as Mr. John Cordeaux, whose name I have mentioned on several previous occasions, informs me of the result of his own observations of many years, which show:—'That, on that portion of the east coast of England which lies opposite Heligoland, birds are in the habit of appearing in large numbers with easterly and south-easterly winds, but that, with winds in the opposite directions, their numbers observed are very small, the migrants in the latter case probably travelling according to their normal manner at great heights overhead.' This result, based on observations extending over many years, entirely agrees with what I have endeavoured to prove in full detail in almost all the different chapters of this portion of the present work.

I subjoin here a synoptical table of the meteorological observations made in the Russian empire in the years 1847, 1859, and 1879, which are specially distinguished by the occurrence of exceptionally powerful migrations from east to west. The material for these data I owe, as I have already stated, to the extraordinary kindness of Professor Neumayer, to whom I would here express my warmest thanks.

Observing Station.			Year.	Month.	Favourable Results: Wind, N.E. to S. and calm.			Unfavourable Results: Wind, S. through W. to N.E.	Total Number of Observations.	Total Results in days.	
Name.	E. Long.	N. Lat.			Easterly.	Calm.	Total.			Wind: easterly and calm.	Wind: westerly S to N.E.
Lugau	39° 80′	48° 55′	1847	September	72	27					
			,,	October	47	38	278	86	364	69½	21½
			,,	November	30	64					
Lugau	39° 80′	48° 55′	1859	September	43	33					
			,,	October	35	57					
Kursk	36° 8′	51° 45′	,,	September	37	46	337	151	488	84¼	37¾
			,,	October	27	59					
Barnaoul	82° 47′	53° 20′	1879	September	16	55					
			,,	October	16	44					
Semipalatinsk	80° 13′	50° 24′	,,	September	28	35					
			,,	October	35	37					
Katharinenburg	60° 39′	56° 53′	,,	September	13	34					
			,,	October	10	43					
Tambow	41° 28′	52° 43′	,,	September	24	29					
			,,	October	40	28					
Lugau	39° 80′	48° 53′	,,	September	64	16	977	487	1464	325⅔	162⅓
			,,	October	40	28					
Kiew	30° 31′	50° 26′	,,	September	58	14					
			,,	October	42	9					
Wilna	25° 18′	54° 41′	,,	September	33	40					
			,,	October	42	9					
Warsaw	21° 2′	52° 13′	,,	September	52	10					
			,,	October	21	10					
Barnaoul	82° 47′	53° 20′	1879	May	30	14					
			,,	June	27	31					
Semipalatinsk	80° 13′	50° 24′	,,	May	27	25					
			,,	June	44	22					
Katharinenburg	60° 29′	56° 53′	,,	May	27	26					
			,,	June	19	26					
Kasan	49° 8′	55° 47′	,,	May	42	11					
			,,	June	19	22					
Astrachan	48° 2′	46° 21′	,,	May	57	7	957	690	1647	319	230
			,,	June	37	13					
Stawropol	41° 49′	45° 3′	,,	May	33	28					
			,,	June	29	32					
Lugau	39° 80′	48° 55′	,,	May	53	15					
			,,	June	34	12					
Pinsk	26° 6′	52° 7′	,,	May	49	5					
			,,	June	30	10					
Warsaw	21° 2′	52° 13′	,,	May	50	7					
			,,	June	30	14					

It remains to make mention of a class of weather phenomena which appear to run in cycles extending over periods of many years. These, though not exercising a controlling influence on migration in the narrower sense, yet, so far as our experience warrants us in conjecturing, affect the general increase or diminution in the numbers of birds occurring during such periods. Thus, within about the last thirty years, the number of migrants occurring here, such as Thrushes, small Warblers, Snipe, Plovers, Godwits, Sandpipers, and related species, and, to a less extent, of Hooded Crows, Starlings, Larks, and Chaffinches, appears unquestionably to have undergone a general diminution. Side by side with this change, however, there has been an equally marked alteration in the meteorological conditions of this island. Before this period the weather during the spring months April and May, especially the latter, was mostly fine and warm, with a prevalence of moderate south-easterly winds. During the early morning hours of the second half of April, and still more so in May, light south-east, south-south-east, and southerly winds used generally to be accompanied by fine warm rain, which was succeeded by sunshine at about nine o'clock. This latter caused a very dense low-lying and slowly-shifting layer of mist to rise from the light soil of the potato-fields of the Upper Plateau; such mists being known here as '*Acker brögen*,' *i.e.* Field mists (*brögen* = to rise in vapours, to steam), while the light warm rains are known as '*Lütj-Finken-Rain*.' This latter designation means 'Small-birds' rain,' a title which is fully justified, for this kind of weather used to be invariably attended by a really numberless swarm of all kinds of Leaf-Warblers, Chats, Wagtails, Tree and Meadow Pipits, Ortolan Buntings, and similar species. Goatsuckers might have been roused out of every secret cranny; Landrails in abundance used to run about in the grass; Dotterels were seen sitting in simple confidence about the ploughed fields, or flying in greater or smaller bands round about in the air, uttering their merry *kütt-kütt, kütt-kütt*, while the blue sky above resounded with the flute-like notes of all the different kinds of Sandpipers. Here and there a Rose-coloured Starling, a Black-headed Bunting (*Emberiza melanocephala*), or a Cretzschmar's Bunting (*E. cæsia*), was shot; and the more watchful gunners and fowlers of the island used to bring reports of peculiar and unknown birds which had managed to escape them by unusual cunning or through some unlucky accident, and whose like they vainly tried to discover in my cabinets. Those were days indeed! Down in my cool cellar stood a large flat dish, filled with some fifty or sixty of the handsomest specially-selected males of the Northern Bluethroat, while rows of other more or less valuable birds were hung round about, in

order to keep as many as possible in a state fresh enough for preparation.

All this has been completely changed; not by any means because the birds have actually diminished in numbers; for when the weather does really once in a way assume moderately favourable conditions, the birds reappear in as large numbers as before. The cause of this change must rather be sought in a complete alteration of the general conditions of temperature and weather which have come about, not suddenly and subject to variations, but gradually and steadily in the course of a long period of time. I am not exaggerating when I say that the last really warm May we have had here dates back to at least thirty years ago; at present cold and dry north winds prevail at this season; and had not the expressions *Acker-Brögen* and *Lütj-Finken-Rain* been called forth by the memories of those earlier better times, they would surely be no longer existent; for the last twenty or thirty years there has—with the exception perhaps of May 1879—hardly ever occurred even a faint approach to these earlier and happier conditions of weather.

This change in climatic conditions has made itself felt also among other divisions of animal life. Thus, the number of our native nocturnal Lepidoptera has by degrees diminished to such an extent that I have almost completely given up collecting these insects, a diversion which formerly filled up, in a most agreeable manner, the hiatus in the bird-life of our island. Almost all Lepidoptera which fly by night show a marked preference for the beautiful red-flowered umbels of the Red Spur Valerian (*Centranthus ruber*), which induced me to cultivate a large number of these plants in my garden; but whereas, formerly, every evening each plant used to be the centre of a teeming crowd of all kinds of moths, only scattered individuals now resort to them, with the exception of *P. gamma*, which still makes its appearance sometimes in comparative abundance.

Thus, for instance, for the last ten years I have quite given up hanging out dried apples as a bait in the evenings, because it would be a hopeless task to search for anything upon them. Indeed, the summer evenings are now never warm enough to induce the insects to swarm. As another instance, the large Dung-beetle, *Geotrupes stercorarius*, which formerly could be obtained here in hundreds, has latterly become quite extinct. I have in vain, within the last few years, offered boys five groschen (equal to about sixpence) for one example of this insect. The large garden spider, *Epeira diadema*, whose webs used formerly to be stretched in dozens over a thick paling in my garden—where, to my annoyance, it used to consume many a much-longed-for moth—has quite disappeared

within the last ten years. All these changes can only be attributed to alterations in the conditions of temperature. The average annual temperature may have remained the same; but, whereas the winters are now not particularly cold, the summers are in a corresponding degree less warm. Sultry summer evenings are no longer known here at all, and even when a day of summer happens to be fine and warm, and apparently heralding a good catch of moths, it is sure to be followed by a cool, if not actually cold evening, with light north winds.

This change in wind and weather records itself on this island in another very striking manner. The little sand island or dune belonging to Heligoland has, in the course of years, lost considerably in extent through the agency of high tides raised by storms, the bases of the sandhills having been undermined by the action of the waves, and the sand subsequently thrown down has been washed away by the tide.

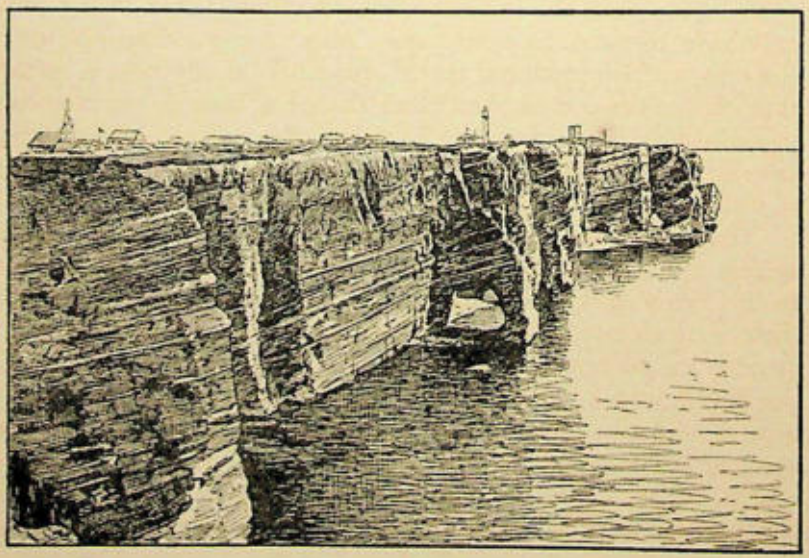
Until about the beginning of the sixties this process of erosion used to take place in severe north-western storms on the north side of Sandy Island. No substantial diminution of land occurred in any other part, least of all on the south side. Since that time, however, matters have completely changed, the sandhills and foreshore being now uninterruptedly torn away by the sea on the south side of the dune, while simultaneously, on the north side, the shore and sandhills have been considerably added to. These changes are still in progress in the present year of 1890. Processes of this kind show that since the beginning of the sixties a complete change must have taken place in the prevalent direction of the wind, seeing that the entirely different effects noted above could only have resulted in consequence of a corresponding change in the causes which produced them. So much, at any rate, is certain, that during the period mentioned there has been no occurrence of powerful tides raised by north-westerly gales, such as were frequent here formerly; in fact, heavy storms from the north-west have been in general among exceptional and isolated phenomena.

The frequency of the earlier occurrences of such hurricane-like storms has, indeed, given rise to the application of separate names to them in regard to the manner and mode of their development. Thus a moderate west wind, accompanied by heavy rain, which steadily veered round to the south with increasing force and finally developed into a violent south wind, was known by the name of *App-Krumper*. This, after a calm of shorter or longer duration, was usually succeeded by the sudden eruption of an extremely violent storm from the north-west, to which the name *Ütt-Stjätter* was applied. These expressions may perhaps be rendered

respectively by the terms 'Creeper-up'[1] and 'Discharger'[2] or 'Shooter-out.' Had these designations not been called into existence by the former frequent occurrences of the phenomena to which they relate, they would certainly never have been originated within the last thirty years, for the simple reason that the causes which gave rise to them no longer exist. Nowadays, in fact, these phenomena proceed in a markedly different manner. In a close and heavy atmosphere, with a downfall of rain, a west wind veering round to south with increasing violence, in the manner described above, is at present no longer followed by a strange, uncanny calm and a sudden hurricane from the north-west, but gradually moderates and veers back to its former westerly direction.

With all these meteorological processes, the appearance of birds, on this island at least, is without question most intimately connected. Accordingly, when some of our gunners come to me occasionally and complain of the hopeless and unendurable state of the snipe-shooting, I am in the habit of returning them what may seem a jocular answer, but is nevertheless meant in full earnest: 'Only wait till Sandy Island begins to lose on the north side again, then you 'll get more Snipe.' Such among them as are careful observers will then at once agree with me, well knowing that, during the last thirty years, days favourable for migration, both in autumn and spring, have been among the rare exceptions.

[1] German, 'aufkriechen' = 'to creep up.'
[2] German, 'ausschiessen' = 'to discharge, shoot out.'



VI. ORDER OF MIGRATION ACCORDING TO AGE AND SEX

The question as to the order of age and sex in which migrants take up their annual journeys is one on which, up to the most recent time, there have prevailed more serious errors than on any other problem connected with the migration phenomenon. It was generally supposed that the old birds acted as the leaders, teachers, and guides of the young ones on their migrations; and although this view was not based on any observations whatsoever in Nature, it seemed so natural and reasonable that it was accepted in pure good faith, without subjecting it to the test of observation and experience. In regard to this question, however, the last ten or fifteen years have amply taught me what an almost hopeless task it is at first sight to oppose an opinion which has remained uncontested for a century. I did not of course expect that the results of my observations would have been at once accepted *in toto*; but at the same time I have been frequently almost amused to see with what caution, not to say incredulity, the reports of my observations, in so far as they contradicted traditional errors, were received. On the other hand, this same opposition and distrust had the good effect of directing a much greater amount of attention to this phenomenon from different sides; and the number of species in regard to which one had become gradually convinced that their young commenced their autumn migration long before their parents, has been increased from year to year.

Naumann's statements on this question, which will be considered more fully later on, are, as a matter of course, based on the most searching observations; they were made, however, in latitudes too far south to allow of the phenomena of migration being recognised in their original simplicity.

Temminck is, I believe, the only one of the older ornithologists who touches upon this question. He only states, however, that 'the young birds migrate apart from the old ones,' without entering farther into the subject (*Manuel d'Ornithologie*, iii. p. xliii.).

Palmén in his comprehensive work, *The Migration-Routes of*

Birds,[1] unreservedly follows the old traditional views, commencing the section on the 'so-called migratory instinct,' with the following statement: 'Direct observations in Nature have yielded the result that among flocks of migrants the older and stronger individuals are in general the leaders of the migratory host.' He could not, however, have begun the treatment of this question with a more unfortunate assertion; for there is no one who has ever made observations which might support this view, nor is there any possible way of determining which of the individuals of a migratory flock, travelling at a height of a thousand, or even only five hundred, feet, are older or younger birds. Among the few species which fly during their migrations at low elevations, rarely exceeding five hundred feet, such as Hooded Crows, Starlings, and Larks, a distinction between the old and young birds, while on passage, can only be made in the case of Starlings, in which the two stages of age are characterised by marked differences in the colour of the plumage. These birds, however, as well as Hooded Crows and Larks, travel in such irregular, ever-shifting swarms, that there can, apart from all other such considerations, be no question of leadership in their case. This, however, is, so far as my experience goes, the manner in which the majority of birds migrate, the only exception being a few Waders and aquatic birds, viz. the Curlews, Cranes, Geese, and related species, which pursue their migration-flight either at an acute angle of very generally unequal legs, or merely in a long oblique line. Among these, it is true, the individuals at the head frequently change places with others, but it is impossible to bring forward even the shadow of a proof that the birds flying at the head of the column are the older and stronger members of this particular assemblage. Body-size is not admissible as a determining factor, nor are such differences of size as may exist, sufficiently important to be observable at the great height at which the migration proceeds; nor is colour, even where such is still distinguishable, any better criterion of the age of individuals in the case of the species under consideration.

Dr. Weissmann (On the Migration of Birds[2]) likewise accepts the usual tradition, and in one of his lectures expresses himself as follows: 'In the case of most birds, the oldest and most experienced members of the flock—*i.e.*, those which have often performed the journey before, travel at the head of the migrant host, and show the others the way.' Here the question at once suggests itself: if this applies only to 'most birds,' what becomes of those who have no such leaders?

[1] *Zugstrassen der Vögel.* Leipzig, 1876.
[2] *Ueber das Wandern der Vögel*, in Gätke.

But this representation of the proceeding, raised though it has been to the dignity of a scientific doctrine, is really nothing more than a plausibly sounding fable, in which—quite after the manner of a fable—the old and wise individuals represent the teachers and guides of simple youth.

In reality, however, this explanation of the question not only lacks all support of actual facts, but is entirely at variance with every observation hitherto made in Nature.

So far as migratory phenomena are concerned, Heligoland may with truth be called the ornithological observatory of northern Europe, for there is probably no place in the world where this great movement is displayed so markedly, in its original form and completeness, as upon this little island-rock. This specially applies to the autumn migration; only very few species at this season approach the end of their journey on or near this island, and nearly all the birds which come under observation are seen hastening to their winter quarters in undiminished numbers and with unabated speed.

Expressed in the simplest language, the incontestable result of all the numerous phenomena as they come under notice here is as follows:—

1. That under normal conditions in the case of the three hundred and ninety-six species occurring here, with the exception of a single one, the autumn migration is initiated by the young birds, from about six to eight weeks after leaving their nests.

2. That the parents of these young individuals do not follow till one or two months later; and

3. That of these old birds again, the most handsome old males are the last to set out on the migratory journey. In spring this order of succession is inverted. This will be treated of more fully afterwards. The only exception to the rule to which reference has been made above, is found in the case of the Cuckoo, and this for reasons easy to divine: for having once foisted her egg on another bird's nest, the business of propagation is ended, and having no other object for staying in the north, she forthwith takes her departure.

Numberless and decisive proofs for the above statements are furnished by those species whose adult plumage differs so markedly from that of the young birds, that one is able to distinguish easily, even at some distance, what stage of age one is dealing with. But even those species whose adult plumage is less striking, can be procured here during the whole period of migration in almost any desirable number, so that in all directions there is at one's disposal most ample material for determining each fact with absolute correctness. In support of what has been said above, I will now give a few extracts from my ornithological journal, which I hope will

settle beyond all doubt the question as to the difference in the time of migration of old and young birds. Among the species specially bearing on this question, the Starlings occupy a place of special prominence, not only on account of the marked differences of their early and adult plumage, but also because of their appearance in extraordinary numbers, in regard to which latter phenomenon the year 1878 was particularly distinguished. The entries are as follows:—

Starling: some few scattered examples of old birds in much worn plumage during the first week in June, these being probably individuals which had lost their spouses, or the broods of which had perished.

June 20 and 21.—Great flights of young birds.
„ 22 and 23.—Enormous quantities of young birds.
Thousands of young birds daily until the end of the month.
July.—From the 1st to the 12th, from thousands to tens of thousands of young birds daily.
„ 16.—Many flocks of young birds.
„ 25.—Immense multitudes of young birds.
Hereupon ensues a pause of two months during which no Starlings, neither young nor old birds, occurred; after this the migration began afresh in the following manner:—
September 22.—Starlings—old birds in fresh plumage—flights of many hundreds.
October 2 and 7.—Large quantities of old birds.
„ 8.—Flights of thousands.
„ 13.—Hooded Crows and old Starlings in tens of thousands.
„ 14.—Hooded Crows in many thousands; Starlings in hundreds of thousands.
October 15th, many; 16th, very few; 20th, tens of thousands; 28th, very many.
November 18 and 19.—Flights of old Starlings, numbering from twenty to fifty individuals.
December 9 to 18.—Daily flights of from forty to sixty individuals.

The course of the migration of the Starling proceeds here in the same manner year after year, provided it is not interfered with by wind or weather. Young grey birds migrate across Heligoland and on both sides of it in a broad column from the last week in June to the end of July; then there ensues a pause of from six to eight weeks, followed at about the end of September by the appearance of the first of the old birds in black plumage. Their numbers increase in the course of October to astonishing proportions, diminish considerably in November, and end in small flights towards the close of the year.

After the Starlings, the Wheatear appears here on favourable

days during the autumn migration in such vast quantities that it deserves to be considered next. In this instance, again, the young birds, from about six to eight weeks old, are the first to migrate about the middle of July. In the year 1880 the advance-guard of these immigrants arrived here on the 24th of July; in 1881 on the 19th; but in 1882 as early as the night between the 7th and 8th of the same month. In 1883 very violent west winds with rain prevailed throughout the whole of July and during the first week of August, and accordingly not a single bird, either of this or any other species, was seen. During the night between the 6th and 7th of August the wind changed to a light south-east. This was followed forthwith by the appearance of numerous species, including Wheatears, all, however, only in small numbers; this paucity was accounted for by the subsequent change of the wind to the west, from which direction it continued to blow, amid many downpours of rain, until the 13th. From the 14th to the 23rd light southerly, south-easterly, and easterly winds prevailed, the weather being fine and warm. During the whole of this time young Wheatears, and other species due at this particular period, migrated in great quantities.

The regular migration of the young Wheatears does not, however, begin until the last week in July, and from that time onwards thousands of these birds arrive here daily. Such, among other instances, was the case in 1880 on the 24th of July, and on the 4th, 5th, 6th, 11th, 12th, etc., of August. This regular migration of young birds continues until the middle of September or even somewhat later, after which time it gradually decreases until its close.

The older birds of this species are seen in much smaller numbers during the autumn migration: probably the majority of them fly across the island during the night without breaking their journey. Their proper migration time is October, but scattered examples in the blue-grey plumage make their appearance as early as September: thus, among forty-five birds of this species, caught at the lighthouse lantern on the night of the 1st September 1881, seven were old birds; and among forty-six, on the night of the 4th, thirteen were old individuals, all the rest, in both cases, consisting of young birds of the year. In 1880 the first old bird was seen on the 10th of October, and in 1882, on the 4th of the same month.

The migrations of the Pied Flycatcher, the Redstart, the Willow Warbler, the Whinchat, the Ortolan Bunting, and many other species proceed in exactly the same manner—in fact, the data given above for the Wheatear will apply with almost equal force for all these species, except that the Willow Warbler is the first

to make its appearance—the Redstart and Ortolan Bunting, in most cases, not appearing until a fortnight later.

The young birds of the Willow Warbler, whose migration commences early in July—I have even obtained a very yellow young individual of this species on the 30th of June—are joined at the end of August by the older paler-coloured individuals; in the case of the Redstart, however, the young of which rarely arrive before the expiration of the first week in August, the old birds follow somewhat earlier; thus, among thirty-six individuals of this species, caught on the night of 4th of September 1881, there were already as many as eleven old birds. On the previous day I had made the following entry in my diary:—Wheatear, one-third of number of individuals, old birds; Redstart, one-half old birds; Ortolans, very numerous—about one-quarter of their number old birds, being the first old individuals seen during the migration.

It should be noted here, as a fact of some interest, that the few old individuals found among the Wheatears and Redstarts, caught on the night of the 4th September, as mentioned above, did not arrive until late after midnight, probably between three and four in the morning, whereas the young birds had already started on their migration in large numbers some hours before midnight. I am not, however, at present in a position to say whether this order of arrival will prove to be the rule, though I have found it to hold good in repeated instances.

The young Sparrowhawks commence their migration at the end of the first week of August, and from that date on appear daily in greater or smaller numbers, while the first old bird, in 1880, was seen on the 29th of September; in 1881, on the 22nd of the same month; and in 1883, on the 4th of October. Of the Peregrine Falcon and the White-tailed Eagle, the young birds arrive at the end of August, but the old ones rarely before October.

As in the case of the Starlings, solitary old examples of the Golden Plover, in much-worn plumage, also made their appearance before the young had commenced their migration. This, however, as will be explained further on, is due to other causes than those which operate in the case of the Starlings.

The first young Golden Plovers arrive here as early as the beginning of July; thus, on the 4th of July 1880, about twenty individuals were observed; after that birds occurred singly up to the 23rd of the month. On the 4th, 5th, 6th, and 10th of August they arrived in small flights, and on the 12th, in a flock of about a hundred individuals. These young birds are so utterly devoid of shyness that the majority of them are almost always shot, all doubts as regards their age being in this manner set aside. The

thick heel-joint, as well as the preponderance of yellow in their plumage, are unmistakable signs of their youth; in some of them, indeed, the tips of the feathers of the back of the head still have adhering to them the small appendages of the downy nestling plumage. None of these flights of young birds are accompanied by old individuals. Old Golden Plovers do not arrive until October, and even then not very numerously, for most of them tarry in the north or east until they are driven off by the advent of wintry weather. At such times, however, they fly across the island in thousands during dark December nights, without halting on their journey.

The Blackbird, again, is another species in the case of which the time of migration in respect to age and sex can be determined with the utmost exactness by reason of the difference between their early and adult plumages. The young reddish-brown birds, with which the migration commences, rarely make their appearance before the middle of October; the old black males defer their arrival until November, and of these latter, again, the last to arrive, some weeks later, are the beautiful glossy black individuals with orange-yellow bills.

Hundreds of similar instances might be brought forward, all of which will be discussed in their place under the headings of the respective species to which they refer. We cannot, however, omit to mention one other instance relating to a species the home of which is somewhat farther removed from Heligoland than those of the species already discussed. We refer to Richard's Pipit, from far-distant Daüria. Under very favourable conditions of weather, I have, on several occasions, met with young birds of this species almost entirely in their young light-bordered plumage, as early as the end of August. September and October are, however, the proper migration-months of these young birds, in the course of which the early dress is gradually replaced by the olivaceous brown early-winter plumage. Old birds in beautiful rust-coloured plumage never appear here before the end of October, continuing during the first half of November. The number of such individuals in the course of the autumn migration is, however, invariably a very limited one. The rule just established in reference to the order of migration does not include certain solitary exceptions. These however in the present case by no means discharge the important function which it is sought to attach to them, viz. the leadership of the young birds during their migration flights. To such exceptions belong the few old Starlings previously mentioned, which are seen here almost every summer some two or three weeks before the arrival of the flocks of thousands of young birds. The pro-

bable cause of their occurrence has been already indicated above. Another exception of the same kind occurs in the case of the Golden Plover, also referred to above, solitary old individuals of which species are likewise seen here long before the commencement of the autumn migration of the young birds.

It is of course possible that among these birds there may be some individual or other of which the brood has perished, though it seems more probable that they belong to the numerous shore-birds which, during the summer months, roam around the islands, coasts, and estuaries of the North Sea. Such birds—though almost all of them are old individuals, and in full breeding plumage—have nevertheless made no attempt at breeding; and they thus terminate an irregular and aimless existence during the spring and summer by an equally irregular migration in autumn. To these belong, more especially, the Grey Plover, the Bar-tailed Godwit, the Oyster-catcher, the Curlew, the Whimbrel, the Knot, the Dunlin, and the Sanderling, and, more rarely, some one or another species of *Totanus*.

Collett, in regard to this phenomenon, says, that whenever he visited, during the summer months, the most southern extremity of Norway, he met there either large flocks or single individuals of the above-named species, which remained there the whole summer, for the most part wearing their full breeding garb—that they awaited the arrival there of the flocks proceeding in August from the north, and then travelled in their company to the south (*Journal für Ornithologie*, July 1881). Collett thinks that these may prove to be individuals not yet endowed with reproductive capacities; to this view however is opposed the fact that the majority of such birds—at least as far as they have been killed here—are old individuals in the purest and most beautiful breeding plumage.

Solitary individuals of the species of Sandpipers enumerated above, in much worn and faded breeding plumage, occur regularly during July and at the beginning of August, arriving, sometimes before the young birds, sometimes simultaneously with them, though never in their company. The true autumn migration of such old individuals as have really bred in the far north or east, does not however commence until the beginning of the winter months, at which period of the year these old birds are clad regularly in their complete winter plumage, not excepting even the old Golden Plovers, which pass through here in October.

All the migrants which pass this island in the autumn have, with some isolated exceptions, their plumage perfectly developed in every part. The few exceptions to this rule are solitary old individuals of the Peregrine Falcon, as well as a few other large birds of prey. Besides these, the only actual instances with which I am

acquainted are those of Richard's Pipit and the solitary examples of the Tawny Pipit (*Anthus campestris*), which occur here at the end of August. Solitary old birds of the Knot and the Sanderling, in the stage preceding the winter moult, likewise occur here during August. These however I regard as individuals who have altogether failed to visit their breeding stations in the course of the summer, and hence do not occupy a normal position in the migratory process generally.

In the retarded autumn moult of these old breeding birds we have in fact the cause of their delayed migration. They only begin to moult after they have done rearing their young, by which time the latter have their organs of flight so far developed as to be almost, if not completely, capable of undertaking their first autumn migration. Their parents, on the other hand, are obliged to tarry in their summer quarters until their new plumage also has been completed.

In regard to the difference of the time of migration of young and old birds, I may be allowed to add a few remarks from an excellent book, viz. Rodd's *Birds of Cornwall and the Scilly Islands*. Speaking of the Knot, the author, in the work in question, states as follows, on p. 101 : 'I have also noticed that the first flocks of these migratory Sandpipers, which usually arrive about the second week of August, are almost entirely composed of young birds. The old birds arrive somewhat later.' In regard to the Woodcock, the same work contains (Introduction, p. xv.) a passage from an essay of the Hon. Francis Roberts, printed in London in 1708, which, though not written with the object of proving the difference of the time of migration of old and young birds, nevertheless fulfils this purpose in an admirable manner. The passage in question runs as follows: 'When it first comes its flesh is short and tender, whereas afterwards it eats stringy, and of a fibrous flesh, as others of our fowls are.' This interesting observation, made one hundred and eighty years ago, gives the clearest evidence of the earlier migration of young birds as compared with that of their parents; for it is evident that by birds of short and tender flesh we must understand the young ones, while, under stringy and fibrous, the old ones are naturally indicated.

The extracts from my ornithological journal, as given above, besides the observations of other ornithologists here cited, to each of which sources of information much further material might be added, should suffice to establish beyond any doubt what has been said as to the difference of time of the autumn migration of young and old birds. It is however impossible that the phenomena as observed in Heligoland should be limited exclusively to this island.

Although on the Continent, with its forests and mountains, investigation of migration phenomena of this kind must be incomparably more difficult, more especially as these become complicated with every degree of latitude further south, yet careful and critical observations should enable us to recognise them without difficulty, in the case of species differing so markedly in the colours of their early and adult plumages as Starlings, Blackbirds, Redstarts, Chats, and many others.

Thus the number of young birds of species which, besides breeding in northern latitudes, do so also in Germany and England, must, in these countries, of necessity undergo a very considerable increase at the beginning of the migration. Even if the young birds bred in these countries had already left before the arrival of the new immigrants, the quantity of the latter would still be far in excess of the former, no matter whether it was made up of individuals from the north or from the east. My old friend and opposite neighbour on the east coast of England, John Cordeaux, has indeed found this view fully confirmed in the case of the Chats and Redstarts.

Careful observation will probably everywhere bring into recognition the original character of the autumn migration, in the more numerous arrivals of young birds at its beginning, and the predominance of old individuals at its close. Or, again, this character will express itself, as, for instance, in central and southern Germany, by the stay of the old birds of many species within the circuit of their breeding area, and the departure of birds of the same species bred in those districts, and the passage of those young birds of the species which have been bred in regions further north.

A similar difference in the time of migration of old and young birds has been noted in regard to the Blackbird within Naumann's area of observation. In regard to this species the great ornithologist says (vol. ii. p. 331), that of those individuals which breed in pine woods, containing juniper bushes, the old do not depart at the end of the breeding season, but that those which breed in leafy woods, in the winter leave for localities which afford them suitable nourishment; and that the young of all, on the other hand, no matter under what surroundings they are bred, depart in September and October; that the old birds were already back at their breeding stations as early as the beginning of March, whereas the young birds did not return until the end of the month.

However, in these latitudes, among those species in which the old birds migrate like the rest, the first to leave unnoticed will be the young individuals which have been bred on the spot, their place being taken by other young birds which have been bred in

more northern latitudes. Some of these latter, however, arrive so late in the southern area, that the old birds which have hitherto tarried there will have begun to depart at the time when the migration of the young individuals from the north is about to terminate. Hence it results, in these southern latitudes, that old and young birds, having no relation of kinship with each other, are nevertheless seen to migrate at the same time. Last of all, forming the rear-guard of the migration of the particular area, there will pass the old birds whose breeding haunts are in the extreme north, individuals whose late appearance Naumann endeavoured to explain by assuming that they had been detained by accidents or mishaps of various kinds.

Hence the course of the spring migration, as detailed above, actually supplies proofs, such as one might logically expect to follow from what we have stated, in regard to the order in which the autumn migration of birds proceeds, because—in the spring, in the case of all species, the most handsome old birds are invariably the first to hasten back to the old homes, as the heralds of reawakening life; these are soon joined by old females, whose numbers increase, while those of the males decline, and the migration is brought to a close by the younger birds.

There follows, however, in the wake of the main body of migrants, an irregular rear-guard of weaklings and crippled individuals, some with the toes of one foot wanting, others with the whole foot lost up to the joint, a rounded ball, with more or less hardened sole, being developed in its place. Others, again, have lost a portion of their flight-feathers or of the rectrices.

If among such a rear-guard of Thrushes, a fowler or collector happens to find an apparently very handsome male Blackbird, in glossy plumage and brilliant orange-yellow bill, or a Ring Ousel, with a very white breastband, he will regularly, on capturing such a specimen, find proved what he was, in fact, convinced of before, viz. that the bird has either lost from six to nine of its rectrices, which have only been restored to half their length, or that the wings have suffered damage of a similar kind, which has not yet been completely repaired.

Some Hooded Crows are seen occasionally in a truly pitiable condition, labouring, with scarcely half their wings left, to follow their companions, who have preceded them by as much as several weeks. It is singular how such a bird could lose so many of the flight-feathers of both wings, and sometimes indeed quite unintelligible how it can still continue to fly with the few it has left.

How hard an effort this is is clearly shown by the increased number of the strokes of its wings; notwithstanding, it slowly

pursues its toilsome and lonely journey, with the blue skies above and the blue waters beneath it; and while our eyes follow the lonely traveller, there arises within us the involuntary reflection: How powerful must be the impulse from within, which urges on so abandoned a creature patiently to strive for a goal of which it can scarcely have a presentiment!

Although the early and independent autumn migration of the young birds had been hitherto quite withdrawn from recognition, this was by no means the case in regard to the early appearance of old males in spring. The reasons for this difference in the state of our knowledge must be sought for, in both cases, in the nature of the phenomena themselves. At the close of summer all the different species of birds not only appear simultaneously in enormous quantities, but in very many of them the autumn plumage varies so little with differences of age, that it is necessary to have the bird actually in one's hands in order to determine to what stage of life it belongs. In spring, on the other hand, the number of migrants which come under observation is in itself a much less considerable one, because, as a rule, one sees almost only such birds as are residents within the area of observation, those belonging to northern or eastern breeding-stations passing overhead unobserved at night; and also because the vanguard of the migratory train consists exclusively of old males, which are not only very easily recognised by the colour of their plumage, but also at once proclaim their sex and age by their song or their call-notes.

Naumann, of course, furnishes numerous proofs for what has been said above, one of which has already been mentioned in connection with the autumn migration of the Blackbird. Faber states (*Life of High Northern Birds*, pp. 33 and 114)[1] that in Iceland, as well as in Denmark, the males of song-birds, at least in spring, arrive before the females; but he doubts whether the same may be the case with waders and natatorial birds. As far as my own experiences go, the first arrivals of Dotterels and Ringed Plovers in Heligoland are invariably males. Similar observations might be collected from many older works. In more recent times Seebohm's two highly interesting journeys, in 1875, to the mouth of the Petchora, and, in 1877, down the Jenesei, from Jeneseisk to the Arctic Ocean, have shown that in these high latitudes also, the males are the first to arrive in spring. Thus, in regard to the Snow Bunting, the author says (*Siberia in Europe*, p. 81): 'When we first met with the flocks of Snow Buntings, we found them to consist principally of males, but as the season advanced the females largely predominated.'

[1] *Leben hochnordischer Vögel*, pp. 33 and 114.

Ibid. p. 91.—'The Shore Larks had already (12th May) been some days in Ust-Zylma, and by this time were in large and small flocks, in the fields, on both sides of the town. *All those we shot proved to be males.*'

Ibid. p. 102.—'Flocks of Shore Larks had by this time (19th May) become more numerous, and consisted of males and females in nearly equal numbers.'

Ibid. p. 132.—'I shot (30th May) the strange songster, and brought down my first Little Bunting.'

Ibid. p. 153.—'I shot the little songster (7th June), and it proved to be a male Scarlet Bullfinch (*Carpodacus erythrinus*).'

Wheelwright (*Ten Years in Sweden*, pp. 331 and 332) says, in regard to the Shore Lark, that, of fifty of the earliest spring arrivals shot at Quickjock, in Lapland, there was found 'strange to say' (!!) only one female bird.

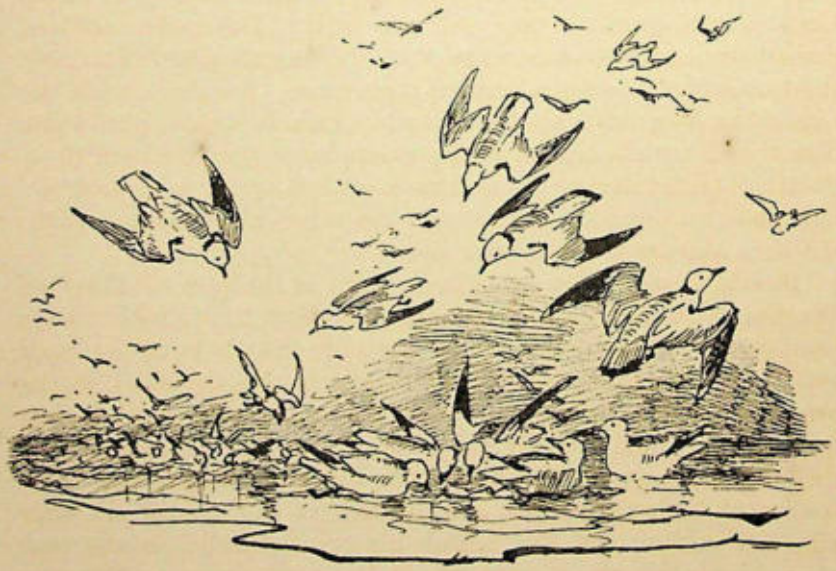
Here in Heligoland the forerunners of the spring migration are invariably old males; a week or two later, solitary old females make their appearance; and after several weeks, both sexes occur mixed, *i.e.* females and younger males; while, finally, only young birds of the previous year are met with. The males arriving earliest during the commencement of the migration are invariably the handsomest examples, in perfect plumage. For instance, in the case of the Ring Ousel, the first examples have invariably pure white breastbands; while almost all the examples of the Northern Bluethroat, obtained during the first week of their spring migration, are old males in which, in addition to the other blue-coloured parts, the lores also are suffused with blue.

Similar features are brought to light in the case of the Pied Wagtail. The vanguard of its migratory host in spring is always composed of old males, in which not only the whole of the back and throat are glossy black, but in which also, the sides of the breast and the flanks are of a deep black colour. The same perfect coloration is met with in the case of the first arrivals of the Pied Flycatchers, the Common and Black Redstarts, the three species of Yellow Wagtails, and, in fact, in the case of all other migrants which pass the island—though naturally, in the case of many species whose plumage is less conspicuous, differences of age and sex can only be discerned if the birds are in closest proximity to the observer.

All these phenomena are displayed so clearly on this island, that they are known to every gunner and fowler as well as, and indeed sometimes better than, his alphabet. Nay, even the boy who rejoices in the possession of his first blowpipe is so well versed in these said phenomena as, for instance, to know perfectly well that as

long as no Yellow-billed Blackbirds are seen in autumn, the Thrush season is still in a fair way.

Seeing that all the statements about the sequence of migration in regard to age, sex, and season, set forth in this chapter, not only deviate considerably from the views hitherto entertained on this subject, but in many cases are entirely opposed to such views, we would remark in conclusion that, in what has been said above, every erroneous notion or possible insufficiency of observation has been most positively excluded. When one has been employed for nearly fifty years in a place like Heligoland in putting together a collection of the most perfect specimens obtainable, he ought at least to be credited with the possession of a sure knowledge of the exact seasons of the year when this or that particular plumage may be looked for.



VII. EXCEPTIONAL MIGRATION PHENOMENA

THE occurrence within a particular district of unusual, or more or less rare, visitors, belonging to a totally distinct avifauna, and generally known under the name of 'casual visitants,' is a fact which has hitherto not received a due amount of attention, owing to our having remained unacquainted with the laws by which these phenomena, like others connected with migration, are unquestionably regulated.

In regard to this question, Heligoland provides material of paramount importance, both by reason of the unexampled number of such interesting strangers from all countries of the northern hemisphere occurring on the island, and also because of the fact of their appearing in such quantities within so limited an area, giving proof of the incomparably larger numbers of these rare birds which must annually pass through the whole of the European continent.

It is remarkable how much our views on such exceptional phenomena have changed from those which prevailed some twenty years ago. At that time, the report of each new stranger shot here used to arouse the most joyful sensation among ornithologists; whereas, subsequently, the views were expressed from many sides that 'casual visitants' of this kind had no scientific significance whatever.

Such a change in the manner of looking at this question can, however, only be ascribed to the insufficient amount of attention devoted to the subject. This neglect was itself undoubtedly the outcome of the traditional error, according to which these strangers were, as a rule, simple and inexperienced young autumn birds which had either been driven out of their normal course by storms, or were wandering about the world at haphazard; and individuals, it was held, which had thus been blown about casually by the wind to one place or another were, of course, not deserving of any further attention.

With this view my own experience of many years is most

decidedly at variance. In the first place, a large portion of the rare visitors which occur here are not young and inexperienced birds, but old individuals. This is the case with the majority of individuals which belong to species originating from regions far to the south-east and south-south-east of this island.

Thus, in the case of the Black-headed Bunting (*Emberiza melanocephala*), I have obtained twelve old examples as against two young summer birds; and, in the case of the Eastern Pied Chat (*Saxicola morio*), the Black-eared Chat (*S. aurita*), and the Desert Chat (*S. deserti*), two old examples of each species as against one young bird of the last-named species only. Again, almost all the examples of the Rose-coloured Starlings which have occurred here were old birds; and so on.

No more do the conditions under which such migrants make their appearance admit of the conclusion that these movements are merely of a roving or blundering kind, without definite plan or aim. On the contrary, we are obliged to assume that these movements, also, are *ab initio* dependent on definite laws or causes of a recurring kind, seeing that species from different quarters of the globe arrive here at correspondingly different seasons of the year, each species rigidly adhering to its own particular period, viz. eastern and north-eastern species in autumn, and those from the south-east and south in spring. Nor do these acting causes confine their influence to isolated individuals, but on the other hand assert themselves to such a degree in the case of all kinds of different species, that one may not rarely see together on one and the same day, on this little rock, species of different genera, whose breeding homes are situated nearly a thousand miles away in eastern Asia; each species, moreover, being frequently represented by as many as two or three examples.

As I think that it may be of interest to adduce instances of this nature, I may, perhaps, be allowed to quote the following extracts from my journal:—

1860. June 18.—*Charadrius fulvus* and *Emberiza melanocephala*.
1861. Oct. 10.—*Sylvia superciliosa*. Three examples together in a willow.
1863. Oct. 9.—*Sylvia superciliosa* and *Emberiza rustica*.
1864. June 12.—*Sylvia* (*Acrocephala*) *agricola* and *S.* (*Ruticilla*) *mesoleuca*. Both new to Heligoland and Germany.
„ Oct. 4.—*Turdus varius* and *S. superciliosa*. Two examples of the latter species.
1867. May 9.—*Emberiza cæsia* and *Saxicola morio*.
„ Sept. 19.—*S. superciliosa*, two examples, and *Emberiza pusilla*.
1870. „ 19.—*Sylvia superciliosa* and *Emberiza rustica*.

1875. Sept. 17.—*Emberiza pusilla*; *Anthus cervinus* and *S. superciliosa*. Two examples of latter species.
1879. May 26.—*Falco eleonoræ* and *Alauda pispoletta*. Both new to Heligoland and Germany.
„ Sept. 27.—*E. pusilla*, two; *E. rustica*, one; and *E. aureola*.
„ „ 28.—*E. pusilla* and *E. rustica*.
„ Oct. 8.—*S. reguloides*, *E. rustica*, two to three examples; *E. pusilla*; *Anthus cervinus* and *Alauda alpestris*, the latter in flocks of hundreds.
„ „ 10.—*E. rustica* and *pusilla*.
„ „ 14.—*S. superciliosa*, two examples.
1880. June 23.—*Saxicola deserti* and *Papilio podalirius*.
„ Sept. 26.—*Sylvia superciliosa*, *E. pusilla*, and *Muscicapa parva*.
„ „ 30.—*E. pusilla*, *Sylvia tristis*, and *S. superciliosa*.
„ Oct. 10.—*Turdus fuscatus*. A day afterwards, *E. pusilla*.

I must further make special mention of the 1st of October 1869, on which day there occurred on the island the Little Bunting, Red-throated Pipit (*Anthus cervinus*), two examples; the Red-breasted Flycatcher, three examples; White's Thrush and Yellow-browed Warbler.

On the day following I obtained *Turdus swainsoni*, which latter likewise no doubt reached this island by an east-to-west route of migration. The occurrences enumerated above were almost always accompanied by larger or smaller numbers of Richard's Pipit.

In the enumeration of these birds mention has also been made of a butterfly, *Papilio podalirius*. This insect, as is well known, only in rare cases advances beyond northern Germany, and on this island also had been seen on only one previous occasion. There can therefore be no doubt that the same atmospheric conditions which favoured the journey hither of the Desert Chat from the south, in company with which it arrived on the same day, also induced this lighter-winged stranger to wander across the sea. That Lepidoptera during their more extended flights are subject to the same meteorological influences as birds I have been convinced by the experience of many nights in July, during which I have caught numerous nocturnal Lepidoptera not belonging to our insect-fauna, the weather of these nights being invariably such that, if it had occurred a few weeks later, it would have conducted hither innumerable Wheatears. It has, in fact, occurred repeatedly that Lepidoptera, especially night-flying species, have passed over this island in countless swarms at the time of powerful bird-migrations. Thus, during the night of the 25th of October 1872, thousands of *Hybernia defoliaria*, mixed with smaller numbers of *H. aurantiaria*, passed over the island in the company of large numbers of

Larks. And again, in the night of the 11th of October 1883, during which an unusually strong migration of all the species of birds due at that time took place, this was accompanied by the appearance of very large swarms of the same species of *Hybernia*.

White Cabbage Butterflies, the Black Arches, *Psilura monacha*, and also *Libellulidæ*, *Libellula quadripunctata*, have been seen to pass here in migratory flights of astonishing proportions, though even these do not come up to those of *Plusia gamma*, which on repeated occasions have occurred in numbers of which it would be quite impossible to form any conception. Thus, during the nights from the 15th to the 19th of August, under the favourable conditions of a south-easterly wind and fair weather, a considerable migration of birds took place. On each of these nights, from 11 P.M. to 3 A.M., the small Noctuæ above referred to were seen at the lighthouse, passing from east to west in undiminishing numbers, like the flakes of a dense snowstorm. These small creatures also manage to cross the North Sea in safety, for they often arrive on the east coast of England suddenly, and in such remarkable numbers, that we can only believe them to be immigrants. In fact, as my friend John Cordeaux informs me, an enormous accumulation of these insects actually took place at a time corresponding to that of the above observations.

Returning, however, to the subject of the present chapter; it is the residents of the far east of Asia which, if not in the number of species, yet at any rate in that of individuals, must claim our first attention. Even if the Richard's Pipit can no longer be regarded among the rare occurrences of Heligoland, this still applies to the Yellow-browed Warbler and the Little Bunting, of each of which species some thirty freshly-killed specimens have passed through my hands, whilst at least double that number has been observed here within the last forty years. White's Thrush I have obtained on five occasions; this splendid thrush having, before my time, come five or six times into the hands of Brand of Hamburg. The Rustic Bunting I have obtained nine times, and the Yellow-breasted Bunting (*E. aureola*) three times. Besides these, the following birds have been killed here in one or two instances:—The Red-throated Thrush (*Turdus ruficollis*), the Black-throated Thrush (*T. atrigularis*), and the Dusky Siberian Thrush (*T. fuscatus*); the Siberian Chiffchaff (*Sylvia tristis*), Dusky Willow-Warbler (*S. fuscata*), *S. viridana*, *S. borealis*, *S. nitida*, *S. coronata*, *S. proregulus*, Booted Warbler (*S. salicaria*), and Pallas' Warbler (*S. certhiola*); also *Pyrrhula rosea*, *Cinclus pallasi*. To these may, perhaps, be added one or two other species of those already mentioned; *Sylvia viridana* has actually been killed on three occasions.

About two-thirds of these Eastern species consist of young birds, whose occurrence here, almost without exception, in autumn, is just what one might expect from the nature of things, inasmuch as it is self-evident that young birds of all species must, during the autumn migration, be represented in much larger numbers than old individuals can be.

A list as extensive as that given above would, one might expect, be in itself sufficient to contradict the assumption that these exceptional occurrences are the result of a straying on the part of the birds in question from the normal track of their migratory journey; and this more especially when we consider, as we are undeniably entitled to do, that the large number of individuals of species from far eastern regions, which are met with in Heligoland, must stand to the quantity of these erratics passing through the whole of Central Europe every autumn, in the same relation as the size of this island does to that of the Continent. Accordingly, if in Heligoland alone from eighty to a hundred examples of the Small Yellow-browed Warbler have been seen during a number of years, what an enormous number of these birds must have visited the whole of Germany during the same period. Again, if twenty, fifty, or even a hundred examples of Richard's Pipit occur here in one day, these numbers can only represent a minute fraction of the quite incomputable quantity of these birds which are travelling at the same period from Daüria to Western Europe.

Moreover, inasmuch as these birds do not occur irregularly at all times of the year, but regularly during the normal autumn passage of the majority of species migrating from east to west, we cannot do otherwise than assume that many individuals of such Eastern species which, in autumn, to a predominating extent, migrate in a southern direction, are induced by annually recurring causes to travel westwards, instead of passing on to their normal winter quarters. As already mentioned, their number is too large, and their appearance too regular, to allow of its being ascribed to accident.

Large, however, as is the number of individuals of these visitors to Heligoland from the far East, it is nevertheless exceeded in regard to the number of species represented, by that of birds whose homes are situated in countries far to the south-east and south-south-east of this island, viz. Greece, Asia Minor, Arabia, Persia, and as far as Turkestan. As already stated, this increase in the number of species is balanced by a decrease in the number of individuals. The collector, however, is amply compensated by the fact that more than three-fourths of the birds are handsome old males in breeding plumage. This latter fact is determined partly by the time of the

year at which these birds make their appearance—*i.e.* almost exclusively in June and July—partly by the motive which prompts their migratory flight.

When we consider the time of their appearance, and the fact that they are, almost without exception, old breeding birds, we may perhaps, as already intimated above, not have far to seek for the motive which prompts these south-eastern species to take up anew their migratory journey, at a time when their spring migration ought to be at an end; and thereafter to continue it in the same north-north-westerly and north-westerly direction which had been pursued by them during the latter movement. The only explanation of this irregularity may probably be found in the assumption, that all such summer visitors are individuals which have lost their spouses during the earlier stages of the breeding season, and which have then sought to satisfy the persistent impulse towards accomplishing the act of propagation, by proceeding farther in the same direction which they had previously pursued during the said spring migration. This view derives considerable support from the fact that most of these birds are old males, who are less exposed to the risk of falling victims to birds of prey than the females, since the latter, while sitting on the nests, engaged either in laying or hatching their eggs, are much more liable to meet with a fate of this description.

A consideration of the regions which are inhabited by these species during the summer and winter months absolves us from the necessity of furnishing a proof of the fact that their spring migration proceeds in a north-westerly direction; nevertheless, in regard to such of these species as occur more numerously, a few instances, such as the following, may be brought in evidence. The Rose-coloured Starling, which in favourable weather is seen here almost every summer, breeds very numerously in Asia Minor, the Crimea, and the Caucasus, and winters in myriads in the east of India. The Black-headed Bunting (*Emberiza melanocephala*), which I have obtained here about fifteen times, nests in Greece and Turkey and Asia Minor, and has its winter quarters in the east of India. In the case of the Short-toed Lark, which I have handled in the fresh state from forty to sixty times, though its breeding range extends too far west to be of much value to the question under discussion, there can nevertheless be little doubt that the examples which have occurred here from the middle of May to July originated from Greece and the neighbouring districts. I have, however, also obtained various examples of this small Lark in completely moulted plumage during the autumn migration, which, considered in the light of analogous occurrences, could only have reached

this island by a flight from east to west; hence it follows that this species must be distributed, even if only locally and irregularly, throughout European and Asiatic Russia, as far north as the latitude of Heligoland. Strange to say, solitary individuals of this bird have made their appearance in Heligoland as late as November.

The following is a list of south-eastern species which have occurred here during the period over which my observations on this island extend:—Eleonora Falcon, Red-footed Falcon, Lesser Kestrel, Rose-coloured Starling, *Ixos xanthopygos*; Ehrenberg's Redstart (*Sylvia mesoleuca*); Rufous Warbler (*S. galactodes*); Orphean Warbler (*S. orphea*); Olivaceous Warbler (*S. olivacea*); *S. pallida*, and Paddy-field Warbler (*S. agricola*); Black-eared Chat (*Saxicola aurita*); Russet Chat (*S. stapazina*); Desert Chat (*S. deserti*); and Eastern Pied Chat (*S. morio*); Calandra Lark, Black Lark (*A. tatarica*); Short-toed Lark (*A. brachydactyla*); and Pallas' Short-toed Lark (*A. pispoletta*); Black-headed Bunting (*Emberiza melanocephala*), *E. luteola*, Cirl Bunting, Meadow Bunting (*E. cia*), Cretzschmar's Bunting (*E. cæsia*), and Large-billed Reed Bunting (*E. pyrrhuloides*); Marsh Sandpiper (*Totanus stagnatilis*); Black-winged Stilt, and perhaps some few others.

The majority of these wayfarers, with the exception of those mentioned previously, have only been observed here once. The Desert Wheatear I have obtained three times, the Black-eared Chat and Eastern Pied Chat, each on two occasions.

Turning next to species whose homes lie far to the south of this island, as in North or Central Africa, it is surprising to find what a sudden difference in the appearance of rare occurrences results from a change of geographical situation, amounting to no more than a few points of the compass. Contrary to the unexampled richness, both as regards number of species and individuals, by which countries far to the east and south-east of this island are represented here, we are confronted with the greatest dearth, of both species and individuals, which belong to more southerly situated areas. Of pre-eminently African birds, only seven can be recorded as distinguished visitors to this island, each of these, moreover, being represented by only one example. They are the Lanner (*Falco tanypterus*); the Moussier's Redstart (*Sylvia* (*ruticilla*) *Moussieri*); Egyptian Goatsucker (*Caprimulgus arenicolor*); the Bee-eater, the Cream-coloured Courser, the Glossy Ibis, and the Demoiselle Crane. This restricted appearance of southern species in Heligoland becomes the more singular when compared with the number of the same birds which have occurred in England.

Thus, the Bee-eater visits England so abundantly that Harting (*Handbook of British Birds*) no longer mentions it among the exceptional occurrences, but allots a place to it among the regular

summer visitants. Saunders (Yarrell, *British Birds*, 1881) says that more than thirty of these birds have been killed in Great Britain, and four in Ireland. Twenty of them were seen in one day in Norfolk, and twelve were shot within the same period of time at Helston in Cornwall.

The most remarkable occurrence, however, in this connection is that of the Cream-coloured Courser, a typically African species, of which Harting records nineteen instances in England. Next to these southern visitors to Heligoland must be considered, though within a somewhat narrower compass, a few interesting natives of the Swiss Alps. Thus, the Chough, and Alpine Chough (*Corvus pyrrhocorax*), have each occurred a few times. The Alpine Accentor I have obtained three times, the bird having been observed on three other occasions besides. The Snow Finch (*Fringilla nivalis*) has occurred twice; the Alpine Swift has once been shot, and observed on one other occasion. Among these we may perhaps also count the Blue Rock Thrush (*Turdus cyanus*) and the Rock Thrush (*S. saxatilis*), of whom the former has been killed here once, and the latter about six times.

In regard to these species from districts much nearer to Heligoland, the south of England again completely outstrips this island. Harting enumerates fourteen instances of the occurrence of the Alpine Accentor, and twenty of that of the Alpine Swift in his own country. Although it may not be difficult to find an explanation for the frequent occurrence of this species in England, one seeks in vain for reasons why natives of Central Africa, and more especially of Switzerland, should so rarely extend their migrations northwards to Germany and Heligoland.

After what we have said as regards the summer excursions of species from the south-east of Europe and Asia Minor, we might presuppose that southern species—*i.e.* those resident in Spain and North-west Africa—would also be met with in comparative abundance in England, just as on the other side, the frequent occurrence of these latter species north of their breeding stations proves the conclusiveness of our assumption as to the causes which determine the appearance of south-eastern species in a north-westerly direction: like the birds from Greece and Asia Minor, which have been met with in districts so far to the north-west of their homes as Germany, Heligoland, and even the Shetland Islands, the numerous visitors to England from Spain and Africa are also individuals that have lost their pairing spouses during the earlier stages of the breeding season, and which then strive to satisfy the still persistent breeding impulse by continuing to follow the original direction of their spring migration,—in their case, one to the north. The time of the appearance of these southern birds in England, taking

place as it does principally in the months between May and August, in a high degree supports this explanation of the phenomenon.

Western Europe, which in order of sequence ought to be considered next, is however so scantily represented in Heligoland that it is indeed hardly worthy of mention. During all the long years I have been zealously collecting, only three birds pre-eminently natives of that region have come under my hands, viz., the Melodious Willow Warbler (*Sylvia polyglotta*), the Dartford Warbler (*Sylvia provincialis*), and the Black Chat (*Saxicola leucura*)—one example only having been obtained in the case of each of them, though it is extremely probable that in the case of the Dartford Warbler a second example was observed by Reymers. Thus, birds from the west of Europe seem as strongly disinclined to migrate eastward as, on the other hand, species from the far East exhibit a decided tendency to migrate towards the west.

If we were justified in assuming that these exceptional occurrences from far-distant countries are those of individuals roving about at haphazard, this rare occurrence of western species, as opposed to the abundant appearance of species coming from the east and south-east, would certainly appear very strange. As, however, the movements of almost all visitors of this kind are connected with certain definite conditions, it is quite probable that the cause of this rare advance of birds from the west of Europe beyond the limits of their homes, in an easterly direction, may yet be established. This has in fact already been done in regard to the frequent excursions of these birds in summer to countries situated to the north of their breeding stations.

In Heligoland, inquiry in relation to this question will naturally be restricted to the birds of the Iberian Peninsula. The line of migration of these birds lies exclusively between north and south. They go in autumn to Africa, and return thence in spring. Any inclination on their part to deviate laterally from their normal migration-path in the same manner as species from the far East, is prevented on the one side by the Atlantic Ocean, while on the other side any attempt to migrate in an easterly direction would conduct them to cold instead of warm winter quarters. Their movements, accordingly, are more narrowly confined than those of any other residents of the Old World, whence it results that we cannot really expect to meet with Spanish birds anywhere east of the Pyrenees, either in autumn or spring.

America, again, to which we ought next to direct our attention, is represented by a wonderful abundance of birds in Heligoland. The aversion which birds manifest for exceptional migrations to the east ceases at the western shores of the Old World. Up to the present the number of New World citizens which have visited this humble

rock amounts to fifteen, all of which, however, with the exception of two, are represented by only one example each. These are: *Turdus swainsoni*; *pallasi*, *fuscescens*, *migratorius*, *lividus* and *rufus*; *Sylvia virens*; *Anthus ludovicianus*, one old and one young example; *Dolichonix oryzivora*, twice, though one of the examples bears marks of having been in captivity at some time or other previously; *Charadrius virginicus*; *Totanus macularius*; *Tringa rufescens*; *Larus bonapartei*, *sabinii* and *rossii*. Of the last species but one, two examples are in my collection, and it has been seen on two other occasions besides. Finally, a fine old male of the Surf Scoter (*Anas perspicillata*) has also been shot here once. Three-fourths of the birds above enumerated were old individuals. As one might expect from the facts just mentioned, England, also, has been visited by considerable numbers of American birds. The number of instances cited by Harting (*Handbook of British Birds*) amounts, up to the date of 1872, to two hundred and fifty-two individuals, belonging to forty-six species; in the most recent consideration of this subject (J. J. Dalgleish, in the Bulletin of the Nuttall Ornithological Club) the number given is a still larger one. Even after excluding all doubtful cases, such as *Anthus ludovicianus*, the numerous instances of the occurrence of the Greenland Falcon, which is out of the question here, and leaving out of consideration the Petrels and West Indian and South Sea Terns, which are not pertinent to the present inquiry, there remain, even after a careful sifting like this, still two hundred and twenty-three instances for us to record. Strange to say, among the fifteen species observed in Heligoland, nine are not included in the above lists, and it is still more remarkable that, with the exception of the one example of the Migratory Thrush, caught at Dover in 1877, not one other occurrence of any American thrush has been observed in England. Ought one, perhaps, to conclude from this that the American species which have visited Heligoland did not reach this island *viâ* England, but landed farther south on the coast of France? The fact that many American thrushes have occurred on the Continent in close proximity to this island lends support to this view. It stands to reason that if all the thrushes of this kind which have been observed in Heligoland and Germany had touched upon the shores of Ireland and England, some of them at least could not fail to have been remarked among the great bulk of other American birds observed in that country, especially when we take into consideration that, besides the individual actually killed, a considerably larger number must have crossed over from America without having come under observation.

The occurrence of so many American species on European soil involuntarily suggests the question as to the possible route by

which these birds may have reached us from their distant homes. That they should have crossed that vast waste of waters—the Atlantic—was at first either disbelieved or only admitted with much reserve, mainly because it was considered quite impossible for a bird to sustain the uninterrupted flight of at least sixteen hundred geographical miles involved in such a journey.

Instead of at once entering into the consideration as to the possibility of such a feat, it would perhaps be wiser to examine which of the two routes leading from America to Europe seems the more likely to be adopted by migrants—that to the east over the ocean, or, otherwise, the so-called overland route through Asia and eastern Europe. For this purpose a comparison of the lists of rare and exceptional occurrences in Germany, including Heligoland, with that of the similar occurrences in England, at one glance decides this question in a most convincing manner. Because, whereas Germany can show an unexampled number of Asiatic species, with only extremely isolated instances of American birds, England marshals a perfect flood of American species, and individuals among which only a few scattered visitors from Asia are found. These facts speak clearly enough; it is impossible that two hundred and fifty birds should travel from America through Asia and the greater part of the continent of Europe to England without more than ten of their number being observed or killed in Germany; on the other hand, all the facts point to the conclusion that the birds reached the coasts of England direct by way of the Atlantic Ocean. Nor indeed could a large number of birds like that have travelled *viâ* Greenland, Iceland, the Færoes and Shetland, as one might have felt inclined to assume, without leaving behind them more extensive traces than it has been possible, in spite of all efforts, to demonstrate. It seems the more surprising that, instead of investigating the possibility of such a direct transmarine flight, people have so long objected to accept this view, since proofs of its actual occurrence have come to light frequently enough. Thus it has been long known as a common occurrence, that ships half way between Europe and America have fallen in with birds travelling, either singly or in flocks, in an easterly direction, migrants of this kind having not rarely attempted to alight upon the rigging, and some having also been caught there. A case of this kind is mentioned by Professor Alfred Newton (Yarrell, *British Birds*, fourth edition, ii. p. 220), according to which Dr. Dewar observed on his passage from America, about six hundred geographical miles east of Newfoundland, flocks of the American White-winged Crossbill crossing the Atlantic before a stiff westerly breeze. Many of the flocks alighted on the rigging of the ship, and of these twelve examples were captured. One or two of the latter escaped as the

ship approached the Irish coast, and made straight for the land. Two others succeeded in escaping from their cage in the streets of Liverpool, and five were safely brought home. Professor Newton, in reference to this case, suggests the opinion that many other migrants may have been thus helped across the Atlantic by human aid; with what success may be inferred from the American element in the list of so-called 'British' birds.

We cannot however reasonably admit that cases like that just instanced explain the passage of American migrants to Europe generally; for, first of all, as opposed to the three or four birds which regained their liberty near the coast or in the streets of Liverpool, we must take into consideration the numerous flocks which must have passed at the same period over one-half of the Atlantic without human assistance, and which certainly would not have retraced their course against the 'stiff westerly breeze' prevailing at the time, but had probably reached the coast of Europe long before their imprisoned comrades.

That among the American birds which have been met with on this side the Atlantic, there are examples which, like the aforesaid Crossbills, have escaped from cages, cannot be doubted; in fact we have already hinted at this in the case of the example of *Dolichonix oryzivora* shot here. The number of such birds, however, cannot be more than very insignificant. The simplest way of obtaining a tolerably clear result in this respect is to subject the species of American birds which have occurred in England to a closer examination.

We shall then find at once that just such of their number as specially commend themselves for the cage or aviary, either by reason of their song, or beauty of plumage, or for being easily sustained with food, are in an insignificantly small minority, while, on the other hand, waders, shore-birds, and aquatic birds are in a majority of ten times the number of the first-named species. Now, these latter birds can only be obtained alive with very great difficulty, and would certainly not be kept in confinement otherwise than in rare and exceptional cases; consequently it is hardly likely that they would ever make a journey to Europe with the aid of human agency.

The birds comprised in the first of these categories consist of the following species: *Turdus migratorius*, *Regulus calendula*, *Ampelis cedrorum*, *Loxia leucoptera*, *Agelaus phœniceus*, *Sturnella magna*, and *Columba migratoria*, in all amounting to about twenty-five examples. A widely different result is presented in the case of the waders and shore-birds: thus, of *Macrorhamphus griseus* fifteen examples are recorded; of *Tringa rufescens* and *Botaurus lentiginosus*, seventeen in each case; while of *Tringa maculata* as many

as nineteen instances are recorded as having occurred on English soil. Further, in regard to this group of birds, we must not forget that they live almost exclusively on the opposite shores of the ocean, and are already well experienced in flying across wide expanses of water, having no doubt, in the course of their life, frequently crossed seas and inland lakes, of which the opposite banks would not have been visible at the commencement of their journey, nor would they have any previous knowledge of the distance to be traversed. Such birds, then, when they set out on their journey over the Atlantic, are not conscious of the task they are undertaking; in fact they have no inherent notion of the duration of time, all that is required being that their strength should hold out until the whole distance is accomplished. Hitherto we have had nothing which could have assisted us in estimating the extent of their capacity in this direction, though there can be no doubt that so far as powers of locomotion go, they surpass to an immeasurable degree every other division of the animal kingdom.

After what has been said in the preceding, we are confronted by the question as to what may be the causes of these surprising migration flights; for although, generally speaking, they must be regarded as exceptional phenomena, they occur far too frequently to allow us to regard them as due to accidental straying on the part of the birds from their normal routes of migration, or to their having been beaten out of their regular course by storms. Moreover, the number of species which resort to these exceptional migrations is, comparatively speaking, so small, and the movements themselves are repeated with such frequency, that we are forced in their case to assume the operation of causes which do not affect other species, even though these may be closely related to the former. We must add to this the fact that the numerous instances above cited, as well as other less frequent occurrences of shore-birds and waders, have been observed almost exclusively during the autumn months. Now, this circumstance leads one to suspect that we are here dealing with a phenomenon analogous to that witnessed in the case of species from the east of Asia, with the difference that in the present case the deviation from the normal southern course of the migration is a fixed one to the east instead of to the west, and that here again, while some species—such as, for instance, the American Bittern before named, various species of Tringa and the like—are in a high degree subject to a tendency for turning off in this manner from their normal migration track, many others exhibit no inclination whatever of this kind. Of the latter kind of birds, the Plovers from the opposite coast of the Atlantic furnish a good illustration, only one species, *Charadrius virginicus*—a bird which every autumn travels in countless multitudes across the sea from Labrador

to South America—having even been observed in Europe, but on that occasion only in one solitary instance.

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

At the time when the question of a possible flight from America to Europe was first mooted, an achievement of this kind appeared utterly beyond the capacity for flight possessed by birds, so far as this was then understood, and consequently was dismissed as impossible without being even deemed worthy of further investigation. I myself, however, was first prompted by this same question to endeavour to discover a standard of measurement for the velocity of the migration flight, an attempt in which I may claim to have to some extent succeeded.

Harting still remains very undecided in his opinion on this question. Thus in one place he says that it is extremely hard to believe that birds, other than natatorial species, should have succeeded in crossing the Atlantic, but adds that most of them must nevertheless have accomplished this feat, because, on the one hand, none of them had been met with in Greenland, Iceland, or the Færoes, and because, on the other hand, many which have occurred in England or Ireland have never been observed anywhere on the continent of Europe. He however considerably weakens his argument when he goes on to say that there was probably good reason for suspecting that many of the smaller of these birds largely availed themselves of the rigging of ships in the course of this passage—overlooking the fact that the hours lost by the birds during such rests only prolong the time which they have to pass without nourishment. The same argument might be urged with equal force in the case of all swimming-birds, belonging to the *Anatidæ*, which might purpose to interrupt their flight across the ocean; for even if we allow that all such birds are diving Ducks—*i.e.* Platypeds—which, however, is certainly not the case—the depth

of the water in mid-ocean is such as would quite preclude their search after any kind of food.

After the facts which have been brought forward in evidence, the probability of a voluntary and direct flight of American birds across the Atlantic can hardly any longer be open to doubt. It remains for us therefore only to establish the possibility of such a flight.

While discussing the velocity of migration flight, we have already brought forward evidence which in general goes to prove that a bird is capable of accomplishing a distance equal to that at present under consideration in one uninterrupted flight. A few words, however, may be added bearing more especially on the case under discussion. The stretch of ocean between Newfoundland and Ireland covers sixteen hundred geographical miles, without any intermediate resting-place. To accomplish this distance would, at the slowest speed of flight as determined in the case of a wild bird, viz. the Hooded Crow, occupy about fourteen and a half hours. On the other hand, in the case of the Bluethroat, only nine hours would be required. Nor is there any reason for doubting that a healthy bird and a fairly good flyer is capable of remaining on the wing for nine, and in extreme cases even fifteen hours. We would mention here, however, one other instance which furnishes an irreversible proof of an uninterrupted flight of as much as three thousand two hundred geographical miles. During its autumn migration the Virginian Plover travels from the Hudson Bay Territory and Labrador across Guayna and northern Brazil to lower South America. In the course of their normal passage these birds neither resort to Bermuda, nor even to the Lesser Antilles, for resting purposes, but fly across them without alighting, and they only interrupt their journey when forced by sudden and violent storms, in which case countless numbers of them seek shelter on one or another of the aforesaid islands. They have been observed, moreover, six hundred miles east of Bermuda, for whole days and nights travelling to the south, in flocks succeeding each other without intermission, and numbering from a hundred to a thousand individuals. (*Vide* J. M. Jones, *The Naturalist in Bermuda*, pp. 71-77.) These flocks, proceeding from Labrador to northern Brazil, meet nowhere with the smallest resting-place in the course of their long migration flight across the ocean, and are consequently obliged to perform this long stretch of three thousand two hundred geographical miles without a stoppage. They thus accomplish double the distance of sixteen hundred miles from Newfoundland to Ireland, and consequently remove every doubt as regards the possibility of the latter achievement.

While discussing this subject, the thought may have involuntarily arisen in the reader's mind that some of these wanderers

in the course of their flight across the wide ocean might grow faint in their wing-powers, and thus miserably perish. I would therefore in this place give the result of some observations I have been enabled to make in regard to this matter, which show that land-birds, such as Thrushes, Buntings, Finches, and the like, are able, in case of exhaustion, to rest for a short time on the surface of the water—even if that be somewhat agitated—and are afterwards capable of continuing their journey.

I made the first observation of this kind whilst engaged, in company with the brothers Aeuckens, shooting Gulls about two miles west of Heligoland. Some distance off, we noticed a small bird swimming on the sea. Neither myself nor my companions were able to make out what kind of bird it was, and therefore carefully approached, anxious to secure what we believed to be a great rarity. Fortunately, before it was too late, we recognised it to be a Song Thrush. Our sportsman's zeal at once changed to a feeling of pity, and a desire to save the exhausted creature from what seemed a very painful situation. We were, however, no little astonished on seeing, as the boat approached, the Thrush rise with the greatest ease from the water, and fly vigorously and in a straight course towards Heligoland.

On another occasion we were about to rescue a Snow Bunting under similar circumstances. This bird appeared, however, to have been considerably exhausted, for we found it swimming, or rather drifting, along on the water, some five or six hundred paces from the island. On the approach of our boat this bird likewise flew up from the water with perfect ease, but was obliged to alight again after flying for a distance of from thirty to forty paces. We drew up to it once more, when it rose a second time, with no better success, however, than before. A third attempt at rescue on our part had no further effect than to drive it for about another thirty paces nearer the island. At last we relinquished the task of pressing our assistance upon this obstinate fellow, feeling quite sure that, after a little rest, he would be perfectly able to reach the island unaided.

In a third instance, a Brambling was seen drifting on the sea, at least three miles east of Heligoland. On the approach of the boat, the bird rose and at once ascended to a fairly considerable height, after the manner of birds which purpose continuing their journey after resting, and, leaving Heligoland unnoticed about a mile to its right, travelled onwards in a nearly western direction, until it vanished from sight. The nearest points of land which the bird could have reached in this direction were the islands of Norderney and Borkum, and it seems beyond all possibility that the bird could have seen either of these islands from the place

where it had set out. Notwithstanding, after a short rest on the sea, it was able, safely and unerringly, to follow the regular track of its autumn migration. The cases just related are the only ones of the kind which have ever come under my observation, whence it would seem that they are of but rare and exceptional occurrence.

Returning now to the subject of rare occurrences in Heligoland, we must in conclusion make mention of species from high northern latitudes which have been observed on this island. Though the number of such northern species is a very limited one, even within the area of their breeding-homes, Heligoland is nevertheless able to produce one or two examples of this kind which would be considered ornaments in the finest museums.

A good many years ago, a large young blue-footed Falcon was killed here, which, inasmuch as its measurements exceed those of all autumn birds of the Gyrfalcon (*Falco gyrfalco*) hitherto observed in this place, must be reckoned among the white northern species. As is well known, no difference exists in the coloration of the early plumage of these two allied species. Old White Falcons, with unspotted heads and tails, and with heart-shaped or uniform dark-coloured spots on the shoulders and backs, have been observed here on two occasions. Unfortunately, however, these birds were not shot.

My collection further contains a young autumn bird of *Fringilla* (*Linaria*) *holbölli*; and, curiously, coming last in the order of sequence in this list, but decidedly the most valuable of all, a fine old male of the Wedge-tailed Gull (*Larus rossii*), in the most perfect winter plumage, which was shot here on the 5th of February 1858.

For the present, this last-named bird may probably be put down as the most inaccessible of all ornithological desiderata. We must however not omit to mention the three skins of this species brought home by Mr. Newcomb, one of the surviving members of the unfortunate 'Jeanette' Expedition, who, with heroic obstinacy, and while struggling for very life against hunger, and the cold and ice of a Siberian winter, had made up his mind that these priceless treasures should not be lost to science. Further, one or two of these birds have been killed on various occasions at Barrow Point and in Franz Joseph Land. Still, in spite of these facts, I think we shall have to wait a good long time before, as is prophesied in the *Ibis* of January 1884,[1] we shall be able to fetch home any desirable number of the eggs and skins of this Gull from the aforesaid stations of the Arctic Sea.

[1] *Op. cit.* p. 105.

VIII. WHAT GUIDES BIRDS DURING THEIR MIGRATIONS?

This question involuntarily suggests itself after we have followed the flights of the feathered wanderers, hastening onwards with storm-like rapidity, at elevations level with the clouds:—By the aid of what capacity are they enabled, on pitch-dark nights in October and November, to take up the right path and to pursue it unerringly to the end, over, say, a sea of more than four hundred miles in breadth, like the German Ocean between the west coast of Slesvick-Holstein and the east coast of England? Man, in spite of his senses and intellectual faculties, is not able to continue moving in a straight line for even as much as a mile in complete darkness or dense fog; whereas birds fly every autumn, without signs or landmarks, from the far east of Asia to the west of Europe, and from the North Cape of Scandinavia to the south of Africa, traversing in each case a distance of considerably more than four thousand miles.

What, however, adds considerably to the truly wonderful nature of this phenomenon, is the fact that the young birds of the year, their age not exceeding six or eight weeks, perform this first journey of their life with the same unerring certainty as the old individuals which follow them a month or two later, and which, moreover, have already travelled over the same road on previous occasions.

Any one who, on dark, starless autumn nights, has heard the babel of voices of these hundreds of thousands and even millions of birds travelling past him overhead, in one fixed direction and in undiminishing numbers for the length of whole months, without the help of any guiding mark discernible by human eye, cannot fail to be led, by the supreme grandeur of this phenomenon, to speculate as to what kind of capacities the unfailing performance of such an act is due; more especially if, like myself, he has for more than half a century watched the phenomenon recurring regularly at each solstice with the same unerring precision as the

planets in their courses. For centuries this question has received the most serious consideration on the part of inquirers, but no final solution of the problem has as yet been arrived at. Nor, indeed, is it likely that such will ever be the case, since the performances of birds during their migrations are raised entirely beyond the range of man's mental and intellectual faculties.

In their perplexity to account for this remarkable phenomenon, scientists and observers sought refuge in the assumption of an 'Instinctive Action' on the part of birds, in virtue of which they adopted unconsciously the right road towards the attainment of an unknown goal. Even such unexcelled observers of the life and actions of birds as Naumann and the elder Brehm, in the course of observations more numerous and searching than any ever comprised within the span of a man's life, yet got no further than to the assumption of this said instinctive action on the part of birds. Later observers, to be sure, have rejected with contempt this explanation of a problem unsolved at the present day, but all attempts at an explanation which have hitherto been made have left it in exactly the same position in which it stood centuries ago. The winged traveller, speeding on his way during the darkness of night, in unerring course over vast expanses of ocean, presents to the savants of our day as great a riddle as it did to the first observer in ages before the dawn of history.

Alfred Newton, in his excellent article on 'Birds' in the *Encyclopædia Britannica*, rejects the idea of instinct as a mere evasion of the difficulty of the question, and as excluding all scientific investigation of the same. Nevertheless, he says we ought to grant that inherited, but unconscious, experience—which, indeed, was all that was understood by instinct—certainly formed a factor in the migratory process. According to this view, birds after all acted unconsciously in a manner suited to a certain purpose; this, however, in the usual way of speaking, can still only be described as instinctive.

But can experience be something of which the subject is altogether unconscious? and, further, can experience, the result of which is positive knowledge, be actually inherited?

Dr. von Middendorff, whose Siberian voyages of investigation extended to the northern parts of the Taimur Peninsula—and who has also made most serious efforts towards solving the problem of bird-migration—assumes that there is inherent in birds 'an inner magnetic sense' which guides them on their wonderful migrations (*Die Isepiptesen Russland*, p. 9). He believed he hatl discovered that the routes of the spring migrations of Asiatic birds converged towards the Taimur Peninsula, in which region one of the magnetic poles is situated, and this led him to adopt the above hypothesis.

When, however, we see, what has been fully discussed in a previous chapter, that these lines of migration to the north of many species are crossed simultaneously by flocks of other species travelling in an easterly direction, this attempt at an explanation of the question will hardly appear sufficient. Von Middendorff himself did not fail to observe that many birds follow directions other than towards the north, and he endeavours to maintain the validity of his view by stating 'that birds are persistently conscious of the directions in which the magnetic poles lie, as well as of the angle of deviation of their flight at the time being from these directions, and that they regulated their course accordingly. Thus, while the sailor has to find his course by calculation, the bird, in itself a complete magnet, marks out its path directly from the chart of its own inner consciousness.' According to this idea, then, the bird does not, like the sailor, act according to calculation, but in response to some inner unconscious state of sensation or intuitive knowledge which, after all, amounts to the same thing as instinct. Moreover, this view of a 'magnetic sense' applies only to the spring migration, and it still remains difficult to see how young autumn birds, at the outset of their first migratory journey, can possibly know the angle at which their winter quarters in the south are situated in relation to the pole.

Von Middendorff has, however, attempted to endow birds with an additional qualification for finding their migration routes, by crediting them with the possession of what he calls a 'sense of direction' (*Richtsinn*). He says that they are by nature conscious of the quarters of the heavens, and able to find their way without the aid of the sense of sight or local memory. This, however, is merely another name for a capacity previously ascribed to the magnetic sense, and tells us no more about the fact itself than that it is the result of an inner unconscious state of sensibility.

We must here mention another highly interesting observation of Professor von Middendorff's, from which it appears that man in a primitive state of nature is likewise possessed of a kind of instinctive capacity for finding the right way, similar to the faculty peculiar to birds and other animals.

He expresses himself to this effect in his *Sibirische Reise* (*Siberian Voyage*), vol. iv. Part ii. p. 1168, as follows:—

'I have never been struck so forcibly by experiences of this nature, as in the endless Tundras of the extreme north, where I discovered this incomprehensible animal peculiarity present in almost undiminished strength in rude and uncivilised men living in a state of nature. The capabilities of the Samoyedes in this direction often exceed all our ideas on this subject.

'Overjoyed at having at last discovered in these men my interpreters of that great mystery of nature, the capacity of orientation possessed by animals, I endeavoured to draw out from them the secret of their art, and pressed them on every possible opportunity. They, however, only looked at me in a stupefied manner, were surprised at my astonishment, and supposed that that was an ordinary every-day occurrence, and self-evident: whereas, on the other hand, our inability of finding our way seemed to them quite incomprehensible. At last they completely disarmed me with the question: "Well, and how is it that the little Arctic fox finds her way on the great Tundra without ever going astray?" So there I was, once more thrown back on the unconscious performance of an inherited animal faculty.'

In one case which he considered doubtful, von Middendorff insisted on following his compass, but very soon made 'the highly surprising discovery that my compass, and not the directive sense of the Samoyedes, had deceived me. It was the former, not the latter, which, owing to the proximity of the magnetic pole, had been drawn to an unexpected extent out of the right direction, and I recognised to my shame that I had done these good people an injustice.'

Hence these Samoyedes, too, wandered in the right track without being able to give a reason for doing so, or, in other words, they also were led by instinct.

I ought not to leave unmentioned that von Middendorff's statements in regard to the migratory movements of animals, covering about one hundred and thirteen large quarto pages of his work, comprise without a doubt the most valuable observations and reports which have ever been published in regard to this subject.

Of more recent works on the migrations of birds, the most extensive is that of J. A. Palmén, entitled *Die Zugstrassen der Vögel.*[1] It is a treatise of the highest interest, in which the author makes use of a large amount of material, resulting from the observation of travellers and local investigators, on a small number of Arctic shore- and sea-birds, from which he endeavours to show that birds during their migrations are in the habit of following shore-lines and the courses of large rivers. In illustration of his theory he adds a map of the Old World in which these routes are shown from 80° to 30° N. latitude, in their varied windings along sea-shores and the courses of rivers flowing north or south.

Observations in Nature on the author's own part appear not to have been made the basis for this work. It is here unnecessary to express an opinion as to this conception of the migratory movement,

[1] *The Migration-Routes of Birds.*

since, on the one hand, this has been done already in the chapter on the direction of the migratory flight, and, secondly, because we are at present not concerned with the directions of migratory routes, but with the question as to how birds are able to ascertain these directions.

Summed up in brief, Herr Palmén also maintains (Section X. of his work) what is now the almost generally adopted view on this question, viz.: That originally birds lived in latitudes which supplied them throughout the whole year with everything necessary to their existence: that in progress of time some of them accidentally came to stray so far beyond the northern limit of their home that on the approach of winter they were compelled to retrace their path thither in order not to succumb to cold and hunger: that a habit of migrating was developed from such accidental erratic wanderings, and that this habit, together with the experiences made on these journeys, had been passed on by inheritance from the old birds to their young.

The author further states that the flocks of migrants generally had for their leaders older and stronger individuals: that the young were not possessed of an inborn consciousness of the necessity of migration, but had to learn all this from their parents. The roads frequently travelled over by these old birds consisted of a succession of spots favourable for taking rest, or feeding-grounds on which they were dependent, and the so-called routes of migration were determined by the geographical situation of such places.

Such young birds, again, as travel alone, are further credited with the possession of a so-called local sense or local memory. This is acquired at first by their getting to know such feeding-grounds as are situated in the immediate vicinity of their nests, impressing these upon their memory, then discovering others further removed, and so on. Supported by this knowledge of stations where food may be obtained, the young birds are now left to their own resources to find the way to their winter quarters.

We have already expressed strong doubts as to the possibility of a hereditary transmission of knowledge derived from experience, *i.e.* of positive knowledge, on the part of parents to their offspring, while, in the chapter which deals with the direction of the migratory flight, we have amply treated the question of definite routes of migration as laid down by Palmén. What value there is in the assumption of a special local sense acquired by birds, in virtue of which they are able to find their way to far distant winter quarters, is best tested by opposing to this hypothesis such facts as Nature annually presents in the numerous cases of young birds belonging to species which perform their autumn migration not in

companies but singly and alone, such, for instance, as the small Warbler, whose home is in the far northern parts of Europe. Let us assume that a young Warbler like this, bred in Norway, within the confines of the Arctic Circle, had spent several weeks in roaming about the neighbourhood of its nesting station to distances of twenty or even forty miles, and in the course of these excursions had got to know every bush, rock, or piece of water within this district, of what possible use, one may justly ask, can such limited local knowledge be to it on its forthcoming journey to Central Africa? The time of its departure is drawing nigh; one fine calm evening it sets out on its first migratory voyage, leaving the world lying far below it in the scent-laden dusk of evening. The moment has arrived for it to enter on the one only true road for its journey: what possible guide is there to indicate this road? The familiar signs within the circuit of its nesting stations have long since vanished, and even if that were not the case, what help could be afforded it by some recognisable rock or wood or lake; from none of these could it learn that its winter quarters lay not to the west or east but to the south, nor could any of these signs point out to it whither the southern course extended. Our tiny friend soars along apparently helpless and perplexed at unknown heights in the darkening blue of the evening sky; yet without hesitancy he spreads his tender wings and flies with perfect assurance towards the far-off goal. But a few hours more and complete night enshrouds him, still unerringly he pursues his flight through pathless space; a thousand, nay, perhaps, thousands of feet below him lies the world, no longer recognisable, and even were he still able to distinguish the dark outlines of land and sea, what would that avail him?—everything is strange; he has never seen it before, and nothing could possibly serve him as a guiding sign on his journey.

At the dawn of the following day our little wanderer will probably find himself on the Danish islands, or perhaps in northern Germany; preening his plumage in the sunshine, and roving about for the day in all directions in search of food; but evening approaches, and with it the hour for resuming his journey. Once more, though now in a strange country, he sets out for the goal of his wanderings with the same calm assurance as on the evening before; during the night he crosses the Alps, and makes a second day's sojourn by the shores of the Mediterranean. Nor are his wanderings at an end here; but the dusk of a third evening summons him for fresh departure. He knows not the extent of the watery surface beneath him, nor how far off is the shore on which he may find rest; no guiding sign or beacon is stretched out in his

way to lead him on the right path; nevertheless, undismayed, he once more spreads his wings, until at last he finds a haven of rest amidst the palms of glowing Africa.

And all this wondrous journey, the first in its life, the little bird is assumed to have been enabled to accomplish solely in virtue of such a knowledge of the features of its feeding-places as it may have acquired in the neighbourhood of its nesting station? The mere fact, already indicated above, that these feeding-grounds not only extend to the south of the nest, but also to the east and west of it, renders such an assumption absolutely untenable, for what should induce the bird to select the first of these directions in preference to the others? Apart from this, the vast majority of birds, like the Warbler above instanced, perform their migratory journeys at night, and at such an elevation as to make it quite impossible for them to distinguish the nature of the ground of the stretches of country which lie far beneath them enshrouded in darkness. Under such conditions the most highly developed local sense would be of no avail, and hence all theories of this kind, however ingenious and plausible, fail to advance by one step this enigmatical factor of the migratory phenomenon.

Besides this theory of the inheritance of collected migratory experiences, the view has been put forward that one generation of birds is in the habit of handing down the sum of such experiences to its successors; I have however shown, and it is now generally acknowledged, that the young birds perform their first migratory journey alone, and independently, one or two months before their parents, so that this Theory of Tradition, as it may be termed, must likewise fall to the ground; for how could the old birds possibly impart their own migratory experiences to their offspring except by practical instruction and guidance while travelling in their company? These old birds, however, are in many cases proceeding towards raising a second brood, or are still engaged in their autumn moult long after their offspring have reached their winter quarters. Further, both the Theory of Inheritance as well as that of Tradition are also quite untenable in regard to the periodical migratory phenomena of other animals endowed with the power of flight, such as beetles and nocturnal Lepidoptera. Among the latter the migrations of *Plusia gamma* furnish in Heligoland excellent material for observation. During their autumn migrations these small creatures travel from Slesvick-Holstein to England, across the North Sea, a breadth of water of four hundred miles in extent. They pass this island in enormous swarms, resembling, as seen from the lighthouse, a dense snowstorm driven by a light breeze. Thus, according to an entry in my journal for 1882, on the night from the

15th to the 16th of August, with a very light south wind, a powerful migration of birds occurred. 'From eleven P.M. to three A.M. millions of *P. gamma* were travelling from east to west, like a dense snowstorm.' 'Again, on the nights of 16th, 17th, and 18th, large numbers of *P. gamma* passed the island, the migrations commencing each evening at eleven o'clock. On the 19th the wind was south-east, the weather fine and calm. In the evening the sky became overcast, and a strong migration of birds took place. From eleven P.M. until two A.M. thousands of *P. gamma* were again seen.' A thunderstorm, with high winds, subsequently put an end to the migration. These little creatures also follow an east-to-west course of migration, and they adhere to it with as much steadiness and precision as the different migratory hosts of birds which are observed here. That they, too, accomplish their journey in safety is shown by the enormous swarms of them which frequently cover the east coast of England, and which can only be explained as the result of an immigration. Besides *P. gamma*, large numbers of *Gastropacha neustria*, *Agrotis graminis*, and other species, are represented in such migratory swarms. It has been suggested that these insects are attracted by the light of the lighthouse, and that, consequently, it is only around the latter that they are seen in such quantities; this, however, is contradicted by the migrations of *Hybernia defoliaria* and *H. aurantiaria*, these insects sometimes making their appearance during strong migrations of Larks in October, when large numbers of them may be found in the course of the night, as well as on the following morning, from one end of the island to the other. Now it is quite impossible that these moths should be able to collect experiences of any kind during this single migration of their life, which, moreover, is performed in the darkness of night across a wide expanse of water, and even if they did, these would be perfectly useless, for these migrants die shortly after their autumn migration without having produced further offspring to which they could commit their experiences, either by hereditary transmission or by personal instruction.

So far as my observations go, the flights of these insect migrants are composed exclusively of males. In the case of the *Hybernia* species, in which the females are wingless, this is of course inevitable.

Palmén says in his book 'that young birds do not possess an innate knowledge of the necessity of migration, nor are they cognisant of the direction in which the migratory journey must proceed, but have to learn all this from their parents.' Now, after what we have just learned in regard to the above-named moths, we may perhaps be allowed to ask how these insects could acquire all

this knowledge in the absence of parents or any kind of teachers during the three stages of their metamorphosis. However much we may be disinclined to admit that in regard to many of the phenomena connected with migration we are at the limit of our knowledge, we can nevertheless hardly deny in the above case, and in that of von Middendorff's Samoyedes, the operation as a means to an end of an instinctive and unconscious agency. It would in any case be interesting to become acquainted with some hypothesis which might appear to help us over this difficulty also, especially as, in the case of the Samoyedes, there was no question of a definite migration route travelled over from primitive times; but we had the fact of these people being capable of orientating themselves from all points to which Middendorff betook himself.

It may not be out of place here to refer to the inexplicable manner in which dogs are able to find their way back to their homes from very long distances. Among many cases of this kind reported in periodicals, I will select one which a few years ago was related in the *Hamburger Correspondent*. The owner of a villa outside of Hamburg presented a large dog to an acquaintance from Aachen (Aix-la-Chapelle), who was on a visit to his house. The animal was put into the dog compartment in the train and conveyed to Aix-la-Chapelle (Aachen), where, however, he managed to run away, reappearing some few days after in a very reduced condition at the home of his former owner. The following is another case of the same kind, based on personal information from the owner of the dog, and above all doubt:—A dachshund, about a year old, was put into a sack on the estate of its owner and taken in a waggon to a farm eight miles off. Arrived at its destination the dog was liberated, but disappeared, and was back home again before the return of the waggon! According to the statements of some field-labourers, it had taken the shortest road home, straight across the fields. A brother of mine, who is a farmer out in Texas, told me it was quite a common occurrence there for cattle which have been driven more than two hundred miles out into the country to return to their native home across pathless tracts and forests. In what conceivable way is it possible to explain such facts as these?

In the preceding discussion by far the largest number of facts brought under consideration have related to the land routes of migratory hosts. We have however still to bring under the reader's notice a theory which has been established to explain the crossing of wide seas by migrants, more especially in relation to the occurrence of American birds in Europe. As already intimated, it was considered absolutely impossible for a bird to traverse a stretch of water at least sixteen hundred miles in breadth, which is the extent

of the Atlantic between Newfoundland and Ireland. Hence it was believed that the only way in which it could accomplish this journey was by making use of what are called 'diluvial land bridges.' These at the present day are represented by the mere isolated remnants of what, in primary geological periods, were large land connections between different continents. In the case of birds crossing over from America to Europe, such a connection is assumed to be formed by Greenland, Iceland, the Færoes, Shetland, and Orkney Islands. The employment of this path as a migration route is considered to have developed into a habit, and this habit to have passed by hereditary transmission from one generation to another from primitive times down to the present day, so that the birds now in existence are able to find their way with perfect certainty from one to another of these mutilated remnants of a previously continuous chain of land in spite of the fact that these detached fragments lie far beyond their range of vision. Italy, which at one time connected Europe with Africa, dividing the Mediterranean into two inland lakes, is said to have formed a land bridge of this kind, for birds exchanging their habitats between these two continents.

Having already shown, when speaking of the velocity of the migratory flight, that a bird is able to cross in nine hours from Newfoundland to Ireland, the hypothesis of these auxiliary roads loses much of its force. Its intrinsic weakness is, moreover, sufficiently displayed in the fact that it can apply to only one or two cases of migration across the sea, and not universally. Among instances which it cannot touch, we may once more refer to the autumn migration of the American Plover, *Charadrius virginicus*, which extends from Labrador nearly to Patagonia. Besides the innumerable flocks of these birds which every autumn travel *vid* the Bermudas and Antilles, their migration column stretches from four to six hundred miles south to the east of Bermuda, whence the southern flight of the latter of these migrants extends from Labrador to the north coast of Brazil. Now at no time can there have existed along the whole length of this line a land bridge of the kind referred to above. Throughout the whole of its course the depth amounts to two thousand fathoms, and between latitudes 18° and 28° N. it reaches as much as three thousand fathoms. Assuming the depression of the land to be just short of a metre[1] per century, from four to six hundred thousand years must have elapsed since the sea-bottom along that line was level with the surface, or rose above it in the form of a land bridge. This period, comparatively short though it may be in the operation of geological

[1] *i.e.* 3·39 feet.

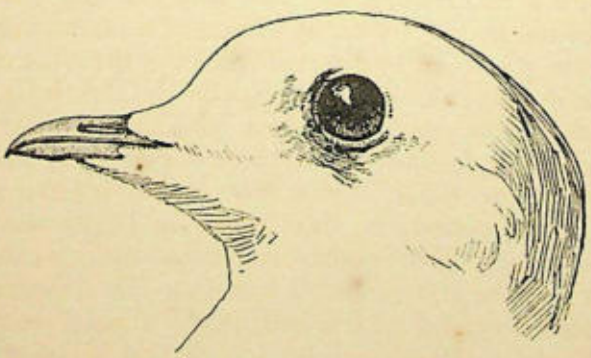
processes, must nevertheless be of immense significance in regard to the animal kingdom. But according to Darwin, Credner, and others (see *Allgemeine Erdkunde*, Hann, Hochstetter, and Pokorny, Pl. xi.) the line from Labrador across Newfoundland, Bermuda, and the Antilles not only shows no sign of such a depression, but, on the other hand, gives indications of a secular upheaval. Thus, not only have we no evidence for assuming the existence at any time of any kind of landmarks along the whole of this immense stretch of sea, but, on the contrary, the results of scientific investigations distinctly oppose such an assumption. We may therefore justly ask—What was it, then, that guided the primitive ancestors of these migrant flocks, counting in their hundreds of thousands, and what is it that still enables the generations of the present to perform, with unerring certainty, this wonderful autumn journey of three thousand two hundred miles over the trackless expanse of the ocean?

Incomprehensible as this faculty possessed by migrants of invariably following the right path during their regular migrations may appear, it becomes a matter for real wonder when we see how they are able also, under exceptional conditions, to accomplish with the same unfailing certainty such purposes as correspond to their needs for the time being. This faculty is specially displayed on occasions when, owing to sudden abnormal changes of temperature, they have to relinquish a spring migration already half completed, and are obliged to turn back and retrace their course to their winter quarters.

An instance of this kind, on a scale of extraordinary grandeur, was witnessed here on the night from the 16th to the 17th of March 1879. In the chapter on the direction of the migration flight we have already related how on this occasion hundreds of thousands of migrants, belonging for the most part to the Curlew, the Golden Plover, the Lapwing, and their congeners, passed over this island in one violent rush westwards, back to their winter quarters, making the darkness of the night resound with the wild babel of their calls. Excepting that much greater haste was displayed on the part of the wanderers, the movement exactly resembled a powerful autumn migration. There was a light south-westerly wind, the weather being mild; it was thawing, and the evening was foggy. Hence, from the local conditions of the weather, no apparent cause could be assigned for a movement of this nature. On the following day, however, the wind changed to east-north-east, and a frost set in which lasted until the 28th of the month. Undoubtedly, this same wintry weather had set in, one or two days before, in regions lying far to the east or east-north-

east of Heligoland. Now, in this case the causes which determined the movement were of a quite different nature from those concerned in the normal autumn migration, which takes place at a time when there is not as yet the least indication of frost or snow. Nevertheless, the birds managed to hit upon the right way of escaping from this sudden and strange emergency. Moreover, in these abnormal circumstances they acted—as, indeed, they do in all their regular migratory movements—as though they were fully conscious of the causes which lay at the origin of the movement, and of the purpose they had in view. Nay, more, they seemed as though they were endowed with an intelligence capable of surmounting all obstacles which might tend to hinder their normal course of action. Therefore, if neither the theory of hereditary transmission, nor that of teaching handed down from one generation to the next, is able to explain the ordinary phenomena of migration, how much more do these theories fall short of throwing light on exceptional instances such as that just related!

Having thus examined the many various attempts made to explain the wonderful faculty possessed by migrants of discovering the right path of their migration, and shown how insufficient most of them are when confronted with actual facts, observed directly in nature, in the course of more than fifty years' investigations and at a spot so favoured as Heligoland, I cannot say that I feel encouraged to add further to the number of such attempts by others of my own.



IX. THE CAUSE OF THE MIGRATORY MOVEMENT

We have now considered some of the principal phenomena which the migratory movement of birds presents to us, and it is, in conclusion, left for us to inquire into the immediate cause which prompts these creatures to undertake their migration journeys.

It would be interesting to discover what induces birds wintering in the more southern parts of Africa, where they are subjected to hardly any changes of climate, suddenly to leave these stations for their breeding homes in the north; or, again, what it is that urges the individuals of a species, the nesting stations of which are situated, say, in central Germany, to start on their journey a month earlier than other members of the same species the breeding homes of which are in northern Scandinavia, and which have been passing their winter in North Africa. The latter allow the migrant stream of their more southern kinsmen to pass over them unmoved, as though they were fully conscious that their own time for departure is not yet ripe, and that their breeding quarters are still held bound in the depths of winter. Phenomena similar to these are also presented by different species of the same genus, as, for instance, in the case of the two species of Bluethroat, *Sylvia suecica* and *S. leucocyana*, of which the first has its nesting stations within the confines of the Arctic Circle of the Old World, while those of the latter hardly ever extend beyond northern Germany. Both species pass their winter in Upper and Central Africa; nevertheless the southern white-spotted species arrives here as early as the end of March and up to the middle of April, even though the weather be still inclement; whereas the northern red-spotted form does not migrate through this island until May, when warmer weather has set in.

Now what could possibly induce the birds of the southern species to start on their journey as early as the end of March, and what could cause their northern relatives to tarry until May in the common winter quarters?—for we can hardly suppose either that

the birds of the former species are aware that their summer home is already habitable towards the end of March, or the latter that theirs will not be fitted for their reception until some four or six weeks later.

The phenomena of the autumn migration are equally astonishing. Beginning at the end of June, and continuing till after November, we observe that, throughout its course, not only do the various species follow each other in a fixed order of sequence, but that an order of like kind is maintained in the case of each individual species by the different sexes and ages of its members, without our being able to assign any cause which would compel different species, or separate sexes and individuals of different ages of the same species, to set out on their migrations at different times.

From very old times, mainly in consequence of the phenomena which succeeded migration, it was conceived that in spring, with reawakening life in Nature generally, the reproductive instinct of birds also was roused afresh, and that it was this which urged them to wander to their nesting-places; while, in autumn, dearth of food and cold admonished them to seek a temporary home in warmer latitudes. This view has in part held its ground up to recent times, for it is not so long ago that Brehm, in one of his talented discourses on this inexhaustible theme, maintained that the two great factors in the world's action, HUNGER and LOVE, also dominated the migratory movements of birds. There were, indeed, sufficient grounds for this conception, for every year we were brought face to face with the fact that, immediately after their arrival, our feathered wanderers set about building up their secluded nests amid jubilant strains of song, whence, soon after, we might see the young brood slip out into freedom; and, again, were they not seen to depart with equal certainty as soon as the gales of autumn began to sweep the stubbles bare and to whirl before them the brown foliage of the woods?

These explanations however do not suffice to explain all the phenomena of migration; thus, it cannot be the reproductive instinct which prompts birds to set out on their spring migration, for many species do not breed in the first, second, or even third year of their life, and yet migrate to their homes just like those of their congeners, who are endowed with the capacity of breeding; nor are they induced to travel by the example of their parents, for they start on their journey alone, and independently, at least three or four weeks after the latter. Inasmuch as this last portion of the spring migration, consisting of individuals not yet capable of reproducing their species, probably constitutes a third of the whole host

of migrants, we are naturally led to ask by what impulse such birds are urged to set out on this journey to their homes.

Nor again are dearth of food and a low temperature the motive causes for migration in autumn. The higher purpose of this mighty process is unmistakably to prevent the races of birds from perishing from hunger and cold; of this however the single individual has no consciousness, nor in fact can it have any idea as to the degree in which its home becomes less habitable with the advance of the season, for all such species as are subject to regular migrations generally leave their homes long before the scarcity of food or the fall of temperature becomes such as to be no longer supportable. Long before the approach of winter all these birds are in latitudes, which, in mildness of climate and abundance of food, are in no ways inferior to those which form their summer abodes, nor do any of them return before spring has again rendered their homes habitable; in fact we may say that from the time they have escaped from the egg they have lived in one continuous summer; hence none of them knows what winter, with all its discomforts, means; and accordingly none can be possessed of any innate tendency for avoiding that, of the existence of which they have up to the present remained entirely ignorant. Should a further particular proof be required showing that neither lack of food nor cold is the direct causes of the departure of birds on their migrations, I would call attention to a fact which I myself have determined, viz. that during the autumn migration, the young birds of the year leave their homes from one to two months in advance of their parents. Indeed, in the case of the Starling, the young birds which migrate at the end of June are not followed by the parents until the end of September. Now in this case scarcity of food can hardly have been the cause for the departure of the young birds, since there must have been a sufficient supply to enable the old birds to stay three months longer. Nor can we lay down this earlier departure to the influence of cold, for as a rule a rise rather than a fall of temperature takes place in the months succeeding June.

In a manner similar to that described in the case of the Starling, the autumn migration of old and young birds proceeds almost unexceptionally among all species of migrants.

According to Professor Newton's view, scarcity of food really is the cause which compels the individuals of a species having their homes in the extreme north to leave their breeding quarters for districts farther south. There their arrival would lead to overcrowding, which again would drive previous residents in these regions to turn southwards, and so on, until all the birds have arrived in latitudes providing them with an abundant food supply.

This explanation would have much to commend it if all the individuals of a species left their breeding-places in the highest northern latitudes simultaneously, and if all followed a north-to-south line of migration. I have however shown myself, firstly, that the young and old birds of a species migrate at widely different times; and, secondly, that a number of species perform their migrations on an east-to-west line of flight. Moreover, if the movement were really of the gradually progressive type indicated by the view expressed above, we should expect to see it proceed at a steady measured pace, whereas, on the other hand, we have it presented to us on Heligoland in the form of an overpoweringly vast and rapid torrent of migration, in which all the original force and simplicity of the movements are preserved, and which dashes over the island with the chaotic impetuosity of an irresistible cataract.

Want of food cannot be considered as the cause of this boisterous departure of the birds, for the simple reason that, even if such a scarcity did arise in the immediate surroundings of their nesting-places, they would endeavour to obtain provisions in districts somewhat farther removed, but certainly not by a sudden flight in a straight line, extending over many hundreds, or even some thousands of miles. Further, those species, the main business of whose life proceeds in daylight, and which in darkness can do no more than flutter about in aimless and unsteady fashion, would certainly not defer their departure till sunset, in order to look for food during the dark hours of the night.

In recent times it has been the fashion to trace back the migratory movements of animals, like any other inexplicable vital activity, to the hereditary principle; and the impulse for the wonderful migratory flights performed by birds is said to have been developed from isolated and accidental movements of an erratic nature. Assuming this view to be correct, it nevertheless affords no explanation as to the conditions which must of necessity have accompanied a first excursion of this kind. Let us assume that a bird, used to a uniformly warm climate and an abundance of food, happened in spring, while in search of a mate or nesting-place, to stray accidentally into latitudes so far north that the approach of winter would plunge it into the direst necessity. Being as yet ignorant of migration, our hapless straggler would, under such conditions, rove about in a helpless fashion, half-starved, and numbed with cold, and could only escape certain destruction if some lucky chance should conduct it towards the south. Now in these circumstances it is surely more rational to assume that such a bird, taught in the school of experience, would avoid for the future getting into similar straits, rather than that it would voluntarily expose itself

a second time to a danger which it had just managed to overcome. Indeed, Palmén too, although himself a supporter of the theory of heredity, says on p. 269 of his book that birds which have on some one previous occasion successfully got over an erratic flight of this kind, during which they have endured hardships, would hardly forget this experience, and therefore avoid it in future.

Erratic flights of this kind might possibly take place abundantly every year; but on account of the discomforts which accompany them, it is by no means likely that they would be repeated by particular individuals, so that it is difficult to see how flights of this nature could ever pass into a habit. In fact it is highly questionable whether an act performed but once in the course of each year could ever become habitual at all, and if not, the assumption of its hereditary transmission must also of necessity be dismissed as untenable.

In regard to both of these hypotheses, we would once more call attention to what we have said in the preceding chapter in reference to the migrations of certain nocturnal Lepidoptera, viz. that these insects undertake but one migration in the course of their lives, and die after it is accomplished, without producing offspring, to which they might impart, either by hereditary transmission or tradition, any of their migratory experiences. Notwithstanding this, each successive generation performs its migrations with the same unerring regularity and completeness.

In unison with the above-named theories, it has further been assumed that the capacity of flight of birds, which originally was exercised within the modest limits of short daily excursions in quest of food, attained its present astonishing development in consequence of repeated migration flights. We are however equally unable to accept this view, for it is impossible that a migratory act of a transitory nature, and only repeated twice in the course of a year, should so affect the whole organisation of a bird, increasing its muscular powers to such an extent as to render it capable of performing feats like that, for instance, of the Bluethroat, which accomplishes its spring passage of sixteen hundred miles, from Africa to Heligoland, in one uninterrupted flight; or the still more wonderful autumn migration of the Virginian Plover over a distance of three thousand two hundred miles, executed without a stoppage, from Labrador to North Brazil. No doubt, by continuous practice day after day, the strength of the muscles, and their powers of endurance, may be increased up to a certain degree, but transitory efforts brought into play but once in every six months cannot permanently affect the organisation of an animal in this manner.

Both in regard to this question as to the immediate cause of the departure of birds on their migrations, as well as in reference to that propounded in the previous chapter, we are confronted with a riddle which has hitherto defied every attempt at a solution, and which indeed we may hardly expect will ever be likely to receive a final explanation.

Long and profound study has been devoted to this subject in many quarters, and has resulted in the enunciation of several very ingenious and plausible hypotheses. None of these, however, will stand their ground when the actual facts, which the life of birds in Nature presents in such abundance, are marshalled against them.

In one way or another, however, almost every attempt at an explanation admits that migrants, with regard to the time and direction of their movements, act with a means to an end, but unconsciously, or, in other words, by instinct.

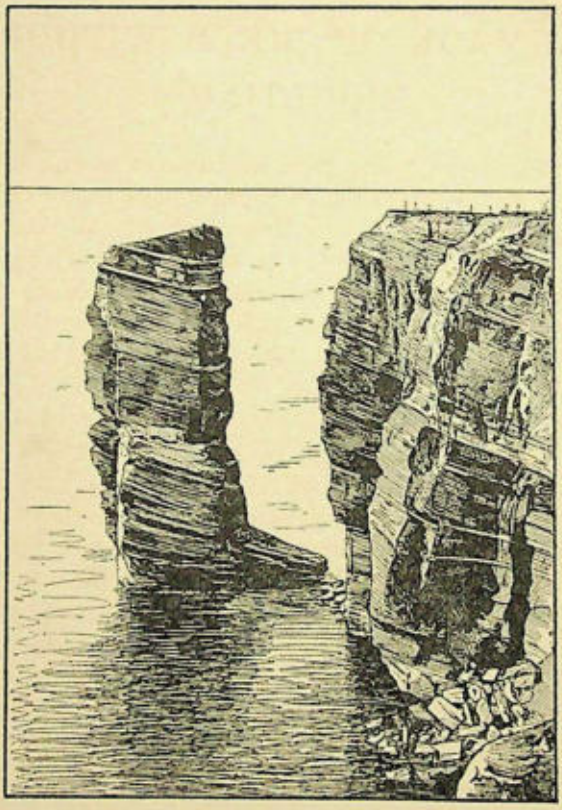
In treating of the various momenta of the migratory flight, we have striven as much as possible to place before the reader only such facts as are beyond question or criticism, but no attempt has been made to furnish a solution of the wide problems which they involve.

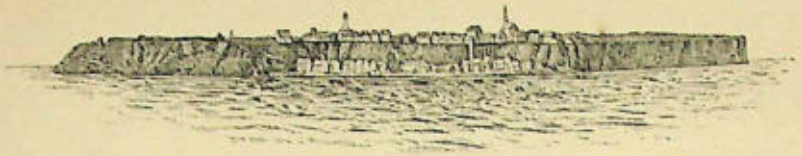
In thus abstaining from setting forth new theories, I have been guided by the conviction, rendered firmer with increasing knowledge of the phenomena, that what at present has been ascertained in reference to the migration of birds furnishes us with no clue, by the aid of which we are enabled to penetrate the depths of this wondrous mystery. The life of a man is too short for the complete exploration of this inexhaustible field, and one can only regret that one is unable to start afresh with observations and inquiries from the standpoint which one has reached at its close.



II.

CHANGES IN THE COLOUR OF THE PLUMAGE OF BIRDS WITHOUT MOULTING





II. CHANGES IN THE COLOUR OF THE PLUMAGE OF BIRDS WITHOUT MOULTING

A PHENOMENON of great and peculiar interest in the life of birds is connected with the alteration of colour undergone by the plumage in the formation of the breeding dress without the renewal of the feathers by moulting. In regard to this process, Heligoland supplies us with an abundance of material for observation, and having for many years devoted considerable attention to the subject, I cannot omit at this time to place before the reader the most obvious results of my investigations.

Schlegel, in his *Sendschreiben an die in Altenburg versammelten Naturforscher*,[1] published in 1852, was the first to express himself in an incisive manner on this subject, and the surprising novelty of his statements at once provoked the liveliest discussion. The majority of observers, however, showed themselves decidedly opposed to Schlegel's conclusions (C. L. Brehm, E. von Homeyer), while from a few others they received at least partial confirmation (Martin, Gloger). On the latter side may be ranged my own reports on the subject, which, though they failed to agree with Schlegel's statements in a few particular instances, nevertheless, gave general recognition to the fact that, in the case of a large number of birds, a great number of the feathers of the plumage resulting from the autumn moult underwent, during the following spring, a complete alteration of colour.

For a few years afterwards the subject was occasionally discussed in ornithological journals, but subsequently, so far as I know, received no further notice. I for my part, however, have devoted the most unremitting attention to it ever since that time, with the result of finding my own earlier conclusions fully corroborated; while, at the same time, the investigation of a very large number of fresh spring birds has further convinced me of the accuracy of one of Schlegel's statements, which I had before considered untenable, to the effect that the margins of the feathers of many

[1] Circular addressed to the members of the Naturalists' Congress at Altenburg.

of the birds of the Snipe species which had become indented or serrated through wear, were restored to their former perfect condition.

The change from the winter plumage to the breeding dress without moulting is accomplished in three different ways. The simplest of these consists in the shedding of the edges of the feathers of the winter plumage, which are mostly of a rusty grey colour; this process goes on during the spring months, and takes place in the case of the Chats, the Shorelark, the Finches, Buntings, and many other species. It is most easily seen in those species whose breeding plumage displays a pure and glossy black, *e.g.* the head of the Snow Bunting, the head and fore-neck of the Reed Bunting, the head and back of the Brambling, the black head and the breast-markings of the Shorelark, the head and back of the Stonechat, the black plumage of the Common and Black Redstarts, and in a large number of other species. With the aid of a magnifying lens of moderate power, one can quite distinctly follow the course of this change in the feathers of the back of the Snow Bunting. The light tips of the barbs of these do not all fall off simultaneously along their whole length down to the black portion, but gradually and unequally, so that in one and the same feather rusty grey *plumules*, as yet in their entire length, may be found mixed with others reduced to half or even a quarter of their original length. Finally, there remains only a fairly regular fine light edge, which, however, also vanishes when the breeding garb is complete. The inconspicuously coloured edges of the smaller feathers of the plumage disappear in a similar manner in all the above-named species, thereby exposing the invariably purer and handsomer colours of the breeding plumage.

A less simple manner, in which the change from the winter plumage to the breeding garb is accomplished, consists, so far as I have been able to determine without the help of a microscope, in a peeling off of the separate barbs of the feathers, whereby these are stripped of a thin inconspicuously coloured envelope, so that the purer and finer colour previously concealed beneath the latter becomes exposed. This colour is in many cases extremely beautiful, *e.g.* the carmine of the Linnet and Mealy Redpole, or the azure blue of the Bluethroats (*Sylvia leucocyana*, *S. wolfii* and *S. suecica*). In other cases, as in the Pied Wagtail and the Pied Flycatcher, a dusky slate grey or rusty grey in this way gives place to a pure glossy black. In the Rock Pipit the olivaceous brown of the winter plumage vanishes before a lighter greenish grey, and, in the feathers of the neck and upper breast, is replaced by a faint vinous tint. In the course of this process, as the facts of the matter prove, the texture of the feathers also undergoes an alteration; their barbs,

which in the winter plumage were rigid, and not in contact with each other, as a result of this peeling off become thinner and more closely opposed to each other, thereby imparting to the whole of the feathers a glossy, silky appearance. Further, the feathers, which by the end of the winter were worn irregularly, and blunted at the tips, after this change of colour, again have their margins completed, and their tips beautifully and evenly rounded off, so that they are in all respects like perfectly new feathers, such as would be produced by moulting. This process may be observed very distinctly in the feathers of the back of the Pied Wagtail. In this bird the colour of the winter plumage is a dusky slate-grey, and devoid of gloss, but after the completion of the breeding plumage it becomes deep black and of silky brilliance. This black colour first makes its appearance as a narrow black border at the tips of the feathers, which soon spreads over their whole surface.

The number of species in which this change from the winter plumage to the more attractive breeding garb is effected, in the manner last described, seems to be fewer—in so far at least as the birds occurring in Heligoland are concerned—than that of the species in which this transformation is carried out by the simple falling off of the dull-coloured edges of the barbs of the feathers, as previously explained.

The last and most wonderful process in the colour changes of the plumage of birds, not attended by a renewal of the feathers themselves, consists in an actual, complete, and very striking change in the colour of the feathers, without such alteration being brought about, or even assisted, by any changes in their texture.

As illustrating the climax of this process we may probably point to the change from a pure snow-white to an intense glossy black or blackish brown. The first of these transformations is displayed in portions of the head and neck of the Little Gull, the fore-neck and upper breast of the White and Pied Wagtails, the breast of the Dunlin, and others. The latter change, from white to blackish brown, is observed in the necks and heads of the Guillemots, of the Razorbill, and undoubtedly also of the Little Auk.

In the first-named species the change of colour from white to black is brought about in the following manner: commencing below, at what afterwards marks the line of separation between the black and white markings, the colour appears at first in scarcely perceptible dots of pure black at the extreme tips of the separate barbs of each feather—the lower portion of the edge being the first to be affected, and thus acquiring a narrow border composed of extremely fine black specks; by degrees these edges increase in breadth until the black colour, extending towards the roots of

the feathers, finally comes to be spread over their whole surface. The whole change of colouring at the particular part of the body likewise proceeds in an upward direction, so that transitional stages of the change are met with during the whole course of its progress.

In the Guillemots and Auks the change of colour proceeds in a different manner; here the shafts of the feathers of the head and neck, which are white in the winter, but blackish brown in the summer plumage, are the first portions of the feathers in which the black colour makes its appearance; almost simultaneously the blackish brown colour appears at the lower third of the feathers in the form of very fine specks, which, coalescing, soon give rise to crescentic markings; these latter, advancing from this point in an upward direction, finally cover the whole surface of the feathers. In this case, however, the whole change of colour does not proceed from below upwards in the regular manner, as described in the case of the Wagtails and the Little Gull, but both begins and terminates in separate scattered feathers of the plumage, so that at its commencement the parts affected appear light, with dark spots, and towards its termination dark, with light spots.

We ought, moreover, to remark that, in the case of the Little Gull, the change of colour of the bluish grey feathers of the crown of the head proceeds in the same manner as in the portion of the heads and necks of the Guillemots and Auks just described; here, too, the shafts are the first to acquire the black colour, which afterwards spreads itself over the web of the feathers. Hence we are presented with the singular phenomenon of a change to black, proceeding in one and the same individual, in the upper portions of the head, in quite a different manner from what it does in the lower portions of the same part of the body.

The black markings of the heads and necks in the summer plumage of old birds of the Plover species, such as the Grey Plover, Golden Plover, and Asiatic Golden Plover (*Charadrius fulvus*), are likewise attained by an alteration of colour, whereas the black breasts of these birds consist of newly-moulted feathers. A peculiar fact in regard to the Golden Plover is that in stuffed examples of this species which have been exposed to the light for a considerable time, the black colouring, which has been formed by mere change of colour, fades to a pale brownish grey, whereas the moulted feathers in the same specimen retain all their former glossy black colour.

We have seen that in the case of the Little Gull the change of the colour of the plumage may proceed in a different manner in different portions of the body; a still more surprising result, however, is presented by the birds of the genus *Tringa*, in many of

which the changes of colour have been observed to proceed in two or even three different ways in separate feathers of one individual. We shall here confine ourselves to illustrating the cases of the Knot, Dunlin, and especially the Sanderling—to which we might add that of the Curlew Sandpiper, and of many other species whose breeding plumage is more or less of a rusty red colour. In these, as is well known, the upper parts in the winter plumage are of a pure or dingy ash-grey colour, the shafts of the feathers being slightly less dark than the webs; in the summer plumage, however, the colour of these parts is a glossy black, with a broad ferruginous border, in many cases accompanied by lateral spots, which often pass into broad irregular band-like markings.

In the Dunlin the change of colour develops itself in the following manner:—In the ash-grey feathers of the back the shaft first becomes black; this colour spreads rapidly over the feather, finally leaving only broad grey margins. The latter at first change to a dull rusty grey, which, however, subsequently passes into a beautiful ferruginous colour. At the same time the dull ash-grey tips of the feathers pass into a whitish grey, their margins being simultaneously rounded off to their former entirety. This shows that these feathers also, which in winter are worn in such a way as to assume a lanceolate shape, undergo a renovation of structure, and that their tips do not acquire their whitish colour simply by fading. In the Dunlin this change does not extend to the long posterior flight-feathers and the smaller outer plumage of the wings, in which the colour only becomes somewhat blacker, and the margins somewhat more even, but which do not acquire the appearance of newly developed feathers, like those of the upper parts of these birds.

In the Sanderling we meet with an actual threefold change of colour in the feathers of the upper parts of the winter plumage, each one of which undergoes a transition from a uniform light grey to a deep black, and from a beautiful ferruginous colour to a pure white. The black, which forms the ground colour of the feathers of the summer plumage, at first appears above their subsequently white terminal markings, and advances with increasing intensity towards the radical portions of the feathers. Soon dull rust-coloured lateral borders are developed, side by side, with this ground colour, and a blurred spot of similar colour is formed on each web of the feathers; these spots increase in size, become purer in colour, and partially pass into transverse bands; simultaneously with these changes the dull light grey of the tips of the feathers becomes transformed to a pure white; not, however, by mere fading, but in this case also by a restoration of the worn and blunted barbs to their previous

entirety. When the change of colour is complete, the feathers are of a deep glossy black, with broad pure white borders, and beautiful sharply defined ferruginous spots at the sides, or transverse bands of the same colour: their tips, too, which had been worn down to a lanceolate shape, have now reassumed their formal beautiful rounded form and entirety of margins. In this species the change of colour, and simultaneous restoration of the edges of the feathers, extends to the long posterior flight-feathers and outer wing-coverts; the white plumage of the breast and sides likewise undergoes alteration of colour in this species; for though the feathers of these parts may be described as perfectly pure white, even in the winter plumage, this colour is still further heightened to what we must term a snowy white in the perfect wedding garment. A similar phenomenon is also observable in the formation of the breeding plumage of the Snow Bunting; nor can such a change be brought about by the mere falling off of the rust-coloured edges of the feathers of the head and breast.

In the Knot, the change of colour to the beautiful breeding plumage proceeds in a similar manner, except that in this species the plumage of the upper parts lacks the broad white terminal borders, and displays more of the beautiful ferruginous colour in broad irregular spots at the sides and tips of the feathers. The change of colour commences by the grey feathers of the winter plumage becoming darker at the tips, and thence gradually becoming blackish; while, simultaneously, the subsequent ferruginous markings make their appearance very faintly in the form of blurred, whitish rusty grey irregular patches upon each web of the feathers, or as stripes along the sides of them: by degrees this marking is brought to perfection, the ground colour of the feathers passing into a deeper black, while their markings assume a more definite shape, and acquire a more intensely ferruginous tint. When the change of colour is complete, the feathers are of a pure glossy black, the ferruginous patches and lateral markings of a very intense colour, and sharply defined, while the worn and blunted tips of the feathers have, in the course of these changes, gradually reassumed their former beautifully rounded form and entirety of margins. In this species the change of colour and form of the feathers of the upper parts extends also to the greater and lesser wing-coverts, and in part also to the posterior flight-feathers.

The change of colour of the white lower parts of this species passes into ferruginous in a nearly similar manner, the latter colour first appearing on the lower third of the feathers on both sides of the shafts, as a very pale blurred film, and thence, increasing in intensity, comes to spread itself over the whole surface of the

feathers. The last to be affected by this change of colour are the upper and lower tail-coverts, in which, indeed, it appears sometimes to remain altogether in abeyance.

In the Bar-tailed Godwit, and undoubtedly also the Black-tailed Godwit, the changes in colour from the winter to the breeding plumage proceed in a similar manner: in the case of the latter species, the material for observation at my command is however limited.

A phenomenon of the highest interest, and one closely connected with the changes of colour, is the restoration of the worn portions of the feathers in regard to which so much doubt has been expressed; this, as has already been mentioned several times, especially affects the edges of the feathers, which—in the case of many birds of the Snipe family—have, as it were, become jagged or serrated by wear. Much instructive material in regard to this process is furnished by the various species of *Totanus* occurring on this island. Unfortunately I was not able to extend my observations to Curlews as much as I should have liked, since these birds are but rarely killed here in the spring.

Although, in the case of the different species of *Totanus*, the change of colour from the winter to the breeding plumage likewise presents us with many surprising phenomena in regard to the restoration of worn portions of the feathers, only three species, viz. the Spotted Redshank, the Marsh and Wood Sandpiper, are of special importance, in all of which the margins of the posterior flight-feathers and the larger feathers of the upper parts also show light triangular spots. These light spots, however, are so little able to stand wear, that by the end of the winter they have almost or entirely disappeared, as a result of which the remaining portions of the feathers have acquired jagged edges something like the cutting edge of a saw. It is this edge which, in the course of the colour changes, is completely restored. The most comprehensive material for the determination of this process has been supplied to me by the Wood Sandpiper. The winter plumage of this bird is dull olivaceous brown on the upper parts, and marked with small light spots at the sides of the feathers, the markings not displaying a sharp contrast with the ground colour. These spots increase in number and size with the increase in size of the feathers, and at the same time gradually assume a triangular form, being disposed in close rows at the edges of the long posterior flight-feathers. As we have said above, the light portions of the feathers are so little capable of resisting wear, that they entirely disappear in the course of the winter, the edge of each feather being thereby formed into a zigzag line.

The alteration of colour of this worn plumage to the fresh, gaily

coloured breeding garb commences by the shafts of the feathers of the upper parts becoming blackish at the tips, whence this colour spreads on both sides over the whole lower half of the feathers, while the light spots at their sides assume a more decided whitish tint. At the same time the serrated indentations of the worn posterior flight-feathers, scapulars, and greater wing-coverts, are restored to completeness, the abraded tips of the barbs which formed the light lateral markings being restored this time to a nearly pure white colour. This process does not extend simultaneously to all the posterior flight-feathers, but these latter present all kinds of transitional stages in the course of their transformation. When this is complete, the feathers are of a dusky black colour, the large triangular spots at their margins nearly white, the serrated indentations of the edges of the feathers are filled out, and the whole plumage has the appearance as if it had just been renewed by moulting.

In the Green Sandpiper, the change of colour to the summer plumage proceeds exactly as in *Glareola*, but is less striking, inasmuch as in this species the ground colour of the feathers of the upper parts in the summer plumage is less dark, and the marginal spots less light and large than in the Wood Sandpiper.

In regard to the Spotted Redshank, I have, I am sorry to say, only limited material at my command; still, such as I have, affords me sufficient proof that, in this case also, the alteration of colour is accompanied by a similar regeneration of the white triangular marginal spots of the posterior flight-feathers and greater wing-coverts, these markings being much larger in this species than in the others previously considered.

The Greenshank on its arrival here in spring is no longer in perfect winter plumage, the alteration of colour having indeed almost passed through its first stage, for the whitish ground colour of the plumage of the upper parts of the winter plumage has already yielded to a rich silver grey, though the feathers still bear the numerous dark-bluish grey marginal spots. The subsequent course of the transformation may however be followed in an extremely clear manner in individuals which one meets with here in May. In them the shafts of the feathers first become deep black along their whole length, the colour soon spreading as a beautiful pure velvety black over both webs of the feathers of the upper plumage, only leaving two broad margins, which simultaneously acquire a white colour and lose their small dark spots. The change proceeds most rapidly in the large scapulars, but, strange to say, in the feathers of the back it only extends to the outer webs, the inner webs becoming a whitish silver grey, and forming a broad stripe of that colour down the back.

At the time of its passage in May, the long posterior flight-feathers of this bird have not yet completed their change of colour, their lower third being still blackish silver grey, approaching a faint black towards the roots of the feathers, while the broad whitish margins still bear traces of their earlier marking of dark spots.

Simultaneously with the change of colour of the upper parts, the grey tinge of the feathers of the neck, upper breast, and sides of the breast disappears: these become pure white, and in their middle acquire deep black streaks in the lines of their shafts, which become very broad on the larger feathers, and, extending to their tips, assume an elongated tear-shaped form. In the beauty of its breeding plumage, elegance of shape, and grace of movements, this bird not only occupies the first place among its congeners, but figures as one of the most handsome of our native avifauna.

In the Redshank the alteration of colour to the summer plumage is characterised by a phenomenon not observed in the case of any other species here discussed, viz. the development of the barred markings of the posterior flight-feathers and greater wing-coverts in older birds. In the winter plumage all the upper parts, as well as the sides of the upper breast, are of a uniform olivaceous slaty grey, with a faint metallic gloss. Of the same colour are also the long posterior flight-feathers and the greater wing-coverts. The latter have whitish edges and small dark marginal spots, and the sides of the breast are suffused with olivaceous slaty grey.

In all the upper parts the change of colour to the summer plumage commences by the shafts of the feathers becoming black, which colour expands in the form of lanceolate spots and streaks towards the roots of the feathers over their whole surface. At the same time darkish dots appear at the margins of the feathers, which, gradually coalescing, form narrow dark bands running inwards to the shafts of the feathers; between these bands the feathers become rusty grey, the colouring proceeding from the margin inwards.

The number of the bands increases with the size of the feathers, so that while the smaller feathers of the back have only indications of them, the scapulars and long posterior flight-feathers display from five to fifteen. The beauty of the markings of these latter feathers is further enhanced by the fact that a whitish border is formed around each of these transverse bars; these are especially marked in the outer webs of the feathers, the colour proceeding from the margins inwards. It is almost superfluous to repeat that side by side with these colour-changes all the feathers reacquire their former freshness and entirety of margins.

In the head, neck, upper breast, and sides of the breast, the change commences by the disappearance of the grey colour of the winter plumage; the feathers become white, and each at the same time acquires a small black streak in the line of its shaft; the latter extends towards the tips of the feather in the form of lanceolate or sagittal markings, and in the large feathers on the sides of the breast develops into barred markings. The feathers on the middle of the breast, as well as those of the belly, which acquire no black markings, likewise share in the general alteration of colour, in so far as they become more purely snow-white. It is well known that the feet, and the root of the lower mandible also, during the alteration of the colour of the plumage, pass from the dull brick-red of the winter plumage to a beautiful pure vermilion red.

To explain the origin and course of development of the transverse bars of the long posterior flight-feathers of this species would be as difficult, if not more so, than to account for the first appearance of the black colour at the lower edges of the white neck-feathers of the Little Gull. If we are unable to assume in the latter case that the colouring matter passes unobserved from the body through the shafts of the feathers to the extreme tips of the bars, and thence spreads visibly upwards over the whole surface of the feathers, we are still less justified in adopting such a view in regard to the transverse bars which mark the feathers of the Redshank; for the barbs of these feathers are placed much more at acute angles to the shafts than the dark transverse bars, so that the former are crossed by the latter in many ways, and display in the lines of their length several gaps which are not marked by the dark colour. We may therefore well ask how the dark colouring matter could leap over these intervening gaps to get to the place of its destination.

In the species hitherto discussed we have traced the course of the alteration of colour from the winter to the breeding plumage, as this proceeds in all old birds which are capable of producing a brood. We may accordingly regard this as the normal phase of the phenomenon. In establishing this conclusion, we have however by no means come to the end of this interesting subject, for many cases occur in which the colour of the early plumage of young birds is also more or less completely changed to that of the breeding plumage of old individuals. Under these conditions, however, we can only regard the process as an exceptional case of assistance or protection, which, as I have grounds for believing, does not affect all the individuals of a species which are of the same age, but only such as are specially strong. What, however, particularly leads one to regard the phenomenon as abnormal is, on the one hand, the fact that a partial alteration of the colour of young birds takes place

in the case of those species where the old individuals are not subject to such a change of colour at all, *e.g.* the Falcons and Gulls; and, on the other hand, that in the case of many young birds this alteration takes place on parts of the body in which, in old individuals, the change to the breeding plumage is effected not by alteration of colour, but by moulting. This is the case in several of the Plovers, among other species.

Among the Falcons, it has been in the case of only one species—the Merlin—that I have noticed an alteration of colour in its first spring; but the material at my command has been so abundant, and my observations have extended over so many years, that every doubt as to their accuracy is out of the question. These young Falcons are met with here on migration in the course of April and at the beginning of May. At that time the colour-changes are about half completed, and may be observed most clearly in the feathers of the backs of male birds. The dusky earthy brown colour of these feathers passes into a dark slate grey, which is first discernible as blackish streaks in the lines of the shafts, and soon spreads over the whole of these feathers, supplanting, as it does so, the rusty grey spots along their margins. Simultaneously a lively rust-red tint makes its appearance at the back of the neck: the crown of the head assumes a very dark blackish slate-grey colour, and here and there feathers on the upper and lower breast become faintly rust-coloured. The colour of the back of such individuals, however, never attains to the beautiful pure blue grey of the old birds, but remains a dull bluish slate-grey.

Of the Gulls I have had under my observation large numbers of the Herring Gull, the Great Black-backed Gull, and Lesser Black-backed Gull. In old birds of these species, the only parts of the plumage subject to changes of colour are on the head and neck. In the winter plumage the ground colour of these parts is white, but is marked by greyish brown streaks. In the spring, however, this plumage, by an alteration of colour, is changed to a pure white.

In young birds the plumage is, up to their second spring, dull white, with blurred, light-brown markings; subsequently, by an alteration of colour, their plumage acquires a more or less perfect resemblance to that of their parents. In the case of the Herring Gull, the bluish grey coloration at first spreads over scattered feathers of the plumage of the upper parts, their light-brown colour disappearing at the same time. The light-brown markings likewise disappear on the head, neck, and lower parts, the feathers of which become white, though not as pure white as those of the old birds.

In the Greater Black-backed and Lesser Black-backed Gulls, the alteration of colour proceeds in a similar manner. In these the slate-black colour is at first faintly developed on both webs of single feathers of the upper plumage, especially the large scapulars, and, becoming darker, very soon supplants every trace of the darker markings of the early plumage. In this case, also, the black colour does not attain to the purity in which it is found in the old birds, but remains until the autumn moult in the condition of a pale, blackish, slate-grey. I have had repeatedly examples of the Lesser Black-backed Gull, in this plumage, offered me as Siberian Gulls (*Larus affinis=borealis*, Brandt), but the colour of their plumage is invariably much darker than that of the latter species.

In the above-named Gulls the alteration of colour does not, as in many other cases, commence at the shafts or the edges of the feathers; but both the light grey and slate-black, though at first very faint, yet appear to spread immediately over both webs of isolated feathers, and increase in depth and purity in proportion as the brown markings of the winter plumage gradually disappear. This change of colour may be followed with extraordinary clearness in the large scapulars, the posterior flight-feathers, and the greater wing-coverts.

An alteration of colour of this kind in younger individuals, taking place on parts of the body where the change to the breeding plumage is in old birds effected by moulting, has been observed also in the Lapwing, the Golden Plover, and Asiatic Golden Plover (*Charadrius fulvus*). It occurs in all probability in many other species of the same genus; but, under my observation, the largest amount of material was furnished by the above-named species.

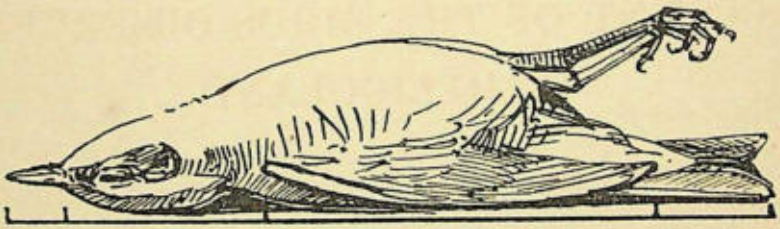
In the old birds of these three species, the light-coloured winter plumage of the breast is replaced in spring by a new growth of feathers of a pure and glossy black, whereas in individuals not quite a year old the black colour of the feathers of the breast is produced by an alteration of colour. This black colour first appears at the lower ends of the feathers, and thence spreads upwards; it, however, does not, as in old birds, extend over the whole surface of the feathers, but only reaches the middle, the radical halves of the feathers remaining white. At the sides of the head, throat, and fore-neck, however, both old and young birds acquire the black colour of their summer plumage by an alteration of colour. It appears, however, that it is only the stronger individuals among these young birds which assume provisionally a nuptial plumage of this kind; for only solitary examples, and these invariably very strong birds, are met

with. In a young spring specimen of the Grey Plover, in my collection, the alteration of colour extends also to the plumage of the upper parts, the brownish, ash-grey, 'smoky-pale' (*rauchfahlen*) feathers acquiring at first a faint blackish colour, which extends from their lower ends upwards, leaving crescentic ash-grey tips. As the black colour becomes deeper and purer, these grey tips pass into whitish grey colour. This alteration of colour spreads almost simultaneously over the whole upper plumage of the bird, the long broad flight-feathers alone excepted. In some of these latter the change of colour has advanced so much that their marginal markings in form already approach those of the old birds; others, again, as yet only display narrow whitish edgings and tips, while a few still retain their worn lanceolate shape and serrated margins. The renovation of the feathers proceeds at exactly the same pace as the alteration of colour, so that those feathers in which the latter change has advanced furthest already possess beautifully rounded tips and equal margins. In others, again, where the light markings are only about half-completed, the edges in places still display indentations; while, finally, those in which the later markings are still in the form of a narrow light border, have their edges indented in the form of a continuous undulated line.

What has been stated above in regard to the change of the winter plumage of birds to their breeding dress is based throughout on observations made on fresh examples, in which, by examination of the inner cutaneous surface, it was possible to determine with certainty whether moulting actually took place or not. In fact, it is only material of this kind that ought to be employed in these observations, and not examples belonging to species in which the change of colour, instead of affecting all the feathers of a particular part of the body equally at the same time, commences instead in isolated feathers, while others are left in the unaltered colour of the winter plumage at its completion. Where the change of colour proceeds by gradational stages in this manner, the bird under examination completely gives one the impression of being fully in the moulting state, and, in fact, examples of this kind have been sent me by ornithologists of repute in proof of a moulting process. A close and exact examination, however, at once reveals the fact that all these scattered and newly coloured feathers are of perfectly normal size; nor do we find among them any others of half or more than half their full growth, still within the dermal quill, as would be the case if one were dealing with a moulting individual.

There can be no doubt that an alteration of colour and renovation of worn parts of the feathers takes place to a greater or less extent in the great majority of birds. I have, however, limited

myself to treating only of the small number of examples in regard to which I can speak with positive assurance, confining my description to what actually takes place, without embarking on any hypothetical conjectures as to the how and wherefore of the matter; for if it indeed should ever be sought to trace the origin and course of the process, this end could only be attained by way of the most searching microscopic examination.



III.

ACCOUNT OF THE BIRDS OBSERVED IN HELIGOLAND

III. ACCOUNT OF THE BIRDS OBSERVED IN HELIGOLAND

BIRDS OF PREY

ACCIPITRES.

Falcon—Falco.—This great genus of the Falcones inhabits in a large number of forms all the countries of the earth. In the first volume of the Catalogue of the Birds in the British Museum, Sharpe gives the number of all the species of Diurnal Birds of Prey known up to 1874, as 377. They are divided into a large number of genera, but, following Naumann, I have described all the species visiting Heligoland under the name *Falco*. These number twenty-seven.

In the Noble Falcons the type of a Diurnal Bird of Prey reaches its highest development both as regards bodily structure, capacities, and entire mode of life.

1.—Greenland Falcon [Weisser Falke].

FALCO CANDICANS, Linn.[1]

Heligolandish: Groot blü-futted falk = *Great Blue-footed Falcon.*

Falco candicans. Naumann, i. 269, xiii. 95, and Blasius, *Nachträge*, 16.
Greenland Falcon. Dresser, *Birds of Europe*, vi. 21.
Faucon gerfaut. Temminck, *Manuel*, i. 17, iii. 9.

A bird of this species, of strikingly large size, was noticed roving about over this island about the end of October 1843, inviting the continuous attention of everybody deeming himself a gunner. The bird was seen everywhere, wherever one might happen to be standing or walking. At one moment it would be speeding from the Dune with short, powerful strokes of the wings, then across the cliff at a height of from two to three hundred feet, and, arrived on the west side of the island, would swoop suddenly down after a quarry to the surface of the water, sometimes in a nearly perpendicular direction, sometimes making one or two turns. Then it

[1] *Falco candicans*, Gmel.

would tear away again at lightning speed, till, vanishing from sight in the dull autumn air, one thought the bird had gone for ever, when suddenly it would again come into sight, soaring calmly along from an opposite direction.

This bird illustrated in a most striking fashion the open, bold manner in which the Noble Falcons hunt their game, relying only upon their own strength and skill, and despising every kind of craft or stratagem—in short, the most perfect types of a bird of prey.

I, who was at that time a passionate sportsman, made no small efforts to secure it. To this end I had already, in the course of the day, exchanged my double-barrelled gun for a single English duck-gun, but without effect. As a last resource, late in the afternoon, I took up my rifle. I found the Falcon sitting on the cliff with his back turned towards me; but he was at a good distance, or about 380 feet by the chart. He was sitting perfectly at his ease, turning his head and looking across at me. At the same moment I pulled the trigger and the noble bird fell, hit between the shoulders, into the depth below.

Overjoyed at my lucky shot, I little dreamt at that time that the bird which had just fallen a victim was to be the originating cause and foundation-stone of the ornithological collection, at present probably without its equal, which it has been my good fortune since that time to accumulate in Heligoland.

Up to that time I had, to prevent their being spoiled, presented any examples of particular beauty or interest which had come within my reach to collectors of my acquaintance. This bird, however, was so splendid a creature that I could not induce myself to part with it. It was soon joined in quick succession by a fairly numerous and varied company. Now, however, to a mere love of sport there was added a higher interest. I borrowed from Reymers, Brehm's *Textbook of the Birds of Europe*;[1] obtained, a few years later, possession of Naumann's first and only work, and thereafter worked with unflagging zeal in the field of Ornithology.

Since that time two or three examples of this bird, of equally large size, have been seen on the island, but none have been shot. The afore-mentioned bird measured, while still fresh, 23·62 inches = (60 *cm.*) from the forehead to the tip of the tail. It is a young bird in autumn plumage, the naked parts round the eye and talons being of a light bluish grey.

Again, on the 19th September 1848, a large Falcon was observed here; its head and tail were of a pure white, the back with heart-shaped black spots on a white ground, and the wings white with black tips. Inasmuch as the bird flew away from the face of the cliff, the observer standing at the top above it was unable to see its

[1] *Lehrbuch der Vögel Europas.*

under side, which, however, was undoubtedly also white. There can further be no doubt of this bird having been a Falcon, and not the more commonly occurring white variety of Buzzard, seeing that the observer was one of the brothers Aeuckens. As their names will be mentioned very frequently in the course of my notes, I will here state at once, that their knowledge of the birds occurring here, their powers of observation, exactness, and reliability are almost without a parallel. Unfortunately the eldest of the brothers is no longer living.

This Falcon has his home in the high Polar regions of the Northern Hemisphere. It appears to have visited England [Britain] with greatest frequency. Harting (*Handbook of British Birds*, p. 85) gives about twenty instances of its occurrence up to 1872.

2.—Jer Falcon [Norwegischer Falke].

FALCO GYRFALCO, Linn.

Heligolandish: Blü-futted falk = *Blue-footed Falcon.*

Falco gyrfalco.	Naumann, xiii.; Blasius, *Nachträge*, 22.
Jer Falcon.	Dresser, vi. 15.
Gerfaut.	Schlegel, *Krit. d. Europ. Vögel*, ii. and 5.

Although the Jer Falcon occurs here either once or several times in the course of every autumn, it is only very rarely shot; in fact, this has not happened on more than six or eight occasions during all the time I have been collecting. The birds appear in October and November, all the examples hitherto met with having been birds of the year, with the backs of uniform dark amber-brown colour. I possess, however, one beautiful example of this species, in which all the scapulars, as well as the greater and greatest outer wing-coverts, are marked by bands of a dull buff colour; in the smallest of these feathers the markings merely consist of oval spots, which extend from the margins of the feathers half-way across them to the shafts; but on the longest scapulars, and more especially on the largest outer wing-coverts, as well as on the upper tail-coverts, they pass into regular bands or bars, which extend close up to the shafts, and in some cases touch them. The longest feathers of the flanks are marked by very broad bands of this kind, which on the outer webs of the feathers extend to the shafts, but do not quite reach them on the inner webs.

The colour of the cere and talons was in this example of a pale yellow, with only a slight tinge of the earlier bluish grey colour.

The total length of the freshly killed bird was 19·68 ins. (50 *cm.*); length of wings, 13·85 ins. (352 *mm.*); length of tail, 8·15 ins. (207 *mm.*); length of tail left uncovered by the wings,

2·13 ins. (54 *mm.*). The bird is a male, and was shot on the 9th of November 1848. No old bird of this species has yet been seen or shot on the island.

The breeding range of this Falcon extends from Northern Scandinavia, through Northern Asia, as far as Arctic America.

3.—The Saker [Sakkerfalke].

FALCO SACER, Linn.[1]

Falco lanarius. Naumann, i. 279, xiii. 98.
Saker. Dresser, vi. 59.
Faucon sacre. Schlegel, *Krit. d. Eur. Vögel*, ii. and 9.

In the year 1839 or 1840, Reymers possessed one of the larger Falcons, which he at that time described as a Lanner. It was an old bird, for it had, while still fresh, light yellow talons, but the sides of the breast and flanks were not spotted nor barred, but had dark stripes on a light buff-coloured ground; the head, too, was largely rust-coloured. When at a later date I had an opportunity of examining skins of *Falco sacer*, I became convinced that Reymers' bird belonged to this species. So far as I know, this beautiful bird fell into the hands of Brandt of Hamburg, who at that time was buying up almost every beautiful and interesting example that was killed on this island. Since that time the bird has not been seen again in Heligoland, although in the course of years very many species, some of them represented by numerous individuals, which have the same home as this species, viz.—south-eastern Europe, Asia Minor, and Palestine—have been observed and frequently shot on the island. Unfortunately at that time I had not commenced collecting.

4.—The Lanner [Lannerfalke].

FALCO TANYPTERUS, Lichtenstein.[2]

Lanner. Dresser, vi. 51 (?).
Faucon lanier. Schlegel, *Krit. d. Eur. Vögel*, ii. and 11 (?).

In the summer of 1840 a local bird-stuffer was exhibiting in his shop one of the larger species of Noble Falcons. My ornithological acquirements being at that time very limited, I considered the bird, on account of the bars on its flanks, to be an old Peregrine, and intended to buy it as such; the owner, however, remarked to me that it was not an old bird, as was proved by its back, which was brown, whereas in old Peregrines it is of a beautiful blue colour, and to my subsequent regret I withdrew from the purchase. On

[1] *Falco sacer*, Gmel.

[2] *Falco feldeggi*, Schlegel.

my coming soon after into possession of Naumann's work, I saw at once that the bird was not *F. peregrinus*, but that it might be the species represented on Plate 23 as an old Lanner Falcon. I was, however, still doubtful, inasmuch as the bird in question was less strongly spotted on its breast, which was rather richly suffused with rust-colour; and, further, because the feathers of the flanks displayed, if not very broad, yet very sharply defined blackish-brown bands. Later on, however, at the Berlin Museum, I recognised at once, and most definitely, in an example exhibited as *F. tanypterus*, the bird which forms the subject of this paragraph.

This species also has not been seen again in Heligoland, nor need this be a matter of much surprise, for it is a singular fact that examples of all species whose homes lie far to the south of Heligoland—that of the present species being in Central or Upper Africa—are among the very rarest occurrences on this island. In the portion of this book which deals with the Migration of Birds I have tried to explain that species belonging to western Europe are also hardly ever seen, and indeed are hardly to be expected, in Heligoland.

5.—The Peregrine [Wanderfalke].

FALCO PEREGRINUS, Linn.[1]

Heligolandish: Snepp-falk = *Snipe Falcon.*

Falco peregrinus. Naumann, i. 285.
Peregrine. Dresser, vi. 31.
Faucon pèlerin. Temminck, *Manuel*, i. 22, iii. 11.

Where bird-life is represented in such abundance as in Heligoland, it is but natural to expect also to meet with this Falcon—one of its noblest representatives. Indeed, it seems to have become more frequent in its visits during the last thirty years, for before that time I had given up all hope of ever securing an old example in perfect plumage for my collection. As a last resource, therefore, I hit upon the idea of keeping a young bird, whose wing had been damaged, confined in a large cage in the open air, until it had assumed the full adult plumage. The experiment was crowned with the most complete success; but after three or four years I had become so fond of this magnificent bird, with its beautiful dark eyes sparkling with pride and daring, that I should never have for one moment thought of killing it, if the absolute impossibility of procuring food for it, during an exceptionally severe winter, had not driven me to this necessity.

Since that time, besides many young birds, several old examples

[1] *Falco peregrinus*, Tunstall.

of this species have been shot here, so that, after several exchanges, my collection can now show a pair to which it would be difficult to find superior specimens. The male is very small, the head, upper breast, and some portion of the breast below this, are white throughout, without spots, and with only a scarcely perceptible tinge of rusty-buff colour (*rostgelblich*). The shafts of the feathers of these parts do not display the faintest trace of transverse stripes. At the sides of the breast a few very small tear-shaped markings are found; the feathers of the flanks have a bluish-grey tinge, with faint indications of narrow blackish-grey bars.

The specimen described was shot on the 7th of April 1875. The chief time of migration of this bird is, for Heligoland, from March until the middle of April, and again in October; young birds make their appearance as early as the end of August; these are mostly of a very dark slaty-grey colour on their upper parts.

The breeding range of this species extends from North Africa to the North Cape, and within the same parallels of latitude throughout Asia and America as well as in Greenland.

6.—The Hobby [Baumfalke].

FALCO SUBBUTEO, Linn.

Heligolandish: Boam-falk = *Tree Falcon.*

Falco subbuteo.	Naumann, i. 296.
Hobby.	Dresser, vi. 69.
Faucon hobereau.	Temminck, *Manuel*, i. 25, iii. 12.

This elegant little Falcon makes its appearance on Heligoland at the end of April and in the course of May, when the weather begins to get warm; but only solitary examples are met with. During the return (autumn) migration, lasting through September or thereabouts, the appearance of old birds is still rarer. Young summer birds[1] are rarer still from the middle to the end of August; of these last not ten examples have been shot during all the time I have been collecting.

One of these birds was seen here on a calm warm summer afternoon, engaged in the pursuit of common cabbage butterflies, which it consumed very deftly during its flight, seizing them with its talons, and then conveying them to its beak.

The shooters of Heligoland hold every Falcon in great respect, probably on account of a certain piratical kinship or sympathy. Hence one of these gentlemen, who regarded such a proceeding on the part of this Falcon as rather below its dignity, thought that it could only be acting thus from mere wantonness or for amusement.

[1] *Anglice*—Birds of the year.—Tr.

The Hobby breeds throughout the whole of central Europe as far north as southern Scandinavia, and in the same latitudes throughout Asia. Its numbers, however, are said to decline considerably towards the east. In Spain only scattered examples are said to nest.

7.—Eleonora Falcon [Leonoras Falke].

FALCO ELEONORAE, Géné.

Falco concolor. Graufalk.	V. d. Mühle, *Ornith. Griechenlands*, 14.
Eleanoran Falcon.	Dresser, vi. 103.
Faucon Eléonore.	Temminck, *Manuel*, iv. 593.

The sole authority for the admission of this species into the list of the birds of Heligoland is a statement of Claus Aeuckens, according to which, on the 26th of May 1879, the same day on which he shot Pallas' Short-toed Lark (*Alauda pispoletta*), a Falcon flew close past him, which in its whole bearing resembled a Hobby, but was somewhat larger than the latter, and of a uniform slate-grey colour—he had, in fact, never seen one like it before. On my suggesting that it might have perhaps been *Falco rufipes*, he assured me most emphatically that the bird in question had no red feathers on the tibiæ, nor red under-tail-coverts, and certainly was not *rufipes*, which was, moreover, smaller, had a different manner of flight, and was perfectly well known to him. On Aeuckens afterwards seeing an example of *F. eleonorae*, which I had procured, in my collection, he at once said that it was a bird of this kind which he had seen on the date before named. Knowing how thoroughly reliable all Aeuckens's observations are, I have no longer any doubt in the matter.

The occurrence of *F. eleonorae* is further supported by the simultaneous occurrence with this bird of another species, also a native of the far South-East, to wit, the small Lark above named, *i.e. Al. pispoletta*. Similar cases, indeed, have occurred pretty frequently on the island.

8.—The Merlin [Zwergfalk].

FALCO AESALON, Linn.[1]

Heligolandish : Lütj-falk = *The Little Falcon.*

Falco aesalon.	Naumann, i. 303.
Merlin.	Dresser, vi. 83.
Faucon émerillon.	Temminck, *Manuel*, i. 27, iii. 13.

Of all the Falcons this small and dexterous robber visits Heligoland in greatest numbers, and its migration extends over a very

[1] *Falco æsalon*, Tunstall.

considerable period. Young birds arrive as early as the end of August, and are seen until the middle of November. The spring migration takes place in March and April. Unlike all the other Falcons, which swoop down upon their prey from above, this small bird, being even more eminently equipped for flight, may very frequently be seen attacking its prey from below in an upward direction; roving low over the fields, the bird will suddenly dart upwards in an oblique direction into the midst of a flock of Chaffinches or Pipits, at a distance of from about two to three hundred paces off, and at a height of a hundred and fifty feet. On approaching its victim this Falcon in a most peculiar manner throws itself over on one side of its body, and attacks the prey in darting past it. I have never yet seen an attack of this kind miscarry, although it is carried out with lightning-like rapidity; failure however happens very often when the bird attacks its prey by swooping downwards from above, both in the case of this small Falcon and also in those of the larger species. In the pursuit of its prey this bird rushes past, swift as thought, keeping its feathers closely pressed to its body and the wings half-closed. This makes it appear so tiny that almost all the gunners of this island feel convinced of the existence of a Falcon still smaller than the Merlin, which however, they say, flew at such an extraordinary speed that no one had as yet succeeded in shooting it. Under the circumstances, this may be considered a very pardonable error.

The nesting-places of this small and lovely Falcon extend from the Hebrides and Ireland eastwards through northern Europe and Asia. America possesses a species only slightly distinguished from it, viz. *Falco columbarius*.

9.—The Common Kestrel [Thurmfalk].

FALCO TINNUNCULUS, Linn.

Heligolandish: Scôarenkôater-hôafk = *Beetle Hawk*.

Falco tinnunculus. Naumann, i. 323.
Common Kestrel. Dresser, vi. 113.
Faucon cresserelle. Temminck, *Manuel*, i. 29, iii. 14.

As may be gathered from the name, the gunners of Heligoland are too acute observers to give to this species a place among the Noble Falcons, but hold it in such low esteem as to call it the Beetle Hawk. This bird has the peculiar capacity of sustaining itself while soaring in the air steadily and apparently immoveably at one particular spot. This habit is known here as *rütteln*, [a word which signifies to shake or rattle,] as it seems to be effected by short but rapid motions of the wings. In this act it is probably seen nowhere

to greater perfection than on this island, where it may often be seen, particularly over the eastern shore, poised in the air with the body motionless, as if nailed to the spot, at a height of from a hundred to a hundred and fifty feet, and that frequently in the teeth of a violent easterly gale. Under the last conditions the bird somewhat depresses the head and fore part of its body, and keeps its tail slightly raised above the level of its back, somewhat in the manner of a cuckoo on the wing, its narrow wings being at the same time drawn up close to the body. In this position it remains, keeping its head turned to the wind, which has often the force of a hurricane, without moving a feather, fixed motionless to the same spot, except when, now and again, it exchanges its place for another with a few hasty strokes of the wings.

This bird visits Heligoland in great numbers, and isolated examples may also be seen out of the regular period of migration at all times of the year. In the spring it arrives as early as March, and is of common occurrence during April and May. Young birds are seen as early as the middle of August, and old ones throughout September and October.

The Common Kestrel breeds numerously throughout the whole of Europe up to about 60° N. latitude; in the south its breeding area extends to North Africa, and to the same extent of latitude through the whole of Asia.

10.—The Lesser Kestrel [Röthelfalke].

FALCO CENCHRIS, Frisch.[1]

Falco cenchris. Naumann, i. 318.
Lesser Kestrel. Dresser, vi. 125.
Faucon cresserellette. Temminck, *Manuel*, i. 31, iii. 15.

To my knowledge this bird has only occurred three times in the island, but Reymers once stuffed and sold a male bird before I had begun to collect. In the summer of 1839 or 1840 a young bird was shot by a visitor on the Dune, but he merely skinned it. The specimen later on came into my possession, but being only a skin, I did not value it much and gave it, if I am not mistaken, to Herr von Zittwitz; possibly it is still at Görlitz, where his collection went afterwards. Finally Claus Aeuckens saw a 'small Kestrel with red back and blue wings,' flying away almost from under his feet from the edge of the cliff, without, however, being able to get a shot at it; for under such conditions almost all birds

[1] *Falco cenchris*, Naum.

of prey precipitate themselves vertically downward, and are at once lost to sight.

The homes of this small Falcon extend through the whole of Southern Europe, North Africa, Asia Minor, Turkestan, and as far to the East as India.

11.—Red-legged Falcon [Rothfuss-Falke].

FALCO RUFIPES, Beseke.[1]

Heligolandish : Road-futted falk = *Red-footed Falcon.*

Falco rufipes. Naumann, i. 311.
Red-legged Falcon. Dresser, vi. 93.
Faucon Kobez. Temminck, *Manuel*, i. 23, iii. 17.

Records of the occurrence in Heligoland, either of living birds or freshly killed examples of this beautiful Falcon, with the talons and skin round the eyes still displaying their bright red colouring, are much rarer than one might expect. So far as my experience goes it has only been shot five times, and seen on one other occasion. The earliest of these occurrences dates back to May 1840. The bird in question was a male, appearing in its first full adult plumage. It came originally into the possession of Reymers, who stuffed it, and from whom I bought it afterwards. The bird is in my collection. Its general plumage is blue-grey, but the shafts of the feathers of the lower parts are still marked by black streaks, and the upper breast has some scattered rust-coloured feathers remaining. The flight-feathers retain large white transverse spots on their inner webs, and the tail still displays a broad black terminal band.

Later on, Oelrich Aeuckens—the eldest of the three brothers, generally known as 'Old Oelk'—obtained two of these birds, first a male and afterwards a female. A fourth example, a beautiful old male in perfect plumage, was shot by my eldest son on the 20th of May 1868, and is also in my collection. On the 3rd of June 1887, Jan Aeuckens shot a one-year-old male, in which, however, the adult plumage is still in an incipient, imperfectly developed stage. On the 13th of the same month Claus Aeuckens again saw a Red-legged Falcon flying about among the houses on the Highland ; he was, however, unable to shoot it under these conditions, and the bird was not seen again afterwards.

The migratory movements of this species are as yet not ascertained with precision. In general, and so far as applies to the preponderating number of individuals, their line of migration is one trending from north to south.

[1] *Falco vespertinus*, Linn.

This results from the simple fact that the western limit of their breeding range extends, not considering extralimital exceptions, from Greece through Hungary to the region of the Dwina, while their winter quarters stretch through Africa as far south as Damaraland, where they are reported as occurring in flocks amounting to tens of thousands. Damaraland is almost in the same meridian as Greece and Hungary. This would likewise explain the very rare occurrence of this Falcon in Heligoland, because this island lies to the west and outside of its line of migration. It is, however, difficult to reconcile with this view its numerous appearances in England [Britain], where, according to Harting (*Handbook of British Birds*, p. 86), it has been observed twenty-nine times between May 1830 and October 1868. The only way out of the difficulty would be to accept Dresser's statement to the effect that the birds also nest in Algiers, though this is doubted by Seebohm. If Dresser be correct, the birds which reach England, like all exceptional occurrences during the summer months, would be individuals which had lost their pairing-spouses during the first stages of the breeding season, but strove to appease the unsatisfied breeding instinct by continuing their journey in the direction of the normal spring migration of the species, viz. northwards across France to England.

In the portion of this book which deals with Migration in general (Part I.), I have sought, by citing many instances, to establish this idea, as one solving the question of exceptional occurrences during the summer.

Seebohm (*British Birds*, i. 42) gives the Jenisei as the eastern boundary of the breeding range of this species: in Turkestan, it appears, according to Sewertzoff, to be a common migrant. In India, however, not many of these birds pass the winter: at this season, indeed, they are nowhere met with so abundantly as in Lower Africa, where, as already stated, the flocks are said to number tens of thousands of individuals.

12.—Golden Eagle [Goldadler].

FALCO CHRYSAËTUS, Linn.[1]

Falco chrysaëtus. Naumann, xiii. 8; Blasius, *Nachträge*, 7.
Golden Eagle. Dresser, v. 533.

The true eagles, feathered down to the toes, count among the rarest occurrences of Heligoland. So far as observations go, the bird has only reached the island four times within the last forty

[1] *Aquila chrysaëtos* (Linn.).

years. Before I commenced collecting, a young example of the Lesser Spotted Eagle, almost as gaily coloured as a young Gannet (*Sula alba*), was shot here, while about twenty years ago a similar bird was found dead at the foot of the cliffs, having been washed up by the sea. The same gunner who had shot the Lesser Spotted Eagle just referred to, also shot a Golden Eagle on the 18th of November 1867. Further, a perfectly white Eagle, of equally large size, was also observed here, but unfortunately not shot, although one of the best gunners of the island, Jan Aeuckens, had already levelled his gun at it a few paces off, and was in fact in the very act of pulling the trigger. The plumage of this bird was throughout snow white, like that of a swan; it had already been shot at during the morning, but at too great a distance. In the afternoon it was seen sitting on one of the sandhills, and Aeuckens landed in a small boat unnoticed by the bird; he succeeded in climbing up the sandhill without being heard. Having reached the top, he was separated from the bird by a distance no greater than ten or twelve feet, the breadth of the summit. The eagle had his back turned towards him, the head somewhat depressed, the pointed feathers of the neck strongly erected; he looked, as Aeuckens expressed it, 'very grumpy,' a grain of shot had hit the back of his head above the ear, and blood was trickling down from his white feathers. Aeuckens silently raised his gun and took aim; but at the moment of pulling the trigger the thought struck him that at such close quarters the shot would mutilate and ruin the bird; he was at a loss what to do. As ill luck would have it, he slid quietly down the hill again in order to consult his father, who was waiting down below; their whispering scared the eagle; a shot sent after him from too great a distance failed to hit the bird, which was never seen again. I suspect that this was the white variety of the Golden Eagle which is said to occur pretty frequently in Northern Asia. The iris of this example was of a rusty orange.

The example of the Golden Eagle shot here is a rather young male, perhaps a little more than two years old. The pointed feathers of the head and hinder part of the neck are of an intense orange-brown colour (*orange-rostfarbig*), the tips only being of a somewhat more faded buff colour (*rost-gelb*). The tail has irregular coarse brownish black spots on a ground of dark grey, with very broad black terminal bars, exactly as figured on Naumann's Fig. 1, plate 339. The feathers have no white towards their roots. The under side of the bird is dark brown, the feathers of the legs are of similar colour, the feathers of the upper breast have a buff-coloured (*rost-gelb*) border. The Golden Eagle nests in the mountains of Europe, Asia, and North America, excepting

those of the highest North; but it is not met with in Greenland or Iceland.

13.—Lesser Spotted Eagle [Kleiner Schreiadler].

FALCO NAEVIUS, Linn.[1]

Falco naevius.	Naumann, i. 217, xiii. 50; *ibid.* Blasius, *Nachträge*, 10.
Lesser Spotted Eagle.	Dresser, v. 401.
Aigle Criard.	Temminck, *Manuel*, i. 42, iii. 23.

As has been already mentioned under the preceding species, this bird has been met with twice on the island; the same gunner who, in 1867, shot the Golden Eagle before referred to, also shot, about the year 1838, when still quite a young fellow, the only Spotted Eagle ever killed on the island. The bird was quite young and very strongly spotted, its plumage comparing remarkably with that of a young Gannet (*Sula alba*). It was stuffed by Reymers. A bird of this species, which had been washed up by the sea, was afterwards found at the foot of the cliff by the elder Aeuckens; it had however been so much eaten into by the thousands of rats which frequent the place that only the upper parts of the bird—which was lying on its back—and the wings, were left undamaged. This bird too was a strongly-spotted young male.

The Lesser Spotted Eagle nests in northern and central Germany, Livonia, Poland, and south-eastern Europe as far south as Greece.

14.—Sea Eagle [Seeadler].

FALCO ALBICILLA, Linn.[2]

Heligolandish: Oadlear = *Eagle.*

Falco albicilla.	Naumann, i. 224, xiii. 66.
Sea Eagle.	Dresser, v. 551.
Aigle pygargue.	Temminck, *Manuel*, i. 49, iii. 26.

If an east wind sets in at the approach of winter we may with safety reckon upon seeing one or more of these birds circling round in the course of the day; and should the wind be succeeded by a lasting frost, Sea Eagles become, if not daily, yet by no means unusual occurrences; if, on the other hand, westerly winds and wet weather prevail during the winter the birds are absent. Isolated examples are also seen occasionally in October and early in the spring.

[1] *Aquila pomarina*, C. L. Brehm.

[2] *Haliaëtus albicilla* (Linn.).

It is surprising that only young or middle-aged examples, with the tails more or less darkly marked, are seen here. During the long interval of forty years or more, an actually white-tailed Eagle has only been seen twice; and it was only after waiting for almost as many years that by a most lucky accident I secured, on the 3rd of February 1875, a very old example, in full adult plumage, for my collection—the bird having been found dead on Sandy Island.

The Sea Eagle is a resident breeding bird from Greenland southwards to Scotland, and extends within the same parallels of latitude to the most eastern parts of Asia.

15.—Osprey [Flussadler].

FALCO HALIAËTOS, Linn.[1]

Heligolandish: Fesk-oadlear = *Fish Eagle.*

Falco haliaëtus. Naumann, i. 241.
Osprey. Dresser, vi. 139.
Aigle balbuzard. Temminck, *Manuel*, i. 47, iii. 25.

While the preceding is more especially a winter visitant on Heligoland, the exact opposite has to be stated in regard to the present species. In the spring it does not make its appearance until the warm days of April and May. The gay-coloured young birds appear in August and are followed by old birds during September; all prefer a light warm south-east wind for their journey.

Excepting in the North and South Polar Regions, the Osprey is distributed as a resident breeding species over all parts of the earth.

16.—Short-toed Eagle [Schlangenadler].

FALCO BRACHYDACTYLUS, Temminck.[2]

Falco brachydactylus. Naumann, i. 236.
Short-toed Eagle. Dresser, v. 563.
Jean-le-blanc. Temminck, *Manuel*, i. 46, iii. 24.

This interesting species has been shot in the island, unfortunately some years before my time—Reymers having received an example in 1835, which he stuffed and sold; its white breast was very sparingly spotted. Later, Claus Aeuckens saw a bird of this species with numerous very dark-coloured spots very close to him on the edge of the cliff, but failed to get a shot at it, inasmuch as

[1] *Pandion haliaëtus* (Linn.).

[2] *Circaetus gallicus* (Gmel.).

the bird, like all birds of prey when surprised in this manner, flew off in an almost vertical—*i.e.* downward—direction.

It is rather strange that this Eagle, which according to Rohweder (*Vögel Schleswig-Holstein's*, p. 5), is resident, though only sparingly, throughout the whole of that district, should not occasionally fly across to this neighbouring island. Evidently it is limited very strictly to a north-to-south line of migration.

This bird occurs as a breeding species in central and southern Europe, and Asia.

17.—Gos-hawk [Hühnerhabicht].

FALCO PALUMBARIUS, Linn.[1]

Heligolandish : Groot hoafk = *Great Hawk.*

Falco palumbarius.	Naumann, i. 249.
Gos-hawk.	Dresser, v. 587.
Autour.	Temminck, *Manuel*, i. 55, iii. 27

This stately bird of prey has only been seen four or five times in Heligoland during the last fifty years. Two of these examples are in my collection, one a young, the other an old bird The latter was shot on the 8th of March 1880, and is a fine female in adult plumage; the other a young autumn bird, in the too zealous pursuit of a prospective victim, got into the throstle-bush and was caught.

The Gos-hawk is distributed as a breeding species over the whole of Europe and Asia; that its visits to Heligoland are so rare, although, according to Rohweder (*l.c.*), it is abundant, and even nests pretty frequently in the neighbouring district of Schleswig-Holstein, is probably due to the complete absence of trees on this island. To the same cause its rare appearance on the island of Borkum is probably attributable. (Droste-Hülshoff, *Vogelwelt der Nordseeinsel Borkum.*)

18.—Sparrow-Hawk [Finkenhabicht].

FALCO NISUS, Linn.[2]

Heligolandish : Lülj hoafk = *Little Hawk.*

Falco nisus.	Naumann, i. 258.
Sparrow Hawk.	Dresser, v. 599.
Epervier.	Temminck, *Manuel*, i. 56, iii. 28.

The autumn migration of the smaller birds provides a well-spread table for this nimble robber, and it accordingly does not

[1] *Astur palumbarius* (Linn.). [2] *Accipiter nisus* (Linn.).

fail to make its appearance, often in great numbers, directly after its commencement.

As early as the middle of August, simultaneously with the arrival of the young Chats, the first young Sparrow-Hawks make their appearance. These young birds continue to arrive throughout the whole of September and October, the first old examples not reaching here before the beginning of the latter month; these old birds, as well as scattered young birds, may still be met with during the whole of November.

Like all diurnal birds of prey, this species performs its migration journeys during daylight, the birds arriving suddenly as though they had dropped from the clouds, and mostly in large flights, but not until late in the afternoon; they seem to have travelled a very long distance, for their crops are perfectly empty, while they must be considerably troubled by hunger, if one may judge from the eager manner in which—until, and even after, sunset—they pursue every small bird which comes within their reach.

Like most other birds, the Sparrow-Hawk flies during its migration at a very great height, at all events out of the range of vision of the human eye, which may be estimated at least at 6000 feet. On one occasion, during an October afternoon, I saw this Hawk arriving in exceptionally large numbers. The sky was covered uniformly with high and somewhat striped white clouds, or rather cirri, which form the most favourable background for perceiving an object at a very great height, when viewed vertically overhead. My attention was attracted upwards by some descending Hawks. Both I and 'Old Oelk,' who was in my company, saw at various heights above us many of these birds descending together in small circles of twos and threes. As their number kept continually increasing, we directed our attention to portions of the sky where no birds were to be seen, and observed, after a short and strained look upwards, some scarcely discernible small dark points which, after a short time, we recognised to be Hawks. According to my experience, and that of my companion, the distance at which a bird of the size of a Hawk is still visible as a distinctly perceptible point, amounts to about the length of Heligoland—*i.e.* 5700 feet; but it is impossible to say how far above this limit the height of the migratory flight of this bird may not have extended. This question of the height at which birds fly during their migration has been discussed more fully in the section on Migration generally.

Since many of the smaller birds, when pursued by the Sparrow-Hawk, take refuge in the throstle-bush, this bird is also frequently caught in the net, greatly to the joy of the Heligolanders, who

shoot it with great zeal, since, like all other raptorial birds, it forms a favourite dish here.

The nesting range of this species extends over the whole of Europe as far as Japan. In the East, however, it is said to be less numerous.

19.—Common Buzzard [Mäusebussard].

FALCO BUTEO, Linn.[1]

Heligolandish : Bott-ühl = *Short Owl.*

Falco buteo.	Naumann, i. 346.
Common Buzzard.	Dresser, v. 449.

The Common Buzzard visits Heligoland throughout the whole year, excepting in June and July, for the most part in small groups of three, four, or more examples, though sometimes during the autumn migration these numbers are increased almost up to hundreds. Should a sharp frost set in later on during the winter, solitary examples of this species are to be met with almost daily. These specially devote their attention to the countless swarms of rats which infest the base of the cliff.

The Buzzard breeds in Europe and western Asia up to about 65° N. lat.

20.—Rough-legged Buzzard [Rauhfussbussard].

FALCO LAGOPUS, Linn.[2]

Heligolandish : Rüch-futted Bott-ühl = *Rough-footed Buzzard.*

Falco lagopus.	Naumann, i. 359.
Rough-legged Buzzard.	Dresser, v. 471.
Buse pattue.	Temminck, *Manuel*, i. 65, 471.

This bird is never found in Heligoland as numerously as the preceding species, though it is common at all times and well known to every gunner. Nor is it seen only during the spring and autumn migrations, but solitary examples are also met with in the course of the winter.

I have only on two occasions met with an old male here, similar to that figured by Naumann, Plate 34, fig. 1. All the rest resembled more or less the example portrayed as fig. 2 on the same plate.

This species breeds in northern Europe and Asia, and in Scandinavia as far as the North Cape.

[1] *Buteo vulgaris*, Leach.

[2] *Archibuteo lagopus* (Gmel.).

21.—Honey Buzzard [Wespenbussard].

FALCO APIVORUS, Linn.[1]

Falco apivorus. Naumann, i. 307.
Honey Buzzard. Dresser, vi. 3.
Buse bondrée. Temminck, i. 67, iii. 38.

Remarkable as Heligolanders are for the faculty of recognising peculiarities of habits, etc., in the birds which frequent their island, this faculty seems in the present case not to have been exercised. For whereas the local shooter and observer is generally very ready as well as happy in the choice of a local name for a bird manifesting any such peculiarity, no such name seems to have as yet been applied to this particular bird. This, like the preceding species, is simply called Bott-ühl, *i.e.* Short Owl. Probably this absence of a distinctive designation is due to the fact of the bird being a bird of passage only, so that a close investigation of its manner and mode of life is rendered impossible. Moreover, its migration takes place at a time when, for the majority of Heligolanders, bird-shooting has already ceased to be a profitable pursuit—to wit, during the latter half of May, and again from the middle of August to the middle of September. Hence the bird is but rarely shot, and its characteristic feature, the feathered bridles or lora, fail to attract the notice of any but such few sportsmen as combine an interest in ornithology with their love of sport. To them the Honey Buzzard is of course well enough known.

Only once, during the first few years of my collecting, did I secure a very fine old example of this species. In this example the head was of a light bluish grey, the sides of the upper breast and longest feathers of the flanks being white, with a few kidney-shaped light brown spots. Unfortunately, owing to my knowledge being at that time still very limited, the example was ruined, and I have never since met with one which even approached it in beauty.

As already stated, the spring migration of this species takes place pretty late. Their autumn migration, on the other hand, is commenced very early, and the birds somehow always manage to avoid rough weather during its progress. In the spring one rarely sees many of the birds together, but during their autumn migration they almost always travel in smaller or larger assemblages, which sometimes, during the first weeks of September, assume considerable dimensions. Thus, on one of these days—the 19th of December 1858—small groups of from three, five, and

[1] *Pernis apivorus* (Linn.).

sometimes as many as ten individuals, passed the island in the course of the forenoon. At noon these flights succeeded each other at shorter intervals, while at the same time an increase in the number of individuals took place. From three o'clock in the afternoon, however, until about six in the evening, the migration proceeded in one incessant stream, the numbers of individuals in the successive flocks increasing up to fifty, eighty, or even larger numbers. These made their appearance on the horizon in uninterrupted succession on the east of the island, and disappeared from view in the far west.

At this time scarcely any gaps occurred between the successive flocks, the van of one band being almost contiguous with the rear of that which preceded it. The weather at the time was beautifully calm, and one might almost fancy that he heard the rustle of their wings though the mighty horde of wanderers passed on their way silently at a great height above.

The question, 'Whence comes this enormous multitude of birds of one and the same species?' is one that may well excite our wonder and astonishment. Leaving out of consideration for the moment the fact that the direction in which these birds travelled was from east to west, their number was so astonishingly large that the breeding stations of central and southern Scandinavia could not possibly have produced or accommodated so vast a throng; only the endless forests of European and Asiatic Russia could have given them birth. Even then, however, it remains as much as ever a subject for wonder how so countless a multitude of individuals, whose nests only occur scattered wherever found, could have possibly congregated for migratory purposes on one and the same day.

The breeding range of this species extends from northern Spain through Europe. In Scandinavia it stretches up to the Arctic circle, and extends within the same parallels of latitude, to all appearances, as far as eastern Asia.

The manner and means by which Buzzards, during their departing journey, frequently rise to elevations beyond human ken, is a phenomenon of the highest interest, which has been already discussed in greater detail in the section dealing with the height at which the flight of migration proceeds in different instances.

A peculiar feature of the process in regard to these birds consists in the fact that they do not, for the purpose of attaining the requisite elevation, make use of the motion of their wings or of aerial currents, but soar upwards in a calm atmosphere with their wings outspread and perfectly motionless. I had noticed this proceeding in hundreds of instances every year. My reports on the subject to fellow-ornithologists, however, invariably met—except in one in-

stance—with so much opposition, that, in order to allay all doubts on the matter, I, one calm sunny day towards the end of September, at noon, fixed my eyes on one particular individual of the large number of departing Buzzards without letting the bird pass out of my sight as long as I was able to distinguish it in the clear sky. When it had reached a height of about 400 feet it lazily flapped its wings two or three times, and then spreading them out soared upwards, without moving its wings, until it disappeared from view. This, according to a reliable estimation, must have occurred at a height of from 12,000 to 15,000 feet. I base my estimate of this height on the migratory flights of the Hooded Crows which pass every autumn across Heligoland or along its shores. Among the flocks of these birds as they fly round the extreme southern point of Sandy Island—a distance of about 8000 feet—a keen eye can still distinguish every individual bird. Hence the height of the above-mentioned Buzzard, seen from below in the whole expanse of its wings, has certainly not been exaggerated. These Buzzards are frequently accompanied by the Common Kestrel, as was also the case in the present instance. The Kestrel, however, rises upward in a manner quite different from that of the Buzzard, for it careers in circles round the latter, its flight in this way assuming a spiral course. It is indeed a very pleasing sight to behold this small Falcon, with oft-repeated hasty strokes of the wings, following in faithful attendance the large Buzzard as the latter soars calmly upwards to the heights above.

Evidently the Kestrel is not equipped for a soaring flight like the Buzzard, for, in order to perform its spiral upward revolutions, it is obliged from time to time to execute ten or twelve rapid and powerful strokes of its wings, which enable it, in virtue of the speed thus acquired, to describe a half or complete circle on calmly expanded pinions. The only investigator who, as the result of his own multiplied observations, confirmed my reports as given above, was Dr. A. Walter, an observer whose early death is a deplorable loss to science. I happened, during a discussion I had with him on the different phases of migration, to make mention of this particular subject, when he at once interrupted me, confirming my statement, and further mentioned his own observations as to the part of companion-migrant played by the Kestrel, though I had not yet alluded to that circumstance. In his own home—Livonia—he had often, during the shooting season, observed with great delight the peculiar social journey of these two feathered plunderers.

How the Buzzard is able, in an atmosphere so much lighter specifically than its own body, to soar upwards like a balloon, without the mechanical aid of its wings, and without being renderec

capable of such a movement by a strong air-current, is still a physical puzzle. That, however, such is actually the case is supported by countless observations. The subject has been entered into more fully in the before-mentioned chapter of the part of this book which deals with Migration in general.

22.—Common Kite [Rother Milan].

FALCO MILVUS, Linn.[1]

Heligolandish : Bott-ühl med üttklept stert = *Buzzard with forked tail.*

Falco milvus. Naumann, i. 333.
Common Kite. Dresser, v. 643.
Milan Royal. Temminck, *Manuel*, i. 59, iii. 30.

This bird too, though quite common on the neighbouring mainland, counts here among the rarer occurrences; it is scarcely seen once or twice in the course of a year, and only three examples have been shot during the last fifty years. That in my collection was obtained on the 29th of November 1874, when wintry weather had already set in; another was shot in June, after it had been for some days feasting on the little Guillemot-chicks on the rock. The third example was shot many years ago in April or May. The few other examples which have been observed occurred in April and May.

The Common Kite breeds in more or less considerable numbers from the Canaries to the Ural, nesting in Scandinavia up to 60° N. latitude.

Contrary to the movements of the Honey Buzzard, whose autumn migration takes place in a decidedly westerly direction, that of the Common Kite seems to be equally fixed on a southerly line of passage; for if there existed the least inclination westwards, the bird would certainly reach here very often from the neighbouring Schleswig-Holstein, where it is a common breeding bird, and from southern Sweden, where it nests in considerable numbers.

23.—Black Kite [Schwarzer Milan].

FALCO ATER, Linn.[2]

Falco ater. Naumann, i. 340.
Black Kite. Dresser, v. 651.
Milan noir. Temminck, *Manuel*, i. 60, iii. 30.

I received a bird belonging to this species during the first years I was collecting, but as it was a poor example I gave it away

[1] *Milvus ictinus*, Savigny. [2] *Milvus migrans* (Bodd.).

again, thinking at the time it would be easy to obtain a better; but although this bird, unfailingly recognisable during flight by the peculiar form of its tail, has been seen a few times since, all attempts to kill another example have hitherto failed.

The nesting range of this bird extends from north-west Africa, through south and central Europe as far as the Lena. It has not yet been observed in Norway and Sweden, but has been met with in Russia as far north as Archangel. Rohweder notes it as of very rare occurrence in the south and south-east of Holstein, and in England it has only been shot once.

24.—Marsh Harrier [Rohrweihe].

FALCO RUFUS, Linn.[1]

Heligolandish : Lung-beaned hôafk = *Long-legged Hawk.*

Falco rufus.	Naumann, i. 378.
Marsh Harrier.	Dresser, v. 415.
Busard harpaye.	Temminck, *Manuel*, i. 69, iii. 39.

This species, also, belongs to those occurring very rarely in Heligoland; though there seems to be no particular reason for this, as it occurs as a common breeding bird in the reed-marshes of Holstein on the west. I have only once received an old male, thirty-nine years ago. Later, three young summer birds were shot here. The latter made their appearance at the end of August, the old male bird on the 6th of October 1848.

This Harrier is a resident breeding bird from western Europe to central Asia. On the north it extends only a short distance beyond the Baltic. In Norway only isolated examples have been met with, but in southern Sweden scattered individuals have been found nesting.

25.—Hen Harrier [Kornweihe].

FALCO CYANEUS, Linn.[2]

Heligolandish : Blü hôafk = *Blue Hawk.*

Falco pygargus.	Naumann, i. 391, xiii. 151 ; also Blasius, *Nachträge*, 29.
Hen Harrier.	Dresser, v. 431.
Busard St. Martin.	Temminck, *Manuel*, i. 72, iii. 41.

During all the time I have been collecting, only three old males of this species have been shot, also an old female, and two or

[1] *Circus æruginosus* (Linn.).

[2] *Circus cyaneus*, (Linn.).

three young autumn birds. Of these, the latter were shot in late autumn, but the two old males, strange to say, in the winter, during snowstorms and frosts.

This bird occurs as a breeding species throughout the whole of central and northern Europe and Asia, even beyond the Arctic circle. Wolley found a nest in Lapland as far north as 68° N. latitude.

The very scanty appearance of this bird in Heligoland seems also to point to a very narrowly confined southern line of their autumn migration; for the least westerly deviation from such a line on the part of the birds nesting in upper Norway, both as regards the old birds and their young, would not fail to carry them frequently across to Heligoland.

26.—Pallid Harrier [STEPPENWEIHE].

FALCO PALLIDUS, Sykes.[1]

Falco pallidus. Naumann, xiii. 154; *ibid.* Blasius, *Nachträge*, 31.
Pallid Harrier. Dresser, v. 441.
Busard blafard. Temminck, *Manuel*, iv. 594.

My collection contains only one young autumn bird of this species. It was shot on the 12th of August 1858 from among a flock of seven individuals, though it was impossible to determine whether all of these were young birds of this particular species. The lower parts of this bird are of a uniform ferruginous colour (*rostroth*), without spots, or any dark stripes on the shafts of the feathers. In the fresh plumage this colour was suffused with a beautiful coppery red. The outer great covert-feathers of the carpal joint nearly project above the notch on the inner web of the first flight-feather. This is the only authenticated instance of the occurrence of this species in Heligoland. I am, however, very much of the opinion that a bird shot here many years ago was really an old male of this species. At the time I considered it to be a young male Marsh Harrier in poor condition, and did not trouble to secure it.

The Pallid Harrier is a resident breeding bird in central and southern Europe and Asia; but it seems to occur much more numerously in eastern Europe than in the west of that continent.

[1] *Circus swainsoni*, Smith.

27.—Montagu's Harrier [Wiesenweihe].

FALCO CINERACEUS, Montagu.[1]

Falco cinereaceus. Naumann, i. 402, xiii. 165; *ibid.* Blasius, *Nachträge*, 33.
Montagu's Harrier. Dresser, v. 423.
Busard Montagu. Temminck, *Manuel*, i. 76, iii. 42.

This Harrier is also of very rare occurrence. Reymers only once possessed an old bird. Claus Aeuckens saw one on the 5th of November 1852, and afterwards two very pretty young summer birds were shot, both of which are in my collection. The extremely isolated occurrence of this species is equally surprising, since it breeds, if not abundantly, in Holstein and on the Lower Weser. The reason of its rarity in Heligoland is no doubt only to be explained as the result of an autumn migration on a rigidly confined southerly line of flight.

Heligoland is indeed a by no means inviting locality for birds of the habits and mode of life of the Harriers. Hence it is interesting to see how on this island each of these species manages to find out the spots most suitable to its character. Thus the Marsh Harrier was shot in the long sand lyme-grass (*Elymus arenarius*, Linn.), which grows so abundantly on Sandy Island; while all the smaller species resort to the sole, insignificant piece of fresh water on the island. This consists of a natural depression, which stretches across the plain of the plateau. At the lower part of this depression the thin layer of soil which overlies the rock was removed and heaped up into a dam, a primitive kind of reservoir for rain-water being thus constituted, which at times contains several feet of water, and is about fifty paces in diameter. Almost every Harrier, without exception, passes over this depression, and if one happens to be seen, Aeuckens forthwith makes his appearance on the spot, and usually returns successful from his expedition. Montagu's Harrier breeds in temperate and southern Europe and Asia, but only rarely passes across the Baltic, and in southern Sweden has been seen only once or twice. Irby found it nesting abundantly in Morocco, and it seems to breed also most abundantly in the low-lying districts of Spain.

Genus Strix—The Owl.—Of the hundred and ninety species of Nocturnal Birds of Prey which—according to Sharpe's statement (Catalogue of Birds of British Museum)—are distributed over the

[1] *Circus cinereaceus* (Mont.).

whole earth, Europe possesses only the small number of fifteen, nine of which are represented in Heligoland; with the exception, however, of the Short- and Long-eared Owl, none of them have been met with on more than one or two occasions.

28.—Tawny Owl [Waldkauz].

STRIX ALUCO, Linn.[1]

Strix aluco. Naumann, i. 473.
Tawny Owl. Dresser, v. 271.
Chouette houlette. Temminck, *Manuel*, i. 89, iii. 48.

The (German) name of this species (= Wood-Owl) is sufficient to show that a place bare of trees like Heligoland is not a suitable place of residence for it: this has indeed proved to be the fact, for the bird has only been seen and shot here once. The example was in Reymers' possession, and being one of his earliest attempts in taxidermy, left much to be desired; when I received it, it was already far gone, and finally went to ruin altogether. Such, indeed, during my earlier years, from want of experience, happened to me in regard to many a bird, which I had thought I might easily replace by a better example, but which I never succeeded in obtaining again.

This Owl nests more or less numerously throughout the whole of Europe, and even across the Ural into western Asia, though only scattered individuals are met with on this island.

29.—Barn Owl [Schleierkauz].

STRIX FLAMMEA, Linn.

Heligolandish: Schleier-ühl = *Veiled Owl.*

Strix flammea. Naumann, i. 485.
Barn Owl. Dresser, v. 237.
Chouette effraie. Temminck, *Manuel*, i. 91, iii. 48.

In general, only very isolated examples of this pretty Owl visit Heligoland; in fact, one can hardly count on obtaining more than one specimen in the course of each year. October 1876 formed a remarkable exception, ten or eleven birds having been seen and, for the most part, shot. During September and October of that year a very strong migration of Eastern species, such as *Sylvia superciliosa*, *Anthus richardi*, and others, took place; Common Jays also occurring in immense quantities, which is only the case when a very strong migratory movement from the direction of eastern Asia takes place.

[1] *Syrnium aluco* (Linn.).

It would appear, accordingly, that in this instance the birds, the normal migration of which is undoubtedly directed south, were influenced by the prevailing conditions of the weather, or carried along with the general stream of migrants, so that in this particular year they, in part at least, migrated to the west, such a deviation from the normal line of migration-flight occurring frequently in the case of many other Eastern species. Moreover, the general geographical distribution of this Owl will account for its rare occurrence in Heligoland: the species, in fact, scarcely extends beyond the Baltic, and only isolated examples reach the south of Sweden.

The Barn Owl inhabits all temperate and hot regions of the earth. Attempts have been made to separate this species into about a dozen different species, according to its lighter or darker coloration, or the somewhat slight deviations which individual birds present from the other members of the group; but Sharpe—who at the British Museum has at his disposal for examination and comparison the largest possible amount of material—is of opinion that such a separation does not appear justified, and has kept all the varieties and colour-stages under the old Linnean name, *Strix flammea*. (See Catalogue of Birds of the British Museum, ii. p. 291.) In this view he has also been joined by Dresser.

With the exception of one example in my collection, all the other specimens of this Owl which have been met with on the island had their upper and lower parts of a dull rust colour; the grey markings of the upper parts were of a very dark colour, and the small spots of the lower parts were very abundant and well defined. The exceptional specimen, however, above referred to, has the feathers of the head, back, wings, and tail of a beautiful light and pure rusty yellow (*rostgelb*). The characteristic grey markings are very light and thinly laid on, while the under side of the bird is of quite light whity rust-yellow (*weisslich rostgelb*), with only a few scattered, scarcely perceptible dark spots at the sides of the breast. The facial disk is quite white. I regard this clean and handsomely coloured specimen as a very old bird, the other individuals, generally of a more sombre-coloured plumage, as young autumn birds.

30.—Little Owl [Steinkauz].

STRIX NOCTUA, Retz.

Strix noctua. Naumann, i. 493.
Little Owl. Dresser, v. 357.
Chouette chevêche. Temminck, *Manuel*, i. 94, iii. 49.

I may repeat in regard to this species, what I have already stated concerning the Tawny Owl: I received a very much decayed

example many years ago from Reymers which he had shot a long time before. Since that time, no bird of this species has been seen on the island.

This small Owl is a resident breeding bird in the temperate parts and the extreme south of Europe, in which latter region it is particularly abundant; it appears only once to have reached the south of Sweden, but, according to Dresser, nests fairly abundantly in Jutland. Moreover, from the fact that the bird has been seen in England only a few times, one might conclude that it was afraid of crossing the sea. Its autumn migration, too, like that of others of its congeners, must take place in a southerly direction, as, if it deviated in any way to the west, it could not fail frequently to reach Heligoland from Jutland.

31.—Tengmalm's Owl [Tengmalms Kauz].

STRIX TENGMALMI, Gmelin.[1]

Heligolandish: Käuken-ühl = *Scops Owl.*

Strix Tengmalmi.	Naumann, i. 500.
Tengmalm's Owl.	Dresser, v. 319.
Chouette Tengmalm.	Temminck, *Manuel*, i. 94, iii. 49.

During all the time I have been collecting, this small and pretty Owl with its soft, silky plumage has been seen here at least thirty times, and has been shot also in most of these instances. It has undoubtedly occurred, however, here on many other occasions, but owing to its shy and retired nature, has failed to come under observation. In most cases, the birds seen in October were solitary specimens, though there are repeated instances of two, three, or even five birds having occurred in one day. Thus, on the 15th of October 1859, two of these birds were shot, and several others observed; in fact, towards the evening of the same day, they became so numerous that the elder Aeuckens put up his snipe-net in the hope of catching Owls in it. He was, however, disappointed; for these birds fly very cautiously, and can see very keenly in the dark, so that they probably always managed to discover the net in good time, and thus avoided being captured.

An extraordinarily strong migration of eastern species, especially of *Anthus richardi*, took place on the above-named day: it had begun, in fact, in the middle of September—hundreds of Common Jays, too, were migrating daily, a phenomenon which, as I have had occasion to mention before, only takes place in autumn, and under such conditions of weather as influence a strong inrush from the

[1] *Nyctala tengmalmi* (Gmel.).

far south, because otherwise the Common Jay is never seen here, not even in solitary instances. On the 5th of November 1864, two of these Owls were shot; two others were killed on the 24th of September 1881, whilst three or four individuals were seen on the same day. Isolated specimens have been seen in the interval between these dates, and the last example recorded was observed in my garden on the 7th of October 1884.

I have, on two occasions, kept this interesting little bird alive for several months, after which I sent the specimens to the Zoological Gardens in London, but unfortunately with but poor success, the first example having died soon after its arrival in the Gardens, while the second is said to have flown away during the sea voyage on board the steamer, although it was confined in a strong wooden box, with wooden bars nailed tightly and closely to one another in front.

During their confinement, these Owls readily accepted dead birds, but refused the carcases of such as had been skinned; if, however, before presenting the skinned birds I first turned them over among loose feathers, I managed to induce the Owls to partake of them.

This species is a breeding bird in all the northern countries of Europe, Asia, and America, as far as 68° N. latitude. In England, according to Harting's statements, it has occurred twenty times up to the year 1872; this fact, combined with the extremely rare appearance of related species of the same genus, proves that the autumn migration of this species is not so rigidly confined to a southerly line as that of the former, but may, under favourable conditions, tend to deviate considerably to the west.

32.—Long-eared Owl [Wald-Ohreule].

STRIX OTUS, Linn.[1]

Heligolandish: Hurn ühl = *Horn Owl.*

Strix otus.	Naumann, i. 451.
Long-eared Owl.	Dresser, v. 251.
Hibou moyen-duc.	Temminck, *Manuel*, i. 102, iii. 54.

Although Heligoland has nothing to offer which might invite an inhabitant of the woods like this Owl to visit it, the bird is, nevertheless, well known to every gunner on the island. Under the most favourable conditions, however, scarcely more than three, or at most four, are likely to be met with in one day; nevertheless, scattered as they occur, they are to be seen through the whole of late autumn up to the beginning of winter; and again, though

[1] *Asio otus* (Linn.).

in somewhat smaller numbers, during the early period of the spring migration when the weather is still inclement.

That this bird is a frequenter of woods is very soon noticeable in the examples which are met with here, for they resort exclusively to the few bushes and shrubs found in the gardens between the houses. Thus, they seem to have a special preference for a strong and close thorn bush in my garden, which is from fifteen to eighteen feet high, and in which they sit the whole day motionless in the darkest possible corner, flying off at once when disturbed into the nearest thick shrub. Accordingly, it is often their fate to be caught in the throstle-bush.

The Long-eared Owl occurs as a breeding species from western Europe to eastern Asia, but only isolated instances are known beyond 60° N. latitude.

33.—Short-eared Owl [Sumpf-Ohreule].

STRIX BRACHYOTUS, Forster.[1]

Heligolandish: Ühl = *Owl.*

Strix brachyotus. Naumann, i. 459.
Short-eared Owl. Dresser, v. 257.
Hibou brachyote. Temminck, *Manuel*, i. 99, iii. 51.

This is by far the most numerously-represented species of all the Owls occurring in Heligoland. It is a quite common daily occurrence during the spring migration right into May, and is also very common in autumn throughout September and October. Although the bird shows no particular inclination for society, it is by no means unusual to rouse, early in the morning, a company of twenty or more from a field, forty by fifteen paces in extent, which may happen to be lying fallow and to be covered with a dense growth of wild mustard.

Besides frequenting ploughed fields and the sand oats[2] of the Dune, these Owls also show a preference for small corners or projections of the cliff, where, if left undisturbed, they will stay the whole day. I remember, very late one beautifully calm May afternoon—on which I had made a good bag at the bottom of the West Cliff—shooting with my rifle six of these birds who were sitting out of range of small shot on the face of the cliff, at a height of from one hundred and sixty to one hundred and eighty feet. Countless Goatsuckers were likewise dozing on this bright warm day among the stones and shingle of the foreshore on that part of the island.

[1] *Elymus arenarius.* v. former note under No. 27. [2] *Asio accipitrinus* (Pall.).

The Heligolanders pursue this bird very zealously, and assert that, roasted, they furnish the finest dish a man could wish for. The birds are, as a rule, pretty fat, and their white flesh certainly looks very tender and appetising. Naumann mentions the Marmot as the largest quadruped which forms the food of this species; it will therefore be of interest to report that, under certain circumstances, this Owl will also attack wild rabbits. Early one autumn morning, at the time of the Snipe migration, Old Oelk and myself were not a little surprised to find, lying close together on the smooth sand of a sandhill, the bloody remains of three freshly-killed wild rabbits. In the immediate neighbourhood we shot afterwards five Short-eared Owls, the contents of whose fully-distended crops, on examination, proved them to be members of the band of robbers to whom the poor rabbits had fallen a prey. This belief was further confirmed by the footprints of the Owls which covered the smooth sandy surface on which the remains of the rabbits were discovered. All the flesh had been peeled off from the skins of the rabbits; these lay spread out with the hairy surface underneath, and there remained adhering to them nothing but the skull, the backbone, and the larger bones, all with the flesh completely and cleanly eaten off. These remnants and the blood-marks were too fresh to have been left from the previous day; nor could we suspect any other bird of prey to have perpetrated the deed, for when we came to the spot it wanted at least still another hour to sunset.

During dark autumn nights, when a strong migration is in progress, and Larks, Thrushes, and other species swarm round the lighthouse in great numbers, this Owl may very often be seen darting up suddenly from the surrounding darkness into the glaring light of the lantern, and with dexterous beatings of the wings disappearing again with equal rapidity. Immediately afterwards, the plaintive cry of a Thrush announces with what certainty this robber plies his trade in the course of his nocturnal flight.

In connection with this bird I should like here to record a funny little story. Of the many descendants of Nimrod who visit this island every season, one has for several years been in the habit of regularly going round the cliff in a boat for purposes of slaughter. One day, while thus engaged, a Sparrow-hawk happened to fly past the face of the cliff. Our sportsman promptly fired; but, what did not greatly surprise the attendant boatmen, failed to hit his bird. Great, however, was everybody's astonishment to see an Owl, which had been sitting on the cliff unobserved, drop down suddenly, dead as a door-nail.

The Short-eared Owl breeds in central and northern Europe,

and in Scandinavia up to 70° N. latitude. Its breeding range extends within the same parallels of latitude through the whole of Asia; and, again, from Alaska through the whole of North America as far as Greenland. But the bird is also found as a breeding species in South America, in Chili, La Plata, Patagonia, and on the Falkland Islands.

34.—Scops Owl [Zwergohreule].

STRIX SCOPS, Linn.[1]

Heligolandish: Lütj Käuken-ühl = *Little Scops Owl.*

Strix Scops.	Naumann, i. 466.
Scops Owl.	Dresser, v. 329.
Hibou Scops.	Temminck, *Manuel*, i. 103, iii. 54.

Only once—on the 16th of May 1862—have I succeeded in obtaining this small, pretty miniature Owl on the island; nor do I think that either before or since has another example been met with. At all events, no second bird of this species has been either caught or shot here. In fact, we can hardly expect to meet with this small bird frequently on the island, considering that it breeds in southern Europe, Asia Minor, Palestine, Persia, and Turkestan. In the north, its breeding range only very rarely advances beyond southern Germany and central Russia.

35.—Snowy Owl [Schneeeule].

STRIX NYCTEA, Linn.[2]

Heligolandish: Snee-ühl = *Snow Owl.*

Strix nyctea.	Naumann, i. 417.
Snowy Owl.	Dresser, v. 287.
Chouette harfang.	Temminck, *Manuel*, i. 82, iii. 45.

This magnificent Owl has been shot here only once, viz.:—in the autumn of 1839 or '40. The bird was sitting flat on a plot of ploughed land, so that the sportsman, who was looking for Snipe, took it for a white cat and paid no further attention to it. One may imagine his astonishment on seeing the supposed mouser spreading his wings and flying off in the shape of a splendid large white bird. Fortunately, it did not fly very far, for, it having again alighted, he was able to shoot it. It was a beautiful example, with but few spots. In the following summer it was sold to a visitor, and its subsequent destination is unknown to me. In

[1] *Scops giu* (Scop.).

[2] *Nyctea scandiaca* (Linn.).

Reymers' time, one of these Owls was found sitting on the rock during a severe winter; it was not, however, shot. About thirty years ago, an inhabitant, who was no sportsman, informed me that he had seen a large white Gull *without a head* flying about on Sandy Island. Undoubtedly this was a Snowy Owl. This is all that can be recorded of this imposing bird, so far as this island is concerned. This poverty of records, however, is strange in regard to a species which, in northern Scandinavia, belongs to the common breeding species, and occurs pretty frequently in England, and annually in Scotland. Moreover, it is a plentiful winter visitant in the Baltic Provinces, sixty individuals having actually in one —of course exceptional—case, been shot during the winter months of 1858–59 in the neighbourhood of Königsberg.

The breeding range of the Snowy Owl extends over all Arctic districts of the Northern Hemisphere. Feilden met with it in Grinnell Land in as high a latitude as 82° 40′ N. latitude, and found their nests in 82° 33′. He states that they nest very numerously at Discovery Bay, latitude 81° 44′ N.

36.—Hawk Owl [Habicht Eule].

STRIX NISORIA, Wolf.[1]

Strix nisoria.	Naumann, i. 427.
Hawk Owl.	Dresser, v. 301.
Chouette caparacoch.	Temminck, *Manuel*, i. 86, iii. 47.

As regards the last species here recorded, I have in conclusion to state that it, like several of its relatives, has only been shot here once. This example was stuffed in the thirties by 'old Koopmann,' the first taxidermist on Heligoland, who sold it and sent it to Hamburg. Since that time the Owl has been seen here twice, but has never again been shot.

The species breeds from Norway to Kamtschatka, and if, as Alfred Newton thinks, the Hawk Owls inhabiting America are not specifically distinct from those of the Old World, it nests in that part of the world also from Alaska to Newfoundland.

Dresser, however, separates them as two independent species—the European (*Surnia ulula*), and the American (*S. funerea*).

[1] *Surnia ulula* (Linn.).

SONG-BIRDS

OSCINES.

Raven—Corvus.—The great family of the Corvidæ, embracing about two hundred species (Seebohm), most of which contain large numbers of individuals, is distributed almost over the whole earth. Of the thirteen species resident in Europe, eleven have, up to the present, visited Heligoland.

37.—Common Raven [Kolkrabe].

CORVUS CORAX, Linn.

Heligolandish: Groot Roab = *Great Raven.*

Corvus corax.	Naumann, ii. 43.
Common Raven.	Dresser, iv. 567.
Corbeau noir.	Temminck, *Manuel*, i. 107, iii. 55.

Only one example of this species has been killed here, having been shot by me on Sandy Island, late in the autumn of 1841. A boat, laden with provisions, belonging to a resident of Heligoland, had happened at this time to run aground on the sandbank of the Dune, and its cargo, among which were a number of quarters of beef and some carcases of sheep, was scattered about on the reef. Now it is quite possible that the Raven passes over the island frequently, but at such a height as to be beyond the range of observation, and that this particular individual, having managed by means of one or other of its highly-developed senses to discover the rich meal spread out beneath it, descended in this instance to its own destruction. Or the bird may have been led hither by mere accident. In any case, it is one of those species which have been observed here in only very rare instances. Since the date mentioned, only two other examples have been observed. One of these was shot at by Aeuckens; unfortunately, however, he succeeded no further than in wounding the bird, which fell into the sea, too far off the shore to be recovered.

The example shot by me is contained in the University Museum of Lund. As I was not collecting at the time, I gave the bird to Old Oelk. He stuffed it and sold it to a certain Herr von Gyllenkrog, from Sweden, by whose will it was transferred, with the rest of his collection, to the above-named museum.

This bird is distributed as a scattered breeding species over Europe, Asia, and North America. The range of its breeding zone is most remarkable and without a parallel, stretching from southern Spain and Portugal to very near the North Pole. According to Captain Feilden's report, a pair was found nesting on the rocks of Cape Lupton, as far north as lat. 81° 44′, during the *Alert* and *Discovery* Expedition under Sir G. Nares, 1875 to 1876.

38.—Carrion Crow [Raben-Krähe].

CORVUS CORONE, Linn.

Heligolandish: Swart Kreih = *Black Crow.*

Corvus corone. Naumann, ii. 54.
Carrion Crow. Dresser, iv. 531.
Corneille noire. Temminck, *Manuel*, i. 108, iii. 558.

Among the countless flocks of Hooded Crows which pass across Heligoland during the two migration periods, an individual of the present species is of rare occurrence, and it is so exceptional to shoot one, that for a number of years now I have been endeavouring to obtain a good old example for my collection.

At various times the view has been expressed, that birds resembling each other in form, and only presenting differences in their general coloration or the colour of single separate parts of the body, are not to be regarded as separate and independent species, as in the case, for instance, of the Black and Hooded Crows, the Black and Grey-backed Wagtails, many Pipits, and even Plovers. In support of this view, the well-known fact of general pairing taking place between these Crows, with the production of fertile hybrid offspring, has been brought forward.

The very circumstance, however, that despite pairing having taken place for several thousands of years, the two colours of the respective species have remained pure and distinct, forms the most striking proof of the specific independence of the two; for, if they had not existed originally as two fixed primary forms, to which the mongrel offspring reverted, though this may have occurred only after several generations, we should at present know neither the one species nor the other in its pure simple coloration, but should

meet only with unlimited gradational stages of mixtures of grey and black forms.

Such an instance is in fact supplied by the Ruff (*Tringa pugnax*). The individuals of this species present in their plumage so endless a change of combinations of rust-red and black and white, that it is literally impossible, among hundreds of these birds, to find two exactly like each other, while what would appear to be primary forms of the rust-red, white and black individuals, are among the greatest rarities.

I assume the primary form of *Tringa pugnax* to have been of rust-red colour; that, as is the case with most birds, more or less white-coloured individuals were frequently produced—as, for instance, males with a white ruff—and that a black variety was evolved by the pairing of a rust-red bird with a white one. In this view I am supported by my own experience when I was breeding Cochin-China fowls. I possessed a number of beautiful fowls of this variety in their original buff (*rostgelb*) colour, and by accident obtained a hen quite normal in form but of a pure white. By crossing this hen with a buff (*rostgelb*) cock, I obtained, greatly to my surprise, a greater or less number of black descendants. Many of the young birds were almost quite black; in others the buff (*rostgelb*) feathers were only tipped with black; in the case of the cocks, the black colour had a very intense steel-blue gloss. I repeated these experiments for about four or five years, always with the same result; after which I got rid of the white fowl, as I prefer to keep only one species, and to maintain that as pure as possible.

The Carrion Crow as a breeding bird is somewhat unequally distributed from the extreme west of Europe to the extreme east of Asia: however, it does not extend so far north as its grey relative; thus it is not met with in Scandinavia. According to Seebohm it occurs most numerously in eastern Asia, from the Jenesei to Japan.

39.—Hooded Crow [Graue Krähe].

CORVUS CORNIX, Linn.

Heligolandish: Kreih = *Crow.*

Corvus cornix.	Naumann, ii. p. 65.
Hooded Crow.	Dresser, iv.
Corneille mantelée.	Temminck, *Manuel*, i. p. 109, iii. p. 59.

As has already been indicated in the case of the preceding species, the Hooded Crow is seen here in great numbers during the two migratory periods of the year; and more especially during the

autumn months passes by and across the island in truly astonishing quantities. In the autumn, and with favourable weather, the migration commences at about eight o'clock in the morning, with flocks of from fifty to one hundred individuals; the movement soon passes into a stream of flocks, consisting of from a hundred to at least five hundred examples, and continues in this manner, without gaps of any kind, until two o'clock in the afternoon. We can scarcely, in a case of this kind, assume that we are dealing with a stream or route of migration which just chances to cross Heligoland, for the movement proceeds in equal magnitude from east to west as far as the eye can reach. More than this, on days when powerful migrations of this kind take place, the migration-front or column has been seen from boats eight miles north of the island to stretch farther to the north, as far as the limits of vision extend; while on the south it reached, simultaneously and in equal magnitude, up the Weser, at least as far as Bremerhaven, as was determined from the steamer which regularly plies between this island and the latter place. We thus get a migration-column of at least thirty-six geographical miles in breadth.

What has just been stated is not only of the highest interest on its own account, but exposes in a very clear light the theory of migration by coast-routes, which has obtained so much favour among ornithologists. Any supporter of this theory, if stationed on any one of the East Frisian Islands from Wangeroog to Borkum, on a day like that described above, would regard and report all he was able to see from the shores of these islands as a most striking proof of his hypothesis, not suspecting in the least that the migration-column extended really from thirty-two to forty miles from the shore farther towards the north.

The autumn migration of this Crow commences at the end of September, and lasts until the close of November; but scattered flocks are by no means rare, even in the middle of December. This bird is not so fastidious in the choice of weather for its journey as are many other species,—which, during some migration periods, are hardly ever seen—but is invariably present in large numbers, often in astonishing quantities; such, for instance, according to my diary, was the case in 1884. The first flocks were seen on the 2nd of October; from that date very large numbers passed almost daily; 'thousands' on the 14th; 'enormously large numbers' on the 21st; on the 24th, 'enormously large numbers of *C. cornix*, *monedula*, *frugilegus*, during a light south-east wind, and clear, beautiful weather, *cornix* and *monedula* travelling in mixed uninterrupted flights, lasting from ten to twelve minutes, and again in similar flights after a short interval the speed of their

flight being one hundred and eight geographical miles per hour—the flights being thus from sixteen to twenty geographical miles in length, and their breadth equal the distance from north and south to which either the naked eye or the telescope was able to reach.' It is impossible to make even an approximate estimate of the numbers of individuals making up a migration of this kind, even if one assumed that the migration-column, like that observed above, did not exceed thirty-six or forty miles. At the same time an extraordinary strong migration was observed taking place over the North Sea, on the eastern coast of England and Scotland up to the Orkney and Shetland Islands: how far this migration may have extended to the south I have been unable to ascertain.

An exceptional circumstance, moreover, connected with the above-named autumn migration, was that the hosts of migrants continued to pass the island even late into the afternoon, and a similar phenomenon was observed on the British coast; the 'Report on the Migration of Birds for 1884,' says: 'the rush appears to have been continuous night and day.'

The same observation was made here and on the estuary of the Humber, exactly opposite this island, on the 1st, 2nd, and 3rd of November of the same year. In other instances, as already stated, the autumn migration always comes to an end at two o'clock in the afternoon, and flocks of hundreds or more arriving after this hour are a rare occurrence. Such late passengers usually fly round the island until evening, when they land and pass the night on any suitable spots. A flock of such birds was once met with by a resident on the plain of the upper plateau during the night. He killed one hundred and eighty-four of them—a welcome windfall for his larder, for the bird forms a favourite dish here.

In contrast with the autumn migration, the spring passage of the Hooded Crow presents us with one of those wonderful phenomena in which the migration of birds so richly abounds. We have just cited an instance in which these birds evidently passed across the North Sea in the dark; such occurrences are, however,—in my experience at least—decidedly rare. In the darkness of night the Hooded Crow is a completely helpless creature; and, accordingly, on the short days of autumn it departs here in the afternoon, and continues its journey as long as there is enough daylight for it to reach the coast of England. For this passage it requires about three hours. In the spring, on the other hand, on their return from England, the flocks not only continue to arrive after sunset, but pursue their journey without stopping, as though all knew exactly that a flight of another quarter or half-hour would convey them to a safe resting-place close by in Schleswig-Holstein; never-

theless it is hard to believe that this bird possesses so accurate a memory of the stretches of land and water traversed in the preceding autumn as would be necessary to enable it to again map out correctly the various stretches of road to be covered each day in the opposite direction, and under totally different conditions.

The statement made above, as to three hours being the time required by this Crow to fly across the North Sea from this island to the English coast, is based on observation; the earliest migrant columns, which left here at eight in the morning, having arrived on the opposite coast at eleven, while the last companies, departing here at two o'clock in the afternoon, arrived at five P.M. The distance is about three hundred and twenty geographical miles, giving a speed of flight of one hundred and eight geographical miles per hour.

These Crows when migrating fly generally at a very inconsiderable height; this is especially the case in autumn when the air is thick, and when they fly across the sea at a height of not greater than ten to fifteen feet from the surface. In the spring, on the other hand, they fly across the island generally at a height of from eighty to one hundred feet; this, during fine and calm weather, being sometimes increased to ten thousand feet or more. They are then only distinguishable with great effort, appearing no larger than very fine dust specks, our attention being attracted by their call-notes, more particularly those of the Jackdaws and Rooks. Frequently the voices of the Jackdaws, faint and yet distinct, reach us from a height so great that the eye is no longer able to discern the birds. I have observed that migrations, proceeding at such enormous elevations, invariably take place only on calm, sunny spring days, when the sky is almost uniformly covered by a bright, clear, immeasurably high stratum of cirrus clouds. At such times in those elevated regions, and at heights, perhaps, greater still, a powerful migration must be in progress; for not only is it possible to discover the above-named species, but one is almost invariably able to hear in addition, from the far-off heights above, the faint, but still clearly distinguishable cries of the Whimbrel, the Bar-tailed Godwit, and other species; frequently, also, these birds may still be discerned by the eye as mere cloudlets of fine dust; often again, their far-off, but still faintly audible, cries alone betray their presence.

The Hooded Crow migrates by preference in fair weather, light south-east winds, and a clear atmosphere; during the autumn months, however, the wind out at sea freshens up very often almost to violence, while it is quite normal on the coast; hence the Crows not infrequently are driven into a south-easterly air-current, which

is too strong for the east-to-west movement of their migration-flight, and, coming obliquely from behind, greatly impedes their progress. This inconvenience they endeavour to meet by setting their head and body towards the south, so that the wind meets them obliquely from in front on the left side: the astonishing part of this manœuvre, however, is that they do not now move straight south, as one might naturally expect, but continue to move steadily, and with undiminished speed, on their westerly course. This happens mostly at a height of from one hundred and fifty to two hundred feet above the island. It is a peculiar phenomenon that on autumn days, on which strong migrations of Hooded Crows take place, only isolated examples of Woodcocks are met with, or they are altogether absent, although, according to the opinion of the oldest and most experienced gunners and fowlers, wind and weather are in every way equally favourable to both species. Inasmuch as the Woodcocks make their appearance quite early at dawn, while the first flights of the Crows do not arrive until eight o'clock, we can hardly conclude that the former birds entertain any objection to the latter, but we ought rather to assume that meteorological conditions of a nature too delicate to be recognised by human capacity restrain the Woodcocks from migrating on days like these, or, what is probably more correct, cause them to travel at such heights as are beyond the bounds of our perception. Golden-crested Wrens, on the other hand, invariably migrate in company with the Crows, and mostly in very large numbers; and the native sportsman, who happens to bring home with him one of these tiny guests, will probably tell his little boy that the Crows carried these pretty wee songsters over on their backs; but this merely by way of a joke, and by no means with that perfect seriousness with which people do not hesitate to dish up the fairy tale of the good big birds, who carry the weak little ones on their backs across the sea.

Finally, I would add one further remark, as regards the position of these Crows in the economy of Nature. Everywhere the protection of birds creates the greatest interest, and man is always put in the foreground as the greatest enemy of the feathered creation. Now, although the destruction of song-birds and other small species, as it appears to be carried on in Italy, ought to be resisted by all possible means; nevertheless all that is offered for sale, in the way of eggs and small birds, in Italy during one complete migration period, would scarcely equal the quantity of eggs and nestlings destroyed by the Hooded Crows during one single summer day.

It is, perhaps, true that the number of individuals of Hooded Crows becomes nowhere apparent in such preponderating quantity as in Heligoland, in consequence of which their destructive influence

is under-estimated; but if one had the opportunity of seeing the hosts of them which travel past during two months of autumn, in uninterrupted sequence, and return in the spring, as is the case here, where no tree, wood, or hill impedes the view; and if one at the same time remembers that all these fellows, impudent as they are cunning, do nothing else during the long summer days, from early dawn to sunset, but plunder the nests of other birds, from the Lark to the Eagle (Dresser), one would indeed wonder that there are still any birds, other than Hooded Crows, left in the world. By all means let us nurture and protect our little bird-friends in every possible manner, more especially by abstaining from destroying any small shrubbery or bush, the sole use of which may, perhaps, be that it affords some small songster a hidden nook for its nest; above everything, however, let us aim at compassing the destruction of Hooded Crows unsparingly year in year out, by all the means placed at our command.

The Hooded Crow does not breed in western Europe, but its breeding area extends from Great Britain, Holland, Germany, and Scandinavia, through the whole of Asia and Europe, as far as the Lena; it also nests, though less numerously, in north-eastern Africa.

40.—The Rook [Saatrabe].

CORVUS FRUGILEGUS, Linn.

Heligolandish: Groot swart Kauk = *Great Black Jackdaw.*

Corvus frugilegus.	Naumann, ii. 78.
Rook.	Dresser, iv. 551.
Corbeau Freux.	Temminck, *Manuel*, i. 110, iii. 59.

Though not visiting Heligoland in such immense numbers as the Hooded Crow, the Rook is nevertheless met with invariably in spring and autumn, often to the number of many thousands on one day. It is one of the earliest arrivals, and almost counts among the heralds of the reawakening migration. Thus in 1885 the first flock of about one hundred individuals arrived as early as the 4th of February, during a southerly wind. This was succeeded by unfavourable weather, lasting until the middle of the month, so that a second and also very large flock did not arrive until the 17th. On the 26th I find 'tens of thousands' noted in my diary. The migration lasted till about the middle of April. As late as the 7th an 'enormous number,' and on the 9th 'very large numbers,' are recorded in my diary. These later visitors often become a great nuisance here, inasmuch as they pull the newly-planted potatoes out of the ground, and almost completely plunder many of the smaller fields. It is

astonishing how exact they are in discovering the particular potatoes that have not yet sprouted, or in some way or other pick out the spot where they are buried in the ground to a depth of about three inches. The birds do not by any means rummage about till they find a potato, but dig their beaks exactly into the spot where one is buried. They appear, therefore, merely to be guided by an extremely keen sense of smell. In the autumn this species continues to pass through this island till very late in the season, sometimes even after frosty weather has set in. Contrary to the habit of the preceding species, which alights here only in exceptional cases, the Rook very frequently interrupts its journey on this island, the flocks dispersing over the upper plateau of the rock in search of food. But, like the preceding species, and perhaps in a greater degree still, flocks amounting to thousands in number, may be seen on fine calm spring days passing across the island at such a height that they appear no larger than very minute specks. Often indeed they entirely disappear from sight, and only their calls, still faintly audible from above, give indication of the vast crowd of wanderers speeding on their way at heights far above the range of human vision.

The breeding range of the Rook extends from England and northern France, through Germany, up to central Scandinavia, and in the same latitude through and beyond central Asia.

41.—Jackdaw [Dohle].

CORVUS MONEDULA, Linn.

Heligolandish: Kauk. *Name for Jackdaw.*

Corvus monedula. Naumann, ii. 93.
Jackdaw. Dresser, iv. 523.
Corbeau choucas. Temminck, *Manuel*, i. 111, iii. 60.

This merry little bird occurs here in greater or smaller companies during the two migration periods of the year. Frequently too it travels in swarms, numbering thousands of individuals, with which those of related species may or may not be mixed, at a great height past and across the island. Sometimes small companies make a day's stay, but in most cases they pursue their journey without taking any further notice of Heligoland. Frequently too a densely-crowded flock of from eighty to a hundred individuals will come rushing, at lightning speed, and at a low elevation, through the streets and among the houses, disappearing again later on. At other times they may be seen sitting calmly, and crowded together in a row, on the weathercock of the church

tower, or on the roof of the church, sunning themselves, and always appearing gay and in a cheerful humour. In two cases Jackdaws have occurred here in which the light spot at the side of the neck was almost quite white.

The Jackdaw is a breeding species in the whole of Europe and in Asia, to about as far as the Jenesei. On the north it does not extend beyond central Scandinavia.

42.—Magpie [Elster].

CORVUS PICA, Linn.[1]

Heligolandish: Heister = *Elster*.

Corvus pica.	Naumann, ii. 101.
Magpie.	Dresser, iv. 509.
Pie.	Temminck, *Manuel*, i. 113, iii. 63.

Our fellow-ornithologists of the neighbouring continent, who meet the Magpie at every step, probably have not the least idea that in Heligoland, famed for its rich avian fauna, it is among the greatest rarities. Thus a bird like White's Thrush (*Turdus varius*) has been shot here ten times as frequently. About fifty years ago old Oelk saw one of these birds here, but all his efforts at securing it were fruitless. The next case of its occurrence happened on the 11th of November 1876. As I was stepping out into my garden early on the morning of that day, I was no little surprised to see a Magpie fly up close by me. Not having a gun at hand, the bird, for the time being, was enabled to fly away, but was brought to me a quarter of an hour later by my eldest son, who had managed to shoot it. Thus the gap in my collection, so long left open by this common bird, was at last filled, and that too by a very fine old example.

The Magpie breeds from Portugal to Kamtschatka, as also in the west of North America. In Finmark it is found breeding as high as 71° N. latitude.

43.—Nutcracker [Nussheher].

CORVUS CARYOCATACTES, Linn.[2]

Corvus caryocatactes.	Naumann, ii. 130.
Nutcracker.	Dresser, iv. 451.
Cassenoix.	Temminck, *Manuel*, i. 117, iii. 67.

The Nutcracker is a very rare guest in Heligoland. During the time I have been collecting, it has occurred and been killed here

[1] *Pica rustica* (Scop.).

[2] *Nucifraga caryocatactes* (Linn.).

only on three occasions. The first of these examples was killed by a boy with a stone at the end of August 1844. The second bird was shot on the 17th of October 1853, and a third a few years later. All these birds were solitary individuals. This may seem specially surprising in the case of the first example, since this species appeared in almost unprecedented numbers during the autumn of the same year in Scandinavia, and also spread in considerable numbers over Germany.

This apparent anomaly is probably explained by the view already expressed in the chapter on the direction of the migratory flight, to the effect: that a large number of birds travel, at the outset of their migrations, from east to west, but turn to the south on reaching Scandinavia. Others again, which have nested or been bred in less advanced northern latitudes, pursue their westerly course as far as England and Ireland before turning their flight of migration to the south. In the above instance, the extraordinary numbers of Nutcrackers which assembled in Scandinavia could only have reached that peninsula from the east. On their arrival in that country, however, their westerly movement must have come to a complete stop, for even if it had been much weakened, large numbers could not have failed to reach this island or the shores of England, whereas here only one example, and in the latter country only two examples, were met with.

One of the birds I gave to Herr von Zittwitz, and it will most probably be found in the Museum of Görlitz.

This bird occurs as a resident breeding species from the mountains of Spain to Japan. Throughout this area, however, the nesting birds are only found scattered in pine and fir woods.

44.—Common Jay [Eichelheher].

CORVUS GLANDARIUS, Linn.[1]

Heligolandish: Hääger = *Jay.*

Corvus glandarius.	Naumann, ii. 122.
Common Jay.	Dresser, iv. 481.
Geai glandivore.	Temminck, *Manuel*, i. 114, iii. 65.

The appearances of this bird on this island are most irregular. Sometimes it occurs sporadically in extraordinary abundance, and, again, for a succession of years, no bird proves to be rarer. After an interval of from ten to fifteen years, in which not a single bird has been seen, there will suddenly appear a band of from ten to fifteen individuals. In some years the number rises to hundreds;

[1] *Garrulus glandarius* (Linn.).

and they have been known to appear in tens of thousands. A migration *en masse* of this nature occurred about twenty-five years ago, when so many of these birds were found in the autumn in the throstle-bushes, that they had to be carried away in large baskets. From that time and until 1876, one or two of the birds were met with only in extremely rare instances, as, for instance, three examples on the 10th of October. On the 21st of the same month, however, a powerful migration took place. A stiff easterly breeze was blowing on that day, and the air was clear. According to my diary, thousands of the birds flew across and past the island, and more than a hundred were shot and caught.

Never, however, have these birds been seen in such enormous swarms as in October 1882. On the 6th of this month my diary contains the following entry: 'A stormy south-east wind; weather clear. *C. glandarius* in hundreds; *Accentor* in unprecedented numbers; *F. cœlebs* and *Anthus pratensis* in hundreds of thousands.' On the 7th the entries are: 'Wind south-east, almost a storm; weather clear. *C. glandarius* travelling across the island uninterruptedly in hosts of thousands and millions; enormous numbers of *Accentor*, *F. cœlebs*, and *A. pratensis*.' On the 8th: 'Wind S.E., freshening; weather clear. *C. glandarius* in still greater numbers than on the day before; uninterrupted swarms, counting to thousands, passing across, as well as to north and south of the island. Birds never before seen in such enormous quantities.'

Thus ended this great procession, in which the birds must have numbered millions. How so vast a number of individuals could have congregated in one great multitude is quite incomprehensible. Since that year (1882) one solitary example only has been seen.

Powerful migrations of Jays occur only during the autumn months, and then only with very strong east or south winds, and in clear weather. Migrations *en masse* of Chaffinches and Meadow Pipits also take place during violent south-east winds. These, however, are not dependent on clear weather, but proceed even when the sky is densely overclouded.

The Common Jay occurs as a resident breeding bird throughout the whole of Europe as far as 64° N. latitude. On the east its range is said not to extend beyond the Ural, the bird being represented in Asia by a distinct, but very similar species, *C. brandti*. From our own experiences, however, of the occurrence of this bird, as related above, this statement would scarcely appear credible. The number of individuals observed within the field of vision on this island alone, during the three October days above mentioned, was so enormous as to be beyond all attempts at estimation, and

even this number can only have constituted a fraction of the great host of migrants moving from east to west at that particular period. In fact, if we imagined the whole area between Memel and the Ural to be covered by one dense continuous forest, in which each tree bore a nest of these birds, all the broods of these would not have sufficed to furnish the material observed in this place on one only of the last of these October days.

45.—Siberian Jay [Unglücks-Heher].

CORVUS INFAUSTUS, Linn.[1]

Corvus infaustus. Naumann, xiii. 214.
Siberian Jay. Dresser, iv. 471.
Geai imitateur. Temminck, *Manuel*, 115, iii. 66.

There is not much to report from Heligoland in regard to this small peculiar bird. It is one of the few which I note here, not from my own observations, or on the strength of those of Reymers or Aeuckens. On the 14th of April 1849, a young gunner who daily brought me birds—sometimes very rare ones—saw one entirely unknown to him, but which he nevertheless described as a small Jay, sitting at a distance of a few paces on a throstle-bush. He described the bird with great exactitude, and especially remarked that it had no blue on its wings, but instead thereof rust-red markings. Unfortunately, he had not his gun at hand; and after he had fetched it, the interesting stranger could no longer be found.

This man who had been occupied working in the fields had had his attention aroused by the call-note of the bird, and told me that it was the 'most remarkable bird-note' he had ever heard, for it was as much like the 'soft mewing of a cat' as the voice of a bird. The most western nesting-places of this species lie in Scandinavia, between 60° and 70° N. latitude, and extend eastwards within the same parallels of latitude as far as Kamtschatka.

46.—Alpine Chough [Alpenkrähe].

CORVUS PYRRHOCORAX, Linn.[2]

Corvus pyrrhocorax. Naumann, 107, xiii. 211; Blasius, *Nachträge*, 41.
Alpine Chough. Dresser, iv. 445.
Pyrrhocorax chocard. Temminck, *Manuel*, i. 124, iii. 68.

During the earliest period of my collecting, I obtained here a very badly stuffed example of this specimen which dated from the earliest

[1] *Perisoreus infaustus* (Linn.).

[2] *Pyrrhocorax alpinus*, Koch.

infancy of local taxidermy: its feet being thickly painted over with cinnabar. I gave it away again, much to my later regret; and, I believe, it will be found in the Görlitz Collection. On the 14th of September 1868 an Alpine Chough was again seen here, but was not shot; and a few years later my eldest son saw two examples flying across the island out of gunshot-range, but still near enough for him to be able distinctly to recognise their yellow beaks.

The Alpine Chough breeds in the higher mountain-ranges of Europe and Asia, at a height of from eight to fourteen thousand feet.

47.—Red-billed Chough [Steinkrähe].

CORVUS GRACULUS, Linn.[1]

Corvus graculus. Naumann, ii. 114, xiii. 212; Blasius, *Nachträge*, 42.
Red-billed Chough. Dresser, iv. 437.
Pyrrhocorax coracias. Temminck, *Manuel*, i. 122, iii. 69.

During the many years that I have made observations on this island, this bird has only occurred twice, the first time in May 1871 or 1872—my journal for those two years unfortunately has been lost, so that I am unable to give the exact date—and the second time, on the 28th of March 1877. This latter example, throughout the whole day, repeatedly took rest for fairly long intervals on the weathercock of the church-tower, and exhibited his red beak to the admiration of everybody, and to the special annoyance of all gunners; nevertheless, despite all efforts, it was not killed.

The Red-billed Chough is a breeding bird from Portugal to China; in north-west Africa; and, in the north, on the rocky coasts of Great Britain. Its nests are invariably placed in high rocks.

Shrike—Lanius.—This genus, which is very nearly related to the preceding, especially to the Jays, comprises, according to Seebohm, about forty species, which are, in great part, inhabitants of the Old World. Six of these belong to Europe, while a seventh—*L. borealis*—has only within recent times extended its breeding range into eastern Europe; and *L. phœnicuroides* can only be regarded as a casual visitant, one example having reached Heligoland from central Asia,

[1] *Pyrrhocorax graculus* (Linn.)

48.—Great Grey Shrike [Grauer Würger].

LANIUS EXCUBITOR, Linn.

Heligolandish: Groot Verwoahr-Fink = *Great Nine-Killer.*

Lanius excubitor. Naumann, ii. 7.
Great Grey Shrike. Dresser, iii. 375.
Pie grièche grise. Temminck, *Manuel*, i. 142, iii. 80.

Only solitary examples of this stately bird are met with on Heligoland—they are specially rare in the spring—and I have only twice succeeded in obtaining birds in perfectly coloured plumage, with the under-sides pure white. It occurs somewhat more frequently during the autumn migration, but even then only solitary examples are met with. In a few instances I have seen the bird, even in winter during deep snow; but they seem to be having a pretty hard time of it under these conditions, if I may judge from the behaviour of a particular individual, which, in the course of each day, used repeatedly to come to one of my windows which looked out upon the garden. In this window hung a cage containing a Goldfinch, and the greedy eyes with which the Shrike used to view the frightened captive, and the energetic attempts it made to get at it, gave clear evidence of the hunger-pangs which were tormenting it.

This species is found nesting as far as northern Scandinavia and Russia; and its isolated appearance in Heligoland would, therefore, seem to show that its autumn migration proceeds almost strictly on a line from north to south. In this respect it differs from the eastern species, *L. borealis=major* (Pallas), the more frequent occurrence of which would lead one to suppose that it was predisposed towards an east-to-west line of migration, a like tendency being exhibited by many other eastern species.

This bird, though very cautious in general, is yet not unfrequently caught in the throstle-bush; that, however, such a fate is well deserved, is shown by the discovery of many a poor little Redbreast with its brains hacked out, the work of this ruthless aggressor. I have even on one occasion seen a Blackbird, as it was hastening along over the grass, pounced upon by one of these daring robbers, and succumb, after a short struggle, to the bites of his assailant.

This species breeds in northern France, Germany, Scandinavia; up to about 70° N. latitude, in European and the adjacent parts of Asiatic Russia, whence it seems gradually to be replaced by the following allied species, *L. borealis.*

49.—Pallas' Grey Shrike [Nordischer Würger].

LANIUS BOREALIS, Vieillot.

Heligolandish: Groot Verwoahr-Fink.

Lanius borealis. Audubon, *Synopsis of the Birds of North America*, 157.
Lanius major. Pallas, *Zoogr. Rosso-Asiat.*, i. 401.
Pallas' Grey Shrike. Seebohm, *Brit. Birds*, i. 595.

This great Shrike is distinguished from the preceding closely-related species in that the great white marks on the wings are simple, and only extend over the ends of the roots of the primaries, the secondaries being of a uniform black throughout; whereas in *L. excubitor* the roots of the secondaries are of white colour, so that duplex white spots are formed on the wings when in a state of rest.

Similar phenomena are presented by these two species of Shrike, as have already been discussed in the case of the two nearly-related species of Crows—viz. the Carrion and Hooded Crows. In both cases we are dealing with an eastern and a western species, each of which originally occupied its own circumscribed area, but of which the eastern form, under the impulse to advance westwards, peculiar to many birds, traversed the limits of the western species, and by intermingling and pairing with the latter, gave rise to the production of fertile hybrids. In the case of the Crows, the areas of the species concerned lay nearer to each other—the home of the Carrion Crow comprising perhaps the eastern half of the Old World, and that of the Hooded Crow its central and western portions. In the case of the two species of Shrike, the phenomenon extended over an incomparably larger area, for there can hardly be any doubt that in this case the primary eastern form was the North American, *L. borealis*, and the western the European, *L. excubitor*.

A similar case of a westward extension of the area of distribution is presented by the Shore Lark, whose primeval home was undoubtedly America, whence it advanced to Asia, and prosecuting this movement in modern times, has pushed forward its breeding range into Europe.

In Heligoland the Shore Lark was, until the year 1835, utterly unknown. It was not until the autumn of that year that Jan Aeuckens shot the first two or three examples of this bird that had ever been seen here. Soon, however, their numbers increased, and a specially large number forced their way to the island in the autumn of 1847, an unusually copious migration from the far East having taken place during this month. Greater or

smaller companies of Shore Larks were seen almost daily from the middle of October to the middle of November, and hundreds of them were shot. In the same year I obtained the first example of *Lanius borealis*, an old male in full adult plumage. Since that time the Shore Larks have steadily increased here from year to year, and since the last ten years, at least, make their appearance in hundreds of thousands, so that during the autumn months and in favourable weather, flocks of from fifty to a hundred individuals may be seen daily passing in uninterrupted sequence across and along the island, from early morning till afternoon; nor does anybody any longer think it worth the trouble to shoot this charming and formerly much-prized visitor.

Since the same time, the Northern Shrike has also steadily increased here, though, as compared with the Shore Larks, its number is still a very modest one. Nor would one expect this to be otherwise, seeing that this, like all other related species of the Shrike genus, number in general much fewer individuals than the various species of the Lark family, all of which are strikingly rich in individuals.

We can hardly regard the advance of this Shrike as far as central Germany to be contemporaneous with its appearance in Heligoland, for its occurrence could never have escaped the notice of so eminent an observer as Naumann, who neither mentions it in his great work, nor in the supplements which were concluded about 1855, and appeared as the thirteenth volume of the chief work in 1860. Brehm mentions this species, as follows, in his *Vollständiger Vogelfang aller Europäischen Vögel*:[1] 'It lives in northern Asia, whence it passes as a straggler into eastern Europe.' Accordingly, Brehm himself had not, until then, met with it in Germany. In Heligoland, however, even at that time it appeared regularly every autumn, and at present one or more examples are seen almost daily, in favourable weather, from the middle of October to the middle of November. Thus, on the 22nd of October, twelve large Shrikes were seen here; seven of these were shot, and proved, with the exception of one of *L. excubitor*, to be all pure-coloured examples of *L. borealis*. The former species in general occurs here much more rarely than *L. borealis*. During my long experience I have only obtained two old examples of *L. excubitor* with their under-sides of a pure white; whereas, almost every autumn, one or two old examples of *L. borealis* in adult plumage, besides about ten or twelve females, younger birds and hybrids, more or less nearly related to *L. borealis*, are shot here. However, like all the Shrikes, this species also is a very cautious bird, which, on the bare surface

[1] *Complete Fowling of all European Birds.*

of the rock, it is very hard to get at; so that in most cases the birds are caught in the throstle-bush.

The finest old male which I have obtained here has all its upper parts of an extraordinary light and pure, almost whity-blue grey (*weisslich blaugrau*) colour; the terminal feathers of the rump and upper tail-coverts alone being in some degree still lighter. All the lower parts are pure white without any markings. The markings on the head, wings, and tail are of the purest and deepest black. Audubon, as well as Richardson and Swainson (*Fauna Bor. Am.*), it is true, say that *L. borealis* and *L. excubitor* are, with exception of the wing-markings, of exactly similar colour; but it nevertheless appears, from their further description, that even the old males of the former species never completely lose the very faint tinge of the dappled breast-markings of their early dress. Pallas also says of his *L. major* that the whitish breast is marked with the finest—*tenuissimis*—grey undulated lines. Beautiful pure-coloured males, like that described above, occur, it is true, only in very isolated instances, perhaps hardly one amongst fifty: moreover, it is well known that the oldest individuals are the shyest, and the most difficult to obtain. In spite of all this, however, one can hardly suppose that this type of plumage could have remained unknown to the above-named observers if it had occurred within the area investigated by them. Is it perhaps possible that this dress attains to this perfection only in the western portion of the area inhabited by the species, and only in isolated examples of very advanced age?

The home of this species will have been ascertained from what has been said above: it has now also advanced as a breeding bird into Scandinavia.

50.—Southern Grey Shrike [Südlicher Würger].

LANIUS MERIDIONALIS, Temminck.

Southern Grey Shrike. Dresser, iii. 387.
Pie grièche méridionale. Temminck, *Manuel*, i. 143, iii. 80.

There is, in my collection, a large Shrike in which the white speculum only extends over the primaries. The bird is markedly smaller than both of the preceding, and all its upper parts, including the tail and upper tail-coverts, are of a very dark grey colour. Further, the breast of this specimen is not dappled with grey markings, its colour being a mixture of light cream and pink (*hellem isabell und rosa*). From all these characters, I conclude the example to be one of *L. meridionalis*. The bird was shot in

the spring, when southern and south-eastern species usually make their appearance here.

This Shrike breeds in Portugal, Spain, and southern France. According to von der Mühle, solitary examples are said to breed also in Greece.

51.—Lesser Grey Shrike [Schwarzstirniger Würger].

LANIUS MINOR, Linn.

Heligolandish : Swart-hôaded Verwôahrfink = *Black-headed Shrike.*

Lanius minor.	Naumann, ii. 15.
Lesser Grey Shrike.	Dresser, iii. 393.
Pie grièche à poitrine rose.	Temminck, *Manuel*, i. 144, iii. 84.

As one might expect, this Shrike, which only rarely passes beyond the northern limits of Germany, occurs in Heligoland only in extremely isolated instances. Some thirty or forty years ago, when May was usually a fine and warm month, one or two of these birds used to be seen here—if not every year, yet fairly frequently—they were, however, shot only on very rare occasions, as it is perhaps the shyest and most cautious species of the whole family. However, the raw and cold weather experienced almost annually during April and May since that time has kept the bird away from the island, besides many other interesting guests which, in former years, used to visit us in greater or less abundance. The last example of this species which has been seen here was shot by Aeuckens at the beginning of June 1887: the one before this was seen in May 1883, but not killed; and a young summer bird, the only example ever observed here in early plumage, was shot on the 23rd of July 1877.

The nesting area of this species extends from France through south and central Europe, and within the same parallels of latitude, about as far as Central Asia. Only a few cases of the occurrence of isolated examples of this bird in England, Denmark, and Scandinavia are known.

52.—Woodchat Shrike [Rothköpfiger Würger].

LANIUS RUFUS, Brisson.

Heligolandish : Road-hôaded Verwôahrfink = *Red-headed Shrike.*

Lanius rufus.	Naumann, ii. 22.
Woodchat Shrike.	Dresser, iii. 407.
Pie grièche rousse.	Temminck, *Manuel*, i. 146, iii. 82.

This handsome Shrike is of still rarer occurrence in Heligoland than the preceding species; in the course of the last forty years,

only five examples have come into my hands—in all cases old males—which were shot on this island at the close of calm and warm days at the end of May or beginning of June.

The rare occurrence of this species in Heligoland may be accounted for by the predominantly western situation of its breeding area. This extends, on the one side, from the west through the north of Africa to the Caspian; and on the other side, through Spain and France, as far as north-eastern Germany. In England the bird is met with occasionally; but it has not yet been observed in Scandinavia, nor is it included in Russow's list of the birds of Esthonia, Livonia, and Courland.

53.—Red-backed Shrike [Rothrückiger Würger].

LANIUS COLLURIO, Brisson.

Heligolandish: Road-rögged Verwôahrfink = *Red-backed Shrike.*

Lanius collurio.	Naumann, ii. 30.
Red-backed Shrike.	Dresser, iii. 399.
Pie grièche écorcheur.	Temminck, *Manuel*, i. 147, iii. 82.

This Shrike, which is distributed as a common breeding bird over the greater part of Europe and the whole of central Asia, was, until about thirty years ago, a very common occurrence in Heligoland during the fine warm days of April and May.

Since the already-mentioned changes in the meteorological conditions of these months, however, only isolated instances of its occurrence have been recorded. It is a notable fact that old birds of this species are never seen here during the autumn migration; not even in the earlier years when the birds still occurred in large numbers during the spring migration; on the other hand, young birds of the year (*Sommervögel*) are met with pretty often every year during their return passage.

This Shrike, too, is as fierce a robber as its larger-sized kinsman. Not very long ago one of them bit off the head of a beautiful Goldfinch which was hanging up in a cage in my garden as a decoy-bird. It was a female, and I caught it immediately after the deed in a fowling-net; the feathers of its upper breast, to which the fresh blood was still adhering, gave irrefutable evidence of the murderous act.

The breeding area of this species extends not only over Europe and Asia, but, according to Dresser, also over south Africa. The birds inhabiting the latter region are residents, remaining in their homes throughout the whole of the year, undisturbed by the innumerable swarms of northern breeding birds arriving in this region every autumn, and departing again every spring.

54.—Cream-Coloured Shrike [Isabellfarbiger Würger].

LANIUS ISABELLINUS, Ehrenberg.

Isabelline Shrike. Dresser, iii. 413.
Lanius phœnicurus. Sewertzoff, *Fauna of Turkestan*, *Ibis*, 1876, 185-187.

Specimens in the Berlin Museum belonging to this species are:—*L. speculigerus*, Taczanowsky; *L. phœnicuroides*, Sewertzoff, Turkestan; *L. arenarius*, Blyth, Darjeeling.

On the 25th of October 1854, I obtained here a young male bird of the year of this interesting species. It was caught in the throstle-bush. It is the only example of this species which has ever been observed here, and, I believe, the only one which has ever been met with in Europe.

H. Blasius, on his first visit to Heligoland in 1858, regarded this specimen as a young example of *L. phœnicurus*, and accordingly noted that species in the supplements to Naumann's work, vol. xiii. p. 39. *L. isabellinus* must therefore be substituted in its place, and *L. phœnicurus*, unless it has since been met with anywhere in Europe, must be struck out of the list of European birds.

The two species are easily distinguishable. Judging from the material at my command, the relations of the various parts of the body are very different. The eggs of the two species are of equal size, and one would therefore conclude that the birds would stand in the same relation to each other; while, however, in *L. phœnicurus* the wings and tail are of nearly the same length, the former measuring 3·37 ins. (86 *mm.*), the latter 3·32 ins. (85 *mm.*), in *L. isabellinus* the tail only measures 3·15 ins. (80 *mm.*), but the wings 3·66 ins. (93 *mm.*).

Besides, in the former species, the feathers of the tail are strikingly narrow, and the whole part much rounded off; its outermost pair of feathers is 0·75 in. (19 *mm.*) and the next pair 0·32 in. (8 *mm.*), shorter than the middle pair. In the latter species, the tail-feathers are very broad, and nearly all of the same length, except the outermost pair, which are only 0·32 in. (8 *mm.*) shorter than the rest.

L. isabellinus, moreover, displays a white speculum on the roots of the primaries, which is not the case in *L. phœnicurus*. Further, the male of the latter species has all its upper parts, and especially the crown of the head, the rump, and the upper tail-coverts, of an intense ferruginous colour (*rostroth*); while its lower parts are of a very vivid and rich buff colour (*rostgelb*). In *L. isabellinus*, on the other hand, as one may gather from the name, the upper parts are of a creamy-brownish or isabelline grey (*isabell-bräunlichgrau*);

the head and neck of some examples passing into a creamy ash grey. Beneath, they are of a more or less whitish-cream colour, with a rose-red tinge on the upper breasts and the sides of the breasts. Both species have the black markings, extending from the nostrils, through the eyes, across the ear-coverts. In *L. phœnicurus*, this is crossed by a broad pure white stripe; in *L. isabellinus*, there is only a dull creamy white indication of it.

The bird which was caught here is, in its upper parts, of a very light creamy reddish grey (*hell isabell-rothgrau*), the crown a little darker, the feathers of the rump passing into a pale ferruginous colour. A faintly indicated eye-streak, and all the lower parts, are of a dull whitish cream colour, the colour being somewhat more intense on the upper breast. The whitish forehead and the crown are very faintly dappled with dark markings; these markings, which are peculiar to young examples of *L. excubitor*, are quite faint. They are also visible on the upper breast, disappearing gradually at the sides. The ear-coverts are of an obscure dark brownish colour (*trübe dunkelbraun*); those of the wings are of similar colour, and have dull rusty grey (*rostgrau*) edges, which, on the posterior flight-feathers and the large outer wing-coverts, pass into a dull rusty white (*rostweiss*). Through this light border there run, as in young examples of *L. excubitor*, fairly well-defined dark lines, which pass round the tip of each feather. All the tail-feathers are of a uniform dull light ferruginous, the colour being very faint on the outer webs; while at the tips and outer webs of the outermost pair of tail-feathers, it passes into a dull ferruginous. The flight-feathers are of a pale earthy colour (*fahl erdbraun*). There is no white speculum on the primaries. It is, however, apparent that one would have been developed at the next moult; for the fourth flight-feather of the right wing, which had been lost by accident and replaced by a new one, bears at its root a fairly broad white spot, indicative of the marking of the succeeding plumage.

The feet of the freshly-killed bird were lead grey (*bleigrau*), the bill flesh-coloured with dark tip. The measurements of this specimen are: total length, 6·50 ins. (165 *mm.*); length of the wing in the resting position, 3·42 ins. (87 *mm.*); length of tail, 3·0 ins. (76 *mm.*); portion of tail uncovered by the wings, 1·57 ins. (40 *mm.*); length of bill, 0·39 in. (10 *mm.*); height of the tarsus, 0·86 in. (22 *mm.*). The tail is uniformly truncate, only the outermost pair of feathers being 0·35 in. (9 *mm.*) shorter than the rest.

The specimens in the Berlin Museum, quoted at the head of this article, so completely agree in their measurements and in the relations of the flight-feathers and rectrices, and show only such

faint deviations in their colorations, that it is impossible to regard them as a distinct and independent species. The example designated as *L. speculigerus* (Taczanowsky) and collected by Dybowsky in Daüria, is unmistakably the oldest of these birds. The white speculum on the primaries is considerably larger than in any of the other examples, and the light creamy brown of the head and back has a small admixture of light grey. Very similar to this example is a very pretty creamy-grey coloured (*isabellgraues*) male in the Museum of Bremen, collected by Finch in Turkestan.

L. phœnicuroides (Sewertzoff) from Turkestan, and *L. isabellinus* (Ehrenberg) from Jumfudda, have smaller specula, and their heads and backs are of a browner colour. They may possibly be young males. All these examples, together with two young specimens described as *L. arenarius*, and one young example described as *L. speculigerus*, resemble each other completely in their measurements as well as in the form of their wings and tails; while the individual caught here, and contained in my collection, is also in perfect agreement with these specimens in all respects, excepting that it is rather more faded, and that, as already mentioned, one of the primaries of its first autumn plumage is replaced by a new feather displaying the speculum; otherwise it is scarcely distinguishable from any one of the young birds mentioned above.

The case is different with three other specimens in the Berlin Museum, collected by Ehrenberg in Arabia, and named by him *L. isabellinus*; these consist of an old male, an old female, and a young bird. They are strikingly larger, and have the tail strongly rounded off. Sewertzoff, in his *Fauna of Turkestan*, cites a *L. isabellinus* (Ehrenberg), which he describes as a Steppe variety, adding that it is constantly larger than his *L. phœnicuroides*, and that only the four median feathers of the tail are of equal length; while in the latter species—*i.e. L. phœnicuroides*—the ten inner feathers are of equal length. He further states that he had examined a considerable number of examples of this *L. isabellinus* and of his *L. phœnicuroides*, but had never discovered an intermediate form. There can accordingly be hardly any doubt that this last-named Shrike of Sewertzoff's from Turkestan is identical with Ehrenberg's three larger examples from Arabia, and that they belong to a distinct species.

The breeding range of this species—*i.e. L. isabellinus*—extends from the Khirgiz Steppes and Turkestan to eastern Mongolia and Daüria. The eggs display all the pleasing colours and stages of markings which are met with in *L. collurio* and *L. phœnicurus*; from the most charming light red (*Hellroth*), with markings of

dark red rings or spots, through a buff and ochreous yellow (*Rost und Okergelb*) to a dull yellowish green ground colour (*gelblichgrün*), with yellowish grey (*gelblichgrau*) marking. Many of the eggs, however, have a ground colour approaching nearer to a greenish than one meets with in *L. collurio*. In size the eggs range pretty closely with those of the Red-backed Shrike, as they do also in form, though smaller ones occur amongst them than are met with in the former species. Their average measurements are: length, 0·90 in. (23 *mm.*); breadth, 0·67 in. (17 *mm.*).

The material for the above descriptions, as well as skins for comparison, I owe to the kindness and generosity of Mr. Tancré, for whom they were collected in the Altai Mountains.

Flycatcher Muscicapa.—According to Sharpe, the genus of these small harmless birds comprises about twenty species. They are inhabitants of the Old World; but Europe possesses only four of them as breeding birds, all of which are represented in Heligoland.

55.—Pied Flycatcher [Schwarzer Fliegenfänger].

MUSCICAPA LUCTUOSA, Temm.[1]

Heligolandish: Swart Besküts = *Black Flycatcher.*

Muscicapa luctuosa.	Naumann, ii. 231.
Pied Flycatcher.	Dresser, iii. 453.
Gobe-mouche bec-figue.	Temminck, *Manuel*, i. 155, iii. 84.

This neat little bird visits Heligoland in larger numbers than any of its near relatives. It is especially abundant during the autumn migration, returning from its nesting quarters as early as the beginning of August, if the weather is fine and warm and the wind from the south or south-east. For instance, in 1882, while the last old birds passed through on the way to their breeding homes as late as July 7th, the first of the young birds returned from the latter as early as the 7th of August. From that date onward they left daily, during the prevalence of a south-east wind, in large flocks until the 20th of the month. From the 21st to the end of the month, strong north-west winds interrupted almost completely the migration of every species, at least throughout the lower strata of the atmosphere, and near the surface of the ground. It was not until the 4th of September that a change for the better set in, when, besides Sylviidæ, Stonechats, and other species, the black—by this

[1] *Muscicapa atricapilla* (Linn.).

time, indeed, already grey—Flycatcher again made its appearance. The last example of that year I find recorded upon the 20th.

This bird appears in incomparably smaller numbers when arrayed in the attractive garb of spring. Its migration at this season commences with the last week of April—in 1884, on the 26th of that month—lasts through May, and sometimes, as stated above, extends even into July.

The breeding range of this species extends from northern Spain through the whole of central Europe, beyond the Ural, where the bird gets gradually scarcer and finally disappears. In Scandinavia, it has been met with up to 70° N. latitude.

56.—White-collared Flycatcher [Halsband-Fliegenfänger].

MUSCICAPA ALBICOLLIS, Temm.[1]

Muscicapa albicollis. Naumann, ii. 224.
White-collared Flycatcher. Dresser, iii. 459.
Gobe-mouche à collier. Temminck, *Manuel*, i. 153, iii. 84.

This elegant little bird has been seen here only once during the last fifty years, the individual in question being a very fine old male, caught on the 3rd of June 1860 in a small fowler's net, and now forming an ornament of my collection. It is hardly likely that this species can have occurred here more frequently, for the bird was entirely unknown to all local gunners and fowlers, not even Reymers having ever seen one like it before on the island.

This Flycatcher belongs, as a breeding species, to southern Europe, from Portugal to the Caucasus; its numbers, however, preponderate in the western tracts of this area. Isolated examples have been found nesting as far north as central Germany.

57.—Spotted Flycatcher [Gefleckter Fliegenfänger].

MUSCICAPA GRISOLA, Linn.

Heligolandish: Hüs-Beskütts = *House-flycatcher.*

Muscicapa grisola. Naumann, ii. 216.
Spotted Flycatcher. Dresser, iii. 447.
Gobe-mouche gris. Temminck, *Manuel*, i. 152, iii. 83.

This harmless and confiding little bird is probably the latest of our spring visitors, and its passage seems to be far more

[1] *Muscicapa collaris*, Bechst.

dependent on warm and calm weather than that of any other species. Solitary examples are rarely seen here before the middle of May, the 19th and 20th of that month being, according to repeated entries in my journal, the usual dates of its arrival. The migration continues until about the middle of June, and the birds begin to leave again as early as July. *M. luctuosa* occurs here as early as April, and again on its return passage in large numbers as late as September; but *M. grisola* has never been observed either so early or so late in its two migration seasons.

This species never appears in very large numbers here. I hardly ever see more than twenty or thirty examples in the course of one day in my garden, which seems to be a favourite resort of these birds. This garden consists of a fairly large and open piece of ground, surrounded on all sides by thorns, which are from fifteen to twenty feet high, and also by elders and willows; and the birds like to perch on the tips of the dry branches, whence in calm, sunshiny weather, they prosecute their chase after flying insects. The Pied Flycatcher, on the other hand, displays a real passion for the twig ends of flowering pot-plants, or the handle of a spade sticking in the ground, etc.

This bird is distributed as a breeding species over the whole of Europe and Asia.

58.—Red-breasted Flycatcher [Kleiner Fliegenfänger].

MUSCICAPA PARVA, Bechstein.

Heligolandish: Lütj Besküts = *Small Flycatcher.*

Muscicapa parva.	Naumann, xiii. 247.
Red-breasted Flycatcher.	Dresser, iii. 465.
Gobe-mouche rougeâtre.	Temminck, *Manuel*, i. 158, iii. 85.

This is the smallest species of the genus, and is further distinguished by the pure white coloration of the basal half of its tail. Formerly, isolated examples of this bird were seen here almost every autumn; in some years also in larger numbers, as, for instance, during the first two days of October 1869, when five examples were seen; while, in the course of October 1870, fourteen birds were observed, of which nine were shot.

Since that time, the instances of its occurrence on the island have been few. In 1875, three examples were observed; also one in 1877, and another in 1880; whilst, for the last seven years, the bird has not been seen at all. It is difficult to assign a cause for this total absence, though undoubtedly, as in many similar cases, atmospheric influences have been at work. These, however, must have been of

an essentially different character from those which have been discussed in detail in the section on migration, for whereas the almost complete absence, for some considerable time now, of light south-east winds must undoubtedly be regarded as the cause of the rare appearance of other eastern and south-eastern species, this cannot possibly apply to the small Flycatcher, for, unlike these species, this bird has never arrived here with south-east winds and calm, warm weather, but mostly with rather strong north-west winds and raw weather. A still more surprising fact in regard to an insectivorous bird so small and delicate as this species is, is the late time of its arrival, which generally falls about October; but there are instances of its having occurred as late as the end of November, viz.: on the 23rd, 28th, and 29th, and once, indeed, as late as the 8th of December. Moreover, the three examples hitherto observed in England were also met with in October and November, and one of them even in January.

These birds, as one might expect, were observed in the milder south-western portion of the country. Two of the birds, in the course of their migration westwards, got as far as the Scilly Islands, and as it is hardly likely that it was their purpose to winter there, we are led to conclude that the line of flight of this species, after proceeding for a space in a westerly direction, finally assumes a southerly turn.

It may, perhaps, appear a bold venture on the part of so small a bird to undertake a journey from the Scilly Islands to Spain at this late and generally stormy season of the year. We have, however, seen how a bird like the Golden-crested Wren, which is still smaller and certainly weaker than the Flycatcher, arrives here on pitch dark and stormy nights in October, and continues its journey over the North Sea to England. After this the flight of this Flycatcher will cease to strike us as an extraordinary performance.

I have only once obtained this small Flycatcher during the spring, nor have I observed it on any other occasion since. This fact, also, supports the view that those of the birds which migrate *vid* Heligoland in the autumn, either turn in their flight towards the south as soon as they reach the eastern and central parts of England, and thence cross the Channel, or,—as was the case with the three before-mentioned examples—that they reach the extreme western portions of the country, and then turning south, cross over into Spain. In the spring, on the other hand,—as is the case with many other eastern species comparatively abundant here in autumn but hardly ever met with in spring—these birds similarly travel from their winter quarters in the south to their homes in the north in a direct line instead of taking the circuitous route by which they reached

their winter stations, so that now they leave Heligoland lying on the left and to the north of their route of passage.

The call-note of this species, which is said by Naumann and Russow to resemble the sound 'füid-füid,' has never been heard in Heligoland; instead thereof a peculiar, somewhat protracted chirp, sounding remarkably like the faint call of the Missel Thrush when heard from a distance, has been remarked here, and, indeed, has in many cases announced the presence of the bird before it has been actually seen. Dr. A. Walter, who observed the bird in great numbers in the forests of Livonia, describes the call as a rattling sound. In its whole demeanour and action this bird is a miniature repetition of its near relative, the Pied Flycatcher.

Strange to say, the first example of this species which I secured had thirteen tail feathers, whence I naturally concluded that the normal number was fourteen. This specimen has, I believe, passed into the possession of Herr von Zittwitz.

The breeding range of this species extends from Germany eastwards to Hungary, whence it passes northwards to Esthonia, Livonia, and Courland, and, according to Seebohm, within the same parallels of latitude as far as Kamtschatka.

Waxwing—Ampelis.—The genus of these handsomely-coloured and prettily-marked birds comprises only three species. Of these *A. cedrorum* is a native of North America; *A. phœnicopterus* belongs to Japan, and the third, *A. garrulus*, inhabits all the northern parts of the Old and New Worlds, and the latter is the only species which has hitherto appeared in Heligoland.

59.—Waxwing [Seidenschwanz].

AMPELIS GARRULUS, Linn.

Heligolandish: Siedenswenske = *Silk-Tail.*

Bombicilla garrula.	Naumann, ii. 143; xiii. Blasius, *Nachträge*, 45.
Waxwing.	Dresser, iii. 429.
Grand Jaseur.	Temminck, *Manuel*, i. 124, iii. 71.

This species seems everywhere, even where it is found as a breeding bird, to occur only sporadically, and this is most particularly the case in Heligoland.

During the autumn months of the year 1847 an extraordinary powerful migration of eastern species took place, and among these appeared, from the middle to the end of September, also some twenty

Waxwings. From fifteen to twenty examples were again seen in January 1850, from the 8th to the 12th of the month. Since then, however, scarcely more than one or two cases of the occurrence of this species have been recorded for ten years at a time. The last solitary specimen was seen in my garden on the 23rd of November 1876.

The nesting places of this bird extend from Upper Lapland eastward through the whole of Asia, and thence stretch farther east from Alaska to about the middle of Arctic North America.

Oriole—Oriolus.—According to Dresser this genus is represented by only two species, *O. galbula*, which inhabits Europe and a great part of Asia, and *O. kundoo*, which is a native of India and eastern Asia.

In both these the smaller feathers of the males are of a beautiful pure yellow colour, and the greater or less extent to which the black markings are developed seems to be the only mark of distinction between the two species, of which only one, the first-named, has hitherto visited Heligoland.

60.—Golden Oriole [Pirol].

Heligolandish: Bülow = Pirol.

Oriolus galbula. Naumann, ii. 171.
Golden Oriole. Dresser, iii. 365.
Loriot vulgaire. Temminck, *Manuel*, i. 129, iii. 73.

'Schulz von Bülow,'—as I used to call it in my own home, the Mark of Brandenburg, when I was a boy—is a very rare visitor here; one or two younger birds or females may perhaps be seen during the latter half of May, but even these cannot be reckoned on with certainty. In the course of fifty years I have observed and obtained only one example, an old male in adult plumage. Its far-sounding cry, 'tüüt-o-lüoh,' a presage of green woods illumined by sunshine, I have never yet had the good fortune to hear on this island. What scenes of the far-off days of happy boyhood would this sound have re-awakened! How well I remember those Whitsuntide holidays, when we employed all our arts of strategy and cunning to get at a Golden Oriole's nest, hanging in the branches of some lofty birch at the edge of the wood; or, again, the beech-grove, shaped like a light-green dome, the open forest with its ancient oaks dating back their birth to a thousand years, and having now but scanty space for their wide-spreading roots and branches, and the dark pine-woods filled with resinous odours!

Those were happy days indeed, when we used to climb up the mighty giants of the forest and settle matters with any Buzzard,

Kite, or Hawk that chanced to come our way, and not feeling at all sure at the time whether we ourselves might not have to come to terms with the grey old ranger, very probably already lying in wait for us at the foot of the tree. As a rule, however, in such an emergency we managed to avoid a personal interview with that worthy official, by simply remaining quietly sitting in the lowest branches, and allowing time to settle the issue. The end of it usually was that grumpy old Bruhn gave in first, in spite of all his previous threats and violence.

The Golden Oriole occurs as a breeding bird in north Africa, in south and central Europe, and in the western half of Asia. To Denmark and the south of Sweden its visits are very rare, but it is of less rare occurrence in the south of Finland.

Starling—Sturnus.—Only three species of this Old World genus belong to Europe as breeding birds. One of these is found nesting in small numbers in Heligoland, whilst another only occurs as a rare visitant.

61.—Starling [Staar].

STURNUS VULGARIS, Linn.

Heligolandish : Sprien = *Starling.*

Sturnus vulgaris. Naumann, ii. 187.
Common Starling. Dresser, vi. 405.
Étourneau vulgaire. Temminck, *Manuel*, i. 132, iii. 74.

The Starlings count among the first heralds of the reawakening spring migration. Larks and Greenfinches come and go nearly the whole winter, sometimes travelling in an easterly, sometimes in a westerly direction. It is quite otherwise with the Starling, which, after it has once begun its migration, continues its journey without stopping, scarcely even allowing it to be interfered with by stormy days. The first small flights appear at the beginning of February, and even earlier if the weather is mild. Thus in 1885 a company of from fifty to sixty of these birds arrived here by a regular easterly course as early as the 13th of January. The migration lasts until the end of March, though isolated stragglers arrive even later.

Thus, while the old Starlings in company with a very small number of other species form the vanguard of the spring migration, the young may be said literally to inaugurate the return movement from the nesting places to the winter quarters, for the first flocks make their appearance as early as the first weeks of June. In 1880

they arrived as early as the 15th of the month, but usually they do not reach here until the 20th; from that date their number increases daily for three or four weeks, and the migration terminates with the end of July. The conditions requisite for the migration of these young birds are fine warm weather and a south-east wind. The summer of 1878 proves in what vast quantities they may arrive under such conditions. Thus my diary has the following entries: June 20 and 21, great flocks of young Starlings; June 22, 23, 24, enormous numbers of young Starlings; until the end of the month many thousands daily—wind south-east, weather calm, clear, and hot; July 1st to 12th, young Starlings in thousands and tens of thousands every day—never seen here in such large quantities before; until the 16th, daily flocks of hundreds of individuals; on the 25th again, large numbers of young birds, with which the migration of the young grey-plumaged birds came to an end.

There now follows an interval of two months during which no Starling is seen. At its termination commences the migration of the old birds which have completed their moult, being now arrayed in their black and much-spotted livery. In the above-named year, 1878, the first flocks, counting by hundreds, arrived on the 22nd of September. My further entries are as follows: On 2nd and 7th of October, large flocks of old birds; on the 8th, flocks of thousands; on the 13th, Hooded Crows and old Starlings in tens of thousands; on the 14th, many thousands of Hooded Crows, and old Starlings in hundreds of thousands; on the 15th, large numbers of Starlings; on the 16th, few; on the 20th, tens of thousands; on the 28th, large numbers. November 18th and 19th, flights of from twenty to fifty; December 9th to 18th, flights of from forty to sixty individuals. With these the autumn migration of that year terminated. Year after year the migration proceeds on the same enormous scale, defying any attempt at an actual estimate of the numbers of individuals engaged therein,—in fact, in my diary I have frequently found the term 'clouds of migrants' as alone capable of conveying an adequate impression of these enormous, almost endless flocks, as they rush in a densely crowded horde across this island.

After what has been stated above, it will hardly be necessary to further point out that no other species proves in a more striking manner how the young 'summer birds'—[*i.e.* birds of the year]—perform their migration independent of, and unattended by, the parent birds; for, on the one hand, the colours of the old and young birds are so entirely different, that the age of the individuals of a migratory flock can be told at once, and without any trouble, even at a height of several hundred feet; and, secondly, a great and rigidly defined interval exists between the times of migration of the

two sets of individuals. To be sure, occasionally during the first days of June, quite isolated old birds,—not only of Starlings, but also of members of other species—may occur, for the most part in much worn breeding plumage; these, however, are examples which either have not bred at all, or whose brood has been destroyed, or which have lost their mates, and in consequence of such experiences have left their nesting places before their proper time; but such individuals have no connection with the young birds that make their appearance one or two weeks later, for these invariably travel alone and independent of the parent birds; the latter, as is proved from the above entries, following them only after they have completed their autumn moult about two months later.

The gunners of Heligoland pursue the young Starlings very actively on account of their very tender and appetising flesh. With what success this pursuit is sometimes crowned, may be illustrated by one instance in which Claus Aeuckens bagged eighty-three young Starlings by once firing off the two barrels of his gun. Old birds are dry and tough, and it would hardly be possible to kill a third part of the same number in two shots.

The Starling breeds numerously throughout the whole of central and northern Europe, and within the same parallels of latitude throughout the whole of Asia.

62.—Rose-coloured Starling [Rosenfarbiger Staar].

STURNUS ROSEUS, Brisson.[1]

Heligolandish: Stuur-Amsel = *The Beautiful Blackbird.*

Sturnus roseus.	Naumann, ii. p. 206.
Rose-coloured Starling.	Dresser, iv. p. 423.
Martin roselin.	Temminck, *Manuel*, p. 136, iii. p. 76.

This beautiful bird has been seen about forty times, and in most cases also shot, within the last fifty years. Like all south-eastern species, it makes its appearance chiefly in June, but has sometimes been met with even in August; thus, among other instances, eight old birds of this species were shot here in August 1853. It appears that we are here really dealing with the normal autumn passage of individuals which have travelled beyond the usual limits of their spring migration, these irregular journeys extending frequently to England, Scotland, and even to the Orkney and Shetland Islands. What is still more surprising is the occurrence, late in the season, of young birds of the year which are still in their grey early plumage; thus, in September 1860, I obtained three such indi-

[1] *Pastor roseus* (Linn.).

viduals. There are two ways in which this phenomenon may be explained. It is possible that this species may occasionally, in European and Asiatic Russia, advance north as far as the latitude of Heligoland, and breed in this region,—a portion of the young, like many other species residing in districts far to the east of this island, do not in such cases follow the normal course of the autumn migration of their species, but turn to the west, and in this manner reach Heligoland. According to the other explanation, we are here dealing with one of those cases of frequent occurrence, where birds which have advanced to Scotland have bred in that country,—the birds observed in Heligoland being the broods of such individuals engaged on their passage to Persia or India. An attempt at nesting of this kind is mentioned by Gray (*Birds of the West of Scotland*, p. 161).

The above-mentioned migration beyond the normal limits of the spring migration of south-eastern species which breed in Greece, Asia Minor, or Syria, and whose winter stations range from southern Persia through the whole of India, must not be regarded as a mere roving about without plan or purpose, but as has been discussed in detail in the section on Migration under 'unusual phenomena,' is doubtless caused by the fact that one member of the breeding pair, mostly the laying or breeding female, has perished during the first stages of the breeding process, while the surviving member of the pair seeks to satisfy the still active breeding instinct by continuing the spring migration in the direction peculiar to its species. This, in the case of the Rose-coloured Starling, proceeds in a westerly direction, and conveys the bird across Germany to England, Scotland, and the islands north of that country.

However adventurous such an attempt may appear, the above-cited observation of Gray's proves that it may, nevertheless, be successful. From the Reports of the Marquis Antinori in the *Naumannia* for 1856, we learn in what unprecedented quantities these birds are destroyed by predatory animals in their breeding colonies, which are located on the ground amongst the rubble.

This bird occurs as a breeding species from Asia Minor to southern Russia, in the Caucasus and Turkestan, extending eastward within the same parallels of latitude into Central Asia.

Thrushes—Turdinæ.—This genus comprises about two hundred species, if we include therein the great White's Thrush, the Rock Thrush, and the American Mocking Thrushes, all of which are here, following the older system of classification, noted as Thrushes. About twenty-one of these have hitherto been met with in Europe, of which, however, only eight can be regarded as

resident breeding birds. The number of species observed in Heligoland amounts to nineteen, among these being two species new to Europe, viz. *T. lividus* and *T. rufus*. Another small American species, *T. swainsoni*, was, at the time of its capture at least, new to Europe, but has since then once been shot in Holstein.

Some of the species, notably the Song Thrush and Blackbird, are also caught here for purposes of consumption. It is strange, however, that there exists in Heligoland no special method for catching the Fieldfare (*T. pilaris*, L.), which is almost everywhere else the principal species captured for this purpose. These birds are caught here or shot only in exceptional cases. One would of course include the Ring Ousel (*Turdus torquatus*, L.) among the species sought after for the table; and this large fat bird is indeed in great demand among our fowlers, but unfortunately it visits Heligoland in by no means large numbers, and then only frequents, by preference, the steep walls and upper edges of the rocks; the bird is, moreover, so shy and watchful that it is difficult to approach it even with the gun.

All the Thrushes are caught here by means of nets. The bait, strange as it may appear, is formed by a few dry shrubs stuck in the earth. The manner of constructing a snare arrangement of this kind is as follows: a space about twenty feet long, and from six to eight feet broad, is surrounded by a fencing of bushes, ten feet high, and placed fairly close together, so that there is just room enough left between them to allow the Thrushes to run comfortably through at the bottom.

The bushes forming one of the long sides of this arrangement are put up perpendicularly, those of the opposite side in such a manner as to incline towards them. Over this latter side a strong net is stretched, reaching from the top of the bushes to within two feet from the ground, and enclosing one side of the enclosure in a long semicircle; a second net, of strong thread loosely strung on a line, is stretched tightly by means of the latter round the lower portion of the same side of the throstle-bush a little above the lower edge of the first net, and also like the latter forms an extensive semicircle round the side of the throstle-bush. Below, however, this net is spread loosely on the ground for a distance of about six feet from the bottom of the bushes: in this manner the depth of the whole arrangement is considerably increased.

The bushes must be set up in such a manner that they may be visible to the birds from some distance, and that there is nothing which might impede their flight towards the open unnetted side. Green bushes, if accessible, will of course attract the birds in a considerably higher degree. In somewhat sheltered gardens, like

mine, the latter may be employed with advantage, but on the top of the plateau they are quite impracticable, for the violent north-westerly gales which prevail here in autumn and winter very soon remove every freely exposed bush, even the lowest.

A netting arrangement of this kind is here called 'troossel-goard,' which, literally translated, means 'throstle-garden.' The term 'throstle-bush,' which, logically speaking, would perhaps be more correct, is however hardly admissible, inasmuch as the language of Heligoland has no such word as 'bush' in its vocabulary; every bush or shrub, however small,—nay, even the potted flowers in the windows—being indiscriminately designated 'boamen,' *i.e.* trees.

There are about twenty of these throstle-bushes on the island; and the capture of the birds by these means forms a very remunerative employment; for, after the potatoes, and what little cabbage there is, have been gathered in, the surface of the island is as bare as the sea which surrounds it.

Consequently, birds like the Thrushes, used to shady woods, are powerfully attracted by the few dead twigs and bushes stuck in the ground, and hasten towards them with the utmost readiness. Once inside the bush, they are, by means of long sticks, driven without much trouble to that portion of the net which lies loose upon the ground, where for the most part they stick their heads through the meshes, and are unable to get back again.

During a strong migration it is by no means rare to catch several hundreds of Thrushes in one morning in one of these contrivances. If the weather is less favourable, one is quite satisfied to get from thirty to fifty. Besides Thrushes, many other birds get accidentally under the net, such as Woodcocks (*Scolopax rusticula*, L.), Wood Pigeons (*Columba palumbus*, L.), the Landrail (*Crex pratensis*, L.), and its near relations; all the species of Shrike, the Long-eared Owl (*Strix otus*, L.); the Sparrow-Hawk (*Accipiter nisus*, L.), too, is by no means infrequently lured thither while in pursuit of his prey. Generally, also, the bush teems with Leaf-warblers, Finches (*Fringillidæ*), and Titmice (*Paridæ*); these however can, by reason of their small size, easily escape through the meshes of the net, getting off without further damage than a good fright.

I have described the 'troossel-goard' in such detail because one might, perhaps to advantage, set up arrangements of this kind in other places, not only on the barren islands of the coasts of England and Norway, but also on heaths and extensive fields lying in the path of the 'throstle-track,'—a term perhaps not unfittingly applied to the autumn migration of the Thrushes, when proceeding, as it frequently does, at a low elevation above the ground.

63.—White's Thrush [Bunte Drossel].

TURDUS VARIUS, Pallas.

Heligolandish: Gold-Troossel = *Gold Thrush*.

Turdus Whitei.	Naumann, xiii. 262.
White's Thrush.	Dresser, ii. 77.
Merle varié ou de Withe.	Temminck, *Manuel*, iv. 602.

This fine large species from eastern Asia has up to the present been shot thirteen times in Heligoland, and has been observed from six to eight times besides. Five of these birds I stuffed for my own collection, four of which still remain amongst its permanent ornaments, while the fifth, a fine male, caught on the 3rd of September 1846, I presented to my dear friend, Professor Alfred Newton of Cambridge.

The dates of the occurrence of these examples, so far as I have been able to ascertain them, are as follows:—October 1827, September 1834, October 1836, October 1840, 3rd September 1846, 3rd October 1849 (a splendid male), 4th October 1864 (a female), 23rd April 1869 (a male, much faded and damaged), 1st October 1869, 16th October 1869 (a fine female), 18th September 1870, 9th October 1872 (a male), 3rd October 1884 (a female).

Apart from those named above, Reymers and old Koopmann have repeatedly caught and prepared specimens of this Thrush in the interval between 1825 and 1837; the dates of these are, however, no longer determinable; to them belong the two examples mentioned by Gould in his *Birds of Europe* as caught near Hamburg, one of which, according to Newton, is still in the possession of Mr. Baker, of Hardwick Court, England, while the other belongs to the next very similar species, *Turdus dauma*.

On the continent of Europe about fifteen examples of White's Thrush have been killed in the course of the last hundred years—the first known instance dating back to the year 1788. In England, the bird, according to Newton, has been seen nine times, from 1828 to 1872, all the examples having been shot with the exception of one. These eight specimens are distributed among several well-known collections.

This strikingly beautiful Thrush is at once distinguished from all hitherto known European species by the variegated plumage, not only of its under surface, but also of its upper parts.

In freshly-moulted autumn birds, all the upper parts are of a beautiful clean, almost golden olive colour (*goldig-olivenfarben*); every feather has its shaft marked by a light yellow stripe, and is

encircled by a broad velvety black crescent-shaped border; on the rump the ground colour passes into a dull olive yellow (*olivengelb*), and on the feathers of the top of the head in front of the black tip, it is of a pure yellow. All the lower parts are white; the largest feathers of the flanks and belly being pure white, those of the upper breast suffused with olive; and on the sides of the breast tinged with light buff colour (*rostgelb*). The feathers of these parts, too, with the exception of those of the belly and throat, have each a deep velvety black crescent-shaped border, which is very broad on the sides of the breast and on the flanks, particularly in the males, so that it covers a large part of the ground colour; towards the middle of the belly, however, it gets narrower, and is gradually lost towards the forepart of the neck. The white under-tail-coverts have only small and very narrow crescent-shaped terminal spots.

The tail-feathers are of a blackish olivaceous brown (*olivenbraun*), the outer webs being of olive colour, which passes partially into a beautiful ochreous yellow (*okergelb*). The greater wing-coverts have their outer webs likewise of an olive colour, and their tips of a bright ochreous yellow (*okergelb*); the median and lesser wing-coverts are deep black, but their terminal third is of a whitish ochreous yellow (*weisslich okergelb*); this colour extends broadly on the shaft as far as the middle of the feather. The under side of the wing displays a very striking marking, which seems to be peculiar to a whole group of eastern Asian and Australian Thrushes. This marking consists of two stripes, one broad and pure white, the other deep black, which spread across the expanded wing from the posterior flight-feathers forward to the second flight-feather. This strikingly peculiar marking at once enables us to recognise the bird when on the wing.

The tail has fourteen feathers. The upper surface of the two central pairs of feathers is of an olive yellowish brown (*olivengelb-braun*), the inner webs being somewhat darker; in the next pair the inner webs, and the lower third of the outer webs, are blackish. The two next following pairs are black; their outer webs have olive-coloured edges, and they have a white spot at the tip. In the next following pair the white marking is very large, and extends along the shaft, where it is very blurred, over half the length of the feather; only the basal portion of the outer web being still black. In the outermost pair of feathers the blackish colour does not advance beyond their basal portions, the greater portion of the inner web being pure white, while the outer web is very light whitish olive coloured (*weisslich olivenfarben*).

The measurements of this beautiful Thrush, as taken from seven

fresh examples, are as follows: Total length, 11·22 in. (285 *mm.*); length of wings, 6·46 in. (164 *mm.*); length of tail, 4·10 in. (104 *mm*); length of tail uncovered by wings, 2·17 in. (55 *mm.*); length of beak, ·86 in. (22 *mm.*); length of tarsus, 1·38 in. (35 *mm.*).

On the wings the third and fourth primaries are the longest, the latter receding only from ·04 to ·08 in. (1 to 2 *mm.*); the second flight-feather is from ·16 to ·20 in. (4 to 5 *mm.*), shorter than the fourth, but by about double as much longer than the fifth, its tip thus approaching considerably closer to the fourth than to the fifth.

The tail is more or less rounded. In one of my examples the outermost pair of feathers is 1·47 in. (12 *mm.*), the next pair ·20 in. (5 *mm.*) shorter than the rest, while in another nearly all the feathers are of equal length, only the outermost pair being ·35 in. (9 *mm.*) shorter.

According to actual observations, the nesting range of this species must extend from the Asiatic side of the Jenesei through southern Siberia. No eggs or nests however have as yet been discovered of which one could assert with certainty that they belonged to this species.

64.—Small-billed Mountain Thrush [Himalaya-Drossel].

TURDUS DAUMA, Latham.

Geocichla dauma. Seebohm, *Cat. Brit. Mus. Birds*, v. 154.

In the museum of Lund there is a Thrush, which, by the will of Baron von Gyllenkrog, went with the rest of his collection after his death to this institution. This example, alleged to have been caught on Fühnen, was bought about fifty years ago by Herr von Gyllenkrog from Brandt, a Hamburg naturalist. Brandt, however, informed me personally, a few years ago, that this example was one of the two birds which at that time, about 1836, reached him from Heligoland, and which Gould, likewise supporting himself on Brandt's statements, mentions in his *Birds of Europe* as having occurred in the neighbourhood of Hamburg. The latter Thrush, according to Gould's determination, was undoubtedly *T. varius*, and still exists, as has been already mentioned, in a collection in England. The other Thrush, however, which in the Lund museum is exhibited as *T. lunulatus*, does not belong, according to the form of the wings, to the latter species, but to *T. dauma* from the Himalayas, between which and the Australian *T. lunulatus*, according to Dresser, no hard and fast dividing line can be drawn.

According to the wing measurements supplied to me from

Lund, the example in the museum of that town has the second flight-feather only ·07 in. (2 *mm.*) longer than the sixth, and ·20 in. (5 *mm.*) shorter than the fifth; the third and fourth flight-feathers are the longest, and project about ·27 in. (7 *mm.*) beyond the second. In the preceding species, *T. varius*, the tip of the second flight-feather comes closer to the fourth than to the fifth; but in the present species, *T. dauma*, it comes closer to the sixth than to the fifth: hence in the former case it comes between the fourth and fifth, and in the latter between the fifth and sixth. Both species are very similar in colour and markings. The present species is a resident breeding bird in the Himalayas, and, as far as is at present known, has not been observed anywhere else on European soil.

65.—Missel Thrush [Misteldrossel].

TURDUS VISCIVORUS, Linn.

Heligolandish: Snarker=*Snorer*.

Turdus viscivorus.	Naumann, ii. 248.
Missel Thrush.	Dresser, ii. 262.
Merle draine.	Temminck, *Manuel*, i. 161, iii. 87.

Of all the Thrushes which are residents of the neighbouring continent, the Missel Thrush visits Heligoland in the smallest numbers; even leaving out of consideration the extreme shyness and cautiousness of the bird, it would be next to impossible to obtain more than twenty examples here in the course of a whole year. It is extremely rare to find this bird among the other captives of the throstle-bush, and to get at it on the bare surface of the Highland Plateau with the gun is quite impossible.

The bird counts among the earliest appearances of the spring migration, arriving in dull and mild weather as early as the beginning of February. As a rule, however, only one or two, rarely more than three, birds are seen in the course of a day. In fact, it is nowhere represented in such large numbers as are other resident Thrush species, although it is distributed over the whole of Europe and Asia, as far at least as Lake Baikal. Irby found the nest at Gibraltar, Sewertzoff in Turkestan, and Wolley obtained both nests and eggs in Sweden and Finland as far as 68° N. latitude.

66.—Song Thrush [Singdrossel].

TURDUS MUSICUS, Linn.

Heligolandish : Grü-Troossel = *Grey Thrush.*

Turdus musicus.	Naumann, ii. 262.
Song Thrush.	Dresser, ii. 19.
Merle grive.	Temminck, *Manuel*, i. 164, iii. 88.

Among the game which graces the table of the Heligolander, the Song Thrush, or,—to give its popular local name, 'de Grü,' *i.e.* 'the grey one'—plays a very prominent part. This, however, by no means implies that the fat Blackbird, or the large, delicious Ring Ousel are held in less estimation, but is due rather to the fact that the Song Thrush occurs here generally in much larger numbers than any of its relatives, and also, both because the chances of its frequent appearance are more favourable and the duration of its migration is much longer than that of any other species. With this advantage of a larger supply there is combined the pleasure of its highly agreeable taste, for, in this respect, a fat Song Thrush in autumn stands second to none of the whole pack of its relatives. Accordingly, when the menu of the Heligolander's housewife contains the item, 'Troossel-supp' (*i.e.* Thrush soup) we may reckon with safety on the timely appearance of paterfamilias at the dinner-table, his spoon held in readiness, and his mouth watering in expectation of the good things that are to come. Nor do I, after many years' practice, intend to blame him in the least for this little epicurean weakness, for I myself have pretty often, when assisting in the grey dawn of the morning at the capture of the dainty fat Ring Ousel, suddenly caught my thoughts straying, with by no means unpleasurable feelings, from the throstle-bush to the soup pot.

The word 'Throstle-soup' may perhaps sound rather strange. Here in Heligoland, however, almost everything finds its way into the soup pot, or rather stewpan; not only every species of Thrush, but also, by preference, Larks, a stray Wood Pigeon, Golden Plover, Pewit, Landrail, and the like. Hardly anything is roasted. For my part, I can only advise everybody who catches birds in sufficient numbers, for once in a way not to roast his *T. musicus*, or Field-fares; but, by way of a trial, to confide some forty or fifty, according to requirements, to the soup pot. But, for heaven's sake, don't have the fattest birds drawn! And if Betty is a true artist, of which I have no doubt, she will send up a soup—to be followed by Thrushes *au naturel*—of which I 'm sure no one will fail to ask a second helping.

The migration of the Song Thrush commences in the spring, according to the state of the weather. As early as the beginning of March, or even earlier—I find it noted at odd places in my journal as early as the third week in February—this migration continues incessantly until the middle of May. The return migration begins in the middle of September and lasts until the end of October or middle of November. A light south-east and south-south-east is the most favourable wind for both migration periods, especially if it be accompanied by fine warm weather. Besides these regular flocks of migrants, there appear here almost annually, during the first days of July, small companies of from five to six young birds. These often have their upper parts still marked with light spots. They frequent chiefly dense bushes and shrubberies in gardens.

The only conclusion to be drawn from the early appearance of birds like these is that they must have been bred on Heligoland. If so, it remains to be explained where their nest could have been situated, unless, perhaps, in some dark cleft of the rocks, since bushes dense enough to serve as the nesting place of a Thrush are not to be found on the island.

The arrival of the Thrushes in the quiet dawn of morning is marked by a peculiar buzzing sound, the birds shooting down from a great height with a rapidity much greater than that of a sky-rocket, and mostly in one steep, perpendicular line of descent; sometimes, however, they describe a two- or three-fold zigzag, as one may recognise from the changing tone of the noise. The downrush of a Thrush, Pigeon, or Snipe, is far too rapid to be capable of observation by the eye; one is only able to see it at the last moment, in which the bird suddenly approaches the ground and forthwith settles thereon. This takes place sometimes in a slightly inclined direction, sometimes almost perpendicularly.

Such a sudden and steep descent, however, takes place only in calm, clear weather; if the atmosphere is damp, dull, and heavy, the birds arrive flying at a lower elevation.

During a strong migration the Thrushes buzz about at early dawn with the speed of an arrow through the streets, among scattered houses and gardens, and, in this way, precipitate themselves into the throstle-bush or other shrubs. The greatest speed at which the birds fly during the day is not to be compared with that of their flight during these early hours. The latter probably represents the last spurt at the close of the migratory journey, and, in the case of the spring migration of the Red-spotted Bluethroat, reaches the astonishing result of one hundred and eighty miles per hour.

During these early morning hours the Thrushes may also be caught with success in large vertically-placed nets, like Snipe nets, but having smaller meshes. In the course of the day these Thrushes fly into the bush more at their ease; sometimes, too, when not watched, they will hop into it along the ground; but one is never able to drive them into it like the Blackbirds. If one approaches one of the latter, the bird tries at first to withdraw by long bounds. A Song Thrush never proceeds in this manner; it sits still and erect until one approaches it too closely, when it suddenly flies away. If it happens to be sitting close in front of the throstle-bush, it will, under such conditions, fly vertically upward and away over, but not into, the bush.

The capture of Thrushes in the throstle-bush was formerly —*i.e.* before the change in the prevailing direction of the wind already referred to had set in—an extremely profitable occupation. An old fowler—Payens—used often to catch as many as five or six hundred birds in one day in his bush. Once, in October 1824, he actually caught as many as a thousand in one day. Nowadays, however, a hundred represents an exceptionally good day's catch.

The Song Thrush breeds abundantly from the Atlantic to the Pacific Ocean. In Norway its breeding range extends to 68° N. latitude.

67.—Redwing [Weindrossel].

TURDUS ILIACUS, Linn.

Heligolandish: Gühl-Jükked = *The Yellow-Winged (Thrush).*

Turdus iliacus.	Naumann, ii. 276.
Redwing.	Dresser, ii. 35.
Merle mauvis.	Temminck, *Manuel*, i. 165, iii. 89.

This handsome Thrush visits Heligoland in much smaller numbers than the preceding, and even of these visitors probably only a small portion calls here of its own choice; for the large flocks, numbering from one hundred to two hundred birds, which descend in October, sometimes late in the afternoon or towards evening, with much noise, are invariably the precursors of bad weather—*i.e.* of violent west wind and rain. Endowed with a presentiment of these impending changes, they break their journey at Heligoland, which would certainly not happen under favourable conditions of weather. This phenomenon furnishes another proof of the valuelessness of data as to the local appearance of birds during their migration period, collected with so much zeal and in so many quarters, if these are not accompanied by the fullest and most

comprehensive information as to the meteorological conditions at the time of observation. For, as has been already fully discussed in the section on 'Atmospheric Conditions which influence Migration,' the appearance of particular birds in greater or less numbers in particular places and at particular times is most intimately connected with the local atmospheric conditions which prevail at the time being.

This bird is caught here only in small numbers; it frequents principally open fields and grass-plots, and hence approaches the throstle-bush only in rare and exceptional cases.

Its autumn migration commences later than that of the Song Thrush, the first individuals rarely arriving before the middle of October. Its movements, too, are less influenced by the weather than those of the last-named species. The migration lasts throughout the whole of November; smaller companies may also be met with as late as December—*e.g.* in 1886, on the 20th, 21st, and 22nd of that month.

The Redwing breeds from the centre to the extreme north of Scandinavia, and within the same parallels of latitude as far as eastern Siberia. Towards the east, however, its numbers undergo considerable diminution.

68.—Dark Thrush [Blasse Drossel].

TURDUS PALLENS, Pall.[1]

Turdus Pallens. Naumann, xiii. 289.
Dusky Thrush. Dresser, ii. 71.
Merle blafard. Temminck, *Manuel*, iii. 97, iv. 605.

I am noting this species mainly on the authority of Claus Aeuckens, he having, on the 3rd of June 1881, seen an example of it at a distance of from eight to ten paces. He had time enough to observe the bird to his entire satisfaction; but, unfortunately, not having a gun with him he was not able to secure it. Aeuckens, who, as a careful and reliable observer probably stands second to none on this island, described the bird so accurately that not the least doubt remained as to its species. He was further convinced of his conclusions on my showing him the skin of one of these birds. The bird, moreover, has been met with pretty often on the continent, and, a few years ago, was caught as near as Holstein, so that its appearance in Heligoland need not be a matter of great surprise.

[1] *Turdus obscurus*, Gmelin.

The home of this Thrush is in the northern parts of eastern Asia. Seebohm found the nest within the Arctic Circle, on a tributary of the Jenesei, and Dybowsky met with breeding birds in Daüria. As the bird has been received even from Japan, it is probable that its nesting places extend into the extreme eastern parts of Asia.

69.—Olive-backed Thrush [Swainson's Drossel].

TURDUS SWAINSONI, Cabanis.

Turdus Swainsoni. Naumann, xiii. 275, pl. 355, fig. 4.
Wilson's Thrush. Richardson and Swainson, *Faun. Bor. Amer.*, p. 182.
Turdus Swainsoni. Seebohm, *Cat. of Birds of Brit. Mus.*, v. 201.

The first example of this small American Thrush observed in Europe was caught, according to Giglioli (*Avifauna Italica*, p. 100), at Genoa in the autumn of 1843. The bird is later reported to have occurred in Belgium, but according to Naumann, 'this report has not been verified.' On the 2nd of October 1869, however, a bird of this species was met with in Heligoland. It was prepared as a specimen by myself and is in my collection. It had been so much frightened by a Sparrow-hawk that it fled up the steps of the wooden stair leading up to the cliff—*i.e.* the Highland, or Oberland—among the people passing there at the time, and allowed itself to be caught by the hand of a young gunner, Jacob Aeuckens, without making the least effort to escape.

According to Giglioli's further notes, another example of this Thrush was caught in Upper Italy in 1878, and exhibited in the museum of Roveredo; and, finally, there is in the museum at Hamburg an example caught several years ago in Holstein. This example, which I was enabled to compare with my own specimen, resembles the latter completely, and is undoubtedly *T. swainsoni*.

All the examples noted above as having been met with in Europe were captured during the autumn migration, which, judging from analogous phenomena, would lead one to presume that they originate from eastern Asia. This assumption is further supported by the fact that during Nordenskjöld's Arctic Expedition three small Thrushes were caught on the Tchukchee Peninsula, on the 1st, 8th, and 10th of June. These are described as *var. aliciæ* (Baird), a pale eastern aberration of *T. swainsoni* (Palmén, *Bearbeitung des Ornithologischen Materials*.[1] As however the original home of both forms is in North America, whence *T. aliciæ* has advanced into Asia, we may therefore assume that *T. swainsoni*,

[1] *Report on the Ornithological Materials collected by the Expedition.*

which only differs from *T. alicia* by its somewhat deeper buff (*rostgelb*) coloration, shares with the latter form the tendency for migrating westwards, and in virtue of this tendency reaches Europe by way of Asia.

In the coloration of all its upper parts, tail, and wings, this small and handsome Thrush exactly resembles a Song Thrush. Its lower parts are dingy white, with a tinge of buff colour on the neck and upper breast. The sides of the neck and upper breast have the spotted markings characteristic of all the Thrush species Towards the upper breast, however, these markings, which at first have the form of acute triangles, rapidly widen out; nor are they as black or as sharply defined as in the Song Thrush; and at the sides of the breast they pass into broad, dingy grey and very faint spots, so as to be scarcely distinguishable from the grey-clouded flanks. The middle of the breast, the belly, and under tail-coverts are of a uniform white.

The measurements of the bird killed here were as follows:—total length, 6·34 ins. (161 *mm.*); length of wing in repose, 3·74 ins. (95 *mm.*); length of tail, 2·64 ins. (67 *mm.*); length of tail uncovered by wings, 1·06 in. (27 *mm.*); length of beak from forehead to point, ·43 in. (11 *mm.*); length of tarsus, 1·10 in. (28 *mm.*).

The breeding range of this species extends across Canada and Alaska as far as the Arctic Circle. The paler, more grey-coloured individuals, which are said to predominate in the eastern portions of their breeding home, whence, according to Seebohm (*Cat. of Birds of Brit. Mus.*, v. 202), they pass over to Kamtschatka, have been separated from the more vividly rust-yellow examples under the name *T. alicia*. How far this separation is correct cannot be decided here. We would only remark that the example which was met with in Heligoland is of a fairly vivid buff (*rostgelb*) colour.

A clutch of eggs of this species, of the genuineness of which no doubt can exist—inasmuch as I received it from the Smithsonian Institution at Washington—in the ground colour and colour of the markings almost exactly resembles diffusely-marked examples of the Ring Ousel, though the ground colour may be somewhat of a less rich sea-green and the colour of the markings not quite so brightly ferruginous (*rostroth*) as in the latter species; moreover, a few violet-grey (*violettgraue*) blotches occur between these markings. In two of these eggs the markings are spread over the whole surface, being somewhat denser at the thicker end of the egg. In another the markings are collected in a zone. In the fourth the violet-grey (*violettgraue*) blotches are more numerous,

and the markings, which consist of small, sharply-defined dots of a deeper violet brown (*violettbraun*) are extremely scattered.

In shape the eggs are moderately rounded, their length being ·86 in. (22 *mm.*), and their largest diameter, ·67 in. (17 *mm.*). Their shells are much less glossy than those of the eggs of most other species of Thrush.

70.—Hermit Thrush [Einsame Drossel].

TURDUS PALLASI, Cabanis.

Turdus solitarius.	Naumann, xiii. 275, pl. 355, figs. 1 and 2.
Hermit Thrush.	Richardson and Swainson, *Faun. Bor. Amer.*, p. 184, pl. 35.
Merle solitaire.	Schlegel, *Krit. Uebers. d. Vögel Europas*, pp. xi. and 70.
Turdus pallasi.	Seebohm, *Cat. of Birds of Brit. Mus.*, v. 190.

An example of this small American Thrush was caught here in October 1836, eleven years after Naumann had obtained one near his residence. Reymers, who, a few years after its capture here, reported the fact to me, was unable in spite of all efforts to obtain the bird from its captor, otherwise it would probably, like *T. lividus*, have come into my collection afterwards. Reymers described the bird to me as a very vividly-coloured miniature Song Thrush, with a tail of similar colour to that of the nightingale. Very soon afterwards, however, he saw at Brandt's, in Hamburg, some American skins of this species, and in this way learned the name of this rare visitor.

According to Professor Giglioli, a specimen of this species caught in Italy is contained in a private collection in that country.

This small Thrush breeds in North America up to 60° N. lat.

71.—Wilson's Thrush [Kleine Drossel].

TURDUS FUSCESCENS, Stephens.

Turdus Wilsoni.	Naumann, xiii. 275, pl. 355, fig. 3.
Little Tawny Thrush.	Richardson and Swainson, *Faun. Bor. Amer.*, p. 179, pl. 36.
Turdus fuscescens.	Seebohm, *Cat. of Birds of Brit. Mus.*, v. 203.

In regard to this small Thrush, also, Reymers is my only authority as to its occurrence on the island. He told me that Brandt had determined it as *T. minor*. Its under parts were almost devoid of spots. The neck and upper breast only were marked by a few of the spots characteristic of the Thrush species,

which were very dingy but not black, on a faint yellow ground. The sides and other lower parts were whitish.

About 1833 this specimen, so interesting by reason of its rarity, passed over into Brandt's possession, as has been the case in many similar instances. On seeing, more than ten years later, the first few hundred birds which I had collected, Brandt expressed his surprise at finding among them so few of the rarer Sylviæ and Thrushes, of which he said he had very often received many interesting examples from this island. It appeared strange that he had never received from here rare Eastern species of Buntings, and he was therefore much surprised at seeing in my collection *Emberiza pusilla*, of which species I possessed at that time my first example.

Buntings from Siberia have, however, within the latter decades, become particularly numerous. May we perhaps be allowed to assume that,—side by side with changes of meteorological conditions which, as already frequently mentioned, have set in within the last thirty years and acted as disturbing agents on the appearance of Eastern insectivorous species—other meteorological influences, too delicate to be perceptible, have come into play and favoured the appearance of Eastern Buntings and other granivorous species?

This small Thrush occurs as a resident breeding bird in the central and northern parts of North America, from the Atlantic Ocean to the Rocky Mountains.

Despite their apparent similarity and almost equal size, it is nevertheless very easy to determine any one of the three preceding small species of Thrush. *Turdus swainsoni* is distinguished from the two others by its olive-coloured upper side, which never has the least tinge of the rusty orange brown (*rostorange-braun*) which characterises the two other species; and of these *T. pallasi* is unmistakably recognisable by its ferruginous (*rostroth*) tail, which in *T. fuscescens* has nearly the same colour as the large flight-feathers. The three species are equally distinct in the marking of their under parts. In *T. pallasi* the black spots characteristic of the Thrushes extend down to the middle of the breast; in *T. swainsoni* only as far as the upper breast; while in *T. fuscescens* they are of a very pale dingy brownish colour, and reach only to the base of the neck.

72.—Fieldfare [Wachholder-Drossel].

TURDUS PILARIS, Linn.

Heligolandish: Lanz (a name without further signification).

Turdus pilaris. Naumann, ii. 296.
Fieldfare. Dresser, ii. 41.
Merle litorne. Temminck, *Manuel*, i. 163, iii. 88.

It is surprising that the Fieldfare, which is everywhere caught in such large numbers, visits Heligoland, famed for the richness of its avifauna, so sparingly that no special method exists for its capture. There is, indeed, the throstle-bush, designed as much for it as for all its other near relations; but it only enters it in extremely exceptional instances, and then, for the most part, only towards evening with the intention of passing the night there. During the day the flocks which make their stay here frequent the pastures of the Upper Plateau. Even then, however, as also during their migrations and local peregrinations, their social instinct betrays itself, for although large companies of them may gradually, while searching for food, get scattered over wide grassy plains, they nevertheless all take to the wing at one and the same time, and forthwith congregate into fairly dense droves. These, after flying for some distance, suddenly and again simultaneously alight upon some other spot. These birds are altogether of a very restless disposition, and, unlike other Thrushes, make their loud call-notes heard continuously as they run or fly about, their unsettled bearing giving one the impression that they were anxious to get off again as soon as possible. This, indeed, is possibly the case, their flight to Heligoland from their breeding places in Scandinavia being too short a stage of the whole migration journey to evoke the desire for a steady rest. In most cases, too, companies of this kind resume their journey after only a few hours, while numerous large droves pass the island both day and night without halting on their passage. In the day they invariably migrate in close companies; and though these do not fly in such densely-crowded droves as, for instance, the Starlings, they yet always keep close together. This, however, is quite different on dark autumn nights, when, judging from their calls, they travel singly and apart, although spread far and near over the whole firmament.

The autumn migration of this species seldom commences before the end of October, continues through the whole of November, and extends not only to the close of the year, but often even far into January of the following year. Thus, in my diary for 1884, I find

the note, 'Many *pilaris*,' not only under the dates 20th, 24th, and 30th December, but also as late as on the 8th, 12th, 13th, and 28th of the following January. February appears to be the only month of rest for this species, and even then a sudden frost and heavy snowfall may drive southward such flocks as have still lingered in the north.

The return passage begins in March; and, strange to say, flights of hundreds of birds are still regularly met with in the course of May, hopping about for half the day on the grass plains, and continuing their journey in the evening.

The movements of this Thrush seem to be as unrestrained in respect to the time of day as they are in regard to the seasons. Like other Thrushes, the birds prefer the night for their passage, but they also arrive at all times of the day in flocks consisting of twenty, fifty, but mostly of hundreds of individuals.

The arrival of a migratory host of such dimensions in dull and misty weather presents a curious scene. At a height of about three hundred feet the birds cannot be seen under such conditions, only their harsh rattling cries are audible through the dense clouds of mist. All of a sudden the foremost members of the drove become visible, dropping almost perpendicularly. These are followed in quick succession, and in a similar manner, by the rest of the flock, all alighting on the same spots as those which preceded them, so that for several seconds a cascade of living birds is presented to our view.

No doubt a similar precipitation, even if only of solitary individuals, also takes place at night; for on one occasion at least, one of these Thrushes had the misfortune, in the dark, to impale itself on the lightning conductor of the lighthouse, and that with such force that the point of the rod which had penetrated the breast projected several inches on the other side beyond its back.

The Fieldfare breeds in large numbers in Scandinavia, and stragglers are met with as far as south Germany. Seebohm found the bird on the Jenesei above 70° N. latitude, while Dybowsky has met with it on Lake Baikal and in Daüria, so that its breeding range undoubtedly extends from Norway in the same latitudes through Asia, at least as far as the Lena.

73.—Dusky Thrush [Braune Drossel].

TURDUS FUSCATUS, Pallas.

Turdus fuscatus.	Naumann, xiii. 307.
Dusky Thrush.	Dresser, ii. 63.
Turdus fuscatus.	Pallas, *Zoog. Ross.-Asiat.* i. 451.

Of this Siberian Thrush, too, so rarely met with in Europe, my collection possesses a beautiful specimen, a young autumn bird in fresh uninjured plumage. It was caught here in the throstle-bush on the 10th of October 1880. Apart from this example, the following are fully-corroborated records of its occurrence in Europe: Bechstein, 1795; Naumann, 1804; Giglioli, Turin, 1829; Brescia, 1844; Genoa, 1862; Florence, 1879.

Further, Baron de Selys Longchamps, is said to possess a Thrush caught in Belgium, which was originally regarded as *T. naumanni*, but subsequently proved to be *T. fuscatus*.

It is, however, quite possible that a similar confounding of species may have occurred in regard to the Italian examples, one or other examples designated as *T. fuscatus* belonging really to *T. naumanni*; for it is very surprising that this latter species also has not been met with among other Siberian Thrushes so numerously represented in Italy, especially as in the rest of Europe it has occurred in vastly larger numbers than *T. fuscatus*. Equally strange is it to find, in Giglioli's *Fauna Italica*, how sparingly Siberian Leaf-Warblers and Buntings are represented in Italy, as compared with its richness in Siberian Thrushes.

The example caught here has all its upper parts of a dusky brown, somewhat similar to the colour of the back of the Fieldfare—a dull dusky ferruginous (*rostroth*) colour shining through on the covered portions of the feathers. On the rump this rust colour becomes very distinct, but on the upper tail-coverts it is again hidden by dusky edges.

The flight- and tail-feathers are blackish, edged with the colour of the back. In the tail-feathers, the edges towards the roots pass into a dusky rust colour; the great wing-coverts as well as the secondaries have dull, rust-coloured, well-defined edges, and the former, like the posterior flight-feathers, have whitish tips. The inner wing-coverts and the inner webs of the flight-feathers are whitish ferruginous (*weisslich-rostroth*).

A very broad, dull yellowish white eye-streak runs from the nostril to and beyond the ear-coverts; the sides of the neck and

the fore-neck are of similar colour; several rows of the black triangular spots characteristic of the Thrushes run down from the lower mandible, merging into each other; and smaller spots of the same kind are found scattered on the throat and forehead, very frequently, too, on the upper part of the grey-clouded upper breast; here they merge with rows of spots, so as to form large blackish-brown spots on the sides. The upper breast and flanks of the bird are marked on the same plan as in the Fieldfare—*i.e.* the feathers of the head are blackish-brown—this colour passing into a dull ferruginous colour at the sides of the breast and flanks, all the feathers having dark grey edges, those of the upper breast being very narrow, but becoming very broad further down so as almost to hide the ground colour. Towards the middle of the breast some of the feathers have small, blackish, kidney-shaped spots. The middle of the breast and the abdomen are of a dull white, the under tail-coverts dark ferruginous colour, their shafts being whitish, and their tips having white spots so large as almost to completely hide the rust colour of the ground.

In general the bird nowhere shows any approach to the olivaceous grey colouring of the upper parts of the other Thrushes, nor does its dark ferruginous (*rostroth*) coloration approximate to the beautiful orange brown (*rostorange*) of Naumann's Thrush.

The measurements of the bird caught here, taken from the freshly-killed example, are as follows:—Total length, 9·05 ins. (230 *mm.*); length of wing in repose, 5·31 ins. (135 *mm.*); length of tail, 4·41 ins. (112 *mm.*); length of tail uncovered by wings, 1·65 in. (42 *mm.*); length of beak, ·59 in. (15 *mm.*); length of tarsus, 1·06 in. (27 *mm.*).

Before the capture of the above-named Thrush in my garden on the 10th of October, I had seen in the same place on the 8th, a Yellow-browed Warbler (*Sylvia superciliosa*); on the 11th, a Little Bunting (*Emberiza pusilla*) was shot; while the Siberian Chiffchaff (*S. tristis*), and *S. superciliosa*, were seen on the same day; on the 25th, a beautiful *S. superciliosa* was shot, and on the following day an example of the same species and one of *E. pusilla* were seen. A *S. superciliosa* had already been observed on the 16th; on the 17th, hundreds of thousands of Siskins covered the whole island, and passed in cloud-like droves; and on the same day I obtained a young grey autumn bird of the Rosy Pastor (*Sturnus roseus*).

Seebohm, in the course of his interesting Siberian voyage, found some nests of this Thrush on the Lower Jenesei; thence its breeding range extends eastwards through northern Asia.

74.—Red-throated Thrush [Rothhals-Drossel].

TURDUS RUFICOLLIS, Pallas.

Turdus ruficollis.	Naumann, xiii. 316.
Red-throated Thrush.	Dresser, ii. 67.
Turdus ruficollis.	Pallas, *Zoog. Ross.-Asiat.* i. 452.

Of all its far eastern relatives, this beautiful Siberian Thrush has been the rarest visitor to Europe; besides the example killed here, only two other instances of its actual occurrence appear to be known: one of these was caught in October 1836 in the neighbourhood of Dresden, while the other was discovered by Altum among other Thrushes in the market at Münster, in November 1866 (*Journal für Ornith.* 1866, p. 423; 1867, p. 109). The example found in Heligoland, a young bird in its first autumn plumage, was shot at the end of November 1843, on the open and freely exposed plain of the Upper Plateau.

In this example all the upper parts, the ear-coverts, and sides of the neck, are of a dingy dark olive grey (*olivengrau*), with some admixture of earth colour (*erdfarben*); the whole coloration—especially on the rump—somewhat approaching that of a Song Thrush in faded plumage. The fore-neck from the bill and ear-coverts downwards is shot with dingy buff colour (*rostgelb*); the sides of the upper breast clouded with dull olivaceous brown (*olivenbraun*); on the sides of the breast and on the flanks, the colour is a faded light olive grey (*olivengrau*), each feather having a slightly darker, much blurred marking along its middle. A dull, very faint eye-streak commences above the eye, and terminates above the ear-coverts. Several rows of blackish brown spots extend downwards along the neck, and a few small, somewhat blurred triangular spots are diffusely scattered upon the upper breast. The flight-feathers and rectrices are somewhat darker than the back, the former having very faint, less pale edges, and only a few of the great covert-feathers have dull whitish tips. The lower wing-coverts are somewhat faintly rust-coloured (*matt rostfarben*), neither ferruginous (*rostroth*) nor buff colour (*rostgelb*), but of a tint intermediate between these two shades. The tail forms the chief mark of distinction between this species and a young Black-throated Thrush, being in the latter blackish brown, without a trace of rust colour, while in the present species, in the inner webs of its feathers, especially those of the outermost pair, there is a very strong admixture of rust colour; this difference becomes remarkably striking on holding, side by side with an example of the present species, a Black-throated Thrush of

the same age; moreover, in *T. ruficollis*, the shafts of the tail-feathers are whitish rust coloured, which is not the case in *T. atrigularis*.

The middle of the breast, the belly, and under tail-coverts are in both species pure white; whilst, however, in *T. ruficollis*, the longest of the latter feathers are only slightly tinged towards their roots with olivaceous grey (*olivengrau*), they are, in *T. atrigularis*, almost entirely olivaceous greyish brown (*olivengraubraun*), which colour also persists over a large part of the next pair of feathers.

Dresser says that the nest of this species has not yet been discovered; but it must breed far up in northern Asia, since it has been met with on migration from the Obi to the sea of Ochotsk. In the case of the first-named river, we have only one record of its discovery, viz. that of Finch; but Prjewalsky notes it for north Mongolia as the most numerous of all the Thrushes which pass through that district; while Swinhoe met with migrants of this species in Northern China. One might therefore expect to discover its nesting places chiefly in the Lena district, especially since Seebohm does not appear to have met with this species among the rich store of Thrushes taken by him at the Jenesei.

I have in my possession an egg alleged to belong to this Thrush, which I received in 1874 from Taczanowsky. It resembles a small, very finely and densely spotted egg of *T. torquatus*, and is 1·14 in. (29 *mm.*) long, and ·82 in. (21 *mm.*) broad.

75.—Black-throated Thrush [Schwarzkehlige Drossel].

TURDUS ATRIGULARIS, Temminck.

Turdus Bechsteinii. Naumann, ii. 310; *T. atrigularis*, xiii. 330.
Black-throated Thrush. Dresser, ii. 83.
Merle à gorge noire. Temminck, *Manuel*, i. 169, iii. 93.

Though my collection is graced by the presence of many rare and beautiful Thrushes, I have just cause for bitter regret at seeing the place of the present species still unoccupied. The bird has been killed, so to speak, all around this island,—in England, Belgium, Denmark, Sweden, East Prussia, Mecklenburg, and Oldenburg, whilst from twenty to thirty instances of its occurrence are recorded from Central Europe. Heligoland, however, has up to the present not been recorded as a locality. On one occasion, it is true, a beautiful old male was seen late in May in the immediate neighbourhood of the island—so near, in fact, that the yellow basal portion of its bill could be recognised quite distinctly. Unfortunately the general migration was already at an end, no gun was at hand,

and the nets had long since been removed from the throstle-bushes. Consequently, this bird with its beautiful collar of black velvet failed to obtain the honour of a prominent place in the select circle of my cabinet.

The breeding range of this species lies chiefly in western Asia. Sewertzoff met with it nesting abundantly in Turkestan; Dybowsky less numerously during its migration in Dauuria.

76.—Ring Ousel [Ringdrossel].

TURDUS TORQUATUS, Linn.

Heligolandish: Kringelt-Troossel = *Ring-Thrush.*

Turdus torquatus. Naumann, ii. 318.
Ring-Ousel. Dresser, ii. 91.
Merle plastron. Temminck, *Manuel*, i. 166, iii. 89.

As already mentioned, this Thrush is, of all the species occurring here, the most in demand by the local fowlers; unfortunately it appears in but limited numbers, while its late arrival in the spring announces the approaching end of the thrush-catching season. Its migration lasts from the middle of April until the middle of May, and is dependent on warm weather, with east or south-easterly winds; the return passage takes place in September.

This Thrush, also, has a liking for associating itself with companies of individuals of its own species, especially when on the wing, and very readily follows the lure-call of another bird of its species. This social inclination is of advantage to the fowler; for though only one Ring Ousel may happen to get into the throstle-bush, its call lures all the members of any flock that happens to be wheeling about at the time to precipitate themselves forthwith into the bush. Thus, on one occasion, a thrush catcher had the unexampled good fortune to take seventy-three of these splendid birds in one 'rush,' in the garden now belonging to me. In general, from ten to twelve examples are considered a sufficiently enviable catch.

The Ring Ousels frequent by preference the grassy places near the edge of the cliff, and the upper portions of its face.

Quite contrary to Naumann's statement, however, in regard to these birds, viz. that 'they are not shy, but confiding—one might indeed say stupid'—they are here, next to the Missel Thrush, the shyest and most cunning of all the Thrushes, and can be approached with a gun only under the most favourable conditions.

The Ring Ousel breeds throughout the whole of Europe from Spain to the Ural.

77.—Blackbird [SCHWARZDROSSEL].

TURDUS MERULA, Linn.

Heligolandish: Swart-Troossel = *Black Thrush*.

Turdus merula. Naumann, ii. 326.
Blackbird. Dresser, ii. 91.
Merle noir. Temminck, *Manuel*, 68, iii. 90.

Strange to say, in its manner and habits this Thrush, during its visits to Heligoland, differs from the description by so unassailable an authority as Naumann, almost as markedly as we had occasion to note in regard to the preceding species. Similar observations made on many other visitors to Heligoland lead me to suspect that during the migration the birds assume certain special manners and peculiarities—*manières de voyage*—which are more or less at variance with their ordinary habits of life. Hence *inter alia* we can in no way regard the Blackbird's manner here as 'extremely distrustful, cautious, or clever'; on the other hand, it would be equally inadmissible to call them simple or stupid, as their elegant appearance would in itself contradict such an assertion. For instance, when I step into my garden, which is about eighty feet long, with a throstle-bush at its farthest end, and happen to find an old male Blackbird sitting in the middle of the garden, the bird will not on my approach at once fly off with loud cries, but hop towards the throstle-bush quietly in long leaps, and with frequent pauses. This manœuvre is performed with particular ease if the bird happen to be in the straight path which leads to the bush, and which is bordered by gooseberry and currant bushes on both sides. Under these conditions, the bird will not infrequently even make a slight turn to one side, in order to pick up quite leisurely some insect or worm that it may have espied there. Nor must one by any means suppose that this behaviour of the bird is due to its being fatigued from its journey, or half-starved; on the contrary, the birds are almost always, particularly during the autumn migration, actually enveloped in fat. The Heligolandish fowlers' report in regard to the Blackbird is to this effect: 'A very sensible bird, which allows itself to be driven to the throstle-bush without making much fuss.' The reader will perhaps remember how very differently the Song Thrush behaves under similar circumstances.

The spring migration of this Thrush commences very early in mild weather; the first examples arrive as early as the end of February, or even somewhat earlier. The main body, however,

arrives during the course of March, the last stragglers bringing the spring migration to a close in the middle of April. The birds return from their breeding quarters from the middle of October to the middle of November; after the latter month, however, one may expect to come across solitary examples, or even groups of from twenty to thirty individuals, at all times of the winter. Thus, at the end of December 1876, some twenty birds visited my garden almost daily, where they greedily devoured the berries on the thorn-bushes. Despite the sharp winter weather, these birds were very plump, as was also the case with the numerous Fieldfares which accompanied them.

Winter visitants like these are invariably old birds, the large majority males, with orange-yellow bills; these, doubtless, had purposed wintering in their breeding quarters, but were driven out by the advent of severe cold and snow; indeed, as soon as the weather becomes milder, they at once disappear again.

Unlike all its other generic relatives, this Thrush by preference frequents the grottos and clefts at the base of the rock. But birds which have chosen such spots for their place of residence during the winter months, have fed largely on the larvæ of marine insects, which occur there in great abundance, and have thereby acquired so unpleasant a smell and taste that they are literally unfit for food.

The Blackbird furnishes excellent proof of the difference in the time of the migratory flight of different ages and sexes; for the glossy black colour of the earliest spring arrivals leaves no doubt as to their being old males. In the course of a week or two they are joined by the greyish-brown females; with the gradually increasing numbers of the latter are associated young birds, in whose plumage the reddish-brown colour is more pronounced. Now and again a solitary black individual with orange bill may be found among these last stragglers; these invariably, as is proved on examination after capture, have suffered some injury or other. Some of the toes, or a foot, have been lost; or the tail or one of the wings has suffered a great loss of feathers; or some other injury sufficient to delay their passage has been sustained. The autumn migration proceeds in similar unchanging sequence; only, in this case, the migration begins with the arrival of the young birds, and terminates with that of the old ones. Hence it has become proverbial among the fowlers of Heligoland that when the *Gühl-nabbeten—i.e.* 'the yellow-billed birds'—begin to arrive, the Thrush season is on the wane.

The spring and autumn migration of all other species proceeds in the same sequence as regards age, with the sole exception of the Cuckoo.

The Blackbird is a resident breeding bird in the whole of Europe and North Africa; in Scandinavia it approaches the circumpolar circle.

78.—American Robin [Wanderdrossel].

TURDUS MIGRATORIUS.

Turdus migratorius. Naumann, xiii. 336.
Migratory Thrush. Audubon, *Syn. of the Birds of North America*, 89.
Merle erratique. Temminck, *Manuel*, iii. 91.

A very fine old bird found lying on the grass near the lighthouse on the morning of the 14th of October 1874, having undoubtedly killed itself against the glasses, furnishes the sole instance of the occurrence of this species in Heligoland. The breast of this bird was of a beautiful reddish-brown colour; the throat pure white, with black stripes. Unfortunately, I did not obtain it for my collection.

There occurred in that year a very powerful migration of species from the far East; on the 11th of October a *Sylvia superciliosa*, and on the 13th and 14th an example of *Emberiza pusilla* were killed. *Alauda alpestris* occurred in large quantities in flights of hundreds until the end of the month. On the 27th of April of the same year also—though this has no connection with the species at present under consideration—I obtained the first and only example of *Alauda tatarica*, a female, which has ever been shot here. The above-mentioned example of this species may, in the present instance, have reached Heligoland *viâ* Asia, having crossed over to the latter continent from North America along the Aleutian group of islands; the fact of the simultaneous occurrence of the other species mentioned above, as well as the time of the year at which it was met with, strongly support the view of its pursuing an east-to-west line of migration.

According to Dalgleish's investigations (*Occurrences of North American Birds in Europe*, Bullet. of Nuttall Club, v. 1880), this Thrush has been met with in Europe on five occasions: once in the bird-market at Berlin, the example being preserved in the Radziwill Collection; twice in the bird-market at Vienna, and once in Bohemia; two of these latter examples are preserved in the Imperial and Royal Museum in Vienna; finally, one example was caught near Dover in the spring of 1876.

The breeding range of this species extends over the whole of North America.

79.—Rock Thrush [Steindrossel].

TURDUS SAXATILIS, Latham.[1]

Heligolandish : Styahn-Troossel = *Stone Thrush*.

Turdus saxatilis. Naumann, ii. 348.
Rock Thrush. Dresser, ii. 129.
Merle de roche. Temminck, *Manuel*, i. 172, iii. 102.

Of this southern species I obtained a beautiful old male and female in breeding plumage, and a young bird in fresh autumn plumage. The birds might seem to have been picked for my collection, for during the whole time of my residence here only two or three other examples have been seen, without, however, being shot. Reymers and Koopmann, however, must have obtained it before my time, for the bird was well known to the shooters and fowlers of that period.

The male was shot on the 9th of May 1851, the female on the 17th of May 1860, and the young bird on the 12th of November 1874. At first I was much surprised to obtain this young bird here, but when I afterwards learnt that this species breeds in all the mountain ranges of central and southern Asia, the occurrence of this individual during the autumn migration did not appear any more strange than that of many other species from eastern Asia. The time of occurrence of the two old birds, on the other hand, leads one to conclude decisively that their home was in the south, or rather, south-east.

The Rock Thrush breeds in almost all the mountain chains of southern and central Europe, from Portugal to the Caucasus; also throughout the whole of central Asia, from Turkestan to China.

In England it has only been shot twice, and in northern Germany it has probably never been observed. Heligoland would appear to be the most northern point of its occurrence.

80.—Blue Rock Thrush [Blaudrossel].

TURDUS CYANUS, Linn.[2]

Turdus cyanus. Naumann, ii. 341.
Blue Rock Thrush. Dresser (*Monticola* (*Petrocossyphus*) *cyanus*), ii. 149.
Merle bleu. Temminck, *Manuel*, i. 173, iii. 103.

Many years ago, about 1830-1832, this Thrush was once caught in the throstle-bush; the bird in question was an old male, for it

[1] *Monticola saxatilis* (Linn.).
[2] *Monticola cyanus* (Linn.).

has always been described to me as a very beautiful blue Thrush. The correctness of this record was proved later on, on my showing to the person who had captured the example referred to above a number of skins, and amongst these one of this species; for he at once picked out the latter, saying: 'That's the Thrush I once caught, but mine was a much finer bird.'

This Thrush breeds in almost all southern rocky mountain-chains from Portugal to the Himalayas, including the rocky islands of the Mediterranean. In the north, its breeding range extends to Switzerland and the Tyrol.

81.—Cat-Bird [Blaugraue Drossel].

TURDUS LIVIDUS,[1] Wilson.

Turdus (Mimus) carolinensis.	Naumann, xiii.; Blasius, *Nachträge*, p. 51.
Cat-bird. Turdus lividus.	Wilson, *Amer. Orn.*, ii. 90.
Orpheus carolinensis, Linn.	Audubon, *Syn. of Birds of N. Amer.*, p. 88.
Orpheus felifox.	Richardson and Swainson, *Faun. Bor. Amer.*, p. 192.

The specimen of this small American Thrush in my possession is the only one of this interesting species that has ever been caught in Europe. It was shot here on the 28th of October 1840 by Oelrich Aeuckens,—the eldest of the three brothers, commonly called 'Oelk.'

This distinguished 'honorary citizen' would most probably have been lost to the list of the birds of Heligoland had not Reymers managed, by strategy, to get the rare stranger into his possession. Considering the almost bitter jealousy which at that time existed between the three stuffers and salesmen of birds of this island, Reymers could not think of obtaining the bird from Oelk by way of purchase. Fortunately, however, a stranger was staying on the island that winter who had dealings with Reymers, and he, before his departure in the spring, went to Oelk for the purpose of buying a few birds for a friend. He bought a Great Titmouse, a Bluethroat, and this Cat-Bird (*Turdus lividus*). Of course, the friend was no other than Reymers. Six years later I obtained the bird from the latter, after much trouble and pressure. On Aeuckens espying the specimen in my collection, he said at once that he also had shot one like it several years ago, and had sold it to a stranger. I can still see the simple-hearted old fellow's face when I replied that it was the very same bird, and told him the whole story: nor am I inclined to believe that this little instance of 'sharp practice' stands alone in the annals of the acquisition of ornithological rarities.

[1] *Galeoscoptes carolinensis* (Linn.).

The plumage of this bird, though very simple, is nevertheless attractive. All the upper and lower parts are of a uniform slaty-blue grey (*schiefer-blaugrau*), the colour on the breast and belly being somewhat lighter than on the back. The crown and tail are deep black, the flight-feathers blackish. The lower tail-coverts present a remarkable and striking deviation from this otherwise simple dress, being of a vivid reddish chestnut brown (*kastanien-rothbraun*), almost exactly like the colour of the corresponding feathers in the Waxwing. The bill and feet are black.

The measurements of the Heligoland example are as follows:—Total length, 7·20 ins. (183 *mm.*); length of the short and roundish wings, 3·46 ins. (88 *mm.*); length of tail, 3·78 ins. (96 *mm.*); length of tail uncovered by wings, 2·88 ins. (73 *mm.*); length of beak, ·67 in. (17 *mm.*); height of tarsus, 1·19 in. (30 *mm.*).

Swainson's measurements (*Fauna Bor. Amer.*) are slightly larger than the above.

On the wing the fourth and fifth flight-feathers are longest, the third only slightly shorter; the second is of the same length as the eighth. In the tail, which is rounded, the outermost pair of feathers is ·78 in. (20 *mm.*) long, and the adjacent pair ·39 in. (10 *mm.*) shorter than the four inner pairs.

The peculiar eggs of this Thrush are of striking beauty. The coloration, though of a simple uniform bluish green, is of such depth and richness as is not met with, even approximately, in the eggs of any European species. The darkest eggs of the Hedge-sparrow are beside them as light and pale as those of the Common Stonechat are beside those of the Hedge-sparrow. Their measurements are: Length, ·98 in. (25 *mm.*); breadth, ·67 in. (17 *mm.*).

This species is distributed as breeding bird over almost the whole of North America, from Texas to Canada.

82.—Brown Thrasher [Rostrothe Drossel].

TURDUS RUFUS, Linn.[1]

Turdus (Taxastoma) rufus.		Naumann, xiii.; Blasius, *Nachträge*, p. 54.
Brown Thrush.	*Orpheus rufus.*	Audubon, *Syn. of Birds of N. America*, p. 88.
Orpheus rufus.		Richardson and Swainson, *Faun. Bor. Amer.*, p. 189.

The only example of this peculiar American species ever observed here was caught late in the autumn of 1836, and, together with a Sea Eagle shot by the same fowler—Claus Siemens—was

[1] *Harporhynchus rufus* (Linn.).

sold and taken to Hamburg. All efforts on my part to get the specimen back have unfortunately proved unsuccessful.

All the upper parts of this Thrasher, including the tail and the outer webs of all the flight-feathers, are bright rust colour; the larger and middle outer wing-coverts have yellow tips, edged on the upper surface with brownish black. The under side of the bird is whitish, with a tinge of dull rust colour, especially on the neck and upper breast. A row of the small triangular spots characteristic of the Thrushes runs down from the lower mandible. The feathers of the upper breast and breast have larger spots of this kind, and on the flanks they assume an oval form. The middle of the breast and belly and the dull rust-coloured under tail-coverts are not spotted.

The bill is of a horny black colour, the mandibular portion being yellow. The feet are of a yellowish flesh colour, and the iris, strange to say, light yellow. The wing is short and roundish, its second flight-feather being of the same length as the ninth; the third is a little shorter than the fourth, fifth, and sixth, these being the longest feathers. In the tail, which is rounded, the outermost pair of feathers is ·78 in. (20 *mm.*) shorter than the more median pairs.

The total length of the bird is 10·23 ins. (260 *mm.*); length of the wings, 4·06 ins. (103 *mm.*); length of tail, 5·31 ins. (135 *mm.*); length of tail uncovered by wings, 4·41 ins. (112 *mm.*); length of bill from forehead to tip, ·98 in. (25 *mm.*); length of tarsus, 1·30 in. (33 *mm.*)

According to Audubon, the bird is a very common breeder throughout North America, from Texas northwards. Swainson states that it is met with as far as 54° N. lat. Its eggs are of a peculiar beauty, and cannot be confounded with those of any European species. Their ground colour is a very pale bluish green, which is, however, almost entirely hidden by innumerable very small bright ferruginous dots. Their length is 1·02 in. (26 *mm.*); breadth, ·75 in. (19 *mm.*).

83.—Palestine Bulbul [Gelbsteiss-Drossel].

TURDUS XANTHOPYGUS.[1]

Ixos Vaillanti.	C. L. Brehm, *Vogelfang*, p. 221.
Palestine Bulbul.	Dresser, iii. 357.
Pycnotus xanthopygus.	Tristram, *Western Palestine*, p. 57.

The primitive ornithologists of this island, Messrs. Koopmann, Reymers, and Oelk, held firmly to the principle: 'It is good

[1] *Pycnonotus xanthopygus* (Hemp. and Ehr.).

fishing in troubled waters'; or, in other words:—Let nobody know that there are birds which are rare and valuable; though, to be sure, they themselves would not have been capable of divulging much information on this score, even had they had the wish to do so. Acting, accordingly, on this principle, Reymers, when purchasing the bird which was taken in May 1837, told the captor that it was a young Golden Oriole, in which the under tail-coverts were only then beginning to get yellow.

In the course of the summer the bird was sold to one of the few visitors who at that time used to come for the sea-bathing (*Badegäste*), and I have unfortunately been unable to obtain any further trace of it. I was more fortunate in regard to a Demoiselle Crane (*Grus virgo*), shot in May of the same year on Sandy Island by Reymers, which, after remaining for about forty years in the Museum of Hamburg, I restored to Heligoland. It would be interesting to find out whether these two birds occurred here on one and the same day—a supposition, the truth of which, after many later experiences of the same kind, I am scarcely inclined to doubt. The home of both species lies in the same direction, viz. far south-east relatively to this island; and I have observed a very large number of cases in which individuals of different species, but from a common home, made their appearance here simultaneously. Thus, Ehrenberg's Redstart (*Sylvia mesoleuca*) and the Paddy-field Warbler (*S. agricola*) on the 12th of June 1864, White's Thrush (*Turdus varius*) and two examples of the Yellow-browed Warbler (*S. superciliosa*) on the 4th of October of the same year; *Emberiza cæsia* and *Saxicola morio* on the 9th of May 1867; and on the 19th of September of the same year one example of the Little Bunting (*Emberiza pusilla*) and two of *S. superciliosa*; on the 22nd of May 1859 the Short-toed Lark (*Alauda brachydactyla*) and Cretzschmar's Bunting (*Emberiza cæsia*); on the 4th of June the Red-footed Falcon (*Falco rufipes*) and *Alauda brachydactyla*; on the 18th of June 1860 the Black-headed Bunting (*E. melanocephala*) and Eastern Golden Plover (*Charadrius fulvus*). To these may be added innumerable similar cases from other years in my diary, but the above-mentioned ones may be sufficient for the present purpose.

The simple dress of this bird has in its general character much similarity to that of *Turdus lividus*. Thus, while the general colour of the body is quite inconspicuous, the head has a deep black marking, and the under tail-coverts are very bright coloured. Only in the present species the body is not bluish grey, but of a dull light greyish brown (*trübe hell graubraun*), the lower parts being whity brown, and the under tail-coverts, as well as those next to

the vent, of a brilliant chrome yellow. Moreover, the deep black markings of the head extend in this species over the ear-coverts and throat. In this species too the wing is abruptly rounded; its second flight-feather very short, of the same length as the tenth. the third and seventh are of equal length, and only ·12 in. (3 *mm.*) shorter than the fourth, fifth, and sixth, which form the tip of the wing. The tail is almost squarely truncate, its outermost pair of feathers being only slightly shorter than the rest.

The total length of this bird is 8·07 ins. (205 *mm.*); length of the wing, 3·74 ins. (95 *mm.*); length of tail, 3·73 ins. (96 *mm.*); length of beak, ·71 in. (18 *mm.*); length of tarsus, ·94 in. (24 *mm.*)

The breeding range of this species is rather limited, extending only over Arabia, Palestine, and Asia Minor as far as Greece and the Archipelago. The eggs are very beautiful. The ground colour is a reddish white, with a fairly large number of violet-grey blotches, and a very rich marking of partly round, partly irregular violet-red spots and dots. In some of the eggs these markings are evenly distributed, in others they are somewhat accumulated at the thick end. They are of a longitudinally pointed form, 1·02 in. (36 *mm.*) long and ·67 in. (17 *mm.*) broad.

There is little doubt that another example of this species occurred here about fifteen years ago. An old and trustworthy fowler very nearly had got it in his throstle-bush, but the bird managed to escape again. He described it as grey, with black head, and yellow feathers below the tail, as yellow 'as dandelions' (*Leontodon taraxacum*). The time was late in May.

Song-Birds—Sylviæ.—Of the family of Song-birds remarkable for its richness in individuals, about one hundred and fifty species are distributed over all the temperate and warm countries of the earth. These have come by degrees to be divided into more than ten genera, which, however, in the present work, will all be cited under their original designation as Sylviæ. Fifty of these species are resident breeding birds in Europe, thirty-nine of whom visit Heligoland in greater or less numbers. Apart from these, however, some few others, belonging to Asia and America, have occurred here, and in consequence have been newly added to European lists as 'honorary citizens.' These are:—

S. fuscatus, proregulus, coronata, viridana, nitidus, certhiola, and *virens.*

84.—Common Nightingale [Nachtigall].

SYLVIA LUSCINIA, Latham.[1]

Sylvia luscinia.	Naumann, ii. 378.
Common Nightingale.	Dresser, ii. 363.
Bec-fin rossignol.	Temminck, *Manuel*, i. 195, iii. 125.

Heligoland, whose superior rank in the domain of bird-life is uncontested by the proudest empire, in one respect only—but that a most sensitive one—may be beaten by the poorest village which possesses nothing more than a small brook or pond, surrounded by bushy woodlands. There, blossoming spring will certainly not fail to bring with it the soulful song of the Nightingale; whereas the steep and naked rocks of this island have never yet re-echoed with its poetic strophes. At the same time, the species cannot by any means be regarded as of rare occurrence here. But for it, as for all the other wanderers of the air, Heligoland is merely an insignificant half-way house, where the larger hosts halt for a moment's brief rest and refreshment, or for temporary shelter against stress of weather, but which they never choose as a lasting abode for their cosy nests or amorous songs.

Solitary examples of the Nightingale arrive in Heligoland from about the middle of April to the middle of May, with light southerly and south-easterly winds, especially if these are accompanied in the early hours by a fine light rain. I do not remember ever having seen the bird here in autumn. Aeuckens, however, insists on having met with it in one or two instances at that season.

The breeding range of the Nightingale extends from Portugal (Cintra) over the whole of southern and central Europe, its numbers, however, decreasing towards the east. Towards the north its nesting stations extend to England, in solitary instances even to Denmark, where however its begins to be replaced by the Northern Nightingale.

An interesting but unsuccessful attempt was made to get the bird to settle in the north of Scotland. A number of eggs were obtained from the neighbourhood of London and placed in the nests of Robins, which readily reared them. All the young Nightingales left in September, without however returning the following spring. (Newton in Yarrell's *Brit. Birds*, 1874, vol. i. p. 319.)

[1] *Daulias luscinia* (Linn.).

85.—Northern Nightingale [Sprosser].

SYLVIA PHILOMELA, Bechstein.[1]

Sylvia philomela.	Naumann, ii. 362.
Northern Nightingale.	Dresser, ii. 369.
Bec-fin philomèle.	Temminck, *Manuel*, i. 196, iii. 126.

Although the western limit of its breeding range extends from Denmark to eastern Holstein, this bird, except in one solitary instance, has never been met with in Heligoland. It would therefore appear that of the many migrants visiting this island from high northern latitudes or the far East, few persist with such stubbornness in the north-to-south direction of their line of flight as does this species. The example referred to above was caught at the lighthouse on the night of the 4th-5th May, and is preserved in my collection.

This bird is found as a resident breeding species from the Peninsula of Jutland, through Denmark, in Lower Sweden, eastern Finland, Poland, Hungary, Russia, and Turkestan. Scattered examples also occur in eastern Germany.

86.—Grey-backed Warbler [Rostfarbiger Sänger].

SYLVIA FAMILIARIS, Ménétries.[2]

Sylvia galactodes.	Naumann, xiii. 398; Blasius, *Nachträge*, p. 62.
Grey-backed Warbler.	Dresser, ii. 553.
Bec-fin rubigineux.	Temminck, *Manuel*, i. 182, iii. 129, iv. 615.

The only example of this southern songster ever caught here was obtained by old Koopmann, from whose hands it passed, early in the thirties, into the well-known collection of Mechlenburg, an apothecary at Flensburg, where it is still to be found. Blasius, whose attention I first called to it, saw it there shortly before the publication of his Supplements to Naumann; and Dresser also examined it after his visit to me in the summer of 1881. Both agree as to its belonging to the Eastern form, *S. familiaris*, under which title it has been noted here.

Up to the present I have not obtained this species here; but the occurrence of a 'Nightingale with a red tail edged by a beautiful black and white terminal border,' has been twice reported to me. One of these birds was seen by Claus Aeuckens through a gap in a garden hedge. The bird was hopping about, exactly after

[1] *Daulias philomela* (Bechst.).

[2] *Ædon familiaris* (Ménétries).

the manner of a Nightingale, a few paces in front of him, but he was unfortunately unable to get possession of it. There exists not the least doubt as to the identity of the latter species; on a skin from Greece being shown him, Aeuckens at once declared it most decisively to belong to the very same species. This is further corroborated by the time of its occurrence on a May morning, and under meteorological conditions most favourable to the appearance of south-eastern strangers.

The nesting stations of this species extend from Greece through Asia Minor, Syria, Turkestan, and Persia to central India. A variety breeding in south-western Europe, distinguished from the present species by the somewhat more pronounced ferruginous colouring of its upper parts, has been established as an independent species under the name of *Sylvia galactodes*. This western form has been twice shot in England, the birds being undoubtedly individuals that had resumed their spring migration, after having lost their mates at the beginning of the breeding season, and thus, by following a line of flight in a northward direction, had reached Great Britain *viâ* Spain. This subject has been discussed more fully in the section on Migration and in other portions of this work.

87.—Red-spotted Bluethroat [Nordisches Blaukehlchen].

SYLVIA SUECICA, Linn.[1]

Heligolandish: Blü-Hemmel-Fink = *Blue Skybird.*

Sylvia (Cyanecula) suecica.	Naumann, xiii. 387; Blasius, *Nachträge*, 59.
Red-spotted Bluethroat.	Dresser, ii. 317.
Bec-fin gorge bleue.	Temminck, *Manuel*, iii. 143.

One would hardly believe that the home of so lovely a creature as the Bluethroat extended so far north as the coast of the Polar Sea, particularly as its beautiful azure blue and rusty orange dress gives one the impression of its being a native of tropical latitudes. As a matter of fact, its life is divided between its Arctic nesting stations and its winter quarters, which extend to the hot regions of central Africa and southern Asia.

The migratory flights of this little bird between regions so widely separated have furnished the most interesting material towards a final solution of a hitherto open question, viz. What is the greatest speed attainable by a bird during its migration flight? and have yielded the astounding result of one hundred and eighty geographical miles per hour. In regard to this inquiry also, as in

[1] *Cyanecula suecica* (Linn.).

so many other cases, this little island has proved itself to be a true ornithological observatory. Its meridian represents the extreme western limit of the migratory flight of this Bluethroat between its breeding stations and its winter quarters, and it is in only isolated instances that this limit is ever exceeded.

During its spring passage from central and northern Africa to the north of Scandinavia, this bird has, according to Giglioli, been met with in Italy only in very isolated instances, in the proportion of one to a hundred of *S. leucocyana*. The same is stated respecting Austria (Backofen von Echt). In the whole of Germany, too, it is during the spring months of rarest occurrence. Naumann says, 'Only single individuals are, in rare instances, met with on the banks of rivers in Thuringia, near Dresden, Vienna, and other places.' Dr. Rey has met with this species near Leipzig only in autumn, never in spring, and knows of only one instance of its capture, by a friend of his, during the latter season. Mr. W. Schlüter of Halle states that during his long experience he has never met with nor received this bird during its spring migration, and has obtained but few specimens during autumn.

Respecting northern Germany, *Sylvia suecica* has, according to recent statements, not only been met with in isolated instances, but, surprising as it may appear, has actually remained to breed near Waren in Mecklenburg, and near Emden in Friesland. These statements, the validity of which cannot fairly be doubted, do not, however, in any way affect the above conclusions as to the marvellous rate of flight of this bird during its spring migration, for the latter two localities are situated only two-thirds of a degree to the south of Heligoland, equal to a flight of about thirteen minutes.

In Heligoland, on the other hand, this bird is, during the same migration period, of quite common and generally known occurrence. In the absence of cold and dry northerly winds at the end of May and April, it appears here as a daily visitor, and if, in addition, the weather be warm and fine, with a light south-east wind, it frequently occurs in such large numbers that, on days of this kind, Oelrich Aeuckens and myself have succeeded in obtaining as many as from thirty to fifty male individuals. In fact, I remember one occasion, in May 1845 or 1846, when there were some sixty of the most beautiful male birds of this species, all picked specimens, lying on a large flat dish in my cellar; and I might easily have doubled that number had I accepted all that were offered me on the same day. Aeuckens obtained nearly as many, all these birds having been caught by boys in nets, inasmuch as grown-up shooters here do not trouble to catch them.

Here, then, we have a bird which during its spring migration is met with only in exceptional and always isolated instances in all latitudes lying between its winter quarters in Africa and Heligoland. In that island, on the other hand, it is at that particular time a common daily occurrence, and numbers under favourable circumstances up to hundreds of individuals. It necessarily follows that it accomplishes its journey in one continuous flight without staying to rest at any intermediate station on its way.

Like all the Sylviadæ and other insectivorous birds, this species travels at night, leaving Africa after sunset and arriving here even before sunrise, and thus employing at most only nine hours in this extensive flight. Now as the whole distance passed over in these nine hours is about sixteen hundred geographical miles, we get the truly astounding yet indisputable speed of one hundred and eighty miles in one hour.

During its return passage in autumn this Bluethroat is found here very abundantly, as also through the whole of Germany. In eastern Europe, too, *e.g.* Greece, where, according to von der Mühle, it is not seen at all in spring, it is then a quite common occurrence. At Heligoland, its autumn migration commences about the middle of August, and lasts, according to the state of the weather, up to the latter half of September. At that time hundreds of these birds, in addition to Redstarts, Whinchats, and other species, frequent the potato-fields of the Upper Plateau. Strange to say, it then never comes into the gardens which form its chief place of resort during the spring migration. At the end of April and throughout May it may be seen there hopping about among the currant and gooseberry bushes, but seems to have a special preference for such places as are densely covered with young cabbage shoots. It does not, however, despise the dead shrubs of the throstle-bush or shady nooks and corners under hedges, and even likes to stay at the base of the rock among the rubble, and in dark clefts of the rock.

This charming bird is an extremely confiding creature. If during one's garden occupations one pays no special attention to the bird, or pretends not to notice it, it will for hours long hop around near one, at twenty, fifteen, or even a less number of paces off, sometimes in rapid, sometimes in more measured, leaps, catching insects the while; at each of its many pauses it gives a jerk with its tail, which it has raised above its wings, and looks around with clear, dark eyes. If, however, it becomes aware of being watched, it vanishes swift as lightning, in long bounds, under some shrubs or among some bushes; only, however, after a few moments, to again make its appearance as simple-hearted as before. Often would I

have liked to possess some one specimen of these birds whose beauty was exceptional, but I could never find heart to do one an injury after it had so confidingly given me its entertaining company during an hour or so of work in the garden.

Unfortunately all the song-birds pass Heligoland in silence, and of the Bluethroat, too, the only note we hear is a kind of smack like 'Tack.' This is specially to be deplored in the case of this bird, for according to Seebohm (*Ibis*, 1876, and *Siberia in Europe*), it is not only an excellent songster, nearly coming up to the nightingale in the sweetness and tunefulness of its song, but it is also capable of mimicking to the highest perfection the call-notes and songs of all its neighbours.

The most western breeding stations of this Bluethroat in northern Scandinavia extend beyond 70° N. latitude. But on the Fjelds of Gudbrandsdalen and the Dovrefjeld in Norway it breeds numerously as far south as 62° N. in altitudes possessing a climate similar to that of their more northern nesting quarters. From Finmark and the Waranger Fjord its breeding range extends eastwards through the whole of European and Asiatic Russia as far as Kamtschatka, and it is even said to have been met with as far east as Alaska. Among other investigators, Seebohm met with this species in extremely large numbers on the Lower Petchora and Lower Jenesei. Von Middendorff met with it in north-eastern Asia, and Nordenskjöld, during his memorable 'Vega' expedition, in the tracts bordering the Arctic Sea. In these high latitudes the Bluethroat and Eversmann's Warbler, *Sylvia borealis*, are the only members of the Sylvia family whose song enlivens the icy solitudes of this Land of the Midnight Sun.

In England the Red-spotted Bluethroat has, according to Newton, been observed only seven times between the years 1826 and 1872. This extremely rare occurrence of the bird on the other side of the North Sea proves how rigidly the line of its migratory flight runs in a direction from north to south, and that its most western limit does not reach beyond the meridian of Heligoland.

The individuals of this species which nest in northern Europe for the most part winter in Egypt, Nubia, and Abyssinia. In western Africa it probably occurs only in very rare instances, although Carstensen (*Naumannia*, 1852) notes it among the birds collected in northern Fez under Pallas' name, *Sylvia cærulecula*.

A noteworthy feature in connection with this Bluethroat is displayed very frequently in the aberrations of the breeding plumage of old males. In normally marked individuals, the throat, foreneck, and upper breast are of a beautiful ultramarine blue, terminated by a deep black band, itself edged by a fine white

border. This is followed by a broad orange-brown (*rostorange*) band of double the breadth; in the centre of the blue marking is a large spot of orange-brown. The most frequent aberration from this marking is that in which the fine white edge on the upper breast is absent, or where the orange-brown spot has a fine white seam below. In other examples, again, the black border on the upper breast is entirely absent, the orange-brown breast-band being then of double the usual breadth; birds marked like this have a very handsome appearance.

Further, I possess an example, also a very handsome bird, in which the orange-brown colour has almost entirely supplanted the blue. Even on the chin a few feathers of the former colour occur among the blue ones, and very soon entirely replace the latter, forming a very intense orange-brown spot, which coalesces with the broad orange-brown breast-band, only a row of isolated blue feathers being left as a parting between the two. The black band is entirely absent in this specimen. With the exception of one bird in autumn plumage, I have not obtained a second example of this kind.

Again, examples frequently occur in which the whitish basal portion of the feathers of the rust-coloured spot on the throat is so large that these feathers come to have merely rufous tips, the white more or less predominating. I possess a very prettily-marked male with an uncommonly large spot on the throat; the latter, however, is orange-brown only in the middle, with a broad white border all round. In this specimen, too, the white edge of the black breast-band is very broad, and extends on both sides upwards along the upper breast. This bird is one of uncommon beauty. I possessed also two other less beautiful birds of this kind in which the spot on the upper breast was very small, and, in the case of one example, has but little rust colour. Both of these birds I had the honour of presenting to my friend Eugene von Homeyer, for the completion of his very extensive series of Bluethroats.

In very old females of this species, almost the entire marking of the normally-coloured male is in rare cases repeated in the spring, but the colour is fainter, and seems dusted over with a fine white. In the few examples of this kind which I had the opportunity of examining, the lower brown band on the upper breast was invariably absent. In younger females the throat is shot with lightish blue; the spot on the neck of a whity rust (*weisslich rostfarben*) colour and terminated by a broad black band, shot with blue on the upper breast, and extending upwards along both sides of the neck.

Young autumn birds have not even a tinge of rust colour, either on the throat or fore-neck; but these parts are pure white, with the exception of a more or less compact deep black band on the upper breast, which is prolonged upwards along both sides of the neck. It is rare to meet with old males in autumn plumage in which the spot on the neck is entirely rust colour, its upper half being almost always of whitish coloration.

A mere superficial inspection of examples of the last kind of aberration from the normal spring plumage of the male discussed above, might easily lead one to suppose that such birds were hybrids of the present and following species. The possibility of such an intermixture is however excluded by the mere fact that the one species breeds within the area of the Arctic Circle, or in northern mountain chains, at heights possessed of an arctic climate, while the other does not extend beyond the North Sea and Baltic, and remains permanently on the plains.

Here in Heligoland, too, the time of the spring migration of the two species very clearly demonstrates the wide distance, comprising many degrees of latitude, which separates their homes. The more southern breeding stations of the white-spotted species become habitable at a very early period of the year, and accordingly the few individuals which ever reach this island arrive as early as the end of March, or during the first days of April; at that time winter still completely reigns in the nesting area of the northern species, and does not yield to milder weather until three or four weeks later; accordingly, the spring migration of this latter species does not take place until May.

88.—White-spotted Bluethroat [Weiss-sterniges Blaukehlchen].

SYLVIA LEUCOCYANA, Brehm.[1]

Heligolandish: Wit Blü-Hemmel-Fink = *White-Blue Skybird.*

Sylvia suecica.	Naumann, ii. 414. *S. leucocyana*, xiii. 373, and Blasius, *Nachträge*, 59.
White-spotted Bluethroat.	Dresser, ii. 311.
Bec-fin gorge bleue.	Temminck, *Manuel*, i. 216.

This elegant bird, with the pure white satiny throat-spot on a field of blue, is one of the rarest of occurrences in Heligoland. With one sole exception, it has occurred here only at intervals

[1] *Cyanecula leucocyana* (Brehm).

of from five to ten years, and in solitary instances, so that during the last fifty years only eight, or at most ten, of these birds have been shot on the island. The one very remarkable exception occurred in the spring of 1877, in which, on the 5th of April, from ten to twelve of these birds were observed here; again several on the 6th, and several others on the 9th; all the birds were handsome males, and nearly all were captured. Since that time I have only once again obtained this species here, viz., on the 17th of May 1879; and have only once shot a female bird, whose early appearance might allow one to conclude with safety as to its belonging to the white-spotted form.

All the earlier birds, or those met with on the last occasion of the occurrence of the species, were males, for the most part fine old birds, with a large white spot on the upper breast. In some few individuals, however, this spot was so small that it was almost —indeed, in one example, completely—hidden by the blue; but even in this instance, on raising the feathers, a small shiny white spot of the size of a No. 4 shot became visible. Judging from the rest of their coloration and markings, however, all these birds were very old examples.

In almost all works on this subject, central and western Europe as far south as Portugal is given as the breeding area of this Bluethroat, Germany and Holland being noted as the parts in which it is met with in greatest numbers. Büchner (*Vögel des St. Petersburger Gouvernements*, 1886), on the other hand, not only mentions the neighbourhood of St. Petersburg as an additional nesting station for this bird, but also states that it is caught in 'very large numbers' in that locality at the end of April and beginning of May. It is, however, hardly probable that the nesting stations of this bird extend beyond the northern limit of the St. Petersburg district, and hence arises the question: Whither do the birds which occur there so numerously during the spring migration direct their course? There is little doubt that they do so towards the east, in which direction the numerous water-courses, originating in the western slopes of the Ural, provide in abundance localities suitable as nesting stations. Hence we may assume that the breeding range of this Bluethroat includes the whole of central and southern Europe, from western Portugal to the Ural Mountains.

89.—Wolf's Bluethroat [Wolf's Blaukehlchen].

SYLVIA WOLFII, Brehm.[1]

Heligolandish: All-Heel blü Blühemmel fink = *Entirely blue Skybird.*
Sylvia wolfii. Naumann, xiii. 377, and Blasius, *Nachträge*, 59.
Cyanecula wolfii. Dresser, ii. 311.

On the 30th of March 1848, there was shot on Sandy Island a Bluethroat having its upper breast of a uniform blue, and showing even on raising the feathers no trace of white beneath, the basal portions of all the blue feathers being of a uniform grey. The bird was a fine old male, and this is the only instance of my having obtained one. In three other instances I have obtained in the spring males with the upper breast of an apparently uniform blue, but in all these a small round brilliant white spot either became visible at once after a slight displacement of the feathers, or could be seen gleaming more or less distinctly through the blue covering feathers, even when these were left undisturbed.

I have followed Naumann in citing this uniformly blue form of Bluethroat as a separate species, inasmuch as Heligoland does not supply sufficient data towards settling the question as to whether it is to be considered an independent species or not. The fact that the present form occupies similar areas to that of the white spotted one, and inter-breeds with the latter, can hardly justify us in disputing its claim to be regarded as an independent species; on the other hand the circumstance that, despite such crossing, both forms maintain their purity, should rather be accepted as evidence in favour of their independence.

However, only such individuals in which the basal portions of all the blue feathers are of a uniform grey, ought to be regarded as *Sylvia wolfii*, while the least indication of a small white spot on the upper breast should be considered as the mark of a mongrel, in the same way as in the case of the Carrion and Hooded Crows.

According to all that has hitherto been observed and reported in respect to this species, Germany is to be regarded as its principal breeding area; it is there that uniformly blue-marked old males have been met with in greatest frequency during the breeding season. It is however probable that its nesting stations extend considerably farther, both west and east, for Howard Saunders obtained in Spain a pair of apparently blue individuals, which, however, on raising the feathers of the upper breast, displayed a small white spot, and were accordingly mongrels. Still, their occurrence

[1] *Cyanecula wolfii* (Brehm).

here necessarily proves that both the pure forms must have also been in residence in the district. Büchner further reports that among the birds caught in the immediate neighbourhood of St. Petersburg, males with a uniformly blue breast were not infrequently met with; accordingly the breeding stations of Wolf's Bluethroat extend from the most western to the most eastern parts of Europe.

90.—Redbreast [Rothkelchen].

SYLVIA RUBECULA, Linn.[1]

Heligolandish: Road-breschod = *Redbreast.*

Sylvia rubecula.	Naumann, ii. 397.
Redbreast.	Dresser, ii. 329.
Bec-fin rouge-gorge.	Temminck, *Manuel*, i. 215, iii. 142.

This little bird, with its large black trustful eyes, and yet at the same time extraordinarily pugnacious disposition, visits Heligoland in very large numbers, both in spring and autumn: often every nook and corner of the island teems with them. In spring, when engaged in the garden digging up one's flower-beds and the like, the little fellow is excellent company, hopping about on the ground around one, picking up a worm or insect here and there, and not in the least disturbed by being looked at. In fact, the bird seems not to heed anything that goes on around it, but confines its attention entirely to the ground, differing in this respect widely from the equally confiding but at the same time ever watchful Bluethroat.

This bird is amongst the small number of songsters which, by means of their modest little tune, strive to beautify the spring on this inhospitable rock, devoid in other respects of so many of the usual charms of that season. The first individuals begin to arrive very early in the spring, and during their autumn migration many of them may be seen even late in November, passing through in the company of the last Blackbird stragglers; now and again, indeed, one will make an attempt at wintering here. In such a case, especially if there be much snow, it becomes a constant guest in the poultry-yard, where it heartily enjoys the bread-crumbs intended for the fowls, and soon comes to regard itself so much at home there, that it even manages to keep those bold but stupid fellows, the sparrows, at a respectable distance from the food-bowl.

The Redbreast breeds throughout the whole of Europe, from the Atlantic coasts of Portugal and the Hebrides to the Ural. Wolley met with it in Lapland, as far as 68° N. latitude.

[1] *Erithacus rubecula* (Linn.).

91.—Redstart [Gartenröthling].

SYLVIA PHŒNICURUS, Latham.[1]

Heligolandish: Smock-heiked. This is the local name applied to the male bird; females and young birds of this species and the Black Redstart are known under the name of Ro-ad stätjed = *Red-tail.*

Sylvia phœnicurus. Naumann, iii. 510.
Redstart. Dresser, ii. 277.
Bec-fin de murailles. Temminck, *Manuel*, i. 220, iii. 146.

The Redstart visits Heligoland almost always in very large numbers, sometimes in immense swarms, both during its homeward journey in spring and during its return passage in autumn. Inasmuch, however, as fine warm weather is an indispensable condition for its journey, it rarely makes its appearance before the middle of April or the beginning of May, and leaves again as early as the last week in August, and throughout the whole of September. During the latter month it is met with in greatest abundance; so that if the days be fine and warm, with light south-easterly and southerly winds, all the gardens, and especially the potato-fields, teem with countless thousands of these birds.

This Redstart breeds throughout the whole of Europe, with the exception of Spain and Portugal; it breeds also very abundantly through the whole of Scandinavia, where it may be met with as far as 70° N. latitude, and even beyond.

It is impossible to state with certainty how far eastwards the nesting stations of this species extend in Asia. Seebohm (*Siberia in Asia*) shot a young bird on the Jenesei, and Sewertzoff notes it as an apparently common bird in Turkestan.

92.—Ehrenberg's Redstart [Weissflüglicher Röthling].

SYLVIA MESOLEUCA, Ehrenberg.[2]

Ehrenberg's Redstart. Ruticilla mesoleuca. Dresser, ii. 285.

My collection possesses a specimen of this rare bird, which was caught here on the 12th of June 1864. It is an old male, and in its general markings resembles an intensely-coloured old male of *S. phœnicurus*, with the exception that the wing-markings are different, the large primaries having fine white edges. This white coloration broadens out considerably on the secondaries, commencing at the base, and increases in width with each successive feather, so that in the last of the posterior flight-feathers it covers the whole

[1] *Ruticilla phœnicurus* (Linn.). [2] *Ruticilla mesoleuca* (Ehren.).

of the broad outer-web, and thus leads to the formation of a large, pure white spot. The two penultimate flight-feathers acquire a peculiar marking, through the sudden projection of the blackish-brown colour in the middle of each of these feathers into the white portion of the outer-web, forming dark spots similar to those met with in the Buntings, and especially well defined in *E. lapponica*, *schœniclus*, *rustica*, and *pusilla*.

The bird caught here completely agrees with the description given by Dresser and Blandford (*Ibis*, 1874, p. 343) of the examples in the Berlin Museum, which were collected by Hemprich and Ehrenberg in Syria and Arabia. In size it resembles *R. phœnicurus*, but the wings of my example are ·25 in. (6 *mm.*), and the tail ·28 in. (7 *mm.*), longer than in an old male of the latter species.

The following are the measurements of my example: Total length, 5·31 ins. (135 *mm.*); length of wing, 3·19 ins. (81 *mm.*); length of tail, 2·36 ins. (60 *mm.*); length of tail uncovered by wing, 1·15 in. (29 *mm.*); the beak measures ·43 in. (11 *mm.*), and the tarsus, ·86 in. (22 *mm.*).

As regards the nesting stations of this species, nothing further is known than has been reported by C. G. Danford in a very interesting article in the *Ibis* for 1877, p. 262. During his travels in Asia Minor, in the winter of 1875 and the spring of 1876, he discovered, with a great deal of trouble, the hitherto unknown nests and eggs of this species, which at that time was itself but little known.

The bird above mentioned as shot in Heligoland appears to be the only example of this species hitherto observed in Europe. A few years ago, Aeuckens wounded a second example, but did not obtain it. Peculiar and interesting in regard to migration is the fact that, on the same day as *S. mesoleuca*, there was also shot an example of *Sylvia* (*Acrocephala*) *agricola*, which is likewise preserved in my collection.

93.—Black Redstart [Hausröthling].

SYLVIA TITHYS, Latham.[1]

Heligolandish: Swart smok-heiked = *Black Redstart*

Sylvia tithys.	Naumann, iii. 525.
Black Redstart.	Dresser, ii. 293.
Bec-fin rouge-queue.	Temminck, *Manuel*, i. 218, iii. 145.

Although the Black Redstart visits Heligoland regularly during the two migration periods of the year, only solitary birds, or a small

[1] *Ruticilla titys* (Scop.).

number of examples, are ever met with in the course of a day; nevertheless the bird, by reason of its peculiarly elegant plumage, is well known to every shooter here. Its migration commences in the spring as early as March, and extends to a correspondingly advanced period in the autumn, and even into winter, birds of this species having, in fact, been met with by no means rarely in the middle of December. Nor is its migration, like that of its near relative, the Common Redstart, at all dependent on fine and warm weather; but, on the contrary, takes place at times and under conditions of weather when no other *Sylvia* would dream of undertaking a journey.

This bird occurs as a breeding species from western Portugal as far as the Volga, but becomes much less numerous from eastern Germany eastwards. It also nests, but more locally, in north Africa, Palestine, and eastwards as far as Persia.

94.—Moussier's Redstart [Moussiers Röthling].

SYLVIA MOUSSIERI, Olph-Galliard.[1]

Moussier's Redstart. Dresser, ii. 321.
Ruticilla Moussieri. Howard L. Irby, *Ornithology of Straits of Gibraltar*, p. 82.

This very interesting African Redstart has occurred once in the summer of 1842; it was shot by Oelrich Aeuckens, and sold by him to a young law-student named Jochmus, from Lüneburg, who used to come here annually for sea-bathing. I had at that time scarcely laid the first foundations of my collection, and had no idea of what value this example was to Heligoland. Afterwards, I made repeated and urgent efforts to obtain it back, but unfortunately without result. At last I gave it up as a bad job, as I was told that the bird had gone to ruin. It was a pretty male in rather worn plumage; its like has never been seen here again, nor is it probable that a second will ever reach this island; for, with two or three exceptions, no other south and west European or north-west African species have ever been seen here.

The home of this species appears not to extend beyond north-west Africa.

[1] *Ruticilla moussieri* (Olph-Gal.).

95.—Orphean Warbler [Sängergrasmücke].

SYLVIA ORPHEA, Temminck.

Sylvia orphea.	Naumann, ii. 445.
Orphean Warbler.	Dresser, ii. 411.
Bec-fin orphée.	Temminck, *Manuel*, i. 198, iii. 127.

Reymers informed me that he had twice—now many years ago—obtained this songster on this island. I have met with it only on one occasion, and that on the 8th of July 1876. This is the more surprising, as this bird, apart from its more southern nesting stations, is quite a common breeding species in Greece, and one or more examples of other south-eastern species turn up here almost regularly every year during the summer months. In England this songster has been shot several times; and it is even reported that its nest, with eggs, has been found there on two occasions.

The breeding range of this Warbler extends from the extreme west of southern Europe, includes north-west Africa, and reaches Turkestan and Persia.

96.—Whitethroat [Dorngrasmücke].

SYLVIA CINEREA, Brisson. [Bechst.].

Heligolandish: Road-rögged Ünger = *Red-backed Warbler.*

Sylvia cinerea.	Naumann, ii. 464.
Whitethroat.	Dresser, ii. 377.
Bec-fin grisette.	Temminck, *Manuel*, i. 207, iii. 133.

This species is one of the commonest birds of this island. Large numbers are seen hopping about in all the gardens from the time when the weather begins to get warm—about the middle of April to the end of May; and during its autumn migration, from the end of August and throughout September, the potato-fields often literally teem with these birds.

The Whitethroat breeds in large numbers from Portugal to Turkestan; in the north its breeding range extends beyond central Scandinavia as far as Archangel.

On this island, where birds seldom make their song heard, it is always a great enjoyment to listen to the soft, continuous piping and chatter of this bird in the sunny morning hours; it sounds to one as though the birds were rehearsing the introductory lessons for the complete melody which is to resound later on in their nest-

ing homes. As I was one fine May morning listening to one of these songsters in my garden, a Willow Warbler, some thirty paces behind me, also started its little tune. Greatly to my astonishment, the Whitethroat at once introduced it in somewhat softer tones in its own fantasias, and repeated it regularly during the shorter or longer pauses occurring between the recitals of the Willow Warbler. One can hardly expect a Heligoland ornithologist to be versed in all the secrets and peculiarities of bird music, and so I cannot say whether this pleasing intermezzo is a habitual feature of this bird's vocal performances, or whether it was on this occasion a little freak prompted by the invigorating effects of travel; all I can say is that it sounded exceedingly sweet.

97.—Lesser Whitethroat [Zaungrasmücke].

SYLVIA CURRUCA, Brisson. [Linn.].

Heligolandish: Lütj Ünger = *Little Warbler.*

Sylvia curruca. Naumann, ii. 451.
Lesser Whitethroat. Dresser, ii. 383.
Bec-fin babillard. Temminck, *Manuel*, i. 209, iii. 134.

Only solitary examples of this pretty little songster are met with on this island; it is the earliest arrival among its nearer relatives during the spring migration, almost always making its appearance as early as the first days of April, even if the weather is still raw, and completes its migration by the middle of May. In the autumn, when it occurs still more sparingly, it may be seen from the latter half of September till towards the end of October, and at times also somewhat later.

The breeding area of this bird extends from France into eastern Asia (Daüria), while its northern range reaches to central Scandinavia. Solitary instances of its nesting in Spain are recorded, but in Portugal it appears no longer to be met with as breeding species.

98.—Garden Warbler [Gartengrasmücke].

SYLVIA HORTENSIS, Gmelin. [Bechst.].

Sylvia hortensis. Naumann, ii. 478.
Garden Warbler. Dresser, ii. 429.
Bec-fin fauvette. Temminck, *Manuel*, i. 206, iii. 132.

This songster also is quite a common bird on this island. On warm days at the end of April and throughout May, as well as at

the end of August and during September, it is met with abundantly in the high bushes of gardens, and during the autumn migration in the potato-fields. Its numbers, however, never come up to those of the Whitethroat.

This bird breeds from Portugal to the Ural chain, and in Scandinavia advances beyond the Arctic circle.

99.—Blackcap [Mönchgrasmücke].

SYLVIA ATRICAPILLA, Brisson. [Linn.].

Heligolandish: Swart-hoaded Ünger = *Blackheaded Warbler*.

Sylvia atricapilla. Naumann, ii. 421.
Blackcap. Dresser, ii. 421.
Bec-fin à tête noire. Temminck, *Manuel*, i. 201, iii. 131.

This species visits Heligoland in small numbers only, and may be met with almost daily, in tolerably fine weather, from the first weeks of April until the middle of May, but only solitary individuals are seen; the same applies throughout October and November. I have even seen the birds as late as on the 5th and 18th December. During both migration periods it frequents almost exclusively the upper twigs of thorn- and elder-bushes in gardens from fifteen to eighteen feet high; in the autumn the bird feeds very voraciously on the ripe elderberries.

Only on one occasion have I heard the beautiful song of this bird. It was early in the morning, and the songster was hidden, secure from all intrusion, in a high and thick thorn-hedge. I was thus enabled to listen with rapture to its song, the first loud flute-like notes of which really made me believe it proceeded from a Nightingale. I confess with regret that when this song ceased the spring of Heligoland appeared to me poorer than ever before.

The Blackcap nests abundantly from Portugal, includes in its range the Azores and Canary Islands, and extends through the whole of Europe as far as the Ural; but its northern range hardly reaches beyond central Scandinavia.

100.—Sardinian Warbler [Schwarzköpfige Grasmücke].

SYLVIA MELANOCEPHALA, Gmelin.

Sardinian Warbler. Dresser, ii. 401.
Bec-fin melanocephala. Temminck, *Manuel*, i. 203, iii. 132.

Reymers is my only authority for including this species in the avifauna of Heligoland, he having obtained one many years ago.

This same specimen passed into the hands of W. Brandt, of Hamburg.

The home of this songster extends over all the countries of southern Europe bordering the Mediterranean, as well as north Africa.

101.—Barred Warbler [Sperbergrasmücke].

SYLVIA NISORIA, Bechstein.

Heligolandish: Kat-Ünger = *Cat-warbler.*

Sylvia nisoria. Naumann, ii. 430.
Barred Warbler. Dresser, ii. 435.
Bec-fin raye. Temminck, *Manuel*, i. 200, iii. 128.

This is by far the rarest of the Warblers belonging to Germany which are met with here. The bird is never seen before the middle of May, and then only on warm, calm days, and in solitary instances; nor can it be by any means reckoned as a regular annual summer visitant.

The breeding range of this species appears to extend only from western Germany to Turkestan; on the north it ranges to Denmark and southern Sweden. In England this bird has not been met with up to this date.

102.—Dartford Warbler [Provence-Grasmücke].

SYLVIA PROVINCIALIS, Gmelin.[1]

Sylvia provincialis. Keyserling and Blasius, *Wirbelthiere Europas*, lvi. and 186.
Dartford Warbler. Dresser, ii. 441.
Bec-fin pitchou. Temminck, *Manuel*, i. 211, iii. 137.

Two instances only of the occurrence of this peculiar bird in Heligoland are on record, it having on one occasion been obtained by Reymers, and on the other observed by myself, on May 31st 1851, hopping about in the thorn-hedge of a neighbouring garden at only a few paces distance. Unfortunately, there being other gardens behind the hedge in question in which people were occupied at the time, I was unable to shoot the bird. It was a male; Reymers' bird, also, according to the description, was a beautiful example of the same sex. This species is essentially a western one; its nesting stations extending from Portugal to eastern France. It also breeds in England and western Africa.

[1] *Melizophilus undatus* (Bodd.).

It should further be mentioned that Claus Aeuckens, on the 20th of April 1873, saw a 'black-headed Warbler, in which neck and breast were of the same dark coloration as the back.' What species this may have been it is impossible to say.

103.—Wood Warbler [Waldlaubvogel].

SYLVIA SIBILATRIX, Bechstein.[1]

Heligolandish : Gühl Fliegenbitter = *Yellow Wren.*

Sylvia sibilatrix. Naumann, iii. 556.
Wood Wren. Dresser, ii. 479.
Bec-fin siffleur. Temminck, *Manuel*, i. 223, iii. 149.

This bird occupies a prominent position among the Warblers, a group of song-birds the members of which are distinguished by their retired behaviour, and the modest, yet at the same time by no means unpleasing, coloration of their plumage.

It is one of the most charming of our tiny songsters, chiefly by reason of the sharp contrast between the coloration of its upper and lower parts. The former portions are of a dark greyish yellow, while the large eye-streak, the upper breast, and the sides of the breast are of a pure and soft lemon-yellow colour.

It visits Heligoland only in very isolated instances, such few individuals as are met with being seen for the most part on warm May days. During its autumn migration—from the middle of July to the middle of August—the bird is much rarer.

This bird is a rare breeding species in Spain and Portugal; its nesting stations extend more numerously from France and England through central and southern Europe, to the Ural; in the north, its breeding range extends to Denmark and lower Sweden.

104.—Bonelli's Warbler [Bonelli's Laubvogel].

SYLVIA BONELLI, Vieillot.[2]

Heligolandish : Grü-hoaded Fliegenbitter = *Grey-headed Wren.*

Sylvia montana. Naumann, xiii. 417.
Bonelli's Warbler. Dresser, ii. 503.
Bec-fin Natterer. Temminck, *Manuel*, i. 227, iii. 154.

Up to the present I have only twice obtained this southern species in Heligoland; in the first instance, an only moderately handsome male, on the 8th October 1861, and subsequently, on the 9th of October 1874, an extremely beautiful male in perfectly fresh

[1] *Phylloscopus sibilatrix* (Bechst.). [2] *Phylloscopus bonellii* (Vieill.).

plumage, with the upper breast and sides of the breast of a brilliant pure silky white; this pure white coloration renders the bird at once distinguishable from all its relatives even at some distance.

Bonelli's Warbler breeds in the mountainous regions of southern Europe, Asia Minor, and Palestine, its range extending on the north as far as south Germany. Hence it seems difficult to explain how the two examples in question could have got to Heligoland during the autumn migration; from their occurrence in October one would, according to the general phenomena of migration, conclude that their home was in the East.

105.—Willow Warbler [Fitislaubvogel].

SYLVIA TROCHILUS, Linn.[1]

Heligolandish: Lütj Fliegenbitter = *Small Wren.*

Sylvia trochilus. Naumann, iii. 568.
Willow Wren. Dresser, ii. 491.
Bec-fin Pouillot. Temminck, *Manuel*, i. 224, iii. 152.

This little bird, which breeds throughout the whole of Europe up to the extreme North, also visits Heligoland in abundance during both periods of migration, and is, in fact, the most numerous of all the Warblers which visit the island. Its principal times of migration are May and September, but on warm spring days it may arrive even earlier. Similarly, fine warm weather, with light south-easterly winds, may convey the bird to Heligoland as early as August, fairly large numbers being met with under these conditions in the potato-fields.

The breeding zone of this bird has probably a wider latitudinal range than that of any other European species, extending from north Africa up to the extreme northern point—the North Cape—of Scandinavia—from 34° to 71° N. lat. The winter quarters of the species are distributed over the whole of Africa down to its most southern provinces. From what we know of the facts of migration, we cannot assume that the millions of individuals, the breeding homes of which are distributed through Europe from the North Cape to the Mediterranean, pour into Africa in one vast chaotic horde, their movements and the range of their migrations being the results of mere accident; but that in this respect also a fixed order as to time and space prevails, in accordance with which, species whose breeding homes are in the extreme south likewise have their winter

[1] *Phylloscopus trochilus* (Linn.).

quarters further south, while those which breed in high northern latitudes do not extend their winter stations beyond northern Africa.

Now, the breeding areas of species nesting farther south become habitable a whole month sooner than those of species nesting in the far North; accordingly, the former start sooner for their breeding homes, than the latter do for theirs. Hence the remarkable fact results, that the birds which have started from four to six weeks earlier from their winter quarters in the far south fly past and beyond those which at that time are still wintering in north Africa, without however the latter being thereby induced to commence their spring migration. They, in fact, quietly remain until their homes in the raw North have become fit to receive them. There still remains, however, the question—What is it that announces to the one set of birds that the time for commencing its migratory journey has approached, and to the other that it has still ample time for resting in its winter abode?

The west-to-east range of the breeding area of this species extends from Portugal to the Jenesei.

106.—Chiffchaff [Weidenlaubvogel].

SYLVIA RUFA, Bechstein.[1]

Heligolandish: Lütj swart-futted Fliegenbitter = *Little Black-footed Wren.*

Sylvia rufa.	Naumann, i. 581.
Chiffchaff.	Dresser, ii. 485.
Bec-fin véloce.	Temminck, *Manuel*, i. 225, iii. 154.

This bird also visits Heligoland in abundance, if not quite so numerously as the preceding species. In spring it arrives sooner, and in autumn remains later, than any other Warbler, and it seems not at all to be afraid of rough weather. Its migration commences as early as the end of March, and in autumn lasts as late as November; indeed, in 1879, one of these birds was seen on the shore among the boats, during the first days of December, engaged in the pursuit of aquatic flies which were disporting themselves in the noon-day sun.

In this species, as in the preceding, the young, more intensely yellow-coloured birds of the year initiate the autumn migration.

The nesting stations of this species extend through Europe from Portugal to the Ural, and in Scandinavia to the latitude of 65° N.

[1] *Phylloscopus rufus* (Bechst.).

107.—Siberian Chiffchaff [Sibirischer Laubvogel].

SYLVIA TRISTIS, Blyth.[1]

Siberian Chiffchaff. Seebohm, *Siberia in Europe*, p. 116; *Siberia in Asia*, pp. 103, 152, 173.

Phylloscopus tristis. Dresser, ii. 477.

Only once, in October 1846, have I obtained a young bird of this species in its first autumn plumage; in this example the characteristic whitish rust-coloured markings of the neck, upper breast, and sides were very strongly defined. In this dress the species is very easily recognised, even at some distance; older, less intensely coloured examples, on the other hand, it would not be so easy, in the open air, to distinguish from somewhat grey specimens of the Chiffchaff, if the birds did not at once make their presence known, even at a fair distance, by their loud and striking call-note. The latter has not the least resemblance to that of any other Warbler, but sounds remarkably like the anxious calls of a young chick that has strayed from the hen. The sound is pi-ak—pi-ak—pi-ak (pēē-ak—pēē-ak—pēē-ak), special stress being laid on the first syllable, and is repeated invariably three or four times; then follows a pause, lasting from half a minute to several minutes, and sometimes, when the bird thinks it is being watched, even ten minutes.

Unfortunately, however, this bird, like many of its relatives, is extremely sharp in detecting any attention paid to it; and manages, by hopping away through the bushes, to withdraw from all observation with such deftness, that neither I nor Aeuckens have ever succeeded in killing one of the six or eight examples which have been met with here. All these had a special preference for a row, fifty feet long, of about twenty thorn-bushes in my garden. These bushes are about twenty feet high, and their crowns form a compact meshwork of twigs. On the last occasion the birds were seen there, Aeuckens stood on the outside, and myself on the inside, of these bushes, at a distance of about thirty paces, and although from the call-notes of the birds and from the frequent slight movements of the outermost and thinnest branches, we could perceive that they were slowly making their way from one end of the bushes to the other, we were unable, in spite of the utmost watchfulness, to hit on a favourable moment for firing; as in all similar cases, a few minutes after, we could hear the well-known pi-ak—pi-ak—pi-ak resounding from a neighbouring garden.

[1] *Phylloscopus tristis*, Blyth.

In general appearance, this and the preceding species closely resemble one another; on a close examination, however, it is impossible to confound the two species—for in the Siberian Chiffchaff, the greyish-brown upper parts have scarcely a touch of the fresh olive colour peculiar to the common Chiffchaff, while the lower parts show not even the least trace of the vivid light yellow colour of the latter species. The neck, upper breast, and the sides of the breast are of a dull light rust colour, almost isabelline—whitish rust-grey in the faded summer plumage—and only the under tail-coverts display the pretty yellow coloration characteristic of the Warblers.

The first authenticated observations on the nest and eggs of this species were made by Seebohm during his interesting and successful expedition to the Lower Jenesei (v. *Siberia in Asia*, pp. 152 and 173). One of the eggs, which was taken in that district on the 15th of July 1877, in latitude 70½° N., and is in my possession, resembles in its fine dark dotted markings the eggs of *Sylvia rufa*, but is somewhat larger than the average measurements of those of the latter species, though the bird itself is usually of smaller size. The egg in question is ·67 in. (17 *mm.*) long, ·51 in. (13 *mm.*) broad; accordingly, of less roundish form than the eggs of *rufa* and *trochilus*. It is pure white, and the reddish-black dots are sparingly scattered over the whole surface, though they are disposed somewhat more densely in a kind of wreath or corona at the thick end of the egg.

Seebohm and Harvie-Brown met with this bird at the beginning of July 1875 on the Lower Petchora; one of Dybowsky's skins, which is in my possession, is dated Lake Baikal, June 18th; therefore we may probably assume that this species breeds throughout the whole of northern Asia.

108.—Dusky Tree Warbler [Brauner Laubvogel].

SYLVIA (PHYLLOSCOPUS) FUSCATUS, Blyth.[1]

Dusky Tree Warbler. Jerdon, *Birds of India*, ii. 191.

My garden is divided from that of my neighbour by a high wooden paling, and it gives me much pleasure to watch through the chinks the doings of the birds there, who, utterly unaware of being watched at a distance of a few feet, move about in their most natural and unconstrained manner. In this way, on the 24th of October 1876, I espied close to me a small Warbler which, as regards the colour of its plumage, might have been described as the most advanced stage of a very vividly

[1] *Luscinia fuscata* (Blyth).

coloured Reed Warbler in autumn plumage—the olivaceous rust colour (*Oliven-Rostfarbe*) on the sides of the breast, the flanks, and the under tail-coverts was, however, much more intense and fresh than is found in the latter species, while its very prominent eye-streaks, as well as the scapular portions of the wings, were also of rust colour. On no part of its body did the bird display the least trace of the lemon-yellow colour so frequently repeated in this group, and which one even meets with on the scapular portions of the wings and the under tail-coverts of *S. tristis*—a species whose general plumage is otherwise of a brownish grey. The bird here referred to is strikingly distinguished from the latter species, which I have observed here, if only momentarily, at least six times, by the much fresher coloration of its plumage, and also by a quite different call-note; and I at once recognised it as the eastern *Sylvia fuscata*. Unfortunately, in spite of all attempts, I found it impossible to get a free shot at it, because on the other side of my neighbour's garden is a long thorn-hedge with houses behind it; all I could do was to observe it for about ten minutes at distances of from two to twenty paces; after which, this much-coveted example flew off into the hedge above referred to, and was not to be found again. This, by the way, was the same hedge in which my son Ludwig shot the example of *Sylvia nitida* which now adorns my collection.

According to Jerdon, this Warbler winters in India; and examples of it have been sent by Dybowsky and other observers from the Baikal region; its breeding range, therefore, probably extends from the middle Obi and upper Irtisch into eastern Asia.

All the Warblers hitherto discussed are distinguished from those which follow by the absence of the banded markings on the wings, which are peculiar to the preponderating number of the Asiatic forms, these bands or bars being formed by the strikingly light-coloured tips of the largest and next largest wing-coverts. These species differ from one another in the tone of their common coloration to a sufficient extent to enable us to recognise them at once with ease; another very good mark of distinction is furnished, however, by the measurements of the great flight-feathers, which substantially are as follows:—

S. sibilatrix.—The second flight-feather longer than the fifth; the third and fourth constitute the tip of the wing.

S. bonellii.—Second flight-feather of the same length as the sixth; the third, fourth, and the slightly shorter fifth, form the tip of the wing.

S. trochilus.—Second flight-feather shorter than the fifth; third and fourth forming tip of wing.

S. rufa.—Second flight-feather of same length as the eighth; the third, fourth, and fifth forming the tip of wing.

S. tristis.—Second flight-feather of the same length as the ninth; the third, fourth, fifth, and sixth form the tip of the wing.

S. fuscatus.—Second flight-feather of the same length as the tenth; the third, fourth, fifth, and sixth form the tip of the wing.

In addition to the Warblers here noted, I must mention another which attracted my attention by its peculiar call-note, and which I shot in my garden at the end of May 1875. It resembles a small and very pale example of *S. trochilus*, and has its lower parts quite white. In this bird the second flight-feather is shorter than the sixth, and the tip of the wing is constituted by the third, fourth, and fifth. Again, on the 9th July 1887, my attention was attracted by the call-note of another Warbler, which sounded something like shüüp—shüüp—shiep. The bird on discovering that it was being watched became extremely shy, and slipped off stealthily through the thorn-bushes, its whereabouts being only discoverable by its frequently repeated call-notes; nevertheless, my son, after the most persistent efforts, succeeded at last in shooting it. This example also resembles a small *S. trochilus*, and the measurements of its flight-feathers are similar to those of the example shot in May 1875. Seebohm, from the last-named, described the bird as a separate species, under the name of *Phylloscopus gätkei* (*Ibis*, 1877, p. 92). From a note of Dresser, however (vol. ii. p. 497), it appears that he has cancelled this name, inasmuch as it had been previously described by Tristram from examples obtained by him on the coasts of the Mediterranean.

109.—Yellow-browed Warbler [Gelbbrauiger Laubvogel].

SYLVIA SUPERCILIOSA, Gmelin.[1]

Heligolandish: Sträked Fliegenbitter = *Striped Warbler.*

Sylvia (Phyllopneuste) superciliosa.	Naumann, xiii.; Blasius, *Nachträge*, p. 74.
Yellow-browed Warbler.	Dresser, ii. 469.
Roitelet modeste.	Temminck, *Manuel*, iv. 618.

This interesting little east Asiatic species was first described by Latham in 1783 from a Russian example obtained through Pennant. From that distant date, up to the autumn of 1836, hardly anything more was heard of the bird. In the latter year one found its way into the bird-market of Vienna, and was kept alive for several

[1] *Phylloscopus superciliosus* (Gmel.).

months in the museum of that city. A second example was shot by Hancock, on the 26th of September 1838, on the English coast; and, in October 1845, two of these birds were taken in the neighbourhood of Berlin. Another example was shot near Milan in 1847; and one was captured, on the 15th of September 1861, near Leyden. Another was shot in England on the 11th of October 1867; and, lastly, Büchner (*Vögel des Petersburger Gouvernements*), mentions one which was caught in the neighbourhood of St. Petersburg on the 22nd of October 1878.

These eight isolated and scattered instances would cover all our knowledge in regard to the occurrence of this species on European soil, if little Heligoland had not come forward with its own small mite. The record of this island, however, is a notable one, as compared with the isolated data from the Continent of Europe. From the time that I obtained the first example of the species, in October 1846, and was thus enabled to direct the attention of our gunners to it, up to the 9th of November 1886, more than eighty authenticated instances of its occurrence have been recorded, of which number thirty-two or thirty-three examples have been shot. Besides, those much valued young sporting friends of mine, the blowpipe- and catapult-shooters, to whom I owe many a bird of this and other rare kinds, have reported to me at least twenty times that they had been engaged in a fruitless hunt after a 'Sträked Fliegenbitter' = Striped Warbler. I have never, however, noted these statements, but only such undoubted cases in which the bird was seen, either by Aeuckens, my son Ludwig, Lorenz Döhn, or myself.

Of these specimens, stuffed by myself, six are before me at the present moment: two—one of which was the first example, shot on the 4th of October 1846—I gave to the late Colonel von Zittwitz, and these, with the rest of his rich collection, will at present probably be found either in the museum of the University of Leyden or in the town museum of Görlitz. Two other specimens were given to my late friend Professor Blasius, and are preserved in the Museum of Brunswick; another is in the Museum of Coburg; one is in the possession of the Honourable Percy Feilding of London; another stuffed specimen, dried after it had been somewhat damaged by shots, was given to Professor Alfred Newton; two skins, unfortunately much damaged, I gave to Mr. Seebohm, who added thereto a third, which he shot himself in my garden on the 5th of October 1876; and, lastly, I presented a stuffed specimen to my friend, John Cordeaux, on the occasion of his recent visit. Besides I have given away several others, but cannot at the present moment remember where they went to; four or five other examples were so much damaged by the shot, that there was nothing more to be done

with them. To these must, further, be added such examples as were stuffed by Heligoland stuffers in my time, and passed over into private collections, as well as such as went to Hamburg, mostly into the possession of Brandt, at the beginning of the thirties, through the agency of old Koopmann and Reymers; among the latter was a bird which successfully evaded all pursuit in the course of the day, but in the evening was found asleep, during a lantern hunt after Chaffinches, and killed.

The migration of this Warbler commences in Heligoland during the last ten days of September, and continues until the end of October; on several occasions the bird has been met with as late as the beginning of November. This bird, like all the Siberian species which visit Heligoland, is only extremely rarely met with in spring. However safely we may look forward to meeting with it every autumn, if the weather is at all favourable, we may be equally certain that in the spring we shall look for it in vain. During a spell of more than fifty years I have only seen it twice at the latter season—once on the 25th of April, the second time on the 25th of May; the first was a very beautiful male, but, unfortunately, was so much damaged by the shot, that it could not be prepared for the cabinet.

The conditions which favour the passage of this bird to Heligoland are an east wind, particularly a light south-east, and warm sunny weather. After its arrival it frequents principally the few tree-like willow shrubs in the gardens between the houses of the Upper Plateau (Oberland). It appears to have a special preference for *Salix smithiania*, for which reason I always cultivate this species in my garden. It is hardly ever seen on *S. caprea* or on elders, but likes high thorns and the greater maples (*Acer pseudo-platanus*). In its manner of hopping through the branches of these tree-like bushes and garden-shrubs it exactly resembles the Chiffchaff and Willow Wren. In doing so, it does not, however, make use of its wings for propelling itself, as the two last-named species do incessantly, even when they do not require their wings for the purpose of fluttering from one branch to another; nor does this bird hop about in the unsteady, and, to all appearances, aimless manner of the latter birds, but progresses calmly and gradually from the lower branches to the top of the tree or bush.

The bird only rarely gives utterance to a call-note; generally it does so only when flying away. This call has the sound of a somewhat long-drawn, softly-intoned 'hjiiph,' and somewhat approaches in character the call-note of *Anthus pratensis*. Swinhoe has very aptly sought to reproduce this sound by the English word 'sweet.'

In its whole bearing this bird has nothing by which it could remind us of the Golden-crested Wren, a bird which hops about in

a restless, almost nervous, manner, and is incessantly uttering cries. Its plumage, moreover, is of firmer texture; and the structure of its nest, which is now known as well as its eggs, is similar to those of the other Warblers, and not at all like that of the Golden-crested Wren. It was probably its small size, combined with the light wing-markings, which induced observers to include the first examples of this species amongst the Crested Wrens; observation of the bird in nature in no way justifies such a position. I myself, accordingly, noted the first examples of this species obtained and observed here, which at that time were quite unknown to me, under the name *Sylvia* (*Ficedula*) in my Ornithological Journal; nor has any of the older shooters, nor of the younger blowpipe sportsmen of Heligoland, ever thought of applying to this bird any other name than that of 'Sträked Fliegenbitter,' *i.e.* Striped Warbler.

It is owing to the tendency exhibited by this bird for selecting as its habitat the small gardens between the houses, where a gun can only rarely be called into requisition, that of the individuals observed on the island such a comparatively small number is secured; moreover, under such conditions, one is generally obliged to shoot at a very short distance, and hence it unfortunately too often happens that, though one may scarcely use half the usual charge, this interesting visitor is frequently so much damaged as to be quite useless for preserving.

Apart from this, it is by no means easy to get a shot at the little stranger; for there are few birds which are so clever in covering themselves, as they hop through the bushes, with branches and foliage in sufficient quantity to render a successful shot impossible.

The whole of the upper plumage of this species is of a beautifully fresh olive-greenish yellow (*olivengelbgrün*), the colour being somewhat darker on the top of the head, and somewhat more yellow on the rump. The under parts are pure whitish sulphur-yellow (*weisslich schwefelgelb*), the belly and under tail-coverts being nearly white. A very broad sharply-defined light sulphur-yellow eye-streak, extending to the nape, and two broad bands of the same colour across the wing, distinguish the bird from all its European congeners, with the exception of the species next to be described, which, in its turn, is principally distinguishable by the broad pure yellow marking of the rump.

In the older males the markings of the head, wings, and upper breast are of a purer and lighter yellow, and there is a fairly distinct lighter streak on the centre of the crown of the head, extending from the base of the bill to the nape of the neck. In the less handsome specimens there is only a faint indication of this marking, while females and young birds have not even a trace of it. In

individuals where this marking is most pronounced, the light eye-streak has, in addition, a fine black border above and below, by which the beauty of this already very conspicuous marking is considerably enhanced.

The flight-feathers and rectrices are edged by the same colour as that of the back. Besides the two characteristic bands, which are formed by the broad pale yellow markings of the tips of the lesser and greater wing-coverts, the three posterior flight-feathers have equally conspicuous broad whitish-yellow edges on their outer webs, while all the secondary and some of the primary quill feathers have pure white edges at the tips, which end in a point on the shaft.

All these markings are less pronounced in females and young birds.

The bill and feet are of a light horn colour, the former with a blackish tip, the latter with yellowish soles.

The measurements of this species, as taken from many freshly-killed specimens, are as follows:—Total length, from 3·58 to 4·10 ins. (91 to 104 *mm.*); length of wing in repose, 1·92 to 2·24 ins. (49 to 57 *mm.*); length of tail, 1·38 to 1·50 in. (35 to 38 *mm.*); length of tail uncovered by wings, ·59 to ·71 in. (15 to 18 *mm.*); length of beak, ·27 to ·32 in. (7 to 8 *mm.*); average length of tarsus, ·71 in. (18 *mm.*). The smaller measurements are not always confined to the females; thus, one of the two examples which were met with in the spring was a male with exceptionally pure and beautiful markings, and nevertheless almost the smallest of all the examples of this species ever obtained here.

In the wings the second flight-feather is of the same length as the seventh; the third, fourth, and fifth are of equal length, and form the tip of the wing—in some cases the fifth is hardly perceptibly shorter; the last posterior flight-feather is generally of equal length with the last, *i.e.* the tenth of the primaries. The tail as a rule appears slightly furcate, the central pair of feathers being usually a little shorter than the lateral pair.

The bill in its whole conformation possesses the typical features of that organ in the Warbler family, and is very plainly distinguished from the long-pointed bill of the Crested Wrens. Measurements are of little further use for proving anything in this respect, since the deviations in objects of such small size are too insignificant to be of much value; when, however, these parts of the two species are examined under a magnifier, the differences become apparent in a most striking manner.

For a long time nothing definite was known as to the home of this species; it was hardly suspected that it could extend beyond northern Siberia, of which fact there seems to be now no longer

any doubt. Seebohm found the nest on the Jenesei, within the limits of the Polar circle, and von Middendorff met with it numerously during the autumn migration to the north of the sea of Ochotsk; thus the breeding area of the species appears to extend from the Lower Jenesei into the most eastern parts of Asia.

Sewertzoff, however, states that this Warbler breeds also in Turkestan, and there at heights of from seven to ten thousand feet; and Brooks believes that he has discovered its eggs in the mountains of Kashmir, eight thousand feet above sea level—in both cases, accordingly, at elevations possessed of a summer climate rather similar to that of northern Asia. Nothing further has been reported as regards Sewertzoff's statement; but in respect to that of Brooks, Seebohm says that the eggs collected by him in Kashmir are not those of *S. superciliosa*, but belong to another hitherto unknown species. What species he is referring to does not appear from his notes; it may probably be *S. humei*, which certainly comes very close to *S. superciliosa*, and which, in the absence of examples of both for close and exact comparison, might easily be taken for birds of the latter species in faded summer plumage.

Unfortunately I have not an egg of *S. superciliosa* at my disposal. One of the eggs collected by Brooks in Kashmir, which is in my possession, is ·55 in. (14 *mm.*) long, ·43 in. (11 *mm.*) broad, of a pure white ground colour, and sprinkled with fairly densely-disposed brownish red spots; the colour of the markings is not so light as that of *S. trochilus*, nor so dark as that of *S. rufa*. Leaving size out of consideration, it seems to resemble most nearly a dark-spotted Titmouse's egg. Seebohm, in regard to his eggs collected at the Jenesei, says that they resemble in a high degree those of *S. humei*.

Sylvia humei is of the same size as *S. superciliosa*, but deviates considerably from the latter in the coloration of the plumage. In the whole of its dress we nowhere meet with the pure and beautiful sulphur yellow which so markedly distinguishes that of the latter species. The eye-streak is dull olive yellow, and the lower of the alar bands is of the same colour, but often even only of a whitish olive grey (*weisslich olivengrau*); in the upper band the olive grey colour is so dull that in some examples this marking almost ceases to be distinguishable. There is a considerably greater difference in the coloration of the two species than there is between *S. trochilus* and *S. rufa*; *S. humei* approaching the latter, while *S. superciliosa* bears a stronger resemblance to *S. sibilatrix*.

Though, apart from colour, the markings of both species must be regarded as similar, they are most distinctly differentiated by

the relations of the flight-feathers to each other, a relation of great specific import in so many of the Warbler species. In *S. superciliosa* the second of these feathers is of the same length as the seventh; in *S. humei*, on the other hand, the second is equal to the ninth; in the latter species, the sixth flight-feather still forms part of the tip of the wing, while in the former the same feather does not nearly reach the tip.

As it is hardly likely that another ornithologist will ever be placed in a position to record such results of an observation of this interesting species, carried out on European soil, as were possible to me on this island, I do not think it will be considered superfluous if I give in their proper order the dates of their occurrences from my ornithological diary:—

1846. 4th October.—Male. First example shot by a boy with a blow-pipe.
1847. 9th November.—Seen, but not killed. In September of the same year an example was shot near Milan.
1848. 8th October.—Female. 10th November.—Not obtained.
1849. 25th April.—Beautiful male. 20th and 25th September.
1850. 1st October.—One bird. 6th.—Obtained two females. 13th and 17th.—One bird each day.
1853. 12th and 17th October.—The example obtained on the latter date was a male.
1854. 28th and 30th September; 6th October.—A young bird.
1857. 20th September.—A bird in my garden.
1858. 22nd September.—Wounded a bird, but did not secure it. 12th October.—One bird.
1859. 7th October.—Two birds in garden, one of which shot.
„ 8th „ A fine male, with broad stripe on crown.
„ 13th „ Obtained two birds, one of them a fine old male.
1861. 10th „ Three examples in Jacob Dähn's willows.
1863. 9th „ Shot a male.
1864. 4th „ Two examples; stuffed one young bird.
1865. 24th „ Obtained two examples, females.
1867. 19th September.—Shot two. 11th October.—One bird; on the same day an example was shot in England.
1869. 1st October.—Saw one bird but did not obtain it.
1870. 19th September.—Two in garden; gun wouldn't act. 20th.—One male presented to Newton.
1871-72. The diaries for these years are lost.
1873. 24th September.—Two. 25th.—Obtained one male. 26th.—Two, not obtained. 30th.—One male. 16th October.—Saw one bird, but did not obtain it.
1874. 10th and 11th October.—Saw one example each day respectively.
1875. 17th September.—Two examples, not obtained.
1876. 25th May.—A bird in garden. 26th, 29th, and 30th September.—A bird on each day respectively. 3rd October.—A bird on each day respectively. 4th October.—Female in garden;

Seebohm missed. 5th.—A male in garden; shot by Seebohm. 6th.—A bird in the trees near the stair. 7th.—One in my garden. 26th.—One in my garden.

1877. 21st and 28th September.—A bird each day; that on latter in my garden.

1878. 2nd October.—A pretty bird in thorn-bush in garden; did not obtain it. 5th to 9th.—Saw a bird each day in garden; was it the same bird? 24th.—A bird in the trees by the stair.

1879. 28th September.—One bird; on the same day two *Emberiza pusilla* and one *E. rustica*. 14th October.—Ludwig shot a fine male; another example seen by Claus Aeuckens, and two birds side by side by Jan Aeuckens.

1880. 16th September.—One bird, not obtained. 25th.—Obtained a fine example; saw another, besides another larger Warbler with a very broad alar band. 30th.—Saw one example: likewise a *S. tristis* in garden. 8th October.—Saw one bird quite close in garden.

1881. 29th September.—One bird, not obtained.

1882. 23rd and 27th October.—Saw one bird each day.

1883. 17th September.—Shot a fine bird.

1885. 26th September.—One bird. 28th.—Shot two fine examples.

1886. 7th October and 9th November.—A bird on each date respectively, not shot.

1887. 11th October.—One bird with a very yellow stripe on crown.

The last of these examples, and a Nutcracker (*Nucifraga*) shot on the 15th of the same month, were the only eastern occurrences during the whole of the autumn migration. This was owing to the violent west winds prevailing, almost without exception, at that time, which invariably, in the most decisive manner, prevent the movements of migration from proceeding within the range of our observation.

110.—Pallas's Willow Warbler [Goldhähnchen-Laubvogel].

SYLVIA PROREGULUS, Pallas.[1]

Motacilla proregulus. Pallas, *Zoog. Ross.-Asiat.* i. 499.

Claus Aeuckens has been a devoted fowler and gunner from his earliest youth. Before he had reached the age when he might be entrusted with powder and shot, his shooting gear consisted principally of a hunting-bag full of rounded pebbles, which he knew how to employ with the most astonishing dexterity. It was with such a pebble that, at the age of eleven years, he hit the first example of *Emberiza rustica* ever killed on the island.

In later years, at times when the Guillemots were flying along the edge of the cliff at a tearing speed, I have seen him hit five or

[1] *Phylloscopus proregulus* (Pallas).

six of them without once missing. He even went so far as to pick out particular birds for his aim; such individuals, for example, as had the white eye-streak, and I have known him to bring down in this manner as many as ten examples in the course of a few hours. At ebb-tide he used to be much about at the base of the cliff, where, in the course of a walk, he would hit some twenty or thirty smaller birds, such as Stonechats, Pipits, Sand-pipers, and others.

Among a mixed bag of this kind there was found one day—6th October 1845—a small Warbler which had been hit by the stone as it was flying along the face of the cliff, and completely crushed against the rock. Nevertheless, Aeuckens, who noticed that the bird was an unusual one, brought me one of its wings, which had remained undamaged, with a portion of the lower part of the back with part of the lemon yellow plumage still adhering to it. I had at that time no idea to what species this wing might belong, though I suspected it was one of the *Reguli*. Aeuckens, however, emphatically insisted that the bird was a Warbler. Accordingly I not only preserved the wing, but, as I am accustomed to do in doubtful cases, made an accurate drawing of it. On obtaining, a year afterwards, the first example of *Sylvia superciliosa*, I believed at first that I had solved the riddle; but, on a closer examination, I found that, although the markings of the two were similar, their measurements did not agree. Several years later I read a short description of *Regulus modestus* (*Sylvia proregulus*), and also procured a skin of this species, but this also did not agree with my wing, as it happened to be an Indian specimen. It was not, however, until the summer of 1879, when Eugen von Homeyer, on his visit to me, brought me, among other interesting objects, a Siberian skin collected by Dybowsky, and labelled *Reguloides proregulus*, that I was enabled to settle definitely that my wing belonged to the latter species. Aeuckens, too, at once asserted, in the most decided manner, that this was the species of which he had hit one on the occasion above referred to.

On the 29th of October 1875, Aeuckens, accompanied by his nephew, Lorenz Dähn, again saw a bird of this species a few steps in front of him under the edge of the cliff. The bird was seeking shelter there against a violent east wind, and could not be induced to come to the Upper Plateau. Had it been shot at in the position in which it was found it would have fallen into the surf below and been lost. Thus our two shooters had the leisure, enforced in this instance, to contemplate the bright lemon yellow plumage of the lower part of its back.

Sylvia proregulus is scarcely any smaller than *Sylvia super-*

ciliosus, and in general aspect resembles a very freshly-coloured specimen of the latter species. Its upper parts, however, are of a purer and lighter olive green, and the lemon yellow markings of the head and neck are considerably purer and richer. This remark especially applies in the case of the eye-streaks, and a stripe of the same colour extending from the bill across the crown of the head deep down to the nape of the neck. The bands on the wings are also broader, and of a purer yellow. The rump is of a rich lemon yellow, its colour being sharply marked off from that of the back, and it is by this feature especially that the bird may be distinguished at a glance from the preceding species.

The only measurements I am able to give from a fresh example are those of the above-mentioned wing. These, however, completely agree with those of four examples collected in eastern Siberia. The total length of the wing is 1·92 in. (49 *mm.*); the third, fourth, and fifth flight-feathers are of equal length, and form the tip of the wing; the sixth recedes by ·04 in. (1 *mm.*); the second is of the same length as the eighth, ·23 in. (6 *mm.*) shorter than the three longest primaries, and ·20 in. (5 *mm.*) longer than the longest of the three last flight-feathers.

A comparison of this wing with Siberian and Indian skins has revealed a fact which seemed hitherto to have escaped observation, viz. that there exists a similar case of difference as between the preceding species—the Siberian *S. superciliosa* and the Indian *S. humei*—inasmuch as *Sylvia proregulus* is not identical with the southern very closely related form, but presents constant differences from the latter, both in coloration of plumage and the relations of the flight-feathers.

Skins from India are described as *S. proregulus*; and Seebohm, the *Catalogue of the Birds of the British Museum*, vol. v. p. 71, places the name *Phylloscopus proregulus* after seven Indian and one Siberian example; whereas a careful examination proves that these two birds form two separate and independent species, like *S. superciliosa* and *S. humei*, *S. tristis* and *S. fuscata*, *S. trochilus* and *S. rufa*, and probably some others.

In colour the Indian species is distinguished from its northern relative, like *S. humei*, and even in a higher degree, by the deeper olive brown (*olivenbraun*) colour of the plumage; the beautiful sibilatrix-like lemon yellow marking on head and neck, which distinguishes the latter species to such advantage, is wanting in the former; the stripe on the crown, and the eye-streaks, are dull olive brownish yellow (*olivenbraungelb*); the back is olive brown, not olive green, as in *S. proregulus*; and all the underside of a dull olive yellow (*olivengelb*), which on the upper breast and

neck passes into olive grey, whereas in *S. proregulus* these parts are pure whitish, with a tinge of lemon yellow.

The rump only, and the bands on the wings, are of nearly the same colour as in the Siberian species.

If a row of specimens of the one species be placed side by side with a row of the other, the differences become really very striking, both on the upper and lower sides of the birds. In this case, however, as in so many other instances in this family, the measurements of the flight-feathers offer the most indisputable proof of the specific distinctness of the two forms. In *S. proregulus* the second flight-feather is equal to the eighth; in the Indian form to the tenth. In *S. proregulus* the third, fourth, and fifth flight-feathers are of equal length, and form the tip of the wing; while, in the Indian form (*S. humei*), the tip is formed by the fourth, fifth, and sixth, the third being ·12 in. (3 *mm.*) shorter. In *S. proregulus* the second flight-feather is only ·23 in. (6 *mm.*) shorter than the tip of the wing; in the Indian form it is ·39 in. (10 *mm.*) shorter, and in consequence almost of equal length to the longest posterior flight-feather, whereas in *S. proregulus* it projects from about ·23 to ·27 in. (6 to 7 *mm.*) beyond the latter.

It is remarkable that not only is the similar difference in coloration existing between *S. superciliosa* and its southern relative repeated in *S. proregulus* and its southern form, but is accompanied by an almost similar difference in the structural formation of the wing.

The breeding range of the present species appears to extend as far as the eastern portions of central Asia.

111.—Crowned Willow Warbler [Gehäubter Laubvogel].

SYLVIA CORONATA, Temminck.[1]

Phylloscopus coronatus. Seebohm, *Cat. of Birds of Brit. Mus.*, v. 49.

This beautifully marked Warbler, whose home is in south-eastern Siberia and Japan, has been caught once on this island, having been obtained by Reymers on the 4th of October 1843. At that time the few birds I possessed served merely as parlour decorations, as I had not yet begun to collect systematically; and though I felt greatly interested in this pretty bird, especially as Reymers described it as never having been seen before on the island, I did not feel inclined to pay the high price which he asked for it. I

[1] *Phylloscopus coronatus* (Temminck and Schlegel).

need hardly mention how much I regretted this afterwards. The bird passed into the hands of Brandt at Hamburg, and may probably still exist in some collection or other. As in other similar cases, I have never been able to ascertain anything further as to its whereabouts, because Brandt, in order not to betray whence he got so many of his rarities, never told his customers that they came from Heligoland.

Among some scattered notes, made about that time, I find the following data written down after I had examined the bird in the flesh at Reymers': October 4 (1843).—A very fine Warbler (*Ficedula*) obtained by Reymers. The head of the bird striped like a Reed Warbler; the stripe on the crown of the head sulphur yellow, the colour very light on the nape of the neck, and very dark on its sides. Upper parts a very beautiful yellowish green, lower parts white. Under tail-coverts of a very beautiful yellow. The wings with a light transverse stripe. The second flight-feather longer than the seventh.

The bird has never been seen again on the island; nor have I been able to find, among the many skins of this species which I have since that time had occasion to examine, an example in which the stripe on the crown of the head was of so light a colour, the back so pure yellowish green, or the under tail-coverts so intensely yellow as in the bird which was found here.

112.—Eversmann's Warbler [Nordischer Laubvogel].

SYLVIA BOREALIS, Blasius.[1]

Sylvia (Phyllopneuste) borealis.	Naumann, xiii.; Blasius, *Nachträge*, 69.
Eversmann's Warbler.	Dresser, ii. 509.
Phylloscopus borealis.	Seebohm, *Cat. of Birds of Brit. Mus.*, v. 40.

This bird was first described as new to Europe in the *Naumannia*, and afterwards in the Supplements to Naumann's *Birds of Germany*, by Blasius after his visit to me in 1858. Until then the example in my collection, which had been killed by one of my young blow-pipe friends on the 6th of October 1854, formed certainly the only instance of the occurrence of this species on European soil. Nor has a second example come into my hands since, although, on the 1st of June 1859, Claus Aeuckens assured me that on the afternoon of the same day he had seen a bird of this species from two to three paces in front of him, outside of the rampart on the eastern edge of the cliff: in spite of all search, however, the bird could not be discovered again.

[1] *Phylloscopus borealis* (Blasius).

From 1858 until 1872 nothing further was heard about this Warbler; but, in the summer of the latter year, Alston and Harvie-Brown met with it near Archangel. After that date it was observed by Seebohm and Harvie-Brown, in June 1875, on the Lower Petchora; while in 1876, and during the following years, it was discovered by Collett in Finmark, at the Porsanger and Waranger Fjords, beyond 70° N. latitude, under conditions from which we may conclude with safety that the species breeds in those districts.

Neither nest nor eggs were known, however, until Seebohm found them in 1877, during his expedition to the Lower Jenesei, in latitude 67° N., in the latter district. From an example before me of the only clutch in Seebohm's possession, it is at once characterised as the egg of a Warbler. Its length is ·67 in. (17 *mm.*); breadth, ·49 in. (12½ *mm.*); and it is rounded off to an equal extent towards both extremities. The shell is white, with a slight gloss, and has a faint sprinkling of small spots, as light as those of the eggs of *S. trochilus*, but in shade approaching more to a rich pink than a reddish brown.

The bird killed here, and in my collection, was in fresh autumn plumage, in which, with the exception of *S. tristis* and *S. fuscatus*, there occurs the least amount of sulphur yellow of any related species of the same genus noted here. All the upper parts are of a rather dusky greyish green, the colour being a little darker on the head and slightly lighter on the rump. The lower parts, including the under tail-coverts, are dull white; the breast and sides clouded with grey, and with a scarcely perceptible tinge of pale sulphur-yellow everywhere. A sharply-defined eye-streak of pure whitish sulphur-yellow extends from the bill to the back of the head; this does not gradually get duller as it runs backward, but ends quite abruptly in its pure coloration. The wings on the outside are of the same colour as the back, and have a dull light yellow band formed by the spots on the tips of the large wing-coverts.

The measurements of this species, as taken from the freshly-killed bird, are as follows: Total length, 4·33 ins. (110 *mm.*); length of wing in repose, 2·28 ins. (58 *mm.*); length of tail, 1·65 in. (42 *mm.*); length of tail uncovered by wings, ·51 in. (13 *mm.*). The bill is very strong, and measures ·43 in. (11 *mm.*), and the length of the tarsus is ·67 in. (17 *mm.*).

In the wing the second flight-feather is of the same length as the sixth; the third, fourth, and the fifth—which is ·04 in. (1 *mm.*) shorter—form the tip of the wing. The tip of the longest posterior flight-feather is ·59 in. (15 *mm.*) distant from the tip of the wing.

The tail is double-rounded (*doppelt abgerundet*), the central and second lateral pair of feathers being ·04 in. (1 *mm.*) shorter

than the fifth, fourth, and third, and the outer pair ·12 in. (3 *mm.*) shorter than these latter. All the feathers are drawn out to a point at the shaft, a conformation produced by the shallow sinuation of the inner web.

The name *S. borealis* is a particularly fitting one in the case of this bird, for of no other species of this family are the nesting quarters so exclusively confined to the higher latitudes. They extend from 70° 20′ N. in Finmark; within the same parallels, along the Arctic coasts of the whole of Asia and across to Alaska. Middendorff met with the bird on the Lower Boganída, and the Vega Expedition found it numerously on the coast of the Tchuktchee peninsula.

113.—Greenish Tree Warbler [Grüner Laubvogel].

SYLVIA VIRIDANA, Blyth.[1]

Phylloscopus viridanus. Seebohm, *Cat. of Birds of Brit. Mus.*, v. 44.
Greenish Tree Warbler. Jerdon, *Birds of India*, ii. 193.

This East Asiatic species, hitherto strange to Europe, I have obtained in Heligoland three times. The first example, a young bird, on the 25th of September 1878; afterwards a fine male, shot by my son Ludwig on the 30th of May 1879; and lastly, on the 3rd of June 1880, I had the pleasure of shooting a beautiful female in my garden. The two last examples are perfectly uninjured; the first is much damaged, but nevertheless preserved with the other two in my cabinet.

It should in this place be noted, that the male bird shot in May had, in the fresh condition, olive grey feet, and may accordingly have to be placed under *S. plumbeitarsus* (Swinhoe). It exhibits, however, no further difference of any kind from the two other examples, and I therefore do not propose to describe it as a separate species on account of a peculiarity which is no longer evident in the dried example.

The fact of its having occurred here three times within so short a space of time might suggest the thought as to whether this may not be the same Warbler met with by Collett in Upper Scandinavia, especially as in its external appearance it closely approaches *S. borealis*. However, after receiving one of Collett's examples, I do not consider this suspicion warranted by the facts.

In its general appearance this species bears a strong resemblance to the preceding, *S. borealis*. The bill, however, is much smaller, in fact a typical Warbler's bill; whereas this organ is, in *S. borealis*,

[1] *Phylloscopus viridana* (Blyth).

unusually strong. The coloration of the upper parts is not so dull as in the latter species, but is of a lighter greyish green, and the whole underside is of a rather intense dull greenish yellow colour. The eye-streak is sharply defined and light sulphur yellow; the dull greyish yellow band on the wing stretches over the tips of the first four or five greater wing-coverts.

The measurements of the bird are as follows:—Total length, 4·33 ins. (110 *mm.*); length of wings, 2·44 ins. (62 *mm.*); length of tail, 1·85 in. (47 *mm.*); length of tail uncovered by wings, ·75 in. (19 *mm.*). These measurements refer to the male; those of the female are somewhat smaller. The bill measures ·27 in. (7 *mm.*), and the tarsus ·71 in. (18 *mm.*).

In the wing the second flight-feather is of the same length as the seventh (in small females it is equal to the eighth). The third, fourth, and fifth are of equal length, and form the tip of the wing, the sixth receding only very slightly from the latter.

Seebohm states that *S. viridanus* nests in Kashmir, and *S. plumbeitarsus*—the validity of which, as a species, he much doubts—from Turkestan to the Amur. We may accordingly regard central Asia as the breeding area of this species.

114.—Bright-green Tree Warbler [Gelber Laubvogel].

SYLVIA NITIDA, Blyth.[1]

Phylloscopus nitidus. Seebohm, *Cat. of Birds of Brit. Mus.*, ii. 43.
Bright-green Tree Warbler. Jerdon, *Birds of India*, ii. 193.

This Warbler from south-eastern Asia—a species entirely new to Europe—was shot by my son Ludwig on the 11th of October 1867, and forms certainly one of the most interesting specimens in my collection. A *Sylvia superciliosa* had been seen on the same day, and my son was searching through the garden for it, when in place of it he came across this valuable acquisition to the avifauna of Heligoland. What, however, could have induced a bird, never met with north-west of the Himalayas, to exchange the palms of the Ganges for this barren cliff of the Northern Sea, is, indeed, difficult to conjecture.

All that is known up to the present time in regard to this rare stranger is limited to some scattered observations of English investigators. Seebohm, in the *Catalogue of the Birds of the British Museum*, sums it up as follows:—'The bird probably breeds in the north-western Himalaya, and winters in Bengal, northern India, and Ceylon.'

[1] *Phylloscopus nitidus* (Blyth).

The example shot on the island, as related above, perfectly agrees with several Indian specimens shown me by Seebohm during his visit here, and with another from the same country in my possession.

The best general idea of the plumage of this bird is conveyed by imagining the upper parts of a *S. sibilatrix* in a pure and fresh plumage, combined with the underside of a very pretty *S. hypolais*. Excepting that in *S. nitida* the posterior flight-feathers have no yellow edges, all the upper parts are of a uniform fresh light-yellowish green, with a very slight admixture of verdigris, the top of the head not being darker, nor the lower part of the back lighter, than the rest. The whole underside, including the under tail-coverts, is of a uniform pure and soft light sulphur yellow, likewise with a very faint touch of verdigris colour. A broad eye-streak, extending to the back of the head, is of the same colour, as also is a band on the wing formed by the light tips of the large wing-coverts.

The bill is pale yellowish flesh coloured (*gelblich fleischfarben*), with the tip of somewhat darker horn colour. The feet are light bluish grey. The measurements of the bird are as follows:—Total length, 4·68 ins. (119 *mm.*); length of wing, 2·48 ins. (63 *mm.*); length of the squarely-truncate tail, 1·96 in. (50 *mm.*); length of tail uncovered by wings, ·86 in. (22 *mm.*). The bill, which is very broad at its base, is ·47 in. (12 *mm.*), and the tarsus measures ·82 in. (21 *mm.*).

115.—Icterine Warbler [Garten-Laubvogel].

SYLVIA HYPOLAIS, Linn.[1]

Heligolandish: Groot Gühl-Fliegenbitter = *Large Yellow Warbler.*

Forty or fifty years ago this bird might have been met with on the island in fairly large numbers almost regularly every May: owing, however, to the changes in meteorological conditions which have taken place since that time, it has by degrees become so rare that one may nowadays count oneself lucky to find one, or at most two, on exceptionally warm May days in the upper branches of garden bushes. They are still rarer during the return migration in August, one or more being met with now and again on the potato-fields of the Upper Plateau.

The only instance of its occurrence which I am able to record, is that of a pair which, in the summer of 1876, built their nest in my neighbour's garden, and reared five young birds. I used to see and

[1] *Hypolais icterina* (Vieill.).

hear the whole family every day in my garden until the 8th of August, when they disappeared, though they probably stayed some short time longer in the fields among the potato and cabbage plots. As early as the 4th of the same month I have caught here a young *S. sibilatrix*, and on the 7th a young *S. phragmitis*.

This Warbler breeds in northern France, Germany, Russia, and beyond the Ural. The northern range of its breeding area extends to central Scandinavia. In England the bird has only been met with twice.

116.—Melodious Warbler [Sänger Laubvogel].

SYLVIA POLYGLOTTA, Vieillot.[1]

Hypolais polyglotta. Seebohm, *Cat. of Birds of Brit. Mus.*, v. 79.
Melodious Warbler. Dresser, ii. 517.
Bec-fin icterine. Temminck, *Manuel*, iii. 150.

I obtained a very fine example of this species on the 23rd of May 1846; since that time the bird has not been seen here again. This is not surprising; for although it is met with as a breeding species as far as central France, it belongs to those pre-eminently western species which never exhibit a tendency towards deviating to the east from the strict north-to-south course of their migration.

This Warbler displays a great similarity to the preceding species, but is distinguished from the latter by its smaller size, the more intense yellow coloration of its lower parts, and the different construction of the wing. In *S. hypolais* the total length of the latter is 3·07 ins. (78 *mm.*), in *S. polyglotta* it is only 2·56 ins. (65 *mm.*); in the former species the second flight-feather is shorter than the fourth, and the third ·04 in. (1 *mm.*) longer than the fourth; in the latter the second is shorter than the sixth, and the third, fourth, and fifth, which are of almost equal size, form the tip of the wing.

Sylvia polyglotta nests preferably in Spain and Portugal; few examples are found breeding in central France, and still fewer in Italy. It is also said to have been caught once or twice in Belgium, and once in Austria.

[1] *Hypolais polyglotta* (Vieill.).

117.—Olive-tree Warbler [Oliven-Sänger].

SYLVIA OLIVETORUM, Strickland.[1]

Hypolais olivetorum. Seebohm, *Cat. of Birds of Brit. Mus.*, v. 79.
Olive-tree Warbler. Dresser, ii. 527.
Bec-fin des oliviers. Temminck, *Manuel*, iv. 611.

One of these Warblers was shot in 1860 by a boy with a blow-pipe. Unfortunately, I only heard of it a few days after. In the interval children had been playing with the bird, and had so completely ruined it that it was no longer fit for preserving. Ignorance, unfortunately, too often entails losses of this kind. For instance, one day Aeuckens brought me a complete set of the tail-feathers of a Stonechat, all of which, with the exception of the central pair, were entirely black, except on the upper sixth portion of their length. It appears that boys had been plucking Common Stonechats in the fields, among which was the bird whose tail was brought to me by Aeuckens. It happened at the end of August, a time at which the young birds of many different species of Stonechats closely resemble each other.

However, I was to some extent compensated for the loss of this Warbler; for, in the course of the same summer, from the 12th of May to the 18th of June, I obtained the following rarities:—*Saxicola aurita*, a splendid white male; *Turdus saxatilis*, an old female; *Muscicapa albicollis*, a beautiful old male; *Emberiza melanocephala*, an old male; and finally, *Charadrius fulvus*.

The Olive-tree Warbler breeds in Greece, Asia Minor, Palestine, and north Africa.

118.—Olivaceous Warbler [Blasser Sänger].

SYLVIA PALLIDA, Ehrenberg.[2]

Hypolais pallida. Seebohm, *Cat. of Birds of Brit. Mus.*, v. 82.
Olivaceous Warbler. Dresser, ii. 537.

Until September 20th 1883, when my son Ludwig shot the one example of this species in my possession, this bird had never been observed north-west of Greece. The time of its occurrence here is a very unusual one for birds belonging to south-eastern species, and we may probably assume that the individual in question had been roving about ever since June in northern or north-western areas, and was, at the time of its capture, engaged on its homeward passage.

[1] *Hypolais olivetorum* (Strickl.).

[2] *Hypolais pallida* (Ehr.).

The breeding area of this species extends, according to Seebohm, through Greece, Asia Minor, Palestine, Turkestan, and Persia, as well as to the north-eastern parts of Africa.

The example shot here undoubtedly belongs to the eastern form, *S. pallida*; the western variety, *S. opaca* (Lichtenstein), which one would hardly expect to meet with here, appears, so far as I am able to judge from the limited material at my disposal, to be a little larger, more inclined to rust colour than to olivaceous, besides differing in the construction of the wing,—the second flight-feather being of equal length to the seventh, and not, as in *S. pallida*, to the sixth.

The coloration of my specimen is as follows:—All the upper parts, as well as the edges of the smaller and larger wing-coverts, are of a pale olive-brown grey (*oliven-braungrau*), with a very marked olive-yellow tinge; the lower parts are dull whitish ochreous yellow. The flight-feathers and rectrices are pale greyish brown, the outer web of the outermost pair of the latter being whitish.

The feet of the freshly-killed bird were dark bluish grey, the colour being very dark on the toes; the bill is of very pale whitish horn colour (*weisslich hornfarben*), the tip being hardly darker than the rest of the organ.

In the wing, the second flight-feather is equal in length to the sixth; the third, fourth, and fifth form the tip of the wing, the last being about ·04 in. (1 *mm.*), shorter than the other two.

Total length of the fresh example, 4·68 ins. (119 *mm.*); length of wing, 2·40 ins. (61 *mm.*); length of tail uncovered by wing, ·98 in. (25 *mm.*); length of tail, 1·92 ins. (49 *mm.*); the outer pair of tail-feathers is ·16 in. (4 *mm.*) shorter than the rest. Length of bill, ·43 in. (11 *mm.*); length of tarsus, ·90 in. (23 *mm.*).

119.—Booted Warbler [Zwerg-Sänger].

SYLVIA SALICARIA, Pallas.[1]

Sylvia (*Iduna*) *salicaria.*	Naumann, xiii.; Blasius, *Nachträge*, 79.
Booted Warbler.	Dresser, ii. 541.
Riverain botté.	Schlegel, *Krit. d. Europäischen Vögel*, pp. xxx. and 60.

'Here is a small Reed Warbler with the tail of an ordinary Warbler.' These were the words with which Claus Aeuckens presented to me, on the 28th of September 1851, a small bird which he had just shot. And the bird was indeed almost an exact minia-

[1] *Hypolais caligata* (Licht.).

ture of *S. palustris* in the faded and worn plumage; it turned out to be *Motacilla* (*Sylvia*) *salicaria* (Pallas, *Zoogr. Ross.-Asiat.* i. 492). The dress of this example is unusually worn and faded; it was undoubtedly a bird of the preceding year, just about to commence its first complete autumn moult. All the upper parts are light greyish brown, with a very slight inclination towards olive-yellow. The lower parts are dull whitish, the sides of the neck and upper breast have a faint touch of the colour of the back, and there is a blurred whitish streak above the eye. All the smaller plumage, particularly on the lower parts, is very dense—almost fur-like.

The flight-feathers and rectrices are of a somewhat darker greyish brown than the back, and their blurred edges are less light; the outer pair of tail-feathers are dull whitish, the outer webs being particularly light. The feet and bill of the freshly killed bird were of a light whitish flesh colour, the upper mandible and tip of the bill being brownish.

The measurements of the bird are as follows:—Total length, 4·48 ins. (114 *mm.*); length of wing, 2 ins. (51 *mm.*); length of tail, 1·77 in. (45 *mm.*); length of tail uncovered by wings, 1·06 in. (27 *mm.*). The bill is ·33 in. (9 *mm.*) long, the tarsus strong and ·78 in. (10 *mm.*) in length. In the wing, which is very abruptly truncate, the second flight-feather is of the same length as the seventh, the third and fourth are of equal length and form the point of the wing, the fifth very slightly receding from the latter. The point of the wing projects only ·35 in. (9 *mm.*) beyond the longest posterior flight-feather. In the tail, which is double rounded, the central and outer pairs of feathers are ·12 in. (3 *mm.*) shorter than the rest.

This bird is an interesting novelty to Europe. According to Seebohm, its breeding range extends through Turkestan, Kashmir, and south-eastern Siberia. Pallas has met with it on the Lena, extending to the northern limit of willow shrubs.

The eggs of this species are very pretty, like those of other species comprised in the *hypolais* group; they have a delicate greyish pink ground colour, sprinkled with many fine and a few larger black dots, some of which coalesce into short dashes, and sometimes into fine hair-like lines. Examples are also found in which the ground colour is white, and which in addition to the black dots have small grey blotches. In form the eggs are roundish, their length being ·59 in. (15 *mm.*) and their breadth ·47 in. (12 *mm.*).

120.—Great Reed Warbler [Drossel-Rohrsänger].

SYLVIA TURDOIDES, Meyer.[1]

Heligolandish: Groot Süllen-Kröper = *Great Reed Warbler*. 'Süllen-Kröper' is the generic name used in Heligoland for the Reed Warbler; it may be translated by 'Hedge-Creeper.'

Sylvia turdoides.	Naumann, iii. 597.
Great Reed Warbler.	Dresser, ii. 579.
Bec-fin Rousserolle.	Temminck, *Manuel*, i. 183, iii. 109.

This elegant bird has only once been captured in Heligoland, and this nearly fifty years ago. The example was stuffed by Reymers, from whom I obtained it afterwards. Since that time the occurrence here of a large Reed Warbler has been twice reported to me; but I have never obtained another example.

The breeding range of this species extends from Portugal to Turkestan, including North Africa, Asia Minor, and Palestine; towards the north the bird is found nesting as far as the North Sea and Baltic, and in solitary instances in Sleswick-Holstein and Denmark. It has never yet been met with in Scandinavia, and only one instance of its occurrence in England appears to be forthcoming.

121.—Reed Warbler [Teich-Rohrsänger].

SYLVIA ARUNDINACEA, Latham.[2]

Heligolandish: Grü Süllen-Kröper = *Grey Reed Warbler*.

Sylvia arundinacea.	Naumann, iii. 614.
Reed Warbler.	Dresser, ii. 567.
Bec-fin roseaux.	Temminck, *Manuel*, i. 191, iii. 115.

This species is met with almost annually, but only in extremely isolated instances. In the earlier years, when the weather was warmer, several birds might have been obtained in the course of a single day; whereas now, this is scarcely possible either in the course of a whole spring or autumn. This is so much the more surprising, as, according to Rohweder, the species is a common breeding bird in Sleswick-Holstein. Its nesting stations extend from Portugal to Turkestan; in the south to Asia Minor, Palestine, and North Africa; and in the north to Lower Sweden.

[1] *Acrocephalus turdoides* (Meyer).

[2] *Acrocephalus streperus* (Vieill.).

122.—Marsh Warbler [Sumpf-Rohrsänger].

SYLVIA PALUSTRIS, Bechstein.[1]

Heligolandish : Same name as preceding species.
Sylvia palustris. Naumann, iii. 630.
Marsh Warbler. Dresser, ii. 573.
Bec-fin Verderolle. Temminck, *Manuel*, i. 192, iii. 116.

This species, like the preceding, was in former years met with far more frequently in Heligoland than is the case now. As regards numbers, too, it was far better represented than the preceding species—a relation which obtains even at the present day in regard to the few individuals still visiting the island. The birds rarely make their appearance before the beginning of May, and only on fine warm days, when it is not rare to hear the almost *hypolais*-like song of one or another of these songsters as it hops through a hedge of thorns.

However late these birds may migrate in spring, they nevertheless pass through very early on their return journey; thus I shot in my garden a fine old example in my collection as early as the 22nd of July 1876.

The breeding range of this species appears to extend from western France across the Ural; its southern range does not come up to that of the preceding species, and in the north it does not reach beyond the Baltic. Isolated instances are known of its occurrence in England, while in Holland it is known to breed very abundantly.

123.—Paddy-field Warbler [Feld-Rohrsänger].

SYLVIA AGRICOLA, Jerdon.[2]

Acrocephalus agricolus. Jerdon, *Birds of India*, ii. 156.
Paddy-field Warbler. Dresser, ii. 559.

The 12th of June 1864 was one of those days such as fall to the lot of the ornithologist only in Heligoland, but that also fairly frequently. During the morning of that day I obtained two strangers from the far East, never hitherto met with in Europe, nor ever seen since then anywhere nearer than Asia Minor and the Lower Volga. One of these birds was *Sylvia mesoleuca*, which has been already dealt with; the other the present species. Two skins of this species were subsequently obtained by Dresser from the

[1] *Acrocephalus palustris* (Bechst.). [2] *Acrocephalus agricola* (Jerd.).

western Ural, and during the last decade the birds, together with nests and eggs, have come into the market from the Kirgiz Steppes.

The plumage of the example shot here and preserved in my collection is, as one might expect from the time of the year in which it was taken, much worn and faded. All the upper parts are dull greyish brown, with a scarcely perceptible tinge of rust-colour on the rump. The lower parts and the faintly marked eye-streak are dull whitish, with hardly any admixture of rust-colour. The flight-feathers and rectrices are of a somewhat darker greyish brown than the back, in which the rust-colour of the earlier plumage remains most perceptible.

In the colour of its fresh plumage this bird almost exactly resembles *S. arundinacea*, except that the crown of the head is considerably darker than the back, and the eye-streak lighter and more sharply accentuated; on the upper parts as well as on the sides of the breast and on the flanks, the dominant colour is a bright ferruginous, while there is nowhere even an approach to an olivaceous tint.

The measurements of the example shot here are as follows:— Total length, 4·72 ins. (120 *mm.*); length of the wing, 2·04 ins. (52 *mm.*); length of tail, 2 ins. (51 *mm.*); length of tail uncovered by wings, 1·38 in. (35 *mm.*). The beak measures ·39 in. (10 *mm.*) the tarsus ·82 in. (21 *mm.*).

In the wing the second flight-feather is somewhat shorter than the sixth, the third and fourth are of equal length and form the point of the wing, the fifth receding by about 1 *mm.* The tail is very pointed, the outer pair of rectrices being in my specimen ·35 in. (9 *mm.*) and the next pair ·16 in. (4 *mm.*) shorter than the central pair.

The breeding range of this small Reed Warbler extends, according to Seebohm, from the Lower Volga through Turkestan and Kashmir, probably as far as China. An egg in my possession obtained from Schlüter, in Halle, and stated to have come from the Volga, measures ·67 in. (17 *mm.*) in length, and ·51 in. (13 *mm.*) in breadth, being of rather rounded shape. In colour and marking it entirely conforms to the characters of the unspotted Reed Warblers already described. The ground colour is a light yellowish green, somewhat fresher than in *S. arundinacea*, with roundish sharply defined olive-grey blotches, and for the most part rounded and sharply defined spots, varying in the depth of the colouring as well as in size. The markings are not very crowded, but everywhere allow the ground colour to be distinctly seen.

124.—Sedge Warbler [Schilf-Rohrsänger].

SYLVIA PHRAGMITIS, Bechstein.[1]

Heligolandish : Süllen-Kröper = *Reed Warbler.*

Sylvia phragmitis. Naumann, iii. 648.
Sedge Warbler. Dresser, ii. 597.
Bec-fin phragmite. Temminck, *Manuel*, i. 189, iii. 115.

This bird might, as compared with its generic relatives, not inaptly be termed the Northern Reed Warbler, for no other species advances in the summer into such high latitudes; and inasmuch as it does so in large numbers, Heligoland, too, receives a numerous contingent of these northern migrants. Not only does the bird occur here more frequently than any of the related species, but its numbers exceed those of all the others taken together. For a *Sylvia* of such small size, the migration of this species commences here very early, it being by no means rare to meet with solitary arrivals as early as the end of March. The main body, however, arrive during April, though the time of migration lasts pretty late into May. The bird may then be seen daily gliding about among garden bushes, or the rock talus at the foot of the cliff, or even seeking for aquatic insects among the sea-tang washed ashore.

During the autumn migration, which begins as early as August and lasts into October, the bird is met with in large numbers in the potato- and cabbage-plots of the Upper Plateau (Oberland), especially in fields which are lying fallow, and are much grown over with wild mustard, but occasionally also numerously among the rubble and sea-wrack at the foot of the cliff.

The breeding range of this species is of a very wide extent. In Scandinavia it reaches to 70° N. latitude, and thence stretches through England, the north of France and Germany, down to the Danube regions, and eastwards within the same parallels of latitude to the other side of the Jenesei, where the bird was still found abundantly by Seebohm.

[1] *Acrocephalus phragmitis* (Bechst.).

125.—Aquatic Warbler [Binsen-Rohrsänger].

SYLVIA AQUATICA, Latham.[1]

Heligolandish: Sträked Süllen-Kröper = *Striped Reed Warbler.*

Sylvia aquatica.	Naumann, iii. p. 686.
Aquatic Warbler.	Dresser, ii. p. 591.
Bec-fin aquatic.	Temminck, *Manuel*, i. 188, iii. p. 114.

I first found this handsome bird in 1847, since which time it has been met with and shot in Heligoland almost every year, though, for the most part, in solitary cases. In 1855, however, the bird occurred pretty frequently, and in the following year in extraordinarily large numbers.

The distribution of this species as a breeding bird is scarcely as yet ascertained to its full extent; at any rate, the conditions under which it makes its appearance here are not in harmony with the statements made in regard to its breeding area. The nesting stations cited for this species are Algiers, Italy, France, Germany—especially the west—Holland, and in solitary instances in Sleswick-Holstein and Denmark.

From the frequent, and in one case at least, very numerous appearances of young birds during the autumn migration, and their complete absence in the spring—I have only once obtained a bird in April—we may with safety conclude that, so far as Heligoland is concerned, the species is a far Eastern one. This conclusion received considerable support from the fact that, on the 13th of August 1856, when these birds appeared here in unprecedented numbers, another species from Eastern Asia was taken—viz. *Sylvia certhiola*. Again, during September 1876, when several individuals of *S. aquatica* were seen and shot here, a very strong migration of eastern species took place. Thus, on the 4th, 6th, and 15th, and daily from the last date to the end of the month, *Anthus richardi* occurred in numbers from five to twenty; on the 22nd, two examples of *Anthus cervinus* and one of *Motacilla citreola*; on the 25th, two examples of *S. aquatica* were shot, and one example each day of *S. superciliosa* on the 26th, 29th, and 30th. Similar occurrences were repeated in the course of October.

The hundreds and more of these birds that arrived here on the 13th of August, above referred to, could not have come from Sleswick-Holstein or Denmark; for, in the first place, they are far too rare in the latter countries for such a possibility, and secondly because, from reasons hitherto unexplained, no migration at all of species

[1] *Acrocephalus aquaticus* (Gmel.).

native to those countries takes place to Heligoland. This is proved by the fact that species which count among the commonest in Sleswick-Holstein, such as *Lanius collurio*, *S. arundinacea*, *Alauda cristata*, *Emberiza miliaria*, and others, are in Heligoland only of very rare occurrence: the last but one, in fact, has only occurred singly at intervals of many years.

Russow does not include the Aquatic Warbler in his Birds of Esthonia and Courland, nor does Büchner mention it among his Birds of the St. Petersburg Circuit. It would appear therefore that the birds of this species which reach Heligoland, do so by a route direct from east to west, like *S. certhiola* and *Anthus richardi*, whose breeding homes are in the Amoor countries.

My two earliest examples from Heligoland I obtained on the 9th and 18th of August respectively of 1847; two others were obtained on the 6th of October 1853; a bird entered in my ornithological diary as *cariceti?* on the 22nd of April 1854. In the course of 1855 I obtained examples on the 13th, 14th, 17th, and 30th of August, and also on the 8th of October. In the following year, 1856, I obtained several on the 12th of August, but the day after that the birds were so abundant that I shot eighteen of them in some narrow plots of land which were lying fallow and thickly overgrown with wild mustard. I might easily have doubled or quadrupled this number, but was unwilling to sacrifice any more of these pretty little creatures, and had enough material to convince myself that the grey *cariceti* plumage is not to be found among freshly moulted autumn birds, but only, as in the case of the April examples mentioned above, in individuals in faded spring plumage.

Among the examples obtained here we find every gradation, from the most beautiful rich orange-buff (*rostorange*) to a pale yellowish-buff (*rostgelb*), and from individuals in which every feather on the sides of the breast and flanks has a strong black streak running along the line of the shaft, to those in which there is not the least trace of such a marking. A most interesting example was brought to me a few years ago. This individual was almost of a uniform, very light, yellowish-buff, all that was left of the black markings of the crown of the head and back being in the form of very narrow streaks. Unfortunately the shooter in his eagerness to secure the bird, had fired at such close quarters that it was completely useless for preserving.

126.—Pallas' Warbler [Gestreifter Rohrsänger].

SYLVIA CERTHIOLA, Pallas.[1]

Sylvia (Calamoherpe) certhiola.	Naumann, xiii.; Blasius, *Nachträge*, 91.
Pallas' Warbler.	Dresser, ii. 633.
Bec-fin Trapu.	Temminck, *Manuel*, i. 186, iii. 113.

I was not a little proud of my collection, at that time very modest as regards numbers, when so eminent an authority on the European bird-fauna as Blasius, during his first visit in 1858, remarked in reference to two examples, 'that he could not on the spur of the moment determine them.' And great was my joy when my reply, expressed more in the form of a question, that one of them might be *S. certhiola*, was confirmed in the course of the conversation. The other bird was *S. borealis* which naturally at that time I had not been able to become acquainted with.

For this addition from the far east of Asia, European ornithology is again indebted to Heligoland. Temminck, indeed, had cited the species as European, but this was owing to an error, the example described by him, which was obtained from Pallas, having been shot east of Lake Baikal.

Von Middendorff has obtained this Reed Warbler on the Sea of Ochotsk, and Von Kittlitz has met with it in Kamtschatka. My example, which Blasius at that time called the jewel of my collection, I obtained here on the 13th of August, it having been caught on the preceding night at the glasses of the lighthouse. It is a young bird in the first autumn plumage.

The plumage of this species, especially in young birds, has a silky sheen, as in *S. aquatica* and *S. phragmitis*, and is unlike the broadly-barbed and stiff plumage of *S. locustella*. In my example the feathers of the upper parts are olivaceous reddish-brown (*oliven-rostbraun*), and have in the middle a brownish-black longitudinal stripe occupying about a third of the breadth of each feather, and extending, as in *S. aquatica*, to the tip of each. In this way connected stripes are formed on the head and back, which, at the back of the neck, are somewhat indistinct, while on the rump they are almost supplanted by the broad edges and tips of the feathers which here pass into pure olivaceous rusty yellow (*oliven-rostgelb*); the same happens in regard to the upper tail-coverts, which, however, have the same dark coloration as the feathers of the back.

All the lower parts of the bird, with the exception of the under

[1] *Locustella certhiola* (Pall.).

tail-coverts, are of a soft olivaceous sulphur yellow. On the belly, throat, and sides of the neck the colour is almost pure sulphur yellow, suffused on the upper breast, and the sides of the breast, with the colour of the back. From above the darker ear-coverts a light olivaceous yellow eye-streak extends from the beak to the back of the head. Each feather of the lower parts, excepting those of the chin and belly, has a fine blackish-brown streak running along the line of the shaft. The under tail-coverts are dull rust colour, and have a blurred darker stripe along the line of the shaft.

The wing-feathers are blackish-brown, and all have sharply defined edges of the same colour as the back; the tail-feathers are faintly black, the outer webs having broad blurred edges of the same colour as the back, the central pair being almost uniformly of this colour; each feather has a large whitish well defined spot on its tip. These spots are the exact opposite to those of the woodcock, being almost pure white on the upper side, but slaty greyish-white below.

This is a large and robust bird, its measurements being as follows:—Total length, 5·74 ins. (146 *mm.*); length of the wing, 2·60 ins. (66 *mm.*); length of tail, 2·24 ins. (57 *mm.*); length of tail uncovered by wings, 1·61 in. (41 *mm.*). The beak, which is not very strong relatively to the general proportions of the bird, measures ·43 in. (11 *mm.*), and the tarsus ·90 in. (23 *mm.*).

In the wing, which is short and much rounded, the second flight-feather is a little shorter than the fourth, the third being the longest, and projecting ·12 in. (3 *mm.*) beyond the fourth. The length from the tip of the longest posterior flight-feather to the point of the wing is ·75 in. (19 *mm.*).

In the tail, which is very round, short and broad, the outer pair of feathers is ·75 in. (19 *mm.*) shorter than the central pair, the other pairs following in steps of ·43, ·27, ·12 and ·04 inches respectively (11, 7, 3 and 1 *mm.*). The longest under tail-coverts are ·20 in. (5 *mm.*) longer than the outer pair of tail-feathers.

In old birds the lower parts are not sulphur yellow, but white, with a tinge of reddish-brown on the neck and upper breast—this colour being very intense on the sides of the breast and the under tail-coverts; none of these feathers have dark stripes along the line of their shafts. The edges of the feathers of the crown, back, and wings are dull rust-grey (*rostgrau*), those of the rump and the upper tail-coverts darkish, and a dingy reddish-brown; the peculiar coloration and marking of the tail is similar to that of the early plumage.

127.—Grasshopper Warbler [Heuschrecken-Rohrsänger].

SYLVIA LOCUSTELLA, Latham.[1]

Heligolandish : Bread-Stätjed Süllen-Kröper = *Broad-tailed Reed Warbler.*

Sylvia locustella.	Naumann, iii. 701.
Grasshopper Warbler.	Dresser, ii. 611.
Bec-fin Locustelle.	Temminck, *Manuel*, i. 184, iii. 112, iv. 613.

There is hardly a bird here which seems less restricted to a particular period of migration than this Reed Warbler. I have obtained it in March, April, May, July, August, September, and even repeatedly in October, though the majority naturally were obtained in May and August. Invariably only solitary samples are met with, although the bird doubtlessly occurs much more frequently than would appear, inasmuch as it is a quiet and retired creature, attracting very little notice. In the spring one only meets with it in the darkest bushes where it glides about close to or on the ground among the lowest twigs, which are penetrated by a luxuriant growth of the long grass of the previous year. During the return migration it frequents the potato- and cabbage-plots, where it is seen with still greater difficulty, and in fact only accidentally.

This bird always looks very pretty, clean and neat, especially when, thinking that it is being watched, it hops along in long bounds with its tail cocked up above its wings. Drawing under such conditions its feathers tightly against its body, its slender figure gives one the impression that its legs are much longer than they really are.

The breeding range of this species appears to extend from England and France through Central Europe to the Ural. In the north it does not reach as far as the south of the Scandinavian peninsula.

128.—River Warbler [Fluss-Rohrsänger].

SYLVIA FLUVIATILIS, Wolf.[2]

Sylvia fluviatilis.	Naumann, iii. 694.
River Warbler.	Dresser, ii. 621.
Bec-fin riverain.	Temminck, *Manuel*, i. 183, iii. 111.

It has not as yet been my good fortune to obtain this bird in Heligoland. Reymers once possessed an example shot by himself, but that was at a time when I had not commenced to collect on

[1] *Locustella nævia* (Bodd).

[2] *Locustella fluviatilis* (Wolf).

scientific principles, and this inconspicuous bird had therefore no attractions for me. Claus Aeuckens saw the bird on the 9th of May 1874 in the fields on the Upper Plateau, but it was not shy enough for him to be able to shoot it in such a way as to obtain it in a fit state for preserving. He noticed the bird a few steps in front of him among the potato-stalks, but on his attempting to recede to within shooting range it disappeared among the stalks; while all attempts to shoot it on the wing failed, owing to its invariably alighting again within a distance of eight or ten paces each time after it had been flushed, and finally could neither be roused nor discovered again. Aeuckens described it as a large, rather dark, but entirely unspotted Grasshopper Warbler, and at once recognised it from a skin which was shown him.

The breeding range of this species seems to embrace Russia, Poland, the Danube districts, and South Germany. Russow notes it for Livonia and Esthonia, and according to Büchner it breeds in the St. Petersburg Circuit—it is hence surprising that it is not occasionally met with in Heligoland. The same may be said in regard to *Sylvia dumetorum*, which, according to Büchner, also, and by no means rarely, breeds around St. Petersburg. It would thus appear that both species adhere, during their autumn migration, to a strict southerly course.

129.—Black-throated Green Warbler

[Grüner Waldsänger].

SYLVICOLA VIRENS, Latham.[1]

Sylvicola virens. Naumann, xiii.; Blasius, *Nachträge*, 156.
Black-throated Green Wood Warbler. Audubon, *Syn. N. Amer. Birds*, 55.

I must, in conclusion, introduce under a separate group another Warbler new to Europe, which could not well have been included in one of the preceding groups. In its own native country this bird belongs to a family very well supplied with members. Audubon enumerates no less than twenty-four species as belonging to it. An example of this bird, *Sylvicola virens*, was shot here on the 19th of November 1858 by a boy with a blow-pipe. The bird in question is a fine old male in perfectly fresh well-preserved plumage, and represents the only instance of the occurrence of the species on this side of the Atlantic.

The beautiful and attractive plumage of this bird is marked as follows:—The crown, back and rump are of a beautiful pure and

[1] *Dendræca virens* (Gmelin).

brilliant yellow olivaceous green (*gelblich olivengrün*); the forehead, a very broad eye-streak, and the sides of the face down to the neck are of a beautiful pure and rich yellow colour; the lores and ear-coverts are blackish intermixed with yellow; the foreneck and upper breast are of a uniform deep velvety black, this colour being continued downward in two broad stripes along the white sides. The breast, belly and under tail-coverts are white, penetrated by a yellowish sheen. The upper tail-coverts are of a very pure bluish grey, the same colour forming the borders of the black feathers of the wings and tail; in the posterior flight-feathers this grey passes into a greyish white, and forms two pure white very striking bands on the tips of the greater and lesser wing-coverts. The two outer pairs of tail-feathers are white, their outer webs being black towards the tip, and the black colour extending upwards along the outer side of the shaft in the form of a narrow sharply defined stripe; in the next pair of tail-feathers the white colour persists only in the form of a large white spot on the inner web, and the three central pairs are entirely black. In my example, which was shot in autumn, the feathers of the foreneck have broad yellowish white edges which partially hide the black ground colour.

In size this bird resembles a somewhat slender Wood Wren. Its measurements are as follows:—Total length, 4·64 ins. (118 *mm.*); length of wing, 3·19 in. (81 *mm.*); length of tail, 1·92 in. (49 *mm.*); length of tail uncovered by wing, ·59 in. (15 *mm.*). The bill is strong, and measures ·39 in. (10 *mm.*), and the tarsus ·71 in. (18 *mm.*).

In the construction of the wing this species differs from its European relatives in that the first flight-feathers are not more or less aborted, but in conjunction with the next feathers form the points of the wings: the relations being as follows:—Second and third flight-feathers of equal length, fourth ·04 in. (1 *mm.*) shorter, and the first ·04 in. (1 *mm.*) shorter than the fourth. The tail is squarely truncate, the outer pair of feathers being scarcely perceptibly shorter than the rest.

Audubon says in regard to the distribution of this species:—Numerous from Texas to Newfoundland.

Crested Wren—Regulus.—The genus of these small, prettily marked birds, which one might call the Humming-birds of the North, embraces but very few species, some of which are distinguished by only very slight differences. Two of these species are residents on the European continent, and also visit Heligoland

annually during both periods of migration. For America Audubon gives three species, one of which—*Regulus calendula*—has,—according to Harting,—been once shot in Scotland in the summer of 1858.

130.—Golden-crested Wren [Gelbköpfiges Goldhähnchen].

REGULUS FLAVICAPILLUS, Naumann.[1]

Heligolandish: Lütj Müüsk = *Little Wren.*

Regulus flavicapillus.	Naumann, iii. 968.
Golden-crested Wren.	Dresser, ii. 453.
Roitelet ordinaire.	Temminck, *Manuel*, i. 229, iii. 157.

It is indeed a matter of wonderment how these tiny birds, apparently endowed with but poor capacity for flight, yet venture merrily and cheerfully on their journey across the sea, and succeed in accomplishing it safely and happily, and that too during the long dark nights of October. And still further, their migration is performed with perfect regularity year after year, and conducts them not only in hundreds, but at times in many hundreds of thousands, in one night to this island. On the following morning their merry call-note resounds from the bushes and shrubs of all the gardens, and even the grassy plain of the Upper Plateau teems with them from one end to the other. The rubble, too, at the base of the cliff is alive with them, and they disport themselves merrily among the vessels and boats on the shore, actively pursuing the aquatic insects in the sea-wrack which is washed up by the tide, even to the very edge of the foaming waves.

The migration of this little bird commences in spring, towards the end of March—sometimes even rather earlier—and continues to the end of April. The autumn migration begins with September, continues throughout the whole of October, and sometimes even extends into November.

The bird arrives generally in fairly large numbers during the autumn migration, sometimes indeed in truly astonishing quantities, as for instance, among other years, in 1882. The earliest individuals appeared on the 8th of September, and the migration proceeded, with occasional interruptions, in moderate numbers throughout the month; with the approach of October, however, a considerable increase in the number of migrants took place, the birds appearing daily in very large numbers; and on the night of the 28th the migration assumed such vast dimensions that even an approximate computation of their numbers was quite out of the question. Perhaps the simile of a snowstorm may help to convey an idea of the

[1] *Regulus cristatus*, Koch.

scene. From ten at night till daybreak the birds sped steadily from east to west past the lighthouse, appearing under the bright glare of the lantern like so many real snowflakes driven by the wind. By daybreak the whole island was literally covered with the birds, but by ten o'clock in the morning the majority had again proceeded on their journey.

It must not, however, be assumed that a migration of this kind consists of a narrow stream of birds attracted by the glare of the lighthouse; or that it is because Heligoland happens to lie in one of the supposed migration-routes; for such is not the case. The birds observed here under these conditions were only a fraction of the migration-column of the species, covering a breadth from north to south equal to the latitudinal extent of its nesting stations. This is proved by the fact that, throughout the whole of October of that year, a similar unprecedented migration of the same species, repeatedly increasing to vast hordes like those seen in Heligoland, was reported from all stations on the east coast of Great Britain—from Guernsey northwards to Bressay, the central island of the Shetland group; representing a migration-column of nearly 680 geographical miles in width.

So astonishing an accumulation of individuals as is displayed by the migration phenomena of these birds could, however, only originate from a breeding area of an enormous extent, as that of the Golden-crested Wren really is, extending from the north of France and England through central and northern Europe up to the limit of the pine forests, and in the same parallels of latitude through Asia as far as Japan.

During the night above referred to countless numbers of these birds took rest on the Upper Plateau of the island, many of them sitting for a time on the window-bars of the lighthouse, and quite confidently preening their plumage in the sunny brilliance of the light. The night was generally overcast and very dark, like all prominent migration nights in autumn.

Of how different a character is the spring migration. Imagine a mild and clear evening in spring: the sun has set long since, and the voices of all the feathered wanderers are hushed in sleep—the last soft 'pitz' of the Redbreast has long since died away, and for some considerable space no sound has disturbed the scented stillness of the air. Suddenly through the silence, like half in a dream, the clear fine note of our little wren is heard, and soon afterwards the bird is seen rising from the neighbouring bushes, through the still luminous evening sky; at measured intervals its call-note—'hiit—hiit—hiit'—is heard as it flies off, in slightly ascending spirals, over the neighbouring gardens; then from every bush—here, there,

near and far—the cry is answered, 'hiit—hiit, hiit—hiit, hiit—hiit,' in loud clear tones, and from all sides its travelling companions, wakened for the journey, rise upwards, following in the wake of the earliest starter—the latter, however, when the answering voices have announced that all the sleepers are aroused, ceases circling about, and rises, with breast erect and brief and rapid strokes of the wings, almost vertically upwards; soon all assemble in a somewhat loose swarm, the call-notes are silenced when the last straggler has joined the departing flock, and the tiny wanderers vanish from sight. While we are still listening to their call-notes growing fainter and fainter in the distance, and straining our eyes for one last look at the little songsters, the first faintly gleaming stars appear in their stead in the deep transparent æther above. Later still, as we gaze upwards to the night sky sown with innumerable points of light, we imagine that those myriads of shining worlds are all that moves between us and the Infinite, while all the time in the heights above us are travelling thousands, nay, millions of living creatures towards one fixed goal—small and weak like this little wren of ours, but all guided as safely and surely as are the farthest gleaming stars.

131.—Fire-crested Wren [Feuerköpfiges Goldhähnchen].

REGULUS IGNICAPILLUS, Naumann.[1]

Heligolandish : Müüsken-Könning = *King of the Golden-crested Wrens.*

Regulus ignicapillus.	Naumann, iii. 983.
Fire-crested Wren.	Dresser, ii. 459.
Roitelet triple bandeau.	Temminck, *Manuel*, i. 231, iii. 158.

This species is a little smaller, and by reason of its black eye-streak, still somewhat more prettily marked bird than the preceding. It visits Heligoland almost as regularly as the latter, but invariably in very small numbers. In the spring it arrives somewhat sooner, and in autumn somewhat later, than *R. flavicapillus*—and thus may be said in a sense to open and close the migration of the crested Wrens.

This species breeds in central and southern Europe, and in north-west Africa; it does not advance as far north as Scandinavia, and reaches England only in solitary instances. On the east its breeding range does not appear to extend to the Ural.

Hedge-Sparrow—Accentor.—This genus comprises about twelve species, only two of which occur in Europe as breeding birds; a third, resident in eastern Asia, *A. montanellus*, has on a few rare

[1] *Regulus ignicapillus* (C. L. Brehm).

occasions visited Europe. In Heligoland one of these species is a common occurrence, while the other has reached the island on a few occasions only.

132.—Hedge-Sparrow [Hecken-Brunelle].

ACCENTOR MODULARIS, Linn.

Heligolandish: Back-Kuhrn Fink = Name the signification of which cannot be traced.

Accentor modularis.	Naumann, iii. 951.
Hedge-Sparrow.	Dresser, iii. 39.
Accenteur mouchet.	Temminck, *Manuel*, i. 249, iii. 174.

Among the many feathered visitors of Heligoland, none displays a more unobtrusive, amiable, and confiding disposition than this inconspicuous little bird. It is always a pleasure, when one is busy in the garden in the spring, to see some of them close to one, undisturbedly following their occupations on the ground. This love for human society on the part of the bird is the more striking, inasmuch as there appears to be but little social intercourse among the birds themselves: each is bent on its own pursuits, little caring either for good or ill about its fellows, however close to them it may happen to be. It offers in this respect a striking contrast to that equally trustful, but most pugnacious little bird, the Redbreast.

It is only when getting ready for departure that these birds come to associate with each other. This movement presents us with a most fascinating insight into the life of these harmless creatures. On a calm clear spring evening, soon after sunset, one may suddenly see one of them fluttering up out of the bushes of some garden, wheeling about hither and thither in short half-circles, and uttering its clear call-notes; soon this note is repeated with a half-dreamy sound from all directions, and by-and-by some twenty or more of the birds are seen to rise round about, all uttering their call-notes at brief intervals, and with short and powerful wing-strokes ascending, breast erect, in circular and semicircular movements to and fro; after reaching a height of about 200 feet above the cliff, if no others of their fellows follow the departing band, the call-notes are silenced, and the travellers rise, with a slight bend to the east, higher and higher, until they vanish from sight in the clear evening sky, to pursue under the canopy of the stars their trackless path to the far-off nesting homes.

The breeding area of the Hedge-Sparrow ranges throughout the whole of central and northern Europe, reaching a latitude of about 70° N. in Scandinavia.

133.—Alpine Accentor [Alpen-Brunelle].

ACCENTOR ALPINUS, Gmelin.[1]

Accentor alpinus.	Naumann, iii. 940.
Alpine Accentor.	Dresser, iii. 29.
Accenteur pégot ou des Alpes.	Temminck, *Manuel*, i. 248, iii. 171.

This interesting native of the mountains has not considered it beneath his dignity to leave his Alpine home in order to find a place in the group of distinguished visitors to little Heligoland. I have obtained the bird on three occasions: two individuals in spring plumage in May 1852 and 1870, and one in autumn plumage in October 1862. Apart from these instances, there is certain proof of its having been seen on two other occasions, but the birds in question could not be shot on account of their extraordinary shyness.

This bird is what is known as a partial migrant, performing no real spring or autumn migration, but moving on the approach of winter from its nesting-places, at heights of from 4000 to 6500 feet, down into the valleys, and at once returning to its mountain home on the cessation of cold and snow.

Hence it is difficult to explain what could have induced the visitors to Heligoland—and the fourteen examples which, according to Harting, have occurred in England up to 1870—to abandon their lofty mountain homes, and to cross many miles of plain and ocean in order to get from Switzerland to Heligoland, or from the Pyrenees to England. We may perhaps assume that these birds, as well as all other irregular migrants, retain a dormant migratory impulse capable of being aroused by unusual circumstances, and that in their case probably some obstacle or disturbance encountered at the commencement of the breeding occupations has, under the stress of the reproductive instinct, called forth into life the impulse to migrate which has conducted them from the Alps or Pyrenees to districts further north. This assumption is not invalidated by the fact that several of the birds in question were not killed till late in the year, for it is quite probable that they had been roving about unobserved during the summer months, and were not noticed till after the beginning of the shooting season. The Alpine Accentor nests in all the higher mountain ranges of Central Europe from Spain to the Caucasus.

[1] *Accentor collaris* (Scop.).

Dippers—Cinclus.—These birds, so peculiar in their mode of life, are but poorly represented in Heligoland; this is probably explained by the fact that the red-breasted form, resident in Germany, does not pass beyond the northern limits of that country; while the black-breasted Scandinavian variety leaves its breeding stations during the autumn migration in small numbers only, the latter form alone having hitherto occurred in Heligoland. The genus embraces about twelve species, most of which are distributed over the northern hemisphere. Only one of these, however, is resident in Europe, and is separated into three but slightly differing varieties, viz.: *Cinclus aquaticus*; its northern aberration, *C. melanogaster*; and its southern form, *C. albicollis*. Apart from these, the East Asiatic species, *C. pallasi*, has been twice observed in Heligoland.

134.—Black-bellied Dipper [Wasserschmätzer].

CINCLUS MELANOGASTER, Brehm.

Heligolandish: Wäter-Troossel = *Water Thrush*.

Cinclus aquaticus.	Naumann, iii. 925.
Black-bellied Dipper.	Dresser, ii. 177.
Cincle à ventre noir.	Temminck, *Manuel*, iii. 106, iv. 609.

During the many years of my collecting I have obtained this common species only five times—four old birds in full plumage, and one young bird in early autumn plumage, with white breast which still displayed the dark spots. One could hardly expect the wide surface of the sea to offer temporary compensation to a species which frequents by preference rapid and foaming mountain-streams. Such of the birds as visit Heligoland remain a few hours, which they pass among the rubble, stones, etc., which lie in the water at the foot of the cliff; they have, however, never been seen to look after food in the salt water which is washed up against that part of the shore.

All the examples obtained belong to the northern black-bellied form, *C. melanogaster* (Brehm).

In the three forms above mentioned the Dipper is a resident breeding bird in all mountainous regions of central, northern and southern Europe. The variety found in Heligoland, *C. melanogaster*, nests in the Faroes and in Scandinavia up to the Waranger Fjord.

135.—Pallas' Dipper [Pallas' Wasserschmätzer].

CINCLUS PALLASI, Temminck.

Heligolandish : Swart Wäter-Troossel = *Black Water Thrush.*

Sturnus cinclus. Var. Pallas, *Zoogr. Ross.-Asiat.*, i. 426.
Cincle de Pallas. Temminck, *Manuel*, i. 177.

In the autumn of the year 1847 a powerful mass-migration of species from the far East passed over Heligoland; and on the 31st of December of that year an example of this rare visitor was seen, but unfortunately not shot. A uniformly and entirely dark-coloured Dipper was, later on, seen by Jan Aeuckens—one of the three brothers—sitting, at a distance of from ten to fifteen paces from him, on the northern bulwark by the sea: not having a gun with him, he was unable to shoot the bird. A confusion of the species is not to be thought of in the case of experienced ornithologists like the three brothers Aeuckens.

The home of this species is, according to Pallas, in the countries around Lake Baikal, Kamtschatka, and the islands lying off its shores. The American species, which is also uniformly dark-coloured, does not appear to be identical with the present species.

Wren—Troglodytes.—These merry little creatures are, under more or less differing forms, residents in the whole northern hemisphere. It is difficult to say into how many valid species they are to be separated, since several species, which had been regarded as good, afterwards turned out to be intermediate forms between two species. Thus, according to Alfred Newton's view, *T. borealis* of Iceland and the Faroes is only an intermediate form of the European *T. parvulus* and the American *T. aëdon*. *T. hirtensis* also, a species sustained by Seebohm for St. Kilda, seems not to have been established. Consequently Europe would possess only one species, which occurs abundantly in Heligoland.

136.—Common Wren [Zaunkönig].

TROGLODYTES PARVULUS, Koch.

Heligolandish : Tschürrn.—Probably onomatopœic, after the call-note.

Troglodytes parvulus. Naumann, iii. 725.
Common Wren. Dresser, iii. 219.
Troglodite ordinaire. Temminck, *Manuel*, i. 233, iii. 157.

Though perhaps the smallest of all birds resident in Europe, the Wren seems nevertheless to be endowed with the most imper-

turbable good temper; for in dull wet weather or cold snow-storms, when most of our feathered friends, sadly dejected in spirit and with feathers all awry, appear to be hoping for better times, this tiny little fellow alone flits about as cheerfully and actively as ever, and by its merry call-note, and the vivacious glance of its bright eyes, seems to 'snap its fingers' at all discomforts; should, however, a stray gleam of sunshine penetrate the gloom of the dull winter day, we shall forthwith find our little friend sitting on a stone in front of one of the grottos at the bottom of the cliff, joyfully giving utterance to some few strophes of its modest song.

Although the Wren has not yet been found nesting on this island, it is to be met with throughout the whole year, excepting in the summer months, when the business of breeding keeps it away. In the winter it frequents the hollows and ravines at the base of the cliff.

The breeding range of this little bird extends from Portugal to Japan, reaching in Scandinavia as far as 65° N. latitude.

Stonechat—Saxicola.—Despite the modest colours of the plumage of all members of this genus, the markings are very attractive, and the birds display much sprightliness and elegance in all their habits and movements. The genus comprises about five-and-twenty species, almost all of which belong to southern latitudes; only one, *Saxicola œnanthe*,—in addition to the two species, *S. rubetra* and *S. rubicola*,—is numerously represented as a resident breeding species in northern Europe, and visits Heligoland in large numbers during both migration periods. Besides this species, three other south European, one African, and one Asiatic species, have been killed here; the two last, *S. deserti* and *S. morio*, being at that time new to Europe.

137.—Common Wheatear [Grauer Steinschmätzer].

SAXICOLA ŒNANTHE, Linn.

Heligolandish: Ohlen; Ohl-wittstätjed = *White-tailed Stonechat.*

Saxicola œnanthe.	Naumann, iii. 863.
Common Wheatear.	Dresser, ii. 187.
Traque motteux.	Temminck, *Manuel*, i. 237, iii. 164.

This apparently confident but nevertheless extremely cautious bird is distributed over the whole of Europe up to the extreme north, and is resident within the same parallels of latitude through-

out the whole of Asia. As one might expect, it is also a very numerous visitor to Heligoland, the island being often, especially during the commencement of the autumn migration, covered with young birds. The migration of these young birds usually commences at the end of July, and lasts to the middle of September—in favourable weather the earliest arrivals frequently make their appearance even much sooner; thus in 1882 young Wheatears were seen fairly numerously on the night of the 7th and 8th of July at the lighthouse. Among these early arrivals individuals with the light-bordered early plumage in still almost perfect condition are frequently found. The number of old birds is however very limited during the autumn migration; with rare exceptions they are not seen before the beginning of October, and their migration lasts until about the end of November; the birds, especially the later arrivals, being invariably most surprisingly fat.

The old males which initiate the spring migration pass through Heligoland from the middle of March to the middle of April; in favourable weather they also appear earlier,—thus in 1881 as early as the 8th, 9th and 10th of the former month. They are followed by the females and younger birds during the latter half of April and through May. At odd times a pair have attempted to breed on the island, but they have probably hardly ever succeeded in rearing their young.

These lively birds have a special preference for the rock *débris* at the foot of the cliff. It is amusing to watch the thousands of these birds there, chasing about after each other, or actively pursuing aquatic insects and the like; all of a sudden one of their number utters a warning cry, announcing the approach of a sparrow-hawk, which he has espied in the distance,—in a trice the whole band has disappeared as though it had sunk into the earth, all the birds having gone into hiding under the stones. A scene of the most animated bustle is changed, as though by a wizard's wand, into deathly stillness. However, the pause is not of long duration; one by one the tiny creatures may be seen emerging cautiously from their hiding-places, and soon the same frolicsome movement reigns again on all sides, perhaps before very long to be once more interrupted in the same manner as before, like sunshine alternating with cloud on a bright day in summer.

In autumn these birds are caught here for the table of the visitors who come for the sea-bathing. Formerly they were caught almost exclusively by some of the old pilots or fishermen, who felt themselves no longer equal to following their former calling on the mighty ocean; later on, however, when boys, still subject to school attendance, began to evince a greater liking for catching

'Ohlen' than for their home lessons, the government put a tax on the nets, which had the effect of restricting the capture of small birds within desirable limits.

In the capture of Wheatears a simple draw-net is employed. The birds are found in very large numbers on the upper edge of the cliff, and are fond of perching on small elevations; it is accordingly usual to heap up on that part of the island a small hillock, about five feet long and from eight to ten inches high; parallel to this mound a net is placed, which, by means of a long line, is let down with a jerk over the hillock, and any birds which happen to be sitting on it. Formerly the net used to be drawn over each single bird as it settled on the hillock. Recently, however, experience has shown that if one makes use of a colony of ants in the heaping up of the earth, the insects and insect larvæ contained in such a heap form such an excellent bait that one has succeeded in getting as many as five and even ten birds at one draw. During a very strong migration of Wheatears, the proceeds of one net may mount up to from five to ten score. As a rule, however, five score is a very satisfactory haul.

138.—Black-eared Chat [Ohren-Steinschmätzer].

SAXICOLA AURITA, Temminck.[1]

Heligolandish: Witt Ohlen = *White Stonechat.*

Saxicola rufescens.	Naumann, xiii.; Blasius, *Nachträge*, 134.
Black-eared Chat.	Dresser, ii. 203.
Traquet oreillard.	Temminck, *Manuel*, i. 241, iii. 165.

The Heligolandish name of this species is connected with the fact of one of the examples killed being an extraordinarily fine old male in summer plumage, in which all the upper parts are pure white, and in strongest contrast with the deep black sides of the head, wings, and tail marking. This bird was shot on the 12th of May 1860. I had previously obtained an old male, in very beautiful rich isabelline rust-coloured autumn plumage, on the 26th of October 1851. These are the only examples of this species hitherto observed here. It should finally be noted that the black marking at the tip of the tail is considerably broader in the autumn examples than in the bird shot in May; in the latter this marking extends, on the outer webs of the third, fourth and fifth feather only, ·35 in. (9 *mm.*) upwards, while in the former it extends for ·71 in. (18 *mm.*).

[1] *Saxicola albicollis* (Vieillot).

The breeding area of the Black-eared Chat extends throughout Southern Europe, North Africa, Asia Minor, Palestine, and Persia.

139.—Russet Chat [Schwarzkehliger Steinschmätzer].

SAXICOLA STAPAZINA, Temminck.[1]

Saxicola stapazina.	Naumann, iii. 879.
Russet Chat.	Dresser, ii. 207.
Traquet stapazin.	Temminck, *Manuel*, i. 239, iii. 164.

At the beginning of the forties, before I had begun collecting, an old male of this species was shot in this island. Though the throat of this example was of a pure velvety black, the back and sides were of a fairly pronounced yellowish rust colour, very similar to the example pictured by Naumann (Fig. 2, Plate 90). The bird was sold to a visitor, and I was not able to ascertain afterwards where it had been sent to.

Subsequently, whitish Stonechats with black throats have been repeatedly observed here, and were for a long time considered by me to belong to the present species; since that time, however, I have received *S. deserti* on several occasions, and have also become acquainted with *S. lugens*, *S. libanotica*, and others with black throat and black markings on the upper breast, and have consequently come to the conclusion that the species of light-coloured Stonechats can only be determined if one has specimens in one's own hand.

Though black-throated Chats have occurred here pretty frequently, only very few have been killed; this is owing to the fact that these birds become very shy and timid as soon as they believe themselves observed or pursued. If on advancing towards a Chat one fixes one's eyes on the bird, one will hardly ever succeed in getting within shooting range of it; if one attempts the same manœuvre a second time after the bird has already once taken wing, it will this time unfailingly fly off to a distance of from 80 to 100 paces; while, if the pursuit is again repeated, the bird will be entirely lost from sight. If one feels inclined to secure one of these birds, it is advisable to walk in a direction leading one some thirty paces past the bird, without looking at it, until one turns towards it for the purpose of shooting. Should the bird happen to be an old male, it will at once take wing; and should one fail to hit, one is sure to find further pursuit long and troublesome, and in most cases unsuccessful.

The breeding stations of this species extend from Portugal and north-west Africa to Greece.

[1] *Saxicola stapazina*, Vieill.

140.—Desert Chat [Wüsten-Steinschmätzer].

SAXICOLA DESERTI, Rüppel.

Desert Chat.	Dresser, ii. 215.
Saxicola deserti.	Tristram, *Western Palestine*, 33.
Saxicola deserti.	Jerdon, *Birds of India*, ii. 132.

This native of the hot and barren desert has on three occasions emigrated from its southern home to Heligoland in the far north. The examples killed here, and preserved in my collection, consist of an old male in pure autumn plumage, shot on the 4th of October 1856, a female caught on the 26th of October of the year following, and an extraordinarily fine old male in pure breeding plumage, shot by Claus Aeuckens on the 23rd of June 1880: four months later, on the 26th of November, an old bird of this species was shot in Scotland, in the neighbourhood of Stirling, and there can be hardly any doubt that both the latter examples left their home at the same time and from similar motives, and that while following the direction of their spring migration, the one got no farther than Heligoland, while the other, by a less perilous route, got so much farther to the north-west. In this connection it should be further remarked that a butterfly, *Papilio podalirius*, was observed here on the same day, viz. 23rd of July 1880, as the last-mentioned Chat, this being the second example of that species which had hitherto occurred in Heligoland. It, too, had probably been led beyond the limits of its home and across the sea by the fine warm weather and light south-easterly and easterly winds.

It is surprising that this Chat, whose far-off home extends no farther than the southern shores of the Mediterranean, should have been observed in the north so much more frequently than the preceding species, *S. stapazina*, which is found as a common breeding bird throughout the whole of Greece.

It would appear that, just as in autumn many species from the far East are inclined more than others to follow in large numbers a westerly line of migration, instead of proceeding in their normal southerly course, so in spring many southern, and especially south-eastern species are, through exceptional causes, more easily induced to pass far beyond the limits of their breeding areas in a north-westerly direction. Thus the Black-headed Bunting (*Emberiza melanocephala*), which likewise inhabits Greece in large numbers, has been killed here at least fifteen times: while of *E. cia* and *E. cirlus*, which are resident not only in Greece but even in districts much farther north, the former has occurred here only once and

the latter twice. *Emberiza cæsia* again, which is resident much farther south, has been killed here ten times, and the small Short-toed Lark (*Alauda brachydactyla*) at least fifty times.

The Desert Chat is at once distinguished from its near black-throated relatives, by the tail being black almost up to the root, the little of white there is on it being only visible quite at the upper portion on the lateral feathers, while it is almost completely covered by the upper and under tail-coverts. Further, in the summer plumage of the male, the upper parts are not pure white, as in *S. stapazina*, *S. erythræa*, *S. melanoleuca*, but of a sandy rust yellow, which colour is also characteristic of the autumn plumage of both sexes, and of that of the young birds; there is not the least admixture of ferruginous, in which respect also it strikingly differs from the soft rust colour of the autumn plumage in *S. stapazina* and *S. aurita*. The black markings on the head and throat, which on the throat of *S. stapazina* do not extend farther than the ends of the longest ear-feathers, in *S. deserti* not only occupy the whole of the foreneck and sides of the neck, but are prolonged on both sides of the upper breast down to the scapular portions of the wings.

In spite of its very simple colours, the old male in summer plumage is a strikingly beautiful bird.

The measurements of the example shot here on the 23rd of June 1880 are as follows:—Total length, 5·94 ins. (151 *mm.*); length of wing, 3·58 ins. (91 *mm.*); length of tail, 2·60 ins. (66 *mm.*); length of tail uncovered by wing, ·94 in. (24 *mm.*). The bill measures ·51 in. (13 *mm.*), and the tarsus ·98 in. (25 *mm.*).

The breeding home of the Desert Chat extends, according to Tristram, from the Sahara Desert, through the desert regions of Egypt, Arabia and Persia, as far as India.

141.—Eastern Pied Chat [Scheckiger Steinschmätzer].

SAXICOLA MORIO, Ehrenberg.[1]

Eastern Pied Chat.	Dresser, ii. 235.
Saxicola leucomela.	Tristram, *Western Palestine*, 35.
Saxicola leucomela.	Jerdon, *Birds of India*, ii. 131.

This species, the eastern form of *Saxicola leucomela*, from which it is distinguished by the black under-side of the wings, which are white in the latter species, has been obtained by me twice on this island: the first example having been an old male in breeding plumage shot on the 9th of May 1867; the second, a beautiful old female, shot on the 6th of June 1882; the value of the latter example

[1] *Saxicola capistrata*, Gould.

being specially enhanced in my eyes by the fact that it was shot at the time of Newton and Tristram's visit to me, who were thus enabled to examine the bird in the flesh.

The summer plumage of the old males of this Chat is composed of black and white, distributed in a remarkable manner. The sides of the head, the foreneck and sides of the neck, the upper breast, wings, and back are deep black; the crown down to the eyes, the back of the neck, rump, breast, and belly, as well as the under tail-coverts, are pure white; the tail-feathers are likewise white with black spots at the tips. Of these spots, those on the outer webs of the outermost pair of feathers extend upwards for 1·19 in. (30 *mm.*), while those on the fifth pair do so only for ·59 in. (15 *mm.*), diminishing gradually from without inwardly in arcuate fashion; in the female the black terminal bands from the second to the fifth feathers have a breadth of only ·20 in. (5 *mm.*), but on the outermost pair they extend upwards to the same extent as in the male. In the wings the primaries and secondaries, as well as all the greater and lesser wing-coverts are of a uniform deep black.

The plumage of the female is not, as stated by Dresser, of similar colour to that of the male, but in general resembles the female of *S. œnanthe*; except that in *S. morio* the whole under-side of the wing is of a uniform brownish black, lacking the lighter borders of the smaller plumage, and the outer surface of the wing also is of a uniform brownish black; the black terminal markings of the tail are shorter, though in the outermost pair of feathers they extend beyond half the length of the outer webs. Further, the coloration of the upper parts of the female of *S. morio* is more isabelline than in *S. œnanthe*, and the former species is moreover considerably smaller than the latter. The measurements of two examples shot here were in the freshly killed specimens as follows:—Total length, 5·35 ins. (136 *mm.*); length of wing, 3·34 ins. (85 *mm.*); length of tail, 2·21 ins. (56 *mm.*); length of tail uncovered by wings, ·67 in. (17 *mm.*). The bill measures ·82 in. (21 *mm.*), and the tarsus ·94 in. (24 *mm.*).

In the closely-related species, *Saxicola leucomela*, the general distribution of the colours is the same as in *S. morio*. In the former species, however, the under tail-coverts are rust-coloured, and almost the whole of the inner webs of the primary and secondary quill-feathers are pure white; moreover, the black markings of the outermost pair of tail-feathers do not extend further upwards than that of the inner feathers, so far at least as one is able to judge from a beautiful old male collected by Tristram in Palestine. This latter example is also considerably larger than the specimens of *S. morio* killed here, and than the skins from a collection from Cyprus and

Sarepta; thus the length of the wing is 3·62 ins. (92 *mm.*), and the tarsus measures 1·10 in. (28 *mm.*).

This Chat occurs as resident breeding species from the Caucasus eastwards through Persia and northern India, as far as north-western China.

142.—Black Chat [Schwarzer Steinschmätzer].

SAXICOLA LEUCURA, Gmel.

Black Chat. Dresser, ii. 247.
Traquet rieur. Temminck, *Manuel*, i. 236, iii. 136.

A few weeks after the beautiful male Desert Chat referred to above was shot, there occurred also an old bird of the present species, viz. on the 11th of August 1880; unfortunately, although the bird was seen at very close quarters, it was not procured. The summer months had been attended by light easterly and southerly winds, with fine warm weather, consequently the year was a very productive one. I had shot *Sylvia viridana* as early as May; *S. tristis* was observed once; *S. superciliosa* five times; *Anthus richardi* frequently; *Emberiza pusilla* repeatedly; *Sturnus roseus* once: and finally, I obtained the first example of *Turdus fuscatus* hitherto observed here, *Saxicola deserti* having been captured also in Scotland during the same autumn.

It is impossible to say how many other birds may have escaped observation at a time like that; for we can never accept that the birds enumerated above comprised all that had during that summer,—owing to special circumstances,—wandered to such a distance beyond the domains of their normal migration; I myself feel convinced that such material as comes under observation forms only a small fraction of what is really abroad under these conditions; indeed, I have frequently expressed myself as ready to exchange the whole of my collection, wonderful as it is, for all the birds which have occurred here without having been seen or killed, if that were possible; the only reservation which I would make in this exchange being the splendid example of *Larus rossii*, of which I am the fortunate owner.

The Black Chat is a western species, nesting in Portugal, Spain, and the south of France, and advancing to Italy and Greece only in solitary instances; the example observed here no doubt originated from the latter country, inasmuch as western and even southern species hardly ever reach this island.

143.—Whin Chat [Braunkehliger Wiesenschmätzer].

SAXICOLA RUBETRA, Linn.[1]

Heligolandish: Kapper; name for *Chat.*

Saxicola rubetra. Naumann, iii. 903.
Whin Chat. Dresser, ii. 255.
Traquet tarier. Temminck, *Manuel*, i. 244, iii. 164.

Warmth seems to be a condition specially necessary to the life of this little bird, since in spring it never makes its appearance before the weather has become settled, warm, and fine, in the first or second week in May; similarly it departs as early as August before the least noticeable fall of temperature has taken place. During the spring migration the birds principally frequent the gardens of the island, where they perch on the end of almost every bare twig, flying upwards from these almost perpendicularly in pursuit of any insects that may happen to be roaming above them, and then redescending to the same twig with a slight and graceful turn. During its passage in August and the beginning of September, the birds by preference resort to the potato-fields, which on calm warm days literally teem with them. In spring also, however, the bird may be counted among the most numerous visitors to the island.

The breeding home of this species extends through central and northern Europe to beyond the Arctic Circle. The western range of its breeding stations in Asia appears not to be definitely established; they must, however, extend to the longitude of Turkestan, inasmuch as Sewertzoff cites this bird both as a breeding species and a bird of passage for the latter country.

144.—Stone Chat [Schwarzkehliger Wiesenschmätzer].

SAXICOLA RUBICOLA, Linn.[2]

Heligolandish: Swart-hoaded Kapper = *Black-headed Chat.*

Saxicola rubicola. Naumann, iii. 884.
Stone Chat. Dresser, ii. 263.
Traquet rubicole. Temminck, *Manuel*, i. 246, iii. 168.

Quite contrary to the preceding closely related species, the Stone Chat starts on its journey for the nesting stations when winter has hardly yet departed, viz. during the first days of March, and sometimes even, as in 1882, as early as the 26th and 27th of February. It occurs, invariably, only in isolated instances, it

[1] *Pratincola rubetra* (Linn.). [2] *Pratincola rubicola* (Linn.).

being rare to see more than two or three individuals in one day; though this number is slightly increased during the autumn migration, the species can only be described as an extremely isolated occurrence for Heligoland.

On the 11th of October 1883 I obtained an example of this species, which, in its general colouring, differs so widely from the blackish-red brown (*schwärzlich rothbraun*) autumn plumage of this bird, that it resembles more a young *S. rubetra* than a *S. rubicola*; on the whole, however, it is of a considerably lighter isabelline colour than the former species, and has its rump isabelline without spots.

It is probably not what is known as a pale yellow variety, such as one finds among nearly all bird-species, but has all the characters of a normally coloured bird; and Aeuckens, who shot it, would not renounce the opinion that he had killed a great rarity. The uniformly coloured blackish-brown tail, and the unspotted rump, however, leave no doubt as to the position of this example.

The species is a resident breeding bird from Portugal to China and Japan; it does not appear to extend beyond the latitude of northern Germany, except in small numbers, for it is of very rare occurrence in Denmark and the south of the Scandinavian peninsula.

Wagtail—Motacilla.—The Wagtails are distributed over the Old World, including about thirty species, containing large numbers of individuals; seven of these are resident in Europe, and visit Heligoland in more or less considerable numbers. In regard to their figure, the markings of their plumage, as well as their general bearing and habits, these birds may be regarded as the most elegant of all the species inhabiting Europe.

145.—White Wagtail [Weisse Bachstelze].

MOTACILLA ALBA, Linn.

Heligolandish: Blü Lungen = *Blue Long one.* *Lung* is the Heligolandish for *Long*, and is a very descriptive designation as a generic name for the true Wagtails.

Motacilla alba.	Naumann, iii. 803.
White Wagtail.	Dresser, iii. 233.
Bergeronnette grise.	Temminck, *Manuel*, i. 255, iii. 178.

The White Wagtail is one of the few birds which now and again make an attempt to breed on this island; that this does not happen more frequently is probably due to the want of fresh water; for although, during the winter months, a fairly large quantity of water

collects in a primitive kind of reservoir on the Upper Plateau, this nearly always, through trickling into the ground, or by evaporation, has disappeared by May; hence, small birds which stay here during the summer, find nowhere water for drinking or bathing, and have to fall back upon the dew of the early morning, which is itself but of rare occurrence.

A pair of these birds, some years ago, by their call and general bearing, gave evidence of their intention to nest on the island; accordingly I kept a large dish constantly filled with water in my garden, and had the pleasure of seeing at first the old birds, and afterwards the grown-up young, daily drinking and bathing in it.

The White Wagtail occurs as breeding species from the Pyrenees to Lake Baikal.

146.—Pied Wagtail [Trauer-Bachstelze].

MOTACILLA LUGUBRIS, Temminck.

Heligolandish: Swart-rögged Lungen = *Black-backed Wagtail.*

Motacilla Yarrelli. Naumann xiii.; Blasius, *Nachträge*, 114.
Pied Wagtail. Dresser, iii. 239.
Bergeronnette lugubre. Temminck, *Manuel*, i. 253, iii. 75.

Of the small species of insect-eating birds this beautiful Wagtail is the first to commence the spring migration, as soon as winter has disappeared. The earliest arrivals appear almost regularly at the end of February, and fine males in full adult plumage have been repeatedly killed on the 24th of the month.

The White Wagtail, invariably, does not make its appearance until a few weeks later; and at the time when its migration is at its height, that of the Pied Wagtail has already almost ceased, its migration rarely extending beyond March. Strange to say, this bird is hardly ever met with here during its return movement in autumn; many years ago I obtained a fine old example in winter plumage, and since that time young autumn birds have been shot on three or four occasions only.

This Wagtail offers the most excellent material for observing the change of colours in the plumage by re-coloration without moulting any of the feathers, characteristic of many birds during spring, inasmuch as it displays distinctly two out of the many different ways in which this process is accomplished. The feathers of the back of this bird turn at this season from a dull grey to a brilliant silky black, and the snow-white portions of the throat and neck likewise assume a pure and brilliant black colour.

In the first case, this is effected by the peeling off of the inconspicuously coloured envelopes of the barbs and barbicels of the winter plumage, as has been treated of in further detail in Part I. of this work, whereby the handsomer colour of the breeding plumage concealed below is exposed. In the other case, however, this change of coloration is effected in a manner which can only be ascertained by the help of microscopic examination; the black at the lower margin of the white feathers making its appearance in the form of a very fine, scarcely perceptible edge, which, gradually widening, finally covers the whole surface of the feather. This process starts at the black collar encircling the upper breast in the winter plumage, and thence extends upwards to the last small feathers of the chin. A similar alteration in colour from white to black takes place in the same manner in the small black-headed Gull (*Larus minutus*).

The breeding range of this species appears to be almost exclusively confined to Great Britain and its island groups, including St. Kilda. Seebohm says that it nests occasionally in Holland, more numerously in north-western France, and in solitary instances in the south-west of Norway, to the last of which probably also belong those individuals of this species which are met with in Heligoland. Now, though these latter appear here only sparingly —from three to five at most on some days in March—it is quite probable, presupposing they are on the way to migrate to Norway, that the birds breed in the latter country more numerously than one suspects.

147.—Grey Wagtail [Graue Bachstelze].

MOTACILLA SULPHUREA, Bechstein.[1]

Heligolandish : Gühl Lungen = *Yellow Wagtail.*

Motacilla sulphurea.	Naumann, iii. 824.
Grey Wagtail.	Dresser, iii. 251.
Bergeronette jaune.	Temminck, *Manuel*, i. 257, iii. 179.

This extremely elegant and graceful bird should really occupy the first place among all its congeners, for in it the ideal form of Wagtail reaches its highest expression. I shall ever keep fresh within my memory a scene depicted before me during one pleasant hour of summer on the west coast of the Scottish Highlands, in which a family of these birds formed the living accessories. I was sitting with my sketch-book in a narrow rock-valley of the picturesque

[1] *Motacilla melanope* (Pall.).

Isle of Arran. From its source, three thousand feet above, a mountain rivulet was hastening to the sea in manifold windings, and with many leaps and tumbles, contracted in one place into narrow channels bubbling over with light foam, widened in another part, forming crystal-clear shady pools, rich in salmon. Throughout the bed of the stream and along its banks were scattered fragments of rock, overgrown with moss, and covered with a profusion of the most lovely ferns, varying in size from a span's length to a man's height, and surpassing each other in freshness and beauty, and in the graceful shape and bendings of their fronds. This scene, in which patches of deep scent-laden shadow alternated with bands of brilliant sunlight, was enlivened by the busy doings of a family of Grey Wagtails, consisting of the parents and five young ones. At one instant a bird might be seen running over some broad slab of rock in hasty pursuit of an insect; at another, chasing one for a short distance in rapid flight; here one would settle for a moment on a bit of rock lying in the bed of the stream, only to quit it immediately for some spot by the edge, from which the water had for the moment receded. Now and again one or another of the birds would stop for an instant to cast a searching glance at the silent stranger who was watching its movements, but, without further heeding his presence, would immediately return to its former occupations.

For an hour I gave myself up to the enjoyment of this fascinating insight into the silent workings of nature—the little creatures sometimes approaching to within a few paces from my feet, and subsequently retiring again to some distance. I seized upon one of these latter moments for withdrawing, without disturbing these trustful little beings. It needed, however, a powerful effort to turn away from this charming scene, which even now, after thirty years, is as fresh before my eyes as if I had just left it; whilst the roar and rush of Knockan Burn seems still to linger in my ears.

This bird is an extremely rare visitor to Heligoland, occurring perhaps once at intervals of five years; old birds being more frequent than young ones, and always appearing early in the year—somewhere about the first half of March. This rare occurrence is explicable from the distribution of the breeding stations of this species, which, although they extend from Portugal through central and southern Europe and Asia to Japan, do not stretch beyond the northern boundaries of Germany. Scattered individuals are also found nesting in Great Britain, especially in Ireland and the west of Scotland, owing to the moderating influence of the Gulf Stream.

148.—Yellow-headed Wagtail [Gelbköpfige Bachstelze].

MOTACILLA CITREOLA, Pallas.

Motacilla citreola.	Naumann, xiii.; Blasius, *Nachträge*, 117.
Yellow-headed Wagtail.	Dresser, iii. 245.
Bergeronnette citrine.	Temminck, *Manuel*, i. 259, iii. 180.

Although the westerly limit of the breeding range of this beautiful Wagtail extends to the most north-easterly portion of European Russia, where Seebohm and Harvie-Brown met with it nesting numerously from latitude 66° to 68° N., I have nevertheless met with it in Heligoland only five times within the long space of forty years; nor does this species, with the exception of these examples, appear to have occurred anywhere else west of its breeding range as above defined; therefore it would seem, like the rest of its genus, to adhere in its migration to a strictly north-to-south line of flight. All the examples shot here are young birds in the early autumn plumage; they are very like individuals of *Motacilla alba* of the same age, but are at once distinguished by the absence of the black circular collar on the upper breast, and by their long spur. In most examples the upper as well as the lower parts have a tinge of olivaceous green; in the first of my examples, however, which I obtained here on the 26th of September 1848, this olivaceous colour is entirely absent, the bird being pure ash-grey and white, and exactly resembling Sturm's representation (Naumann, xiii., pl. 377, fig. 4), except that the crown of the head and the forehead are not as white as they are figured there; in fact, in none of my examples is the forehead so light-coloured. The last of the birds of this species which has occurred here is the largest and handsomest in my possession, and was shot on the 28th of December 1886; all the upper parts and the sides of the upper breast are very dark grey, almost blackish grey, the sides being of somewhat lighter grey. All the lower parts are white, the under tail-coverts being pure white, while the throat, foreneck, and mid-breast, and especially the sides of the face and the white eye-streaks, are shot with pale lemon yellow. The wing- and tail-feathers are black; the secondary quill-feathers, and especially the three posterior flight-feathers, have broad white outer edges, as is also the case with the greater and middle wing-coverts, which, moreover, have broad white tips, forming two very striking bands across the wing. In the tail the outermost feathers are pure white, the second pair of the same colour, with black wedge-shaped stripes on the inner webs, which are broadest towards the bases of the

feathers and end pointedly below; by their sides a second series of fine streaks run in the line of the shafts down to the lower third of the feathers.

The measurements of this example are as follows:—Total length, 6·89 ins. (175 *mm.*); length of wing, 3·32 ins. (85 *mm.*); length of tail, 3·19 ins. (81 *mm.*); length of tail uncovered by wings, 1·96 in. (50 *mm.*). The nail of the posterior toe is ·47 in. (12 *mm.*) long.

The breeding stations of this species extend from the Petchora eastwards to the Pacific Ocean. Von Middendorff found it nesting at the Boganida up to 71° N. latitude.

149.—Blue-headed Wagtail [Blauköpfige Bachstelze].

MOTACILLA FLAVA, Linn.

Heligolandish: Blü-hoaded Gühlblabber=*Blue-headed Wagtail. Gühlblabber* is the Heligolandish name for the genus of this and the next two species of Wagtails, and signifies something very yellow.

Motacilla flava.	Naumann, iii. 839.
Blue-headed Wagtail.	Dresser, iii. 261.
Bergeronnette printanière.	Temminck, *Manuel*, i. 260, iii. 181, iv. 622.

This pretty little bird is numerously distributed as a breeding species not only from the most western parts of Europe to the most eastern parts of Asia, but also across the Pacific Ocean from the west coast of America to the Rocky Mountains. As one might expect, it also visits Heligoland in very large numbers during both migration periods—though naturally its numbers are incomparably larger in autumn than in spring; but even during the latter season, if the weather is tolerably favourable, flocks of hundreds may be seen covering the sheep pastures.

This bird is of rare occurrence in England as well as in southern Norway; in southern Sweden as far north as Stockholm, it is, however, a fairly common breeding species. Accordingly, the innumerable quantities which touch on Heligoland during the autumn migration cannot originate from regions more or less to the north of the island, but must get to Heligoland by an east-to-west route, differing in this respect from their congeners which have been treated of hitherto.

150.—Black-headed Wagtail [Schwarzköpfige Bachstelze].

MOTACILLA MELANOCEPHALA, Lichtenstein.

Heligolandish : Swart-hoaded Gühlblabber=*Black-headed Wagtail.*

Motacilla melanocephala. Naumann, xiii. ; Blasius, *Nachträge*, 125.
Black-headed Wagtail. Dresser, *melanocephala*, iii. 273 ; *viridis*, 269.
Motacilla melanocephala. Temminck, *Manuel*, iv. 623.

From the examples of this species to be found in Heligoland annually during the spring migration it is impossible to divide the yellow Wagtails without white eye-streak into grey and black-headed sub-species, for among the males one meets with every gradation of head colouring, from a dark blue slate grey to a pure brilliant black. In the latter individuals, at the time of their arrival, the whole of the crown of the head down to the neck, the sides of the head and neck as far as the back, are of a pure brilliant black. The occiput is covered by a mixture of broadly barbed, slaty-black, more- or less-worn feathers of the winter plumage, and silky brilliant pure black feathers which have been renovated by alteration of colour. This can be very well seen if, under a moderate magnifying power, one passes a piece of white paper under some of the separate feathers. Undoubtedly all the feathers of the hinder part of the neck have undergone this re-coloration by the time the birds have reached their nesting stations, so that the birds are then of a uniform black from the forehead down to the back.

Beautiful black examples of this kind are, however, met with only in solitary instances, and almost always among the earliest arrivals of the spring migration,—these being doubtless the oldest males. In such birds the foreneck is at that time also pure yellow up to the last small feathers on the bill; a white chin I have observed only in the case of later arrivals, these being birds of less age, in which the crown of the head was invariably of lighter or darker slaty-blackish grey, and in which the change of colour to a pure black had made only a slight advance from the forehead.

It is surprising that investigators who visited the northern breeding stations of this species appear not to have met with old black-headed males like these, since their regular occurrence in Heligoland during the spring migration proves that they must be represented in the former districts also; further, it seems unintelligible why they should be resident in northern and southern

latitudes but not within the very broad belt intermediate between these.

Several authors make note of indications of white eye-stripes in the Black-headed Wagtails. These, however, would seem to be rare; for among the numerous examples obtained here during the long period of fifty years, I have scarcely met with more than two or three birds which displayed from three to four small white feathers, for the most part on one side of the head only. The only conclusion which it seems to me permissible to draw from this circumstance is that inter-breeding must sometimes, even if only extremely rarely, take place between this species and *M. flava*, resulting in the production of mongrels having the last-named peculiarity. Frequently, also, one finds among both species fine old males having on the occiput scattered yellow feathers intermingled with the normally coloured ones; these, however, must be regarded as merely accidental features. In individuals of this kind the yellow colour of the lower parts is almost invariably of very great intensity.

The individuals of this species, which it has been thought fit to separate under the name of *M. viridis* = *cinereocapilla*, breed from central to upper Scandinavia, and within the same parallels of latitude as far as eastern Asia. In a few old males of these the crown of the head is of a slaty-blue grey. Of those nesting in Italy, Greece, and as far as Turkestan, the males are said invariably to have the crown perfectly black in the breeding plumage.

Another black-headed species, in which the males however have a pure white eye-streak is, according to Blasius (*Supplement* to Naumann), resident in southern Russia and Dalmatia, and has been shot by Finsch on the Obi.

151.—Yellow Wagtail [Grünköpfige Bachstelze].

MOTACILLA RAYI, Bonaparte.[1]

Heligolandish: Gühl-hoaded Gühlblabber = *Yellow-headed Wagtail.*

Motacilla flavcola.	Naumann, xiii.; Blasius, *Nachträge*, 129.
Yellow Wagtail.	Dresser, iii. 277.
Bergeronnette flavéole.	Temminck, *Manuel*, iii. 183.

This handsome Wagtail arrives here with every spring migration; for the most part, however, only single individuals are met with,—three or more on the same day being an exceptional occurrence. Their migration commences very early; one might almost say that

[1] *Motacilla raii*, Bp.

they commence the spring migration of this particular group of Wagtails, for they appear almost invariably, in company with the first old males of *M. flava*, about the beginning of the last ten days of April, if the weather is warm. The migration of the latter species, however, extends into June, while *M. rayi* is rarely met with later than the middle of May. *M. melanocephala* is the last to arrive here, never making its appearance before the end of May, accompanied by stragglers of *M. flava*. From this late migration we may conclude that the home of the individuals passing here is a far northern one. It is, however, incomprehensible where the members of *M. rayi*, touching on Heligoland, may get to; their only likely goal would appear to be the south of Scandinavia. Dresser, however, states that they are not met with in the latter district.

The nesting range of this species, so far as this has been ascertained, is very limited in extent, and scarcely stretches beyond England, Scotland, and portions of northern France. The bird has not been found to breed in the rest of Europe, but, strange to say, is again met with as breeding bird on the lower Volga, and in western Turkestan. Aeuckens has twice found the nest of this Wagtail in Heligoland, the first in a potato-plot, the second in long grass. In both cases the birds hatched their eggs and reared their young.

Pipit—Anthus.—This genus includes, according to Seebohm, about forty species, which are distributed over almost all the known parts of the earth. They are birds of inconspicuous external appearance and modest demeanour. Six of the genus are resident breeding species in Europe, with which two others are associated as rare visitors: viz. *Anthus richardi*, from the far east of Asia, and *A. ludovicianus*, from North America. All of these occur in Heligoland.

152.—Water Pipit [Wasserpieper].

ANTHUS AQUATICUS, Bechstein.[1]

Anthus aquaticus.	Naumann, iii. 789.
Water Pipit.	Dresser, iii. 335.
Pipit spioncelle.	Temminck, *Manuel*, i. 265, iii. 187, iv. 623.

This Pipit is, like all other Alpine residents, a very rare visitor to Heligoland; so far as I have been able to determine, it has only

[1] *Anthus spipoletta* (Linn.).

occurred twice. On one of these occasions it was obtained by Reymers; on the other it came within the sphere of my own observation. In England it has been killed three or four times, and is said also to occur pretty frequently in Denmark.

The breeding range of this species extends through all the mountainous districts of Europe and Asia, where the bird is found to nest at heights of from eight to ten thousand feet, though occasionally also in less elevated situations, as for instance at the foot of the Riesengebirge in Silesia.

153.—Rock Pipit [Felsenpieper].

ANTHUS RUPESTRIS, Nilsson.[1]

Heligolandish: Tung-Harrofs. *Harrofs* being the name for Pipit, and therefore = *Tang Pipit.*

Anthus rupestris.	Naumann, xiii.; Blasius, *Nachträge*, 108.
Rock Pipit.	Dresser, iii. 343.
Pipit obscur.	Temminck, *Manuel*, iv. 628.

We may describe the Rock Pipit as the best-known bird in Heligoland, partly because it is one of the few birds which, with the exception of the summer months, remain the whole year; partly because it chiefly, or almost exclusively, frequents that part of the island where the population is principally occupied,—to wit, the shore.

It is surprising that this bird has never yet made an attempt to breed on the island, seeing that the grass-grown prominences of the east side of the rock are apparently as well adapted for this object as those which it frequents by preference in other places; and further, since it is a fairly common breeding bird on the opposite coast of England. The cause may possibly be traceable to the lack of fresh water here, which is especially felt during the nesting season.

The bird is a solitary, serious creature, little caring for the society either of members of its own or of other species. While searching for food, it walks step by step, only rarely at an accelerated pace, over the sea-tang on the shore, or on the rocks and *débris* exposed at low tide at the base of the cliff. It utters its call-note only when taking to flight, a single call repeated after rather long pauses. The note is deeper and longer drawn than that of the Meadow Pipit, and has an agreeable sound, by no means

[1] *Anthus obscurus* (Latham).

harsh, like that of the Tree Pipit; if the bird is suddenly surprised, it often in flying away utters its call two or three times in succession. It is by no means a shy bird, and never flies very far; if repeatedly disturbed while busy at the foot of the cliff, it flits from one piece of rock to another, never more than fifteen or twenty paces at a time, finally perching on a prominence half way up the face of the cliff, where it will quietly wait until one has passed along underneath it, after which it will resume its occupation on the shore.

Whether one meets it on a fine spring morning, while cautiously pursuing the Woodcock, or on dull cold winter afternoons, amid blinding snow, whilst one is watching for northern Ducks, Geese, and Swans, the bird always displays the same demeanour, showing no signs either of comfort or distress; but, solitary, serious and active, and without displaying any particular shyness in regard to man, it performs the various functions of its daily existence.

The winter plumage of this Pipit is very dull and inconspicuous; all the upper parts are dull olivaceous green (*olivenschwärzlich*), the lower parts dull olivaceous sulphur yellow; the neck, upper breast, and sides being strongly clouded with the colour of the back. In the summer plumage, which the bird acquires by alteration of colours (as distinct from moulting), the head, back of the neck as far as the back, and down to the sides of the upper breast, are greenish grey, not olivaceous grey, the blackish feathers of the back having broad obscure edges of the same colour; the throat, sides of the neck and upper breast as far down as the breast, are of a dull reddish colour, as though composed of a mixture of rust-colour and pink; the feathers of the sides have broad obscure streaks of the colour of the back. In females and younger males the head is neither of so pure a grey, nor does the reddish colour so much incline to pink as in the old males, which are sometimes of an almost vinous red.

Neither in the winter nor summer plumage of this species is there anywhere any display of pure white. There is a very obscure dull greyish brown wedge-shaped patch on the outermost pair of tail-feathers, and a small mark of similar colour on the tip of the next pair; in the Water Pipit these markings are, as is well known, pure white, and the upper parts are more decided greyish brown, with a hardly perceptible greenish hue in the winter plumage.

The Rock Pipit, which might also appropriately be called Sea Pipit, breeds on all the rocky shores of northern Europe, including northern France, Great Britain, with the Hebrides, Shetland and Orkney Islands, on the Faroes, and on the coasts and islands of the Scandinavian Peninsula.

154.—American Pipit [Amerikanischer Pieper].

ANTHUS LUDOVICIANUS, Gmelin.[1]

Anthus ludovicianus.	Naumann, xiii. ; Blasius, *Nachträge*, 111.
Pennsylvanian Pipit.	Dresser, iii. 331.
American Pipit.	Audubon, *Syn. of Birds of North Amer.*, 94.

This is another species which, in virtue of two examples killed in Heligoland, has acquired the right of honorary citizenship of Europe. The first of these birds was shot on the 6th of November 1851 by a native gunner, whose attention was attracted by the, to him, unknown call-note of the bird. It was an individual in fresh autumn plumage. The second was killed on the 17th of May 1858 by the merest accident. A boy begged a shooter to let him fire a shot from his gun; he pointed the latter at one of the many Pipits that were running about, killing one which proved to be a female of this species in beautiful spring plumage. Hitherto no other instance of the occurrence of this species in Europe has been made known. It was believed to have been obtained in England, but all such examples turned out to be Rock Pipits.

According to Audubon, this bird breeds very numerously in Labrador and the Hudson Bay Territory (fur countries). An example was shot, during the Vega Expedition, on the Tchukchi Peninsula on the 10th June 1879.

155.—Meadow Pipit [Wiesenpieper].

ANTHUS PRATENSIS, Bechstein.[2]

Heligolandish : Lütj Harrofs = *Little Pipit.*

Anthus pratensis.	Naumann, iii. 774.
Meadow Pipit.	Dresser, iii. 285.
Pipit farlouse.	Temminck, *Manuel*, i. 269, iii. 190, iv. 635.

This little Pipit specially belongs to those species which are most numerously, and during the greater part of the year, represented in Heligoland. In 1885 its migration commenced as early as the 24th of February, and lasted, not counting solitary stragglers, until the 20th of May. It returns on the autumn migration as early as the end of August; it is of very frequent occurrence during September, and appears in the course of October often in quite incredible quantities, frequenting then chiefly the fields and grass-plots of the Upper Plateau. Throughout November

[1] *Anthus pensilvanicus* (Latham). [2] *Anthus pratensis* (Linn.).

small companies of these birds are seen on the shore, and though they depart with the advent of wintry weather, a few solitary individuals nevertheless almost invariably stay behind—appearing to find sufficient food, even at that season, among the sea-wrack on the shore. This species breeds numerously from France, northwards to Iceland, and from Germany northwards through the whole of the Scandinavian Peninsula to the North Cape; how far its nesting range extends eastwards beyond the Ural has not been determined; but, according to Sewertzoff, the bird is a migrant throughout the whole of Turkestan.

156.—Red-throated Pipit [Rothkehliger Pieper].

ANTHUS CERVINUS, Pallas.

Heligolandish: Road-halssed Harrofs = *Red-necked Pipit.*

Anthus pratensis. Naumann, iii. 777, Pl. 85, Fig. i.; Blasius, *Nachträge*, 97.
Red-throated Pipit. Dresser, iii. 299.
Pipit à Gorge rousse. Temminck, *Manuel*, iii. 192.

I obtained the first example of this Pipit on the island on the 28th of September 1854, and the second on the 20th of September 1857. Soon after, Claus Aeuckens learned its call-note, and in consequence managed to see, and frequently shoot, one or other of these birds almost regularly every autumn. In 1884 they occurred here in unexampled frequency; from the 15th to the 30th of September thirteen examples were seen, and for the most part shot, on some days as many as three examples. Nevertheless, the birds can only be counted as rare occurrences in Heligoland, which is the more surprising, as they are very numerous in the north of the Scandinavian Peninsula. Evidently the migration of this species, like that of many others resident in that locality, must proceed in a rigidly north-to-south direction, a slight westerly deviation taking place only in very exceptional cases in autumn, for I have never obtained this bird here in spring. The first of the above-mentioned examples was an old male in fresh autumn plumage, which is specially distinguished from the spring plumage in that the eye-streak, foreneck, and sides of the neck, together with the greater part of the upper breast, are not of a beautiful rust-colour but of a vinous red colour without spots, the beautiful rich olivaceous brown (*Oliven-Rostorange*) first making its appearance on the sides of the breast. The example was brought to me as a 'red-throated *Tree* Pipit,' which species it in reality resembles, especially in the fresh condition, much more than a Meadow Pipit. Its call-

note, too, is much more like that of the former than that of the latter species; while its eggs also in a high degree resemble some of those of the Tree Pipit, but have nothing in common with those of the Meadow Pipit. It is distinguished, however, from both these species by the almost black broad central marking of the largest pair of the under tail-coverts, which in the other species in question are of a uniform whitish rust-colour. The breeding range of this Pipit extends from Finmark to Kamtschatka; Von Middendorff found it on the Boganida in 71° N. latitude.

157.—Tree Pipit [Baumpieper].

ANTHUS ARBOREUS, Brisson.[1]

Heligolandish: Pie-Harrofs. Name onomatopœic, after the call-note.

Anthus arboreus.	Naumann, iii. 758.
Tree Pipit.	Dresser, iii. 309.
Pipit des buissons.	Temminck, *Manuel*, i. 271, iii. 194.

This is one of the few birds which have attempted to breed here; unfortunately the attempt was unsuccessful, for the nest with four eggs of the type with brown spots like burnt marks, was destroyed by cats; it had been placed against a large tuft of grass in the middle of a large hedged-in grass-plot, about a hundred paces in diameter, which adjoins my garden, and was protected against every possible disturbance by human hand.

This bird is a common migratory species in Heligoland, but it never makes its appearance until really warm weather has set in, usually not until about the end of April, being in such cases a daily visitor throughout May. It begins to pass through on its return passage about the middle of August, and up to the last week in September, in large numbers. During both periods of migration it is accompanied regularly by the Ortolan Bunting.

This species breeds very numerously in central and northern Europe and Asia, from the Pyrenees to Kamtschatka, but does not advance beyond the Polar Circle, except in places here and there.

[1] *Anthus trivialis* (Linn.).

158.—Tawny Pipit [Brachpieper].

ANTHUS CAMPESTRIS, Brisson.[1]

Heligolandish : Lütj Brief = *Small Richard's Pipit.*

Anthus campestris. Naumann, iii. 745.
Tawny Pipit. Dresser, iii. 317.
Pipit rousseline. Temminck, *Manuel*, i. 267, iii. 289.

The Tawny Pipit visits Heligoland in very small numbers; only now and again may a solitary example be met with on a fine warm afternoon in May or August. Hardly more than three or four of the birds are shot in the course of a year, though perhaps double the number, certainly not more, may occur within that time.

This species breeds in Spain, France, Germany; and within about the same parallels of latitude as far as China. In England only solitary examples have occurred. In Denmark it is very rare, though it is said to nest pretty frequently in lower Sweden.

159.—Richard's Pipit [Richardspieper].

ANTHUS RICHARDI, Vieillot.

Heligolandish : Brüüf. Name onomatopœic, after the call-note of the bird.

Anthus Richardi. Naumann, xiii. ; Blasius, *Nächtrage*, 94.
Richard's Pipit. Dresser, iii. 325.
Pipit Richard. Temminck, *Manuel*, i. 263, iii. 185.

This handsome bird which, in all countries to the west of Lake Baikal, is known only as a solitary occurrence of the greatest rarity, is regarded by the professional shooter of this island as so common an appearance, that he would not on its account miss the opportunity of shooting a Woodcock. Unfortunately, since the change of weather during the migration periods—which we have had already several times occasion to deplore—has set in, this Pipit is less frequent in its appearance than formerly, the conditions in this case, again, being fine warm weather and a south-easterly wind. Nevertheless, the bird is still seen every autumn, or recognised by its far-sounding call-note, while every spring examples are now and again shot.

To enable the reader to form some idea as to the numbers in which this bird may, under favourable conditions, reach western

[1] *Anthus campestris* (Linn.).

Europe, I will give here a few extracts from earlier years of my ornithological diary :—

1848. September. From 17th to end of month, shot over thirty *A. richardi*—very many throughout October—the last on the 29th of November.

1849. Sept. 10th to 28th. From ten to over twenty examples daily: the last bird shot on the 29th of November at 2° below freezing-point.

1859. September. Very many daily, from beginning of month until 20th.

1868. September 20. *A. richardi* very frequent since end of August; repeatedly up to as many as fifty examples in one day—often from twenty to thirty together.

„ Sept. 30. *A. richardi* still very many.

„ Oct. 30. *A. richardi* still numerous.

1869. September 15 to 25. *A. richardi* daily; from ten, twenty, to thirty examples. Until end of October, daily, six to eight examples.

1870. Sept. 21. From the first week of the month, *A. richardi*, many every day.

„ November 23. An old bird, 8½ inches = 203 *mm.* long.

1876. September 4. Ten to twelve examples; 6th, twenty and more; 15th, twenty to thirty.

These birds must also have been very numerous here in the autumn of 1839; at that time I did not possess the least knowledge of birds, but remember sitting, on a fine autumn afternoon about the beginning of October, with Oelrich Aeuckens, the eldest of the three brothers, on a bench on the northern point of the island, and seeing countless numbers of Meadow Pipits, Larks, and other species running about in front of us on a wide grass plain. Aeuckens called my attention to some of them as something out of the common—these were Richard's Pipits, and we could see thirteen of them within a distance of fifty paces. There must have been hundreds of these birds on Heligoland on that day.

On the island of Borkum, fifty-six (geographical) miles from here, Herr von Droste-Hülshoff (*Vogelwelt der Nordseeinsel Borkum*, p. 105) met with this Pipit in 1868, during the months of September and October, on two occasions, in companies of seven individuals, and six times singly, or in twos and threes. In stating, however, that this species does not proceed by steps, like other Pipits, but in hops like a Thrush, the last-named observer has decidedly fallen into an error which will be at once set aside by an examination of the bird's footprints in the sand. Besides observing the birds in numberless instances in the open air, I kept one

for several days alive in an open cage, but never noticed it to progress in any other manner than by nimbly running step by step.

This Pipit is a very shy and cautious bird; and on the open bare plain of the island it is very difficult to get to within shooting range of it. Once disturbed, it invariably flies off a long distance, at a good height; under such conditions, it is quite useless to continue the pursuit forthwith; since the bird, if aware of being pursued, usually either departs entirely, or at least flies across to Sandy Island; this, however, as with many other species, has reference only to solitary individuals. If several of them are together, or on days when there is a strong migration, they are far less shy. If, on a fine day at such a time, one sits quietly in the grass, avoiding every appearance of noticing the birds, and allowing other less shy species to run about one undisturbed, one will be astonished to see how very close these otherwise very cautious birds will approach, and perform their various movements quite naturally and unrestrained. Hours spent thus in the confiding company of hundreds of different kinds of these charming creatures count among the most enjoyable in an ornithologist's vocation.

The call-note of this bird is described very differently in different works: chay—degli—zirp, or ziepp—being some of the sounds which it is said to resemble. According to my own experience, extending over more than fifty years, during which time thousands of these birds have come under my notice, this call-note consists of a loud, rapid and harshly ejaculated r—r—rüüp, sounding, in the case of young birds, almost like r—r—reep; this is confirmed by the local name of this bird, which is derived from its call-note. This note the bird utters only once at every rise, except in some rare cases when, after being surprised, it rises suddenly, repeating r—r—rüp—rüpp several times in quick succession. As the bird flies almost always at a good height, and its extremely original call-note is audible at a great distance, it betrays its presence to the shooter while still far away; when the call-note is no longer heard, one may conclude with certainty that the bird has settled on the ground.

In the manner of its flight this Pipit partly resembles the Wagtails, partly the Larks. If it is flying over a considerable distance at a not very great elevation, it progresses in wide and shallow undulations, not however in so striking a manner as the Wagtails. Its flight at considerable elevations is more like that of the Larks. Arrived at the goal of its flight, the bird executes a fluttering or shaking movement before descending, previously for a moment surveying the place on which it intends to alight as

though to make sure that no danger is lurking for it there. In the course of its elevated flight it frequently halts for a moment in a similar manner. As has been already stated, the bird moves along the ground step by step, very nimbly and rapidly, like the Tawny Pipit,—frequently raising its body erect, and taking a look round, then again running along for a distance, and often in the course of its run leaping upward after insects flying across its path; after which it will rest for a short interval, moving its long tail slowly up and down the while; these observations can however only be made if one lies on the ground and inspects the bird from a considerable distance through a telescope.

I kept a young autumn bird of this species, slightly grazed on on the wing by a shot, for several days alive in a large cage in company with several Buntings and Finches, with which it agreed very well. The bird was not at all shy or wild, but ran about nimbly and cheerfully, and also accepted readily, and within my immediate neighbourhood, some maimed flies which were offered it. Unfortunately, I was not prepared for maintaining an insect-feeder; and, much to my chagrin, was obliged to kill it, so as to avoid torturing it uselessly. I was the more sorry for this, as I felt convinced that I could quite easily have kept it alive with ants' eggs, for it is a hardy and by no means a delicate bird.

During the autumn migration, the young birds of the year, which are still almost completely in their first plumage, arrive as early as the end of August, their migration lasting until the end of October, at which time, also, old birds already make their appearance. Solitary individuals of these latter are met with throughout November, and have been repeatedly shot even up to the middle of December.

The spring migration takes place in May—the birds arriving at this season being almost invariably solitary old examples in beautiful rust-coloured plumage, though also occasionally an autumn bird of the preceding year in nearly white faded plumage; in some of these latter the light borders of the greater and lesser wing-coverts have literally faded to a pure white.

In the above-named young summer birds—the first arrivals of the autumn migration—the upper parts are dull blackish brown, the lower whitish, very faintly shot with rust yellow. The feathers of all the upper parts, as well as those of the greater and lesser outer wing-coverts, have narrow, sharply-defined dull buffy white (*rostgelblichweiss*) edges, and a stripe of similar colour passes over each eye. From the bill downwards, along the sides of the neck, there runs on each side a broad line of closely apposed, nearly black spots, which on the upper breast and the sides of the breast pass into

longitudinal stripes. This plumage is very rarely obtained in a quite pure condition, fewer or more feathers of the following plumage, according to the time at which the particular individual arrives, being mixed with it. The feathers of the upper parts are dark olivaceous brown, blackish in the middle; both colours are, however, no longer sharply marked off, but run into each other, the rump particularly appearing merely clouded.

The old bird in fresh adult plumage may perhaps be called the handsomest of all the Pipits occurring in Europe. The whole of the plumage is overspread by a pleasing, in part very rich, rust colour, only the two outer tail-feathers displaying any pure white. The feathers of all the upper parts are brownish black in the middle, and have beautiful broad rust-coloured lateral borders, their tips being of a lighter colour; on the head and neck, these colours form five dark stripes, separated by rust colour. On the rump and upper tail-coverts the rust colour is somewhat duller, and almost completely hides the dark central parts of the feathers. The greater and middle wing-coverts, and the three very long posterior flight-feathers, have very broad borders of a rich rust colour. All the lower parts are light rust colour, this colour being very intense on the sides of the upper breast and breast, and particularly on the flanks. From the lower mandible a black stripe runs downwards along both sides of the neck, which, becoming very broad below, borders the whole of the upper breast in the form of stripe-markings.

The flight-feathers are brownish black, and the tail-feathers almost black—the outermost pair of the latter being pure white, with a narrow dark cuneiform spot at the base of the inner web; the second pair is dark along the inner edge of the inner web, and has a very narrow, almost black, stripe on the shaft. The pure white of these two pairs of feathers forms the sole white marking in the whole plumage of the bird.

The bill is of pale horn colour, the tip being dark, and the legs and feet are of pale yellowish flesh colour. The rust colour of the plumage, as described above, is intermediate between rust yellow and rust red. I have only obtained two birds in which this colour had to be called faint rust red, or ferruginous, these being probably very old examples. The female of this species is distinguished from the male by the rust colour being rather less beautiful, and having a slight touch of olivaceous brown—the spots, also, which form a border or gorget round the upper breast, are more rounded in form—there is no difference between the sexes in size of body and the length of the spur. It should be further noted that the sides of the breast and the flanks in old birds are invariably with-

out spots, while pale blackish stripes are found on these parts only in young birds still in their first plumage.

The measurements of a fine old male shot on the 7th of May 1850, are as follows:—Total length, 8 ins. (203 *mm.*); length of wings, 3·93 ins. (100 *mm.*); length of tail, 3·15 ins. (80 *mm.*); length of tail uncovered by wings, 1·96 in. (50 *mm.*); length of bill, ·59 in. (15 *mm.*); length of tarsus, 1·25 in. (32 *mm.*). The middle toe measures ·78 in. (20 *mm.*), and its nail ·31 in. (8½ *mm.*) The posterior toe measures ·51 in. (13 *mm.*), and its spur ·78 in. (20 *mm.*).

The breeding home of this species is Daŭria, extending from Lake Baikal eastwards to the Lower Amoor, and southward to Mongolia. In its autumn migration it is carried in great quantities to China and India—as far south as Ceylon; but, as is the case with many species from eastern Asia, a large proportion of these migrants turns to the west—probably none to so great an extent as this Pipit—flying across the whole of the Asiatic and European continents to Spain, and even passing from the latter country across to western Africa—a migration flight of 4800 geographical miles. During these migrations, solitary examples of the bird have been killed in all countries of Europe. From England about fifty such instances, dating back as far as the year 1812, are recorded. That the bird has not been more frequently killed in Germany is probably due to insufficient observation, for considering the record which this little neighbouring island is able to show in this respect, one would conclude with certainty that the bird must also have very frequently touched on the mainland of Germany.

The first eggs of this species were collected by Dybowski near Lake Baikal, and have probably hitherto not been found west of that district; they are very much like those of the Water and Rock Pipit, but are somewhat larger, and not so pointed as the latter; the largest of four collected by Dybowski, and in my possession, is ·86 in. (22 *mm.*) long, and ·57 in. (17 *mm.*) broad. In two of them the ground-colour is white, but so closely and finely marked with light reddish brown, that at a short distance the eggs appear of a uniform colour; the third is very similar, but its colour inclines slightly towards a brownish olivaceous; the fourth is much larger, with clearer brownish spots and dashes, so that the greenish white ground-colour everywhere is seen clearly through the markings.

Lark—Alauda.—This genus embraces, according to Seebohm, about seventy species. All of these, with one exception, are confined to the Old World, nine of them occurring in Heligoland.

160.—Skylark [Feldlerche].

ALAUDA ARVENSIS, Linn.

Heligolandish: Lortsk = *Lark.*

Alauda arvensis.	Naumann, iv. 156.
Skylark.	Dresser, iv. 307.
Alouette des champs.	Temminck, *Manuel*, i. 281, iii. 203.

The Skylark is the only bird which lends to Heligoland a touch of the true poesy of spring; for now and again, on rare and exceptional occasions, a pair of these birds are content to build their nest on this humble island rock, and to send down upon it from the clear ethereal heights their joyous strains of song. With how much wonderment must the bird look down upon this little island speck from heights of a thousand feet or more to which it has risen, singing, on quivering wings; and how strange a contrast is the unbounded surface of heaving ocean-waves, now spread beneath it, to the acres of waving cornfields over which its notes resounded in other places.

Although the bird does not actually herald the advent of spring, it may at least be credited with proclaiming the departure of winter; for its first flights arrive as early as February, or even January, if at that time the winter cold has relaxed and the weather happens to be what we would call mild for the season of the year. To illustrate this, on the night of the 17th of January 1882, after a change to better weather had occurred, a very strong migration of Skylarks took place, and thousands of these birds were seen flying eastwards on the following day. This premature desire for travel has, however, often very ill consequences; for if there be a return of frost or snow, the travellers are again forced to abandon, often in sad plight, the homes to which they had hastened with so much joy. In some years this home-coming and re-departing is frequently repeated, for on the least favourable change of weather the birds at once hasten back to their nesting places. However, inasmuch as the bird is very modest in his food requirements, it has got over its worst difficulties by the time the latter half of February is reached. The main migration lasts until the end of March; but small grey stragglers, in greater or less number, are by no means

of unusual occurrence even late into April. The autumn migration takes place during October and November.

The Skylark belongs to those birds, the altitude of whose migratory flight hardly ever passes beyond the utmost limits of human vision; for they never, not even during fine and sunny spring days, rise to elevations at which they appear no larger than scarcely perceptible particles of dust, as is so often the case at that time with Jackdaws and Rooks, but the separate birds of a flock can invariably be distinguished to perfection by a keen and practised eye. In the autumn migration, on the other hand, especially in dull and heavy weather, they often fly so low over the sea that they have to adapt their flight to the undulations of the slowly rolling waves. During uniformly dark, damp autumn nights the height of their migration-flight seems to amount to about 200 feet, for all the birds seen here by the lantern of the lighthouse arrive flying in the same plane as the latter, as is also the case with all the other various migrants which arrive on these dark nights. As soon, however, as this uniformly dense darkness begins to get at all scattered, with the appearance of one single star, or of the faint line of light which announces the speedy rise of the moon, all these Larks, like all other migrants present at the same time, rise at once to elevations from which not a single one of their call-notes is any longer audible. If, a few hours later, the firmament once more becomes shrouded in uniform darkness, the stream of migrants forthwith again rushes past at the former lower altitude. As we have already expressed in the chapter on the Altitude of the Migration Flight, these phenomena illustrate in a striking manner how much the height at which birds fly in their migratory journeys is dependent on the conditions of the atmosphere prevailing at the time; and an apparently slight change in these conditions either brings the wanderers within our view, or completely withdraws them from the observation of our senses. Accordingly, weeks and weeks sometimes pass without the birds due at the particular time being seen; it is then generally assumed that they have been kept back by bad weather. Should, however, the weather suddenly improve at the end of the spring migration of some particular species, all that will be seen of the latter is a rear-guard composed of females and younger birds; whence it follows that the males which initiate the migration have, during the prevalence of unfavourable conditions in the lower regions of the atmosphere, made use of strata offering more favourable conditions, and have passed on their way far above the range of our observing faculties.

The migratory phenomena of these Larks, as they are displayed

in this island, often call to mind a much vexed question of recent times,—viz.:—the diminution in the numbers of birds, and the necessity for protection. To a witness, however, of the enormous passage of migrants, of the myriads of individuals which on autumn nights travel past this island, like the flakes of a snowstorm, not only within the area of the lighthouse, but for miles north and south out to sea, these complaints seem quite incomprehensible. It is surely impossible that the hand of man can exercise any perceptible influence on such enormous migration-streams; for even if during a certain year, long ago, 15,000 Larks were caught here in one autumn night, this number does not even approximately express a proportion of one for each 10,000 individuals forming part of such a migrant stream, extending from 6 to 8 German—24 to 32 geographical—miles in breadth, and lasting for about seven hours; and all that is needed for a phenomenal appearance of this kind is that the requisite meteorological conditions coincide with the normal time of migration of a particular species. Such a coincidence has naturally not occurred very often, and has indeed become rarer and rarer in the course of the last thirty years; when, however, it does occur, all the species at that particular time are found to be represented in as enormous flights as they were at any previous period, thereby proving that the birds still exist in quantities which exceed all computation. We must, of course, not overlook the fact that the great treasure-house, whence this island derives its immeasurable riches, extends eastward for more than a thousand German, or four thousand geographical miles, and for the most part consists of an area the primitive natural conditions of which have been left completely untouched by the hand of man. To be sure, if after some thousands of years all the land from the Neva to Kamtschatka were to become as thickly populated and as extensively cultivated as central Europe is at the present day, it would indeed be a bad outlook for our little feathered friends; for where could they possibly betake themselves if they were to be banished from these homes, as they are at present being driven from others—for instance, from Germany. The much-discussed diminution of birds in Germany has not been brought about by their destruction, but by crowding-out. We know how fish have been almost completely banished from many rivers by the refuse waters of countless manufactories and overgrown cities. In the same manner agriculture pushed to the utmost limits of productiveness, the cultivation of even the smallest spot of land, the clearance of every bush or shrub, the cutting down of woods, and the clearance of forests, have either destroyed the ancestral homes of our birds, or their happiness and comfort have been so much disturbed by the all-pervading noise of railways, corn-

mills, iron-works, crushing-mills, saw-mills, and rolling-mills, that they have retired to districts lying far away from the noisy occupations of mankind. How many thousands of places have, through causes of this kind, lost their nightingales; and then when their song is no longer heard, the fault is laid in most cases to every possible cause but the right one. Not a word, however, can be pleaded in excuse for such disgusting wholesale massacres of the smallest songsters as seem to be carried on in Italy.

The most terrible enemies of the smaller birds are the Crows, *Corvus cornix* and *corone*, of whose enormous numbers one can have no conception, at least not on the mainland of Europe. In Heligoland one is able to gain a more correct idea of their numbers, especially during the autumn migration, when for more than five weeks an almost incessant stream of these birds not only passes across the island, but, so far as I have been able to determine, extends at least eight geographical miles out to sea on the north, and, on the south, to the German coast actually as far as Bremerhaven; thus presenting a migration-column of from thirty-two to forty miles in breadth. The velocity of the flight of these birds amounts, as has been shown in the first part of this work, to 108 geographical miles per hour; let any one therefore form a conception of the myriads of these creatures, reflecting at the same time that every one of them, during the long summer days, from four in the morning until late sunset, does nothing else than hunt for eggs and young nestlings. After a consideration of this kind, we can only feel astonished that there still exists any single small bird at all. This work of annihilation is further aided by Magpies and Jays, which, however, are fortunately not so rich in individuals as the two species of Crows above referred to.

Accordingly, it would be well for the protectors of our smaller birds to seek as much as possible to limit the numbers of these robbers. This, to be sure, seems a hopeless task enough when we consider the immense extent of their breeding area extending on the east beyond the Jenesei, though in Germany at all events it might be carried out with success.

The Skylark breeds from Portugal to Kamtschatka, and in the north as far as upper Scandinavia.

161.—Wood Lark [Heidelerche].

ALAUDA ARBOREA, Linn.

Heligolandish: Piddl—name onomatopœic, after the call-note.

Alauda arborea.	Naumann, iv. 102.
Wood Lark.	Dresser, iv. 321.
Alouette lulu.	Temminck, *Manuel*, i. 282, iii. 203.

This elegant and harmless little bird visits Heligoland only in small numbers; it is quite exceptional to see more than from three to five individuals together, and only on one occasion have I met with a larger number: this was during the powerful migration-stream of species from the far East in the autumn of 1847, when there occurred on the 13th of November a flock of at least fifty or sixty of these birds. It is their habit to run quietly about on the arable land, and one only notices their presence, when they are accidentally startled, by their merry and melodious call-note—'Tü piddl—Tü piddl'—uttered from an inconsiderable height in the air.

One cannot help being fond of this gentle, confiding little creature, and no one on the island thinks of doing it any harm—unless perhaps an accident should bring it under the primitive net of one of our youthful fowlers, which happens, however, extremely rarely.

Though by no means what one would call a robust bird, it can nevertheless not have a feeble constitution, because it commences its migration while the weather is generally still raw—as early as the end of February—and continues it through March. Its autumn migration takes place chiefly in October and November, but scattered young birds also arrive as early as September. All the birds appear to travel by day, none having as yet been met with during the night-captures at the lantern of the lighthouse nor in the fields. The song, which our great master Naumann describes in such rapturous terms, has unfortunately never yet been heard here.

This bird breeds in central and southern Europe, from Portugal to the Ural, though in the former country as well as in Spain only in small numbers. In the north, solitary examples are still met with in southern Scandinavia; while in the south its range seems to extend as far as Palestine, Tristram having found it nesting in that country.

162.—Pallas' Short-toed Lark [Pallas' kurzzehige Lerche].

ALAUDA PISPOLETTA, Pallas.[1]

Alauda pispoletta. Pallas' *Zoogr. Ross.-Asiat.*, 526.
Pallas' Short-toed Lark. Dresser, iv. 355.

On the 26th of May 1879, Aeuckens came to my house remarking, in a rather casual manner, that he had shot the small Short-toed Lark which he had already seen on the day previously. In handling the bird, however, I much surprised him with a friendly box on the ear, as, pointing to the smaller posterior flight-feathers and the spotted upper breast, I added: 'What have I been telling you these many years? What was it you were specially to take notice of?' As, however, he is as passionately fond of a rare or new bird as I am myself, his joy at this lucky capture of a species new to our island was no less lively than my own.

In the coloration of its plumage, this species bears the strongest resemblance to the small grey Skylarks (*A. arvensis*), which form the rearguard of the spring migration. Neither the light edges of the feathers of the head, back, and wings, nor the upper breast and sides of the breast, have the least touch of ferruginous—all are dull buffy grey (*rostgelblich grau*), which colour on the eye-streaks, neck, and the under side of the bird, passes into a dull yellowish white. Each feather on the upper breast and the sides of the breast has a broad blackish-brown central stripe, which on the flanks is converted into a fine stripe on the shafts of the feathers. The tail-feathers are brownish black—the outermost pair is pure white, not isabelline as in *A. brachydactyla*, and the inner webs towards the root bear cuneiform spots of a dingy dark colour. In the second pair of feathers, the outer webs only are white. The bill in my fresh example was very light bluish grey, towards the base, especially on the lower mandible, light sulphur yellow; the feet were light flesh-coloured.

The measurements of the example killed here—a female—are as follows:—Total length, 5·62 ins. (143 *mm.*); length of wings, 3·46 ins. (88 *mm.*); length of tail, 2·20 ins. (56 *mm.*); length of tail uncovered by the wings, ·82 in. (21 *mm.*). The bill measures ·32 in. (8 *mm.*), and the tarsus ·86 in. (22 *mm.*). A male bird of this species, lent me by Dresser for comparison, is ·94 in. (24 *mm.*) longer than the example described above.

This small Lark, which hitherto seems not to have been observed west of its breeding range, occurs as a resident breeding

[1] *Calandrella pispoletta* (Pall.).

species from the Lower Volga, and the area of the Caspian Sea to Turkestan, and Persia, and as far as Mongolia and China.

163.—Short-toed Lark [Kurzzehige Lerche].

ALAUDA BRACHYDACTYLA, Leisler.[1]

Heligolandish: Lütj Lortsk = *Small Lark.*

Alauda brachydactyla.	Naumann, iv. 188.
Short-toed Lark.	Dresser, iv. 341.
Alouette calandrelle.	Temminck, *Manuel*, i. 284, iii. 205.

Formerly, hardly a year passed without this pretty little Lark being observed here at the end of May or June, even though only in very solitary instances.

In former years, when more favourable conditions of weather prevailed, the bird was seen pretty frequently in autumn, sometimes even as late as November. During the time I have been collecting, it has passed through my hands about thirty times; and besides that, it has been seen and heard, without being killed, on an equal number of occasions.

The examples obtained in summer—which undoubtedly originate from Greece and Asia Minor—are invariably much more ferruginous, especially the males, than those which have been shot here in October and November. The home of the latter in Asia must extend to the latitude of Heligoland, the birds there undoubtedly joining themselves to the many other species from the far East whose autumn migration proceeds in a westerly direction. In the absence of any single actual instance in support of it, the idea of an autumn migration directed to the north-west from Greece or Asia Minor cannot be entertained.

The predominant colour of the upper parts of the October birds is a pale dull clay-yellow (*blasses trübes Lehmgelb*); the under side is almost pure white, suffused on the sides of the upper breast and flanks with the colouring of the back; the birds of the year from the south-east, on the other hand, are nearly all of a pale ferruginous colour. In a male of this kind obtained in June, the whole crown of the head is of a vivid ferruginous, each separate feather, however, having a fine rust-brown stripe on the shaft.

There is a remarkable difference in the sizes of the autumn birds which have occurred here: thus, some examples which I have obtained did not exceed 5 ins. (127 *mm.*) in length; others again are much larger, as, for instance, an example shot on the 14th of

[1] *Calandrella brachydactyla* (Leisl.).

November 1870, which measured 6·02 ins. (153 *mm.*). In the first-named example the wing measured 3·26 ins. (83 *mm.*), the tail 1·96 in. (50 *mm.*); whilst, in the last-named, the wings were 3·78 ins. (96 *mm.*), and the tail 2·56 ins. (65 *mm.*). The birds of the year from the south-east, on the contrary, exhibit scarcely any difference in size.

I kept one of these pretty little birds over a year in a cage; it had been momentarily stunned by a very light shot which had grazed the back of its head, but recovered very soon, and became extraordinarily tame. It underwent a complete moult in the autumn, managed to get safely through the winter, and sang heartily during the spring; but died, much to my regret, at the beginning of the summer. Its song was much more like that of a Bunting than a Skylark. I fed it on canary-seed, which, like a Lapland Bunting in a cage hanging by its side, it used to peel before consuming; a Shore Lark, on the other hand, which I had had over ten years in a cage, never did this.

This Lark occurs as resident breeding species from Portugal through all the countries of the Mediterranean and as far as India. Heligoland is the extreme northern limit up to which it has been observed as an exceptional occurrence.

164.—Calandra Lark [Kalander-Lerche].

ALAUDA CALANDRA, Linn.[1]

Alauda calandra.	Naumann, iv. p. 127.
Calandra Lark.	Dresser, iv. 365.
Alouette calandre.	Temminck, *Manuel*, 276, iii. 206.

At the beginning of June 1839 or 1840, one of these birds was shot by Reymers on Sandy Island: that is all that can be reported about it from this island. It has, unfortunately, never yet been captured during all the time I have been collecting. This is the more surprising, inasmuch as, being a south European species, it inhabits Greece as numerously as the Short-toed Lark, of which species examples have occurred here almost every year. Probably the bird has a particular aversion towards travelling northwards, just as we find many species from eastern Asia which do not deviate westwards from their normal southern autumn migration; while large numbers of other species, breeding side by side with these, do so annually to a very considerable extent.

The Calandra Lark is a breeding bird in all the countries of the Mediterranean, both in Europe and Africa, and also in Asia Minor and Palestine.

[1] *Melanocorypha calandra* (Linn.).

165.—White-winged Lark [Weissflügelige Lerche].

ALAUDA LEUCOPTERA, Pallas.[1]

Heligolandish: Witt-jükked Lortsk = *White-winged Lark.*

Alauda leucoptera. Pallas, *Zoogr. Ross.-Asiat.*, i. 518.
White-winged Lark. Dresser, iv. 373.

For many years it was my special desire to acquire one of these birds among the other species from eastern Asia which I wished to obtain on this island. During a week's visit which Dresser paid me in July 1881, I happened to give expression to this wish, and he at once expressed his readiness to send me a skin. I however refused his friendly offer, remarking that a skin would be of no use to me, as the birds would have to come to me alive; and—*lupus in fabula*—one of them was actually already on its way hither; for a week later, on the 2nd of August, a freshly-shot beautiful old male, with ferruginous crown, and the outer surface of the wings of the same colour, was brought to me. The gunner who shot it, not being an ornithologist, took it for a Snow Bunting, on account of its pure white secondaries. That I might, however, have nothing further to wish for in regard to this species, Aeuckens, a few years later, brought me a freshly-killed, beautiful old female, shot on the 2nd of June 1886.

The breeding home of this large, thick-billed Lark extends from the Steppes of the Lower Volga, through the Khirgiz Steppes, to the Jenesei.

Pallas first met with it very numerously distributed along the Irtish, as far as the Altai. It has been observed as an exceptional occurrence in Poland and Galicia, and has been shot twice in Belgium, once in England, and once in Italy.

166.—Black Lark [Mohrenlerche].

ALAUDA TATARICA, Pallas.[2]

Alauda tatarica. Naumann, xiii.; Blasius, *Nächtrage*, 158.
Black Lark. Dresser, iv. 377.
Alouette nigre. Temminck, *Manuel*, i. 275, iii. 207.

This peculiar Lark, the male of which in summer has its plumage of a uniform black, is represented in my collection by a female, shot here by Claus Aeuckens on the 27th April 1874.

Although this female example has throughout the characteristic

[1] *Melanocorypha sibirica* (Gmel.). [2] *Melanocorypha yeltoniensis* (Forst.).

colours and markings of the Lark family, it is nevertheless at once distinguished from the two preceding species, *A. calandra* and *A. leucoptera*, by the absence of the white colour on the inner web of the outer pair of tail-feathers, and by the black colour of the under wing-coverts.

The breeding range of this species extends across the Steppes of central Asia, whence in rare and exceptional cases it reaches central Europe. The only authenticated instance of its occurrence in Europe appears to be the bird shot in Heligoland. Blasius states that in March 1850 three or four examples occurred near Brussels.

[I have much pleasure in being able to add to the preceding account, that to-day (July 27, 1892) an extraordinarily fine old male of this, so rare, species in central Europe was brought to me by Jasper Kliffmann, the nephew of Claus Aeuckens, which had been shot by him shortly before on the Upper Plateau. Accordingly this species, so peculiar by reason of its summer plumage, is now represented in my collection by an old pair.

The whole plumage of this example is of a uniform deep black, without the least trace of the light edges of the feathers in the winter plumage. By way of contrast to the plumage, the colour of the beak in the fresh bird is a quite light, whitish-bluish-grey, very faintly shot with whitish sulphur yellow: the feet are of a uniform black.

The measurements of this old male are as follows:—Total length from forehead to tip of tail, 7·64 ins. (194 *mm.*); length of wing in repose, 5·30 ins. (134 *mm.*); length of tail, 2·83 ins. (72 *mm.*); length of tail uncovered by wings, ·78 in. (20 *mm.*).

The measurements of the female are considerably less throughout.]

167.—Crested Lark [Haubenlerche].

ALAUDA CRISTATA, Linn.

Heligolandish: Topped Lortsk = *Crested Lark.*

Alauda cristata.	Naumann, iv. 134.
Crested Lark.	Dresser. iv. 285.
Alouette cochevis.	Temminck, *Manuel*, i. 277, iii. 204.

It is singular that this species, which is so common in Sleswick-Holstein, counts here among the greatest rarities, scarcely a single bird being seen during intervals of three or four years. However, Heligoland is in this respect a partner in misfortune with the

neighbouring isle of England, where this Lark likewise belongs to the very rare occurrences, although it nests in fair abundance on the other side of the English Channel and in Holland. This inequality of distribution is probably to be explained by the fact that the bird has an aversion to crossing the sea, and that such individuals as are found to breed in small numbers in the south of Sweden remain there the whole year. In Norway the species is represented by only three examples, which were observed at Drontheim, in 1880 (Collett, *Norges Fuglefauna*).

This Lark is distributed as a breeding species from Portugal through central and southern Europe and Asia as far as China. In the north I have met with it in East Friesland.

168.—Shore Lark [Berglerche].

ALAUDA ALPESTRIS, Linn.[1]

Heligolandish : Berg Lortsk = *Mountain Lark.*

Alauda alpestris.	Naumann, iv. 149.
Shore Lark.	Dresser, iv. 387.
Alouette à hausse-col-noir.	Temminck, *Manuel*, i. 279, iii. 201.

The question of the gradual extension of the breeding range of some birds has much occupied the present generation of ornithologists. Alexander von Homeyer has attempted to establish the advance of the Serin Finch (*Fringilla serinus*), and everybody knows that the Little Bustard has, a number of years since, taken up a fixed abode in some districts of Thuringia, and nests there in annually increasing numbers. Again, Pallas' Grey Shrike (*Lanius major*) has been undoubtedly likewise engaged, during a number of years, in extending its area of distribution from east to west, as has been more fully discussed under the description of that species; while the same fact finds more or less striking expression in the case of several other birds. There is, however, probably no species which has so rapidly and in such numbers advanced the limits of its distribution as this Lark has done in the course of the last fifty years, and nowhere are its annually increasing migratory flocks displayed so abundantly, as at present is regularly the case in Heligoland during the autumn and spring migrations.

Until the autumn of 1847 the Shore Lark was known here only from the examples shot by the brothers Aeuckens some ten years before that date; during the October and November of the latter year, however, the birds all of a sudden appeared in such large

[1] *Otocorys alpestris* (Linn.).

numbers that another gunner of the name of Aeuckens was able to shoot twenty of them in one day, while some sixty examples were captured during the course of the autumn migration. From that time onwards the birds appeared every autumn, on every favourable migration day, though perhaps not in such abundance as in the first-mentioned year, during the autumn months of which an exceptionally abundant migration of species from the far East took place. Nevertheless, the numbers of these visitors increased steadily every year from that time. The notes in my journal are as follows:—October 1850, several daily; October 1852, small companies; November 1863, many; October, November 1869, hundreds daily; 20th to 24th October 1870, flocks of from twenty to eighty examples; on the 28th flocks of hundreds; October 1874, in large quantities. Ten years later they could only be estimated by thousands; and in the course of recent years the numbers of this handsome lark have increased to such an extent that on some days in the autumn of 1883 all the fields of the Upper Plateau of the island were completely covered with the birds, while in the spring of 1884 there perhaps occurred here more of them than during all the spring migrations of preceding years put together.

The birds have continued to pass through in the same large numbers annually on all favourable days up to the present year 1888. The original native home of the Shore Lark is North America, where it is distributed as a breeding species from high Arctic latitudes down to Texas and the mountain plateaus of Mexico. The more southern individuals do not display the pleasing soft vinous red coloration of the plumage, for the latter has given place to a bright brick red; their measurements, too, are less than those of the more northern forms. However, they in no way differ from those which at present migrate in hundreds of thousands to almost the westernmost parts of Europe. By degrees this species has advanced its nesting stations throughout the whole of northern Asia and Europe as far as Scandinavia, and there is no doubt that it will next establish itself in the north of Scotland; there might then result the most interesting fact of some of these birds flying across the Atlantic back to their original home as exceptional visitors. The first isolated instances of the occurrence of the Shore Lark in Europe are of very remote date. According to Klein, an example was killed at Danzig as early as the year 1667. Frisch, in 1739, gave a representation of an example which had occurred in Brandenburg, and Klein mentions it as having been again observed near Danzig in 1747. At that time the bird was known only as an American species, and the individuals enumerated above were considered to have reached Europe through

having been driven out of their course by storms. It is, however, more probable that the species had at that time already established itself in Asia east of the Lena. Nilsson, in his *Fauna of Scandinavia*, states that Linnæus in 1758, and Brisson in 1760, regarded this bird as exclusively a resident of America, but that later on it had been discovered in those districts of Asia which are situated nearest to America. According to Pallas (*Zoogr. Ross.-Asiat.*, 1811) the bird was in the last-named year already distributed over the whole of Siberia, but until 1835 had not been met with as a breeding bird in Scandinavia. Nilsson, however, even at that time expressed his conviction that such would probably be the next thing to occur, his prediction being verified by Professor Lovèn's discovery of the species, two years later, in eastern Finmark. Since that time the Shore Lark has rapidly multiplied, until it has become one of the most common breeding birds in Lapland and Finmark.

The preceding statements have been collected from Newton's edition of Yarrell's *British Birds*, and from Dresser's *Birds of Europe*.

In England the number of individuals observed and killed in that country has likewise increased continuously within the last fifty years, although, as compared with Heligoland, this increase is only a modest one. Four cases of its occurrence are reported during the thirties; an example was shot in each of the years 1840, 1850 and 1853, and in 1859 three of a small band were killed. From 1860 to 1870 the visitors increased to flocks of from fifteen to twenty individuals, and in the autumn of 1873 no less than thirty-three were killed at Spurn Point, at the mouth of the Humber, just opposite Heligoland; three years later this number had already increased to some eighty individuals, which were shot during the autumn months of 1882 in the neighbourhood of Yarmouth.

It remains, however, a mystery where the many hundreds of thousands of Shore Larks which, each autumn, pass across or along Heligoland by an east-to-west route, pass their winter. It cannot be in Great Britain, despite the fact that the vast majority of autumn migrants arrive there by an east-to-west route, for their number is so great that they would simply cover all the fields in that country. What then becomes of them? We cannot believe that they escape observation, for the Shore Lark is a very restless bird, and does not, like other Lark species, try to escape observation by skulking along the ground, but, on the other hand, invariably runs along the ground in a hurried and restless manner, at once taking to the wing on the approach of man, and incessantly uttering its

clear call-note during its flight. Neither do the birds appear in north Germany or Holland in numbers corresponding to the enormous numbers in which they become visible on this island. In France they seem to be observed still more sparingly, and in Spain they have, up to the present, not been met with at all. Notwithstanding, according to the direction of the route by which they arrive here, and in which they continue on their departure, the goal of their journey—or, in other words, their winter quarters—must lie in the two last-named countries, for the autumn migration of this species illustrates in a most salient manner the view expressed in the chapter on the Direction of the Migration Flight, viz.: 'That of the birds whose general autumn movement proceeds in a westerly direction, such individuals as have their breeding homes in latitudes rather far north, do, under circumstances of necessity, make temporary deviations to the south of their normal migration route.'

This species must have displayed, even from its origin, a strong inclination for a westerly autumn migration, for otherwise it could never have got across into Asia, and finally to Lapland and Finmark. A large number, if not indeed the majority, of all the individuals breeding in northern Asia and the north of European Russia persist, even at the present day, in this route of migration as far as northern Scandinavia. Those observed in eastern Finmark are seen to arrive from the east, whence they are called Russian Snow Buntings. After reaching Finmark and Lapland they, in company with the individuals breeding in those districts, turn southward, in order to resume their former westerly course in latitudes somewhat farther south, for it is only in this way that we can explain their occurrence in such large and continually increasing multitudes within the confines of Heligoland, coupled with the western extension of the breeding range of the species; neither Lapland nor Finmark, together with European Russia, is spacious enough to produce such enormous quantities of individuals.

That the deflection of their migration-route to the south commences in upper Scandinavia may be concluded from the fact that neither has the bird been met with by Saxby on the Shetland Islands, nor is there any mention made of it in the British migration reports from the east coast of Scotland; while, finally, this conclusion is confirmed by the reports of Collett, according to which the autumn migration of the Shore Larks proceeds on the east of Norway, from north to south through Sweden, and the bird is hardly ever seen in the former country down to its southernmost extremity. To the south of Sweden, however, the migration must again assume a westerly direction, to account for the countless flocks arriving in Heligoland, and to a less extent in England; all

such birds, according to direct observations, not only arriving by an east-to-west line of flight, but having almost all been observed or killed on the eastern coast districts of the country.

From the comparatively small number met with in the east of England it appears that the hundreds of thousands which continue their autumn journey from Heligoland westwards cannot have their winter quarters in the former country, but must continue their journey at a high elevation. Since, however, they do not reach the west of England—only two individuals being recorded as having occurred there in 1879 by Rodd, at the close of many years of observation (*Birds of Cornwall and Scilly*)—and have not been met with by Thompson in Ireland, one must suppose that they turn south in the central parts of the country, and travel across to France and Spain, possibly passing the winter months in the central mountain regions of these countries. That they continue their journey to Africa is perhaps a somewhat venturesome assumption.

The Shore Larks have appeared here in increasing numbers also during the spring migrations of recent years, these numbers reaching an almost astonishing proportion in April and May of 1884. Not only may this phenomenon be intimately connected with the increasing number of breeding birds at their most western breeding stations, Finmark and Lapland, but it may also bring the question of their winter quarters nearer to a solution. From the fact that all the species from the far east and north-east which so frequently occur in Heligoland during the autumn hardly ever touch on the island again in the spring, we concluded, in the chapter on the Direction of the Migration Flight, that all birds which endeavour to reach winter quarters in latitudes farther south by making temporary southward deflections from the normal westerly course of their autumn migration, in the spring, when migration proceeds at much greater haste, try to return from these lower lying points to their breeding homes in a direct line—*i.e.* along the hypotenuse of the angle formed by the lines of flight pursued in the autumn migration. A line having for its terminal points Finmark and Lapland, with Heligoland lying in its middle, would have its commencement in Spain and western France, in which latter countries we may accordingly with safety look forward to finding the winter quarters of the Shore Lark. That hitherto we have not succeeded in discovering them is probably only due to the want of sufficient exploration of these countries during all the months of the year.

On account of its pleasing appearance I have kept one of these birds for years in a cage. The song, though by no means loud, is nevertheless agreeably lark-like; its call-note, with which it cheerfully greets me as soon as it hears my step, two large rooms off, is

loud and mellow. Most of the birds are peevish in captivity, and tire themselves by impetuously fluttering against and shaking the bars of their cage; this is probably due to the fact of one's not being able to avoid selecting the prettily-marked old males for cage-birds. My example, however, which I have kept now for more than ten years, is so tame that it will take flies from the finger, and even allows me to put my hand into the cage and softly stroke its back with my finger.

In the spring this bird will accept so-called earwigs, and in the summer, flies, but rejects both these insects as autumn approaches. Small and moderately sized moths are always acceptable, and spiders are received with the utmost readiness at all times of the year. Its staple food, however, is canary-seed, and as much green food as is procurable. Sustained in this manner, the bird keeps in excellent condition, renewing its plumage every autumn to such perfection that it is in no way inferior to a bird living in a state of nature.

As has been already mentioned, Shore Larks are very restless birds, constantly running rapidly and restlessly about the fields. They are also rapid and dexterous flyers, and during their flight give repeated utterance to their call-note which, if not loud, is clear and distinct: it resembles a clear ringing Zie—hi—hi, continuously repeated, and has much resemblance to the call of the Hedge-Sparrow, except that it is louder.

The Shore Lark occurs as a breeding species from northern Scandinavia to Behring Strait, as well as through the whole of northern America. It does not reside in Greenland, and has never been met with in Iceland nor on the Faroe Islands.

Bunting—Emberiza.—This genus embraces about forty species, distributed over Europe, Asia, and America, from ten to twelve being breeding birds in Europe. Among the birds of Heligoland it occupies a most prominent place; among the seventeen species which have been observed here, no less than nine are of exceptional occurrence, among which *Emberiza rustica* is represented by ten, *E. melanocephala* by at least fifteen, and *E. pusilla* by from forty to fifty examples.

As compared with this numerous occurrence of species from such far-off homes, it is very singular that others which count among common breeding birds as far north as central Germany, such as *E. cirlus* and *E. cia*, have each only occurred here twice in the long space of fifty years, especially when even *E. luteola* from the

Altai has visited Heligoland twice, and *E. aureola* from upper Siberia on no less than three occasions.

169. Common Bunting [Gerstenammer].

EMBERIZA MILIARIA, Linn.

Heligolandish : Dikke-Diert = *Thick* or *Fat Beast*.

Emberiza miliaria.	Naumann, iv. 213.
Common Bunting.	Dresser, iv. 163.
Bruant proyer.	Temminck, *Manuel*, i. 306, iii. 219.

The short plump figure of this bird probably has given rise to the above-noted not very flattering Heligolandish designation. Its appearance is rendered still more striking, and acquires a kind of bull-dog character, if, as I have done, one mounts it side by side with its pretty little cousin, the tiny Little Bunting (*Emberiza pusilla*).

As a rule this bird visits Heligoland in small numbers only, a few scattered examples—at most two or three in one day—being seen occasionally during March and again in November. The year 1883 was a striking exception to this rule, the bird having occurred on the 2nd, 7th, and 8th of November in companies of from ten to fifteen and twenty individuals, without its being possible to adduce any special cause for this phenomenon, which, moreover, extended to the return journey of the following spring—'very many Common Buntings daily' having been noted in my journal during the last days of March.

The breeding home of this Bunting extends from Portugal to Central Asia. Sewertzoff mentions it as a breeding species and bird of passage even in Turkestan. Its range does not however extend very far north, the bird being of rare occurrence in lower Norway, though somewhat more numerous in lower Sweden. In England and Scotland, including the Hebrides, it is very abundant. It is resident in specially large numbers in Spain and Portugal, and found as a common breeding bird even on the Canary Islands.

The migration of this Bunting must adhere very rigidly to a north-to-south line of flight, because the least inclination for an east-to-west course would convey the numerous residents of this species in England, Holstein and Denmark in far greater numbers to Heligoland than is actually the case.

170.—Yellow Bunting [Goldammer].

EMBERIZA CITRINELLA, Linn.

Heligolandish : Gjühl Klütjer = *Yellow Bunting.*

Emberiza citrinella.	Naumann, iv. 234.
Yellow Bunting.	Dresser, iv. 171.
Bruant jaune.	Temminck, *Manuel*, i. 304, iii. 218.

The Yellow Bunting does not appear here in large flocks, but nevertheless is one of the commonest birds of this island, being present in varying numbers at all seasons of the year. Scattered examples occur among the vanguard of the great host of spring migrants as early as March and April, while the bird passes on migration throughout all the autumn months, and even in the middle of winter; at which time small numbers are always met with among the enormous flocks of all possible kinds of granivorous birds which frequently cover the island during sudden and heavy snowfalls.

The breeding range of the Yellow Bunting extends from northern Spain and France, through the whole of central and northern Europe, and in Asia as far as the Jenesei. In the north it extends to the northernmost parts of Scandinavia; and, since Wolley saw it arriving in upper Lapland during the autumn migration by an east-to-west route, it must also nest in the same high latitudes in European and Asiatic Russia.

171.—Yellow-breasted Bunting [Weidenammer].

EMBERIZA AUREOLA, Pallas.

Emberiza aureola.	Naumann, xiii. ; Blasius, *Nachträge*, 166.
Yellow-breasted Bunting.	Dresser, iv. 223.
Bruant auréole.	Temminck, *Manuel*, iii. 232.

Although I have obtained three examples of this Bunting in Heligoland, I have hitherto not succeeded in securing the very handsomely-marked male bird. The examples in my collection consist of two young birds shot on the 18th of September 1852, and the 5th of November 1864 respectively, and an old female killed here on the 8th of July 1870.

The breeding range of this species extends from the north of European Russia, through the whole of Siberia to Kamtschatka. With the exception of a few individuals killed in Italy the bird does not as yet appear to have been observed in central Europe.

This species likewise furnishes a proof of the obstinate manner in which many birds adhere to the southerly course of the autumn migration.

172.—Cirl Bunting [Zaunammer].

EMBERIZA CIRLUS, Linn.

Emberiza cirlus.	Naumann, iv. 251.
Cirl Bunting.	Dresser, iv. 177.
Bruant zizi.	Temminck, *Manuel*, i. 313, iii. 227.

I have obtained this Bunting here on two occasions only, viz. :—a fine male in full adult plumage on the 27th of April 1862, and, not until nineteen years later, on the 31st March 1883, an old female. Seeing that this species nests in isolated instances as far north as central Germany, and is even fairly abundant in the south of England, its rare occurrence on this island might seem surprising. The bird, however, is a pre-eminently western species, breeding most numerously in Spain and Portugal, and thence in gradually decreasing numbers through the whole of south and central Europe. This species in fact affords another proof of the rare occurrences of western and southern species in Heligoland; and the two examples killed here probably mark the northernmost point to which this species has ever advanced.

173.—Strickland's Bunting [Grauer Ammer].

EMBERIZA CINEREA, Strickland.

Emberiza cinerea.	Krüper, *Journal f. Ornithologie*, 1875, p. 268.
Strickland's Bunting.	Dresser, iv. 159.

This interesting Bunting was first discovered by Strickland near Smyrna in 1836; a second example was obtained by Von Heuglin in North Africa. For several decades nothing more had been heard about the bird until Krüper, in the spring of 1863, during an excursion to Asia Minor, re-discovered it, as it were. He was looking on the mountains above Burnova for *E. cæsia*, and shot a Bunting in which, to his great surprise, he recognised what was to him an entirely unknown species. Having once had his attention attracted to the bird he succeeded in obtaining several males, and, later on, females also. In spite of all efforts, however, he was unable to obtain the nest and eggs, although he proved the bird to be a by no means uncommon breeding species in Asia Minor.

In Heligoland the bird has been observed once, but unfortunately, though it remained for nearly a week, was not killed. It was slightly injured by a shot which grazed it, on the 1st of June 1877, the day on which it was first observed; this, though it had the good effect of keeping the bird here till its wound was healed, had, at the same time, made it so shy that it flew off, rising at as great a distance as a hundred paces or even more. The bird took up its residence in a field of very short oats, where, with a telescope, it could be observed for any desirable length of time, at the distance mentioned, from above the edge of a bank of earth. Claus and Jan Aeuckens, as well as my son Ludwig, made every imaginable effort to secure it, but to no purpose. It left the island with its wound healed on the 6th of the month.

The first report which reached me in regard to this rarity was couched in these terms: 'A Bunting, very like the female of *E. melanocephala*, but with the back of a finer grey, and the outer tail-feathers with a large white spot.'

Among a number of skins of *E. melanocephala*, *E. luteola* and other similar species, a beautiful skin of Krüper's, belonging to a male bird, was at once noted as belonging to the present species with the additional remark: "Neck not quite so yellow.'

So far as I am concerned I have no doubt as to the identity of this example. As, in many other cases, simultaneously with the above-named Bunting, one of its countrymen, a one-year old male of *E. melanocephala*, was likewise observed here. This I succeeded in obtaining on the 3d of June.

As appears from Krüper's detailed reports, this is a breeding species in Asia Minor. The same observer adds that there can be no doubt about this bird belonging to the European fauna, as it was said to have been discovered during recent years also in Russia.

174.—Ortolan Bunting [Gartenammer].

EMBERIZA HORTULANA, Linn.

Heligolandish: Ortelloan = *Ortolan*.

Emberiza hortulana.	Naumann, iv. 258.
Ortolan Bunting.	Dresser, iv. 185.
Bruant ortolan.	Temminck, *Manuel*, i. 311, iii. 225.

The reputation as a delicate morsel for the palate, which this bird has held from the days of the old Romans through all subsequent ages, has never reached Heligoland; for on this island the bird, both in spring and autumn, is left completely unnoticed,

although, next to the Snow Bunting, it is the most abundant species of the whole genus. No special method of capture is in use, and neither its small body nor its alleged delicate flavour is considered equal to the value of a shot.

The quiet, harmless mode of life of this bird also contributes to the fact that it receives so little attention: during the spring migration, from fifty to a hundred of these birds may be staying in a plot of oats about six inches high without being noticed, unless they happen to be accidentally disturbed.

Hundreds of these birds visit the island on all fine warm days in May, and from the middle of August to the end of September. During the first-named month it frequents fields sown with oats or barley, and during August and September the potato-fields.

On one occasion I obtained an old male of this species, the measurements of which were much below the normal. In this example the light yellow colour of the foreneck extended over all the lower parts, only the sides of the upper breast displaying a very faint tinge of rust-colour. I am unable to give a fuller description, or the measurements of this example, inasmuch as it is in the possession of E. von Homeyer.

The Ortolan is distributed as a breeding species over the whole of Europe, though very unequally. In Scandinavia it is found nesting as far as the Arctic Circle, while in England it is only of rare occurrence. On the east it probably does not extend far beyond Central Asia, though Sewertzoff mentions it as a breeding species as far east as Turkestan. In the south, its nesting range extends to Asia Minor and Palestine.

175.—Cretzschmar's Bunting [Grauer Ortolan].

EMBERIZA CÆSIA, Cretzschmar.

Emberiza cæsia. Naumann, xiii.; Blasius, *Nachträge*, 172.
Cretzschmar's Bunting. Dresser, iv. 213.
Bruant cendrillard. Temminck, *Manuel*, iii. 225.

Twenty-five or thirty years ago, when the early summer in Heligoland was still warm and fine, one or two examples of this peculiarly coloured Bunting used to be seen, and in most cases shot, nearly every May and June; in autumn I have never observed the bird. About a dozen examples, for the most part fine males, were obtained during May 1848, June 1852, May 1857, 1859, 1862, 1866, and 1867. In the course of the last twenty years, however, it has been observed and shot on one occasion only.

The breeding range of this species does not appear to extend beyond Greece, Asia Minor, Palestine, and Turkestan.

176.—Meadow Bunting [Zipammer].

EMBERIZA CIA, Linn.

Emberiza cia.	Naumann, iv. 270.
Meadow Bunting.	Dresser, iv. 205.
Bruant fou.	Temminck, *Manuel*, i. 215, iii. 227.

As regards this species there is very little to report from Heligoland; about fifty years ago Reymers on one occasion obtained a rather young bird, which he sold to Brandt of Hamburg; at that time I had not commenced collecting. I had for many years given descriptions of the bird to my gunners, but without result, until at last my son Ludwig, on the 8th of March 1882, brought me the long-desired spoil in the form of a splendid old male in the purest summer plumage. He had shot the bird on the fields of the Upper Plateau.

The breeding range of this species extends through the whole of Europe, and in Asia to at least the eastern boundary of Turkestan. In Germany it advances as far as the middle of the Rhine, and in the south is found nesting as far as Asia Minor and Palestine.

177.—Pine Bunting [Fichtenammer].

EMBERIZA PITYORNIS, Pallas.[1]

Emberiza pityornis.	Naumann, iv. 276.
Pine Bunting.	Dresser, iv. 217.
Bruant à couronne lactée.	Temminck, *Manuel*, i. 310, iii. 224.

This Bunting has only once been captured in Heligoland, I myself having been so fortunate as to catch an example, a very fine old male, in the throstle-bush of my garden on the 16th of April 1881.

It is a handsome bird, its size exceeding that of the Yellow Bunting, and rather approaching that of *E. melanocephala*. The total length of the freshly killed bird was 6·69 ins. (170 *mm.*); the length of the wing, 3·70 ins. (94 *mm.*); length of tail, 3·07 ins. (78 *mm.*); length of tail uncovered by wings, 1·42 ins. (36 *mm.*).

The eggs of this bird, which I owe to the kindness of Herr Tancré, in their markings of fine lines and small dashes completely

[1] *Emberiza leucocephala* (Gmel.).

resemble those of the Yellow Bunting, but their ground-colour is somewhat more greenish than in the latter species. In one of them the fine veins are almost entirely absent, and the ground-colour is nearly hidden by short reddish-brown lines, as is rather frequently the case in the eggs of the Yellow Bunting. In form and size they are much like larger examples of the latter species; they were obtained in the Altai Mountains.

The breeding range of this Bunting extends from the Irtish and Altai eastwards through Siberia; in Turkestan it is, according to Sewertzoff, merely a bird of passage and winter visitant.

178.—Little Bunting [Zwergammer].

EMBERIZA PUSILLA, Pallas.

Heligolandish: Französk Nieper = *French Reed Bunting.*

Emberiza pusilla. Naumann, xiii.; Blasius, *Nachträge*, 175.
Little Bunting. Dresser, iv. 235.
Bruant nain. Schlegel, *Kritische Uebersicht d. Eur. Vögel*, lxxi. and 84.

Claus Aeuckens is responsible for the above somewhat peculiar Heligolandish designation of this bird; and it is only in use among such shooters as really possess a more than usually intimate knowledge of the rarer species occurring. The term 'French' is, however, not to be considered in a geographical sense, but as signifying something quite peculiar, and different from what has been ever seen before.

The first example of this pretty little Bunting I obtained on the 4th of October 1845, it having been shot by Oelrich Aeuckens, the eldest of the three brothers, unfortunately since deceased. After the bird had been once seen and its call-note marked, it was observed here almost every autumn, and in most cases killed. Some twenty-five or thirty examples have, I should say, passed through my hands. By way of example, I may here give a series of the dates of occurrence of this species:—4th October 1845; 11th October 1846; 10th and 12th October 1847; 30th September, 4th, 9th, 11th, 23rd, 27th October, and 17th December 1848; 20th and 26th September 1849; 15th September, 10th, 12th, and 18th October 1850; 5th, 7th, and 9th October 1851; 18th, 27th October and 9th November 1852. The greatest number of these Buntings, accompanied by *E. rustica* and other eastern species, appeared in the year 1879. The notes in my diary are as follows: On the 26th September shot one *E. pusilla*; on the 27th shot two ditto, and saw one *E. rustica*; Claus Aeuckens likewise saw what was probably an *E. aureola*; on the 28th shot one *E. pusilla*, and also saw a pair

of the same species; also shot one *E. rustica*, but not the same one as was seen on the day before. In the example shot the feet were perfectly clean, a sign by which Heligolanders are able to tell whether a bird has arrived the same morning or the day before, the feet being in the former case clean; in the latter, coloured red by the soil. An *E. pusilla* was seen on the 29th, another on the 30th, and again one on the 1st October. On the 8th an *E. pusilla*, two or three *E. rustica*, one *Anthus cervinus*, and one *Sylvia proregulus* (Claus Aeuckens); on the 9th, one *E. rustica*; on the 10th, one *E. pusilla*, —this bird, judging from the soles of its feet, having been here also on the previous day. One *E. rustica* was seen but not secured; on the 14th, two *Sylvia superciliosa*—one a fine male—shot by my son Ludwig. On the 24th, *Fringilla hornemanni*, a young male. Besides the species named, many examples of *Anthus richardi*, and hundreds of thousands of *Alauda alpestris*, were observed.

One feels inclined to ponder as to how many other equally interesting rarities from Siberia may not have visited Heligoland at the same time, without having come under observation, and how large a number of them must have passed through northern and central Germany on the way to their winter quarters in western Europe. Among these, the Little Bunting especially would have escaped observation, being a quiet ground dweller not easily scared, and seeking its food among field-plants and along high grass borders, where it may frequently be approached to within ten paces or less before it will take flight. It utters its call-note only while on the wing; this is a very feeble cry, hardly like that of a Bunting, but yet audible at a considerable distance; it is very high in tone, somewhat resembling the sound produced by striking a tensely-stretched thin steel wire with the point of the nail.

Though this bird in the general coloration of its plumage bears a strong resemblance to other closely-allied species, it cannot by any means easily be confounded with them. From young Reed Buntings (*E. schœniclus*) it is distinguished both by its much smaller size, and also more especially by the absence of the vivid ferruginous colour of the small outer wing-coverts, which in all the different stages of the plumage in *E. pusilla* are of a pale earthy grey; its shorter tail, too, serves to distinguish it even at some distance; nor does it, as it runs along, jerk this organ either so frequently or in such striking manner as *E. schœniclus*. There is equally little chance of confounding it with young autumn birds or hen birds of *E. pallasi*, for in such birds the ground-colour of the feathers of the upper portion and sides of the breast is of a more or less rich isabelline rust-colour (*isabell rostfarben*), and the pale rust-

coloured streaks on the shafts are only slightly darker than the ground. In *E. pusilla*, on the other hand, these streaks in all the different stages of plumage are pure black, and sharply defined from the ground-colour of the feathers, which in this species, on the upper portion and sides of the breast, is very frequently pure white.

The most characteristic marking, however, of this Bunting is that of the head. A bright ferruginous broad median streak runs along the crown of the head from the beak to the nape; this is bordered on each side by a somewhat narrower black streak of equal length; the lores and ear-coverts are also ferruginous, the latter edged by a black line. Broad buff-coloured (*rostgelbe*) eye-streaks extend behind to the back of the head, then bend downwards, embracing the ear-coverts, and thence upwards as far as the lower mandible. From the angles of the latter, broad black stripes extend downwards along both sides of the throat as far as the upper breast. The throat and upper breast are buffy white (*rostgelblich weiss*), each feather of the latter with a black streak on the shaft.

The measurements of freshly-killed birds are as follows:—Total length, from 5 ins. (127 *mm.*) to 5·31 ins. (135 *mm.*); length of wings, from 2·64 ins. (67 *mm.*) to 2·76 ins. (70 *mm.*); length of tail, 2·20 ins. (56 *mm.*); length of wing uncovered by tail, 1·22 in. (31 *mm.*) to 1·38 in. (35 *mm.*). The bill measures ·27 in. (7 *mm.*), and is very pointed; the upper mandible is not arched, but compressed before the tip. The tarsus measures ·67 in. (17 *mm.*). The nails of the hinder toes are short and much curved; the feet are small and whitish flesh-coloured.

I have in my possession an egg of this bird, collected by Seebohm on the 30th of June 1877 on the Jenesei in 67° N. latitude. It is ·67 in. (17 *mm.*) long, ·55 in. (14 *mm.*) broad, therefore of rather circular shape. It has neither fine veins nor dots, but in its markings presents the characters of some eggs of the Common Bunting; the ground is dull ochreous white with large reddish violet blotches, the markings consisting of reddish sepia-brown spiral lines, short commas and spots, some of which appear nearly black, with somewhat lighter edges.

The breeding range of this small Bunting extends from the Dwina and Petchora to the extreme east of Asia. Seebohm met with it on the Jenesei up to 71° N. latitude; Middendorff in the Taimyr Peninsula, and Schrenk on the Lower Amoor. Solitary individuals have, during the autumn migration, reached as far as the south of France. It has been killed several times in Italy, once in Sweden, and once in England.

179. Rustic Bunting [Waldammer].

EMBERIZA RUSTICA, Pallas.

Heligolandish: Road-straked Nieper = *Red-striped Reed Bunting.*

Emberiza rustica	Naumann, xiii.; Blasius, *Nachträge*, 180.
Rustic Bunting.	Dresser, iv. 229.
Bruant rustique.	Temminck, *Manuel*, iii. 229.

This, like the preceding species, is almost exclusively an Asiatic bird, and counts in a still higher degree among the rarer occurrences of central and western Europe, Heligoland probably being able to show more instances of its occurrence than all other parts to the west of its breeding range together. I find it noted no less than sixteen times in my diary, and of these examples eight are at present set up in my collection. The first example of this species was killed here in 1839 or 1840. Claus Aeuckens, at that time a little boy, threw a flat stone at it in such a manner as to sever the head clean from the trunk. Although at that time I neither collected nor possessed the least knowledge of birds, it was at my instigation that the bird was stuffed in spite of its unfortunate condition. It went into the collection of Herr A. P. Schuldt of Hamburg, who afterwards, when I had seriously devoted myself to the avifauna of Heligoland, most kindly gave it over to me; and though I am now in possession of a number of far more beautiful examples, the specimen in question still forms a pleasing recollection of my early unassisted steps in the domain of ornithology. The other examples were obtained in the following order: 10th September 1857; 9th October 1863; 9th September 1870; 3rd April 1873, a female; 5th October 1875, a male; 9th October 1878; 27th and 28th of September 1879, one each day; on the 8th October two or three birds were seen, and one each day on the 9th and 10th; on the 14th April 1880, one in my garden; on the 17th of September 1881 an example was shot here; and on the same day one was killed on the opposite coast of England. On the 24th September my son Ludwig shot a young bird—in connection with which I would remark that, four days previously, he likewise shot the first example of *Sylvia* (*Hypolais*) *pallida*, which had ever occurred here. In the head-markings of the autumn plumage this Bunting shows much similarity to other closely related species, but could nevertheless never be confounded with any of these. It is at once characterised by the abundance of the beautiful rich ferruginous colour, which is spread over the whole of its plumage. The feathers of the hind neck, the shoulders and rump, as well as

the upper tail-coverts are of a pure rich ferruginous, with only very fine lighter coloured edges; it is, however, especially the marking of the upper portion and sides of the breast which at once allows us to distinguish this species from all its congeners: all the feathers of these parts have a median broad rich ferruginous streak, and since the whole under surface of the bird is pure white, these streaks are at once very noticeable even at some distance. In old males the head in summer is of a deep shiny black, above and behind the eye a broad stripe of pure white passes backwards, nearly meeting a patch of the same colour on the nape. A male bird of this kind is unquestionably the handsomest of all Old World Buntings.

The measurements of fresh examples are as follows:—Total length, 5·78 ins. (147 *mm.*); length of wing in repose, 3·07 ins. (78 *mm.*); length of tail, 2·32 ins. (59 *mm.*); length of tail uncovered by wings, 1·34 in. (34 *mm.*).

The eggs of this species, in regard to which doubts were entertained for so long a time, appear at last to have been obtained by Seebohm and Herr R. Tancré; one of these stated to originate from Siberia has been kindly lent me for description by the last-named gentleman. One would hardly take it for a Bunting's egg, although in its markings it bears some distant resemblance to the eggs of *E. melanocephala* and *E. luteola*. It is ·82 in. (21 *mm.*) long, ·67 in. (17 *mm.*) broad, and of somewhat pointed shape. The ground is a rather rich yellowish sea-green, with relatively large dark olivaceous grey patches. The whole egg is somewhat densely sprinkled and dotted with olive-coloured spots, and has small and moderately large irregular olive-coloured markings; it most nearly resembles fresh very bright green, and not densely spotted, eggs of the Great Reed Warbler (*Sylvia* (*Acrocephalus*) *arundinacea*) except that in *E. rustica* the grey patches are much more pronounced, and the olivaceous outer markings much more scanty than in the present species.

In Heligoland the Rustic Bunting is met with principally on fields amongst vegetables; I have, however, on two occasions seen it perch on a willow-bush from ten to twelve feet high, a fact which has never been observed here in the case of the Little Bunting. Its call-note resembles that of the last-named species, but is perhaps somewhat stronger.

The breeding home of this species extends from the Archangel district as far as Kamtschatka.

180. Reed Bunting [Rohrammer].

EMBERIZA SCHŒNICLUS, Linn.

Heligolandish : Nieper. Local name for *Reed Bunting*.

Emberiza schœniclus.	Naumann, iv. 280.
Reed Bunting.	Dresser, iv. 241.
Bruant de roseaux.	Temminck, *Manuel*, i. 307, ii. 219.

Although this pretty little creature is distributed as a breeding bird over the whole of Europe, it can only be regarded as a somewhat rare occurrence in Heligoland. This holds good especially in regard to the spring migration. The autumn of 1884, however, was an exception to the rule, for about the middle of October hundreds of these birds were seen in one day—more than occur usually in the course of a whole year. *Turdus iliacus* also occurred in preponderatingly large numbers, and *Alauda arborea* and *Emberiza miliaria* were observed repeatedly in unusual abundance. During the same time the Reed Bunting also occurred in strikingly large numbers in England; and it was probably owing to similar causes that the Northern Bluethroat appeared during the same migration period in exceptionally large quantities on the east coast of England, where, under ordinary conditions, it is of extremely rare occurrence. The direction of the wind during the days of the strongest migrations was frequently north-north-west. I do not, however, believe that local and transient changes in the direction of the wind are able to exert a direct influence on the normal line of flight of a migrant. This is rendered very evident here in the migratory droves of Crows which, while frequently changing the direction of the axial line of their body, never in the least alter that of their migration-flight; even a very violent south-east or south-south-east wind, such as they often get into here out at sea, neither influences the westerly course of their autumn migration nor its velocity; although under these conditions the position of their body is south-south-west, *i.e.* removed by six points of the compass from their westerly line of flight, their migration, in spite of the more or less considerable sideward movement into which they are thus forced, nevertheless proceeds in as exact an east-to-west direction as during the most favourable weather, when the axial line of the bird's body coincides with the line of their migration flight. All migrants, both in autumn and in spring, are most numerously brought within the range of observation during the prevalence of light and moderate south-easterly and south-south-easterly winds accompanied by warm weather; while they are seen in least numbers if violent west winds accompanied by rain prevail during their spring and autumn

migrations. The Reed Bunting is found as a breeding bird from western Europe to Japan, and from Italy to upper Scandinavia. Seebohm found its nest on the Jenesei as far as 70½° N. latitude.

181.—Large-billed Reed Bunting [Gimpelammer].

EMBERIZA PYRRHULOIDES, Pallas.

Emberiza pyrrhuloides. Naumann, xiii.; Blasius, *Nachträge*, 184.
Large-billed Reed Bunting. Dresser, iv. 249.
Bruant de marais. Temminck, *Manuel*, iii. 220, iv. 639.

This magnified repetition of the Reed Bunting has once been captured—a very fine old male in full adult plumage having been caught here on the 24th of April 1879 by some boys in a net. Several other birds of this species must have occurred on the island that day; for, in the first place, one of my shooters, who had been on Sandy Island that day without having a gun at hand, described to me very accurately 'the large light-coloured Reed Bunting'; and I myself, on the afternoon of the same day, saw three of these birds flying very low over my garden, one of them being a very light-coloured male of this species, and the two others inconspicuous females—unquestionably also belonging to it; these birds could not be discovered again. Nevertheless, the example referred to above is a great ornament of the Bunting division of my collection.

The pure deep black colour of the head in this example does not quite extend to the back of the head. On the other hand, the pure white of the neck extends nearly to the back, and occupies the sides of the upper breast, the breast, flanks, and under tail-coverts, all of which parts are devoid of any kind of dark markings. Of the five black stripes of the back, the three central ones are separated by two narrow dull rust-grey streaks, while a very broad, nearly pure white stripe extends downwards between the two outer stripes on each side. The abundance of pure white in the plumage of this bird, side by side with the deep black and the light ferruginous colour of the outer wing-coverts, gives it an extremely distinguished appearance.

The measurements taken from the fresh example caught here are as follows:—Total length, 6·50 ins. (165 *mm.*); length of wings, 3·23 ins. (82 *mm.*); length of tail, 2·95 ins. (75 *mm.*); length of tail uncovered by wings, 1·85 in. (47 *mm.*).

The bird has been met with as resident breeding species from the mouths of the Volga and Ural rivers, at the Caspian Sea and Lake Aral, eastwards as far as Yarkand.

182.—Black-headed Bunting [Schwarzköpfiger Ammer].

EMBERIZA MELANOCEPHALA, Scopoli.

Heligolandish: Swart-hoaded gühl Klütjer = *Black-headed Yellow Bunting.*

Emberiza melanocephala.	Naumann, iv. 227, xiii.; Blasius, *Nachträge*, 165.
Black-headed Bunting.	Dresser, iv. 151.
Bruant crocote.	Temminck, *Manuel*, i. 303, iii. 217.

I obtained the first example of this large and handsome Bunting on the 4th of June 1845; it is an old male in which, singularly, the normal black markings of the head not only extend downwards along the sides of the neck, but the fore-neck also has a long black longitudinal patch. Since that time the species has occurred here about fifteen times, and has been killed in most of these cases. With the exception of one young bird, all these examples are in summer plumage, five old males, three old females, and a male in its second year, being in my collection, while an old pair was given by me to Mr. Gurney. With the exception of the young bird of the year (*Sommervogel*) which was shot in August, all these examples occurred between the 6th of May and the 18th of June.

In England this species has only been observed once, an old female having been shot there in November 1868. It appeared astonishing at the time that this individual should have made the journey to England so late in the year, instead of flying towards its winter quarters in the opposite direction. Unquestionably, however, the bird did not get to England at so late a period of the year, but had landed there during the preceding summer, and had remained unobserved, until, in autumn, while accompanying a flock of Yellow Hammers, it was easily recognised on the open field and shot.

In Heligoland one is probably justified in saying that a bird has arrived on the same day on which it is observed; in England or the continent, however, such an assumption would not be tenable, especially under conditions such as those mentioned above.

This Bunting is a breeding bird in Dalmatia, Greece, Asia Minor, and the Caucasus; it does not appear to nest farther east, for it is not mentioned by Sewertzoff among the birds of Turkestan.

183.—Red-headed Bunting [Braunkehliger Ammer].

EMBERIZA LUTEOLA, Jerdon.[1]

Emberiza icterica. Eversmann, *Addenda ad Pallasi Zoogr. Ross.-Asiat.*, ii. 10.
Euspiza luteola. Jerdon, *Birds of India*, ii. 378.
Emberiza luteola. Sewertzoff, *Fauna of Turkestan*; *Ibis*, 1876, 249.

I have twice had the good fortune to come across this Bunting in my garden, both examples being old males: the first on the 20th of June 1860, and the second, a less handsomely-plumaged specimen, some years later in September. Very probably this species had been shot on a previous occasion by Oelrich Aeuckens; but the bird in question having been heavily wounded, half fluttered, half fell into some shrubs, and, in spite of all efforts, could not be found again.

It was described as a beautiful very yellow Bunting, the markings round its bill being almost as red as those of a Goldfinch.

The early summer of the above-mentioned year was a generally rich one, even for Heligoland. On the 12th of May I obtained a splendid old male of *Saxicola aurita*; on the 17th, *Turdus saxatilis*, fem.; on the 3rd of June, *Muscicapa albicollis*, also a splendid old male; on the 18th, *Emberiza melanocephala*, an old female; and on the same day, *Charadrius fulvus*, an old female; on the 20th, the above-mentioned *Emberiza luteola*; and on the 14th of July, *Fringilla serinus*, the first example of this species observed here.

This Bunting is at once distinguished from all related yellow species in that the rump, the sides of the neck, upper breast, and breast, as well as all the lower parts, are of the purest and richest yellow, without spots of any other colour. The forehead, cheeks, and throat are of a beautiful rust-red. The feathers of the wings and tail are greyish brown, and have grey edges which, on the lesser and greater wing-coverts, as well as on the posterior flight-feathers, pass into broad whitish grey borders. As in the preceding species the outer tail-feathers have no white markings.

This species breeds east of the Caspian Sea,—according to Sewertzoff, in the whole of Turkestan—at elevations of from 4000 to 8000 feet. Herr R. Tancré has had large numbers of both the bird and eggs collected in the Altai Mountains. Some of the eggs, which he has kindly given to me, bear a strong resemblance in colour and markings to those of *E. melanocephala*, but are much smaller, and in general are not so much dotted with black as those of this closely related species. They measure ·82 in. (21 *mm.*) in length, and ·63 in. (16 *mm.*) in breadth; the ground-colour

[1] *Emberiza luteola*, Sparmann.

is a dull olivaceous yellowish white (*olivengelblich getrübtes Weiss*), with darkish grey roundish blotches, and yellowish olive-brown (*gelblich-olivenbraune*) splashes, which are gathered in a zone, or are somewhat more crowded at the thick end. In one of the eggs a violaceous greyish brown (*violettlich graubraun*) shade predominates, both in the ground-colour as well as in markings, whereby it resembles some of the eggs of the White Wagtail so much as to be easily mistaken for them. In one egg in my collection the dots are finer than in any other, and the markings, which are rather scanty, are distributed uniformly over the whole surface. This example I owe to the kindness of Colonel Wardlaw-Ramsay, who collected it in Afghanistan during the war in 1880. The ground-colour in this example is of a very pale sea-green.

184.—Snow Bunting [Schneeammer].

EMBERIZA NIVALIS, Linn.[1]

Heligolandish: Sniiling = *Snow Bunting.*

Emberiza nivalis. Naumann, iv. 297.
Snow Bunting. Dresser, iv. 261.
Bruant de neige. Temminck, *Manuel*, i. 319, iii. 339.

As might be expected, the Snow Bunting is a very numerous visitor to Heligoland—especially in late autumn, on the approach of frosty weather. A flock of some hundreds of these boisterous birds, descending for a moment on some open plain, presents a most pleasing sight. Evidently they do not alight for the purpose of resting—for they seem not to know what rest means,—nor in search of food. They, in fact, absolutely roll themselves over and over along the ground, the individuals at the rear of the flock flying low over the whole train of those in front of them, and immediately taking up their place in front of the foremost rank; this manœuvre is repeated without interruption, so that all the flock soon gets to the edge of the cliff. Arrived there, they rise in a body and hasten, as though they were chased by the wind, in a high curve to some distant spot, where the same restless movements are performed over again. The liveliness of such a scene is enhanced in no small degree by the clear call-notes of the birds, which they utter repeatedly both while running along the ground and when on the wing.

Not infrequently solitary young birds of the year arrive as early as the last days of August and the first days of September.

[1] *Plectrophenax nivalis* (Linn.).

In these the plumage is invariably of a very dusky, almost coppery-brown colour. Old birds in pure summer plumage I have obtained only on three occasions. These were individuals which had been delayed on their migration by some accident or other, for the normal spring migration of this high northern species takes place very early in the year, when the birds are still in nearly full winter plumage. There is, however, no European bird which surpasses in the beauty of its plumage an old male of this species, which displays none but the two colours of the breeding dress, viz. a deep, shiny black and a snowy white.

The breeding stations of the Snow Bunting are of circumpolar distribution. Captain Feilden found a nest with eggs in 82° 33′ N. latitude, in the neighbourhood of Knot Harbour, Grinnell Land. The Ptarmigan alone seems to breed still farther north; at least, the same observer found a pair of these birds in latitude 82° 46′ N., of which he shot the female. Lieutenant Aldrich, however, found traces of this species still farther north, viz. in the snow in latitude 83° 6′ N. (*Notes from an Arctic Journal*, by H. W. Feilden. Reprinted from the *Zoologist*, p. 72).

185.—Lapland Bunting [Lappländischer Ammer].

EMBERIZA LAPPONICA, Linn.[1]

Heligolandish: Berg-Sneeling = *Mountain Snow Bunting.*

Emberiza lapponica.	Naumann, iv. 319.
Lapland Bunting.	Dresser, iv. 253.
Bruant montain.	Temminck, *Manuel*, i. 322, iii. 339.

Unlike its congener, the preceding species, this Bunting occurs here only in solitary instances; from the middle of September until the end of October two to three examples, rarely more, may be occasionally met with during a day. In its character, too, it is altogether unlike the Snow Bunting, having nothing of the boisterousness and wildness of that species, but being of a gentle and quiet disposition. Indeed, I have frequently for years kept it confined in a cage, and its melodious, if somewhat melancholy, tune has given me much enjoyment during many a summer night spent at my desk over these leaves. The song of the Snow Bunting has exactly the same character; but the melodious, flute-like notes are fuller, and the bird in confinement will only give utterance to them during the first hours of June and July nights. The Snow Bunting remains, however, so utterly intractable, crying like one possessed when any person approaches its cage, that it is impossible to

[1] *Calcarius lapponicus* (Linn.).

make friends with it, and one generally ends by once more giving the peevish fellow his liberty.

The Lapland Bunting, on the other hand, ceases fluttering after one or two weeks' confinement if one keeps renewing its food, and soon becomes so tame that it will take flies from the finger. It also invariably accomplishes its autumn moult to perfection, and in a very short time.

In the breeding plumage this bird, like other species from the Far North, is of extremely rare occurrence here. In fact, I have only once obtained it in the perfectly pure dress of summer.

Like the preceding species, the Lapland Bunting breeds within the whole Arctic Circle, but does not advance so far north as the Snow Bunting.

186.—Bobolink [Wandernder Reisvogel].

DOLICHONYX ORYZIVORA, Linn.[1]

Wandering Rice-Bird. Audubon, *Syn. of Birds of North America*, p. 138.

An old male of this species has been twice shot here during the summer months, and in each instance the bird was brought to me in its fresh condition. One of these examples has the tail and the tips of its wings much worn, but the plumage in other respects is quite perfect, and does not give the bird the appearance of having been kept in confinement. The second specimen was perfect in all its parts, and had certainly never been in a cage.

This species is perhaps best placed here after the Buntings; for, although it cannot actually be described as one of this family, the females and young autumn birds very closely resemble, especially in general external appearance, the phases of plumage belonging to similar ages of the large Yellow Buntings, *Euspiza*, and especially *E. luteola*.

The home of this bird extends over, and is exclusively confined to, the United States of America. Apart from the two examples cited, the bird has hitherto not occurred on this side of the Atlantic.

Finch—Fringilla.—This genus comprises about a hundred species, all rich in individuals, inhabiting almost the whole of the globe with the exception of Australia. Despite this wide range in distribution of the genus, its representatives in Heligoland are amongst the least interesting of the feathered visitors of that island, for, with the exception of isolated occurrences of *Fringilla nivalis*, *F. hornemanni* and *F. exilipes*, the seventeen species which the island can show are all common European names.

[1] *Dolichonyx oryzivorus* (Linn.).

187.—Chaffinch [Buchfink].

FRINGILLA CŒLEBS, Linn.

Heligolandish: Bockfink, from Buchfink = *Beechfinch*.

Fringilla cœlebs. Naumann, v. 13.
Chaffinch. Dresser, iv. 3.
Gros-bec pinson. Temminck, *Manuel*, i. 357, iii. 260.

No one of the numerous bird-visitors to this island has more angry epithets hurled after it than the Chaffinch during its spring migration. This treatment, indeed, is not meted out to it by the gunner or fowler, but by everybody who has sown a bit of earth in his modest garden with cabbage, radish, or turnip seed; for should this have been done towards evening on one of the first days of April, we may be sure to find the little plot at dawn of the next day covered with Chaffinches, which, by the time one may happen to intervene, will probably have dug up and consumed half of the seed for their breakfast. To prevent this wholesale plunder, a net is stretched about a foot high above the piece of ground; but if this is not tightly fastened down with pegs all round, or if a single mesh of it is torn, the simple creatures are sure to creep through the opening and destroy as much as possible before one arrives on the scene.

No possible benefit is, on the other hand, derived from these birds except that in two or three instances a fine old cock bird finds its way into the cage and satisfies the modest demands of its owner by its monotonous tune. The bird is not caught for culinary purposes, though if a method for the capture of the same were established, one would frequently be able to obtain thousands of them from the middle of September to the end of October. All the potato-fields of the Upper Plateau are often covered with clouds of these birds during the autumn migration. It is also fairly abundant during the spring migration, from the end of March to the end of April, but its numbers at that time bear no comparison with those of the autumn migration.

Now and again a pair of these birds have nested here. In general the breeding area of the species extends over the whole of Europe from Portugal to the Ural, and in Scandinavia advances northward as long as it can find a district offering the least amount of arboreal vegetation. In the east, towards Asia, it is found nesting in solitary instances only; and, according to Sewertzoff, it is but rarely met with during the winter months in Turkestan.

188.—Brambling [Bergfink].

FRINGILLA MONTIFRINGILLA, Linn.

Heligolandish : Quäker. Name formed after the call-note.

Fringilla montifringilla.	Naumann, v. 44.
Brambling.	Dresser, iv. 15.
Gros-bec des Ardennes.	Temminck, *Manuel*, i. 360, iii. 264.

This bird, also, like the preceding species, is an extremely unwelcome guest in the gardens of the island. Inasmuch as it generally arrives somewhat later than the Chaffinch in spring, the turnip and cabbage seeds have, by the time of its arrival, sprouted their first germinal leaves, this handsome bird seems to take a special delight in pulling the young plants out of the soil, and leaving them untouched on the ground. Members of bird-protection societies will probably say that, in doing this, it is trying to get at some noxious insect at the root of the plant. This seems, however, hardly likely to be the case; for, in the first place, it pulls out the plants indiscriminately, one by one, down to the very last; and secondly, seeds which have been protected by a net from amiable attentions of this nature, are found to thrive excellently. Hence we ought hardly to find fault with people who make use of protective contrivances of this kind to the best of their powers. We shall mention similar facts in regard to the Sparrow.

A peculiar variety occurs sometimes, though extremely rarely, among the males of this species. This consists in the steel-blue glossy black of the head and neck extending also to the foreneck, which in the normal plumage is of a brownish orange (*rostorange*), and thus entirely surrounding the neck. During my long experience I have obtained examples with this exceptional marking on two occasions. Naumann makes no mention of it; but, according to a remark of Newton's in his edition of Yarrell's *British Birds*, it has been frequently noticed by English observers.

The spring migration of this species falls for the most part in April, but solitary old males arrive sometimes as early as the middle of March. The autumn migration commences about the middle of September; frequently the numbers of migrant flocks increase considerably in the course of October, but they never attain to the enormous proportions of those of the Chaffinches.

The breeding stations of this species extend from Norway to the Sea of Ochotsk, from 60° N. latitude, as far as birch trees, however stunted, afford the bird the opportunity for building its nest.

189.—Snow Finch [Schneefink].

FRINGILLA NIVALIS, Linn.

Fringilla nivalis.	Naumann, v. 4.
Snow Finch.	Dresser, iii. 617.
Gros-bec nivcrolle.	Temminck, *Manuel*, i. 362, iii. 261.

This peculiar Finch, with the wings and tail of a Snow Bunting, as Aeuckens describes it, has occurred here twice; the first time on March 30th 1849, and on one other occasion Aeuckens saw it in late autumn, but did not secure it. On the first-named date the wind was a light south-east and the weather fine. Light east winds prevailed at that time generally, and were productive of a copious migration; thus, a short time previously, a Citril Finch was seen, a species which has also only been twice observed here.

The nesting stations of this species approach the snow-line of the higher mountain-ranges of Europe and Asia from Spain to Turkestan (Irby, Sewertzoff). It is only when these regions become inhospitable during the winter months that the bird descends to lower-lying districts: it has, in fact, no proper migration.

190.—Goldfinch [Distelfink].

FRINGILLA CARDUELIS, Linn.[1]

Heligolandish: Ziebelitsch = *Goldfinch.*

Fringilla carduelis.	Naumann, v. 126.
Goldfinch.	Dresser, iii. 527.
Gros-bec chardonneret.	Temminck, *Manuel*, i. 376, iii. 269.

This elegant bird occurs here almost always in solitary instances, from three to five individuals in one day counting among the exceptions. Its autumn migration takes place in October, and the spring migration from the middle of April to the end of May; now and again it is seen during the mass-migrations of seed-eating species which are caused by a heavy snowfall and sudden frost during the winter months.

The breeding area of this species extends over the whole of Europe, and in Norway advances beyond the Arctic Circle. It also breeds in the Canaries, Madeira, north-west Africa, Asia Minor, and eastwards as far as the Altai Mountains.

[1] *Carduelis elegans* (Steph.).

191.—Linnet [Bluthänfling].

FRINGILLA CANNABINA, Linn.[1]

Heligolandish : Irdisk. Name having no meaning attached to it.

Fringilla cannabina.	Naumann, v. 80.
Linnet.	Dresser, iv. 31.
Gros-bec linotte.	Temminck, *Manuel*, i. 364, iii. 262.

The capture of a 'Blood-blood-road Irdisk' is always a source of great delight to our young Heligolanders; for, next to the Goldfinch, it is everybody's favourite cage-bird. To be sure the old males are at first somewhat wild and peevish, but, having once got used to their new surroundings, they soon come to be highly-esteemed members of the family. Though the Siskin, too, is much in favour as a cage-bird, this is rather by reason of its simple confiding manner and invincible good humour than on account of its musical accomplishments,—its song, with the almost momentarily repeated concluding strophe, 'Friederi—i—Friederi—i—äh—h—h,' is indeed a very modest performance; but has at any rate this merit, that by its inexhaustible vivacity it impels even the idlest songsters to chime in. The Linnet not only visits Heligoland in very large numbers, but does so also during a very large portion of the year. It arrives with the earliest Chaffinches as soon as the middle or end of August, and one is really unable to say when its autumn migration actually ends; for not only does it still continue to be very numerous during October and November, but smaller or larger companies are met with even in December. Nor is there a pause in its occurrence at the close of the year, for it may be seen again in January, being indeed specially numerous during the sudden and heavy snowfalls which have been already frequently mentioned as apt to occur at this season. During February and March it occurs daily, in greater or smaller companies, in the regular course of its spring migration. These companies gradually decrease in numbers from the middle to the end of April, when the spring migration terminates.

The Linnet breeds numerously throughout the whole of Europe, advancing in the north to beyond 60° N. latitude. Eastwards, its breeding range extends at least to Central Asia; according to Sewertzoff, it occurs both as a common breeding bird and migrant as far east as Turkestan.

[1] *Linota cannabina* (Linn.).

192.—Twite [Berghänfling].

FRINGILLA MONTIUM, Gmelin.[1]

Heligolandish: Road-ejeähssed = *Red-Rump.*

Fringilla montium.	Naumann, v. 103.
Twite.	Dresser, iv. 59.
Gros-bec de montagne.	Temminck, *Manuel*, i. 368, iii. 262.

One can hardly imagine a merrier company than a flock of these little birds; their favourite resorts are fields lying fallow, and thickly overgrown with wild mustard; and it is amusing, on approaching too close to the birds, suddenly to see a dense crowd of from sixty to a hundred of them rising, amid shrill pipings, from all sides to a height of from ten to twelve feet; then, after a slight wheeling movement, returning all with one accord, amid general noise, to the spot they occupied before. In this manœuvre the birds which have taken flight are guided back to their old place by the long-drawn, flute-like call-notes of some individuals which have remained on the ground. Sometimes they will rise only two or three feet before falling in again; but whichever movement they adopt, this is always carried out by the whole flock collected in a dense crowd, each individual making at the same time as much noise as its small yellow bill will allow. This small and interesting Finch has only received a very modest share of the red pattern which is peculiar to the group. It occurs here during October and November to the number of hundreds of individuals in one day, and also, though less numerously, through the whole of December. It also arrives frequently in countless numbers with a sudden and heavy snowfall.

Its spring migration occurs in March, when it is met with rather less numerously, though still in flocks numbering up to fifty individuals.

193.—Mealy Redpoll [Leinfink].

FRINGILLA LINARIA, Linn.[2]

Heligolandish: Twieweleahr and Road-hoaded—the first being the name applied to the males, the second to females and young—and signifying *Red-headed.*

Fringilla linaria.	Naumann, v. 173.
Mealy Redpole.	Dresser, iv. 37.
Gros-bec sizerin.	Temminck, *Manuel*, i. 373, iii. 267.

The Mealy Redpoll is an extremely irregular visitor to Heligoland. In rare and exceptional cases it occurs in really astonishing

[1] *Linota flavirostris* (Linn.). [2] *Linota linaria* (Linn.).

quantities—in some years again only in large scattered flights—while in others it is represented by scarcely more than a few scattered individuals; and even these cannot be relied on with certainty every year. All this, however, applies only to the autumn migration, for in spring the bird is never met with otherwise than as an extremely isolated occurrence.

The most astonishing migration *en masse* of this species which I have ever witnessed took place in the autumn of 1847. This migration, I believe, extended also over the whole of Germany. It commenced here on the 13th of October with from twenty to thirty examples, its numbers increasing daily until, from the 26th of October until the 3rd of November, they are recorded as hundreds daily in my diary; on the 4th and 5th of November, 'countless flocks' and 'innumerable multitudes' are noted; on the 6th, 'fewer than on previous day.' About a hundred each day occurred until the middle of the month, after which time solitary individuals and smaller companies continued to be seen until the middle of February of the following year. On the two principal days above mentioned, the whole island was literally covered with these birds, so that one might have thrown a stone in any direction one chose, and it was sure to hit birds as long as it continued rolling along the ground.

It was in the autumn of this memorable year that the Shore Lark, hitherto so rare on the island, for the first time made its appearance in large numbers, since which time this bird has become a permanent and steadily increasing visitor to Heligoland, and to the west of Europe generally.

Other Fringilla species appeared at the same time in quite unusual numbers—*e.g. F. montium*, daily in flocks of hundreds; *F. cœlebs*, *F. montifringilla*, and *F. cannabina* in countless numbers; *F. spinus* also, if less abundantly, still in striking quantity. During October, November, and December 1881, another strong migration of Mealy Redpolls took place, but was not to be compared even approximately with that of 1847: the phenomenon, moreover, in the last case was peculiar in this respect, that almost all the birds hurriedly passed over the island in large flocks, a comparative few only alighting. We ought to add that when this species makes its appearance in unusually large numbers, both sexes are represented simultaneously in all ages of life, and in all stages of plumage.

The breeding stations of the Mealy Redpoll lie within the Arctic Circle, both in the Old and New World.

194.—Greenland Redpoll [Polarfink].

FRINGILLA HORNEMANNI.[1]

Linota hornemanni. Holböll, *Fauna Grönlands.* Translated by Paulsen, p. 30.
Greenland Redpole. Dresser, iv. 55.
Gros-bec boréal. Temminck, *Manuel*, iii. 264, iv. 644.

This interesting northern species I have also obtained here on one occasion, the remarkable size of the bird having induced Claus Aeuckens to shoot it; in this respect, apart from its somewhat shorter tail and much smaller bill, it exactly resembles a young Chaffinch. The example in question is a young autumn bird, and was shot on the 24th of October 1879. Its plumage is very beautiful and perfect; in coloration and markings it much resembles its congeners of the same age, but the colours throughout the whole of the plumage are more decided; thus, for example, the whitish buff-coloured (*weisslich rostgelben*) stripes which in young birds of *F. linaria* border the black median stripes of the back, in this example are pure white along their whole length. The rump also is white, the three black stripes becoming merged in this colour. The black patch on the throat is very broad, and extends downwards along nearly the whole extent of the foreneck. The upper part of the breast is isabelline rust-colour, with broad black stripes at the sides, which extend downwards along the whole of the white sides of the breast and flanks.

In coloration this example accordingly deviates considerably from Holböll's description, according to which the plumage of both old and young is divided almost exclusively between grey, white, and rosy-red. Temminck, on the other hand, whose description is also taken from examples collected by Holböll in Greenland, says that the brown patches of the back are edged with rust-colour; that the rump has brown markings, and that the sides are marked with numerous brown spots. A young female autumn bird (*Herbstvogel*) received by Dresser from Greenland is stated by that ornithologist to resemble in coloration some specimens of *F. linaria* to such a degree that it can only be distinguished from the latter species by its considerable size, and the conformation of its beak.

The measurements of the bird taken on this island perfectly agree with those given by Holböll and Dresser, and are as follows:—Total length, 5·47 ins. (139 *mm.*); length of the wings, 3·11 ins. (79 *mm.*); length of tail, 2·80 ins. (71 *mm.*); length of tail uncovered by wings, 1·19 in. (30 *mm.*); the notch of the furcate tail is ·75 in. (19 *mm.*)

[1] *Linota hornemanni* (Holb.).

long. The bill is short, straight, and not pointed the upper mandible might be described as somewhat arched, and towards the point slightly curved downwards. Its length from forehead to tip is ·32 in. (8 *mm.*).

This bird is found as a breeding species in Greenland, Spitzbergen, and northern Iceland; in the first-named country Holböll found its nest from 69° N. to beyond 73° N. latitude. The bird has only been met with south of its northern breeding haunts on three occasions: once in France, once in England, on the 24th of April 1855, the example in this case being a very fine old bird; and the third instance is furnished by the example killed in Heligoland.

195.—Coues' Redpoll [Sibirischer Leinfink].

FRINGILLA EXILIPES, Coues.[1]

Coues' Redpole; *Linota exilipes.* Dresser, iv. 51.

During the wonderful migration *en masse* of Redpolls in the autumn of 1847, already referred to, this small species was very abundantly represented; and whenever after that time a repetition of this phenomenon was observed, some one or more examples of this singular little bird were invariably found to occur among the other more or less numerously represented species. I have, however, only succeeded in obtaining one other example—a young autumn bird—since that remote date, having been the one which was shot of two birds observed on the 1st of December 1891. A fair number of Redpolls had, in fact, been observed from the beginning of November of the latter year; but on the 30th of the month thousands were seen, in large flocks for the most part, flying across the island without alighting. On the day after, flocks of from thirty to fifty individuals were again observed, among which occurred the two birds above mentioned.

Apart from its considerably smaller size, the present species is distinguished from *F. linaria* by the generally lighter colour of its plumage. In the young autumn bird of *F. exilipes* in my collection the dark stripes of the back,—which in young birds of *F. linaria* are blackish-brown, are whitish brown-grey (*weisslich braungrau*), with whitish yellowish-grey (*weisslich gelbgrau*) edges, while the two light-coloured central streaks are pure white. The brownish-grey markings on the sides of the breast are still lighter in this species, besides being much blurred, and disappearing almost entirely in the flanks; in *F. linaria* these streaks are

[1] *Linota exilipes*, Coues.

black, and sharply defined; the rump is pure white, and entirely unspotted. An old male, shot by Seebohm on April 22nd 1875 on the Petchora, in the colour of the upper parts completely resembles the Heligoland specimen, but has only pale brownish-grey stripes left on the flanks, while the upper breast, sides of the breast and rump are of a light rosy-red colour.

The measurements of the examples killed here completely agree with those of the old bird from the Petchora, and are as follows:—Total length, 4·72 ins. (120 *mm.*); length of the wings, 2·64 ins. (67 *mm.*); length of the tail, 2·28 ins. (58 *mm.*); length of tail uncovered by the wings, 1·19 in. (30 *mm.*). The bill is very small, measuring ·23 in. (6 *mm.*) from forehead to tip, and only extending ·16 in. (4 *mm.*) beyond the bristle-like plumes which hide the nostrils.

This bird occurs as a breeding species from the north-east of European Russia, through the whole of northern Asia, and advances, under the same parallels of latitude, into northern America. During the *Vega* Expedition it was the only Redpole met with in the north of the Tchuktchee Peninsula.

196.—Lesser Redpoll [Rostbrauner Leinfink].

FRINGILLA RUFESCENS, Vieillot.[1]

Lesser Redpole. Dresser, iv. 47.

This, the smallest of the Redpolls, affords a most striking proof of the strong disinclination of species from western Europe to migrate beyond the extreme limits of their homes. In the central and northern parts of England, as well as in the whole of Scotland, this bird is a common and abundant breeding species, and yet, in spite of the most careful attention, I did not obtain my first example here, for my collection, until 1882. This individual was shot by my son Ludwig on the 24th of October, and on the 7th of November I myself shot another of these pretty birds in my garden. On the 15th of May 1884 a third example was brought me by Claus Aeuckens; and on the 21st and 22nd of the same month one was again seen, without, however, being captured; since that time it has never been observed again on the island.

This bird supplies a further highly interesting contribution to the bird-life of Heligoland, inasmuch as a pair of them nested in 1872 in the throstle-bush put up in my garden. I did not discover the nest until autumn when the leaves were falling. I thought I

[1] *Linota rufescens* (Vieillot).

should have to look for it among the thorn-bushes, which are from fifteen to eighteen feet in height, and not where I actually did find it—viz. in an elder-bush, about nine feet high, at a spot under which I used to pass at all hours of the day. A stout branch had broken off at a distance of several feet from the stem, and had given off four shoots at the place of rupture, so that the whole had the form of an open hand, in the cavity of which the nest was placed. The male of the pair had perished early in the season, having probably fallen a victim to the numerous cats on the island; nevertheless, the lone little widow laid her eggs, and faithfully reared her young. Inasmuch as the whole family finally disappeared one day, we may assume that they had happily set out together on their autumn journey.

No doubt can be entertained as to the identity of these birds, for not only used the hen to sit daily beside a shady bench in my garden, at a distance of from three to five feet above my head, uttering her 'hüet—hüet' plaintively, as though in solicitude for her nest some few paces off, but I picked up from the ground on one occasion two of the small rust-brown young ones who were as yet too helpless to leave their nest, and restored them, after a long inspection, to their home amongst the elder-branches.

This species can be distinguished at a first glance from the three preceding related species, being not only the smallest, but also the darkest of the three. All the upper parts, including the rump, are of a dark rich rust-brown, this colour not only occupying the sides of the neck, upper breast and breast, but also extending to the edges and tips of the greater and lesser wing-coverts and the posterior flight-feathers, whilst even the red of the summer plumage of the male has an admixture of this rust-colour.

The measurements of the examples of this species shot here are as follows:—Total length, 4·52 ins. (115 *mm.*); length of the wing, 2·64 ins. (67 *mm.*); length of the tail, 2·04 ins. (52 *mm.*); length of tail uncovered by wings, 1·02 in. (26 *mm.*). The bill is ·32 in. (8 *mm.*) long, and by its elongated tip much resembles that of *F. linaria*, whereas the bills of *F. hornemanni* and *F. exilipes* resemble each other in shape.

This species seems to nest nowhere except in Scotland and its islands; in England, throughout the north, and as far as the central parts of the country; and also in the north of Ireland. Seebohm says that these birds during their migration appear in large flocks in the Orkney Islands;[1] unless, however, their breeding range extends to Scandinavia, or further east, it is difficult to see whence such flocks come, or whither they go.

[1] *History of British Birds*, vol. ii. p. 117.

creatures. When he had finished, I asked him in a quite casual manner: 'And are they really all small birds; are there no larger birds at all?' Whereupon he exclaimed: 'No, not one; the whole place swarms with nothing but small birds.' I replied: 'Well, now, that *is* wonderful; but who on earth can have carried all these little folk over on his back?' From that time he never mentioned the subject again.

The breeding area of the Siskin extends from France and England through the whole of central and northern Europe and Asia to Japan. In Scandinavia it has been met with even beyond the Arctic Circle.

198.—Citril Finch [Zitronenzeisig].

FRINGILLA CITRINELLA, Linn.[1]

Fringilla citrinella.	Naumann, v. 148.
Citril Finch.	Dresser, iii. 535.
Gros-bec venturon.	Temminck, *Manuel*, i. 370, iii. 263.

There is very little to be said about this bird here: it has only occurred twice. Many years ago Reymers had caught one alive, and kept it in a cage for a number of years. On the 19th March 1849 one was again seen, but not killed; and I have up to the present not been able to obtain one for my collection.

The nesting stations of this species are situated in the mountains of southern Europe, extending as far north as Switzerland and the Black Forest.

199.—Serin Finch [Girlitz].

FRINGILLA SERINUS, Linn.[2]

Fringilla serinus.	Naumann, v. 114.
Serin Finch.	Dresser, iii. 549.
Gros-bec serin.	Temminck, *Manuel*, i. 356, iii. 259.

Alexander von Homeyer and other ornithologists have attempted to prove that the Serin Finch has been advancing its breeding area in a northerly direction. So far as I know, however, no such attempt at nesting has at present extended beyond central Germany. Now, although one can hardly expect to hear of this bird building a nest in Heligoland, the occurrence here of five young grey indivi-

[1] *Chrysomitris citrinella* (Linn.).

[2] *Serinus hortulanus*, Koch.

197.—Siskin [Erlenzeisig].

FRINGILLA SPINUS, Linn.[1]

Heligolandish : Ziesk = *Siskin*.

Fringilla spinus.	Naumann, v. 173.
Siskin.	Dresser, iii. 541.
Gros-bec tarin.	Temminck, *Manuel*, i. 371, iii. 264.

In some years this little bird is met with here during the autumn migration in quite incredible abundance, whereas in most years it belongs to those of the Finch species which are represented here in only inconsiderable numbers; during the spring migration, especially, only solitary examples are met with.

The autumn migration takes place from the middle of September until about the end of October, the birds appearing almost annually in smaller or larger flights, but sometimes in astonishing numbers, as in the autumn of 1880, when their numbers were such as no one ever remembers to have seen here before. My journal on this occasion states as follows:—September 16, wind S.E., quite calm, sunny, warm—*F. spinus* early, in flights numbering up to fifty. In the afternoon, hundreds in the garden, feeding on lettuce which had gone to seed; all young birds; on the 17th, hundreds of of thousands; flocks like clouds; the whole island covered with them.

During this unprecedented migration, an excellent opportunity presented itself to me for finally dispelling a notion which had become current for some years, though it was scarcely to be taken seriously—viz. that small birds are, during their migration-flights, carried by the larger ones on their backs to their places of destination. Summer visitors to the island had often asked my opinion on this question; and during this particular September a gentleman of scientific acquirements frequently started the subject. He himself was so thoroughly convinced of the truth of this belief, that anything I said to the contrary failed to make the least impression on him. Then came the 17th of September above mentioned,—a day to him pregnant with disaster. He came to me to express his astonishment at the enormous quantities of small birds which filled the whole island, for, besides the Siskins, a very strong migration of numerous Sylviæ, Chats, Tree Pipits, Ortolan Buntings, and the like, had taken place. He could not find words to express his astonishment at the incomprehensible number of these small

[1] *Chrysomitris spinus* (Linn.).

creatures. When he had finished, I asked him in a quite casual manner: 'And are they really all small birds; are there no larger birds at all?' Whereupon he exclaimed: 'No, not one; the whole place swarms with nothing but small birds.' I replied: 'Well, now, that *is* wonderful; but who on earth can have carried all these little folk over on his back?' From that time he never mentioned the subject again.

The breeding area of the Siskin extends from France and England through the whole of central and northern Europe and Asia to Japan. In Scandinavia it has been met with even beyond the Arctic Circle.

198.—Citril Finch [Zitronenzeisig].

FRINGILLA CITRINELLA, Linn.[1]

Fringilla citrinella.	Naumann, v. 148.
Citril Finch.	Dresser, iii. 535.
Gros-bec venturon.	Temminck, *Manuel*, i. 370, iii. 263.

There is very little to be said about this bird here: it has only occurred twice. Many years ago Reymers had caught one alive, and kept it in a cage for a number of years. On the 19th March 1849 one was again seen, but not killed; and I have up to the present not been able to obtain one for my collection.

The nesting stations of this species are situated in the mountains of southern Europe, extending as far north as Switzerland and the Black Forest.

199.—Serin Finch [Girlitz].

FRINGILLA SERINUS, Linn.[2]

Fringilla serinus.	Naumann, v. 114.
Serin Finch.	Dresser, iii. 549.
Gros-bec serin.	Temminck, *Manuel*, i. 356, iii. 259.

Alexander von Homeyer and other ornithologists have attempted to prove that the Serin Finch has been advancing its breeding area in a northerly direction. So far as I know, however, no such attempt at nesting has at present extended beyond central Germany. Now, although one can hardly expect to hear of this bird building a nest in Heligoland, the occurrence here of five young grey indivi-

[1] *Chrysomitris citrinella* (Linn.).

[2] *Serinus hortulanus*, Koch.

duals during the summer months at all events seems to admit of the conclusion that these birds may have been bred in the neighbourhood of the island, perhaps in Sleswick-Holstein. I do not, however, share the view that breeding attempts of this kind, made in districts far distant from the regular home, justify one in assuming an extension of the breeding area; for, under the conditions discussed in the chapter on 'Exceptional Migration Phenomena' (Part I.), it is quite possible that a male and female, happening to meet far beyond the normal limits of their breeding area, may pair and breed without either parents or offspring ever returning to the same place afterwards.

Thus, during the wonderful irruption of Pallas' Sand Grouse in 1863, some of these birds were found breeding as far west as Denmark; but in the autumn both the young and old birds departed, never to return. The same phenomenon was repeated in 1888.

The first example of this species which I obtained here was an old male, shot on the 14th of July 1860. I next secured a remarkably beautiful male bird on the 8th of June 1879. On the 28th of the same month five young grey birds were seen, only one of which displayed a very faint tinge of yellow; and on the 11th of July of the same year, another old bird was seen, but was not shot.

The summer in question was exceptionally rich in occurrences from the far South-east. Thus, May brought us *Alauda pispoletta*, *Falco eleonoræ*, and *Sylvia viridanus*; June, *Sturnus roseus* and *Emberiza melanocephala*, on two occasions in each case; while *Himantopus rufipes*, as well as another example of *S. roseus*, were seen in July. Among so numerous a stream of migrants proceeding from the south-east—as from the instances cited we may assume to have advanced over the whole of Germany—a pair of Serin Finches may very easily have come together, and, like Pallas' Sand Grouse in the above instance, have bred far from their home in Sleswick-Holstein or Denmark, without an exceptional case of this kind having of necessity any influence on the distribution of the species. In Heligoland the bird has not been seen again since that time.

The breeding stations of this species extend through southern Europe from Portugal to Greece. In the north it is found breeding in still fairly large numbers as far as Frankfort-on-the-Main.

200.—Red-fronted Finch [Rothköpfiger Girlitz].

FRINGILLA PUSILLA, Pallas.[1]

Passer pusillus. Pallas, *Zoogr. Ross.-Asiat.*, ii. 28.
Red-fronted Finch. Dresser, iii. 561.

A beautiful male of this interesting species, with the head-markings as scarlet-red as those of a Fire-crested Wren, was seen on the 7th May 1886 sitting on the throstle-bush belonging to a young fowler here; and was so free from shyness as to allow itself to be looked at from a distance of a few paces. Unfortunately, I missed getting this valuable example, as the man thought he could catch it alive in his net; in this, however, on account of the meshes being too large, he did not succeed. According to his description, the red colour was most beautifully developed on the top of the head, and was somewhat more yellowish towards the forehead. This shows how near, and with what leisure, he had been able to examine the bird. During this particular May there was a very strong migration on many days; and on the 2nd of June I obtained my second example of *Alauda sibirica*, a fine old female.

Pallas first found this species in the Caucasus. Its breeding home extends through the mountains of Turkestan, the Taurus, Lebanon, and undoubtedly the Altai Range. In 1876 C. G. Danford brought the eggs of this bird, as well as of *Sylvia mesoleuca*—both unknown until then—from the Taurus.

201.—Greenfinch [Grünhänfling].

FRINGILLA CHLORIS, Meyer.[2]

Heligolandish: Kort Gühl-Klütjer = *Short Yellow-Hammer.*
Fringilla chloris. Naumann, v. 64.
Green Finch. Dresser, iii. 575.
Gros-bec verdier. Temminck, *Manuel*, i. 346, iii. 254.

I am at a loss to explain what could have induced the Heligolanders, who are otherwise so good at drawing distinctions, to designate this Finch as a Bunting. When we reflect that they do not call the Common Kestrel a Falcon but a Beetle-Hawk—do not class the three Yellow Wagtails (*Budytes*) among *Motacilla*, nor the Tawny Pipit with *Anthus*—we cannot comprehend how they could have made such a blunder in regard to the Greenfinch. How-

[1] *Serinus pusillus* (Pall.).
[2] *Ligurinus chloris* (Linn.).

ever, in one of the last of the British migration reports there is a note from which it appears that the name Green Bunting is also applied to this species on the east coast of Britain.

Almost without exception the bird migrates at a very peculiar time of the year, viz. in the months of December, January, and February. Thus it was represented on this island in quite extraordinary numbers almost daily during the last month of 1884 and the two first months of 1885; nor was this a case of large companies of these birds remaining for a longer period than usual, but a continuous migration was in progress during all that time. Later in March, however, it seemed as though a small flock was remaining here longer than usual; scattered stragglers are met with even as late as the end of May. It seems as though this species exhibited but little inclination to leave its home, and can only be induced to do so by the gradually increasing severity of the weather; hence these birds are nearly always numerously represented among the enormous flights of migrants which, in winter, frequently make their appearance in consequence of sudden frosts or heavy snowfalls.

This bird is a common breeding species from Portugal to Turkestan, its range from north to south extending from within the Arctic Circle down to north Africa and Asia Minor.

202.—Hawfinch [Kernbeisser].

FRINGILLA COCCOTHRAUSTES, Meyer.[1]

In Heligoland also called Kernbeisser (= *Kernel-biter*).

Fringilla coccothraustes.	Naumann, iv. 435.
Hawfinch.	Dresser, iii. 575.
Gros-bec vulgaire.	Temminck, *Manuel*, i. 344, iii. 253.

Although the distribution area of this bird extends from Portugal to Japan, it appears in Heligoland in very small numbers only, during both periods of migration: it is rarely that one sees more than three examples in one day, and these for the most part singly. This is the more remarkable as the bird is found breeding in Sleswick-Holstein and southern Scandinavia. According to Naumann, however, the species shows but little migratory tendency; and, if not forced by very severe weather, will remain even during the winter within the confines of its nesting area. The year 1881 was a very exceptional one for Heligoland in this respect, the unprecedented number of from twelve to fifteen individuals having been seen daily about the middle of April.

[1] *Coccothraustes vulgaris* (Pall.).

203.—Common Sparrow [Haussperling].

FRINGILLA DOMESTICA, Linn.[1]

Heligolandish: Karkfink = *Church-bird.*

Fringilla domestica.	Naumann, iv. 453.
Common Sparrow.	Dresser, iii. 587.
Gros-bec moineau.	Temminck, *Manuel*, i. 350, iii. 256.

Master Sparrow, who gives himself such airs everywhere, plays a particularly prominent part in the avifauna of Heligoland, being the only one of all the smaller birds which is a fixed annual breeder there. Unfortunately, we can hardly say that this adds to the attractions of the island. For not only does the never-ending call of the males—'shüllüp—shüllüp'—during the pairing and breeding periods become extremely wearisome, but the discordant chatter of the freshly fledged young, applying for food to their parents among the high thorns of the gardens, is extremely objectionable. Apart from this, they do very severe damage in the smaller gardens of the island by biting off all the young blossoms of the gooseberry and currant bushes, and throwing them on the ground, apparently for mere pastime. Those who support the protection of animals will probably in this case advance the view that in proceeding thus, the object of the bird was to find noxious insects; and I myself at first entertained the same idea, until I found very soon that one bush after the other was robbed of every single blossom, when I thought it was high time to interfere; since then my bushes bear fruit in abundance.

The experience of our friends in America has also been a very sad one in regard to the Sparrow. Immigrants from Europe, thinking it would be very nice to transplant a bit of the old home to the new country in the shape of the Sparrow, had a number of these birds sent over from Europe, and set them at liberty. To the great joy of its admirers our little friend throve so well that very soon it not only completely flooded buildings and open places in New York, Chicago, Cleveland, and other large cities, but completely drove out of the parks and pleasure-grounds all the native Sylviæ and Thrushes which had hitherto beautified these places by their song. It has now inundated all the United States from the Atlantic to the Pacific Ocean; its flocks have increased to such enormous multitudes that the peach- and vine-culture are seriously threatened, and the Government is obliged to study means of putting a stop to this pest.

[1] *Passer domesticus* (Linn.).

It is a general opinion that the Sparrow is what is known as a resident bird, which never leaves its breeding area even during the winter months. This may indeed be the case in central Germany and further south, but does not hold good here in Heligoland. The flocks of young birds which have been bred here disappear at the end of July; the old birds remain until the middle of September, though a few of them probably winter here, with which many of those continuing on passage associate: because a company of from twenty to thirty individuals is found here throughout the winter. The resident birds which return in spring are distinguished in a very striking manner from those which pass through on their migration at the same time; for whereas the former, immediately after their arrival, give themselves great airs on the roofs and in the gutters, incessantly proclaiming their characteristic 'shüllüp—shüllüp,' and evidently feel still quite at home in the poultry yard, the migrant bands, consisting of from about thirty to fifty individuals, for a short time fly about silent and shy, high in the air and in a dense crowd, and very soon afterwards continue their journey. The same thing happens in September, and perhaps even somewhat earlier.

The home of the Sparrow ranges at the present time over by far the greater part of all the countries of the earth inhabited by man.

204.—Tree Sparrow [Feldsperling].

FRINGILLA MONTANA, Linn.[1]

Heligolandish: Ingelsk Karkfink = *English Church-bird.*

Fringilla montana.	Naumann, iv. 480.
Tree Sparrow.	Dresser, iii. 597.
Gros-bec frique.	Temminck, *Manuel*, i. 354, iii. 259.

It is very evident that if this pretty little cousin of our House Sparrow could find a suitable opportunity for building a nest here, it would have long since become settled on the island; for the birds which make their appearance here during the spring migration at the beginning of May, unlike all other migrants which call on their passage, are not at all in a hurry for proceeding on their journey, and often remain for several weeks—a phenomenon which is not repeated in the case of any others of our numerous spring visitors. Frequently I had almost come to believe that some of these bands had actually proceeded to build a nest, as for instance, in May 1884: on the second week of that month, from three to five

[1] *Passer montanus* (Linn.).

of these birds appeared in my garden, their numbers thereafter increasing, until on the 20th they had reached to about eighty or a hundred. The whole band, however, departed on the 22nd, the weather on that day being fine, calm, and warm, with a very light easterly wind. The birds in question could not, however, have been detained owing to the weather being unfavourable for their journey, because arrivals of fresh individuals were taking place daily during their stay.

That this species shows a tendency for establishing itself permanently in new localities is proved by the following instance which occurred more than ten years ago in the Faroes: a few pairs of these birds—until then unknown on the islands—made their appearance in the spring, remained, nested, and in the course of several years increased to such an extent that they annihilated all the seeds in the small gardens; and, further, did so much damage to the fields of the island, humble as these already were, that it became necessary to proceed against the marauders in every possible manner.

The home of this species extends south of the Arctic Circle, through the whole of Europe and Asia. In autumn it passes here without alighting.

Bullfinch—Pyrrhula.—This genus, all the male birds in which are distinguished by their beautiful red plumage, comprises some thirty species, most of which are distributed over the northern parts of the Old and New World. Four of these belong to Europe as breeding species, and a fifth from eastern Asia, *P. rosea*, has occurred as a casual visitant in very rare instances; all these birds also visit Heligoland, but invariably only solitary individuals are met with, and these only at intervals of many years.

205.—Northern Bullfinch [Grosser Dompfaff]

PYRRHULA MAJOR, Brehm.

Heligolandish: Doompoap = *Bullfinch* (literally = *Canon*).

Pyrrhula major. C. L. Brehm, *Vögel Deutschlands*, 252.
Northern Bullfinch. Dresser, iv. 97.

The Bullfinches resident in Europe have been separated into two species: the eastern form, *P. major*, and the western, *P. europaea*. This geographical separation is very clearly illustrated

by the more or less frequent occurrence of these birds on Heligoland, the western species being almost entirely absent:—*i.e.* if a Bullfinch occurs at all, one may with safety reckon on its belonging to the larger, purer and more handsomely coloured eastern species. Moreover, this bird only makes its appearance here in autumn during a strong migration of eastern species—as, for instance, during the powerful mass-migration in 1847—in the course of which the Bullfinch was seen daily, to the number of from three to six individuals, on the 26th October, and on the 1st, 4th, 5th, 14th and 17th November. It has never occurred so numerously since that date, one to two of these birds at most having been seen at intervals of five years or more.

During the above-mentioned year the Waxwing also occurred in larger numbers than has ever been the case since. Another distinguishing feature of this year was the first appearance *en masse* of the Shore Lark. *Pyrrhula major* inhabits Scandinavia, Russia, Poland, and within the same parallels of latitude, the whole of northern Asia.

206.—Common Bullfinch [Dompfaff].

PYRRHULA VULGARIS, Brisson.[1]

Pyrrhula vulgaris.	Naumann, iv. 283.
Common Bullfinch.	Dresser, iv. 101.
Bouvreuil commun.	Temminck, *Manuel*, i. 383, iii. 248.

If the beautiful red shade of the last-mentioned larger species is attained by a mixture of good vermilion with a little white, the red colour of the present species can only be compared to a rather more than usually pure brick-red. In a similar way, the beautiful pure blue-grey of the back of the former species is distinguished from the dull grey of the smaller form; the latter I have met with here only once. Aeuckens, some years ago, possessed a male which, at that time, I considered a young specimen of *P. major* in poor condition, and consequently I did not trouble to acquire it.

The measurements of a male specimen obtained from England are as follows:—Total length, 5·90 ins. (150 *mm.*); wings, 3·07 ins. (78 *mm.*); tail, 2·52 ins. (64 *mm.*). The measurements of a fine old male of *P. major* in my collection, in which the grey of the scapulars and feathers of the back is mixed with red, are:—Total length, 6·61 ins. (168 *mm.*); wings, 3·58 ins. (91 *mm.*); tail, 2·76 ins. (70 *mm.*).

P. vulgaris is a resident breeding bird in Germany, England, France, Spain and Portugal.

[1] *Pyrrhula europæa*, Vieillot.

207.—Pine Grosbeak [Fichtengimpel].

PYRRHULA ENUCLEATOR, Temminck.

Pyrrhula enucleator. Naumann, iv. 403.
Pine Grosbeak. Dresser, iv. 111.
Bouvreuil dur-bec. Temminck, *Manuel*, i. 333, iii. 246.

Up to the present I have not been so fortunate as to obtain this very desirable bird. During Reymers' younger years two of them were once caught here, one a carmine red, the other a yellowish-grey specimen. As they were considered to be cock and hen birds they were put into a spacious cage, into a corner of which a large heather-broom was placed in the hope that the supposed pair would be induced to nest. This, however, as might have been expected, did not take place. Subsequently these birds came into the possession of an Englishman, who took them over with him to England.

This handsome bird inhabits the coniferous forests of the Far North of both the Old and New World, but on the approach of winter seeks, as a rule, slightly lower latitudes. In the south of Norway, however, *e.g.* at Christiania, it is seen in flocks numbering from twenty to a hundred individuals, and is also caught in great quantities; nevertheless, not a single one comes to this island, which is the more tantalising inasmuch as it has been repeatedly captured in England.

[To my great joy I am able to report that, after long waiting, my desire to see this fine bird in my collection has at last been gratified,—a freshly shot beautiful old male having been brought to me to-day (the 20th October 1890). The whole body of this bird is of a pure and beautiful rose-carmine colour. The broad light edges of the posterior flight-feathers, and greater and intermediate wing-coverts, are nearly pure white, and add considerably to the bird's distinguished appearance.]

208.—Sinaitic Rose Finch [Rosengimpel].

PYRRHULA ROSEA, Temminck.[1]

Pyrrhula rosea. Naumann, iv. 427; Blasius, *Nachträge*, 195.
Bouvreuil pallas. Temminck, *Manuel*, i. 335, iii. 246.

With the exception of the young autumn bird (*Herbstvogel*) already mentioned by Blasius in his *Supplements* to Naumann, no other

[1] *Carpodocus roseus* (Pall.).

instances of the occurrence of this species can be recorded for the island. This example, which is considerably larger than the young autumn birds (*Herbstvögel*) of the following species, is distinguished by a faint tinge of red on the edges of the feathers, of which three young autumn birds (*Herbstvögel*) killed here show no trace.

The measurements of the example above referred to, as taken from the freshly killed bird, are as follows:—Total length, 5·90 ins. (150 *mm.*); length of wings, 3·34 ins. (85 *mm.*); length of tail, 2·56 ins. (65 *mm.*). As compared with these, the measurements of a young Scarlet Grosbeak, shot here on the 3rd of October 1851, are as follows:—Total length, only 5·12 ins. (130 *mm.*); length of wings, 2·95 ins. (75 *mm.*); length of tail, 2·32 ins. (59 *mm.*).

As far as is known, the breeding home of this beautiful bird extends from central to eastern Asia.

209.—Scarlet Grosbeak [KARMINGIMPEL].

PYRRHULA ERYTHRINA, Pallas.

Pyrrhula erythrina. Naumann, iv. xiii.; Blasius, *Nachträge*, 194.
Scarlet Grosbeak. Dresser, iv. 75.
Bouvreuil cramoisi. Temminck, *Manuel*, i. 336, iii. 247.

Since the 3rd of October 1851, on which day I obtained the first example of this species, the bird has been shot on three other occasions: the last being on September 9th, 1884. All were young birds in the first autumn plumage, and are now preserved in my collection with the exception of one example which, after I had shot it, fell down among the cliffs, and could not be recovered. Apart from these examples, this species has been observed in several other instances without having been shot. The bird is very noticeable by its loud peculiar call-note, which, strange as this may sound, is intermediate between the flute-like note of the Bullfinch and the loud 'Räät' of the Brambling (*Fringilla montifringilla*). The bird has so little of shyness in its nature that it does not mind being looked at for any length of time at very close quarters, especially if it happens to be sitting on a bush of *Sonchus oleraceus*, picking out the seeds after the plant has ceased flowering. This plant appears to be its favourite food; at least I have never seen it feed upon any other in this locality.

The western limit of the breeding range of this species extends from Poland northwards as far as east Finmark, and it is found nesting within the same parallels of latitude as far as Kamtschatka.

Crossbill—Loxia.—In the case of the Crossbills, Heligoland affords a practical proof, if only on a humble scale, of the influence which changes in the physical appearance of a district can exert on the occurrences of bird species. The last generation of our islanders was very fond of planting poplars, so that fifty years ago there was hardly a house, with its small garden attached to it, which was without one of these trees. The present generation seems to entertain a veritable hatred for trees of any kind, and has destroyed to such an extent what their fathers planted, that at present there is scarcely a single one of these trees left on the island. These poplars, however, which in this island never attain to any great height, were the favourite resort of the Crossbills visiting here; and the birds, owing to their simple confiding nature, used to be shot down from them in dozens by boys with blowpipes. With the disappearance of these trees, the occurrence of the birds has diminished to such an extent that hardly twenty individuals have been killed during the last decades. Now and again smaller or greater flocks of them may be seen flying across the island, amid loud utterance of their call-notes; inasmuch, however, as no reply is given to the latter, and the birds at the same time miss their favourite resorts—the poplars—they continue their journey without alighting.

Another instance of the same kind is furnished by the Longicorn beetle (*Saperda cardiarias*), which formerly was very abundant on the poplars, but likewise vanished with the latter.

The genus of the Crossbills comprises only four species; they are principally inhabitants of the northern regions of the Old and New World: three of them are resident in Europe, and also visit Heligoland.

To the above, which was written several years ago, I have to add by way of supplement, that in 1887, Heligoland was visited by *L. curvirostra* in multitudes such as I had never seen here before, and that the species again occurred very numerously in 1889, being in this instance accompanied by *L. bifasciata*.

210.—Parrot Crossbill [Kiefern-Kreuzschnabel].

LOXIA PYTHIOPSITTACUS, Bechstein.

Heligolandish: Groot Borrfink = *Great Burr-Bird.*

Loxia pythiopsittacus. Naumann, iv. 339.
Parrot Crossbill. Dresser, iv. 121.
Bec croisé perroquet. Temminck, *Manuel*, i. 325, iii. 242.

Judging from the Heligolandish name, one would imagine that the Crossbills had a predilection for burrs, perhaps on account of

the seeds. I myself, however, have never yet seen them on this plant, which now, owing to the very extensive cultivation, has been almost extirpated. Aeuckens, however, tells me that he has formerly met with the bird on large thistles, and it is therefore very likely that it also resorted to burrs. The passion and acuteness of Heligolanders for finding suitable nicknames leave no doubt that, in former times, when the Crossbills were abundant here, the birds used to resort by preference to burr-bushes, which at that time were equally plentiful. The Heligolandish name for burrs is 'borren,' hence the name 'Borrfink.'

Naumann, in reference to the next-mentioned smaller species, says that in the absence of other food, it will content itself with the seeds of thistles and burrs. Although attempts to cultivate pines and firs on this island have been made repeatedly for more than eighty years, these have never yet succeeded. And the Crossbills which visit Heligoland, no longer finding their usual and formerly exclusive food, consequently avoid the island more and more.

I have never yet myself obtained the Parrot Crossbill here. Reymers, however, possessed a fine male example. In former times the bird undoubtedly used to visit the island, among flights of its near relatives, which was especially likely, as it has been frequently killed in a country so near to us as England.

The home of this species appears to be restricted to the coniferous forests of Scandinavia and northern Russia.

211.—Common Crossbill [Fichten-Kreuzschnabel].

LOXIA CURVIROSTRA, Linn.

Heligolandish: Borrfink = *Burr-Bird.*

Loxia curvirostra.	Naumann, iv. 356.
Common Crossbill.	Dresser, iv. 127.
Bec-croisé des pins.	Temminck, *Manuel*, i. 328, iii. 242.

As has been already mentioned in reference to the preceding species, the Common Crossbill was, as recently as about thirty years ago, a very common bird, flocks of from twenty to fifty individuals being, during August, a by no means rare occurrence. However, since the extirpation of the poplars, which at that time were numerous, and formed almost exclusively the resort of these birds, Crossbills are hardly ever seen. Solitary individuals—three, or at most five—may indeed at times be seen flying at a considerable height across the island, giving loud utterance to their call-note,

'kütt—kütt—kütt.' Since, however, they get no reply, nor espy any tree to their liking, they soon continue their journey onward.

That birds are able to discern from a great distance, or an immense height, whether a particular place offers them the requisite conditions of rest and nourishment, is well illustrated by the following instance:—A vessel laden with provisions for the winter which was returning home from the mainland, ran ashore on Sandy Island and went to pieces. A number of quarters of beef, forming part of its cargo—the meat being perfectly fresh—were lying about on the shore of the sandbank, and forthwith attracted the notice of the Common Raven by the promise of a good feast; this bird, however, is of so exceptional occurrence here that it has only been seen on three occasions during the last fifty years.

In support of the above opinion, written down from six to eight years ago, a proof has recently been furnished by this species of Crossbill. In 1887 this bird appeared as early as June and July in flights which frequently summed up to a hundred individuals; all of them, almost without exception, resorted to the thorns in my garden, which are from fifteen to twenty feet in height, where they pecked about actively among the leaves. As I felt sure that the leaves alone could not form the food of these birds, I examined them, and found that each leaf, which was more or less curled up, contained a small white hairless caterpillar, and these larvæ were also found filling the stomach of such of the birds as had been shot. The birds must consequently have observed, in their flight across the island, that this—by the way, quite unusual—kind of food was present in exceptional abundance. On turning up Naumann, I find under article 'Food,' that these Crossbills will also eat plant lice (*aphides*); the poplars formerly abundant here always had a large quantity of leaves with large blisters or swellings on their upper surface, which were thickly crowded with plant lice; hence it was doubtless these insects which at that time enticed the birds to alight on the island.

Amongst the numerous flocks of the Common Crossbills which came to this island about forty years ago, there occurred a fairly large number of individuals in which the greater and intermediate outer wing-coverts had white terminal spots constituting two more or less pure white bars across the wings, like those shown in the representation of the young bird in Naumann (Pl. 110, fig. 4). These bars were never broader than those in the figure in question, but for the most part narrower, frequently merely forming a fine white line. I have handled many examples of this kind in all stages of age, but have only one old red bird with this kind of marking in my collections. We cannot look upon such individuals as transitional forms

tending towards *L. bifasciata*, for the bars even in extreme cases hardly reach the breadth shown in Naumann's bird. It is singular that among the hundreds of Crossbills which visited Heligoland in 1887, there was not a single individual which displayed an indication of this particular wing-marking, nor did I meet with any such among the less numerous visitors of 1879.

The flights of Common Crossbills which formerly used to visit Heligoland occurred almost invariably only in August, and, what is very singular, almost always in stormy weather with heavy rain. Contrary to the behaviour of other visitors to the island, these birds in most cases stayed for several days, and, by the continuous and loud utterances of their call-note, induced other individuals of their species, which might otherwise have simply passed across the island, to alight and stay.

The Crossbill is a resident breeding species throughout the whole of central Europe and Asia, as far north as coniferous forests extend. In the south the bird has been found nesting as far as the pine forests of the mountains of Greece, Spain, and even of the Balearic Islands.

212.—Two-barred Crossbill [Zweibindiger Kreuzschnabel].

LOXIA BIFASCIATA, C. L. Brehm.

Heligolandish: Witt-jükked Borrfink = *White-winged Crossbill.*

Loxia leucoptera. Naumann, xiii.; Blasius, *Nachträge*, 188, Pl. 385, Figs. 1, 2, 3.

Two-barred Crossbill. Dresser, iv. 141.

Bec-croisé leucoptère. Temminck, *Manuel*, iii. 243.

One or two examples of the present two-barred species used to occur among every flock of Common Crossbills which formerly visited this island. A red male and a grey female in my collection date back to that period: since I obtained these, forty years have passed, and it is more than twenty years since the last solitary example of the species was seen here. In the present year (1889), however, this beautiful Crossbill has occurred more frequently than on any previous occasion. On the 14th of August I obtained a beautiful scarlet-red male and an old female. On the 1st, 16th, 18th, 20th, and 22nd of September, from two, five, up to eight males and females were seen daily, accompanied by larger numbers of the common species; but among all these only one bird in the grey-and-black-striped early dress. For my collection I stuffed three fine red old males, a younger yellow male, two old females, and the young bird already mentioned. A large number were consigned

to cages by fanciers: some of them having been sold, the rest subsequently died out.

The breeding range of this Crossbill extends over the whole of northern Asia, whence, in some years during the autumn and winter months, large flights direct their course westwards as far as central Europe.

It should in this place be noted that the American White-winged Crossbill (*L. leucoptera*) has not yet been observed in Heligoland; an example in my collection was erroneously supposed to belong to this species, but undoubtedly it belongs to the Asiatic form. In England, on the other hand, it has been killed repeatedly. This American species is considerably smaller than that from the Old World; has a very slender bill, and is distinguished, especially in the case of the male, in a high degree by the colour, which in the Old World form is nothing more than a brilliant scarlet, but in the American bird fines off to a pure soft rosy-red.

Titmouse—Parus.—This genus comprises about sixty species, of which about a dozen belong to Europe. Of these, few besides the Great and Blue Titmouse are met with, and then only as exceptional occurrences, in Heligoland. The Blue Titmouse is the most regular, if not the most numerous, on the arrival of which one can reckon with safety every autumn; this is by no means the case with the Great Titmouse, though this bird, when it really does occur, appears in larger numbers than the former species. When I review my long experiences as an ornithologist on this island, I must allow that Titmice have occurred here during the last twenty or twenty-five years in markedly smaller numbers than in the preceding period of similar duration. This, however, by no means justifies one in assuming that the number of individuals of these species has undergone a diminution; the comparative scarcity is solely and exclusively due to altered meteorological conditions which, as has been already repeatedly emphasised, have become quite different from what they were during the earlier period.

213.—Great Titmouse [Kohlmeise].

PARUS MAJOR, Linn.

Heligolandish : Groot Rollows. *Rollows* being the Heligolandish name for *Titmouse*.

Parus major.	Naumann, iv. 9.
Great Titmouse.	Dresser, iii. 79.
Mésange charbonnière.	Temminck, *Manuel*, i. 287, iii. 208.

As has been already stated, these beautiful birds by their ceaseless activity and merry, clear-sounding call-notes, used in former years to contribute not a little in giving a special touch of liveliness to the annual autumn migration. These birds used always to appear in greatly increased numbers at times of exceptionally strong migrations of eastern migrants, as for instance, during the memorable autumn of 1847, in the course of which the birds occurred almost daily in large numbers from the end of September until after the middle of December. In my journal of that year I find, among other notes, the following: 9th of October, *P. major* and *cæruleus*, numberless; *ater*, a few; 10th, thousands of the same species; 11th, extremely numerous; 12th, enormous quantities; 13th, ditto; 14th, thousands—and fairly large numbers almost daily until the end of the month, and throughout the whole of November. The last note, on the 16th of December, is as follows: *Parus major* daily, in fairly large numbers—which here means at least many hundreds.

Although a powerful migration of this kind must be counted as among exceptional phenomena, this Titmouse used, nevertheless, until the beginning of the sixties, to occur here every autumn in more or less considerable quantities; all this, however, was changed to such an extent that, during the last few decades, only single or a few scattered individuals have been met with; so that at the end of October 1884 I had to note in my journal: 'Not a single *Parus major*, nor any other species of Titmouse, throughout the whole of the month; the same being the case in November.' The autumn of 1878 furnishes the last exceptional instance in which this species as well as *P. cæruleus* occurred in abundance, while *P. ater* and *P. caudatus*, especially the latter, were represented in larger numbers than for a long time previously. Isolated instances of the numerous occurrences of this or that bird, in the course of many years of scarcity, sufficiently prove that the long absence of a species is not due to its having diminished in the number of individuals, but must be

traced to other causes; these being indeed exclusively, as I am able to assert in the most decisive manner, after many years of observation, unfavourable conditions of weather in the atmospheric strata nearest the earth's surface, which compel the travellers to seek for their route in more favourable regions lying at higher elevations and far above the range of observation.

What has been said above will explain the late occurrence of the autumn migration; and hence also, to this late departure at the close of the year corresponds the early arrival of the birds at its beginning. The individuals in pursuit of their journey to their breeding homes not infrequently appear here as early as the last week of February, and are observed until the end of March; their number in spring is invariably considerably smaller than in autumn.

The breeding range of this species embraces the immense area of the whole Old World from the Atlantic to the Pacific Ocean, extending in breadth from this side of the Arctic Circle to the 40th parallel of North Latitude. Inasmuch as this Titmouse occurs as a common breeding bird numerously in Scandinavia, Denmark, and even Sleswick-Holstein, it must for the most part adhere rigidly to a southerly line of migration, since the least deviation to the west could not fail to bring individuals breeding in the extreme north every autumn to Heligoland, not only regularly, but also in large numbers.

A species, *P. minor*, very similar to the Great Titmouse, but slightly smaller, and with the under-side dull white instead of light yellow, occurs in Asia. I happened casually to show a skin of this species to Aeuckens, when he at once declared, in his most decisive manner, that he had already had the species in hand here.

214.—Coal Titmouse [Tannenmeise].

PARUS ATER, Linn.

Heligolandish: Lütj swart Rollows = *Small Black Titmouse.*

Parus ater.	Naumann, iv. 34.
Coal Titmouse.	Dresser, iii. 87.
Mésange petite charbonnière.	Temminck, *Manuel*, i. 288, iii. 209.

I have not had this small Titmouse in hand since 1878, during the October and November of which year *P. major* and *P. cæruleus* once more, after a long interval, occurred in great abundance, a few Coal Titmice, and several dozens of Long-tailed Titmice, being also found among their numbers. In the autumn of 1847 this bird was found; though only in very small numbers, yet it was invariably in company with the many great flocks of the above-named species; and

in March of the following year I find, under date of the 12th, from ten to fifteen examples noted in my journal. Nowadays, however, the bird has become of so rare occurrence, that only some fifteen examples have been seen here during the last twenty-five years.

This species is distributed from the Arctic Circle southwards over the whole of temperate Europe and Asia; inhabits the coniferous forests of Scandinavia; and is found to breed—but sparingly, it is true, —in Sleswick-Holstein and England. Its quite exceptional occurrence in Heligoland can, however, hardly be assumed to be due to its adhering to a specially rigid north-to-south line of migration; nor can it be the result of the absence of coniferous trees of any kind on this island, for there were no such trees here in former years, when this bird occurred more frequently.

215.—Blue Titmouse [Blaumeise].

PARUS CŒRULEUS, Linn.

Heligolandish: Blü Rollows = *Blue Titmouse.*

Parus cæruleus.	Naumann, iv. 62.
Blue Titmouse.	Dresser, iii. 131.
Mésange bleue.	Temminck, *Manuel*, i. 289, iii. 209.

It is indeed a source of great enjoyment to see a flock of these birds in the course of their regular rovings, busily occupied in scrutinising the modest trees of a Heligolandish garden; a species of willow (*Salix smithiana*), and a maple (*Acer pseudo-platanus*), receive the bird's special attention. In activity and garrulity the Blue Titmouse considerably surpasses the preceding species. Not a moment's rest is found to prevail in a company of from twenty to thirty of these birds; for not only do all the different members of the band move onward in one direction in the merriest confusion, but each individual bird keeps all the parts of its body in constant motion. They are continually twisting and turning their heads, or moving their wings, or fluttering and hopping through the branches. For the most part, however—and this is the most pleasing sight of all—they hang with their backs downwards from the thinnest tips of the willow branches, examining the leaves and finding something to pick everywhere, while all the time they are giving utterance to their cheerful and silvery-toned call-notes. Thus they pass from one garden to another, until they have made the round of the island, which completed, one has the pleasure of receiving their visits a second time.

Sometimes these Titmice, like the preceding species, resume their journey as early as noon: often they may still be seen, during

the afternoon, to disappear in the course of it. Like many other species, they travel only by daylight, for they are never seen at the lantern of the lighthouse. Their time of migration is pretty nearly the same as that of the Great Titmice; but they neither appear quite as early in the spring, nor do they depart quite as late in autumn, as the former species.

The Blue Titmouse is confined exclusively to Europe. In the north it advances beyond 60° N. in exceptional cases only, and in the south hardly ever passes across the Mediterranean, not even in winter.

216.—Marsh Titmouse [Sumpfmeise].

PARUS PALUSTRIS, Linn.

Parus palustris.	Naumann, iv. 50.
Marsh Tit.	Dresser, iii. 99.
Mésange nonnette.	Temminck, *Manuel*, i. 291, iii. 212.

This little bird, with its silky, glossy black crown, was caught here once many years ago, but has not been seen again since. Its total absence from this island is surprising in the highest degree, inasmuch as the bird is known to nest as far north as central Scandinavia, is resident also in Denmark, and occurs as a common breeding species in Sleswick-Holstein, and on the North Sea islands, some few miles off the coast of that province. According to Rohweder, it is more numerous in that district during the autumn migration than any other species of Titmouse.

The Crested Titmouse has also been met with here only once, while the Long-tailed and Bearded Titmice are likewise quite exceptional occurrences; the only way by which we can account for the strange absence of all the members of this genus is that, with the exception of the Great and Blue Titmice, all these species travel during the autumn in a strictly southerly line of migration, so that it is quite impossible to meet with them west of the meridian line under which their nests are situated.

217.—Northern Marsh Titmouse [Nordische Meise].

PARUS BOREALIS, De Selys-Longchamps.

Parus borealis.	Naumann, xiii.; Blasius, *Nachträge*, 147.
Northern Marsh Titmouse.	Dresser, iii. 107.

This Titmouse has also only occurred here once, viz. on the 10th of November 1881. It is somewhat larger than the preceding species; the crown of the head is a dark slaty-brown, the back

is greyish-brown, strongly approaching to rust-colour, and the rump of a still more pronounced rust-colour; the sides also are pretty richly suffused with brownish rust-colour.

The breeding home of this species extends, in Scandinavia and further east, from about 60° N. latitude northwards. It is surprising that the bird has not occurred more frequently on this island; but the same explanation applies in its case as has been given in regard to the migratory movements of the preceding species of this genus.

218.—Siberian Marsh Titmouse [Oestliche Meise].

PARUS KAMTSCHATKENSIS, Bonaparte.

Siberian Marsh Titmouse. Dresser, iii. 119.

On the 1st of November 1876, I had the painful pleasure of seeing an example of this species at a distance of from six to eight paces in front of me, without there being a possibility of obtaining possession of the bird. During my long experience I have repeatedly been placed in similar situations—as, for instance, in the case of *Hirundo rufula*; and I can assure my readers that this is no small torture for a zealous ornithologist, especially for one who limits himself to collecting examples within a narrowly confined area. The bird in question was a very handsome example in perfect plumage, with the feathers of the crown of the head of a glossy black, and extending down to the back; the cheeks of a dazzling white; the back of a light whitish-grey, which was further set off by a very faint inclination to bluish-grey. The appreciation of these colours stands out so distinctly before my eyes that I could make a picture of them at any moment. In some skins from eastern Asia which are in my possession, the back is not of as beautifully pure grey as was the case in this bird. When I saw it, it was hopping about, for a few moments, in a creeper covering a wall, on which only a few yellow leaves were remaining; it was in a street in front of my house, but before I was able to fetch any kind of shooting gear, the bird, with the restlessness characteristic of its genus, had flown elsewhere, and could not be recovered, although I had put a prize of ten marks (= 10s.) upon its head.

As is indicated by its name, this species inhabits the extreme eastern portion of Asia, and has probably as yet not been seen anywhere else in Europe than in Heligoland.

219.—Crested Titmouse [Haubenmeise].

PARUS CRISTATUS, Linn.

Parus cristatus.	Naumann, iv. 42.
Crested Titmouse.	Dresser, iii. 151.
Mésange huppée.	Temminck, *Manuel*, i. 290, iii. 211.

This pretty little crested Titmouse has been once obtained here by Reymers, and Claus Aeuckens has also met with it once. I have not, however, as yet succeeded in obtaining an example of this species—common though it be—that had been killed on the island, for my collection. Its breeding home extends through all the coniferous forests of Europe from the extreme west to the Ural, and from the Mediterranean to the north of Scandinavia.

220.—Long-tailed Titmouse [Schwanzmeise].

PARUS CAUDATUS, Linn.[1]

Heligolandish : Lung-Stätjed Rollows = *Long-tailed Titmouse.*

Parus caudatus.	Naumann, iv. 82.
Long-tailed Titmouse.	Dresser, iii. 67.
Mésange à longue queue.	Temminck, *Manuel*, i. 296, iii. 214.

This small and peculiar bird occurs only sporadically, but always in small companies. In 1847 it appeared in comparatively large numbers, and was also tolerably abundant in the autumn of 1878; while several examples were again seen in November 1881. In spring, like all its congeners, it is much rarer; but, under date of the 27th of March 1848, I find recorded ten examples, with the note—'Exceptional in spring.' Among companies like this, several handsome white-headed examples constantly occur.

The breeding home of this species extends beyond the Arctic Circle, and throughout the whole of Europe and Asia; in the south it ranges to the southernmost of the mean latitudes (*i.e.* about 30° N.) in both these divisions of the earth.

[1] *Acredula caudata* (Linn.).

221.—Bearded Titmouse [Bartmeise].

PARUS BIARMICUS, Linn.[1]

Heligolandish: Boart-Rollows = *Bearded Titmouse.*

Parus biarmicus.	Naumann, iv. 89.
Bearded Titmouse.	Dresser, iii. 49.
Mésange moustache.	Temminck, *Manuel*, i. 298, iii. 214.

This is another exceptionally rare visitor to Heligoland. Reymers possessed a fine old male fifty years ago; another was shot on the 8th of November 1847; to this was added a companion female, which was shot by Oelrich Aeuckens on the 5th of April 1849—the day of the memorable fight of Eckernförde. Besides this, the bird has up to the present time been seen on about three or four other occasions, without, however, having been shot.

In the case of this beautful little bird, its rare occurrence in Heligoland need not create surprise; for its breeding range does not advance to such high latitudes as that of any of the preceding species, but terminates in northern Germany. So that, according to Professor Newton (Yarrell's *British Birds*), the individuals which have been observed in Heligoland must be regarded as having advanced to the most northern limit of their range. The nesting stations of this species extend through the whole of central and southern Europe as far as Asia.

[1] *Panurus biarmicus* (Linn.).

BRACHYPODINÆ

ALCYONES.

Kingfisher—Alcedo.—This genus, distinguished by beauty of plumage, though sadly lacking in that of shape, embraces about twenty species. The majority of these belong to Asia, though a few occur also in Africa, Australia, and America. Europe possesses only one species, which also occurs in Heligoland; and in England the American form—*Alcedo alcyon*—has been shot on two occasions.

222.[1]—Kingfisher [Eisvogel].

ALCEDO ISPIDA, Linn.

Also called Eisvogel (=*Ice-bird*) in Heligoland.

Alcedo ispida.	Naumann, v. 480.
Kingfisher.	Dresser, v. 113.
Martin-pêcheur Alcyon.	Temminck, *Manuel*, i. 423, iii. 296.

This singular little bird, with its plumage of almost tropical brilliancy, its disproportionately large head and bill, and feet almost deformed, is a very rare visitor to Heligoland. It is sometimes seen once or twice in the course of a year, and then again for several years is not observed at all. The examples which have been met with here frequented stones washed over by the sea, and the rubble at the base of the cliff.

The bird is a resident in central Europe and Asia. In the north its breeding range does not extend further than southern Sweden, where, however, it occurs only sparingly.

Merops—Bee-eater.—In display of colours, the plumage of the species of this genus considerably surpasses that of even the preceding genus; while the lines of the body, leaving out of consideration the somewhat large bill and small feet, are very pleasing, approaching those of the Swallow. About twenty species are com-

[1] By request of the author the order in which the species are treated has from this point to No. 240, on page 437, been changed from that of the original, as well as from No. 311, on page 518, to the end of the book.

prised in this genus, which exclusively belongs to southern latitudes, especially tropical Asia and Africa. Southern Europe possesses one species, an example of which on one occasion has occurred in Heligoland.

In connection with this genus, I ought to mention Dresser's *Monograph of the Meropidæ*, a truly magnificent work, containing thirty-four plates of most beautifully coloured life-size representations of these so wondrously beautiful birds.

223.—Bee-eater [Bienenjäger].

MEROPS APIASTER.

Merops apiaster.	Naumann, v. 462.
Bee-Eater.	Dresser, v. 155.
Guêpier vulgaire.	Temminck, *Manuel*, i. 420, iii. 239.

As stated above, this brilliantly plumaged bird has only been observed here once, the example in question having been shot by Reymers. In England the bird has occurred very frequently, even in companies amounting, in some cases, up to twenty examples, as many as twelve of these birds having been shot on one occasion in the west of England (Rodd, *Birds of Cornwall*, p. 68).

In the south of Spain the Bee-eater occurs very numerously as a breeding species, and immense quantities of their eggs and young are, according to Irby (*Orn. of Straits of Gibraltar*, pp. 65-67), destroyed annually by snakes and lizards. We have already in another place explained in detail that in these instances we must assume that individuals, the earlier stages of whose breeding operations have been interfered with, resume the spring migration, which has for its object the satisfaction of the breeding instinct, and are thus carried far beyond their normal limits. Now, inasmuch as the line of migration of these birds in spring proceeds in direction northwards from Africa to Spain, breeding birds which have been disturbed in Spain in the manner indicated, cross the Bay of Biscay, and reach Ireland and the western and other parts of England, just as species from Greece and other south-eastern countries—the line of whose migration in spring runs to the north-west—manage to reach Germany and Heligoland.

The nesting stations of this Bee-eater extend from Spain and the north-west of Africa within the same parallels of latitude as far as Farther India. It is said to have bred twice in the south of Germany, and occurs now and again as far north as northern Germany, while on one occasion it has been seen in Sweden, and that actually within the confines of the Arctic Circle.

Roller—Coracias.—This genus comprises only a small number of species, which, with the partial exception of that described below, are inhabitants of the hot regions of Asia and Africa. In all of these birds the plumage is very beautifully coloured, brilliant light bluish-green and ultramarine being the predominant tints.

224.—Roller [Blau-Rake].

CORACIAS GARRULA, Linn.[1]

Coracias garrula.	Naumann, ii. 158.
Roller.	Dresser, v. 141.
Rollier vulgaire.	Temminck, *Manuel*, i. 127, iii. 72.

Only three of these birds have been killed here during my time of residence—one of which was in Reymers' possession about fifty years ago; and since then two other examples, now in my collection, have occurred, the last of which was shot on the 25th of May 1881.

This species is found breeding from Portugal to Farther India, but nowhere very numerously. It occurs as a common breeding species in northern Germany; scattered examples have also occurred in southern Sweden; and it has even strayed as far north as the Waranger Fjord.

Cuckoo—Cuculus.—This genus embraces a considerable number of species that are resident in Asia, Africa, and some even in America, but of which one only can be regarded as a common European breeding bird. There is, indeed, an African species, *Cuculus glandarius*, which annually visits the south of Spain, and also breeds, which means that it deposits its eggs in the nests of the magpies resident there, leaving to them the task of hatching them, and rearing the young. This species, however, is of extremely rare occurrence in the rest of Europe, having only been met with twice in Germany and England, though it is frequently seen in the south of Greece. Besides this species, an American species, *Cuculus erythrophthalmus*, has once occurred in England (Harting, *British Birds*, p. 124), and another likewise American species, *Cuculus americanus*, has been observed and killed in the same country in no less than six instances; the latter, however, though its call-note 'Ku—ku—ku' resembles that of our species, is distinguished from its European kinsfolk by the fact that it builds its own nests, and, like honest parents, rears its own posterity.

[1] *Coracias garrulus* (Linn.).

225.—Cuckoo [Kukuk].

CUCULUS CANORUS, Brisson [Linnæus].

In Heligolandish also called *Kukuk*.

Cuculus canorus.	Naumann, v. 196.
Cuckoo.	Dresser, v. 199.
Coucou gris.	Temminck, *Manuel*, i. 381, iii. 272.

Not only is the spring of Heligoland bereft of the solemn strains of the Nightingale, but the merry note of the Cuckoo also has been almost entirely denied to it. I have scarcely heard it more than ten times in the course of upwards of fifty years, although the bird is of well-known occurrence both on its homeward passage and on its return voyage to its winter quarters. Their roaming and restless habits, especially pronounced in the case of old birds, has of course much to do with their being so generally known, especially as they prefer to fly at a height which will enable them to rove freely over houses and bushes. Though there may be only two or three of these birds on the island, these are seen so repeatedly in different places during the whole day that any one, not well acquainted with the habits of this species, would believe that at least a dozen of them were present.

We have frequently, in the course of this work, laid stress upon the fact that, during the autumn migration, the young birds of the year set out on their journey to their winter quarters from four to six, or even eight weeks before their parents; to this rule the Cuckoo forms the one single exception, for in its case the old birds return from three to six weeks before their young. This phenomenon results from the simple fact that as soon as these birds have foisted their eggs upon some other species, there remains no longer anything for them to do in their summer home, and they accordingly at once resume their return journey, while their offspring is being reared by the foster-parents. Hence, in the case of this species, we not only have the singular phenomenon that the spring migration of the old birds, which takes place in May, is succeeded by their autumn migration as early as June, but also, contrary to what obtains in regard to all other migrants observed here, the young birds of the year do not set out for their home passage until four or six weeks later,—viz. from the first weeks of July until the end of August. The majority of these young birds display the dark slaty-grey plumage, only solitary specimens displaying the rust-coloured dress.

The Cuckoo is very widely distributed, one may say, in fact, from the Atlantic to the Pacific Ocean, for it is equally common and well known in western Europe and eastern Asia. In Scandinavia it has been met with even beyond 70° N. latitude.

Wryneck—Yunx.—These peculiar birds are represented in Europe by only one species, though several others occur in Asia and Africa; among the latter is a new species, introduced by Hartlaub, *Jynx pulcherricollis* (*Ibis*, 1884, p. 28, pl. iii.), which is distinguished by its upper breast and under tail-coverts being of a rich ferruginous colour, and must be counted among specially beautiful birds; at the same time the plumage of our native species, though only ranging through an inconspicuous grey, pale rust-colour and black, nevertheless belongs, by reason of its wonderfully delicate markings, to the most attractive of our avifauna.

226.—Wryneck [Wendehals].

YUNX TORQUILLA, Linn.[1]

Heligolandish: Dreierfink = *Turning* or *Twisting Bird.*

Yunx torquilla.	Naumann, v. 356.
Wryneck.	Dresser, v. 103.
Torcol ordinaire.	Temminck, *Manuel*, i. 403, iii. 284.

In Austria this bird is known as Natterwindl = Snake-bird—a name which expresses with extraordinary aptness its peculiar, almost 'uncanny,' movements. For, when held by the feet in a sitting position on the hand, it neither flutters nor displays the least degree of shyness, but extending and attenuating its neck, turns and twists its head round in such a remarkable manner, that one is involuntarily reminded of a small snake or adder, more especially as the bird, throughout the whole of these movements, remains perfectly dumb.

This species ranges from Portugal through the whole of Europe, and within the same parallels of latitude through Asia to China, Japan and Kamtschatka. In Heligoland, it is a numerously represented and well-known visitor, both during the spring and autumn migrations. In the north it advances up to central Scandinavia.

[1] *Iynx torquilla* (Linn.).

Woodpecker—Picus.—How sorry a place this treeless island must be for birds whose true home is in the pathless forests needs not further to be discussed here; and it is therefore hardly necessary to add that this genus, which is so numerously distributed in all parts of the world, in Heligoland is represented by only one species—*i.e. Picus major*—which can be regarded to some extent as a regular visitor to the island, a very small number of examples being seen almost every year; besides this species, *P. leuconotus* and *P. viridis* have each been observed once. Seebohm estimates the number of species of the Woodpecker genera at more than three hundred.

227.—Great Spotted Woodpecker [Grosser Buntspecht].

PICUS MAJOR, Linn.

Heligolandish: Holtbekker = *Woodpecker.*

Picus major.	Naumann, v. 298.
Great Spotted Woodpecker.	Dresser, v. 19.
Pic épeiche.	Temminck, *Manuel*, i. 395, iii. 281.

As already mentioned, this bird occurs here in only very isolated instances; two or three young birds are occasionally seen during the autumn migration—but by no means every year—whilst an old example is a rare exception. They may be seen hammering about on the dry wood of the throstle-bushes, and now and again one will try to hack the beetles or larvæ of *Cryptorhynchus lapathi* out of the willow-stems in my garden, which are from four to five inches thick; indeed, these birds would earn my best thanks if they were able to free my poor willow-bushes from this pest, for by the time that the stems, especially in the case of *Salix caprea*, have attained to a thickness of from two to three inches, they are already so much bored through by this vermin, that they either die off or are snapped by the least gust of wind. This Woodpecker is a very common breeding bird from the Canaries and Portugal to Japan and Kamtschatka. In the north it has been met with even beyond the Arctic Circle.

228.—White-backed Woodpecker [Weissspecht].

PICUS LEUCONOTUS, Bechstein.[1]

Picus leuconotus.	Naumann, v. 313.
White-backed Woodpecker.	Dresser, v. 39.
Pic leuconote.	Temminck, *Manuel*, i. 396, iii. 282.

This handsome Woodpecker, characterised by the abundance of pure white on its back, has, so far as can be ascertained, only

[1] *Dendrocopus leuconotus* (Bechst.).

occurred here once—viz. on the 21st of September 1879. During that year a quite exceptionally strong migration of eastern and south-eastern species took place, the list of our avifauna having been enriched by five new names. During the spring migration: *Emberiza pyrrhuloides*, *Alauda pispoletta*, *Falco eleonoræ*, *Sylvia viridana*, *Emberiza melanocephala*, occurred repeatedly; *Fringilla serinus*, repeatedly; *Himantopus rufipes* and *Sturnus roseus*, repeatedly. During the autumn migration, *Sylvia tristis*; *Anthus richardi* rather frequently. *Anthus cervinus*, repeatedly; *Emberiza pusilla*, from eight to ten times; *E. aureola?*; *E. rustica*, five to six times; *Sylvia superciliosa*, repeatedly; *reguloides*, *Larus affinis*, and *Fringilla hornemanni*. The names are arranged in the order of the occurrence of the respective species; and the same influence which produced this extraordinary number of exceptionally rare eastern species most probably also affected the species of Woodpecker at present under discussion.

The home of this species extends from central Scandinavia as far as Kamtschatka.

229.—Green Woodpecker [GRÜNSPECHT].

PICUS VIRIDIS, Linn.[1]

Picus viridis.	Naumann, v. 270.
Green Woodpecker.	Dresser, v. 77.
Pic vert.	Temminck, *Manuel*, i. 391, iii. 280.

As has been previously mentioned, I have only observed this Woodpecker once. The bird in question flew from my garden into that of a neighbour, but immediately afterwards was not to be found, either there or anywhere else; probably, after a fruitless inspection of the few tree-like shrubs of the island, it had taken its departure again. It was in the beginning of summer; the bird had its flanks strongly marked with spots arranged in bands or bars, and was therefore probably a somewhat young female.

This species is distributed over the whole of Europe, but in the north does not advance farther than central Scandinavia.

Tree Creeper—Certhia.—The genus of these small peculiar birds embraces, according to Seebohm, only three species. They form a very sharply marked-off division as regards form and structure, but in their mode of life and habits they are closely related to the Woodpeckers, for like these they seek their food by climbing up

[1] *Gecinus viridis* (Linn.).

the stems of large forest trees; their feet are indeed feeble, but provided with large curved claws, and the feathers of their tail are stiff and pointed. All these parts nevertheless entirely differ in structure from the corresponding parts in the Picidæ.

230.—Tree Creeper [Baumläufer].

CERTHIA FAMILIARIS, Linn.

Heligolandish: Boam-Looper = *Tree-runner* (lit.).

Certhia familiaris.	Naumann, v. 398.
Common Creeper.	Dresser, iii. 195.
Grimpereau familier.	Temminck, *Manuel*, i. 410, iii. 288.

This small harmless bird visits Heligoland in limited numbers only; it is more frequently seen in autumn than in spring, but in all cases it is only scattered and solitary individuals that one ever meets with, climbing about in the few insignificant trees and among the shrubs of the island.

The nesting area of this species extends from Portugal to Japan, as well as throughout the whole of North America; its latitudinal range extends from north Africa to above 62° N. latitude in Sweden.

Swift—Cypselus.—The two species of this genus resident in Europe are also included in the bird-list of Heligoland, although one of them can only be noted as occurring in extremely isolated instances. Members of this genus are found in all parts of the world, though Asia appears to possess the largest number; Jerdon gives eight for India, including therein three very closely related *Acanthyllis* species, as well as the two European ones. It is singular that of the Asiatic Swifts only one has hitherto been met with in Europe—viz. *Acanthyllis caudacuta*, which has been shot in England on two occasions, viz. in July 1846 and again in July 1879. The spring migration of the latter year was so rich in rare visitors from the far East or South-east that I advised my English ornithological friends to keep a good look-out; and the Swift in question, whose breeding range extends from eastern Asia southward to Australia, shows how seasonable my recommendation was in this instance. The separate genus *Acanthyllis* is distinguished from *Cypselus* by the fact that only three instead of all four of its toes are directed forwards, and by the quills of its tail-feathers being prolonged to hard points.

231.—Swift [Mauersegler].

CYPSELUS APUS, Illiger [Linnæus].

Heligolandish: Tohrn-Swoalk = *Tower Swallow.*

Mauer-Segler.	Naumann, vi. 123.
Swift.	Dresser, iv. 583.
Martinet de muraille.	Temminck, *Manuel*, i. 634, iii. 303.

This bird is of quite common occurrence here during both migration periods of the year; on warm and fine May days these birds congregate in great numbers until noon, without one's being able to see either single birds or companies of them arriving; they chase about high up in the air with much noise, and disappear during the early hours of the afternoon as unperceived as they came, their number diminishing by degrees. It happens, however, also, that large compact flocks pass later in the day also, high over the island from west to east, without halting in their flight or deviating from the direct line of their passage. In general they occur equally numerously in spring and autumn, though in both cases their number is entirely dependent on the weather; during west winds and rain one may be sure of not meeting with one of these birds. The Swift is distributed over the whole of Europe and Asia, but appears to be less numerously represented in the latter than in the former of these continents.

232.—Alpine Swift [Alpensegler].

CYPSELUS MELBA, Illiger [Linnæus].

Alpen-Segler.	Naumann, vi. 115.
Alpine Swift.	Dresser, iv. 603.
Martinet à ventre blanc.	Temminck, *Manuel*, i. 433, iii. 403.

During all the time I have been collecting, this bird has only been killed here once—viz. on the 7th of May 1871. However, according to the reports of reliable authorities, it has been seen on two other occasions without it having been possible to obtain possession of either of the examples in question. Apart from its larger size, this species is further distinguished in a striking manner from the preceding, especially when on the wing, by its underside being almost entirely white; whereas in *C. apus* only the throat is light-coloured.

In England the Alpine Swift is a much more frequent visitor. Harting gives some twenty instances of its occurrence up to the year 1871. This bird, however, occurs very numerously distributed as a

breeding species in the mountains of Spain, whence we may probably assume that these English examples are individuals which had early lost their spouses at their nesting stations, and reassuming their spring migration in its original direction, south-to-north, had reached the south of England by way of the Bay of Biscay or the Pyrenees, a view to which we have already given frequent and detailed expression in connection with related phenomena.

That, under similar conditions, residents in Switzerland do not likewise more frequently get to Heligoland, is probably to be ascribed to the situation of this island considerably further north than the south of England; so, also, the only known instance of the occurrence of an Alpine Swift in Denmark dates back to the year 1804.

This bird is a resident breeding species from Portugal to India, including North Africa and Palestine. Its northern range seems rarely to extend beyond Switzerland. As the name of each species indicates, the Alpine Swift prefers the rocks of high mountain-chains for its nesting places, while the Common Swift[1] almost without exception selects high walls for its dwelling.

Swallow—Hirundo.—Almost all the species of these charming birds which are resident in Europe are also very numerously represented in Heligoland; the only species hitherto not observed in Heligoland is *Hirundo rupestris*, whose breeding home ranges within the same parallels of latitude from Spain to China, though, according to Naumann, solitary individuals are found breeding as far north as Switzerland and the Tyrol. On the other hand, another southern or south-eastern form, *H. rufula*, has been met with here on one occasion, while *H. cahirica* has occurred repeatedly.

233.—Swallow [Rauchschwalbe].

HIRUNDO RUSTICA, Linn.

Heligolandish: Swoalk = *Swallow.*

Hirundo rustica.	Naumann, vi. 49.
Swallow.	Dresser, iii. 477.
Hirondelle de cheminée.	Temminck, *Manuel*, i. 427, iii. 297.

Although this familiar bird has not yet built its nest on this island, it occurs in very large numbers on its homeward passage in spring, and on its journey to its winter quarters in autumn.

[1] German for *Cypselus apus* is 'Mauersegler'—*i.e.* Wall-Swift. This explains above reference.—R. R.

At the former season it makes its appearance about the second week of April, and migrates until the end of May. In autumn, the first individuals arrive about the middle of September, their migration continuing throughout October, and sometimes even into November, as among other instances, in the year 1883, when small flights of these birds were observed as late as the 7th and 8th of the latter month.

The summer home of the Swallow extends over almost the whole of Europe and Asia. In Scandinavia it has been found breeding as high as 68° N. latitude, and exceptional cases of its occurrence have been recorded from East Finmark, and even Spitzbergen and Nova Zembla (A. Newton: Yarrell's *British Birds*, ii. 346).

234.—Chestnut-bellied Swallow [Egyptische Rauchschwalbe].

HIRUNDO CAHIRICA, Lichtenstein.[1]

Heligolandish: Road-bosted Swoalk = *Red-breasted Swallow.*

Hirundo cahirica.	Naumann, xiii.; Blasius, *Nachträge*, 207.
Chestnut-bellied Swallow.	Dresser, iii. 473.
Hirondelle Boissoneau.	Temminck, *Manuel*, iv. 652.

A very beautiful example of this species was seen among the hundreds of thousands of Swallows which occurred here on the 20th and 21st of May 1881. The bird in question, which was described to me by a builder's assistant, as 'as red as a new brick,' and by a fowler, 'as red as a Redstart,' was sitting with hundreds of Common Swallows on a large roof. I was prevented by a window from shooting at once, and while I was hastening to a more favourable position, a Hobby came flying like an arrow over the roof; all the Swallows rose at once to an immense height, and did not return. All our search after this much-coveted individual proved futile; although either the same bird, or a second example, was again seen on the next day, but was not killed. Several of these Swallows were reported to have occurred in Sleswick-Holstein about that time, whilst, as already said, an exceptionally powerful migration was in progress over this island. This was not strictly limited to the island; for from boats at sea, about a mile off on one side of the island, as well as from others at the same distance from the opposite side, thousands of migratory flocks were observed travelling in a broad column across the sea without break during the whole of the forenoon.

[1] *Hirundo savignii* (Steph.).

This species is distinguished from the Common Swallow by the whole of its underside being of a very beautiful ferruginous colour. Its breeding range appears to be restricted to Egypt and Palestine (Tristram, *Western Palestine*, p. 60).

235.—Red-rumped Swallow [Alpenschwalbe].

HIRUNDO RUFULA, Temminck.

Hirundo rufula.	Naumann, xiii. ; Blasius, *Nachträge*, 209.
Red-rumped Swallow.	Dresser, iii. 487.
Hirondelle rousseline.	Temminck, *Manuel*, iii. 298, iv. 652.

During the last days of May 1855, in fine weather, and with light south-easterly winds, a very powerful migration took place. An exceptionally large number of Dotterels and Golden Plovers, in the most handsome breeding plumage, were killed on the 29th, and several examples of *Sterna anglica* and *S. minuta*, which are reckoned among rare occurrences here, were observed. I had, however, a specially pleasing surprise in seeing on the same day a flock of *Tringa platyrhyncha* = *Limicola pygmæa*, a species not till then met with on the island, nor seen since. There were about fifteen of the birds, five of which I brought down at the first shot. Among other common occurrences, an extraordinarily large number of Swallows were also observed on the same day. On the next day, as the east wind freshened, these latter congregated in masses the numbers of which were beyond computation, the birds evidently having a presentiment of the bad weather which set in to their destruction shortly afterwards.

On the afternoon of the same day—*i.e.* the 30th—I walked to the northern point of the island, the temperature falling at the time, and the east wind having considerably increased in force. All the insects had already gone under shelter, and the birds were evidently greatly in want of food, for they flew backwards and forwards about my feet so closely, for the purpose of catching the flies roused by my footsteps, that in advancing I continually kept drawing back my foot for fear of kicking the poor creatures. Thousands of them were, however, already so much exhausted, that they sat about close under the leeward edge of the rock on every available somewhat sloping surface, in densely-crowded companies of from twenty to fifty and more individuals, with their heads stuck under their wings. Among one of these bands I suddenly espied something never seen before—viz. an individual with a light rust-coloured rump. The bird was sitting about two feet below the

edge of the cliff, which terminated below in a dark ravine filled with rubble. How was one to obtain it? If I shot it where it was, it would fall into the depth below and be lost. It was sitting at an arm's length below the edge of the cliff; I lay down at right angles to the edge, and looked down on the bird; every feather, the small nostrils, were as distinct before my eyes as if I had the bird in my hand. I carefully passed my hand down over the edge; but, on approaching it, the small company became somewhat restless, the birds raising their heads, and at the same time I found that they were a few inches too far down for me to reach them. I therefore lay down along the edge of the cliff so as to gain in length of grasp, and with my left hand felt about for some strong tuft of grass, in order to obtain a hold against falling over the cliff; but all the grass had been eaten off quite short by the sheep: without hold of some kind or other, with an abyss of some two hundred feet deep in front of me, I thought the matter somewhat hazardous. It was a desperate situation for an eager collector. As a last resource, I roused the bird repeatedly, hoping that while on the wing it would make such a turn that if shot it would fall on the upper surface of the cliff, but all to no purpose. It soared about for a time backwards and forwards below the edge of the cliffs, under shelter from the wind, then sank and disappeared, making a turn round the north point of the island. I naturally believed I should never set eyes on it again; went home, and made a sketch of it in colours—having, however, previously described it to the brothers Aeuckens, and offered a good price for its capture and production.

In the course of the night the wind developed into an ice-cold storm from the north-east; and the Swallows, exhausted by want of food, crowded in hundreds of thousands into all the crevices and cavities of the lee-side of the cliff, where they were frozen in such quantities that one might have gathered sacks-full of them.

And then happened what will hardly seem credible: among the enormous quantities of dead Swallows, Oelk—the eldest of the Aeuckens brothers—who had walked round the island during the ebb-tide, had picked up the eagerly-coveted rarity, which he brought me with the question: 'Is this it?'

This example is in my collection, and is up to the present the only one of this species ever observed on the island.

236.—Martin [Hausschwalbe].

HIRUNDO URBICA, Linn.[1]

Heligolandish: Witt Swoalk = *White Swallow.*

Hirundo urbica.	Naumann, vi. 75.
Martin.	Dresser, iii. 495.
Hirondelle de fenêtre.	Temminck, *Manuel*, i. 428, iii. 300.

For four or five years several pairs of these pretty birds had built their nests under the gable of a house situated on the shore of the island, and had successfully reared their young. Unfortunately, during some repairs, a few of the nests were destroyed, and another was impudently taken possession of by sparrows; in consequence of these disturbances, the Swallows abandoned the place. A few years later, however, several pairs again established themselves on buildings along the shore, while some others chose for their nesting-place a large grotto, about forty feet high, on the western side of the cliff; so that Heligoland is now able to show a small colony of these pretty, harmless creatures.

This Swallow also occurs here very numerously as a bird of passage—arriving, however, in spring somewhat later than the Common Swallow, and again passing at a correspondingly earlier time in autumn. As a breeding species it is distributed almost over the whole of Europe, extending to about central Asia, for Jerdon met with it nesting as far east as northern India. The bird seen by Seebohm on the Lower Jenesei, however, was not of this species but a close relative, *H. lagopoda*, which is said—among other characters—to be distinguished from the European form by the fact of the longest upper tail-coverts being pure white, whereas in *H. urbica* they are black (Seebohm, *Siberia in Asia*, p. 115).

The present species, however, is found breeding abundantly even in Upper Lapland, 68° N. latitude, and extends as far as eastern Finmark. A pair also, in June 1819, began to build a nest in the north of Iceland, but soon gave up the attempt, and took their departure The same thing happened a year later on the south side of that island with a pair of Common Swallows (Faber, *Prodromus der Isländischen Ornithologie*, p. 20).

[1] *Chelidon urbica* (Linn.).

237.—Sand Martin [Uferschwalbe].

HIRUNDO RIPARIA, Linn.[1]

Heligolandish: Lütj grü Swoalk = *Small Grey Swallow.*

Hirundo riparia.	Naumann, vi. 100.
Sand Martin.	Dresser, iii. 505.
Hirondelle de rivage.	Temminck, *Manuel*, i. 429, iii. 300.

This, the smallest of European Swallows, both during the spring and autumn migrations, is of quite common, often very abundant occurrence. Thus thousands and tens of thousands of these birds were among those which perished through the severity of the weather on the 30th of May 1855, as already related under No. 235.

The breeding range of this little bird is among the most extensive in the whole of the bird-world. It stretches from Portugal and north-west Africa as far as China, and from Alaska to Newfoundland; while in its latitudinal range it extends to the Far North of Europe and Asia on the one side, and the most southern of the United States of America on the other.

Nightjar, or *Goatsucker—Caprimulgus.*—The genus of these peculiar birds is represented by a greater or smaller number of species in all parts of the world. One of them, *Caprimulgus europæus*, occurs throughout the whole of Europe, and is also of quite common occurrence in Heligoland. Besides this, *C. ægyptius*, which is a native of Africa and portions of Asia, has occurred here once—a great rarity. *C. ruficollis*, however, which is a resident of western Europe, has not yet been observed here. Jerdon gives no less than eight species as natives of India.

238.—Nightjar [Ziegenmelker].

CAPRIMULGUS EUROPÆUS, Linn.

Heligolandish: Nachtschwalber = *Night Swallow.*[2]

Caprimulgus europæus.	Naumann, vi. 141.
Goatsucker.	Dresser, iv. 621.
Egoulevent ordinaire.	Temminck, *Manuel*, i. 436, iii. 304.

On warm calm days from May to the middle of June, this peculiar bird may be seen squatting close to the ground with its eyes almost shut, in shady places, in gardens, or along the base of

[1] *Cotyle riparia* (Linn.).

[2] Compare English name, *Nightjar.*

the cliff; or it will suddenly start up close to one's feet, and fly off silently like a shadow to some similar spot close by, there to continue its dreamy meditations. As soon, however, as the sun has set, when moths and beetles begin to swarm, the bird may be seen snapping up such insects in rapid and dexterous flight, or we may hear it from a somewhat elevated position giving utterance to its peculiar voice, which resembles the noise of a spinning-wheel. The bird returns from its nesting places as early as the first half of August, if the days are fine and warm.

This bird occurs as a breeding species from Portugal to central Asia, its northern range extending in Europe to beyond 60° N. latitude. It winters south of the Mediterranean.

239.—Egyptian Goatsucker [Heller Ziegenmelker].

CAPRIMULGUS ÆGYPTIUS, Lichtenstein.

Egyptian Goatsucker. Dresser, v. 629.
Caprimulgus arenicolor. Sewertzoff, *Fauna of Turkestan*; *Ibis* 1876, p. 190.

As might be presumed, many of the rarer birds in my collection are the reward of the most untiring exertions made in their pursuit. Strange to say, however, I owe not a few of my most valuable examples to the merest accidents; and this applies to the specimen of this rare Goatsucker. A visitor (*Badegast*) who had walked from the Seehundsklippen (the seal-cliffs) to the dune with a gun loaded with buck-shot, on reaching his destination discharged his weapon at the very first bird that came in his way; this chanced to be the above-named Goatsucker, at that time, August 1876, the first example observed in Europe; since then, however, another specimen was killed in England on the 23rd of June 1883.

In its coloration this Goatsucker bears no resemblance to the common species, its isabelline rust-grey colour (*isabell-rostgrau*) is generally so light that at first I took my specimen for a pale variety of *C. europæus*. A closer examination, however, shows that the pattern of zig-zag lines made up of darkish dashes and dots, is different from that of the more common species, while the feathers of the head and back lack the somewhat broad and dark stripes which run in the line of the shafts in *C. europæus*. The ground-colour of the plumage throughout is isabelline varied by darker dust-like markings which, on the tips of the feathers, especially the longer feathers of the back and humerus, form dilated fine sagittal lines. The smaller plumage of the upper parts of

the bird in the peculiar distribution of the colours resembles that of the small scapulars and neck feathers of the Wryneck. The marking of the outer wing-coverts is specially characteristic—in all of these the isabelline ground-colour is finely dusted with grey and brownish, with a large round whitish isabelline spot at the tip of each feather, which above is separated from the rest of the outer web by a fine dark-brown irregular line; these large light spots at the tips of the feathers are disposed in four rows across the wing when in repose.

The underside of the bird is whitish isabelline, dusted on the upper breast with light brownish grey markings, which at the sides of the breast pass into irregular transverse lines, and almost entirely disappear on the feathers of the flanks. The feathers of the thighs are whitish isabelline without spots; the same description applies to the under tail-coverts, though in the largest pair of these there are faint indications of transverse lines on the inner webs. The chin of the bird displays the two large roundish white spots peculiar to the genus.

The flight-feathers in their barred markings resemble those of the common species, except that the colour is infinitely lighter: in my example, too, the great white spots of the first three flight-feathers are absent. The tail-feathers are isabelline dusted with brownish, and have seven brownish, irregular narrow dark transverse bands; the outermost pair of feathers below the last of the bands is white and unspotted, and the next pair isabelline and also without spots; so that two large round light spots are thus formed on the tips of the feathers on each side.

The total length of the bird is 10·23 ins. (260 *mm.*); the length of the wing in repose, 7·67 ins. (195 *mm.*); length of tail, 4·92 ins. (125 *mm.*). The first flight-feather is but little shorter than the second and third, which are the longest, the fourth being shorter than these by ·86 ins. (22 *mm.*).

The breeding area of this species appears to extend from Egypt to Turkestan.

Hoopoe—Upupa.—This genus comprises but a very small number of species, of which the European *Upupa epops* also inhabits Asia. According to Jerdon (*Birds of India*) a very similar somewhat smaller and darker coloured form, *U. nigripennis*, occurs in that country. Africa possesses one or two species, besides forming the winter quarters of the European species.

240.—Hoopoe [Wiedehopf].

UPUPA EPOPS, Linn.

Heligolandish : Leaph. Name for *Hoopoe*.

Upupa epops.	Naumann, v. 437.
Hoopoe.	Dresser, v. 179.
Huppe puput.	Temminck, *Manuel*, i. 415, iii. 291.

'Stjüllig as enn leaph' (*proud as a Hoopoe*) is a favourite expression of the Heligolander when he wishes to describe something very smart and gay coloured. This expression has become so proverbial, that no doubt in most cases it is used by persons who have probably never seen the bird; for it belongs to those species which, though of annual occurrence, are yet invariably represented by but very few examples. From the middle of April to the middle of May from six to eight of these birds is the most that is ever seen—in fact, as a rule the number is less; in autumn one or two are at times met with, but several years often pass by without any at all being observed.

The Hoopoe is distributed as a breeding species from western Europe through the whole of Asia as far as Japan. In the north, southern Sweden would appear to mark the limit of its range; though, strange to say, an example was killed in Spitzbergen in 1868 (Newton : Yarrell's *British Birds*, ii. 125).

GALLINACEOUS BIRDS

GALLINÆ.

Grouse—Tetrao.—The almost countless number of gallinaceous birds are distributed in one form or another over the whole world; thus, while we may meet with members of this family dusting themselves in the sands under the equatorial sun, the footprints of others have been discovered in the Polar snow as far as 86° 6′ N. latitude (Feilden, *Arctic Journal*). In Heligoland, however, up to 1863 only one member of this family was represented, viz. the Common Quail. In the year in question, and again in 1883, the wonderful invasion of Pallas' Sand Grouse from Central Asia took place, by which a second species of the Gallinæ was added to the avifauna of this island. Since then a third species, the Partridge, has been added, this bird having been seen here for the first time in 1889.

241.—Pallas' Sand Grouse [Steppenhuhn].

TETRAO PARADOXA, Pallas.[1]

Heligolandish: Rott-futted = *Rat-footed.*

Tetrao paradoxa.	Pallas, *Zoogr. Ross.-Asiat.*, ii. 74.
Pallas' Sand Grouse.	Dresser, vii. 75.

In May and June 1863 the whole of Europe was flooded by a remarkable host of this Asiatic species, Heligoland, too, as one might have expected, coming in for its share. Small bands of three or five, but also larger ones of twenty and even fifty individuals, were seen almost daily, and sometimes, though in rarer instances, flocks of a hundred or more. These latter for the most part were observed hastening along at a tremendous speed, the flights, however, not proceeding in one direction, after the manner of a fixed migratory movement, but irregularly in all directions, according to what appeared to be the prevailing mood of a particular company: frequently, too, a large flock on the island would exchange places with a smaller one on the sandbank, and *vice versâ*.

[1] *Syrrhaptes paradoxus* (Pallas).

About thirty or forty specimens were shot: the smallness of this number is partly accounted for by the habit of these birds of lying closely squatted on the ground, and also by the close similarity of the plumage of their back with the soil, particularly when the latter is of a reddish-brown colour like that of Heligoland; there is no doubt that if one had been able to hunt these birds with a pointer, fifty or more of them could have been taken in one day. Of the examples killed here in 1863, thirteen passed into the possession of my revered friend, the late Professor Blasius. Pastor Zander received two, and others were sent by Aeuckens to all parts of the world.

The first examples in 1863 were shot on the dune on the 21st of May: until the end of the month, and throughout the whole of June, the birds were observed frequently; later, however, occasionally and in small companies: on the 15th of November some seven or nine individuals were seen, and a solitary female was shot as late as the 30th of December.

Since this great invasion a few of these birds have been seen here on one or two other occasions—*e.g.* in 1872, in which year several examples were also observed in England. Again, on the 12th of May 1876, two examples were seen at the dune, and from eight to ten were noticed flying over the sea. On the following day, May 13th, a fresh example was found dead at the foot of the cliff. One example was seen on the 15th, and another on the 16th; and on the 23rd July three birds, a male and two females, flew over the sea, out of shooting range, past Jan Aeuckens' boat. It is probable that another small migration occurred during that year, for on the 4th of May one of these birds was killed near Modena, in Italy; and on the 4th of October two examples, a male and a female, were shot in Ireland.

I have only heard the call-note of this bird when it was on the wing. It resembles the sound 'Kütt—kütt—kütt,' ejaculated in a rapid jerky manner. When noticed, the birds are not at all shy. In one particular instance five or six of them ran about within a distance of from twenty to thirty paces of a man who was digging up his potato-plot, and who looked at them at his leisure in the pauses between his work. In another instance, five of the birds remained for two hours squatted flat against the ground at a distance of about thirty paces from the three brothers Aeuckens (!) who were tarring one of the beacons belonging to the island, during which occupation they were talking in a loud voice, shouting to each other, and handing a long ladder about. The birds did not fly away until the brothers, having finished their work, approached them to within a few paces.

I little dreamt, when writing the above report on the occurrence of this interesting bird some years ago, that it would be once more my good fortune to witness another visitation like that of 1863; nevertheless this has not only happened, just as I am occupied in the final revision of these sheets, but the immigration of the present year 1888 exceeds, up to the time of writing, that of 1863 at least tenfold, in respect to numbers of individuals; this remark of course applies only to my own area of observation.

The first examples of the present immigration, twenty in number, were seen on the dune on the 25th of April; on the 26th, eight; on the 27th, ten; on the 28th, twenty-five; on the 30th, eleven. May 2nd, eight examples; 4th, fifteen; 5th, twenty-three; 7th, twelve; 8th, twenty. Up to this time the birds had only been observed by workmen on the dune; all of them had arrived invariably during the early hours of the morning, and resumed their journey late in the afternoon.

On the 13th, 14th, 15th and 16th, flights of from three and five up to twenty-five examples were seen on the island, the dune and over the sea. On the 17th a large number of birds occurred, my son Ludwig having shot eighteen on the dune quite early in the morning.

On the 18th, flocks of from fifty to a hundred individuals were seen; at the same time small companies also occurred continuously.

On the 19th, the air was thundery, and no birds were observed.

On the 20th, flights of from five to twenty individuals.

On the 21st, fog; no migration.

On the 22nd, light east wind—clear—warm. Hundreds of Sand Grouse.

On the 23rd, flights of from ten to forty.

On the 24th, a flock of over forty.

On the 25th, wind north—cold; small flights of from five to twenty individuals.

On the 26th, in swarms; number incomputable. Twenty-two were shot on the dune.

On the 27th, many large flocks of from fifty to eighty individuals.

On the 28th, ditto.

On the 29th, flights of from five to fifty birds.

On the 30th, flights of from ten to fifty individuals.

On the 31st, wind south-west; rain. Small flights of three, five, up to ten individuals.

The migration proceeded in a similar manner throughout June. A flock of over a hundred birds was seen as late as the 27th of that month on the dune, the weather at the time being warm, and the wind light south-east. In the course of July the birds

occurred in smaller numbers; but on the 20th a flight of twenty individuals was seen in addition to several solitary examples.

Moreover, on nearly all the days enumerated above, large and small flocks were observed by fishermen from the island passing over the sea; and occasionally a dead bird, still in a fresh condition, was seen drifting on the water. Some of our fishermen who had been for some days, about this time, at the island of Neuwerk within the estuary of the Elbe, reported, with expressions of astonishment, that they had seen thousands of these birds roving about in that locality.

What the further development of this movement will be remains to be seen; in any case, the number of birds which has occurred up to the present is already more than ten times as large as that observed during the whole period of the irruption of 1863. There is little doubt that the birds will again take to breeding in places which they find suitable; but I do not share in the hope, as indeed I did not in 1863, that the species will become naturalised in Europe. Species from very distant regions do not establish themselves in new areas by sudden and powerful immigrations of this character, but advance their range slowly and steadily,—like, for instance, the Shore Lark, and undoubtedly also Pallas' Grey Shrike (*Lanius major* = *borealis*), which probably occupied a century in advancing their breeding range from the east of Asia to Scandinavia. The fact of birds having been bred in a certain locality is not alone sufficient to induce them to return thither after an absence of eight months. In proof of this may be mentioned the attempt made in Great Britain to establish Nightingales in the more northern division of the empire; to this end a considerable number of eggs were brought from near London to Caithness in Scotland, and placed in the nests of Redbreasts. These birds duly hatched the strange eggs thus foisted on them, and also reared the young; the latter remained until September when they left with the main body of autumn migrants, and never returned to the place of their birth (Newton, in Yarrell's *British Birds*).

The sudden appearance *en masse* of the Sand Grouse in central and western Europe is so remarkable a phenomenon that one is forced against one's will to speculate as to its possible causes. One feels inclined to assume that meteorological conditions, which so largely dominate the normal migration-flight, may also exercise a determining influence in exceptional cases of this kind. Thus, for example, if a sudden snowfall late in April during a cold spring, like the present one of 1888, were to occur in central and northern Mongolia, where these birds breed in large numbers, it might, by overwhelming their nests and eggs, so disturb large numbers of

the birds which had just begun their breeding occupations, as to compel them to resume their spring migration after the manner of other southern and south-eastern species. Such birds, if they did not at once alight upon districts offering them the requisite conditions for nesting, would then travel beyond the limits of their natural home; their extraordinary capacity for flight would, in fact, convey them in a few days to countries four thousand miles distant.

The ovaries of Sand Grouse which were taken here at the beginning of May contained only very small eggs about the size of a No. 5 shot. Now, according to Radde (*Reise im Süden von Ost-Sibirien*, ii. 287), these birds begin to breed as early as April, and therefore one is led to suspect that these exceptional migratory hordes consisted of individuals whose first clutch of eggs had been destroyed.

As has been already intimated, the velocity of the flight of these birds is truly astonishing. In whatever high esteem the noble Falcon is held in this respect by Heligolanders, all of them are agreed, without exception, that this bird would not be able to overtake a Sand Grouse. The rapidity of their flight is particularly remarkable in cases where large flocks cross the sea at a considerable distance from land; hardly have such birds approached within the vicinity of one's boat before they are again lost sight of on the distant horizon. I do not entertain the least doubt that cases may have occurred in which they have crossed the North Sea between Jutland and England several times in one day.

In Heligoland the birds resort by preference to the base of the sand-hills or dunes on Sandy Island, where it is hardly possible, so long as they remain quietly on the ground, to discover them among the sand and variously-coloured shingle. Amongst the contents of their stomachs I have found, in most cases, only the seeds of wild plants, very rarely a few grains of wheat or barley, but rather frequently the seeds of the sand lyme-grass (*Elymus arenarius*); sometimes, again, only grass cut up into fine bits; also sand-grasses and other shore plants, always mixed up with a quantity of small grains of quartz. In several cases, too, I found a number of sea-snails, such as *Littorina littorea* and *L. obtusata*; but in no instance did the stomachs which I examined contain the remains of beetles or other insects.

This interesting bird occurs as a resident breeding species in the sandy steppes of Asia, from Turkestan to China, and is especially abundant in the desert tracts of Mongolia.

242.—Partridge [Rebhuhn].

TETRAO PERDIX, Linn.[1]

Perdix cinerea. Naumann, vi. 477.
Partridge. Dresser, vii. 131.
Perdrix gris. Temminck, *Manuel*, ii. 488, iv. 334.

The occurrence of the Partridge on this island had been repeatedly reported to me, but none of these cases proved to be sufficiently reliable. At last, however, on the 17th of July 1889, one of these birds was actually caught here. It was a beautiful calm day, with a very light east wind. A large folding door, looking east, in the hall of a public beer-garden, happened to be open, and through this a bird flew straight against a mirror hanging on the opposite wall; it fell to the ground somewhat stunned, and was seized with the hands. Unfortunately, it was at once plucked, and when I saw it only the feathers of the head were left. The bird was a female.

This species breeds through the whole of central Europe, and in Sweden even beyond 66° N. latitude.

243.—Common Quail [Wachtel].

TETRAO COTURNIX, Linn.[2]

Heligolandish: Lütj Tuck. *Tuck* being Heligolandish name for *Quail.*

Perdix coturnix. Naumann, vi. 575.
Common Quail. Dresser, vii. 143.
La Caille. Temminck, *Manuel*, ii. 491, iv. 334.

This small and pretty bird is a very rare visitor here, it being hardly possible even to obtain one or two of them every year; the summer of 1878, however, proved an exception to this rule. At the beginning of August of that year so many of them were heard uttering their call-notes from the potato-plots, that our gunners were of opinion that a pair had bred here, and that it was their numerous progeny which were so prominently attracting our attention. It is, however, hardly likely that birds of such tender age would have their linguistic powers developed sufficiently to enable them to call out 'Flick de Büx'[3] distinctly.

[1] *Perdix cinerea* (Lath.). [2] *Coturnix communis*, Bonnaterre.

[3] Onomatopœic rendering of call-note probably equals the German *Buck den Rück*, 'Bend your back,' (see Yarrell, *Brit. Birds*, iii. 129). The English rendering is 'Wet my lips,' very similar in sound to the Heligolandish. *Flick de Büx* in all probability means 'Mend your breeches.'—*Translator.*

I have in my collection a very handsome specimen of this species, in which the throat and the upper part of the foreneck, as well as a broad band extending upwards from the latter to the ear, are of a pure deep black colour. From the ear the black band is continued, in the form of a narrow stripe, to the upper mandible. A second band, composed of black spots, passes from one ear to the other along the sides of the neck and the foreneck; and a third stripe, of equal breadth, extends from above the ears along the nape of the neck down to the back. Usually the markings—which are black in this specimen—are, in typical examples, of a reddish-brown colour, slightly paler and fainter than that of the general plumage of these parts.

The Quail is a very widely distributed breeding species, its nesting area extending from the Azores through the whole of temperate and southern Europe and Asia, as well as through North Africa.

DOVES

COLUMBÆ.

Dove—Columba.—This genus is distributed by numerous species over the whole world. Four species are European, and also belong to Heligoland, in addition to which the small south-eastern species, *C. risoria*, has also occurred here on one occasion. Audubon mentions seven species as belonging to North America, one of which, *C. migratoria*, has once or twice occurred in England (Harting, *British Birds*).

244.—Ring Dove [Ringtaube].

COLUMBA PALUMBUS, Linn.

Heligolandish: Holt-Düwe = *Wood Pigeon*.

Columba palumbus.	Naumann, vi. 168.
Ring Dove.	Dresser, vii. 3.
Colombe ramier.	Temminck, *Manuel*, ii. 444, iv. 307.

In general this Dove, though quite common on the island, rarely visits it in large numbers. Solitary individuals are met with early in March; and later on, until about the end of April, from three to five examples may be seen daily. It is only in exceptional instances that their numbers increase in spring to companies of ten or more individuals.

The autumn migration commences during the latter half of September and lasts throughout the whole of October and until after the middle of November. At this period the birds are much more numerous, though flights of twenty or thirty individuals, such as were observed, for instance, on the 25th of October 1884, are rare even at this season.

This species is distributed over the whole of Europe, advancing nearly up to the Arctic Circle. It is less numerous in the countries of the South, and those bordering the Mediterranean. How far its breeding area extends east of the Ural has not been determined

with certainty, but Sewertzoff does not mention it among the birds of Turkestan.

245.—Rock Dove [Felsentaube].

COLUMBA LIVIA, Brisson.[1]

Heligolandish: Witt-rögged Feldflüchter = *White-backed Field Pigeon.*

Columba livia.	Naumann, vi. 186.
Rock Dove.	Dresser, vii. 11.
Colombe biset.	Temminck, *Manuel*, ii. 446, iv. 308.

The plumage of this Dove, the primeval parent of all the infinite number of varieties of tame pigeons, is of a pure, soft blue-grey colour; the rump is snow-white, the wings are crossed by broad, deep black bands, and the neck and upper breast shine with deep green and red reflections. All these characters combine to make this bird not only the handsomest of all its resident congeners, but also one of the most attractive of our whole avifauna. Unfortunately, it is but a rare visitor to the island, only occurring at intervals of several years, and has been shot perhaps only once in ten years.

This species breeds in great abundance on all the rocky coasts of the west of England, Ireland, and Scotland, as far north as the Shetlands, Orkneys, and Faroes, and as far south as the Azores and Canary Islands. Large flocks are also found in the high rocky mountain ranges of Spain, and on all the rocky coasts of the Mediterranean and the islands of that sea. In Turkestan it is found breeding at elevations of from seven to eight thousand feet. The species is, however, rare in Scandinavia, which probably also explains its rare appearance in Heligoland.

246.—Stock Dove [Hohltaube].

COLUMBA ŒNAS, Linn.

Heligolandish: Lütj Feldflüchter = *Small Field Pigeon.*

Columba œnas.	Naumann, vi. 215.
Stock Dove.	Dresser, vii. 23.
Colombe colombin.	Temminck, *Manuel*, ii. 445, iv. 308.

This species, also, is only met with here in solitary instances, never in companies like the Ring Dove, though it occurs far more frequently than the Rock Dove, for one or two of the birds may be

[1] *Columba livia*, Gmelin.

seen in the course of each spring and autumn migration. It is distributed as a breeding species over the whole of Europe, advancing as far as Central Asia; though, as a rule, less numerous in southern countries, it is still found nesting abundantly in Asia Minor and Palestine. Its northern range extends to southern Scandinavia.

247.—Turtle Dove [Turteltaube].

COLUMBA TURTUR, Brisson.[1]

Heligolandish: Turtel Düwe = *Turtle Dove.*

Columba turtur.	Naumann, vi. 233.
Turtle Dove.	Dresser, vii. 39.
Colombe tourterelle.	Temminck, *Manuel*, ii. 448, iv. 312.

During the beautiful days of May, and until after the middle of June, the small and graceful Turtle Dove is reckoned among our common birds. Solitary birds are comparatively rare, small companies of from three to five individuals being mostly seen. In 1885 they were specially abundant, my journal containing the following entries:—May 28.—Wind, south; weather fine, warm: *C. turtur* remarkably numerous—about fifteen shot; on the same day there was a very powerful migration of all species due at this period. May 29.—Wind, S.S.E. to S., calm; at noon, wind suddenly shifted to N.W.; migration much feebler than on previous day, but still very many *C. turtur*. May 30 and 31.—Wind, south-west—very high; dense rain-clouds, consequently no migration. June 4.—Wind, light southerly; weather warm and clear; *C. turtur*, up to forty individuals, and on June 13th, in fine warm weather, a few Turtle Doves, besides *Hirundo, Cypselus, Caprimulgus*, and *Muscicapa grisola.*

When not disturbed, this bird has but little shyness; in fact it is rather of a confiding nature, and it is always a pleasure to see one or more of them tripping lightly with short steps about the garden. During the autumn passage they occur in much smaller numbers—in fact, almost in solitary instances only. This is a very singular phenomenon, which is repeated in a still more marked degree in the case of the Red-backed Shrike, *Lanius Collurio*, of which species neither Claus Aeuckens nor myself have ever met with an old bird during the autumn migration, such birds as were seen having been invariably solitary young individuals.

The nesting area of the Turtle Dove ranges through the whole of temperate and southern Europe, Asia Minor, and Palestine, and

[1] *Turtur communis*, Selby.

in the east extends to Turkestan. In the north it occurs locally and irregularly distributed in Scandinavia, but has never been met with as a breeding species in that peninsula.

248.—Collared Turtle Dove [Lachtaube].

COLUMBA RISORIA, Linn.[1]

Columba risoria. Keyserling u. Blasius, *Wirbelthiere Europas*, p. lxii.
Collared Turtle Dove. Dresser, vii. 51.

One of these birds was shot here many years ago by Oelrich Aeuckens. At the time I regarded it as a tame bird which had escaped from confinement, and accordingly took no further notice of it. The individual in question seemed to me at the time to have more bluish-grey in its plumage than I had seen in cage-birds of this kind; and a subsequent examination of such tame examples proved to me that I was correct in my previous notion. Hence I entertain no longer the least doubt that Aeuckens' bird was really a Collared Turtle Dove in a truly wild condition, such as are resident in Greece and other southern countries, throughout the whole of Asia as far as China. This conclusion was further strengthened by the plumage, which had all the freshness of a wild bird.

[1] *Turtur risorius* (Linn.).

WADERS

GRALLÆ.

Bustard—Otis.—This genus comprises some twenty species, inhabiting the temperate and hot latitudes of the Old World. Only two of these are resident in Europe, and of these one is represented in Heligoland.

249.—Little Bustard [ZWERGTRAPPE].

OTIS TETRAX, Linn.

Otis tetrax.	Naumann, vii. 52.
Little Bustard.	Dresser, vii. 338.
Outarde canepetière.	Temminck, *Manuel*, ii. 507, iv. 343.

About fifty years ago two examples of this interesting species were shot on this island. I myself, however, had to wait for nearly thirty years before I succeeded in securing a specimen of this much-coveted bird for my collection. The bird in question was observed here on the 27th June 1882; the first shot only wounded it, but it was killed a few hours later. It is a male of the previous year, without any indication of the beautiful black and white markings of the head and neck; in any case, we can now say that the species is represented here.

For several weeks previous to the occurrence of this bird, we had had a light south-east wind and very hot weather; these are favourable conditions for the appearance of species from the far East—indeed, a *Saxicola morio* had been killed on the 6th of the month, Alfred Newton and Canon Tristram being here on a visit at the time. We may therefore probably assume that the Bustard had also reached the island from that quarter—certainly not from the south, nor—as still less likely—from the west.

The breeding area of this Bustard extends from Portugal to India, the bird being most numerous in the western portion of this vast area. A large number have been met with in England. In northern Germany, however, it is only a straggler; and a few solitary individuals have advanced as far as to Scandinavia.

Courser—Cursor.—This genus embraces ten species, of which only one has found a place—and that merely as an accidental visitant—in the European avifauna, and has occurred in Heligoland.

250.—Cream-coloured Courser [Isabellfarbiger Läufer].

CURSOR EUROPÆUS, Latham.[1]

Cursor europæus.	Naumann, vii. 77.
Cream-coloured Courser.	Dresser, vii. 425.
Coure-vite isabelle.	Temminck, *Manuel*, ii. 513, iv. 345.

Reymers on one occasion—in 1835 or 1836—obtained this interesting stranger in Heligoland. This bird, like many another rarity, was at the time sold and went to Hamburg, and it is probably on this example that Droste-Hülshoff (*Vögel Borkums*) bases his statement of its occurrence in this island. Unfortunately, I did not succeed in recovering the specimen in question, which is the more annoying, as no other example has been either seen or killed here, though it has occurred twenty-one times in England since that time.

We can only account for the extremely frequent occurrence in England of so southern a stranger by again assuming that we are dealing with individuals which have resumed the northerly course of their spring migration from their breeding-places in the west of Africa, after having lost their spouses; and that, not meeting with districts similar in character to their desert home, they have reached England by a northerly course *viâ* Spain. Favier (Irby, *Orn. of Gibraltar*) says that these birds appear annually in fairly large numbers in the neighbourhood of Tangier, while in Malta and Sicily they occur more as stragglers during the spring. These cases may probably also be traced back to a similar cause.

The breeding area of this species extends from the Canary Islands through North Africa and South Asia.

Crane—Grus.—The continent of Europe possesses but one species of this genus which, however, is represented more numerously in other parts of the world, notably in Asia. In Heligoland two species only have occurred—viz. the European form, an example of which was once seen but not killed, and many years ago, the beautiful Demoiselle Crane (*Grus virgo*) from the south, the bird on this occasion being shot.

[1] *Cursorius gallicus* (Gmel.).

251.—Common Crane [Grauer Kranich].

GRUS CINEREA, Bechstein.[1]

Grus cinerea. Naumann, xi. 345.
Common Crane. Dresser, vii. 337.
Grue cendrée. Temminck, *Manuel*, ii. 557, vi. 366.

This well-known Crane is almost unknown here; the only bird of this species ever observed on this island was seen by Jan Aeuckens in April 1867. The bird in question came from over the sea, passed at a low elevation over the edge of the cliff, and calmly continued its flight in the same direction to the opposite side of the island, without paying any further attention to this little rock, which, to so stately and distinguished a bird, may have appeared too insignificant to be deserving of notice.

This bird is distributed as a breeding species over the whole of northern and central Europe, and it has actually been found nesting in fair numbers in the south of Spain in localities adapted to its habits and mode of life.

252.—Demoiselle Crane [Jungfern-Kranich].

GRUS VIRGO, Pallas.[2]

Grus virgo. Naumann, ix. 386.
Demoiselle Crane. Dresser, vii. 353.
Grue demoiselle. Temminck, *Manuel*, iv. 367.

The example of this beautiful bird, which forms no small ornament to my collection, is of older date than any other member of the numerous host which I have succeeded in accumulating here; it was shot by Reymers on the dune in May 1837, when I had not yet set foot on Heligoland. The bird is not a very old example, but, nevertheless, has the yellowish white bunch of feathers behind the eyes fairly well developed.

In the course of that same summer, this specimen came into the possession of a certain Dr. Schmidt from Hamburg, who presented it to the museum of that city as a curiosity. It stood there until a few years ago, a perpetual thorn in my side. A lucky chance brought me in contact with Dr. Sonne, a member of the committee of the Hamburg Museum, and a distinguished authority on Algæ. I represented to him that my collection was really the right place for it, with which view this gentleman was

[1] *Grus communis*, Bechstein.

[2] *Grus virgo* (Linn.).

so kind as to agree; and a short time after, to my extreme joy, I had the pleasure of receiving this highly prized treasure. I take this opportunity of expressing my warmest thanks to the gentlemen of the museum committee for their great generosity, and especially to Dr. Sonne for his good offices in the matter.

This elegant bird belongs more especially to southern Asia and north Africa; it nests, however, also in the south-east of Russia, and, according to Irby's Reports, it is extremely probable that it does so frequently, if not regularly, in the south of Spain.

Stork—Ciconia.—Both European species of this genus, the White and the Black Stork, visit Heligoland. They are found in Asia and Africa, though these countries possess several other more or less nearly related species. The same remark applies to South America. In North America none of these forms are represented.

253.—White Stork [Weisser Storch].

CICONIA ALBA, Bechstein.

Heligolandish: Oadeboar = local name for *Stork*.

Ciconia alba. Naumann, ix. 231.
White Stork. Dresser, vi. 207.
Cigogne blanche. Temminck, *Manuel*, ii. 560, iv. 369.

German mothers and nurses are accustomed to tell young children that the Stork brings the babies. In Heligoland, however, this brief and simple answer would scarcely satisfy an infant of an observant and critical disposition; for whilst in this little red isle the school benches are crowded with young scholars, not more than one or two, very rarely, three, Storks visit the island in the course of each spring. Nevertheless, inasmuch as Heligoland can show so much select material among its feathered guests, it is quite possible that the limited number of the Stork deputation commissioned thither for the above mentioned purpose is compensated by the special ability of its individual members.

As is the case with most other migrants, these Storks leave again on the day of their arrival. On one occasion, however, one of these birds remained for several days, and was seen to carry all kinds of dry vegetable matter, in large bundles, to the roof of a rather high house, standing by itself. Unfortunately, the latter presented no suitable spot for attaching the foundation of the nest, so that, after two days, the bird relinquished its unsuccessful efforts, and took its departure. It would have been

interesting to have seen how far this attempt at nesting would have progressed. But owing to the want of fresh water and suitable food, it is hardly likely that a pair of Storks could have continued to exist here for any length of time.

It is surprising that the Stork, which is so very confidential in the immediate vicinity of its nest, exhibits a corresponding amount of caution and shyness at a distance of a few hundred paces away from it. This is the more singular, because, as a rule, the bird is not subjected to annoyance or injury in the localities where it makes its home. Unfortunately, however, such is not the case in the north of France, where either pursuit, or want of consideration, has completely driven the birds from their former nesting haunts. Nor does this bird breed in England; indeed, it has never been allowed to get so far even as to make the attempt; because, for centuries, it has been the habit in that country to shoot down as curiosities such of the birds as arrive there singly, or in small companies, in the spring.

With these exceptions, the Stork is found nesting from western Europe to central Asia, and from the latitude of northern Sweden south to that of north Africa.

254.—Black Stork [Schwarzer Storch].

CICONIA NIGRA, Cuvier.[1]

Heligolandish: Swart Oadeboar = *Black Stork*.

Ciconia nigra.	Naumann, ix. 279.
Black Stork.	Dresser, vi. 309.
Cigogne noire.	Temminck, *Manuel*, ii. 561, iii. 370.

During my long ornithological experience, this bird has only been seen three times on this island, but unfortunately was not obtained on any of these occasions, all the birds displaying such extraordinary shyness that it was impossible to get near them. The last of these occasions was when a pair visited the island during the spring, some thirty years ago. In spite of all efforts, I was unable to get within shooting range, even with a rifle; although at that time I considered myself quite equal to hitting a mark, such as furnished by these birds, at a distance of from one hundred and fifty to two hundred paces.

The rarity of this bird's visits to Heligoland is explained by the situation of its summer quarters. Its breeding range very rarely extends to the north of the Baltic, but up to that limit of latitude

[1] *Ciconia nigra* (Linn.).

the bird is distributed through Germany, central and southern Russia, as far as China, its nesting quarters extending southwards down to Palestine and Persia.

It is with great pleasure that I am able to announce that, during the present year (1889), my collection has been enriched by a specimen of this species, which was shot here on the 23rd of May, the bird in question being a female.

254a.—White Spoonbill [Weisser Löffler].

PLATALEA LEUCORODIA, Linn.

Platalea leucorodius.	Naumann, ix. 312.
Spoonbill.	Dresser, vi. 319.
Spatula blanche.	Temminck, *Manuel*, ii. 595, iv. 387.

It appears strange that a species like the present, whose area of distribution extends from Portugal to Japan, and which is found breeding so far north as southern Holland, should form an addition to the remarkable list of the birds of Heligoland—the more so, as it is impossible to see what could attract or attach a typical marsh-bird like the present species to the rocky walls and shingly beach of an island like Heligoland. The same fact explains also the rarity, and extreme paucity in numbers, in which its more or less closely related species, with the exception of the Heron, have visited this island.

Until the end of the seventeenth century the Spoonbill was found breeding in England, since which time, however, the draining of its breeding places has compelled it, like many other Waders, to seek another home.

In Europe, Holland may for the present be regarded as the most northern limit of the breeding stations of this species. Those which are most numerously occupied are situated in Hungary and in the valley of the Lower Danube.

Heron—Ardea.—This genus is distributed in a rich variety of forms over the whole earth, but is very poorly represented in Heligoland; even the Common Heron only occurs in very isolated instances, and of each of three other European species only one example has occurred in Heligoland during a long lifetime. England, on the other hand, not only has a record of nine European species, but an American form, *Ardea lentiginosa*, has been observed there on no less than eighteen occasions. The latter fact, with which may be associated many other similar ones, can hardly leave

any doubt as to the question of birds being able to migrate from America to Europe.

255.—Common Heron [Grauer Reiher].

ARDEA CINEREA, Brisson.[1]

Heligolandish : Reier = *Heron.*

Ardea cinerea.	Naumann, ix. 24.
Heron.	Dresser, vi. 207.
Héron cendré.	Temminck, ii. 567, iv. 371.

One or two young birds of this species are met with on some of the days of the general autumn migrations, but old birds are seen comparatively rarely, the only example which has ever come into my hands having been a beautiful male in perfect plumage, with long black feathers on the crown of the head; this specimen has a place in my collection. In addition to this, other individuals of less advanced age have occurred on a few occasions. This extreme rarity is the more singular, as the bird is known to breed up to very high latitudes in Norway.

The breeding range of this species extends from England and France through the whole of temperate Europe and Asia. In Norway it is said to advance, in exceptional cases, up to the 68th parallel, though 57° N. latitude appears to be the more usual limit of its breeding range. In the southern countries of the Mediterranean it is only met with during the passage to its winter quarters.

256.—Purple Heron [Purpur Reiher].

ARDEA PURPUREA, Linn.

Ardea purpurea.	Naumann, ix. 63.
Purple Heron.	Dresser, vi. 217.
Héron pourpré.	Temminck, *Manuel*, ii. 570, iv. 372.

The only example of this species ever killed on this island was obtained by me on the 9th of June 1847, since which time the bird has not again been seen. This, however, need not specially surprise us, as it advances to the extreme north of Germany only in exceptional instances. In Holstein, the bird has, according to Rohweder, only been seen and shot once. The specimen shot here was a female of a very beautiful buff (*rostgelb*) colour. The nesting range of this handsome species extends from Spain through France, Germany, European and Asiatic Russia, and as far as China.

[1] *Ardea cinerea* (Linn.).

257.—Common Bittern [Rohrdommel].

ARDEA STELLARIS, Linn.[1]

Ardea stellaris.	Naumann, ix. 159.
Common Bittern.	Dresser, vi. 281.
Héron grand butor.	Temminck, *Manuel*, ii. 580, iv. 381.

This species has only been killed here once during all the time I have been collecting, nor has it been observed since. About sixty years ago, however, one of these birds is said to have been caught at the lantern of the lighthouse. As, however, these birds are but sparingly represented in the northern portion of their breeding area in lower Sweden, the rare occurrence of this species in Heligoland need occasion no surprise. The breeding range of this bird is nevertheless a very extensive one, stretching from Portugal to Japan, and reaching in the south as far as S. Africa, large numbers nesting even at Cape Colony (Saunders, Yarrell, 1884).

258.—Little Bittern [Zwergrohrdommel].

ARDEA MINUTA, Linn.[2]

Ardea minuta.	Naumann, ix. 194.
Little Bittern.	Dresser, vi. 259.
Héron blongios.	Temminck, *Manuel*, ii. 584, iv. 383

This bird has only been seen and killed once in Heligoland, although it is said to have strayed to Norway, the Faroes, and even Iceland; all such cases, however, can only be regarded as peculiar exceptions, as the breeding range of this small species does not, in any case, extend beyond the Baltic, though in its longitudinal extent it stretches from Spain through Europe to the Caspian, and from the latter further eastwards to Cashmere.

The example of this bird, and also that of the preceding species, were killed here before 1847; the former was slain by a boy with a stone, the latter was shot. Both specimens are in my collection.

Ibis—Ibis.—The only member of this genus belonging to Europe, *Ibis falcinellus*, has a place in the bird-list of Heligoland. Asia, Africa, and America each possess several species more or less related to the present one. None of these, however, appear to have hitherto found their way to Europe.

[1] *Botaurus stellaris* (Linn.).

[2] *Ardetta minuta* (Linn.).

259.—Glossy Ibis [Brauner Ibis].

IBIS FALCINELLUS, Vieillot.[1]

Ibis falcinellus.	Naumann, viii. 539.
Glossy Ibis.	Dresser, vi. 335.
Ibis falcinelle.	Temminck, *Manuel*, ii. 598, iv. 389.

Many years ago a beautiful old bird of this species was shot here, and I entertain scarcely any doubt that it was this same 'splendid specimen' (*Prachtexemplar*) mentioned by Naumann as obtained from the North Sea, from which that author drew up his description and picture of this species; the time of the record—viz. the summer of 1824, so far as one can reckon back—agrees exactly with what is stated as to its occurrence on this island.

The individual in question was captured by Oelrich Aeuckens, the oldest of the three brothers, now unhappily long since deceased, under the following circumstances:—For several days in the course of July a small band of Curlews (*Numenius arquata*) had taken up their quarters on the small sand-flats at the foot of the cliff, without Oelrich—commonly called Oelk—being able to get within shooting range of them. By reason of his being constantly on the lookout for them, he had, however, got to know the spot which the birds were specially partial to; he therefore crept into one of the many small recesses in the cliff close by, and built up the entrance to this recess in such a manner as to leave only room for the barrel of his gun. The afternoon was hot, and the coolness of the damp grotto, combined with a certain amount of *ennui* on the part of our somewhat phlegmatic old friend, had the effect of lulling him very soon into a gentle slumber. How long this lasted he couldn't tell; but on awakening, as it gradually began to dawn upon him where he actually was and what was his object in being there, he saw the whole company of Curlews running about 'like domestic fowls' in front of him at a short range. Having waited till he thought he had as many of the birds as possible within aim, he fired off his primitive musket, and found that he had felled five of them, of which one, to his great astonishment, was 'blood-red' on the neck and all the lower parts. Now by 'blood-red' ('blood-road'), the ornithologists of Heligoland not only understand the beautiful carmine on the breast of the male Linnet, but also the rust-red colour of the Bar-tailed Godwit, the Knot, and other similar species. If a particular example of this kind happens to be very dark and rich in colour, and is considered very handsome, it is invariably

[1] *Plegadis falcinellus* (Linn.).

described, as in the above instance, as *blood-blood-road*, or very blood-red.

This species breeds in southern Spain, Hungary, and the south of European Russia, and within the same parallels of latitude throughout the whole of Asia, likewise in north Africa and the southern states of North America.

Curlew—Numenius.—The genus of these stately birds does not include a large number of species. It has been attempted, by relying on individual variations, to raise the number to nineteen, but Dresser, in his excellent work (*Birds of Europe*) shows that it must be limited to nine. Jerdon cites the two usual European species as likewise occurring in India, and also mentions *N. tenuirostris* as having been observed there. America possesses three independent species, *N. longirostris*, *N. hudsonicus*, and *N. borealis* (Audubon, *Syn. of N. Amer. Birds*), of which the latter, according to a statement of Harting, has, up to the year 1872, occurred four times in England. Two of the European species visit Heligoland regularly, and in large numbers; the third, *N. tenuirostris*, has been shot here once during the earlier years.

260.—Common Curlew [Grosser Brachvogel].

NUMENIUS ARQUATA, Latham.[1]

Heligolandish: Groot Reintüter = *Great Rain-tooter.*

Numenius arquata.	Naumann, viii. 478.
Common Curlew.	Dresser, viii. 243.
Courlis cendré.	Temminck, *Manuel*, ii. 603, iv. 393.

Large flocks and small companies of this Curlew pass by and cross over this island during both migration periods of the year, uttering, as they fly along, their far-sounding call-notes; their numbers are particularly large during the long dark nights of autumn. Being a strong and hardy bird, it is not easily driven from its breeding haunts by the inclemency of the weather, and its regular autumn migration is hardly concluded with the end of autumn; large numbers, however, must annually remain in their breeding homes, such being undoubtedly very old individuals who feel themselves equal to staying out the winter; for, if in December and January, the regions of the far North or East are visited by a sudden sharp

[1] *Numenius arquata* (Linn.).

frost or snowfall, countless flocks of these birds, together with Golden Plovers, Lapwings and *Tringæ* will be seen, on the night preceding the advent of such weather here, migrating over the island, amid great haste and noise, on an east-to-west line of flight; in fact their numbers are, on such occasions, so immense that one might almost believe that no autumn migration had as yet taken place. Thus, for instance, on the night intervening between the 19th and 20th December 1878, from 3 A.M., my journal records:—'Myriads of *N. arquatus*, mixed with countless numbers of smaller Waders.' Many other instances of a similar kind might be quoted. Solitary individuals are also seen here during the winter, and, what is particularly remarkable, in the hardest frosts. No doubt, at such times the birds must be in sore straits, many of them probably perishing; in fact, on occasions like this, countless dead Curlews have been seen drifting on the sea between Heligoland and the estuary of the Elbe.

The spring migration of this species commences very early: in 1885, with the advent of mild weather, it was observed to pass here as early as the 3rd of February, accompanied by *Char. auratus*, immense numbers of Skylarks, many Greenfinches and Linnets, Blackbirds and Redwings, and even a few Song Thrushes; these were followed, on the next day, with a southerly wind, by a flock of at least a hundred Rooks. The weather continued mild throughout the whole month, so that the spring migration, after having once begun, proceeded without any substantial interruptions. The young birds of the year, which are the real inaugurators of the autumn migration, frequently arrive here as early as the middle of July.

I have been struck by a peculiar tendency which these birds, and, more particularly, the smaller species next to be discussed, display in the manner of their flight, especially during their spring passage; that is, from travelling in flocks without regular order or system, they will form themselves into an oblique line, terminated by a short curve. Often, also, an irregular flight of from fifty to eighty of the small species (Whimbrel) will form into several scattered lines of greater or less length, which subsequently unite into one single column. In this latter formation their rate of flight is so tremendous that there is little doubt of their accomplishing the distance from the island to the oyster-bank—22,000 feet to the east—in little more than a minute; while the dune, at a distance of 4000 feet, to which they may be followed by the eye, is actually reached in a few seconds.

The Curlew occurs as breeding bird in Scotland, central Scandinavia, northern Germany, Poland; and, within the same

parallels of latitude, through European and Asiatic Russia as far as China and Japan.

261.—Whimbrel [Kleiner Brachvogel].

NUMENIUS PHÆOPUS, Latham.[1]

Heligolandish : Lütj Reintüter = *Little Rain-tooter.*

Numenius phæopus.	Naumann, viii. 506.
Whimbrel.	Dresser, viii. 227.
Courlis corlieu.	Temminck, *Manuel*, ii. 604, iv. 394.

It would appear as though the Whimbrel visited Heligoland during both migrations in much larger numbers than the preceding species; at all events it is seen, especially in spring, in much larger companies than the large Curlew. It is, however, much more energetic than the Curlew in the utterance of its call-note, so that, especially at night, one may easily be deceived in judging of its numbers. But on some occasions, *N. arquatus* has occurred in quantities which have never been approached by *N. phæopus* even approximately; as for instance, in the already-mentioned night of the 19th—20th December 1878, as also in the nights of the 13th—14th February 1876, and of 15th—16th March 1879, in both of which last two instances the migrant hosts consisted of birds which had already commenced their spring passage, but had been driven back by a return of wintry weather. From mishaps of this kind the Whimbrel is exempt, because it never starts on its spring migration before the weather has become really warm, and variations of the kind referred to above are out of the question.

During the last half of April, and throughout May, in calm warm weather, the birds migrate over this island at a considerable altitude on an eastward line of flight. It is an especially pleasing sight to see, late in the afternoon of one of these bright warm days, flock after flock of these birds, all but out of the range of vision, hastening at a tremendous speed towards their distant home, while their varied call-notes—a faint but yet clear and distinctly audible 'hee-hee-hee—hee-hee-hee-hee'—sound from above like far-off merry laughter. What a contrast with this it is to hear, on bleak October and winter nights, the loud hoarse 'Ou—lüük' of the Curlew sounding from near and far through the darkness in wild and almost unearthly cadence.

In the time of its departure for the autumn migration, this

[1] *Numenius phæopus* (Linn.).

species anticipates its predecessor; though young birds of the Common Curlew may make their appearance here by the middle of July, this only occurs exceptionally, but is the rule with the present species. The old birds pass here on the return journey in August and September.

The breeding range of this species extends from Iceland, the Faroes, Orkney and Shetland, and the north of Scotland, through upper Scandinavia to Dauria and Kamtschatka. Its winter quarters extend not only to Cape Colony, but also to Australia and Van Diemens Land.

262.—Slender-billed Curlew [Dünnschnäbliger Brachvogel].

NUMENIUS TENUIROSTRIS, Vieillot.

Numenius tenuirostris.	Naumann, viii. 527.
Slender-billed Curlew.	Dresser, viii. 237.
Courlis à bec grêle.	Temminck, *Manuel*, iv. 394.

This small southern Curlew has been shot here once, towards the end of the thirties, by a very zealous gunner of those days called Hans Tönnies. I myself have never seen the specimen, which either went first into the possession of Brandt, the Hamburg dealer, or was taken away from here by Baron von Gyllenkrog, a Swedish gentleman, and a very enthusiastic collector, who used to visit the island at that time; in fact, every rare and beautiful bird which happened to be killed here at that period went into the possession of one or the other of these two collectors. Tönnies used often to talk to me about 'the little Curlew with roundish black spots on the sides, resembling in shape the spots on the sides of the breast of an old Peregrine'; nor had the striking slenderness of the bill escaped the notice of our sharp-sighted Heligolander.

On reading in Dresser's work the statement that this species had once been killed on Sylt, it at once occurred to me that that might probably be the example which Brandt had obtained from this island, and had sold to Baron von Gyllenkrog as having been shot on one of the—at that time—still Danish islands, well knowing that this consideration would greatly enhance the value of the specimen in the eyes of the gentleman referred to. According to Brandt's own oral information, he had acted in a similar manner in regard to two examples of White's Thrush (*Turdus varius*) caught here, and also in regard to another species very similar to the latter. In discussing the Glossy Ibis, we have already expressed

the opinion that the beautiful examples, described by Naumann as obtained from 'the North Sea,' may also have come from Heligoland in a similar manner.

The breeding range of the Whimbrel extends from Spain through the countries of Europe bordering the Mediterranean; how far it advances eastwards into Asia has not been determined. As already stated, Jerdon mentions it as having been seen in India; but Sewertzoff does not quote it among the birds of Turkestan.

Godwit—Limosa.—This genus contains but a small number of species: three of these are natives of Europe and Asia, two of them visiting Heligoland; the third, *L. cinerea*, although nesting abundantly in the north of European Russia, has not yet been observed here. Besides the above, Asia possesses a few species closely related to the European forms; America, on the other hand, has two independent species, confined exclusively to that continent; and, according to Jerdon, Australia also possesses several species of its own.

263.—Black-tailed Godwit [Schwarzschwänzige Uferschnepfe].

LIMOSA MELANURA, Leisler.[1]

Heligolandish: Groot Marling. *Marling* being Heligolandish name for *Godwit*.

Limosa melanura. Naumann, viii. 406.

Black-tailed Godwit. Dresser, viii. 211.

Barge à ruque noire. Temminck, *Manuel*, ii. 664, iv. 421.

This species is of extraordinarily rare occurrence on this island. During all the time I have been collecting, only three of these birds have been shot here, all being individuals in breeding plumage. No doubt the birds may migrate frequently across the island; but the cliff does not form a suitable habitat for birds of similar habits, and Sandy Island is now of too insignificant extent to attract the larger kinds of shore-birds.

This bird occurs as breeding species in Holland, Denmark, southern Scandinavia, Germany, and Russia, and throughout Asia as far as the region of the Amoor.

[1] *Limosa belgica* (Gmel.).

264.—Bar-tailed Godwit [Rostrothe Uferschnepfe].

LIMOSA RUFA, Brisson.[1]

Heligolandish: Road Marling = *Red Godwit*. Young birds: Grü Marling.

Limosa rufa.	Naumann, viii. 446.
Bar-tailed Godwit.	Dresser, viii. 203.
Barge rousse.	Temminck, *Manuel*, ii. 668, iv. 424.

This species too is only seen here in very isolated instances, but much more frequently than the preceding. The majority of the birds which are shot, now and again, during the close of the summer, are young individuals. Old males in perfect plumage occur only very rarely: one such example I obtained in May 1854, and from that time no others were met with until May 1887. On the 14th and 15th of the latter month, two unusually beautiful examples, in the most perfect breeding plumage, were brought to me. There is no doubt that the natural conditions of this island are responsible for their rare appearance; for it is of quite common occurrence, in the most beautiful breeding plumage, on Neuwerk, which is close to Heligoland in the estuary of the Elbe, and also upon the islands on the west coast of Sleswick-Holstein. Among the babel of voices of migrant hosts, composed of all the different species of shore and other birds which annually pass across this island during the dark nights of autumn, the call-notes of this Godwit may be heard in abundance; besides which, how many different rattling, piping, and quacking sounds does not one hear during such nights, proceeding from the general throng of migrants above, sounds which are utterly unknown to any gunner or fowler on this island; and could we manage to get into our possession the feathered wanderers from whom these voices emanate, the avifauna of Heligoland would no doubt be enriched by many a rare and interesting addition.

The nests and eggs of this species have been discovered by Wolley in Lapland, and by von Middendorff in the Taimyr Peninsula. No other breeding places of the species are known.

Plover—Charadrius.—This genus, with its more or less closely related forms, is represented by a large number of species throughout the whole world, all of those which occur as breeding birds in Europe being also found in Heligoland. In addition to this, Heligo-

[1] *Limosa lapponica* (Linn.).

land can boast of several interesting strangers, enrolled as 'honorary citizens' on the list of European birds. These are the North American species, *Charadrius virginicus*, the Asiatic *C. fulvus*, and *C. caspius*, which may also be termed an Asiatic species. Of the first of these species, the example shot in Heligoland is the only one hitherto observed in Europe; of *C. fulvus*, three other examples have been killed on European soil, but Heligoland had the start by nearly ten years; in the case of *C. caspius*, on the other hand, the two examples of this species which have occurred here are the only ones hitherto killed west of the Caspian. Apart from those above-named, another American species new to Europe, *C. vocifer*, has once been shot in England.

In the genus of the Plovers, we find brought into striking prominence the phenomenon of two or even three species, almost exactly resembling each other in the colour of their plumage, yet exhibiting the most marked differences in the general size of their body, or in the relation of the size of particular parts of the body to the total size of the individual. Thus, while the wings and tarsi of *C. auratus* and *C. fulvus* are, on an average, of the same length, the breast-bone of the former measures 2·52 ins. (64 *mm.*), that of the latter only 1·96 in. (50 *mm.*), being thus by nearly a quarter-length shorter than that of *C. auratus*. It is unnecessary to explain how this must affect the general shape of the one species as compared with the other. Similar relations obtain in the case of *C. hiaticula* and *C. minor*.

Among other genera, those of the Geese and Gulls present us with similar phenomena. In the case of the former, the species concerned are *Anser cinereus* and *A. brachyrhynchus*; and also *A. albifrons* and *A. minutus*. Among the Gulls, we have the phenomenon repeated in *Larus marinus* and *L. fuscus*, as well as in *L. glaucus* and *L. leucopterus*. In all these cases, so far as I have been able to judge from the material at my command, it is invariably the smaller species which is distinguished from the similarly coloured larger form by a more slender form of body, and comparatively longer wings and feet.

265.—Golden Plover [Goldregenpfeifer].

CHARADRIUS AURATUS, Suckow.[1]

Heligolandish: *Welster* for early and winter plumage; *Welster-boll* for breeding plumage.

Charadrius auratus.	Naumann, vii. 138.
Golden Plover.	Dresser, vii. 435.
Pluvier doré.	Temminck, *Manuel*, ii. 535, iv. 352.

The European bird bearing this name is amongst the best-known in Heligoland. During most months of the year it is either seen here by day, or its clear, far-sounding call is heard during the night. The first young birds arrive as early as July, sooner or later in that month, according to the state of the weather. In 1880, as many as twenty individuals were seen as early as the 4th of the month. In 1881, scattered examples were seen on the 18th and 19th; and, in 1883, the first bird was shot on the 16th. Early individuals like these are nearly always marked with very large yellow spots, and the feathers of the back of the head frequently have small appendages of the nestling-down adhering to them. The main migration of these young birds takes place during August and September, in the course of which months, especially if the weather be fine and sunny, they are shot daily in greater or less numbers, and served up in the restaurants under the name of 'Goldfowls.' If a heavy rainfall, with a light east wind should occur at that time, immense flights of these young birds, mixed with Oyster Catchers and young Knots, may be seen flying low over the sea, coming from an easterly direction, and alighting on the dune. The old birds begin to arrive about the end of October. They are easily recognised, both by their thin tarsal-joint, as well as by the smaller, less pure yellow marginal spots of the plumage of the upper parts, the smaller number of spots on the sides of the breast, and the much whiter coloration of their lower parts. The autumn migration of these old birds terminates at the end of November; as soon, however, as frosty weather sets in, large flocks and smaller companies of the birds again migrate over and past the island, amid much noise, in a westerly direction. These flights take place during the first few nights of the frosty weather, or, more particularly, on the night which precedes its arrival; and, besides Golden Plovers, they include innumerable Curlews, Oyster Catchers, Lapwings, species of *Tringa*, accompanied by Larks and Blackbirds, and probably also Fieldfares. All of these migrants are old and

[1] *Charadrius pluvialis* (Linn.).

very plump birds, whose intention probably was to pass the winter at or near their breeding home.

The return of the old birds to their summer homes, in more or less perfect breeding plumage, takes place in the course of May and the first week of June. The black feathers of the underside as far as the middle of the neck, which are renewed by moulting, are in these individuals, during the latter period of their passage, almost always perfectly complete; but the black markings of the upper portions of the neck, the throat, and cheeks, which are produced by alteration of the colour of the feathers, are frequently incomplete.

It is a singular phenomenon that in stuffed examples which have been kept for a long time exposed to the light, the pure black acquired by alteration of colour fades again to a pale brownish black, whereas all the black portions renewed by moulting retain their deep and glossy black colour.

From the middle of June and throughout July, solitary old birds for the most part, partially in breeding plumage, are met with; these are individuals which, for some reason or another, have not migrated to their nesting-stations, and are roving about during the summer months in aimless fashion, as is the case under like conditions with large numbers of individuals of other species of this genus, as well as of other closely related genera.

Their breeding range extends over the whole of northern Europe, and in Asia, at least as far as the Jenesei,—Seebohm having met with it at the mouth of that river.

266.—Asiatic Golden Plover [Asiatischer Goldregenpfeifer].

CHARADRIUS FULVUS, Gmelin.

Charadrius longipes. Naumann, xiii.; Blasius, *Nachträge*, 221.
Asiatic Golden Plover. Dresser, vii. 443.

This interesting stranger I have obtained on three occasions, the first example being a fine male in perfect plumage, which was secured on the 25th of June 1857; the second, a younger female, was obtained on the 18th of June 1860. In this example, the alteration of the colour from the summer to the winter plumage had proceeded so far as to develop the black colour of the lower parts and foreneck to about half its full extent. Finally, on the 11th of July 1867, I obtained another remarkably fine old male in the most perfect breeding plumage. Since the last date, this neatly-shaped bird has not been seen again on the island.

Despite its close resemblance in colour to *C. auratus*, there can

now no longer be any doubt as to the validity of this species, which used once to be questioned. It used to be a saying of our late revered master, Professor Blasius, that if during one night all birds were to become black, there would be an end of many species; and I know of no case in which the realisation of this statement would furnish clearer proof for the validity of a species than in the present instance. We could then be no longer led astray by the similarity of the markings of *C. fulvus* and *C. auratus*, and only relations of form and shape would be admitted as determining factors. These, however, differ to such a degree that, if we regard them by themselves, the idea of the identity of the two species could not be entertained for a moment. Badly prepared skins may, perhaps, cause us for a moment to hesitate in our judgment, but no one who has ever had the two birds in his hands, in the fresh condition, could give admission to the least doubt in the matter. Even the skeleton of the two species, the foundation of all outward form and shape, displays the most striking differences. Thus, the breast-bone of *C. auratus* is 2·52 ins. (64 *mm.*) in length; while in *C. fulvus* it only measures 1·96 in. (50 *mm.*), being shorter therefore by nearly a quarter of the length of the former. Notwithstanding that the trunk of *C. fulvus* measures so much less than that of *C. auratus*, certain separate portions of its body not only equal corresponding parts in the other species, but in some cases even exceed them. Thus, the beak of the finest old *C. auratus*, which I was able to get for my collection, only measured ·78 in. (20 *mm.*), while that of an equally fine old *C. fulvus*, shot here, measures a good ·94 in. (24 *mm.*); the tibia is of the same length in both species; but whereas, in *C. auratus*, that part of it which is uncovered by feathers only measures ·32 in. (8 *mm.*), in *C. fulvus*, the naked portion measures ·78 in. (20 *mm.*). In *C. fulvus*, the tip of the longest posterior flight-feather is equal to the third of the primaries, and recedes ·23 in. (6 *mm.*) from the point of the wing; in *C. auratus* the same feather is equal to the fifth primary, and recedes ·87 in. (23 *mm.*) from the apex of the wing. We might enumerate several other absolute and relative divergencies of this kind, but it is not so much these separate details as the wide difference of general shape determined by them, that so markedly distinguishes the two species.

Though in their colour and markings they bear a general resemblance to each other, several differences are nevertheless discernible. In *C. fulvus* the feathers on the under surface of the wing are ashy grey at all stages of life; in *C. auratus* they are pure white: further, old birds of *C. fulvus* in summer plumage display a difference of colour and marking in

the larger plumage of the upper parts, notably in the largest wing-coverts and scapulars, these not being bordered by triangular yellow marginal spots as is the case in *C. auratus*, but marked by bands of pure black and white, the white ground-colour taking up a much larger portion of each feather than the dark and narrower bands; these markings also extend to the outer pairs of the tail-feathers, which are barred with almost as pure black and white as those of *Totanus glareola*. In the smaller plumage of the upper parts the markings are very pale yellow, which in places fades to a whitish colour; the larger plumage, however, had probably got its nearly pure white colour when freshly moulted, for the covered portions of it which are not exposed to the light are likewise almost pure white. The younger female in my collection—a bird of the previous year—displays no sign of the beautiful markings of the upper parts as just described, but approaches nearer to *C. auratus* in these markings. In the same way a young autumn bird from the Amoor region, which I possess, and owe to the kindness of Herr Tancré, in its whole plumage resembles a young *C. auratus* of the same age; but all the yellow spots are very large, and the lower wing-coverts, as already mentioned, are ashy-grey.

One of the eggs of this species—of which Seebohm was fortunate enough to bring home two clutches from the lower Jenesei—is, as one might naturally expect, much smaller than those of the European species. Its length is 1·77 in. (45 *mm.*), and its greatest breadth 1·34 in. (34 *mm.*); it has also more gloss than those of the other Charadrius species; the ground-colour is purer and lighter than in *C. auratus* and *C. squatarola*, being specially distinguished by a larger admixture of reddish with the rust-yellow; the spots are lighter and more of a dark reddish-brown than of a blackish-brown, as is the case in closely related species, nor do they assume the darker shade even where this colour is very densely laid on. Moreover, judging from the specimen before me, these spots are not so large as they usually are in *C. auratus* and *C. virginicus*.

The measurements of the three birds shot here, taken from the fresh examples, are as follows:—Old male, 1857: total length, 8·78 ins. (223 *mm.*); bill, ·94 in. (24 *mm.*); wings, 6·46 in. (124 *mm.*), projecting ·39 in. (10 *mm.*) beyond the tail; tarsus, 1·65 in. (42 *mm.*). Young female, 1860: total length, 9·33 ins. (237 *mm.*); bill, ·86 in. (22 *mm.*); wings, 6·34 ins. (161 *mm.*), projecting ·51 in. (13 *mm.*) beyond the tail; tarsus, 1·57 in. (40 *mm.*). Very handsome old male, 1867: total length, 9·17 ins. (233 *mm.*); bill, ·94 in. (24 *mm.*); wings, 6·38 ins. (162 *mm.*), projecting ·39 in. (10 *mm.*) beyond the tail; tarsus, 1·61 in. (41 *mm.*). Young bird from the

Amoor region: bill, ·86 in. (22 *mm.*); wings, 6·46 ins. (164 *mm.*); tarsus, 1·50 in. (38 *mm.*).

The nesting stations of the Asiatic Golden Plover extend from the lower Jenesei eastwards, over all the Tundra regions of northern Asia as far as Behring's Strait. Von Middendorff met with it as breeding bird in the Taimyr Peninsula in 74° N. lat., and Dr. Bunge found it on the islands of New Siberia (*Ibis*, 1888, p. 344). In winter it migrates to India, Australia, and even New Zealand. In addition to the examples which have occurred in Heligoland, it has been killed four times in other parts of Europe, once in Poland by Taczanowsky, twice in Malta (Wright, *Ibis*, 1865); and the fourth example was found among other wildfowl in Leadenhall Market in London.

267.—American Golden Plover [Amerikanischer Goldregenpfeifer].

CHARADRIUS VIRGINICUS, Bonaparte.

Charadrius virginicus.	Naumann, xiii.; Blasius, *Nachträge*, 221.
Charadrius marmoratus.	Audubon, *Syn. of Birds of N. America*, 222.

This third species of Golden Plover I have once obtained here—viz. on the 20th of December 1847. The individual, as one might presuppose from the season of the year at which it was captured, was in winter plumage, and, judging from its thick tarsal joint, appeared to be a young autumn bird. In size it was intermediate between *C. auratus* and *C. fulvus*, but had not the thickset shape of the former species, while its wings and tarsi were even more slender than those of the latter; the wings also projected considerably further beyond the tail than in either of the before-mentioned closely related species. The plumage of the example killed was very much faded; in the feathers of all the upper parts the light marginal spots were of a dull light yellowish-brown, nor indeed could they have ever been of the golden-yellow colour of the young birds of the European and Asiatic species, for even in those portions of the feathers which are covered by two or three layers of other feathers, and thus completely protected against the effects of light and air, the colour of the spots was no more than a light dull citron-yellow, somewhat similar to the yellow of the marginal spots on the plumage on the upper parts of very handsome young autumn birds of *C. squatarola*. Richardson and Swainson (*Fauna Bor. Americana*) also describe the colour of the spots of the upper parts as citron-yellow, and that of the greater wing-coverts as whitish.

The measurements of the example killed here are as follows:—Total length, 9·43 ins. (240 *mm.*); length of wing, 7·125 ins. (181 *mm.*), projecting 1·125 ins. (28 *mm.*) beyond tail. The tibia measures 2·62 ins. (66 *mm.*), and the tarsus, 1·69 in. (43 *mm.*).

The breeding home of this species extends throughout the whole of Northern America from the Atlantic Ocean to Behring's Strait. The only authenticated instance of its occurrence in Europe was furnished by the example shot here forty-one years ago (1888) and preserved in my collection. An example was indeed found, in November 1882, in a game and poultry market[1] in London (J. H. Gurney, jun., *Ibis*, 1883, p. 198); but Dresser, as well as Seebohm and Saunders, hesitate to admit the species, on the strength of this fact alone, to the list of British birds.

During its autumn migration this bird is said to travel to Patagonia; and there is certainly no doubt as to its advancing far into South America, for countless flocks every autumn perform the singular and unexampled journey from Labrador to Guiana and North Brazil, traversing in one unbroken flight a continuous surface of ocean varying in extent from two thousand seven hundred and sixty to three thousand two hundred and forty miles. Nor indeed have they exhausted their flying powers to the utmost in the execution of this feat, for though some divisions of the broad migration column of these birds travel *viâ* the Bermudas and Lesser Antilles, very few interrupt their flight on either of these island groups, unless compelled by stress of weather (J. M. Jones, *The Naturalist in Bermuda*). According to the reports of the same observer, ships on their way to England have met with migratory hosts of this Plover from five to six hundred miles east of Bermuda, companies numbering from thirty, fifty, up to several thousands, having been observed passing overhead for two days and two nights. In one case the birds were travelling in a south-easterly direction, and in the other direct south. Assuming that they had started from Labrador or eastern Canada, those pursuing the former course would strike upon the first land on the north coast of Brazil: this means that they have performed in one uninterrupted flight a distance of about three thousand two hundred and forty miles—*i.e.* about as far as from Heligoland to Lake Baikal! Again, the flocks following the southern line of flight would, by this course, land on the coast of eastern Guiana, which, in their case, still means an uninterrupted flight of two thousand seven hundred and sixty miles.

Granting that a bird is able to fly for fifteen hours without

[1] Leadenhall Market (Yarrell, *Brit. Birds*, iii. 276).

rest or food, we should, judging from the above-mentioned distances, get a speed of flight of from one hundred and eighty-four to two hundred and sixteen miles per hour; and even if one assumed that a bird could continue flying uninterruptedly for twenty hours, which, however, seems to exceed the range of possibility, there would result, in the case of the flocks which have migrated to Brazil, a velocity of flight of more than one hundred and sixty miles per hour. We have, moreover, already obtained a result of one hundred and eighty miles per hour in the case of the spring passage of the Northern Bluethroat from north Africa to Heligoland. In regard to bird-flight generally, as well as the capacities for flight of different species, we are, however, still completely in the dark.

268.—Grey Plover [Kibitz-Regenpfeifer].

CHARADRIUS SQUATAROLA, Naumann.[1]

Heligolandish: Witt Welster = *White Golden Plover.*

Charadrius squatarola.	Naumann, vii. 249.
Grey Plover.	Dresser, vii. 455.
Vanneau pluvier.	Temminck, *Manuel*, ii. 547, iv. 359.

For beauty and distinguished appearance, an old bird of this species, in the fresh and perfect breeding dress, stands, without question, in the first rank among our avifauna. The two simple colours of its plumage—snowy white, and deep glossy black—are distributed with an elegance, the like of which is not attained, much less surpassed, or indeed capable of being surpassed, in any other avian genus. It is, however, but rarely—hardly once in three or four years—that one is able to obtain the bird in such perfection on this island; for although it occurs frequently every summer during the latter half of May and in the beginning of June, it is extremely cautious, and but rarely allows itself to be lured within shooting range by the bird-call [2] of a gunner. In fine clear weather solitary individuals may be seen migrating on an eastwardly course at great altitudes, occasionally giving utterance to a loud and clear 'kü-ü-lüh,' as with tremendous speed they hasten to their distant home. Solitary young autumn birds are met with at the end of the summer on the shore of the dunes; but these are, for the most part very shy, and invariably cause the flocks of Tringæ with which they keep company to seek safety in timely flight. Old birds pass on their migration later in autumn; they remain, however, unseen, inasmuch as they travel over and past the island only by night. Judging from their

[1] *Squatarola helvetica* (Linn.). [2] Lockpfeife = *Decoy pipe, or whistle.*

frequent call-notes, which are heard in the darkness, they must often be very numerous, as for instance, late on the evening of the 17th of November 1878, on which occasion the whole expanse of the sky, from the north to the south, resounded with the voices of these migrants, which were proceeding at a rushing speed from east to west. The eggs which, by the majority of collectors, are still, and will probably continue to be, things 'longingly but vainly wished for,' were first discovered by Von Middendorff in the Taimyr Peninsula, in 74° N. latitude. They were afterwards taken by Mr. M'Farlane, a collector of the Smithsonian Institution at Washington, on the shores of Arctic North America, in the summer of 1864, and finally, Messrs. Harvie-Brown and Seebohm were successful in discovering the nests during an exploration in the north-east of European Russia, undertaken with the object of discovering, besides other rarities of the high North, the nest of this particular Plover. The bird was met with in fair abundance on the Tundras of the Lower Petchora in latitude 68° N.; and these gentlemen succeeded in discovering, between this point and the mouths of the river, in 71° N. latitude, in all twelve nests, and in bringing home some thirty eggs as well as some of the young in down. One of the eggs, which I possess, and owe to the kindness of my friend Seebohm, was found on the first day of their search,—the 22nd of June 1875,—and counts amongst the most valued treasures of my collection. In colour, markings, and shape, this specimen certainly bears great resemblance to eggs of the Golden Plover; the shell, however, is somewhat less glossy than in eggs of the latter species, approaching in this respect to the eggs of the Lapwing. The ground-colour is a dull buff, with an inclination towards olive, though this tint is less strongly developed than in the eggs of the Lapwing. The markings consist of a few small grey blotches, besides other somewhat larger ones of the same colour, while there are also a number of roundish spots, of a blackish-brown or almost black colour, which at the thick end of the egg coalesce into larger blotches. In the few cases where these spots are somewhat blurred, the thinner layer of colouring matter does not display the reddish-brown shade which one meets with much more frequently in eggs of the Golden Plover: in this respect also the eggs are more like that of the Lapwing, in which the colour of the spots is almost invariably a pure brownish black. They measure 2·125 ins. (54 *mm.*) in length, 1·37 ins. (35 *mm.*) in their greatest breadth, and in shape are very pointed.

The nesting stations of this Plover extend over all the Arctic countries of the Northern Hemisphere. As has been previously stated, it has been met with as a breeding species from the 68th to the 74th

parallel of northern latitude. Whether its breeding range extends beyond this limit is unknown; Captain Feilden does not mention it among the birds observed by him between 78° and 83° 6′ N. latitude. During its autumn migration it advances to latitudes very far south, and has even been met with in winter in Australia.

269.—Lapwing [Kibitz].

CHARADRIUS VANELLUS, Wagler.[1]

Heligolandish: Kibitt = *Lapwing.*

Charadrius vanellus.	Naumann, vii. 269.
Lapwing.	Dresser, vii. 545.
Vanneau huppé.	Temminck, *Manuel*, ii. 550, iv. 362.

As one might suspect, a bird so common as the Lapwing is of quite ordinary occurrence on this island, old birds being as abundant in spring as in autumn. In spring, they are among the earliest arrivals, solitary individuals being seen sometimes as early as the middle of February, before the departure of frost and snow. Young birds are often found so early as the end of June and throughout July in large numbers; in 1881, for example, on the 23rd of July, and again in 1885, on the 21st of the same month, my journal describes them as present in 'hundreds.' They are fond of running about on the potato-plots, where, covered by the stalks, their voices only announce their presence. Many can scarcely be called full-grown, the feathers of their heads and the backs of their necks being mixed with down, and bearing the frayed remains of their earlier dress. Moreover, most of them are not sufficiently advanced in education to be able to pronounce their own name—[*i.e.* Kibitt (English sound *Kee-bitt*)].

The Lapwing occurs as breeding species throughout the whole of central and northern Europe and Asia.

270.—Stone Curlew [Dickfuss].

CHARADRIUS ŒDICNEMUS, Linn.[2]

Heligolandish: Dickfuss = *Thickfoot.*

Œdicnemus crepitans.	Naumann, vii. 92.
Stone Curlew.	Dresser, vii. 401.
Œdicneme criard.	Temminck, *Manuel*, ii. 521, iv. 348.

This peculiar bird is of very rare occurrence in Heligoland. This need not cause surprise, because southern Holstein marks the northern limit of its nesting stations, and only rare stragglers are

[1] *Vanellus vulgaris*, Bechst.

[2] *Œdicnemus scolopax*, S. G. Gmelin.

met with in Denmark. During the last fifty years, this bird has been shot not more than six times, the individuals in question having made their appearance either at the beginning of the first frost or in fine days in April and May.

It is a resident breeding species in the temperate and southern parts of Europe, and in north Africa, its eastern range extends as far as India.

271.—Dotterel [Mornell-Regenpfeifer].

CHARADRIUS MORINELLUS, Linn.[1]

Heligolandish: Sandhuhn = *Sandfowl.*

Charadrius morinellus.	Naumann, vii. 163.
Dotterel.	Dresser, vii. 507.
Pluvier guignard.	Temminck, *Manuel*, ii. 537, iv. 355.

This bonny bird formerly occurred much more frequently than has been the case within the last few decades. This fact, however, must in no way be attributed to a diminution in the number of individuals, but rather to a change of climatic conditions. We have already stated, on repeated occasions, that about thirty years ago our May used to be for the most part fine and warm, with light south-east winds, and frequently with light showers of rain during the early hours of the morning. Such conditions of weather induced hosts of migrants to make a temporary halt on the island; and even now, on transitory and exceptional occasions of this nature, these conditions generally lead to an arrival of large numbers of Dotterels and other species due at the time. All this, however, has been changed since the period before named.

May is now almost unexceptionally attended by cold and dry—sometimes violent—north winds, which are not those which will convey birds to Heligoland, but seem rather to prevent birds—which are without doubt migrating at great heights above—from alighting for a temporary rest. That migration, however, proceeds in spite of these conditions can hardly be questioned, although the birds travel at too great a height to be witnessed by human eyes. This conclusion is proved by the fact that, after the lapse of the proper migration period of a particular species, it is no longer seen, even if a most favourable change of weather should take place: the migrants, in fact, rise to more elevated strata of the

[1] *Eudromias morinellus* (Linn.).

atmosphere, which offer them more favourable currents, and other conditions necessary for their purpose.

The Dotterel appears to be very partial to warmth, for it rarely appears before May, and even then only on fine calm days. In 1884 and 1885 it was very abundant during the spring migration: among other instances, I have recorded fifteen individuals for the 21st of May of the latter year; stragglers are often met with during the first week of June. The earliest arrivals are invariably males, being very easily recognised by their plumage, which is less brightly coloured than that of the females. The females have the crown of the head of a pure and deep black colour, margined on each side by clear broad bands of brilliant pure white; these bands extend in a most ornamental manner over the eyes and downwards to the nape of the neck, where the black colour of the top of the head terminates in undiminished intensity in a point. In the male the top of the head is not black, but pale dark brown, all the feathers being broadly edged with buff colour (*rost-gelb*). The eye-streak is pure white, but more or less deeply tinged with dull buff colour; the upper part of the breast is less pure rust-coloured, and the belly is dull brownish black rather than pure black; all the feathers of the back, as well as those of the long posterior flight-feathers, are very broadly edged with a beautiful buff colour, almost, in fact, brown orange (*rost-orange*). In old females these buff-coloured edges are very narrow, and disappear entirely higher up upon the back.

During the last few years, young birds of the year have occurred more numerously during the autumn passage than was the case formerly. Still their occurrence cannot be relied on with as much certainty as can that of the old birds in spring, provided the weather be favourable at the latter season. The year 1882, however, furnished a striking exception to this statement, for on the 22nd of August of that year an extraordinarily large number migrated past, although westerly winds and rain were prevailing at the time; on the 4th of September, the weather having meanwhile become fine, with very light north-east winds and calms, so many of these birds travelled over and past the island, that one of the flights lasted for more than five minutes—a phenomenon which has not been observed either before or since.

The breeding range of the Dotterel extends through almost the whole of northern Europe and Asia. Its nests are met with from the mountains of the Scottish Highlands to the North Cape in Norway. Von Heuglin met with it in Nova Zembla; Seebohm on the Jenesei in lat. 71° N.; von Middendorff in the Taimyr Peninsula, to beyond 73° N. lat.; and Nordenskjöld obtained it close to

Behring's Strait. In the Riesengebirge and Styrian Alps it breeds near the snow line, where it meets with conditions of climate similar to those which prevail in Arctic latitudes.

272.—Caspian Plover [Caspischer Regenpfeifer].

CHARADRIUS CASPIUS, Pallas.[1]

Charadrius caspius.	Pallas, *Zoogr. Ross.-Asiat.*, ii. 136.
Charadrius asiaticus.	Naumann, xiii.; Blasius, *Nachträge*, 225.
Caspian Plover.	Dresser, vii. 479.

As a collector of the birds of a district so narrowly confined and so far north as Heligoland, I may indeed be considered fortunate to have obtained no less than two individuals of a species the home of which is so far to the south-east as that of the bird under consideration, especially as one of the birds happened to be an old example in beautiful pure summer plumage, and the other a specimen in equally faultless juvenile dress. The former of these examples I obtained on the 19th May 1859, and the latter before that date, viz.:—on the 16th of November 1850. Besides this, some 'Küker'—*i.e. C. hiaticula*—with the breast of ferruginous colour, were also seen on the 10th of March 1848, and on the 22nd of April 1876. Unfortunately, these individuals were not shot, so that it remains undetermined whether they belonged to the present species or to *C. pyrrhothorax* or *C. mongolicus*.

The Caspian Plover is smaller than *C. morinellus*, but much longer in the legs and wings. Its plumage is firmer and more compact, and is more like that of the Ringed Plover, between which and *C. morinellus* this species appears to occupy an intermediate position. The colours of its plumage are as beautiful as they are simple. With the exception of the high forehead, all the upper parts are of a light dull greyish-brown colour, similar to that of the smaller species of Plovers, more especially *C. cantianus*; the forehead, a broad eye-streak, the lores, cheeks, chin, throat, and sides of the neck pure white, the ear-coverts, which have a faint brownish tinge, forming the only break. The upper breast from the neck downwards, and the upper third of the breast, are of a beautiful uniform orange brown colour, being divided from the pure white of the lower parts by a narrow blackish band. The flight-feathers are blackish brown; the tail-feathers are of the same colour as the neck, but towards their tips become much darker, and terminate in broad dull whitish edges, which in the

[1] *Ægialitis asiatica* (Pall.).

outermost pair extend to the outer webs. The bill and feet are dull yellowish, the colour of the former passing towards the tip into horny black.

In the young autumn bird, the colour of the upper parts is duller, and of a shade rather like that of *C. morinellus*; all the feathers have light buffy grey (*rostgelblich graue*) borders. In my example these are much faded, but in one of the posterior flight-feathers, which happens to have been renewed, it is of a much fresher, dull orange-brown colour (*rostorange*). The upper breast is of the same colour as the back, the median feathers having buff-coloured edges at their tips. The forehead, eye-streak, cheeks, and foreneck, are dull yellowish white, and all the lower parts from the upper breast downwards are white. The bill and feet are ochreous yellow, the former being black at the tip. The tail and flight-feathers are of the same colour as in old birds.

The measurements are as follows:—Length of wings, 5·78 ins. (147 *mm.*), projecting ·63 in. (16 *mm.*) beyond the tail; length of bill, ·75 in. (19 *mm.*); tarsus, 1·57 in. (40 *mm.*); naked portion of tibia, ·67 in. (17 *mm.*).

An egg from the area of the Caspian is considerably smaller than that of the Dotterel; the ground-colour is buff, with a strong touch of olivaceous; the markings consist of very small round and oval blackish-brown spots, the latter not being so large, and not coalescing as frequently, as they do in the Dotterel; they are scattered uniformly over the whole surface of the shell, and are not very crowded. The shell is devoid of gloss, resembling that of *C. cantianus* in this respect, but it feels much rougher to the touch than that of the latter species. The eggs measure 1·45 in. (37 *mm.*) in length, and 1·06 in. (27 *mm.*) in their greatest breadth, which is about the middle; the smaller end is only slightly more pointed than the larger.

The breeding range of this Plover appears to extend from the Caspian, through Turkestan, no farther than central Asia.

273.—Ringed Plover [Halsbandregenpfeifer].

CHARADRIUS HIATICULA, Linn.[1]

Heligolandish: Küker; probably onomatopœic, after the call-note.

Charadrius hiaticula. Naumann, vii. 91.
Ringed Plover. Dresser, vii. 497.
Grand pluvier à collier. Temminck, *Manuel*, ii. 539, iv. 357.

The somewhat melancholy note—*ü-ü-üt*—of this prettily-marked bird may be heard very early in the spring, in mild weather

[1] *Ægialitis hiaticula* (Linn.).

about the middle of March. All the individuals which arrive from that date up to the middle of April are handsome old birds in perfect plumage, the minute markings of the head and neck being composed of the purest snowy white and of the deepest black.

The migration of the young birds in summer takes place as early as that of the old ones in spring; in fact, they are, almost always, the first of all the arrivals from the parental nests. Their calls, which are somewhat higher pitched, and less clear than those of the old birds, may be heard intermingled with those of the Redshank (*Totanus calidris*), in fine warm weather, as early as the last days of June and the 1st of July. The first young Starlings, indeed, arrive from ten to twelve days earlier, and are, without exception, the first arrivals on the return migration.

The northern limit of the breeding range of this Plover extends from Greenland across Iceland, Spitzbergen, Nova Zembla, the Taimyr Peninsula, as far as Behring's Strait. Captain Feilden killed a female, which he suspected to be breeding there, in Buchanan Strait, Smith Sound, in 78° 48′ N. lat.; and Malmgren (Saunders: Yarrell's *British Birds*, iii. 259) met with a brood on the Seven Islands to the north of Spitzbergen, in lat. 80° 45′ N. From these northern latitudes southwards, the species has been found breeding on almost all the sea-coasts and inland seas of northern Europe and Asia, while it occurs as a straggler as far south as the west coast of France, and also in Turkestan.

274.—Kentish Plover [Seeregenpfeifer].

CHARADRIUS CANTIANUS, Latham.[1]

Heligolandish: Road-hoaded Küker = *Red-headed Ringed Plover.*

Charadrius cantianus.	Naumann, vii. 210.
Kentish Plover.	Dresser, vii. 483.
Pluvier à collier interrompu.	Temminck, *Manuel*, ii. 544, iv. 358.

This small and prettily marked bird is of infinitely rarer occurrence on this island than its larger relative described above. One cannot by any means be certain of obtaining, in the course of each spring, even a single old example in perfect plumage, or of meeting with one or two young birds during the summer months; this is the more surprising, as the bird is a common breeding species only about thirty miles off, on the coast and islands of Sleswick-Holstein. This affords evidence of the decided objection which many species have for a westering migration flight; whereas

[1] *Ægialitis cantiana* (Latham).

hundreds of others, in countless numbers, follow such a course every autumn, almost from one side of the Old World to the other.

In a very handsome but somewhat small old male, preserved in my collection, the whole of the forehead, from a very narrow black streak at the base of the beak far down to the nape of the neck, is of a beautiful light orange-brown colour; on the top of the head only a few grey feathers of the winter plumage are to be seen; the upper ear-coverts have only a faint tinge of brownish, and the black patch on each side of the breast is very small. The three outer pairs of tail-feathers are pure white, the colour of the back first making its appearance on the inner web, and the tip of the outer web of the fourth pair. I shot this lovely specimen many years ago, and I have never obtained one like it again.

The breeding range of this Plover extends from western Europe to eastern Asia; it only nests on the sea-coasts, or on the shores of inland salt-water lakes. In the north its breeding range does not reach further than lower Scandinavia, while the Caspian and the Salt Lakes of Turkestan form its southern limit.

275.—Lesser Ringed Plover [Flussregenpfeifer].

CHARADRIUS MINOR, Wolf and Meyer.[1]

Heligolandish: Lütj Küker = *Little Ringed Plover.*

Charadrius minor.	Naumann, vi. 225.
Lesser Ringed Plover.	Dresser, vii. 491.
Petit pluvier à collier.	Temminck, *Manuel*, ii. 542, iv. 357.

While the preceding is exclusively a frequenter of the sea-shore and the banks of salt-water lakes, the present species, which is also the smallest of the European Plovers, displays a decided preference for the sides of rivers and fresh-water lakes, and is hardly ever found on the sea-coast. These haunts, combined with the fact that Heligoland lies only a few degrees south of the northern limits of its breeding range, will sufficiently account for its rare occurrence on the island. During the last fifty years this bird has only been seen and shot twice, both examples being in my collection. One of them is an old male in spring plumage, which was shot by my son Ludwig in June 1866; the other is a young bird of the year, not more than six or eight weeks old, the feathers of the upper parts having light-coloured margins.

The nesting stations of this species extend from Portugal to China, but small numbers advance as far north as Scandinavia.

[1] *Ægialitis curonica* (Gmel.).

Throughout central and southern Europe it is met with as a common breeding species at all spots providing suitable habitats, such as rivers, fresh-water lakes, etc.

Woodcock—Scolopax.—This genus has been divided into two families, the Woodcocks and the Snipes.

The European Woodcock is also distributed over Asia. America possesses an indigenous, somewhat smaller Woodcock, *S. minor*. Another, *S. saturata*, is said to be a native of Java. Of the Snipe, *S. gallinago* and *S. gallinula* are found also in Asia; besides which, Jerdon mentions three additional species for India. America, besides the small species of Woodcock before named, has three distinct species, two of which, *S. wilsoni* and *S. grisea*, have occurred in England,—the former once, and the latter more than fifteen times up to the year 1872 (Harting, *British Birds*). In England, a Snipe has been frequently met with which in size and form is said to agree completely with *S. gallinago*, but which differs from it in colour and markings as completely as one can possibly imagine. In examples of this kind, all the feathers of the upper parts, as well as the wing-coverts, are varied by light and dark brown undulated bands; there is no trace of the rust-coloured stripes on the back and neck, and the plumage is without any admixture of black. Such birds have never been found breeding, examples having been only shot now and again. In the old edition of Yarrell's *British Birds*, this peculiar form has been described and figured as a distinct species, under the name of *S. sabinei*; but later English observers have regarded it as a very remarkable variety of the Common Snipe.

In Heligoland the four species that belong to Europe as breeding birds occur for the most part in large numbers.

276.—Woodcock [Waldschnepfe].

SCOLOPAX RUSTICOLA, Linn.

Heligolandish: Snepp = *Snipe*.

Scolopax rusticola.	Naumann, viii. 361.
Woodcock.	Dresser, vii. 615.
Bécasse ordinaire.	Temminck, *Manuel*, ii. 673, iv. 429.

To the gunner of Heligoland, 'De Snepp' is an object of great respect; in fact, he looks upon it as quite a superior kind of game, before which all else sinks into insignificance. To shoot a Woodcock, he will leave everything else in the lurch. Thus it happens not

infrequently that on some days during the migration period of the Woodcock, the weather is of such a kind that one may with safety look out for Siberian rarities; and I have often on such occasions begged one or other of our gunners to devote more attention to such occurrences, laying stress on the fact that one of these *rarae aves* would yield him double, four, and even six times the money value of a Woodcock; but in all cases my efforts at persuasion proved unsuccessful. My request to them to give up the chance of a Woodcock for the pursuit of an eastern Bunting or Warbler was invariably refused with a quiet, compassionate smile.

The Woodcock passes on migration in large numbers, both in spring and autumn, though, as one might expect, it is much more abundant during the later season of the year. As is the case with all other birds, its appearance—*i.e.* its migration at altitudes at which it comes within the range of observation—is entirely dependent on meteorological conditions, and therefore its numbers vary considerably in different years. If more or less violent south-westerly winds, with rain and mist, prevail throughout one or other of the two migration periods, neither Woodcocks nor any other birds are seen on this island; if, on the other hand, the weather is warm and calm, with light south-easterly to southerly winds, we may with safety look forward to the presence of all the different species of birds in large quantities; but to bring about what is known as a 'great flight' of Woodcocks, it requires the outbreak of a stiff north-wester, succeeding light southerly and south-westerly breezes; in such cases the migratory hosts are evidently unexpectedly surprised during their flight by the stormy weather, and large numbers of them are driven to seek shelter on the ground. On occasions of this kind the numbers of these birds which have been found within the limited area of this island, covering barely a square mile, have almost approached the marvellous. On the 21st of October 1823 the number of these birds caught and shot here exceeded eleven hundred: eighty-three of these were bagged by Jacob Lassen, an old and well-known Woodcock-catcher on this island, while an old gunner, Hans Prohl, shot ninety-nine, having failed to bring down his hundredth bird. These bags are the more surprising when we take into consideration the kind of shooting gear with which they were obtained. Most of the gunners of those days used old infantry muskets—the remains of the cargo of a Dutch vessel which had run ashore on the sandbank; its contents, after lying for months at the sea bottom, had been fished up during calm weather. For measuring the charge of powder and shot these old sportsmen used, as a rule, the bowl of a clay pipe. When we further add to all this the fact that they were by no means

adepts at shooting birds on the wing, the results they obtained appear truly astonishing. On the 18th of October 1861 about six hundred Woodcock were caught and shot here, five hundred of which I saw lying on the shop floor of a dealer—no doubt a rare sight—though I have frequently known bags of from two to three hundred as the result of one day's shooting. During the spring migration a 'great flight' of this description is of rare occurrence; nevertheless two of the Aeuckens brothers—Oelk and Jan—on one occasion in spring shot, in the early morning, some fifty birds at the foot of the cliff—about two hundred altogether having been killed on the same day. The wind at the time being a light south-easter, and the weather hazy, this case cannot be considered exceptional, but rather as belonging to the regular migration. On another occasion, many years before this, a young pilot shot seventy-four Woodcock on a Good Friday. It appears from these instances that this species may occur in large numbers during the spring migration, wind and weather alone being the factors which determine their appearance.

As has, however, been already frequently mentioned, the meteorological conditions have considerably altered since about thirty years ago. Before that time, it was almost a fixed rule for the wind during the autumn months to pass slowly from west to south, and then, after a short interval of approximate calm, to change suddenly to a stiff north-westerly gale; an event which, if it happened at a time when the migratory movement was at its highest development, was invariably followed by a more or less considerable flight of Woodcocks. Since that time, however, these conditions are no longer met with on this island: nowadays in autumn strong west winds, veering round to south with increasing force, and rain, are not followed by sudden north-westerly gales, but almost invariably slacken back to west. However, Heligoland has reaped at least one advantage from this change; for its small sandy dune, the possession of which is to this island a question of life and death, is now no longer exposed to the destructive effects of the high flood-tides resulting only too frequently from these violent north-westerly gales; for before this period of change this portion of our island diminished steadily on the north-west side; since that time, however, while decreasing on its southern side, the shore on the north side has gained considerable additions from year to year.

Further, before the period under consideration, the spring and summer months were almost invariably fine and warm, with a prevalence of south-easterly winds, so that in April and May of almost every year the island used to teem with Sylviæ and other small birds; indeed, there were many days on which one might

have been able to secure more than a hundred Bluethroats (*Sylvia suecica*), and some twenty or more examples of *S. hypolais* and *S. palustris*. Since then, on the other hand, our spring and summer is almost always cold, with raw and dry winds from the north, and the number of these Sylviæ, and of other both smaller and larger species which put in an appearance at those seasons, has dwindled to the slenderest proportions, so that now the two last-named species are seen perhaps not more than twice or three times in the course of a spring migration.

Moreover, this change of weather has made its influence felt in another domain of the fauna of this island. During the warm summers of earlier years, many of the blossoming shrubs and bushes in my gardens—*Centrantrum rubrum* among others, as well as slices of apple which had been hung out as bait—used to be completely covered by numberless thousands of the most varied species of nocturnal lepidoptera, so that it was invariably two o'clock in the morning before I had finished gathering in the spoil. All this has entirely come to an end since the time mentioned, for the native species have probably completely died out, and those once so interesting occurrences, the large insect immigrations from the continent, are now totally abandoned; so that for nearly ten years I have given up collecting in this no longer fertile field of Natural History. Other insects have disappeared at the same time; among them, the large common Garden Spider, whose nets used to be stretched over every corner of the palings and posts of my garden-hedge, and proved death-traps to many a small and interesting moth; of this Spider I have not seen a single example for many years. Among the beetles, similar facts have been noted in the case of the large Dung Beetle (*Geotrupes stercorarius*); this insect, which was once one of our commonest native species, has at last disappeared so completely, that on a recent occasion I vainly offered a boy five groschen (about sixpence) for one of them.

To many of the residents on this island the sale of Woodcocks forms a by no means inconsiderable source of income, though it is now less lucrative than in former years; therefore all possible means are employed for the capture of these birds. Besides being eagerly pursued with powder and shot, many are snared in large nets specially made for the purpose, and occasionally they are taken in the throstle-bush.

The nets are, according to the place for which they are designed, from 36 to 72 feet in length, and about 24 feet in height, the meshes being about 2½ inches (65 *mm.*) in diameter, so that a Woodcock flying against them can easily get its head and neck through. In

putting them up, one selects, if possible, a spot which is bordered on both sides by buildings or high bushes, as the Woodcock likes to slip in through openings or gaps of this kind. The net is hung upon two poles, and has a line on each side which runs through pulley-blocks fixed on the top of the poles. Long before daybreak the fowler takes his stance beside one of the poles, holding in his hands one of the lines on which the net is suspended; he has to be very careful to strike this line at the moment a cock flies into the net. To cause the net to fall as quickly as possible, flints about the size of two fists are fastened at its upper corners near the line, and if a good watch is kept and the line runs clear in the blocks, it rarely happens that a bird which has once got into the net escapes again. These nets are made of strong grey thread; and although on a clear day they may be seen from a considerable distance, birds which happen to be making towards them fly in without being scared, sometimes even late in the morning. At present there are ten or twelve of these nets on the island, on each of which a tax of five marks (five shillings) a year has to be paid into the public treasury.

As already mentioned, the Woodcock is also actively pursued with the gun, but by no means according to the orthodox laws of sport. Neither are the birds shot before the dog, nor is the sport confined to such only as may be on the wing; but they are killed at any time and place, and under any circumstances in which one may meet with them. Herein the remarkable keen-sightedness of Heligolanders stands them in good stead. An experienced gunner, while carefully examining the upper plain, the shore, or shingle, will, at a distance of forty or fifty paces, discover a Woodcock squatting flat on the ground, among dead grass or potato-stalks, or dry sea tang, which last, from its close resemblance to the bird's plumage, will still more effectively screen it from observation. After he has espied his bird, the gunner stalks it until he gets somewhat closer, and then suddenly fires.

For this sort of sport, the later hours of the morning or forenoon are mostly chosen. Another method, which is equivalent to taking the birds at flighting-time, consists in taking up one's position at early dawn at the corner of some rock, and shooting any birds which, as the day breaks, may happen to fly past. This kind of sport, too, has its own peculiar charms. True, that it may lack the idyllic beauty which at the time of the spring migration breathes through the woods, which are budding forth in leafy verdure, and jubilant with the song of birds; still, any one whose mind is susceptible to the influences of outward Nature must be irresistibly impressed by the solemn grandeur with which she unfolds herself on this island.

Rising at early dawn, we set out for the spot where we propose to take up our stance, proceeding on our way with as little noise as possible; with such passers-by as we happen to meet, we exchange in subdued tones a few words as to what chances of sport the fine calm weather is likely to promise. At intervals the far-sounding call of a solitary Blackbird strikes our ears. Suddenly, with the whizzing noise of a rocket, a flock of migrating Song Thrushes dives down obliquely from a great height. Again, a soft 'tschü-tschü-tschü-tschü,' betokens the wing-beats of a passing Woodcock, the bird itself unseen. This is soon followed by the short sharp sound of the line of a falling net, and the dull 'thud' of the captured bird hurled forcibly on its back on the ground—the short, sure, and painless method adopted here for despatching birds which have been caught in the net. Somewhat accelerating our pace, we soon arrive at our stance. It is as yet too dark for shooting, but our auditory faculties are the more keenly aroused. The soft call-note of the Redbreast resounds from far and near, while at intervals of varying length a passing Woodcock, hidden in obscurity, betrays its presence by the sound of the low beatings of its wings. Then for a time all is silence, save that from the quiet sea beyond, there is carried to our ear the subdued roar of a long-drawn wave, as, rolling lazily along, it breaks upon a sunken reef—like the wan phantom of a storm which has long since spent its force.

But soon day dawns, and the sport begins. If we have chosen the foot of the cliff for the field of operations, and there is not too great a number of shooters distributed along it, we may bring down from ten to fifteen birds in the course of a few hours, the first of these numbers being the greatest which I have ever obtained under these conditions. A far better result, however, is attained when one is alone, or nearly so, on the scene of operations, as was the case with the brothers Aeuckens in the previously related instance. Frequently a very large number of shooters take up their posts at the bottom of the cliff along the whole length of the island from north to south; and if the birds are plentiful during these early morning hours, the shots will succeed each other with such rapidity that one might almost fancy them to proceed from a line of skirmishers. As a rule, however, these marksmen belong to a type whose lead is usually more powerfully attracted by surrounding space than by the object of sport, so that the sound of repeated 'bang-bangs' is generally a good indication of the advent of a bird.

In this connection we may take leave to point out that it is a great mistake to suppose, as has been frequently stated, that the birds, on arriving here, are so much exhausted and out of condi-

tion that one might almost beat them to death with sticks; neither Woodcocks, nor any other species of birds, display the least sign of fatigue on their arrival here, and, as I have already explained in detail in the first part of this book, during nearly fifty years I have only met with three instances—viz. a Song Thrush, a Snow Bunting and a Brambling—in which actual exhaustion has compelled birds to take a short rest on the sea at distances of from one to three miles off this island.

I ought not to omit mention of another very serious misstatement in regard to fowling and migration which, I regret to say, has actually found a place in the only existing work of our revered master, Naumann. In treating of the Woodcock he says (vol. xiii. p. 399) that in Heligoland every proprietor of a house also owns a net—a lark-net, in fact—which, during the migration period, is hung across the street from one house to the other, and on the next morning is found full of birds. Strangers could not pass through the streets of an evening without getting from one of these nets into another. Now it seems to me utterly inexplicable by what mistake or misapprehension this great observer could have been led to pen what is not a mere exaggeration, but a perfect invention. The only persons with whom he associated during his short visit here in 1840 were the late Hilmar Freiherr von dem Busche-Lohe, whose early death is a matter for sincere regret; Reymers, whose name so frequently turns up in these pages; Jacob Lassen, an old fowler of Woodcocks, who has also been already mentioned, and myself. All of these persons were thoroughly acquainted with the conditions under which fowling is carried on in Heligoland, and all the circumstances connected with migration on this island, and they were equally incapable of giving to an authority like Naumann information of any fact not based on the strictest truth. Two such Woodcock nets did indeed exist at that time on the lowland, in an open street leading to the shore, and another was established for some years on the Upper Plateau, in a street opening towards the sea; but these were the only nets of this kind which were to be found in the streets in 1840, or since that time.

The statement, particularly, that all one has to do is to stretch the net across the street in the evening in order to find it full of birds in the morning, is a most serious misrepresentation of the actual state of things. The birds are by no means to be caught in this simple fashion; but the nets are handled in the manner described above, and it is only in extremely exceptional cases that a Woodcock, Thrush, or Owl will remain in them for more than a moment after they have been caught in the meshes. In some few isolated instances nets, it is true, are used which have

on each side an additional wide-meshed outer covering through which a Woodcock is able to fly comfortably. The object of this arrangement is to prevent birds, which have once been captured, from escaping again immediately afterwards; but even this precaution proves insufficient if one does not strike the net as soon as possible after a catch. Moreover, for species of the size of the Yellow Wagtails and the Bluethroats, mentioned by Naumann in this connection, these nets are far too wide-meshed, leaving out of consideration that neither of these species flies during the night, and, least of all, low among the houses. I have dwelt intentionally at some length on this subject, because, for some years now, it has been the fashion in Protectionist quarters to represent Heligoland as the great slaughter-house of birds; and statements have from the same sources found their way into public journals, to the effect that from 60,000 to 70,000 birds were butchered here in the course of a month.

To the Woodcocks arriving at night or early dawn the resting-places which they are obliged to resort to on this island must indeed seem wonderfully strange: used to passing their life in shady woods, it need perhaps hardly surprise us that they should select as the nearest substitute for their former haunts the dark grottoes and crevices which the rocky cliff of this island provides in such abundance. Such places are, however, by no means their only resorts; for not only does one meet with them on the perfectly level plain of the Upper Plateau, and among the shingle at the foot of the cliff, but they will even settle on extremely narrow, often much sloping, projections of rock at all heights along the face of the cliff, whence not a few are frequently shot from above. I would here relate an incident which once happened to one of our gunners. This man, who in other respects could not be regarded as more than an average shot, happening to climb over a high *talus* of rock at the foot of the cliff, espied, on a narrow projection which sloped somewhat backwards, the head of a Woodcock; climbing to a somewhat higher point of the rock in order to get a safe shot, he discovered a second bird close to the first. He thereupon fired, and seeing neither of the birds rise, felt not a little pleased at having killed the two. Imagine, however, his joy and astonishment when, on reaching his spoil after some trouble, he found that he had killed not two, but four, Woodcocks at one shot, all of these birds having been sitting close together on one small spot.

In spring it has repeatedly occurred that two Woodcocks have been killed in a furrow with one shot; and I have once at the same season found two sitting close together under the net of my

throstle-bush. Though such occurrences are rare, they nevertheless seem to show that in some cases the birds begin to pair even during their home passage, or it may be that pairs of the previous year meet again on their way to the nesting haunts. During the autumn passage, on the other hand, each individual travels separately, and however many of the birds may be engaged on migration, they never show the least tendency to join in companies; in fact, I know of no bird which shows so little concern for others of his own species which he may happen to meet in the course of his travels.

In conclusion, I must mention a peculiar and very ancient custom which dates from the time of the Danish Landvogts, and has been handed down to the English governors. This supreme authority of our island receives as a tribute, on the part of the community, the first Woodcock which is killed during the spring and autumn migrations. Inasmuch as it is equally old usage to purchase this firstling by the payment of a dollar from the public treasury, every gunner and net-owner on the island is eagerly bent on winning the honour of the prize.

This 'Eaast Snepp' may be delivered on any day on or after the 1st of March and 1st of October, and should a gunner have succeeded in killing the bird on one of the dates mentioned, or any day following, however early it be in the morning, he will run as fast as his legs will carry him to the 'Landes-Kassenmeister' (public treasurer), knock that dignitary up from his slumbers, and hand over to him the bird of honour.

The breeding range of the Woodcock is one of extraordinary dimensions, extending from the Azores, Canaries, and Madeira, through Europe and Asia as far as Japan. Its northern limit is defined in Scandinavia by the 65th parallel of N. latitude, but in eastern Siberia is said not to advance beyond 60° N. latitude.—(Seebohm, *British Birds.*)

277.—Great Snipe [Grosse Sumpfschnepfe].

SCOLOPAX MAJOR, Gmelin.[1]

Heligolandish: Groot Tschaker. *Tschaker*, Heligolandish name for *Snipe*.

Scolopax major.	Naumann, viii. 291.
Double Snipe.	Dresser, vii. 631.
Bécassine double.	Temminck, *Manuel*, ii. 675, iv. 430.

Of its four European congeners, the present species visits Heligoland in the fewest numbers; this more especially applies to the spring migration, during the whole course of which hardly more

[1] *Gallinago major* (Gmel.).

than two or three individuals are ever seen. Raw and cold weather does not appear at all to suit this bird, for it is never seen here until it has become really warm, and even then only on fine sunny days in May. The bird appears to acquire a special attachment for a spot which it has once frequented. Thus, one individual had selected a sunny patch on the grass in my garden, which was sheltered by a wooden paling; and although I might rouse it two, and even three times, on the same day, it would always patiently return to the same spot—which, by the way, was no bigger than a man's hand—as though it had been its nest. Young autumn birds occur somewhat more abundantly than old individuals, about the end of August and during the first weeks of September.

This species, whose breeding home is more eastern than that of the others, only visits western Europe, including England, on migration in small and fluctuating numbers. Its breeding range extends from Jutland up to 70° N. lat. in Scandinavia, and in the south to the northern parts of eastern Germany, whence it stretches within the same parallels of latitude through European Russia. How far eastward into Asia it breeds has not been determined, though Seebohm found the bird in fair abundance on a small tributary of the Jenesei just within the Arctic Circle.

278.—Common Snipe [Sumpfschnepfe].

SCOLOPAX GALLINAGO, Brisson.[1]

Heligolandish: Tschaker=*Snipe*.

Scolopax gallinago.	Naumann, viii. 310.
Common Snipe.	Dresser, vii. 641.
Bécassine ordinaire.	Temminck, *Manuel*, ii. 676, iv. 433.

This widely distributed species is of quite common occurrence in Heligoland; and, excepting in June and July, is met with more or less numerously at all times of the year, including the winter months.

In mild winters large numbers of these birds seem to remain in their northern or eastern breeding homes; for if a sudden and severe frost, particularly if accompanied by a snowfall, sets in at the end of November, December, or during the first months of the new year, they are at once observed to pass this island in greater or less numbers. Throughout the evening and all night long of the 21st of November 1862, with an east wind and snowy weather, the air was completely filled with countless thousands of *C. auratus*, *C. vanellus*, *N. arquatus*, and *S. gallinago*. On the day following, large numbers of Golden Plovers and Lapwings continued to migrate,

[1] *Gallinago cælestis*, Frenzel.

whilst bands of this Snipe were seen flying about like coveys of Partridges, and alighting in gardens on sheltered spots which were free from snow, especially among cabbages, where they may often be seen in companies of from twenty to fifty individuals; this, for instance, was the case on the 14th of February 1876, and on the 19th of December 1878, etc.

This species is the first of the whole genus to arrive here in the spring, the earliest arrivals almost invariably making their appearance before the 'First Woodcock.' The migration lasts until the end of April. The young autumn birds frequently appear as early as the last week of July, on fine warm days, in company with young Ringed Plovers and Redshanks. It appears to breed irregularly in Greenland; in Iceland it is more abundant, and in the Faroes it is numerous; from Ireland, England, and Scotland its breeding range extends eastwards through nearly the whole of Europe and Asia, advancing in the north even beyond the Arctic Circle, and in the south to the latitude of upper Italy.

279.—Jack-Snipe [Kleine Sumpfschnepfe].

SCOLOPAX GALLINULA, Linn.[1]

Heligolandish: Water Snepp = *Water Snipe.*

Scolopax gallinula.	Naumann, viii. 344.
Jack-Snipe.	Dresser, vii. 653.
Bécassine sourde.	Temminck, *Manuel*, ii. 678, iv. 439.

This pretty little Snipe is a well-known visitor to this island, occurring in fairly large numbers on both migrations. Unlike the preceding species, however, it appears to have a great objection to travel when the weather is cold, or, in fact, at all wintry. On fine warm days during the last half of April, and in the course of May, the birds show the utmost reluctance to quit the spot on which they have squatted, so that they are frequently almost trodden upon, and, indeed, have often been picked up with the hand; this sluggishness is probably due to the unusually plump condition in which one finds them, more particularly late in the summer, for that they are not fatigued by their migrations is proved at once by their vigorous flight when they are flushed. Indeed, as I have remarked before, with three exceptions, I have never yet known any bird of any kind to arrive here in a fatigued or exhausted condition.

The late appearance of this bird in spring points to its being a species whose nesting haunts lie in the high North. That indefati-

[1] *Gallinago gallinula* (Linn.).

gable investigator, the late Mr. John Wolley, brought the first eggs from Lapland, where he discovered several nests on the Tundras of Muonioniska in lat. 68° N., and Von Middendorff found it breeding on the Boganida in 70° N. latitude. According to Seebohm, however, it breeds also in Norway, on the Dovrefjeld, in 63° N. lat. above the zone of trees—the climate in these regions being probably similar to that of its other high northern breeding places.

Sandpiper—Totanus.—Among the numerous families of Waders and shore-birds distinguished by beauty of form and grace of motion, the genus of the Sandpipers occupies the most prominent place. So light and graceful is their gait that they hardly seem to touch the ground in walking, or at most only with the tips of their toes. Their flight also proceeds in a most graceful and dexterous manner, and under certain conditions may, by the aid of a few powerful beats of their long and narrow wings, be accelerated to a tremendous speed. The genus is rich in species, which are distributed over all parts of the earth. Seven of these are resident in Europe, in addition to which two or three American species have been observed as rare visitors: of these latter, *Totanus macularius* has once been shot in Heligoland.

The Heligolandish name for Sandpiper is 'Juhlgutt'; *Totanus hypoleucos*, however, is known as 'Soaltpieper' = Saltpiper.

280.—Redshank [Rothfüssiger Wasserläufer].

TOTANUS CALIDRIS, Linn.

Heligolandish: Road-futted Juhlgutt = *Red-footed Sandpiper.*

Totanus Calidris.	Naumann, viii. 95.
Redshank.	Dresser, viii. 157.
Chevalier gambette.	Temminck, *Manuel*, ii. 643, iv. 413.

The young birds of this species, in company with those of the Ringed Plover, form the van of the mighty hosts of large and small Waders which, during the autumn migration, cross and pass this island on their way to their distant winter quarters. The call-notes of these birds—in the case of the Redshank, a soft 'Djü—ü—ü,' and in that of the Ringed Plover a more long-drawn 'Tüüh,'—may be heard, more especially during the earlier hours of fine warm mornings at the beginning of July, and even as early as the last days of June; but the callers travel at such altitudes that they scarcely appear larger than small dots, while frequently even the

sharpest eye utterly fails to detect their presence. Old birds are seen and heard in the course of April: their call is clearer and louder, the final ü of the Djü being frequently repeated five or six times. Old individuals in perfectly pure winter plumage occur here extremely rarely, and then mostly during severe frosts.

The nesting-stations of this most numerous species of the genus extend through the whole of central and northern Europe and Asia.

281.—Spotted Redshank [Dunkler Wasserläufer].

TOTANUS FUSCUS, Linn.

Heligolandish: Swart Juhlgutt = *Black Sandpiper.*

Totanus fuscus.	Naumann, viii. 123; xiii. Blasius, *Nachträge*, 242.
Spotted Redshank.	Dresser, viii. 165.
Chevalier arlequin.	Temminck, *Manuel*, ii. 639, iv. 413.

The only perfect old male of this species in my collection was obtained as far back as the 11th of June 1847. Since that time one old but less beautiful bird has been shot, and similar examples have been seen on two or three other occasions. Of young autumn birds, about five or six examples have been shot during the last fifty years. Consequently this peculiarly coloured Sandpiper is considered amongst the great rarities of Heligoland.

The breeding places of this species range from the far north of Scandinavia to Behring's Strait.

282.—Greenshank [Heller Wasserläufer].

TOTANUS GLOTTIS, Bechstein.[1]

Heligolandish: Witt Juhlgutt = *White Sandpiper.*

Totanus glottis.	Naumann, viii. 145; xiii. Blasius, *Nachträge*, 243.
Greenshank.	Dresser, viii. 173.
Chevalier aboyeur.	Temminck, *Manuel*, ii. 659, iv. 420.

This beautiful species visits Heligoland regularly during its spring passage, from the end of April until the middle of May, but invariably only in solitary instances; and of the individuals thus observed only a very small number are ever shot, for the bird is of a singularly shy disposition, and even the excellent bird-call of a Claus Aeuckens will not tempt it within gun-shot range. Young birds of the year appear abundantly in the course of August, and are frequently shot, not having as yet developed the cautious disposition of their parents.

[1] *Totanus canescens* (Gmel.).

The old birds which visit this island resort exclusively to the shore at the base of the cliff, as do also large numbers of the young autumn birds; these, however, are also often shot while flying across the plain of the Upper Plateau, and on the dune, because being as yet unconscious of danger, they are led without difficulty to follow the sounds of the decoy-whistle. It is a singular fact that the old birds of this species, and also of the Grey Plover, which are not inferior to them in intelligence, while extraordinarily vigilant on land, seem to forget all caution at sea, at once following the feigned call-notes quite close up to a boat, and even attempting to alight a few paces off the latter, on the float-lines of the lobster baskets. The Redshank would never dream of doing this, being in fact, the shyest of the whole family.

The breeding range of the Greenshank extends from the northern Hebrides through Scotland, northern Scandinavia, and Finland, as far as Kamtschatka.

283.—Marsh Sandpiper [Teich-Wasserläufer].

TOTANUS STAGNATILIS, Bechstein.

Totanus stagnatilis.	Naumann, viii. 171.
Marsh Sandpiper.	Dresser, viii. 151.
Chevalier stagnatile.	Temminck, *Manuel*, ii. 647, iv. 414.

Very little can be reported from Heligoland in regard to this elegant Sandpiper. So far as our information goes, it has only been killed here once: the example in question, an old male in the prettiest and purest breeding plumage, was shot by Jan Aeuckens on the 7th of May 1862, and forms a great ornament to my collection. The deep black markings of the grey feathers of all the upper parts are very perfectly defined, and on the long posterior flight-feathers pass into transverse stripes or bands. This bird was found on the shore at the foot of the cliff.

The breeding range of this species extends from eastern Europe —*e.g.* Hungary—through southern Siberia to the Sea of Ochotsk.

284.—Green Sandpiper [Punktirter Wasserläufer].

TOTANUS OCHROPUS, Linn.

Totanus ochropus.	Naumann, viii. 58.
Green Sandpiper.	Dresser, viii. 136.
Chevalier cul-blanc.	Temminck, *Manuel*, ii. 651, iv. 415.

Its graceful shape, combined with the snowy purity of the white portion of its plumage, which is still further heightened by the

peculiar greenish-black colour of the upper parts, renders this bird the most pleasing representative of a family all of whose members display considerable attractions. To handle and examine one of these birds is a recurring enjoyment. It is not, however, often that one obtains one on this island, as during the spring passage almost all of them migrate at great altitudes without alighting, and only send down to us from the blue sky the greeting of their clear and flute-like calls. Young birds of the year, with the upper parts marked by fine rust-coloured spots, occur here in much greater abundance, and are shot fairly often. This species is the earliest arrival of the genus, the first individuals being observed as early as the end of March. The migration lasts until the end of April.

The species is found breeding from central Europe and Asia up to and within the Arctic Circle.

285.—Wood Sandpiper [Bruch-Wasserläufer].

TOTANUS GLAREOLA, Linn.[1]

Totanus glareola.	Naumann, viii. 78.
Wood Sandpiper.	Dresser, viii. 143.
Chevalier sylvain.	Temminck, *Manuel*, ii. 654, iv. 416

This, the smallest of the typical long-legged Sandpipers, occurs somewhat more frequently than the preceding species, but also invariably only in solitary instances during the spring migration, from about the middle of April to the end of May. It does not avoid the grass-plots of the Upper Plateau to the same extent as the Green Sandpiper, being frequently shot while running about there. This, however, refers only to old birds, for young autumn birds are hardly ever obtained here at all. As long as I have been collecting, only two examples of the latter have been shot; they invariably migrate at great altitudes, without being induced to follow the decoy-whistle. I ought to add that the August of 1888 formed an exception to this rule, some five or six young birds having been killed in the course of that month.

The breeding zone of this bird extends through northern Europe and Asia to Kamtschatka, and in the north advances beyond 70° N. latitude.

[1] *Totanus glareola* (Gmel.).

286.—Common Sandpiper [Kleiner Wasserläufer].

TOTANUS HYPOLEUCOS, Linn.

Heligolandish : Soaltpieper = *Saltpiper*.

Actitis hypoleucos.	Naumann, viii. 7.
Common Sandpiper.	Dresser, viii. 127.
Chevalier guignette.	Temminck, *Manuel*, ii. 657, vi. 419.

This lively little bird, which is of somewhat smaller size than the preceding species, visits Heligoland in greater number than any of its congeners; it displays a greater liking for society than some of its near relatives. Of the latter, one meets almost invariably only solitary individuals; whereas, the present species occurs in bands of ten, twenty, or more individuals, which disport themselves in a most lively and pleasing manner upon the stones in the shallow water at the foot of the cliff. If disturbed or flushed, as happens, for instance, if any one looks down on them over the edge of the cliff, the whole company take to their wings with merry pipings, the birds keeping very close to each other, and flying in a moderate curve, quite low above the surface of the water, to some other similar spot. If a stone is thrown after them while thus engaged, and happens to fall into the water with a loud splash close to or in the midst of the birds, the whole flock takes alarm and instantly dives beneath the water, but reappears after a moment or so, and flies away.

The nesting quarters of this small Sandpiper extend from Portugal to Kamtschatka; it breeds in Scandinavia, Finland, and throughout the whole of Asia up to the Arctic Ocean.

287.—Spotted Sandpiper [Gefleckter Wasserläufer].

TOTANUS MACULARIUS, Temminck.[1]

Actitis macularia.	Naumann, viii. 34.
Spotted Sandpiper.	Seebohm, *British Birds*, v. 122.
Chevalier perlé.	Temminck, *Manuel*, ii. 656, iv. 417.

In about the latter half of the thirties Hans Tonnies, a gunner whose name has been already mentioned in connection with the Slender-billed Curlew, shot during the month of May, by a small pond on the Upper Plateau, what was described as a 'Soaltpieper' (*Totanus hypoleucos*), 'quite similar to the common species, but having a small round black spot upon each of the white feathers of

[1] *Totanus macularius* (Linn.).

the underside.' Tonnies regarded it as a remarkable variety, having no idea of the existence of a separate spotted species. In the course of the summer this rare stranger was sold to a 'Badegast,' just as the Demoiselle Crane (*Grus virgo*), shot by Reymers in the summer of 1837 was, except that I was not so fortunate in procuring the specimen in this case as in the other instance.

In May 1847, Claus Aeuckens, having one day happened to shoot a *Tringa rufescens*, had noticed a small Sandpiper running about close by it. This bird, roused by the shot, had followed Aeuckens' imitation of its call-note, and kept soaring slowly, quite low above him with light beats of the wings. Aeuckens at once described this bird to me as white on the underside, with many black spots in form like 'the small roundish black spots of the Missel Thrush'; also, at that time, Aeuckens knew nothing of *T. maculatus*, but, nevertheless, used to assert constantly that what he had seen was another 'very rare' bird; unfortunately, at that time he possessed only an old and simple musket, and had not a second shot for the bird.

This is all we are able to report from Heligoland in regard to this small exclusively American species. In England, however, it has been shot rather more frequently.

Stilt—Himantopus.—Of this genus, which is closely related to the Sandpipers, five species are distributed over all parts of the earth. One of these is a resident in Europe, and is one of the rare visitors to Heligoland.

288.—Black-winged Stilt [Stelzenläufer].

HIMANTOPUS RUFIPES, Bechstein.[1]

Hypsibates hymantopus.	Naumann, viii. 191.
Black-winged Stilt.	Dresser, vii. 587.
Echasse à manteau noire.	Temminck, *Manuel*, ii. 582, vi. 350.

To the now almost extinct generation of old gunners and fowlers of Heligoland the Black-winged Stilt was a well-known bird, Reymers having, about fifty years ago, obtained an example of this species. From that time the bird had not been seen again until the 25th of June 1879, on which latter date Jan Aeuckens met with an old white-headed specimen on the rubble in the water at the foot of the cliff; unfortunately he had no gun at hand to

[1] *Himantopus candidus*, Bonnaterre.

enable him to kill the much-coveted spoil. The month in question was characterised by the prevalence of light south-easterly winds, with fine warm weather, conditions which served to bring many other rare residents of the far south-east to this island.

This bird is found as a breeding species throughout southern Europe and Asia, as well as in north Africa; though rarely extending its range to central Europe, it has nevertheless very frequently reached England.

Avocet — Recurvirostra. — This genus, characterised by the peculiar upwardly-curved form of the bill, comprises only four species, which are distributed over nearly all parts of the earth; only one of these belongs to Europe, and it has also occurred in a few instances in Heligoland. America and Australia possess distinct species of their own.

289.—Avocet [Säbelschnäbler].

RECURVIROSTRA AVOCETTA, Linn.

Recurvirostra avocetta.	Naumann, viii. 213.
Avocet.	Dresser, vii. 577.
Avocette à nuque noire.	Temminck, *Manuel*, ii. 590, iv. 387.

Strange to say this bird, so singular in form and coloration of plumage, has occurred in Heligoland in only a few instances, although it breeds numerously immediately opposite on all the islands off the coast of Holstein. The last example which occurred was shot by my son Ludwig on the dunes at the beginning of June 1871.

The breeding range of this species extends throughout central and southern Europe and Asia.

Oystercatcher—Hæmatopus.—This genus also appears to contain only five species. Only one of these is numerously distributed over all the coasts of northern Europe, and is also of quite common occurrence in Heligoland. According to Seebohm, eastern Asia, Australia and New Zealand, the Falkland Islands and Straits of Magellan, and also America, possess each a species of their own.

290.—Oystercatcher [Austernfischer].

HÆMATOPUS OSTRALEGUS, Linn.

Heligolandish : Lüew. Name given to the *Oystercatcher*, and probably formed onomatopœically after the call-note.

Hæmatopus ostralegus.	Naumann, vii. 325.
Oystercatcher.	Dresser, vii. 587.
Huitcrier pie.	Temminck, *Manuel*, ii. 531, iv. 351.

It is indeed impossible to discover how this bird has come by its name; for it would be but a sorry look-out for it if it had to sustain itself on oysters fished up by its own exertions, and even if a happy chance were to bring one of these luscious molluscs in its way it would not even be able to open it. However, it has got the name somehow, and godfathers and godmothers in baptism must be held responsible for it. In Heligoland it is very common, its loud call-note, well known to everybody, being heard at all times of migration during the day, and still more frequently at night. It, however, very rarely chooses this island as a place to stay in; some of them may perhaps roam about the dunes for a few days, apparently having their minds 'on thoughts of breeding bent.' During the summer months handsome old birds are often met with leading an apparently roving and aimless existence; and what is still more singular, birds which can by no means be regarded as stragglers are again seen in the winter during a severe frost.

I have been told by old people that before Heligoland became a sea-bathing resort, when the sand-island was much larger, and only visited in exceptional cases, scattered pairs of Oystercatchers used to breed annually on its southern tongue, which at that time was much longer and broader, and was composed of sand and gravel. Similar attempts at breeding, however, have only been made twice or three times within the last fifty years, and have only in one instance led to the production of offspring. The individuals which are met with here, under favourable conditions of weather, etc., are most frequently young birds of the year. I remember a very strong migration of all kinds of shore-birds which happened one August in the forties, there being at the time a light easterly breeze and heavy rainfall, in the course of which I shot, in less than three hours of the morning, besides countless other objects, some fifty young Golden Plovers. Turnstones, Knots and Dunlins, Ringed Plovers, Sanderlings,—all of them young birds, were migrating at the time in large flocks overhead, and swarming about in immense numbers in all directions. Young Oystercatchers were present in such numbers that on one occasion

thirteen of them remained unconcernedly at a distance of about twenty paces from where I was standing. I believe I could have killed the lot with one shot, for they were standing in close file, one behind the other, on the perfectly smooth sand, the rising tide just wetting their feet. Since, however, it is my rule never to kill any creature—bird, butterfly or beetle—unless for scientific or culinary purposes, these trustful children of the bird-world had no harm to fear from me.

The breeding range of the Oystercatcher extends from Ireland and the Hebrides to the Kurile Islands, and in Scandinavia up to the North Cape.

Sandpiper—Tringa.—This genus embraces about twenty species which are distributed at their breeding haunts over all the countries of the northern hemisphere, and are met with during the winter months not only in southern Africa but also in South America, Australia, and New Zealand. The nine European species visit Heligoland, almost all in quantities, besides which an American species, *Tringa rufescens*, has once been shot on the island. This species, besides several other American species, *T. bonapartei*, *T. pectoralis*, and *T. pusilla*, have also been obtained rather frequently in England.

291.—Knot [Isländischer Strandläufer].

TRINGA ISLANDICA, Gmelin.[1]

Heligolandish : Knott. *Name for this species.*

Tringa islandica.	Naumann, vii. 372.
Knot.	Dresser, viii. 77.
Bécasseau canut.	Temminck, *Manuel*, ii. 627, iv. 409.

No species offers so striking a proof of the enormous distances which birds can accomplish during their migratory journeys; while its most southern nesting stations are only a few degrees distant from the North Pole, it appears as though its chief breeding area, like that of so many other species, could only be situated on some extensive island or continent somewhere in the great North Polar Sea. Captain Feilden observed the birds for the first time, on the 5th of June 1876, near Knot Harbour, Grinnell Land, in lat. 82° N.; but in spite of the most energetic search he did not succeed in discovering the nest or eggs.

Now, from these high latitudes this species travels not only down to South Africa and Asia, but it has been met with in winter

[1] *Tringa canutus*, Linn.

in Australia and New Zealand. Therefore, those of the birds which have migrated from a latitude of 80° N. to one of 45° S. will have accomplished a distance of nearly eight thousand miles, their journey having led them from the ice-bound regions of the north to lands glowing beneath the rays of the equatorial sun, and thence once more to temperate climes. One may feel inclined to ask why the birds did not terminate their migration on reaching in the northern hemisphere a climate similarly conditioned to that of their final winter home south of the equator. While, however, the immense and apparently unnecessary latitudinal extent of this migratory flight presents us with an insoluble problem, its equally wide longitudinal range offers a weighty support for assuming, as we have intimated above, that there exists an extensive insular or continental area between the points reached by the *Jeannette* in 1881 and the Pole. For it is out of the question that Grinnell Land and the neighbouring regions in the western hemisphere could be the breeding area of those birds which travel down to Australia and New Zealand in the eastern half of the globe. Or whither, we may ask, were those individuals wending their course which were met with during the spring migration by Middendorff at the Sea of Ochotsk, by Dr. Bunge in New Siberia (Dr. Bunge, *Great Liakoff Island*; *Ibis*, 1888, p. 344), and by the *Jeannette* during its disastrous expedition in search of the Pole? Only one answer is possible, viz.—northwards, to a district of such extent and character as to afford suitable nesting places to the present species, as it does to others like *Tringa subarquata* and *T. arenaria*, *Anser torquatus*, *Larus rossei*, and numerous other species in the Arctic. Where else could we find such a region unless it be between the Jeannette Islands and the Pole? Unfortunately, insurmountable masses of ice still prevent us, with the means at present at our command, to reach this ornithological treasure-house; but should it ever be possible to construct balloons the motion of which could be under the complete control of the aëronaut, and the Jeannette Islands were made the starting-point of such an expedition, there is little doubt that this question could be solved with comparatively little difficulty. The observations of Dr. Bunge on Liakhov Island furnish, besides other interesting material, unequivocal proof of the determining influence of meteorological conditions, at the time being, on the occurrence of birds; because in the case of most of the species observed in that locality individuals observed migrating were similar—in greater or less numbers—on days with the same kind of weather, *i.e.* when the birds were subjected to similar influences. Thus, on the 11th of June, *Tringa canutus* and *T. subarquata* were observed in small flights, and on the 14th, more

numerously, several individuals having been shot; on the 18th, in still larger number, while on the 20th only solitary individuals or stragglers were met with. *T. arenaria* was seen on the 10th and 20th of June. Of *Charadrius hiaticula*, which breeds on the island, the first individuals arrived on June 11th; from that date the bird was rare, until the 20th, when it appeared in numbers. In the case of *C. fulvus*, which also breeds on the island, the first individual was seen on the 12th of June; several were observed on the 14th, and large numbers on the 20th. Of *C. helveticus* a pair was noticed on the 19th, but its numbers were increased on the 20th. This 20th of June seems in fact to have been a day specially favourable for migration, for parallel facts are repeated in the cases of many other species—*e.g. Phalaropus*, *Lestris*, and *Anas*. It is further a noteworthy fact that on this particular day the migration of species whose breeding homes lie to the north of the island either diminishes or ceases altogether, while that of species which have remained to breed, such as *C. hiaticula* and *C. fulvus*, rises in numerical proportion.

In Heligoland the Knot is of rather rare occurrence during the spring migration. In the course of May a bird may be met with occasionally on the dune; but I had to wait a good many years before I succeeded in obtaining a fine old individual in the pure nuptial plumage. About the end of July old birds in much faded summer plumage occur somewhat more frequently; in such individuals the beautiful rich ferruginous colour of the neck and lower parts had passed into a light orange-buff (*Orange-rostgelb*) while the ferruginous spots on the feathers of the back and wings have faded to a buffy-white (*rostgelblichem Weiss.*). This last colour is in sharp contrast with the glossy black ground-colour of the feathers of the back and shoulders, so that the bird still presented a strikingly beautiful appearance. However, birds like these have certainly not returned from breeding homes in the high north, but belong to the numerous individuals which have passed an errant kind of existence during the summer, large numbers of which are found among nearly all the species of shore-birds.

Young birds of the year in the grey plumage occur numerously, sometimes in flocks on the shore of the dunes, throughout August and the first half of September; on the other hand, old birds in pure winter plumage are of rather rare occurrence. Most of these are killed in the earlier part of the year on the upper plain of the island.

The breeding range of this species has been already discussed above; its eggs have never hitherto been discovered.

292.—Purple Sandpiper [Meerstrandläufer].

TRINGA MARITIMA, Brünnich.[1]

Heligolandish: Kanelk. *Name, the meaning of which cannot be traced.*

Tringa maritima.	Naumann, vii. 467.
Purple Sandpiper.	Dresser, vii. 69.
Bécasseau violet.	Temminck, *Manuel*, ii. 619, iv. 404.

This species is almost exclusively a winter visitor to the island. I have only obtained it once or twice in spring plumage; in the last of these cases I found two examples at the foot of the cliff, one of which I shot. On a later occasion I obtained another solitary specimen, and a few years ago two examples were again observed. During the winter months groups of from five to fifteen individuals are met with on the rocks and stones overgrown with sea-tang, which project above the water at the foot of the cliff; these birds are invariably old individuals in which the feathers of the head and back are nearly black with purplish reflections, which gives the bird a singularly beautiful appearance. Young autumn birds with the feathers of the upper parts edged with light borders, occur as stragglers at the end of August and September; these, strange to say, frequent the gravelly shingle and sea-tang which are found intermingled on the long southern point of the dune. Neither old nor young birds are met with on the Upper Plateau. This bird displays little shyness, and may be approached within gunshot range either in a boat or on foot.

It does not breed so far north as the preceding; nevertheless its nesting range embraces Greenland, Spitzbergen, Nova Zembla, the Taimyr Peninsula, and the other Arctic coasts of Asia, as well as Arctic America. On the south, Ireland, the Faroes, Orkneys and Shetlands appear to form the limits of its breeding range.

Quite contrary to the behaviour of the preceding species, *T. maritima* appears to adhere most obstinately to its northern home, not allowing even the inclemency of an Arctic winter to drive it into more genial latitudes. According to Collett (*Norges Fuglefauna*) countless flocks may be met with through the whole of the winter, not only along the northern coast of Norway, but also along the whole coast of Finmark. Few old birds probably extend their journey beyond the southern coast of the North Sea, and the stragglers which have been met with at the Mediterranean were probably, without exception, young birds of the year in autumn plumage (or after the moult).

[1] *Tringa striata*, Linn.

293.—Pygmy Curlew [Bogenschnäbliger Strandläufer]

TRINGA SUBARQUATA, Temminck.

Heligolandish: Road Stennick = *Red Sandpiper.*

Tringa subarquata.	Naumann, viii. 408.
Pygmy Curlew.	Dresser, viii. 59.
Bécasseau cocorli.	Temminck, *Manuel*, ii. 609, iv. 397.

Though admitted to the list of resident European birds, the Pygmy Curlew is of rarer occurrence in Heligoland than any other species belonging to our continent. During the many years that I have been busily collecting I have only once been able to obtain an old bird in pure summer plumage, though Aeuckens has once or twice had in his possession examples in the transitional stage of colour, from the winter to the summer plumage. A few solitary young birds of the year are shot every autumn; these frequent by preference the Upper Plateau of the island. Aeuckens asserts that he has seen, almost annually in May, small flocks of these birds migrating overhead at a great altitude, and in an easterly direction. I must confess, however, that I have never met with an instance of this.

The egg is, up to the present, unknown; nor have its breeding stations, which are doubtless identical with those of *T. islandica = canutus*, been hitherto reached, though the bird has been met with on its spring passage to the north in the Taimyr Peninsula, the islands of New Siberia, and other high latitudes.

294.—Dunlin [Alpen-Strandläufer].

TRINGA ALPINA, Linn.

Heligolandish: Stennick = *Sandpiper.*[1]

Tringa alpina.	Naumann, vii. 426.
Dunlin.	Dresser, viii. 21.
Bécasseau brunette.	Temminck, *Manuel*, ii. 612, iv. 399.

This species is richer in individuals than any other of its European congeners, and is also the commonest and most numerous representative of the genus in Heligoland. Old birds, in more or less perfect summer plumage are, it is true, met with for the most part as stragglers rather than in companies; but even these

[1] *Sandpiper* is the English equivalent for the genus designated in German by the name 'Strandläufer,' the literal translation of which is really *Shore-runner.*

occur in sufficient frequency to be well known to everybody. Young birds of the year, on the other hand, having the feathers of the back streaked with black or dark brown, are among the commonest of all the birds frequenting the shore of the dune from the end of July to the end of September. Old birds in pure winter plumage become less frequent in late autumn and during the winter months, though the confusion of sounds due to their calls, heard on all migration nights from October to March, gives evidence of the enormous flights of these birds which at this season cross and pass the island on their migratory passage.

Flocks of these birds, hurrying past this island in restless flight during the evenings and nights of December and January, invariably indicate the advent of wintry weather, with snow and severe frost, on the following day. Larks arrive almost at the same time, followed after a few hours by Golden Plovers, Lapwings, Curlews and Oystercatchers, all the birds manifesting the greatest haste as they dash past the island from east to west.

The breeding zone of this species extends from the Hebrides eastwards through the whole of northern Europe and Asia, as well as through North America. Middendorff met with it on the Taimyr as far north as 74° N. lat.; and, according to Benzon and Rohweder, its nesting stations extend to Denmark and Sleswick-Holstein.

Tringa Schinzii (Brehm). Naumann, vii. 221.

Naumann had already described this smaller form as a distinct species. In regard to its occurrence on this island, all I can say is that I have repeatedly obtained very small individuals, with the ferruginous colour strongly predominating in the feathers of the back generally, and, in the case of the scapulars, even quite supplanting their darker markings. In such individuals the black colour of the breast was also much less developed. These small birds are not met with on the dune by the seashore, which is almost exclusively the resort of the larger forms, but are only found on a small piece of water in a grassy depression on the Upper Plateau.

295.—Little Stint [Kleiner Strandläufer].

TRINGA MINUTA, Leisler.

Heligolandish : Lütj Stennick = *Small Sandpiper.*

Tringa minuta.	Naumann, vii. 391.
Little Stint.	Dresser, viii. 29.
Bécasseau échasses.	Temminck, *Manuel*, ii. 624, iv. 407.

This pretty little species is of very rare occurrence on the island during the spring passage, and in the course of fifty years I have only succeeded in obtaining one individual in May in breeding plumage. Young birds of the year in autumn plumage, on the other hand, are quite common here from August to the middle of September, frequenting the shore of the dune in company with large numbers of young Dunlins.

We have in this way a further proof that species from far-off eastern and north-eastern districts do not return to their homes in spring by the same circuitous routes, which they adopted on their autumn passage; but set out on their homeward flight in a straight and direct course from their winter quarters in Africa and Spain, leaving the points touched on during the autumn migration far to their left.

The breeding stations of the species extend over the Tundras and littoral regions of northern Asia and the islands lying off its coast. It is nearly fifty years ago that Von Middendorff found it nesting on the Taimyr Peninsula, and in 1886 Dr. Bunge found large numbers of what appeared to be the eggs and young of this species on the islands of New Siberia. In the west, its breeding range extends to northern European Russia, where Seebohm, in 1875, secured a rich spoil of eggs and nestlings on the estuaries of the Petchora.

A few scattered nests have been found by Collett since 1880 on Porsanger Fjord near the North Cape. The bird has also been met with during the summer months on Nova Zembla, and probably breeds on that island.

296.—Temminck's Stint [Temminck's Strandläufer].

TRINGA TEMMINCKII, Leisler.

Heligolandish : Lütj grü Stennick = *Small Grey Sandpiper.*

Tringa Temminckii.	Naumann, vii. 483.
Temminck's Stint.	Dresser, viii. 45.
Bécasseau Temmia.	Temminck, *Manuel*, ii. 622, iv. 405.

This little bird is, like the preceding species, a very rare spring visitor to this island, though it occurs somewhat more frequently

than the Little Stint; such solitary individuals, however, as have been shot in the course of May, at intervals of several years, invariably have their breeding plumage in a very imperfect stage of development, so that up to the present I have not succeeded in obtaining a perfectly coloured specimen for my collection.

Young birds of the year are shot annually in August and September, but, as a rule, much less frequently than those of *Tringa minuta* of the same age. They frequent by preference a small piece of fresh water on the Upper Plateau, where one never meets with *Tringa minuta*, but which is invariably resorted to by the old spring birds of the present species. From what one sees of this bird on the island one would regard it as rather partial to fresh water and grassy surfaces, whereas *Tringa minuta* appears to prefer the sandy flats of the sea-shore.

Temminck's Stint is found breeding from northern Scandinavia to the Sea of Ochotsk.

297.—Sanderling [Dreizehiger Strandläufer].

TRINGA ARENARIA, Linn.[1]

Heligolandish: Witt Stennick = *White Sandpiper.*

Calidris arenaria.	Naumann, vii. 353.
Sanderling.	Dresser, viii. 101.
Sanderling variable.	Temminck, *Manuel*, ii. 524, iv. 348.

The name by which this handsome species is known in Heligoland proclaims the season of the year on which it is principally seen on this island; for greater or smaller flights of these birds, in their pretty light-coloured plumage, are met with on the dune throughout all the winter months. This light-coloured winter dress presents a remarkable contrast to the dusky, almost black, plumage of *T. maritima*, a species which occurs here at the same time during the winter. It strikes one particularly when one examines the two birds side by side in the fresh condition, as one has frequent opportunities of doing during shooting excursions in the winter. It has, however, always seemed to me that in the white portions of the breeding plumage the colour is even purer—more of a snowy whiteness, in fact—than one finds in the winter garment. Unfortunately, individuals in the full breeding dress are very rare here; but the bird in this stage of plumage occupies, on the score of beauty, a prominent place among its congeners. Individuals of this description only occur here in very isolated instances towards the end of May; the young speckled birds

[1] *Calidris arenaria* (Linn.).

of the year, on the other hand, are very common from the end of July, roving about in flocks on the shore of Sandy Island; they are not, however, in the habit of running about on the wet sand at the water's edge, like the young Dunlins, but frequent the dry portions of the shore above high-water mark.

Up to the present time, only a few isolated nests of this species have been discovered. Its principal breeding grounds have not yet been reached, though they are doubtless situated in the same Polar area which forms the chief nesting quarters of *T. islandica=canutus* and *T. subarquata* for, according to Dr. Bunge's observations in New Siberia, this bird continued its spring migration northward from these islands in company with the species named above, and also reappeared on its return passage from the end of July to the middle of September.

M'Farlane, a collector of the Smithsonian Institution at Washington, found a nest with four eggs on the Arctic coast of North America, in 68° N. latitude. Captain Feilden found another with two eggs in Grinnell Land, lat. 82° 33′ N. During the German expedition, Dr. Pansch collected on Sabine Island, on the east coast of Greenland in 74½° N. lat., ten eggs which could only have belonged to this species, it being the only member of the genus Tringa met with in this district.

This is all that can be stated with certainty in regard to the nests and eggs of this species, numberless flocks of which are met with during its autumn migration in almost all the countries of the northern hemisphere.

298.—Turnstone [Steinwälzer].

TRINGA INTERPRES.[1]

Heligolandish: Seemannche = *The Little Merman.*

Strepsilas interpres.	Naumann, vii. 303.
Turnstone.	Dresser, viii. 555.
Tourne pierre à collier.	Temminck, *Manuel*, ii. 553, iv. 362.

The fact of this species being so well known in Heligoland is doubtless largely due to the rich coloration and variegated markings of its plumage, for it is by no means strongly represented as regards numbers. Spring birds in perfect plumage occur only in very isolated instances on the dune; but young birds of the year are fairly frequent during August and September. Now and again an old bird in dusky winter plumage may be seen in the course of the winter months.

[1] *Strepsilas interpres* (Linn.).

Probably few birds are so widely distributed as the Turnstone. Its breeding haunts extend from Greenland, Iceland, and the coasts of Scandinavia and Finland, along the whole of northern Asia, and through all the littoral area and islands of northern America. Captain Feilden has met with it in Smith's Sound, in 82° 30′ N. lat.; and Alfred Newton has found it on Spitzbergen. Its winter range extends, on the one side of the Atlantic, to the southern coast-regions of South America, and on the other to South Africa, and also to Australia and New Zealand.

299.—Broad-billed Sandpiper [Plattschnäbliger Strandläufer].

TRINGA PLATYRHYNCHA, Temminck.[1]

Limicola pygmæa. Naumann, viii. 271.
Broad-billed Sandpiper. Dresser, viii. 1.
Bécasseau platyrhyngue. Temminck, *Manuel*, ii. 616, iv. 403.

On the afternoon of the 29th of May 1855, as I was walking along the edge of the cliff, a densely crowded flock of fifteen small birds suddenly, amid much piping and chirping, flew from the sea close past me to the grassy plain of the Upper Plateau. Thinking that they belonged to *Tringa minuta*, I quickly imitated the call-note of that species, whereupon the birds, after circling round me in a curve, settled on the grass some forty paces off, and at once commenced running hurriedly backwards and forwards. Although the turf was very uneven, I succeeded, by seizing a favourable moment, in killing five of them at one shot. I have stated already that *T. minuta* counts in spring amongst our greatest rarities; and at the time in question I had as yet no example of this species in my collection. Overjoyed at my success, I rushed hastily towards my spoil, when to my utmost surprise I recognised in the five birds before me examples of the Broad-billed Sandpiper, a species which up to that time had been neither seen nor killed here, and therefore was something quite new to me. I shot other two of the same flight, and a day afterwards obtained four more: these probably also belonged to the same company, for although another strong migration took place on the 30th, we can hardly suppose that two such great rarities would occur on two successive days. However, *Hirundo rufula*, which was also new to Heligoland, occurred among the hundreds and thousands of Swallows which arrived on the island on this same 30th of May, of which enormous quantities subsequently perished from hunger and cold

[1] *Limicola platyrhyncha* (Temm.).

in consequence of the cold easterly gale. Since that time this species of Sandpiper has neither been shot nor observed here again; this is the more singular, inasmuch as it is by no means a rare breeding bird in northern Norway and Sweden, whence its nesting stations must extend through Finland to at least central Asia, for it is met with in India during the autumn migration.

300.—Ruff [Kampfhahn].

TRINGA PUGNAX, Brisson.[1]

Heligolandish: Bruus-höhn = *Ruff*; lit., *Fighting Cock.*

Machetes pugnax.	Naumann, vii. 502.
Ruff.	Dresser, viii. 87.
Combattant variable.	Temminck, *Manuel*, ii. 631, iv. 411.

Of this species, whose appearance is of such singular peculiarity in the fantastic ornamentation assumed by the male in breeding plumage, only young birds of the year occur as regular visitors on migration in Heligoland in autumn. Old individuals, with fully developed ruffs and head-plumes, are met with during all the summer months, either as stragglers or in small companies, up to the commencement of the autumn moult, when the long feathers of the neck begin to disappear again. These are doubtless individuals which have been roving about without pairing on the neighbouring coasts and flat islands, and which have been induced by the fine weather to undertake a somewhat further excursion across the sea. I have only twice obtained males with perfectly pure white ruffs; both of these are very handsome birds, especially the last, in which the feathers of the breast are black, with steel blue reflections, those of the upper parts being of a fine rust-colour speckled with black, each with a large shining roundish black spot at the tip.

The nesting range of this species commences in the west in Holland and northern Germany, and extends northwards to the extreme north of Scandinavia, and within the same parallels of latitude eastwards to Kamtschatka. Von Middendorff met with young birds in the middle of August, as high as 75° N. latitude; these birds must, therefore, have been hatched in districts still further north. Bunge, also, on the 19th of August, found a young bird on the New Siberian Islands.

[1] *Machetes pugnax* (Linn.).

301.—Buff-breasted Sandpiper [Rostgelber Strandläufer].

TRINGA RUFESCENS, Vieillot.[1]

Actitis rufescens. Naumann, xiii. ; Blasius, *Nachträge*, 239.
Buff-breasted Sandpiper. Dresser, viii. 111.
Bécasseau rousset. Temminck, *Manuel*, ii. 624, iv. 407.

The occurrence of the only example of this rare American bird ever killed or observed on the island dates back to the 9th of May 1847. This fine example was shot on a grass plot on the Upper Plateau by Claus Aeuckens, who, though at that time hardly emerged from the stage of a blowpipe sportsman, was nevertheless well acquainted with all the usual occurrences of bird-life.

Strange to say, the bird was in the company of another Sandpiper quite unknown to Aeuckens, but which, from his description, could be no other than the American Spotted Sandpiper (*Totanus macularius*). Unfortunately, as Aeuckens, like most of the gunners of those days, was only very inadequately provided in the way of fire-arms, having but a poor single-loading musket, he did not succeed in shooting the bird ; the latter, indeed, followed Aeuckens' imitated call-note, and kept soaring repeatedly quite low over him, so that he could quite clearly distinguish its roundish black spots, in form 'like the smallest spots on the underside of the Missel Thrush'—but it had flown away before he had got his gun loaded for a second shot.

This simultaneous occurrence of two shore-birds from the east coast of North America need however create no more surprise than the frequently noted appearance of several individuals belonging to entirely different species whose home is in the far east of Asia ; indeed, the latter have set out on their journey hither from a district which is at least half again as far from Heligoland as the home of these visitors from the Atlantic coasts of North America. This exclusively American species breeds in the high northern regions of that continent, and during the winter months extends its migrations far down into South America. Beyond the British Islands—where, according to Harting (*Handbook of British Birds*), it has occurred sixteen times—the instances of its occurrence in Europe are extremely rare and isolated.

Phalarope — Phalaropus.—This genus only contains three species, two of which belong to the Arctic coasts of the Old and New World, while the third is limited to the far north

[1] *Tryngites rufescens* (Vieill.).

of America. The two former species are met with in Heligoland.

302.—Grey Phalarope [Plattschnäbliger Wassertreter].

PHALAROPUS PLATYRHYNCHUS, Temminck.[1]

Heligolandish : Groot Swummer-Stennick = *Great Swimming Sandpiper.*

Phalaropus platyrhynchus.	Naumann, viii. 255.
Grey Phalarope.	Dresser, vii. 605.
Phalarope platyrhinque.	Temminck, *Manuel*, ii. 712, iv. 446.

The name which Heligolanders have assigned to this small and peculiar bird is a very descriptive one, for in its whole external appearance it really displays a good deal of resemblance to the Sandpipers. Its mode of life and habits, on the other hand, are, so far at least as my own observations go, entirely different. I have never seen it on the shore, but invariably on the water, though sometimes close to the shore; nor have I ever noticed that it exhibited the least desire of exchanging the one place of resort for the other. To watch this pretty bird actively pursuing its search for the larvæ of aquatic flies which form its food, on the waves nearest the shore, affords one of the most peculiar and pleasing insights into bird-life. Light as a feather, and seeming hardly to touch the water, with a turn now to the right now to the left, the bird allows itself to be carried by an inrolling wave quite close to the shore, only rising above its clear crest at the very moment when this is about to break in surf, so that each time that one fears the bird will be dashed beneath the water and buried in the rolling surf, it is already actively swimming about on the next advancing wave. I have sat for hours on the extreme point of the shore of the dune deeply absorbed in contemplating the familiar confidence displayed by these delicate creatures in an element of which every motion calls into activity forces of stupendous power.

This bird is not a frequent occurrence in Heligoland. I have only once obtained an example which showed any approach to the pure spring plumage. Young birds of the year, on the other hand, with the feathers of the upper part black and edged with straw yellow, are shot on the sea every autumn, and now and again also an old individual with the back of a pure grey colour.

The bird occurs as breeding species in Greenland, Spitzbergen, on the Arctic coast of Asia, and in Arctic North America to beyond 82° N. latitude.

[1] *Phalaropus fulicarius* (Linn.).

303.—Red-necked Phalarope [Schmalschnäbliger Wassertreter].

PHALAROPUS ANGUSTIROSTRIS, Naumann.[1]

Heligolandish: Lütj Swummer-Stennick = *Small Swimming Sandpiper.*

Phalaropus angustirostris.	Naumann, viii. 240.
Red-necked Phalarope.	Dresser, vii. 597.
Phalarope hyperboré.	Temminck, *Manuel*, ii. 709, iv. 445.

This small Phalarope is amongst our rarest occurrences. In November 1837 I shot a young bird at sea, and on 15th of May 1870, I obtained an old one in pure spring plumage. Between these two dates it has only been killed twice, which is the more singular, as it is by no means an uncommon breeding species in northern Norway. Its breeding range extends from the Hebrides and Greenland to Behring's Strait, and from Alaska eastwards through the whole of northern America.

Rail—Rallus.—This peculiar genus contains, according to Seebohm, fifteen species, which are met with both in the Old and New World. Of these, only one belongs to Europe, and it occurs in Heligoland.

304.—Water-Rail [Wasser-Ralle].

RALLUS AQUATICUS, Linn.

Heligolandish: Blü Ackerhennick = *Blue Field-hen.*

Rallus aquaticus.	Naumann, ix. 472.
Water-Rail.	Dresser, vii. 257.
Rale d'eau vulgaire.	Temminck, *Manuel*, ii. 683, iii. 438.

This bird, peculiar not only in shape, colour, and markings, but also in mode of life and habits, is universally known here, although only few and solitary examples are met with, and these are seldom caught. Though hardly ever shot, the bird occasionally gets into the nets of such throstle-bushes as are put up in gardens, and is frequently also caught by the hand in corners of court-yards and garden hedges; in fact, it very often seems to lose all shyness. On one occasion I raised one in my garden, when it flew off over a fence close by, about five feet in height, on the lower side of which there is a small enclosed and level space of ground. I looked cautiously

[1] *Phalaropus hyperboreus* (Linn.).

for a while across the fence in order to watch the further movements of the bird, but, despite all efforts, could not get sight of it again, and therefore gave up the search. Imagine my astonishment when, on looking up, I saw the bird not two feet from my face; it was sitting longways on the stout branch of a large elder-bush on the other side of the fence, and looking at me perfectly unconcernedly.

The Water Rail does not seem to mind raw and cold weather, for it often arrives as early as March, and again makes its appearance in November.

It breeds throughout the whole of Europe, and at least as far as central Asia.

Crake—Crex.—This genus comprises about twenty species which inhabit the Old World, though they are represented by closely related forms in America. Four of the species belong to Europe, all of which occur in Heligoland, some of them, of course, only in small numbers.

305.—Land Rail [Wiesen-Sumpfhuhn].

CREX PRATENSIS, Bechstein.

Heligolandish: Akkerhennick = *Field-hen.*

Crex pratensis.	Naumann, ix. 496.
Land Rail.	Dresser, vii. 291.
Poule-d'eau de genet.	Temminck, *Manuel*, ii. 686, iv. 439.

This bird, universally known in Germany as 'Wachtelkönig'—[*i.e.* 'King of the Quails']—is a common though never numerous occurrence on the island. Two or more of these birds are never seen together; however many may be on the island on a fair warm day in May or August, these are always solitary, and each individual goes about its own business apart from the others.

Unlike its near relative, the Water Rail, it makes its migrations conditional upon warm weather, and is of common occurrence on fine calm days from the middle of April to the end of May, and again from August into September. The bird is fond of frequenting gardens well supplied with bushes and shrubs, and while noiselessly stealing about among these, often manages to get under the net of the throstle-bush; it also frequents long grass, and may likewise be frequently met with among the shingle at the foot of the cliff.

It is distributed as a breeding species over the whole of Europe up to the Arctic Circle, and in Asia nests as far as the Jenesei.

306.—Spotted Crake [Gefleckтes Sumpfhuhn].

CREX PORZANA, Lichtenstein.[1]

Heligolandish : Lütj-bonted Akkerhennick = *Small many-coloured Field-hen.*

Crex porzana.	Naumann, ix. 523.
Spotted Crake.	Dresser, vii. 267.
Poule-d'eau marouette.	Temminck, *Manuel*, ii. 688, iv. 440.

This charming bird seems to be still more partial to warmth than the preceding species, for the few examples which one meets with here occur in May and August; nor can one exactly reckon upon obtaining more than three in the course of a year. As, however, such individuals are, in almost all cases, met with by the merest chance, we may assume that probably a somewhat larger number visits the island on both migrations.

With the exception of the extreme north, the breeding zone of this species extends over the whole of Europe, and at least as far as central Asia.

307.—Little Crake [Kleines Sumpfhuhn].

CREX PUSILLA, Lichtenstein.[2]

Crex pusilla.	Naumann, ix. 547.
Little Crake.	Dresser, vii. 283.
Poule-d'eau poussin.	Temminck, *Manuel*, ii. 690, iv. 440.

The Little Crake has only been seen and shot here once during the last fifty years—viz. on the 22nd of April 1854; the bird in question was an old female, and is preserved in my collection. In the case of this species also, we may probably assume that it has occurred more frequently, but on account of its small size and retired mode of life has always escaped observation. It occurs as a breeding species in the lower parts of central and southern Europe, and extends within the same parallels of latitude eastwards as far as India.

[1] *Porzana maruetta* (Leach).

[2] *Porzana parva* (Scop.).

308.—Baillon's Crake [Zwerg-Sumpfhuhn].

CREX PYGMÆA, Naumann.[1]

Heligolandish: Lühr-lütj Akkerhennick = *Smallest Field-hen.*

Crex pygmæa.	Naumann, ix. 567.
Baillon's Crake.	Dresser, vii. 275.
Poule-d'eau Baillon.	Temminck, *Manuel*, ii. 692, iv. 440.

I happened one fine afternoon in May to be standing in front of my house leaning on a low fence, having a talk with an old sailor, when a small bird came flying up the street and settled on the ground between us, so that it almost touched the toes of my boots. I whispered in some excitement: 'Look! here is a bird sitting between our feet which I have never yet seen on the island; how can I secure it?' The bird was a beautiful male of that handsome species, Baillon's Crake. The next moment it had flown off down the street. It settled, however, at a distance of about forty paces, by a high paling belonging to a garden along which there was a scanty growth of grass, and crept through a very small opening in the paling to the other side, where there was a space of about twelve feet square, densely overgrown, like a corn-field, with the stems of the Common Rocket, from three to four feet high and most of which were dead: hither the bird had fled for refuge. How was one to get it from a place where shooting was prohibited? This seemed, indeed, an almost hopeless undertaking. I went off as quickly as possible to Claus Aeuckens, who lived close by, and in as few words as possible explained the matter to him, and asked for his advice. He at once took hold of what is called here a 'Ketcher'—*i.e.* a sweep-net fastened to a stick about eight feet long—and hastened with me to the spot. Aeuckens, who is a thorough adept in matters of this kind, next began to push the stick of the 'Ketcher' from the other side of the paling along the ground among the dead shrubs, shaking it a little as he did so. He repeated this manœuvre foot by foot, and had scarcely reached the opposite edge of the enclosure when the bird came slipping out of its lurking-place like a mouse, but was at once covered with the net. Drawing a deep sigh of relief we looked at each other, for we had scarcely expected that we should accomplish our task successfully, however skilfully we might set about it. Every zealous collector will understand my joy when I held in my hand this new addition to the birds of Heligoland, until then never seen on the island. Before concluding this narrative, I ought to mention that the paling was

[1] *Porzana bailloni* (Vieill.).

seven feet high, and private property: so that Aeuckens and myself figured on this occasion as poachers of the worst type.

Since that time the species has not been seen here again. Its nesting stations are distributed locally and irregularly through central and southern Europe, and within the same parallels of latitude through Asia as far as Japan, occurring most numerously in the eastern portion of that area.

[On the 28th May 1890 a fine old male was caught, and is in my collection.]

Water-hen—Gallinula.—This genus contains about eighteen species (Seebohm), which are distributed over all the temperate parts of the earth. According to Dresser's investigations, the points in which these differ from each other are so insignificant that this author feels disinclined to accept them as genuine species. One of these forms only belongs to Europe, and is met with in Heligoland on very isolated occasions.

309.—Moorhen [Teichhuhn].

GALLINULA CHLOROPUS, Latham.[1]

Heligolandish: Grōön-futted Waterhennick = *Green-footed Water-hen.*

Gallinula chloropus.	Naumann, ix. 587.
Moorhen.	Dresser, vii. 313.
Poule-d'eau ordinaire.	Temminck, *Manuel*, ii. 693, iv. 441.

So far as I remember, ten examples at most is all that can be recorded of this species for the last fifty years; almost all of these, moreover, were caught in the throstle-bushes in the gardens; for, like all the preceding related species, this bird has a preference for creeping about stealthily under cover of rushes, grass, etc.

It is distributed as a resident breeding species through Europe and Asia. In Scandinavia it advances up to 63° N. latitude; and, if we follow Dresser in regarding the Moorhen of America as identical with the European species, we must consider its range as extending over the northern half of that continent.

Coot — Fulica.—This genus comprises about twelve species, which are distributed over all temperate countries of the world. Only one species is properly to be considered European—viz. *F. atra*; but the African species, *F. cristata*, is also found irregularly distributed as a breeding species on the islands and northern coast-tracts of the Mediterranean.

[1] *Gallinula chloropus* (Linn.).

In Heligoland *Fulica atra* has been the only species hitherto met with.

310.—Common Coot [Blässhuhn].

FULICA ATRA, Linn.

Heligolandish : Wäterhennick = *Water-hen*.

Fulica atra.	Naumann, ix. 635.
Common Coot.	Dresser, vii. 327.
Foulque macroule.	Temminck, *Manuel*, ii. 706, iv. 444.

This peculiar bird-form is also a very rare occurrence on this island. During all the time I have been collecting, perhaps from six to eight Coots have been shot while swimming on the sea near the island, in most occasions late in the autumn.

The nesting range of this species extends over the whole of central Europe and Asia, and as far as 60° N. latitude.

NATATORIAL BIRDS

NATATORES.

Swan—Cygnus.—The genus of these large and beautiful birds comprises only seven species; of these three belong to the Old World, two are resident in North America, one in South America, and one in Australia. The three Old World species also occur in Heligoland.

311.—Mute Swan [Höcker-Schwan].

CYGNUS OLOR, Illinger.[1]

Heligolandish: Swoan = *Swan.*

Cygnus olor.	Naumann, xi. 442.
Mute Swan.	Dresser, vi. 419.
Cygne tubercule.	Temminck, *Manuel*, ii. 830, iv. 529.

This bird has only been killed here twice; the first example, shot many years ago, was a youngish bird whose white plumage had a tinge of grey in it; the black tubercle at the base of the bill was also but little developed, while the colour of the upper mandible was only pale red. The second example was a very old handsome white bird with red bill and large tubercle; it was shot on the 21st of February 1881 by my son Ludwig, who on the same day killed a very large old Whooper Swan. Both the examples of this tuberculated species were very large, perfectly developed birds, showing no trace of having been kept in captivity at any previous period, and were in the full possession of their flying powers.

Wild birds of this species breed in isolated instances in Denmark, Southern Sweden, Germany; and within the same parallels of latitude throughout Asia.

[1] *Cygnus olor* (Gmel.).

312.—Whooper Swan [Singschwan].

CYGNUS MUSICUS, Bechstein.

Heligolandish: Swoan = *Swan.*

Cygnus xanthorhinus.	Naumann, xi. 478.
Whooper Swan.	Dresser, viii. 433.
Cygne à bec jaune.	Temminck, *Manuel*, ii. 828, iv. 526.

The musical talent of this bird can hardly be said to be of a high order; nevertheless, a flock of nineteen of them, which was flying along in a long line, once made me believe that the sons of a proprietor of a dancing-saloon close by had got possession of some of the trumpets, and were giving free expression to their musical fancies; it was only when I noticed the real musicians, travelling high above my head, that, to my great amusement, I recognised my error.

This Swan occurs here more or less numerously every winter, being seen most frequently during long-continued frost; on such occasions it is nothing uncommon to see flights of ten, twenty, and even much larger numbers, migrating high overhead in a long row one behind the other, uttering loud trumpet-calls as they pass along.

The breeding range of this species extends through the extreme north of Europe and Asia.

313.—Bewick's Swan [Kleiner Schwan].

CYGNUS MINOR, Keyserling and Blasius.[1]

Heligolandish: Lütj Swoan = *Little Swan.*

Cygnus melanorhinus.	Naumann, xi. 497.
Bewick's Swan.	Dresser, viii. 441.
Cygne de Bewick.	Temminck, *Manuel*, iv. 527.

This bird is seen here only extremely rarely, and only solitary examples are ever met with; its almost total absence from the island is, however, easily explained, as it is also very rarely observed in Finland and Scandinavia. Its more numerous occurrence during the autumn and winter in Scotland, England, and Ireland might, on the other hand, appear singular, were it not that it merely affords another proof of a fact established as regards other species—viz. that many migrants pursue a westerly flight during the first part of their passage, and only subsequently turn their course to the south. The same applies to the present species, which breeds in Nova Zembla and the whole of the coast-region of

[1] *Cygnus bewicki*, Yarr.

northern Asia. I have in my possession an egg of this Swan, which was collected by Seebohm on the Lower Jenesei in lat. 70½° N.

The only example ever killed here is preserved in my collection; it is an old bird which was shot on the 17th of March 1875.

Goose—Anser.—This genus is numerously distributed almost from Pole to Pole, and in nearly all latitudes of the Northern Hemisphere. Eight or nine of the species are European, and with only one exception—viz. *A. ruficollis*—also visit Heligoland, though, for the most part, as mere passing callers on migration.

314.—Grey Lag Goose [Graugans].

ANSER CINEREUS, Meyer.

Heligolandish: Groot Grü Guss = *Great Grey Goose.*

Anser cinereus.	Naumann, xi. 229.
Grey Lag Goose.	Dresser, vi. 355.
Oie cendrée.	Temminck, *Manuel*, ii. 818, iv. 517.

It is impossible to determine how often this species may occur among the numerous flocks of Geese passing over this island during the double migration. It is, however, only shot in solitary instances. Grey wild Geese in general rarely alight on the island; and even when they do so, are not easily got at for want of cover. I possess a very large, and probably very old, example of this species, which has a row of small perfectly white feathers at the base of the upper mandible.

The Grey Lag Goose breeds in the Hebrides, in Scotland, Germany, Scandinavia, Finland; eastward it ranges to China; and on the north upward along the coast of Norway to 70° N. latitude.

315.—Bean Goose [Saatgans].

ANSER SEGETUM, Bechstein.[1]

Heligolandish: Grü Guss = *Grey Goose.*

Anser segetum.	Naumann, xi. 302.
Bean Goose.	Dresser, vi. 363.
Oie vulgaire.	Temminck, *Manuel*, ii. 820, iv. 517.

Most of the wild Geese which are shot here belong to this species; we may therefore assume that the majority which touch upon Heligoland belong to it.

[1] *Anser segetum* (Gmel.).

The nesting stations of the Bean Goose do not extend so far south as those of the preceding species—in Norway not lower than 64° N. lat.; from thence its breeding range extends through Finmark, northern Finland, and the whole of northern Asia.

316.—Pink-footed Goose [Kurzschnabel-Gans].

ANSER BRACHYRHYNCHUS, Baillon.

Pink-footed Goose. Dresser, vi. 369.
Oie à bec court. Temminck, *Manuel*, iv. 520.

So far as I know, this Goose has only been killed here three times. Unfortunately the first of these examples, an old bird with nearly pure rust-coloured neck, went to ruin. I obtained a somewhat younger individual on the 30th of March 1880, which is in my collection; and a young bird was shot in October. The species must be altogether of rare occurrence in Germany, otherwise Naumann could never have overlooked it; for it is impossible to confound a freshly-shot old bird of this species with any other European form of Grey Goose, not only by reason of its strikingly small bill, but also on account of the conspicuous rich rosy-red (*rosenrothe*) colour of this organ. Temminck describes this colour as a vivid purple red; but it is only about twenty-four hours after the death of the bird that the red colour becomes darker. The feet are of a lighter red than the bill, and neither had—in the specimens which passed through my hands—the least touch of yellow or orange.

The head and neck of this Goose are of a pronounced rust-colour. The outer flight-feathers are invariably very light-bluish ash grey (*bläulich aschgrau*); this colour also extends to the largest of the outer wing-coverts, which, moreover, have very broad pure white tips. There is also a great deal of pure white in the markings of the tail, which in this respect have no resemblance to those of *A. segetum*, but are almost like those of very old examples of *A. cinereus*; in fact, *A. brachyrhynchus* is altogether much nearer to the latter species in the whole of its coloration. Apart from this, the wings of the present species project four centimètres (1·56 ins.) beyond the tail, whereas in the Bean Goose they are of equal length with it, and in the Grey Lag Goose recede considerably behind its apex. The measurements of the old bird described above are:—Total length, 26·38 ins. (670 *mm.*); wings, 16·14 ins. (410 *mm.*); tail, 5·51 ins. (140 *mm.*); beak, 1·69 in. (43 *mm.*); tarsus, 2·95 ins. (75 *mm.*); middle toe, 2·95 ins. (75 *mm.*).

The beak is rosy-red, the nail being black, as are also the

margins of the mandible. There is, besides, a black spot on each side of the beak between its upper ridge and the nostril, this spot being broad where it commences at the sides of the forehead, and running out into a point above the anterior margin of the nostril. In my example, there was in addition a further small dark spot between the first dark spot and the mandible. The beak of this species measures, in the old bird, 1·69 in. (43 *mm.*) from the forehead to the tip; in *A. cinereus*, 2·24 ins. (57 *mm.*) to 2·36 ins. (60 *mm.*); and in *A. segetum*, 2·76 ins. (70 *mm.*), these measurements being taken from old males in my collection.

The Pink-footed Goose is accounted an Arctic breeding species. Seebohm, in regard to its breeding quarters, says definitely that it nests in Spitzbergen, probably in Iceland, and possibly in Franz-Joseph Land. It occurs, however, on migration in China and Japan, whence we may assume that its breeding range extends to the Polar area north of the Jeannette Islands, for the existence of which we have endeavoured to adduce proofs when treating of the species of Tringa.

317.—White-fronted Goose [Blässgans]

ANSER ALBIFRONS, Bechstein.[1]

Anser albifrons.	Naumann, xi. 351.
White-fronted Goose.	Dresser, vi. 375.
Oie rieuse.	Temminck, *Manuel*, ii. 821, iv. 518.

Only two examples of this species have occurred during the long period of years over which my observations have extended. About forty years ago the brothers Aeuckens managed to secure alive a very fine old male, which had been slightly wounded. The bird used to run about freely in a yard, and throve so well that after six weeks its wound was completely healed, and it flew away again, much to my regret and that of its owners, as it was an extremely handsome bird. The second example was shot two or three years ago. It is a rather young bird, in which the white marking of the forehead only consists of small scattered feathers, which are commencing to break through the blackish-brown colour around the beak.

This species touches Heligoland probably only on very rare occasions. Among the large numbers of Grey Lag Geese which migrate over and past the island, one never observes individuals small enough to allow one to regard them as belonging to this species. The breeding range extends along the Arctic coasts of Asia and the groups of islands which skirt them. Von Middendorff found it nesting in the Taimyr Peninsula in 74° N. lat.; and

[1] *Anser albifrons* (Scop.).

Dr. Bunge on the islands of New Siberia. If Dresser and Seebohm are correct in considering this species identical with *A. gambeli*, its breeding range will also extend to Arctic America.

318.—Lesser White-fronted Goose [Zwerggans].

ANSER MINUTUS, Naumann.[1]

Anser minutus.	Naumann, xi. 365.
Lesser White-fronted Goose.	Dresser, vi. 383.
Oie naine.	Schlegel, *Krit. Uebersicht d. Europ. Vögel*, p. cx.

A young bird of this species, in the first autumn plumage, is among the earliest specimens of my collection, having been obtained nearly fifty years ago. Since that time, no other individual of this species has either been seen or shot here.

In the form of the different parts of its body, this species stands in a similar relation to the preceding as *A. brachyrhynchus* to *A. cinereus*, *Larus leucopterus* to *L. glaucus*, or *L. fuscus* to *L. marinus*; that is to say, in the smaller species the body is less compressed than in the larger. The wings are relatively longer, and in the case of the smaller species project far beyond the tip of the tail; while in the larger species they either do not reach it, or are of equal length with it, or only just project beyond it. Similar relations obtain in the case of *Charadrius fulvus* and *C. auratus*, and also in *C. hiaticula* and *C. minor*, all of which agree in colour and general marking, but, apart from size, differ particularly in the relations existing between the various parts of the body. When to these differences of measurements and relations of parts we have to add, as in the present case, an entirely different coloration of the bill and feet—these being orange in *A. minutus*, but light flesh-colour in *A. albifrons*—it becomes quite incomprehensible to us how these two species could have been united as one species, as has been attempted by some writers. We may mention, in addition, that in *A. albifrons* the wings are of equal length with the tail, whereas in *A. minutus* the tips of the wings project 1·50 in. (38 *mm.*) beyond the end of the tail; or, in other words, the first, second, and third flight-feathers extend beyond the tail, while the fourth is the first of the flight-feathers which is equal to the tail.

Solitary examples of this species are found breeding even as far south as northern Scandinavia, and thence through the whole of the coast-regions of northern Asia as far as Behring's Strait.

[1] *Anser erythropus* (Linn.).

319.—Snow Goose [Schneegans].

ANSER HYPERBOREUS, Pallas.[1]

Anser hyperboreus.	Naumann, xi. 213.
Snow Goose.	Dresser, vi. 413.
Oie hyperborée.	Temminck, *Manuel*, ii. 816, iv. 516.

Although no example of this Goose has as yet been shot on Heligoland, several undoubted cases of its occurrence on the island have been brought under my notice. In the first of these instances a number of gunners saw, in the course of the severe winter of 1844-45, nine quite white Geese with black flight-feathers, like Gannets (*Sula alba*), flying in a row past the eastern point of the shore; the same phenomenon was observed on the 19th of December 1847. On the next occasion, two gunners called Dähn, father and son, while out lobster-catching at the beginning of May 1880, saw from their boat four white Geese, with orange-coloured beaks and feet, flying close past them; and on the 12th of the same month, they saw three others under similar circumstances. Unfortunately they were, in both cases, unprovided with guns, and the birds flew past them at a very short range. Finally, on the 25th of December of the same year, some little boys found a perfectly white Goose, with black wings and orange beak and feet, sitting on the Upper Plateau; the bird in question displayed so little shyness that the boys were able to throw clods of earth at it from quite close quarters.

The breeding range of the Snow Goose extends from the Hudson Bay country in Arctic America to Alaska (*Natural History of Alaska, Signal Service, U.S. Army*, vol. ii. p. 138), and further westward to northern Asia, where the bird was met with during the *Vega* Expedition on the coast of the Tchuktchee Peninsula on the 10th, 14th and 15th of June (*Vega Expedition*, Palmén). Undoubtedly these birds were engaged migrating to the area of land which we have already mentioned as probably existing between eastern Asia and the Pole.

320.—Brent Goose [Bernikel-Gans].

ANSER TORQUATUS, Frisch.[2]

Heligolandish: Radde-Guss. Name for *Brent Goose.*

Anser torquatus.	Naumann, xi. 393.
Brent Goose.	Dresser, vi. 389.
Oie cravant.	Temminck, *Manuel*, ii. 824, iv. 522.

Isolated examples of this Goose appear here every winter. During a long spell of severe frost, flights of from fifteen to twenty

[1] *Chen hyperboreus*, (Pall.).

[2] *Bernicla brenta* (Pall.).

and more of these birds are commonly met with swimming or drifting about on the sea. Smaller companies of from five to ten may be seen at high tide, when the sea is calm, swimming about close to the foot of the cliff, picking off the small molluscs, crustaceans, etc. found attached to the rocks there.

The breeding zone of this species lies very far to the north, extending from the northern parts of Greenland across Spitzbergen, Franz-Joseph Land, Nova Zembla, the Taimyr Peninsula, eastwards to Grinnell Land, where Captain Feilden found it nesting as far as lat. 82° 33′ N.

321.—Bernacle Goose [Weisswangige Gans].

ANSER LEUCOPSIS, Bechstein.[1]

Anser leucopsis.	Naumann, xi. 378.
Bernacle Goose.	Dresser, vi. 397.
Oie bernache.	Temminck, *Manuel*, ii. 823, iv. 520.

This pretty little Goose is of very rare occurrence on Heligoland. So far as I remember, only two examples have been killed within the last fifty years, one of which, a handsome old bird, is preserved in my collection. Claus Aeuckens insists on sometimes having seen small flights of this Goose passing over the island during the spring migrations, though I myself have never experienced anything of the kind.

The nesting stations of this species have not been reached, up to the present time. They appear to be situated within the highest Polar areas, for the bird has been met with at the migration periods in Greenland, Spitzbergen and Nova Zembla.

Duck—Anas.—In the number of its species this genus exceeds every other among birds. The majority of species also are remarkably rich in numbers of individuals, and are distributed over all parts of the earth; even little Heligoland being visited by no less than twenty species, and in the case of some of these, at times in incredible numbers. For a long time now, and on many sides, attempts have been made to raise each of the different forms in which these birds present themselves to the dignity of a separate genus, so that now there are almost as many genera as there used to be species. I myself, however, have preferred to follow in this, as in many other cases, the older nomenclature of my great master, Naumann.

[1] *Bernicla leucopsis* (Bechst.).

322.—Mallard [Stockente].

ANAS BOSCHAS, Linn.

Heligolandish: the male—Grööñ-hoaded Gjoard = *Green-headed Drake.*
The female—Grü Enn = *Grey Duck.*

Anas boschas.	Naumann, xi. 576.
Mallard.	Dresser, vi. 469.
Canard sauvage.	Temminck, *Manuel*, ii. 835, iv. 531.

Like all fresh-water Ducks this species never occurs here in large numbers, but only solitary examples are met with, both during the autumn and spring migrations. During a long spell of severe frost it also occurs during the winter months, such birds, however, being invariably in a very emaciated condition.

This generally known species, the ancestral parent of the domestic Duck, breeds in central and northern Europe, and within the same parallels of latitude throughout Asia and America, as well as in Greenland; it however, only in rare instances, advances beyond the Arctic Circle.

323.—Pintail [Spiessente].

ANAS ACUTA, Linn.[1]

Anas acuta.	Naumann, xi. 638.
Pintail.	Dresser, vi. 531.
Canard à longue queue.	Temminck, *Manuel*, ii. 838, iv. 532.

This beautifully shaped Duck is but of very rare occurrence here; as long as I have been observing, I have only met with five or six examples, all, with but one exception, being old males.

The breeding range of the species extends from Greenland and Iceland through Europe, Asia, and America; it is not found nesting north of the Arctic Circle, nor does it extend further southward than the latitude of central Germany.

324.—Gadwall [Mittelente].

ANAS STREPERA, Linn.

Anas strepera.	Naumann, xi. 659.
Gadwall.	Dresser, vi. 487.
Canard chipeau.	Temminck, *Manuel*, ii. 837, iv. 532.

I have only once seen an example of this species. The bird had been shot by the eldest of the Aeuckens brothers, and was a

[1] *Dafila acuta* (Linn).

not very handsome male, though at once recognisable by the ferruginous colour of the wing-coverts and the black bill. This species also breeds from Iceland south to central Germany, and within the same parallels of latitude through Scandinavia, Russia, and the whole of Asia and North America.

325.—Wigeon [Pfeifente].

ANAS PENELOPE, Linn.[1]

Heligolandish : Feif-Enn = Pfeifente—*i.e. Piping or Whistling Duck.*

Anas penelope.	Naumann, xi. 724.
Wigeon.	Dresser, vi. 541.
Canard siffleur.	Temminck, *Manuel*, ii. 840, iv. 533.

This pretty Duck is a well-known bird here, being shot, not indeed very often, but yet fairly frequently in the winter months, during severe frosts. During the day it is only seen singly, never in companies; but its merry, numerously resounding call-notes, on calm dark migration nights, give unmistakable evidence of the copious numbers of individuals contained in the migratory flights. They evidently fly at a very low elevation across the Upper Plateau—so low, indeed, that the hurried beats of their wings may be distinctly heard in the stillness of the night, and one is induced involuntarily to look upwards under the belief of being able to perceive the wanderers.

Their nesting area includes Iceland, and extends within the same parallels of latitude through Scandinavia and Finland, as far as eastern Asia. South of this zone its nest is only rarely met with, though it is found pretty often to the north of it. Von Heuglin actually killed a female as far north as Nova Zembla.

326.—Garganey [Knäkente].

ANAS QUERQUEDULA, Linn.[2]

Anas querquedula.	Naumann, xi. 677.
Garganey Teal.	Dresser, vi. 513.
Canard sarcelle d'été.	Temminck, *Manuel*, ii. 844, iv. 539.

This small Duck is also among our very rare occurrences, only three examples, all old males, having been seen and shot during the last fifty years. This is the more singular, as the birds breed—although never numerously—on the continent close by, in

[1] *Mareca penelope* (Linn.).

[2] *Querquedula circia* (Linn.).

England and in Sweden. Its nesting range extends from France to the Amoor River.

327.—Teal [Krickente].

ANAS CRECCA, Linn.[1]

Heligolandish: Krück-Ent = Krickente = *Teal*.

Anas crecca.	Naumann, xi. 701.
Teal.	Dresser, vi. 507.
Canard sarcelle d'hiver.	Temminck, *Manuel*, ii. 846, iv. 539.

Young birds of this, the smallest of our native Ducks, occur here pretty frequently in autumn. Males in handsome plumage make their appearance soon after the break-up of winter, and in the course of spring, and large flocks are seen to pass on migration. Heligoland, in fact, does not possess suitable stations to induce this and other species of Ducks to alight and tarry upon it.

This beautiful bird is distributed as a breeding species in very large numbers from Iceland throughout England, Germany, and Scandinavia, up to 70° N. latitude; and is found nesting within the same parallels of latitude as far as eastern Asia.

328.—Shoveller [Löffelente].

ANAS CLYPEATA, Linn.[2]

Anas clypeata.	Naumann, xi. 747.
Shoveller.	Dresser, vi. 497.
Canard souchet.	Temminck, *Manuel*, ii. 842, iv. 540.

Only one example of this species can be recorded from Heligoland—an old female in my collection,—which was shot many years ago. Besides this example, the species has never been seen here, which is probably owing to the fact that its nesting zone does not lie so far north as that of many of its congeners previously mentioned. It is found breeding from England through Jutland, lower Scandinavia, and Russia, as far as eastern Asia, Alaska, and in the whole of northern America.

[1] *Querquedula crecca* (Linn.).

[2] *Spatula clypeata* (Linn).

329.—Shell Duck [Brandente].

ANAS TADORNA, Linn.[1]

Heligolandish: Barger-Enn = *Bergente*? (Mountain-Duck).

Anas tadorna.	Naumann, xi. 534.
Shelldrake.	Dresser, vi. 451.
Canard tadorne.	Temminck, *Manuel*, ii. 833, iv. 531.

This bird is on the whole but of rare occurrence here, although in Sleswick-Holstein, near by, it is fairly numerous as a breeding species—in fact, almost as a domestic bird. Those which are met with on this island are, for the most part, young individuals, killed on occasional instances in August and September. Old birds have only been seen and shot rarely, their number, so far as my observations go, amounting to about half a dozen, almost all of which occurred in the winter months during severe frosts.

The breeding range of this species extends from Great Britain to eastern Asia, and from northern Germany up to 70° N. latitude in northern Scandinavia.

330.—Common Scoter [Trauerente].

ANAS NIGRA, Linn.[2]

Heligolandish: Male: Knobbed. Name derived from the hump on the beak.
Female: Bührn. Name without further signification.

Anas nigra.	Naumann, xii. 99.
Common Scoter.	Dresser, vi. 663.
Canard macreuse.	Temminck, *Manuel*, ii. 856, iv. 543.

If we include, in our report on the swimming birds of Heligoland, those ducks which live upon the sea around, the fauna acquires a different aspect. On the island poverty of numbers characterises this division, but on the sea, at certain times, the quantity of birds to be seen, during long and severe winters, for miles around this island, is quite beyond conception, and defies all description. A long spell of frost, such as was experienced, *e.g.*, in the winters of 1837-38, 1844-45, and on other occasions, causes the whole of the Baltic to be covered with ice, while the entire bay from around the coast of East Friesland up to Sylt forms one continuous field of pack ice. All the flocks of birds which, during ordinary winters, are in the habit of staying in the Gulfs of Bothnia and Finland, and under the shelter of the west coast of Holstein, now congregate on the

[1] *Tadorna cornuta* (Gmel.).

[2] *Œdemia nigra* (Linn.).

open sea outside of this ice-field. Wherever the eye roams it alights upon Sea Ducks of all possible species, near and far, high and low, in smaller or larger flocks, singly or in pairs. These consist of myriads of Common and Velvet Scoters, flights of from five to fifty gay-coloured Red-breasted Mergansers, smaller companies of the beautifully-coloured Goosander, mixed with bands of from twenty to a hundred or more Scaups (*A. marila*), which flights again may be crossed by from three to five of the brilliant white, green-headed males of the Golden Eye, and the still rarer and elegant Eider Duck; and travelling high overhead long chains of Whooper Swans send forth their loud and resonant trumpet-calls. The wide surface of the sea presents a scene of aquatic bird-life equally rich and varied. Velvet and Common Scoters assemble in dense crowds near the ice, while large flocks of Scaups, all keeping close together, dive and swim about among the rocks off the eastern and western sides of the island. This part of the sea is also frequented by flocks of Red-breasted Mergansers, which likewise hold aloof from those of other species; besides smaller flocks of the pretty Long-tailed Duck, solitary individuals of the beautiful Brown-headed Pochard (*A. ferina*), and, more rarely, of the beautiful Tufted Duck. The pretty little Smew is only rarely seen, from three to five examples in a flock being the most one ever meets with. Here and there, dispersed among this motley throng, a *Colymbus cornutus*, in plumage of satiny gloss, pursues his way, heedless and independent of the flocks around him; and from three to five Black Guillemots (*Uria grylle*) may be seen diving and swimming about, equally regardless of the rest of the busy life around. To the passionate sportsman and ornithologist, heedless of the cold and biting frost, these are indeed red-letter days. A large assemblage of all kinds of birds, more especially of Common and Velvet Scoters, always gathers on the lee side of the ice-field. Generally a calm prevails over this part of the sea; this, however, makes it much more difficult for large and clumsy birds, like these Ducks, to rise from the water, and knowing that they only do so against the wind, a sportsman steers his boat in such a manner that in rising they have to cross its bow. Now, the Ducks know this just as well as the gunner, so they hesitate for a moment, undecided whether they shall escape the danger either by flight or diving, and this moment of indecision generally brings about their destruction. Most of the Ducks, however, are shot on the wing in front of the ice-fields, where the most varied species rove about in innumerable greater and smaller companies. If managed in the right fashion, this sport may be very profitable. The two older of the brothers Aeuckens have often killed more than fifty birds in one morning, and during the severe winter of

1844-45, I shot as many as fifty-four in one afternoon, bags of some forty having frequently fallen to my share on other occasions. I ought not to omit to mention here that at that time we had still to make shift with percussion guns; and with one's fingers more like icicles than living flesh and blood, putting on the caps was by no means an agreeable business; still, as one did it for pleasure, there could be no talk of discomfort. The seamy side of the sport only began to be felt when it ceased to be productive.

Large numbers of Ducks are also caught in nets, which are put out near the islands in shallow water, so that they are left dry at low tide. These nets, which are eighteen feet square, are made of strong thread, and have pretty wide meshes; along the margins a number of corks are attached for the purpose of keeping the net afloat. A line is attached at each of the four corners of the net, having a stone tied to its end, the weight of which is sufficient to hold the net in position, even when the water is somewhat agitated; the length of these lines is so adjusted that, as the net is raised by the corks with the rising tide, they may keep it stretched out horizontally below the surface at a little above half high-water mark. The Ducks, which dive very actively after their food—small fishes and crustacea—in their pursuit of these get to the spot over which the net is stretched, and are caught in the latter as they are in the act of returning to the surface. Their supply of air being already exhausted, death soon ensues, and the spoil is gathered in at the next low tide. The catch is more productive at night, partly because the ducks then come close in to shore in larger numbers, and also because the cleverer ones among them are then less able to avoid the net, though they must be sufficiently sharp-sighted to be able to discover their food at the bottom of the sea in the dark. In regard to the food of these birds, we were once enabled to make an interesting observation: during one stormy night in winter a ship stranded, and went to pieces on the long southern extremity of the dune. Its cargo, consisting of small grey horse beans, was carried by the current along the sea-bottom far out to the east. This undoubtedly quite new dish was so much approved of by the ducks, that thousands of them assembled and remained on the spot, where, in a depth of about ten fathoms, this evidently very welcome food was spread in rich abundance. All the birds obtained from this quarter were literally enveloped in fat, which, unlike its normal condition, was very white and palatable. These birds had not a trace of the fishy taste peculiar to the flesh of these Ducks, and specially pronounced in old males.

The Common Scoter nests from Iceland through northern Europe and northern Asia, as far as Behring's Strait. The only

distinction noticeable in North American birds is a somewhat different coloration of the tubercle on the beak.

331.—Velvet Scoter [Sammtente].

ANAS FUSCA, Linn.[1]

Heligolandish: Groot Swart Dükker = *Great Black Diver.*

Anas fusca.	Naumann, xii. 123.
Velvet Scoter.	Dresser, vi. 657.
Canard double macreuse.	Temminck, *Manuel*, ii. 854, iv. 543.

This beautiful large Duck occurs here under the same conditions as the preceding species, and in equally enormous, and quite incalculable quantities. Its breeding range extends likewise through northern Europe and Asia; and it is also represented in America by a related but scarcely distinguishable form.

332.—Surf Scoter [Brillenente].

ANAS PERSPICILLATA, Linn.[2]

Anas perspicillata.	Naumann, xii. 140.
Surf Scoter.	Dresser, vi. 669.
Canard marchand.	Temminck, *Manuel*, ii. 853, iv. 542.

This beautiful black American Duck, an occurrence of which is of the utmost rarity in Europe, has once visited Heligoland, a fine old male having been shot on the 9th of October 1851, near the dune; this example is preserved in my collection. The species has been repeatedly met with and shot on the coast of Great Britain, and several times on the coast of Norway. An example is actually recorded from Finland. The example from Heligoland is, however, probably the only instance of the occurrence of this species in Germany.

It breeds throughout the whole of the far north of America.

333.—Scaup [Bergente].

ANAS MARILA, Linn.[3]

Heligolandish: Slabb-Enn. Name without signification.

Anas marila.	Naumann, xii. 88.
Scaup.	Dresser, vi. 565.
Canard milouinan.	Temminck, *Manuel*, ii. 865, iv. 545.

As already stated when discussing the Common Scoter, this species occurs here in very large numbers during severe winters,

[1] *Œdemia fusca* (Linn.). [2] *Œdemia perspicillata* (Linn.).
[3] *Fuligula marila* (Linn.).

when it is by no means rare to meet with flocks of from twenty to a hundred individuals.

It seems to have much stronger social tendencies than any other of the Sea Ducks met with here; for whether present in smaller or larger numbers, they always swim and fly, though one can hardly say in crowds, yet always in separate companies. Common and Velvet Scoters may also be seen, ten or fifteen together; this, however, appears to be more the result of accident, because they easily part company, and each species goes separately in pursuit of their food.

This species breeds from Iceland to Japan, and throughout the whole of North America.

334.—Tufted Duck [Reiherente].

ANAS FULIGULA, Linn.[1]

Anas fuligula.	Naumann, xii. 64.
Tufted Duck.	Dresser, vi. 573.
Canard morillon.	Temminck, *Manuel*, ii. 873, iv. 547.

This little Duck, distinguished by the beautiful tuft of the male, also occurs only in extremely isolated instances during severe winters, and is not seen at other seasons of the year. This is less surprising, seeing that it is pre-eminently an eastern species, its nests being rare and isolated in the north of Scotland and Norway, but becoming more frequent in northern Sweden and Finland, while northern Asia forms its principal breeding area.

335.—Pochard [Tafelente].

ANAS FERINA, Linn.[2]

Heligolandish: Road-hoaded Slabb-Enn = *Red-headed Scaup.*

Anas ferina.	Naumann, xii. 21.
Pochard.	Dresser, vi. 551.
Canard milouin.	Temminck, *Manuel*, ii. 868, iv. 546.

Only a few examples of this species are met with here, scarcely half a dozen being shot during the severest winters. It is met with near the flocks of Scaups, without, however, mingling with them. As a breeding species, it does not advance so far north as many of its congeners; it has been met with most abundantly in European Russia, and thence in declining numbers as far as Lake Baikal; it is also found nesting irregularly, and in scattered pairs, in Germany and Great Britain.

[1] *Fuligula cristata* (Leach).

[2] *Fuligula ferina* (Linn.).

336.—White-eyed Duck [Moorente].

ANAS NYROCA, Güldenstädt.

Anas nyroca.	Naumann, xii. 41.
White-eyed Duck.	Dresser, vi. 581.
Canard à iris blanc.	Temminck, *Manuel*, ii. 876, iv. 546.

About fifty years ago Oelrich Aeuckens once caught a male of this species in his duck-net, since which time the bird has not again been seen here: this is not surprising, as it belongs to temperate and southern Europe, and also nests in north Africa.

337.—Golden Eye [Schellente].

ANAS CLANGULA, Linn.[2]

Heligolandish: Witt-sitted = *White-sided.* Female: Lügen-oog. Name, the meaning of which cannot be traced.

Anas clangula.	Naumann, xii. 162.
Golden Eye.	Dresser, vi. 595.
Canard garrot.	Temminck, *Manuel*, ii. 870, iv. 550.

This beautiful Duck is very numerously represented in Heligoland during severe winters, but it never congregates in such large companies as, for instance, *A. marila*. The large majority of the birds consists of brown-headed females and younger males. These come nearer in to the island than the Scaups, and we may see them quite close to the foot of the cliff, in smaller and larger companies, busily and dexterously diving after their food. They are also caught pretty frequently in the duck-nets, and it is only owing to their remarkable astuteness that this does not happen oftener. Thus, other species, females and young males of *A. nigra*, *A. fusca*, and *A. marila*, on getting within the reach of a net during their operations at the sea-bottom, in diving upwards allow themselves to float vertically towards the surface, and so get fast into the net. The Golden Eyes, on the other hand, though they also without the least shyness will advance right under the middle of the net, in returning to the surface dive at first very carefully in an oblique direction from underneath, until they are clear of the net, and only then pass vertically upwards to the surface. It is most entertaining to watch their artful manœuvres from the cliff, and it has always been a great enjoyment to me to sometimes get the better of these cunning fellows in spite of all their stratagems. Another favourite way of mine of hunting these Ducks was to make a kind of stalk upon them, the *modus operandi* of which is

[1] *Fuligula nyroca* (Güldenstädt). [2] *Clangula glaucion* (Linn.).

as follows:—Seeing a small company of birds diving about among the rocks near the shore some two hundred paces off, the shooter must watch for the moment when all have dived beneath the surface, then take a run of some twenty or thirty paces towards the game, and before they reappear above the surface throw himself flat on the ground and wait, without stirring, until they have dived once more. This manœuvre is repeated until one gets sufficiently near, so that the last run will take one straight to the water's edge. Stones or seaweed are of great advantage in the way of cover, especially as one gets near to the birds. The gunner should be perfectly ready for shooting at the instant he gets to the water's edge, for the birds will rise on the wing as soon as their heads appear above the surface, and not a moment is to be lost if each barrel is to bring down its bird. It is highly amusing to watch the astonished faces of the Ducks, the feathers of their head all on end, when they thus suddenly see a man standing right in front of them in a quarter where they had considered themselves perfectly safe from all intrusion. However, it is often the sportsman who has to go off with a long face; for if the suspicion of the birds has been in any manner aroused, they will indeed at once dive, but forthwith reappear on the surface, by which time, however, the shooter has as a rule already leapt to his feet, and so comes off with the joke against himself. But even in a case like this, the amusement which the cleverness of these birds must provide for any one who is a naturalist and observer will amply compensate him for the failure of his sport.

The fine old males are very frequently shot on the wing from boats. These birds do not come so near to the island during the day, though they evidently do so at night, when they are frequently caught in the nets.

Their breeding range extends throughout the north of the Old and New Worlds, from about 58° to 71° N. latitude. Solitary examples have also been found nesting farther south, as, for instance, repeatedly in the Mark of Brandenburg.

338.—Long-tailed Duck [Eisente].

ANAS GLACIALIS.[1]

Heligolandish: Grau-linsk. A name which is perhaps formed after the call-note.

Anas glacialis. Naumann, xii. 210.
Long-tailed Duck. Dresser, vi. 617.
Canard de Miclon. Temminck, *Manuel*, ii. 860, iv. 553.

The gay-plumaged males and inconspicuous females of this species are the first of the Diving Ducks to make their appearance

[1] *Harelda glacialis* (Linn.).

on the approach of a severe winter. They may then be seen diving in companies of three to five over the reef which extends from the base of the dune for nearly four miles out to sea in a north-westerly direction. They evidently find in that quarter food specially to their liking, for they stay there by preference throughout the whole winter. Females and young birds are pretty often taken in the duck-nets, while old males, which, as a rule, do not come so near to the island, are frequently shot from boats.

The Long-tailed Duck belongs to those species whose breeding haunts are situated in the highest northern latitudes; they extend around the Pole, and have been met with in Spitzbergen in latitude 80° N., and in the Taimyr Peninsula in 74° N. latitude. Captain Feilden shot the bird in September, *i.e.* on its return passage from the breeding stations, near Floeberg-Beach, in 82° 27′ N. latitude.

339.—Eider Duck [Eiderente].

ANAS MOLLISSIMA, Linn.[1]

Heligolandish: Hurn-snoabelt = *Hornbill.*

Anas mollissima.	Naumann, xii. 252.
Eider Duck.	Dresser, vi. 629.
Canard eider.	Temminck, *Manuel*, ii. 848, iv. 541.

The present, unlike the rest of the Sea Ducks which visit this island, is not restricted in its appearance by particular seasons or conditions. Young birds are met with every autumn and frequently shot, while old males in perfect plumage have been repeatedly killed at the same season—amongst others a remarkably fine example preserved in my collection, which was shot on the 25th of October 1850. In severe winters flocks of from twenty to fifty individuals may be seen on the sea. These consist for the most part of grey birds, intermixed with which are scattered old white male birds. The winter visitors probably originate from breeding stations in the far north, while the autumn birds, some of which at times appear here as early as September, probably reach this island from the neighbouring isle of Sylt.

The nesting stations of this Duck extend throughout Greenland, Iceland, Spitzbergen, Franz-Joseph Land, and Nova Zembla. Captain Feilden met with it up to 81° 38′ N. latitude. In the south its breeding quarters extend to the coast and islands of northern Scotland and Scandinavia. The island of Sylt is probably the southernmost point where occasional pairs are still found

[1] *Somateria mollissima* (Linn.).

nesting, I myself having stood by the nest of a brooding female on the 6th of June 1874.

340.—King Eider [Prachtente].

ANAS SPECTABILIS, Linn.[1]

Anas spectabilis. Naumann, xii. 285.
King Eider. Dresser, vi. 643.
Canard à tête grise. Temminck, *Manuel*, ii. 851, iv. 541.

This bird has only been seen and killed once during all the time I have been observing on the island. The one in question was a young male shot on the 11th of January 1879. In this example the brown colour of the early plumage was about to undergo the change to the succeeding marking. On the upper breast the reddish chamois tint was beginning to supplant the brownish colour; white feathers, with their markings still imperfect, were displayed on the scapular portions of the wings and at the sides of the vent, while on the flanks the black colour of the succeeding plumage had already made considerable advance.

It belongs as a breeding species to the highest Arctic countries of both hemispheres. Captain Feilden found its nests at Floeberg-Beach in 82° 27′ N. latitude; von Middendorff in the Taimyr Peninsula in 74° N. latitude; Dr. Bunge on the islands of New Siberia; and it has also been found nesting in Alaska.

341.—Steller's Duck [Scheckente].

ANAS DISPAR, Sparrmann.[2]

Anas dispar. Naumann, xii. 240.
Steller's Duck. Dresser, vi. 649.
Canard de Steller. Temminck, *Manuel*, vi. 547.

I obtained three young grey birds of this species in the winter of 1844-45; I presented them to Herr von Zittwitz, and they have probably, with the rest of his beautiful collection, passed over into the possession of the town of Görlitz. On the 11th of February 1855, I obtained a youngish male in the interesting stage of transition to the light-coloured plumage. The tuft or crest on the occiput is already considerably advanced both in form and in the colour of the feathers. This specimen represents the species in my collection.

The breeding quarters of this beautiful bird are found on the Arctic coasts of northern Asia. Von Middendorff collected the eggs

[1] *Somateria spectabilis* (Linn.). [2] *Somateria stelleri* (Pall.).

in the Taimyr Peninsula, and Dr. Bunge met with the bird, to all appearances numerously, on the islands of New Siberia, but failed to discover either the nest or eggs.

Merganser—Mergus.—This genus only contains five or six species, three of which are resident in Europe, and also visit Heligoland in more or less considerable numbers. Besides these the beautiful American Hooded Merganser (*Mergus cucullatus*), has several times been seen and killed on the coast of Great Britain.

342.—Goosander [Grosser Sägetaucher].

MERGUS MERGANSER, Linn.

Heligolandish: Gühl Seehöhn = *Yellow Seacock.*

Mergus merganser.	Naumann, xii. 356.
Goosander.	Dresser, vi. 685.
Grand harle.	Temminck, *Manuel*, ii. 881, iv. 556.

During mild winters this stately bird is hardly ever seen here, or at most now and again a blue-grey young individual or female. On the other hand, on the commencement of a severe frost, the beautiful old males appear in fairly large numbers, and, in fact, are at such times much more abundant than females and younger birds.

It is really singular that this Merganser is not seen here every winter, because it breeds numerously in Iceland, in Scandinavia, and, if less frequently, also in Denmark, while its nests have been found sporadically even in Sleswick-Holstein. In the east its breeding range extends throughout the whole of northern Asia, while in America it is represented by a form only distinguished by a very slight difference in the markings of the wings.

343.—Red-breasted Merganser [Halsband-Sägetaucher].

MERGUS SERRATOR, Linn.

Heligolandish: Kringelt Seehöhn = *Necklet Seacock.*

Mergus serrator.	Naumann, xii. 333.
Red-breasted Merganser.	Dresser, vi. 693.
Harle huppé.	Temminck, *Manuel*, ii. 884, iv. 556.

This Merganser, as has been repeatedly mentioned in connection with the Diving Ducks, visits the sea near and around Heligoland in winters of enduring severity, in very large numbers, flocks of from

fifty to a hundred, and often even much larger numbers, frequenting the sea at a short distance from the island. Such flocks consist almost exclusively of very handsome old males, with double tufts on the head formed by the peculiarly elongated loose hanging feathers of the occiput. Females and younger birds are found nearer to the island, where they dive about after food; these never congregate into companies, but invariably follow their occupations apart from their fellows. Solitary examples make their appearance very early in the winter, whereas the large flocks of old males only arrive after three or four weeks of severe and persistent frost. Among the birds with rust-coloured heads one often meets with very small individuals, so that one almost feels tempted to regard them as belonging to a separate species, which, however, is not the case.

It is more difficult, in the case of the present species than even in that of the preceding, to explain why it is not seen here regularly every autumn and winter, seeing that it nests numerously throughout the whole of Norway, from the North Cape down to its southernmost extremity. It also occurs as a breeding species in Sweden and Finland, as well as throughout Asia and the north of America, and also in Iceland and the north of Scotland, and the islands skirting its coasts.

344.—Smew [Kleiner Sägetaucher].

MERGUS ALBELLUS, Linn.

Heligolandish: Lütj witt Seehöhn = *Small White Seacock.*

Mergus albellus.	Naumann, xii. 314.
Smew.	Dresser, vi. 699.
Harle piette.	Temminck, *Manuel*, ii. 847, iv. 559.

This diver, in its simple and yet most elegant dress of snowy white and deep velvety black, is of extremely rare occurrence in Heligoland; only now and again, after prolonged frost, does one meet with a solitary female or young bird which may be followed later by a pair of old males; and only on two occasions have as many as five and three been seen together. A male in perfect plumage has only been shot here once; but birds with rust-coloured head have been killed on five or six occasions.

My journal for 1847 has some interesting notes with regard to the appearance of winter visitants of this kind from the far East. Until the middle of December of that year the weather had been

dull and foggy, with stormy westerly winds, after which it suddenly changed to frost.

On the 16th the wind was S.E., freshening, with some frost: a strong migration of *Charadrius auratus*, flocks of from fifty to sixty passing continuously; *Vanellus* and *Tringa alpina* likewise migrating in large numbers—all of them precursors of approaching wintry weather, which had undoubtedly already set in to the east of the island.

On the 17th and 18th, wind S.E., very strong,—frost; *Anser* in flocks of hundreds and more passing continuously, also a very strong migration of all species of *Anas*.

On the 19th, S.E., stormy,—frost; *Anser niveus*, eight to ten individuals; *Mergus albellus*, three examples; besides these a very strong migration of all the above-named, notably *Anas*.

On the 20th, E.S.E., clear,—strong wind and frost. *Falco albicilla*, *Mergus merganser*, *Anser*, and *Anas* all in large numbers: *Larus glaucus*, a few examples; and *Charadrius virginicus*, a bird in winter plumage, the first example of the kind seen here. Under the circumstances we can only assume this individual to have reached Heligoland by an east-to-west flight.

Until the end of the month, with similar conditions of weather, *Anas*, *Anser* and *Mergus serrator* continued to migrate in enormous numbers; on the 25th, *Falco albicilla*, an old white-tailed bird, *L. glaucus* and *L. leucopterus*, and, strange to say, a Chat, *Saxicola œnanthe* (Wheatear) in excellent condition: on the 26th, *Fulica atra*, and on the 31st, *Cinclus pallasi*.

These wintry conditions lasted throughout the whole of the following January 1848, the cold reaching from 18·5° to 14° F., (=6° to 8° R.), and on one occasion actually 7·25° F. (=11° R.), quite exceptionally low temperatures for Heligoland, where the sea, which never sinks below freezing-point, exercises a highly moderating influence on the temperature of the atmosphere. The sea around the island, as far as one could see with the telescope, literally teemed with myriads of Ducks and Divers, notably *M. serrator*; long chains of Whooper Swans passed over the island, or swam about amongst the ice at shorter or longer distances off; *M. albellus* was seen repeatedly, and large as well as small flocks of *Anser torquatus* frequented the vicinity of the island, or migrated past. Moreover, *Larus rossii* was undoubtedly seen on the 8th of January 1848, for several of the most careful shooters brought me reports of a small white Gull, with the central feathers of the tail much longer than the rest, like *Lestris parasitica*; any possible confusion with *L. crepidata* is quite excluded here.

On the 1st of February the winter came to an end with the

setting in of a light south-west wind, and dull mild weather; all the sea-birds vanished as if by enchantment, while Larks, *A. arvensis*, began to pass on migration in large numbers. Blackbirds, Fieldfares and Redwings made their appearance, and the first Woodcock of the spring season was shot on the same day. In fact, the spring migration henceforth underwent its usual development without any further interruption worth mentioning.

The breeding range of this small Merganser in the west commences in northern Lapland and Finland, and extends throughout northern Asia. Wolley obtained the eggs in Lapland, and Seebohm on the Lower Petchora.

Cormorant—Carbo.—This genus comprises a large number of species which, with the exception of the Polar regions, are distributed over all the countries of the earth. Three of the species are resident in Europe, and of these two visit Heligoland in somewhat solitary instances.

345.—Cormorant [Kormoran].

CARBO CORMORANUS, Meyer.[1]

Heligolandish: Klewff-Skwarwer = *Rock Diver*. *Skwarwer*, name for *Colymbus*.

Halieus cormoranus.	Naumann, xi. 52.
Cormorant.	Dresser, vi. 151.
Grand cormoran.	Temminck, *Manuel*, ii. 894, iv. 563.

Although the Cormorant is a generally well-known bird on this island, it is only seen in exceptional and solitary instances, and is but rarely shot. As long as I have been collecting, there has only once been obtained an old male in spring plumage, with fine white feathers on head and neck, and a white patch on the thighs. This specimen has been in my collection during the last forty years. Several younger birds, and old birds in winter plumage, however, are obtained every year. These mostly come in from the sea before sunset, and settle on one of the prominences of the steep face of the cliff in order to rest for the night. For this purpose they almost invariably seek out a spot where they can neither be seen from the upper edge of the cliff nor from a boat, and are accordingly protected against every risk of attack; they will frequently make use of the same spot, for from three to six nights, as a resting-place after the day's labours.

[1] *Phalacrocorax carbo* (Linn.).

There are probably few species whose breeding range is as extensive as that of this Cormorant; it is found, in fact, on the Atlantic coast of America, and thence extends within the same parallels of latitude across Greenland, Iceland, Great Britain, Germany, and Scandinavia, as far as Japan; while in the south it reaches South Australia and New Zealand.

346.—Shag [SEERABE].

CARBO GRACULUS, Meyer.[1]

Heligolandish: Lütj Klewff-Skwarwer = *Little Cormorant.*

Halieus graculus.	Naumann, xi. 88.
Shag.	Dresser, vi. 163.
Cormoran largup.	Temminck, *Manuel*, ii. 900, iv. 565.

This species visits Heligoland still more rarely than the preceding, though it hardly ever appears solitary, but usually in groups of from three to five individuals. It occupies the day in fishing on the sea; and, like its larger-sized relative, after sunset retires for the night to the rocks of the island. It is but rarely shot here; nevertheless, on one occasion I succeeded in bringing down a brace of them at one discharge of my double-barrelled gun. I happened to be by the shore one fine calm evening after sunset, and seeing Aeuckens *père* and another shooter hurriedly pushing a boat into the water, I lent a hand in good comradeship; espying, however, a gun lying in the bottom of the boat, I jumped in without further ado, and pushed off with the others. Then only I learnt that Aeuckens had discovered the sleeping-berth of three Shags, and was going to try his luck at obtaining one or two of them. The gun was without further consideration entrusted to my charge. Noiselessly we rowed along, until we got underneath the spot, high above which the birds were sitting, boding no ill. As they were not visible from the boat, we suddenly made a loud noise with our oars, which drove all three flying in alarm from their shelter. Their black bodies formed excellent targets against the red evening sky, and my swift double shot was at once followed by two heavy splashes in the water. Shooters will pardon this little story. Many years have flown by since then; and at all times it does one good to live in one's memory again happy moments of sport experienced in the vanished past.

Before I collected, Oelrich Aeuckens once in winter caught a very light green Cormorant, with light green eyes, and in size

[1] *Phalacrocorax graculus* (Linn.).

scarcely exceeding a Smew. This specimen went to the Museum of Lund. I was for a long time of opinion that the example in question belonged to a separate species; but, after receiving from Collett the measurements of Norwegian Shags, I no longer entertain any doubt as to its identity with the present one.

Unlike that of the preceding species, the breeding range of the Shag appears to be very narrowly confined, being apparently restricted to Iceland, Great Britain, the Channel Islands, the west coast of Norway, and the north coast of Lapland.

Gannet—Sula.—The only European species of this genus is represented in Heligoland, or rather on the sea around the island. Six other species are said to be distributed throughout all the oceans of the world southwards to New Zealand, none of which, however, appear to have visited Europe.

347.—Gannet [Bassgans].

SULA BASSANA, Brisson.[1]

Heligolandish :	Gent. Name of the species.
Dysporus bassanus.	Naumann, xi. 14.
Gannet.	Dresser, vi. 181.
Fou blanc.	Temminck, *Manuel*, ii. 905, iv. 569.

To any one who has seen this handsome, stately bird, in its dazzling white plumage, soaring over its native element, the ocean, in its wonderful flights, the name 'Tölpel' [*i.e.* 'awkward, clumsy fellow'] must indeed seem utterly undeserved, and, in fact, a slander. Unfortunately, in Heligoland it occurs only in solitary instances, though during nearly all months of the year—(January and February, if these months are accompanied by severe frost, may be excepted)—and in all the various stages of plumage, from the dark early dress to the pure white perfect plumage of the adult bird.

Countless swarms of these birds frequent the coast of Scotland, that land so profusely endowed with scenic beauty; and it is a great enjoyment to watch their merry bustle from the summit of some lofty cliff, with the sea heaving and rolling far below; while near and far flocks of the birds, in snowy plumage, are to be seen soaring over its broad expanse of green.

The breeding stations of this species lie within a comparatively

[1] *Sula bassana* (Linn.).

small circuit of the North Atlantic Ocean. Innumerable colonies nest on Iceland, the Faroes, Orkneys, Hebrides, and other islands of the Scottish coasts. Thus, according to Seebohm, no less than 150,000 pairs nest on Sulasgeir or Sulesgeir, one of the northernmost of the Scottish islands. Smaller colonies of breeding birds are also found on the American islands on the opposite coast of the Atlantic.

Gull—Larus.—Of these birds it may in truth be said that their pinions carry them wheresoever the briny waters of ocean flow around the countries of the earth. The number of species is about fifty, of manifold variety and extraordinary richness in numbers of individuals. One of these, which may be described as the rarest and most beautiful of all—*Larus rossii*—by one of its representative, shot on this island, has acquired the right of an honorary citizen of Germany.

348.—Glaucous Gull [Grosse Eismöve].

LARUS GLAUCUS, Brunnich.[1]

Heligolandish : Isskubb = *Ice Gull.*

Larus glaucus.	Naumann, x. 350.
Glaucous Gull.	Dresser, viii. 433.
Mouette burgermeister.	Temminck, *Manuel*, ii. 757, iv. 467.

Old birds of this species, with the plumage of the back of soft whitish grey, are met with here extremely rarely, such specimens invariably displaying on the head and back of the neck the grey streaks characteristic of the winter plumage. In the summer dress, in which these parts are also white like the rest of the plumage, they have not yet been seen or killed here. On the other hand, young birds, in light greyish brown plumage, are shot here rather frequently every year in late autumn and winter.

The Glaucous Gull breeds on all the islands and coasts around the Pole up to 82° N. lat.

349.—Iceland Gull [Kleine Eismöve].

LARUS LEUCOPTERUS, Faber.

Heligolandish : Lütj Isskubb = *Little Ice Gull.*

Larus leucopterus.	Naumann, x. 367.
Iceland Gull.	Dresser, viii. 439.
Mouette leucoptère.	Temminck, *Manuel*, iv. 467.

This smaller, much prettier, and slenderer repetition of the preceding species is of the utmost rarity on this island; one

[1] *Larus glaucus*, Fabricius.

can hardly reckon on obtaining even one specimen during the autumn and winter months of each year, such individuals being invariably young autumn birds, whose plumage, in all cases brought under my observation, is considerably lighter than that of the dull, brown-coloured, similarly aged individuals of the larger species. Very striking differences of size are displayed by these young birds *inter se*. I have often obtained specimens which, but for their relatively much longer wings, might easily have been placed under the preceding species. In the present species the wings project from seven to eight centimètres beyond the tail, whereas in *L. glaucus* they are of the same length as the tail. A birdstuffer here, many years ago, possessed a very light-coloured young bird of this species which was actually but little larger than *Larus canus*; I could not, however, induce him to part with the bird.

The Iceland Gull breeds from Alaska and the Aleutian Islands, throughout the coast-regions of Arctic North America as far as Greenland.

350.—Great Black-backed Gull [Mantelmöwe].

LARUS MARINUS, Linn.

Heligolandish: Old birds: Manteldräger = *Mantle-wearers.*
Young birds: Groot grü Kubb = *Great grey Gull.*

Larus marinus.	Naumann, x. 438.
Greater Black-backed Gull.	Dresser, viii. 427.
Mouette à manteau noir.	Temminck, *Manuel*, ii. 760, iv. 471.

Old black-backed individuals of this powerful and stately Gull are specially numerous here during the stormy months of autumn and winter; during violent westerly gales flocks of hundreds may frequently be seen assembled under the lee side of the island. All such birds display the dark spots on the head and neck characteristic of the winter plumage. Early in the spring and in fine weather the birds are fond of sunning themselves in large numbers on the flat northern foreshore of the dune. Individuals in the perfect, pure white summer plumage are met with extremely rarely; on the other hand, young birds in the first or second autumn of their lives, are of very frequent occurrence.

This bird is found as a breeding species in Greenland, Iceland, on the coasts and islands of Great Britain, and from central to northern Scandinavia. In Russia it occurs more sparingly and scattered, but ranges as far as the estuary of the Petchora. It does not appear to occur in northern Asia; but breeds in

Alaska and Labrador, and probably also in the intervening tracts of North America.

351.—Lesser Black-backed Gull [Kleine Mantelmöwe].

LARUS FUSCUS, Linn.

Heligolandish : Lütj Manteldräger = *Little Mantle-wearer.*

Larus fuscus.	Naumann, x. 419.
Lesser Black-backed Gull.	Dresser, viii. 421.
Mouette à pieds jaunes.	Temminck, *Manuel*, ii. 767, iv. 471.

All the parts of the body of this small and graceful gull appear light and slender when compared with the solid and robust form of the corresponding parts of the preceding species, of which indeed it almost looks like a youthful representative. The wings, however, are, in the present species, much longer in proportion to the body than in its larger relative, which gives the bird, especially when on the wing, a much more graceful appearance.

Unfortunately, it is only rarely that a solitary example is seen, and an individual in summer plumage with white head is scarcely shot more than once in ten years. Young autumn birds in very dark-brown spotted plumage, and with a good deal of black at the terminal portion of their tail, occur here rather frequently in the course of September.

This species breeds in western Europe, on the coasts of Scandinavia, Great Britain, France, and, Spain; according to Irby, scattered individuals also nest on the opposite coast of Africa.

352.—Siberian Gull [Sibirische Möwe].

LARUS AFFINIS, Reinhardt.

Siberian Herring-Gull. Dresser, viii. 417.

Up to the present time I have only been able to obtain one example of this northern species; the bird in question was in the stage moulting to the first adult winter plumage, with the back displaying the dark slate-grey markings, while the central feathers of the white tail were still slightly sprinkled with black; in its measurements this example agreed completely with an old bird killed by Finsch on the Obi. Unfortunately two other examples shot here were lost to science; one, an old bird in pure summer plumage and with yellow feet, having been turned into a lady's muff; and another, a younger bird, having been used for a lady's hat. The example in my collection was shot on the 20th

of August 1870 near the dune, by Herr Feodor Schneider, a gentleman from Silesia, who had the great kindness to present it to me. During a violent westerly gale on the 20th October 1879, which had caused enormous crowds of gulls to assemble on the lee side of the island—among others, hundreds of *Larus minutus*—a Siberian Gull was again seen at a short range, flying up and down over the wild surf of the breakers, and descending here and there in search of food; the bird might easily have been shot, but would have been carried away, for the storm was far too violent and the sea running much too high for a boat to have gone out. To have to look on calmly while an eagerly coveted bird is moving about in one's immediate neighbourhood, without its being in one's power to obtain it, is indeed enduring the tortures of Tantalus; the most painful experience of this kind, however, which I have ever passed though, is the case of *Hirundo rufula* already related under its own heading.

I ought to mention that the living or freshly killed bird, in the relations of its body and wings, is much more closely connected with *Larus fuscus* than with *L. argentatus*, for in the Siberian Gull the wings in repose project beyond the tail as much as in *L. fuscus*, while this is known not to be the case in *L. argentatus*.

The Siberian Gull is met with nesting from the estuaries of the Petchora eastwards along the Arctic coasts of Asia, and also in Alaska (*Larus cachinnans*. Alaska. Signal Service, U.S. Army).

I have to say in addition that an old bird was shot here on the 25th of October 1888, which is preserved in my collection.

353.—Herring Gull [Silbermöwe].

LARUS ARGENTATUS, Brünnich.[1]

Heligolandish: Old birds: Sömmerkubb = *Summer Gull*.
Young birds: Grü Kubb = *Grey Gull*.

Larus argentatus.	Naumann, x. 379.
Herring Gull.	Dresser, viii. 399.
Mouette à manteau bleu.	Temminck, *Manuel*, ii. 764, iv. 470.

This is at all times of the year the most numerously represented of the many species of gulls met with on Heligoland, and also is seen soaring about in search of food more frequently than any other species in the immediate vicinity of the island.

During the fishing seasons in spring and autumn, when the fish offal supplies them with a rich abundance of welcome fare, hundreds and thousands of the birds assemble near the shore; in the earlier

[1] *Larus argentatus*, Gmel.

summer months by far the larger majority of these are old individuals in snow-white plumage. At such times the scene presented to the eye of an onlooker is truly wonderful. Over a surface of sea a thousand paces or so in extent, and close to shore, vast numbers of the birds spread themselves in a motley crowd, at all heights above the sea up to two or three hundred feet; they soar about confusedly among each other, crossing each other's paths, ascending and descending, amid frequent utterance of their loud clear-sounding 'klī-ou—klī-ou—klī-ou' (kliau—kliau—kliau). Still more beautiful is the scene when, momentarily disturbed by a boat, the whole flock rises in circling flight above the cliff, and there, in the calm clear atmosphere, soars about on motionless expanded wings, neither sinking nor ascending, but revolving in beautiful curves and circles, until, the boat having disappeared, the birds once more return to their previous occupations.

In the first part of this work, when dealing with the altitude of the migration flight, I have expressed the conviction that these gulls, and in fact the majority of birds, are endowed with qualities and capacities by means of which they are enabled, according to their needs, to neutralise and overcome the general laws of gravity, without thereby making use of the mechanical powers of their wings, or being supported by atmospheric currents. In this conviction I remain unshaken; and progressive observations, combined with the most severe criticism of my own views, on my own part, have only served to further confirm me in my previous conclusions. Not only are these gulls able to soar in a calm atmosphere in a direction straight forwards, or sideways, on calmly outspread wings, but, as has been more fully discussed in the case of Buzzards, they can also, in a manner similar to theirs, soar upwards to any desirable altitude. The gulls are able to perform their soaring movements on the same plane in all phases of the weather, during the most violent storm as well as in a perfect calm, progressing forwards or sideways at the most variable rates of velocity; now darting along with the swiftness of an arrow, now merely gliding, as it were, at the slowest pace imaginable. In the latter case, indeed, we are frequently, even against our will, forced to the conclusion that these birds must have at their command some unknown means or mechanism which prevents their sinking; for neither is the surface-area of their wings large enough, nor are these organs sufficiently concave in form, to allow of their supporting the bird after the manner of a parachute. I have been able to make these observations for a long series of years, in all manner of ways, and under the most favourable conditions, at the end of the landing-stage on this island, where hundreds of the birds have been

soaring immediately around me; so that there is absolutely no possibility of my having been in any way mistaken in my statements on this question. Up to the present time, indeed, the nature of this phenomenon lacks every kind of adequate explanation; but the same may be said in regard to another process of a similar or closely related nature, though expressed in an exactly opposite manner: I mean the slow immersion—not by diving—of the body of swimming birds in a specifically heavier medium like water; no one can refute the actual performance of such an act, but we are as little able to explain it as we can the opposite action of the soaring upward of the avian body in the specifically lighter atmosphere.

It has been conjectured in several quarters that this upward soaring flight of birds is accomplished by vibratory movements of the separate feathers; I am, however, able to state most definitely, from observations made in the closest proximity to the birds themselves, that no such vibrations of the feathers really take place. Both myself as well as the youngest of the Aeuckens brothers —now, I am sorry to say, no longer living—have spent many summer hours lying in the sunshine close to the edge of the cliff, watching the hundreds of old Herring Gulls which were flying, unconscious of our presence, along the face of the rock, and soaring upwards over the cliff edge, a few paces from us—so near, in fact, that we could plainly distinguish the dark pupils of their clear lustrous eyes; but we were never able to discern the least trace of this supposed vibratory movement of the feathers, although the birds were so near to us that anything of this description could not have possibly escaped our observation. All that seemed to happen on such occasions, was, that the birds, suddenly seeing two persons so unexpectedly near them, drew up their plumage somewhat tighter, but, otherwise undisturbed, soared upwards, without any wing-movements, calmly but with a fair speed into the still clear atmosphere.

In order to obtain a safe and reliable result from such observations, it is necessary to keep the eye on one particular bird out of the many hundreds swarming about in search of food; we shall see it roving over the surface of the water where any fish offal happens to be drifting, on calmly outspread wings, and, sweeping round in a fairly large curve, once more re-traverse the same space; if in the course of these movements the bird happens to spy a morsel at some distance, it at once slackens its speed, its horizontal progress having, by the time it arrives near the object in pursuit, become so slow that it would unavoidably drop if it were not able to sustain itself by other means than its calmly expanded wings. In this manner it will glide along for about ten paces past its spoil,

and then, after making a short and rapid turn, will glide down towards the latter in an oblique direction. It is only when in the act of picking up its find, and during the next following moment, that the bird executes a few not excessively powerful beats of the wings, after which it makes a small turn, and, rising to its former height of from ten to twenty feet, continues anew its soaring flight.

During a heavy storm these large gulls soar about at heights of at least a thousand feet, as calmly and with the same demeanour as in the most perfect calm. For hours long, as in the calmest sunshine, they may be seen at such times gliding along on horizontally expanded wings; it seems to make no difference to them whether they travel with or against the wind, or whether their flight carries them forwards, or sideways, or in circles. At one time they may be seen soaring quite slowly to and fro, at another dashing with stormy haste toward some object sighted in the distance; very frequently they will remain poised motionless at one spot almost for the space of minutes; all these movements and turns, including the last, being performed with the body placed horizontally and the wings expanded in the same position. Many an enjoyable hour have I spent in watching the performances of these wonderful flyers, and, indeed, the whole of bird-life probably presents no sight more charming and graceful than the soaring flight of these snow-white scourers of the deep.

Herring Gulls, if reared quite young, become extraordinarily tame. Heligolanders have, in fact, in repeated instances proceeded so far in the process of taming these birds, that such individuals would, while flying about in company of their wild relatives, at once return to the whistle of their master. One of our shooters made use of this docile act on the part of the birds for purposes of sport. He used to take his gull up to the cliff and throw it up in the air as soon as any wild gulls came in sight. The tame bird would immediately join the latter, and soar about with them, but return at once to his master's whistle, followed by the wild birds, one or two of which would then, without much trouble, fall to our sportsman's gun. One day when this gunner was accompanied on one of his expeditions by another very good marksman, Jan Aeuckens, his gull returned in the before-mentioned manner, accompanied by four wild birds; four rapid shots brought down the whole group of the latter. This piece of wholesale slaughter, however, so terrified the tame bird that it darted down like a falcon with wings drawn up against its body, and lay down cowering between the feet of its master.

Up to within about eighty years ago, this species used to breed on the rocks and on the dune. It was then forbidden

to disturb the birds until the day of the festival of St. James, July 25th. This protection of the birds must have ceased subsequently; for when I came to the island, fifty years ago, no breeding gulls were any longer to be found, and any one who liked could shoot the Guillemots which bred on the island. Moreover, the formidable diminution which the area of the dune and the height of the sandhills have undergone in the interval, combined with the encroachment of visitors consequent upon the establishment of the Sea-Baths, must alone have sufficed to render futile any further attempts at nesting on the part of the birds.

In the neighbouring island of Sylt the birds have been almost completely exterminated, in consequence of the institution, by the German Reichstag, of the Wild Birds' Protection Act. They used to breed there in thousands until the year 1873; besides them, large numbers of Eider Ducks had their nesting stations on the island. On the occasion of my visit to this breeding station in 1874 I indeed still found several hundreds of nests; all of them, however, with the exception of three, had been plundered of their eggs. The Herring Gulls on that island make their homes on the sandhills, the wide and extensive slopes of which are densely grown over with short heather and grass, and are used as pastures for large flocks of sheep. The proprietors, from time immemorial, have had the right to collect the gulls' eggs, which were brought to market, and yielded a by no means inconsiderable revenue. Only the first clutch used to be taken, and the birds were protected during their further breeding operations by allowing the shepherds to have the small eggs of the Terns, in return for which compensation they were to keep off all trespassers. The Protection Act referred to above, however, prohibited the owners of these lands from collecting the gulls' eggs, and they accordingly no longer had any interest in looking after the protection of their birds; the consequence was that the islanders used to rob all nests they could lay hands on during the night and at early dawn. As I have already said, I only found three nests left which contained eggs, while thousands of gulls were filling the air with plaintive cries; on every dung-heap, however, in front of the smaller houses, lay wheelbarrow loads of the shells of gulls' eggs, it being evidently considered superfluous even to make an attempt at concealing them.

The nesting stations of this Gull extend from eastern Scandinavia westwards to the central parts of North America. In the south they stretch along the coasts of the North Sea and of France and Spain down to the Azores and Canary Islands.

354.—Common Gull [Sturmmöwe].

LARUS CANUS, Linn.

Heligolandish: Buhr = *Peasant.*

Larus canus.	Naumann, x. 301.
Common Gull.	Dresser, viii. 381.
Mouette à pieds bleus.	Temminck, *Manuel*, ii. 771, iv. 477.

This Gull is likewise very numerous, and generally known, on the island; but it never occurs in such large numbers as the preceding, examples in perfect summer plumage, with pure white heads, being extremely rare. This bird is also much shyer than any of the other gulls met with here, and knows excellently well how to keep out of the range of gunners in boats; nor can it be decoyed by throwing dead gulls out to it, but will avoid them, sooner than allow itself to be led into danger by the decoy.

The Common Gull is found breeding in the Hebrides, Orkneys, Shetland Islands and Scandinavia, as far as the North Cape; and throughout the whole of northern Asia.

355.—Kittiwake [Dreizehige-Möwe].

LARUS TRIDACTYLUS, Latham.[1]

Heligolandish: Muusk. Name without further signification.

Larus tridactylus.	Naumann, x. 322.
Kittiwake.	Dresser, viii. 447.
Mouette tridactyle.	Temminck, *Manuel*, ii. 774, iv. 478.

From the end of October till about the end of January the Kittiwake Gull is the most numerously represented of the genus on the parts of the North Sea which surround Heligoland. In the course of November and December large numbers of them are shot. The most favourable conditions for their appearance in quantities, and also for the shooting of them, are light west winds, with dull mild weather. They are shot at distances of from fully one to two miles from the island, for only solitary individuals, and these exceptionally, ever approach nearer. After New Year, when the days become decidedly longer and lighter, their numbers diminish, the birds probably commencing about that time to return to their breeding homes.

For the purpose of shooting these birds small rowing-boats are employed, each occupied by two or three men, provided with double-

[1] *Rissa tridactyla* (Linn.).

barrelled guns, and under very favourable circumstances a party like this may bag as many as two hundred birds in the course of a forenoon. They are very simple birds, mostly flying quite close up of their own accord; in cases of their not doing so, they are easily decoyed by imitating the movement of birds descending after food, for which purpose one or more dead birds are thrown down upon the water; or, in the absence of such, a pair of wings tied together will serve equally well. They fly once or twice round the boat, quite close to it, after which, if not killed in the meantime, they resume their former course. These harmless creatures are not even afraid of the firing; on the contrary, if ten or twenty are wheeling round the boat, and the shooter only goes on shooting them down, more birds will continue to come up. With the convenient breech-loaders now in use the sport must be very easy. In my younger years we had to make shift with the ramrod and percussion-caps, a slow and tedious business, notwithstanding which I often used to bag as many as ninety birds in the course of a forenoon.

In former years the birds were killed merely for the sake of the flesh and feathers. During November and December they are remarkably fat, and are then considered a delicacy, and although a certain 'Greenland'[1] flavour clings to them, nevertheless, at the time when I shot them myself, I used to relish them considerably when prepared in Heligolandish fashion. By this method, some coarse pearl barley is boiled, with water and some salt, over a moderate fire until it is half-cooked, and then spread over the bottom of a stoneware or brass saucepan; next to this comes a layer of gull, which is covered by a layer of barley; over this another layer of gull, with its covering of barley, and so on, until the quantity of layers corresponds to the number of individuals in the family; the whole is topped by a layer of dough sprinkled with raisins. This primitive pie is allowed to cook for three hours in a baking oven, and is served at the mid-day meal. In serving, the basin or saucepan is turned upside down over a dish; its contents, baked to a beautiful brown, and shining with fat, are thus dislodged in more or less perfect shape, and certainly present all the appearances of a very tempting dish.

Since Heligoland has developed into a prominent bathing resort this 'Sea-Gull' ('See-Möwe'), prettily stuffed, has become an article much in demand as a souvenir of the island. Very large quantities of the bird are, however, specially used, and even exported, for the manufacture of ladies' hats, muffs, and similar articles.

[1] *i.e.* fishy.

The breeding zone of this species extends completely round the Pole into very high latitudes. Captain Feilden found it in Smith's Sound and Baffin's Bay; Parry, north of Spitzbergen, in 82½° N. lat.; it is also found nesting on Nova Zembla, in northern Scandinavia, Greenland, Arctic America; and ranges southwards to the coasts of Great Britain. About ninety years ago a fair number used to breed at one spot on the west coast of Heligoland, old Aeucke Ö. Aeuckens—the father of our three brothers—having seen the birds there in his boyhood.

356.—Great Black-headed Gull [Grosse Schwarzkopf-Möwe].

LARUS ICHTHYAETUS, Pallas.

Larus ichthyaetos.	Keyserling and Blasius, *Wirbelthiere Europas*, pp. xcv. and 241.
Great Black-headed Gull.	Dresser, viii. 369.
Mouette ichthyaetos.	Temminck, *Manuel*, iv. 472.

This large, black-headed, distinguished-looking species has occurred here once, unfortunately before I was collecting, and there are reasons for believing that it has been seen a second time. I have not, up to the present time, been able to obtain an example, nor is there, unfortunately, any probability of my doing so. Still, the fact that many another rare stranger from the home of this species adorns my collection, and its occurrence in England in 1858 or 1859 (Dresser), leaves me the hope of still seeing its vacant place in my collection filled up.

Hitherto this bird has only been found breeding in the area of the Caspian, on the Lower Volga, and more rarely on the Black Sea. Tristram met with it in winter on the Lake of Galilee, and other investigators have found it on the Red Sea and on the coasts of India.

357.—Black-headed Gull [Lachmöwe].

LARUS RIDIBUNDUS, Linn.

Heligolandish: Lachmöow = *Laughing Gull.*

Larus ridibundus.	Naumann, x. 364.
Black-headed Gull.	Dresser, viii. 357.
Mouette rieuse.	Temminck, *Manuel*, ii. 780, iv. 485.

Old birds of this species with brown head are only rarely seen or shot here. Quite young birds, with their backs still brown, are also rare, and only met with as solitary individuals. But younger,

and also old individuals in winter plumage, appear sporadically in large flocks.

This handsome Gull breeds on all the inland seas of temperate Europe and Asia.

358.—Bonaparte's Gull [Bonaparte's Möwe].

LARUS BONAPARTII, Swainson.[1]

Larus Bonapartii. Richardson and Swainson, *Faun. Bor. Amer.*, p. 425, pl. 72.

Larus philadelphia. Seebohm, *British Birds*, iii. 307.

In size this American species is intermediate between *L. ridibundus* and *L. minutus*, its head in perfect summer plumage being of a greyish black colour. I have obtained it here once, during the severe winter of 1845, the bird having been in winter plumage, with beautiful red feet. In England it has been seen eight or ten times, and has in most of these cases been killed. Its breeding range extends throughout the whole of the far north of America, from Labrador to Alaska.

359.—Little Gull [Zwergmöwe].

LARUS MINUTUS, Pallas.

Heligolandish: Stenn-poahl. Name without special signification.

Larus minutus. Naumann, x. 242.

Little Gull. Dresser, viii. 373.

Mouette pygmée. Temminck, *Manuel*, ii. 787, iv. 490.

All the gulls leave their northern breeding stations before the approach of winter in order to betake themselves to more temperate latitudes. In the case of none, however, does this movement so much partake of the nature of a true migration as in that of the present species. Long-extending flights of these pretty little birds may be seen travelling over the sea past the island at the close of September and during the first half of October. Their movements, however, are quite different from what one is accustomed to see in the case of most migrants. Companies of from one to two hundred individuals travel in motley throng quite low over the sea, continuously dropping to the surface to pick up food. All the time, however, they rigidly maintain their western course of flight, and, speeding along with great rapidity, are very soon lost to sight. Moreover, considerable quantities of these gulls, intermingled with

[1] *Larus philadelphia*, Ord.

the larger species, are met with here all the winter months during violent westerly and north-westerly gales, when they seek a temporary shelter on the lee side of the island. While roving over the sea in all directions in search of food, they execute many rapid beats with their wings, continuously displaying at the same time the peculiar greyish-black (*grauschwarz*) colour of their undersides.

Soon after New Year the light bluish-grey (*bläulichgrau*) feathers of the occiput already begin to undergo the alteration to the black colour of the breeding plumage. This black colour first makes its appearance on the shaft of each feather, and then spreads in the form of a fine black dust over the remainder of its surface. In the feathers of the underside of the head, the foreneck and sides of the neck, which in the winter are pure white, the alteration of colour commences at the extreme tips of the barbs of each feather, the deep pure black colour appearing there in the form of fine specks, which at first form a fine black edge around the tip of the feather; this gradually advances towards the root of the feather, and finally overspreads its whole surface. This alteration of colour from perfectly pure white to deepest black commences simultaneously at the lower border of what is subsequently the black marking, and gradually extends upwards, so that in the end the part known as the chin is the only spot where the white colour is still apparent.

I have only obtained this gull here twice in pure summer plumage: one of these examples, perfect in all the feathers of its plumage, was, strange to say, shot on the 15th of November 1861, although the black markings of the head evidently do not date from the previous spring, but are quite fresh, close, and new, like all the rest of the plumage. I have repeatedly noticed similar appearances in Red-throated Divers (*Colymbus septentrionalis*), but never in the case of any other bird.

The nesting range of the Little Gull extends from Lakes Ladoga and Onega, through southern Siberia, to the Sea of Ochotsk.

360.—Sabine's Gull [Sabine's Möwe].

LARUS SABINII, J. Sabine.[1]

Larus Sabinii.	Naumann, xiii.; Blasius, *Nachträge*, 272.
Sabine's Gull.	Dresser, viii. 337.
Mouette de Sabine.	Temminck, *Manuel*, iv. 488.

This beautiful little Gull is at once distinguished from its congeners by its distinctly forked tail. I have obtained the bird on two

[1] *Xema sabinii* (J. Sabine).

occasions, both examples belonging to young autumn birds (*junge Herbstvögel*) in which the aberrant form of the tail is rendered specially prominent by the deep black markings at the tip, extending to a breadth of 1·10 in. (28 *mm.*) forwards along the white of the feathers. The first example was shot by Jan Aeuckens on the 25th of October 1847, in a very stormy north wind. Another, also very pretty young individual, was shot after a long interval on the 28th of October 1883, and a similar bird was seen on the 10th of November of the same year. The latter was, however, not shot, though there cannot be the least doubt as to its identity, for it was seen by the two best observers on the island—Jan and Claus Aeuckens—independently of one another, flying at a small distance seawards from the edge of the cliff. They were, however, unable, or rather unwilling, to shoot the bird, as it would only have fallen into the violent surf deep down below, and been destroyed.

The nesting stations of this gull extend from the Taimyr Peninsula eastwards through northern Asia and Arctic America as far as Greenland. It has also been met with on Spitzbergen. According to Seebohm it has occurred from twenty to thirty times on the coasts of England, Scotland, and Ireland.

361.—Cuneate-tailed Gull [Rosse's Möwe].

LARUS ROSSII.[1]

Larus Rossii.	Naumann, xiii. ; Blasius, *Nachträge*, 270.
Cuneate-tailed Gull.	Dresser, viii. 343.
Mouette de Ross.	Schlegel, *Krit. Uebers. d. Vögel Europas*, p. cxxvi.

Whereas *Larus sabinii* was distinguished from all other gull species by its deeply furcate tail, the characteristic feature of Ross's Gull is the equally aberrant pointedly cuneate form of the same organ. Each pair of feathers of the latter from the outermost pair is several millimètres longer than the preceding pair, while the central pair projects far beyond all the rest. Thus, whereas the former species, though a true gull in its general structure and character, yet in one of its external features exhibits an approach to the Tern family, the present species, whilst in all other respects equally conforming to the gull type, may be said to possess the form of tail peculiar to the predaceous gulls or Skuas. Neither species, however, beyond this peculiar conformation of the tail, exhibits any further relationship to the two genera of birds mentioned, just as, among these latter, forms exist in which the forked or cuneate

[1] *Rhodostethia rosea*, Macgillivray.

form of tail, respectively, peculiar to these genera is nearly or entirely wanting.

A few examples of this remarkably beautiful gull have found their way into collections; of these one of the finest, if not in fact the finest, belongs to Heligoland. This bird was an old uninjured male in the purest winter plumage; it was shot near the island on the 5th of February 1858. In the fresh state, the head, neck, and all the lower parts, as well as the tail, were tinged with a beautiful rosy red[1] (*rosenroth*), this colour being particularly rich on the breast, and also penetrating the soft bluish-grey colour of the feathers of the back, especially on the shoulders, quite similar to what one sees in the same parts in old males of the Northern Bullfinch (*Pyrrhula major*) from the East. Unfortunately this beautiful colour disappears completely in mounted specimens. This change cannot be due to the action of light; for I placed some of the fresh rose-coloured feathers in an envelope, which I put inside a book, and found after a year that these feathers, too, had become perfectly pure white.

In my specimen a few insignificant portions only are dark-coloured; these consist of a very faint border of the anterior margin of the eye, formed by small black hair-like feathers, and a narrow deep black streak along the outer webs of the first quills, which, however, do not extend to the tips of the feathers—exactly as shown in Naumann's representation of *Larus melanocephala*, pl. 259. The whole outer sides of the wings, as well as the back, are of a very light and pure bluish-grey[2] (*bläulichgrau*); all the remaining parts of the plumage are pure white, deeply and beautifully tinged with rose-colour in fresh examples. The bill is very small and black, the feet vermilion red, with an admixture of carmine colour. In the wedge-shaped tail, the central pair of feathers projects 1·19 in. (30 *mm.*) beyond the adjacent pair. The bird is of the same size as *Larus sabinii*, and is therefore intermediate also between *L. ridibundus* and *L. minutus*.

Nothing definite can up to the present time be reported with regard to the breeding range of this species: though investigations have been carried on to beyond 83° N. latitude, no one has as yet succeeded in discovering the nesting stations of this bird. As we have already fully discussed under *Tringa islandica*, these no doubt exist on a continental or insular area in the Polar basin north of the islands discovered by the *Jeannette* in June 1881, Mr. Newcomb, the zoologist who accompanied the expedition, having succeeded in killing the, up to that time, unprecedented number of

[1] Peach-blossom red—Yarrell, *British Birds*, iii. 582.
[2] French-grey—Yarrell, *British Birds*, iii. 582.

eight examples. Several individuals have, moreover, been shot on the north coast of Alaska, and among them an autumn bird only a few months old. Ross obtained the first examples ever seen on Melville Peninsula. Parry met with it in July during his boat expedition over the ice up to 82° 45′ north of Spitzbergen. An example was captured by the Austrian expedition on Franz-Joseph Land, and another was killed near the north-east coast of Siberia during Nordenskjöld's memorable northern voyage.

It is maintained in several quarters that no land exists within the Polar basin. The various spots around the Pole, however, from which the occurrence of this gull has been recorded, coupled with the fact that the spring migration of this species, as well as that of the *Tringæ*, geese, and other birds associated with it, was in these high latitudes observed to be still directed to the north, incontrovertibly point to the conclusion that the nesting stations of these birds can only be situated to the inside of these different points, upon an extensive land area, free from ice only during a few brief summer months, and stretching northward from the Jeannette Islands to about 85° N. latitude, and thence southward in the direction of Alaska, down to and below the 80th parallel.

Of the examples of *Larus rossii* killed during the *Jeannette* Expedition, Newcomb brought three away with him when the ship was lost on the 13th of June, and the crew commenced their terrible march across the ice from the 77th degree of northern latitude down to the delta of the Lena River. We may say that each traveller, in the shape of his load of provisions, literally carried on his back the term of his natural life. Nevertheless, Newcomb was determined to take at least three examples of his spoil with him. These he succeeded in safely bringing to Washington, where he handed them over into the charge of the Smithsonian Institution.

362.—Ivory Gull [Elfenbeinmöwe].

LARUS EBURNEUS, Phipps.[1]

Larus eburneus. Naumann, x. 341.
Ivory Gull. Dresser, viii. 349.
Mouette blanche. Temminck, *Manuel*, ii. 769, iv. 474.

An old, perfectly white example of this species was shot at from the shore here on the 20th of January 1850. Unfortunately the bird was merely wounded, and managed to escape far out to sea. There had been a prevalence of easterly winds with frost from the 8th of the same month, and many Sea Ducks, Geese, Divers, and

[1] *Pagophila eburnea* (Phipps).

Swans were observed swimming about near the island or travelling past on migration. Iceland Gulls, old as well as young birds, were seen and frequently shot, and a young Arctic Gull occurred on the 3rd of the month, all of which occurrences indicated that, owing to climatic changes of an unfavourable nature, the homes of these birds in the far north had ceased to be habitable. A gull of perfectly pure white plumage had been seen on a previous occasion, but in this case the person who reported its occurrence was not a professional shooter, and consequently not so reliable as the observer in the first-mentioned instance, whose statement admits of no doubt. On the coasts of Great Britain, especially those of the north of Scotland, and on the Orkney and Shetland Islands, old and young birds of this species have been shot in more than twenty instances.

The nesting stations of this gull rank among the northernmost of all birds, being found in Spitzbergen, Franz-Joseph Land, and Grinnell Land. According to Seebohm, only four eggs of this species are to be found in collections, three of which were discovered by Malmgren on Spitzbergen, in latitude 80° N., while the fourth was brought home by McClintock from Prince Patrick Island, 77° 25′ N. latitude.

Tern—Sterna.—The present, like the preceding related genus, contains about fifty species. These are distributed over all the oceans of the world; but only one of them belongs to the Arctic north. Only eight of the European species are met with in Heligoland.

363.—Sandwich Tern [Brandseeschwalbe].

STERNA CANTIACA, Gmelin.

Heligolandish: Kerr.	Name formed after the call-note.
Sterna cantiaca.	Naumann, x. 50.
Sandwich Tern.	Dresser, viii. 301.
Hirondelle de mer Gangek.	Temminck, *Manuel*, ii. 735, iv. 454.

These birds make their appearance in Heligoland during the second half of April and until the middle of May, when they may be seen chasing one another about in pairs in the bright sunshine, at heights of from five hundred to a thousand feet, amid frequent utterance of their loud shrill cries; often, indeed, their calls alone are audible from heights to which the eye vainly endeavours to penetrate. These are undoubtedly breeding pairs from the coasts

of Sleswick-Holstein and East Frisia, which, rejoicing in their recent union, thus gaily disport themselves, but a few minutes being required to take them back to their home.

Somewhat later, the same birds are met with in much larger numbers. They then come in swarms very close to the sand-island, dropping incessantly down to the surface of the water in pursuit of Sand-eels (*Ammodytes tobianus*), which are very abundant there. The birds at first consume these themselves, but later on carry them to their young. The young appear on the scene very soon after their education is finished, arrayed in the mottled plumage of their early youth; and old and young may then be seen fishing near the dune until the end of the summer.

This species breeds on the coast of England, and from the coasts of Jutland southwards to those of Spain, as well as on the Canary Islands. It also occurs as a breeding species on the Atlantic coast of North America; and, according to Seebohm, is a common summer resident on the Black Sea and Caspian.

364.—Roseate Tern [Dougall's Seeschwalbe].

STERNA DOUGALLI, Montagu.

Sterna Dougalli.	Naumann, x. 78.
Roseate Tern.	Dresser, viii. 273.
Hirondelle de mer Dougall.	Temminck, *Manuel*, ii. 738, iv. 457.

I have only twice obtained this elegant bird during my long experience on this island, both specimens having been old birds in summer plumage. Some uncertainty still exists as to the home of this species. According to Seebohm, we may consider it to be a resident of the coasts of the Atlantic and Indian Oceans.

It used formerly to be not uncommon as a breeding species on the coasts of Great Britain, but is said to have become very rare there in recent times. It also nests on the east coast of North America, on the coast of Ceylon, and on the west and north-east coasts of Australia and New Caledonia, but is not met with in New Zealand.

The old bird in summer plumage has the beak almost entirely black; the feet are scarlet-red (*scharlachroth*).

365.—Arctic Tern [Arktische Seeschwalbe].

STERNA MACRURA, Naumann.

Heligolandish: Road-nabbed Kerr = *Red-billed Tern.*

Sterna macrura.	Naumann, x. 114.
Arctic Tern.	Dresser, viii. 255.
Hirondelle de mer arctique.	Temminck, *Manuel*, ii. 742, iv. 458.

This Tern never arrives here before the first half of May, when it may be seen in fairly large numbers, mingling with *S. cantiaca*; and swarming round about the dune. In August, old and young birds again appear in considerable numbers on the return passage from their northern homes, the former of these still displaying the black markings of the head in their original purity. Its homes lie farther north than those of any other of its congeners, the breeding range extending from the Hebrides and Shetland Islands across Greenland, Iceland, Spitzbergen, along the whole Arctic coasts of Asia, and through Arctic America. Captain Feilden met it breeding on Ballot Island in 81° 44′ N. lat.

366.—Common Tern [Flussseeschwalbe].

STERNA HIRUNDO, Linn.[1]

Heligolandish: Road-futted Kerr = *Red-footed Tern.*

Sterna hirundo.	Naumann, x. 89.
Common Tern.	Dresser, viii. 263.
Hirondelle de mer Pierre Garin.	Temminck, *Manuel*, ii. 740, iv. 458.

Next to *Sterna cantiaca*, this species is the commonest of the Terns met with on this island. It arrives nearly at the same time as the Sandwich Tern, or perhaps a little later, but certainly never earlier. Its fishing-grounds, also, are quite close to the sand-island, where, like *S. cantiaca*, it may be seen swooping down after Sand-eels, amid much shrill noise. It may be seen there throughout the whole summer; most numerously, however, after the completion of the breeding season, when the old and young birds fish in company.

This widely-distributed species breeds on the coasts of the Atlantic Ocean, from England to the Canaries, and from Bermuda to Labrador. It also nests along the coasts of the North Sea, the Mediterranean, Black Sea, and Caspian, and as far as Lake Baikal and China.

[1] *Sterna fluviatilis*, Naumann.

367.—Little Tern [Kleine Seeschwalbe].

STERNA MINUTA, Linn.

Heligolandish: Lütj Kerr = *Little Tern.*

Sterna minuta.	Naumann, x. 145.
Little Tern.	Dresser, viii. 279.
Petite hirondelle de mer.	Temminck, *Manuel*, ii. 752, iv. 464.

It seems as though this pretty miniature Tern did not feel itself equal to crossing the open sea, for in Heligoland it is of quite exceptional and solitary occurrence—not a single example having been either seen or shot during the last ten years. It is even less partial to breeding by the sea than the preceding species, preferring the estuaries of large rivers and inland waters. Its northern range does not advance beyond Jutland and Denmark; but it is found nesting from Gibraltar within the whole area of the Mediterranean, in Greece, Asia Minor, and Turkestan, and as far as eastern India.

368.—Caspian Tern [Grosse Seeschwalbe].

STERNA CASPIA, Pallas.

Heligolandish: Groot Kerr = *Great Tern.*

Sterna caspia.	Naumann, x. 18.
Caspian Tern.	Dresser, viii. 289.
Hirondelle de mer tschegrava.	Temminck, *Manuel*, ii. 733, iv. 454.

Although a small nesting colony of this stately Tern still exists on the neighbouring island of Sylt, the birds only rarely cross over to Heligoland. Its harsh raven-like cries have, indeed, been heard on very rare occasions; but the bird itself has only been killed here once during all the time I have been collecting. That example, a beautiful old bird, was shot on the 22nd of June 1880, and is preserved in my collection.

The breeding range of this Tern is of world-wide extent. Although small numbers are found nesting on the coasts of the Baltic and North Sea, its proper breeding zone is a pre-eminently southern one: its nesting stations extend along the Mediterranean, the coasts of Africa, Gulf of Persia, Caspian Sea, and the salt lakes of Turkestan, as far as India and China, and thence south to Australia and New Zealand. In America it breeds from Alaska and Labrador southwards to California and Florida.

369.—Gull-billed Tern [Dickschnabel-Seeschwalbe].

STERNA ANGLICA, Montagu.

Heligolandish: Lunn Kerr = *Land Tern.*

Sterna anglica.	Naumann, x. 38.
Gull-billed Tern.	Dresser, viii. 295.
Hirondelle de mer hansel.	Temminck, *Manuel*, ii. 744, iv. 460.

The great difference in the mode of life of this species from that of its near congeners could not fail to attract the notice of the observant Heligolander, and he has christened the bird accordingly. Any one who, day after day, has watched the Terns darting down into the sea from great heights, so that the foam spurts high into the air, must feel particularly surprised to see a bird so similar in appearance roving about over the fields, suddenly dropping among the long stalks of the potatoes, and disappearing from sight.. Such, however, is the only way in which the bird seeks its food on this island; for it has never been seen fishing on the sea like the other members of the genus. The few examples of this species which I have obtained here were shot at the end of May, or during June and July; they were invariably old birds. Neither young nor old autumn birds have ever been observed here. The occurrence of the species altogether is limited to solitary examples, which are only met with after intervals of from five to ten years.

The breeding stations of this species are dispersed over nearly all the temperate regions of the earth. In the Old World it is found breeding from southern Spain to the salt lakes of Turkestan and Mongolia, and also at various spots in Australia. In the Western Hemisphere it is resident on the Atlantic coasts of North America, from Massachusetts to the West Indies. Exceptional breeding stations of this species are found in Denmark.

370.—Black Tern [Schwarze Seeschwalbe].

STERNA NIGRA, Brisson.[1]

Heligolandish: Lütj Swart Kerr = *Little Black Tern.*

Sterna nigra.	Naumann, x. 189.
Black Tern.	Dresser, viii. 327.
Hirondelle de mer épouvantail.	Temminck, *Manuel*, ii. 749, iv. 464.

The pretty little Black Tern is in general of rare occurrence in Heligoland. In spring, especially, a bird may be shot once at intervals of years; in some years, during the return migration, it

[1] *Hydrochelidon nigra* (Linn.).

passes the island in tolerable numbers during the course of the autumn, but often remains entirely absent for a long series of years. It is not a sea-bird like the majority of its congeners, but nests near fresh water at a greater or less distance from the sea.

Its range extends from western Europe to central Asia, and from the Mediterranean to southern Scandinavia. A form which so closely resembles *Sterna nigra* that it is doubtful whether it can really be separated from the latter, occurs as a breeding species in America from the south of Canada to the south of Alaska.

Skua—Lestris.—This interesting genus consists of only six species, of which four belong to the Northern and two to the Southern Hemisphere; the former of these are represented on the bird-list of Heligoland.

371.—Common Skua [Grosse Raubmöwe].

LESTRIS CATARRACTES, Illiger.[1]

Heligolandish: Groot Skeetenjoager = *Great Skua*.

Lestris catarractes.	Naumann, x. 470.
Common Skua.	Dresser, viii. 457.
Stercoraire cataracte.	Temminck, *Manuel*, ii. 792, iv. 495.

This stately bird is of such rare occurrence on this island that it was thirty years before I could get an example shot here for my collection. At last, on the 6th of November 1885, one was brought me,—a fine old male, remarkably strong and heavy. This much-coveted species had been seen several times in the course of previous years: shot at, but missed, on one occasion, and killed by a 'Badegast' on another. The latter, however, was too proud of his spoil to resign it to me.

This species seems to be altogether not very rich in numbers, for its breeding range is limited to a very narrow circle which does not extend beyond Iceland, the Faroes and Shetland Islands. English observers who have visited the nesting stations of these birds have reported an alarming decrease in their numbers in the course of about sixty years, so that we are only too well justified in apprehending that, at no very distant time, this large and beautiful bird may share the fate of *Alca impennis*.

[1] *Stercorarius catarrhactes* (Linn.).

372.—Pomatorhine Skua [Kugelschwänzige Raubmöwe].

LESTRIS POMARINA, Temminck.[1]

Heligolandish : Uhr-grootst Skeetenjoager = *Second largest Skua.*

Lestris pomarina. Naumann, x. 487.
Pomatorhine Skua. Dresser, viii. 463.
Stercoraire pomarin. Temminck, *Manuel*, ii. 793, iv. 495.

In spring the points of the two prolonged central tail-feathers of this species become twisted half-round their shafts, causing the terminal portions of the webs to assume a vertical position, and giving one the impression, when the bird is viewed from some distance, as though it had a globular appendage to its tail. At this season of the year the species is of very rare occurrence in Heligoland, having only been shot on two or three occasions during all the time I have been observing there. Young autumn birds, on the other hand, in all stages of plumage, from the uniform blackish-brown to the variegated dress spotted with rusty-grey[2] (*rostgrau*), occur annually in October and November, as a rule very frequently, and sometimes even very numerously, as for instance in November 1879. I do not remember having ever seen old birds during the autumn months.

Of the nesting stations of this species very little is known. They are situated on the continent or islands adjacent to the Pole; probably in largest numbers between the Pole and the Jeannette Islands, near the still unknown breeding stations of *Tringa islandica*, *Larus rossii*, and other species already treated of. Von Middendorff found the nest and eggs in the Taimyr Peninsula in 74° N. lat. Dr. Bunge saw the bird still migrating towards the north on Great Lhiakov Island in New Siberia at the end of June, and Ross met with it as high as 82° N. lat.

373.—Richardson's Skua [Schmarotzer-Raubmöwe].

LESTRIS PARASITICA, Illiger.[3]

Heligolandish : Skeetenjoager = *Skua* ; lit. *Predaceous Gull.*

Lestris parasitica. Naumann, x. 506.
Richardson's Skua. Dresser, viii. 471.
Stercoraire Richardson. Temminck, *Manuel*, iv. 449.

This is the commonest of the Skuas visiting Heligoland, and this statement applied with even greater emphasis in those earlier

[1] *Stercorarius pomatorhinus* (Temm.).
[2] Buff-coloured brown. Yarrell, *British Birds*, vol. iv. p. 672.
[3] *Stercorarius crepidatus* (Gmel.).

seasons when the weather, at the beginning of summer, was almost invariably fine and warm. Old birds, both in the light as well as in the uniformly dark-coloured plumage, were at that time of quite common and often frequent occurrence in the immediate vicinity of the island. For more than thirty years, however, the last of the spring and the first of the summer months have been almost without exception raw and cold; and consequently this species, which never used to make its appearance before the weather became warm, has only been seen on rare and solitary occasions. The number of young birds during the autumn months has likewise undergone considerable diminution.

This species is widely and very numerously distributed. Its nesting stations extend from the Arctic coasts and islands of the Old and New World, southwards as far as the Shetland Islands and Hebrides.

374.—Buffon's Skua [Kleine Raubmöwe].

LESTRIS BUFFONI, Boie.[1]

Heligolandish: Lütj-Skeetenjoager = *Little Skua.*

Lestris crepidata.	Naumann, x. 534.
Buffon's Skua.	Dresser, viii. 481.
Stercoraire parasite.	Temminck, *Manuel*, ii. 796, iv. 501.

I have only twice obtained old birds of this species; the first example was shot on the 31st of July 1853 by Von Sodenstern, a Hessian lieutenant, who most kindly presented me with it for my collection. It is a specimen of a fine male, in which the sides of the neck are of a rich straw-yellow colour, and in the tail the central pair of feathers extends 8·7 ins. (22 *cm.*) beyond the adjacent pair. The second example, an old female, also shot in the summer season a few years ago, has unfortunately lost the two central feathers of the tail, but is faultless in all the rest of the plumage. Solitary young birds of the year are met with almost every autumn.

This small species is a summer resident on the Arctic coasts and islands of the Old and New World; it is known to have bred in exceptional cases south of 70° N. lat. Von Middendorff found it nesting in the Taimyr Peninsula in 74½° N. lat. Captain Feilden met with it in Smith's Sound, 78° N. lat., and Parry in 82° N. lat.

[1] *Stercorarius parasiticus* (Linn.).

Petrel—Procellaria.—This peculiar genus—in which the nostrils are not placed at the sides of the beak, but form two tubes upon its upper ridge—embraces, according to Seebohm, about a hundred species. All the birds are oceanic in their habits, severing all connection with the land as soon as the duties of the breeding season are finished, and passing the rest of their existence exclusively on the wide oceans of all the divisions of the globe. Eight of the species may be considered as European, five of which visit the neighbourhood of Heligoland.

375.—Fulmar [Eissturmvogel].

PROCELLARIA GLACIALIS, Linn.[1]

Procellaria glacialis.	Naumann, x. 589.
Fulmar.	Dresser, viii. 535.
Pétrel fulmar.	Temminck, *Manuel*, ii. 802, iv. 505.

The gales of autumn almost annually bring this bird to Heligoland. For the most part only solitary individuals are met with, but in some years larger numbers occur, as for instance, in December 1873, when seventeen were shot between the 11th and 14th of the month; on that occasion they were swarming round the fishing-boats at sea, about eight miles from the island; and amongst them was one uniformly dark greyish-brown (*dunkel graubraun*) individual of the size of a Herring Gull.

In November 1879 these birds again occurred in extraordinarily large numbers, ten, for example, having been shot on the 9th. *Lestris pomarina* also was represented in unusual abundance; *L. buffoni* was observed repeatedly, and on the 27th of December I obtained a *Procellaria pelagica*. In my journal for that year I find the following remark at the close of November: 'Never before so many *L. pomarina* and *Procellaria glacialis* as this autumn.'

Breeding colonies of these birds are found on both sides of Davis Strait, in Iceland, St. Kilda, the Faroes, Spitzbergen, Nova Zembla, the Kurile Islands, and on Prince Albert Land in Arctic America.

376.—Great Shearwater [Grosser Sturmvogel].

PROCELLARIA MAJOR, Faber.[2]

Great Shearwater.	Dresser, viii. 527.
Puffin majeur.	Temminck, *Manuel*, iv. 507.

In Reymers' time, when the smaller species, *P. anglorum*, still occurred here in abundance, that collector once shot one of the larger

[1] *Fulmarus glacialis* (Linn.). [2] *Puffinus major*, Faber.

species. I myself have never yet been able to obtain this bird. However, on the 13th of November 1879, some fishermen from this island saw a large Petrel, about eight miles out at sea, flying about among a number of *P. glacialis*, quite close to their boat. This bird had its back and the crown of its head of a blackish-brown colour, its underside being white. There is no doubt that it belonged to *P. major*.

Nothing definite is as yet known in regard to the nesting stations of this species; it is, however, suspected that they are to be found on the coast of Greenland. The birds pass the autumn and winter months on the Atlantic Ocean, and occur often numerously off the coasts of Ireland, but are rare in Iceland, Norway, and in the North Sea generally.

377.—Sooty Shearwater [Dunkler Sturmvogel].

PROCELLARIA GRISEA, Gmelin.[1]

Sooty Shearwater. Dresser, viii. 523.
Puffin majeur. Temminck, *Manuel*, iv. *La femelle*, 508.

At the last hour, when I had already thought that these pages were finished, an example of this species made its appearance on the scene, in order to assume a place on the list of the birds of Heligoland. The example in question is a fine old male, in freshly moulted, nearly uniformly blackish sooty-brown plumage (*schwärzlich russbraun*) the chin, throat, and upper part of the foreneck alone displaying a faint tinge of grey. The firm plumage of the back and upper sides of the wings has the appearance of polished whalebone.

It was shot on the 25th October 1888 in the vicinity of the island, and is the only one of this species ever killed here.

In regard to its nesting stations very little is known at present. In the one hemisphere it is said to nest numerously on the coasts of New Zealand and the Chatham Islands, and in the other, it has been observed in June—*i.e.* the breeding season—on the south coast of Greenland. It is also said to be abundant on the coast of Labrador, and is distributed during the autumn and winter months over almost the whole area of the Atlantic and Pacific Oceans. It has also been met with occasionally on the coasts of Great Britain.

[1] *Puffinus griseus* (Gmel.).

378.—Manx Shearwater [Englischer Sturmvogel].

PROCELLARIA ANGLORUM, Temminck.[1]

Heligolandish name for this species, 'Marmuck': in Norway applied to the *Fulmar*.

Puffinus arcticus.	Naumann, x. 618.
Manx Shearwater.	Dresser, viii. 517.
Puffin manks.	Temminck, *Manuel*, ii. 806, iv. 509.

As already mentioned, this species was twenty-five years ago, of quite common and well-known occurrence. Reymers has often told me of shooting excursions on which he killed from ten to fifteen of these birds in the course of a morning. Naumann, who visited Heligoland in 1840, used at that time repeatedly to obtain specimens from Reymers, which the latter found at sea in smaller or larger flocks, most frequently off the southern extremity of the dune. Since that time the bird has entirely—and, indeed, had almost suddenly—disappeared. Ever since I have been collecting I have only once, about thirty-five years ago, obtained a young bird of the year after the moult or in autumn plumage (*junger Herbstvogel*) and have never heard of its being seen on the sea, either far from or near to the island.

This complete disappearance of the bird from this island has probably some connection with similar phenomena on the coast of Great Britain. Seebohm says that on the Scottish islands many of the breeding haunts of this species have been abandoned, and, according to Dresser, the birds have been completely supplanted in other localities by the Puffin. However, the bird still breeds numerously on the Orkney Islands, and one might expect that some of the young from these colonies would wander far south into the North Sea, unless there are causes at work preventing this. One feels inclined to suspect that the disappearance of some favourite kind of food is accountable for the recession of this interesting species.

Apart from the Orkneys and Shetlands, it breeds very numerously in Iceland, the Faroes, St. Kilda, and almost all the islands of the west coast of Scotland and Ireland, south to the Scilly, Azores, and Canary Islands, as well as on several of the Mediterranean islands as far as the Bosphorus.

[1] *Puffinus anglorum* (Temm.).

378.—Manx Shearwater [Englischer Sturmvogel].

PROCELLARIA ANGLORUM, Temminck.[1]

Heligolandish name for this species, 'Marmuck': in Norway applied to the *Fulmar*.

Puffinus arcticus.	Naumann, x. 618.
Manx Shearwater.	Dresser, viii. 517.
Puffin manks.	Temminck, *Manuel*, ii. 806, iv. 509.

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[1] *Puffinus anglorum* (Temm.).

379.—Leach's Petrel [Schwalben-Sturmvogel].

PROCELLARIA LEACHII, Temminck.[1]

Heligolandish : Storm-Swoalk med üttklept Stjert = *Storm-Swallow with forked tail.*

Thalassidroma leachii.	Naumann, x. 575.
Leach's Petrel.	Dresser, viii. 479.
Thalassidrome de Leach.	Temminck, *Manuel*, ii. 812, iv. 512.

I have only four times obtained examples of this species for my collection; the first was caught early in the morning of the 14th of December 1850, on the gallery of the lighthouse, and though perfectly uninjured, made not the least attempt to escape. Two other examples were about the same time shot on the sea, and two besides were seen. In November 1888 three birds were shot, and one was caught alive on the gallery of the lighthouse.

As regards the nesting stations of this species, Seebohm says: 'So far as is known, there exist only three breeding colonies of this species: one in the North Pacific, which extends from the Kurile to the Aleutian Islands, and two others in the North Atlantic —viz. on the islands of the Bay of Fundy, and in the north of Scotland on St. Kilda and Rona Island.'

380.—Storm Petrel [Kleiner Sturmvogel].

PROCELLARIA PELAGICA, Linn.

Heligolandish : Lütj Storm-Swoalk = *Little Storm Swallow.*

Thalassidroma pelagica.	Naumann, x. 557.
Storm Petrel.	Dresser, viii. 491.
Thalassidrome tempête.	Temminck, *Manuel*, ii. 810, iv. 514.

This, the smallest of all the Petrels, visits the neighbourhood of Heligoland in the course of the last three months of every year, and is shot once or twice almost annually. In November and December 1879, which months were remarkably rich in Petrels and Skuas, Aeuckens took as many as eight or ten examples. In years like that of 1879 this little bird is much more frequently seen by fishermen some ten to twenty miles out at sea.

The nesting stations of this species are found on the Orkney and Shetland Islands, the Faroes, St. Kilda, and several of the islands on the west coast of Scotland.

[1] *Cymochorea leucorrhoa* (Vieillot).

Diver—Colymbus.—This genus only contains four species, three of which are residents of the north of Europe; the fourth, *C. Adamsi*, is an American species, but is said to have occurred once or twice on the coast of England. The first three species occur more or less numerously on the sea in the neighbourhood of Heligoland.

381.—Great Northern Diver [Grosser Seetaucher].

COLYMBUS GLACIALIS, Linn.

Heligolandish: Groot Skwarwer. *Skwarwer* name for *Diver*.

Eudytes glacialis.	Naumann, xii. 397.
Great Northern Diver.	Dresser, viii. 609.
Plongeon imbrin.	Temminck, *Manuel*, ii. 910, iv. 571.

In its beautiful breeding plumage this handsome bird is but of rare occurrence off the island; it may be seen at odd times during May near the long reef to the north of the island, but it is very rarely shot; in fact, I can only remember three instances. In late autumn and during the winter months, when wearing the obscure grey plumage, it may be seen oftener near the island; but being a very wary bird, which generally knows how to escape from danger at the right moment, cases of its being shot are none too frequent.

All diving birds when hotly pursued are endowed with the capacity of immersing their body to such a depth that their back is under water. Of this art the present species is a perfect master, and, moreover, has at its command other contrivances by which it is frequently able to trick its pursuer. As soon as the bird's suspicions are aroused it immerses its body almost completely, and in this manner swims off with astounding rapidity. If, however, it finds that it is being seriously pursued, it allows only its neck to project above the surface, and will next take to diving completely under. Instead, however, of making straight for the sea-bottom in a more or less vertical direction, as it does when diving after food, it sinks without further movement, leaving hardly a trace of its presence on the water, and swims off horizontally beneath the surface at such a rate that two expert oarsmen in a light boat, and rowing their hardest, will scarcely be able to overtake it; the creature, well aware of this, only for a moment projects its head above water in order to breathe, but at once disappears again. By this time, however, it has already become so exhausted that it is obliged to gasp for air with widely extended beak. Seeing the uselessness of attempting to escape in

this manner, it now has recourse to stratagem. Instead of continuing to swim along rapidly in a horizontal direction, it bends off towards the side, at a right angle below the water, or dives right down to the bottom, allowing the boat to glide over and past it. Sometimes this trick succeeds, and while the shooter is spying eagerly forward, ready to fire, the oarsmen suddenly see the bird diving up once more to the surface far in their rear. An experienced sportsman, however, generally knows what the bird is up to by the manner in which it dives, and usually rows no farther than the spot where it disappeared. Then, however, is the moment when attention combined with rapidity and surety of aim are required, for in most cases the bird rises quite close to the boat, often only a few paces off, but dives again at the same instant; if one misses it, it is all over with the sport; for even if the bird should be sighted again at all, it is sure to be at a distance of from one hundred to one hundred and fifty paces, and all farther pursuit will be useless.

The actions of this Diver, as described above, present us with a problem as interesting and as difficult to explain as is the soaring upward of many birds without beatings of their wings or the help of air-currents, which we have already fully discussed in treating of the Buzzards and Gulls. This latter phenomenon is of course opposed to the established laws of gravity, according to which it is impossible that the heavier body should rise in the lighter atmosphere; consequently doubt has been thrown on the reliability of my observation, to which, nevertheless, I adhere with the firmest conviction. Now, the case of this Diver presents us with an act of kindred nature, though opposite in the manner of its execution, and too well known to be questioned by either sportsman or naturalist. This act consists in the immersion at any desirable time, and for any desirable period, of the lighter avian body in a much heavier and denser element—*i.e.* the water. The volume of the body of the Great Northern Diver amounts to about a cubic foot, and its weight to fifteen pounds; the weight of a cubic foot of water, on the other hand, amounts to more than sixty pounds. Nevertheless, the Diver is able, without any apparent effort, not only to immerse its much lighter body in the heavy mass of water, but also to remain for a protracted period below the surface, in order to escape pursuit by moving forwards in a horizontal direction. This kind of immersion and horizontal forward movement below the surface of the water must not, however, be confounded with the more or less vertical diving movements towards the bottom executed by the bird in its search for food; this latter movement is accomplished by mechanical action, the bird assuming an almost

perpendicular position, head downwards, and driving its body down into the water by powerful upward strokes of its broad swimming feet. The two actions have as little in common as has the ordinary flight of birds by means of the mechanical motion of their wings with their soaring flight on motionless expanded pinions.

These Divers, moreover, and other related aquatic birds, avail themselves of this capacity of immersing their body and of keeping it below the surface for any desirable time, not only for the purpose of escaping from danger, but also, as I had an opportunity of observing, with the object of surprising and securing some coveted prey. Many years ago I was a witness of a highly interesting case of this nature in the Zoological Gardens at Hamburg. On a moderately sized pond a Cormorant had immersed its body completely in the water, its neck being quite drawn in, so that only its head was visible above the surface; in this position the bird lay without stirring. I could not conceive what was the meaning of this extraordinary behaviour on the part of the bird, and watched it at some distance. A considerable number of Swallows were, after their manner, skimming along the surface of the water, and as one of them, boding no ill, sped close past the Cormorant, the latter shooting out its neck to its full length, swift as lightning made a snap at the bird. After two other unsuccessful attempts, the wily robber at length succeeded in snatching a victim, which he swallowed, after giving it two or three shakes in the water. He then again immersed his body as before, and lay motionless in ambush for further prey. I ought to add that the pond in the middle, where the Cormorant lay concealed, was about four feet deep, and entirely free from any plant growth, so that the bird could not possibly have obtained any hold by its feet below.

That the body of a bird, light as a cork as compared with the water, should be able to remain for a protracted period beneath the surface, is indeed as great a physical problem as the motionless soaring flight of some other species of birds in a calm and almost weightless atmosphere. Serious doubts have been expressed as to the accuracy of my observations in regard to the latter of these phenomena; but every sportsman and naturalist who has ever engaged in a hunt after Divers will endorse the accuracy of the facts I have related in regard to them.

The Great Northern Diver breeds throughout the whole of Arctic America, from Alaska to Greenland, and also very numerously in Iceland.

382.—Black-throated Diver [Polartaucher].

COLYMBUS ARCTICUS, Linn.

Heligolandish name same as preceding.

Eudytes arcticus.	Naumann, xii. 418.
Black-throated Diver.	Dresser, viii. 615.
Plongeon à gorge noire.	Temminck, *Manuel*, ii. 913, iv. 571.

In its summer plumage this bird, though smaller, is in beauty not inferior to the preceding. I have only once obtained an example of it in this stage, nor has a second been either shot or observed within my experience. It, however, occurs pretty often during the winter months, being then also more or less frequently shot. It prefers fishing in the shallow water near the sand-island, and it is very good sport to drive the bird gradually into shallower water. Its perplexity at seeing the distance between itself and the boat growing less each time it rises to the surface, is then distinctly visible. As the depth of water into which the bird is driven diminishes, the intervals during which it remains below the surface grow shorter and shorter; one takes advantage of this by pulling up with all one's might as close as possible, and firing as soon as the bird reappears on the surface. The pursuit must, however, be carried on with great caution and coolness. One must not rush upon the bird too eagerly when it reappears on the surface, but remain lying quietly on one's oars, and try to appear as though one were not taking any notice of it whatever; for if it sees that it is being pursued with undue haste, it will take a swift and determined dive, shooting away right underneath the boat, and generally not reappearing on the surface until a good distance out to sea. In such a case all further pursuit is useless; similarly, after one has missed the bird, all idea of further sport may be relinquished.

This Diver breeds on the Hebrides, in the north of Scotland, Scandinavia, throughout northern Asia, and also in Arctic America.

383.—Red-throated Diver [Rothkehliger Seetaucher].

COLYMBUS SEPTENTRIONALIS, Linn.

Heligolandish: Road-halssed Skwarwer = *Red-throated Diver.*

Eudytes septentrionalis.	Naumann, xii. 434.
Red-throated Diver.	Dresser, viii. 621.
Plongeon à gorge rouge.	Temminck, *Manuel*, ii. 916, iv. 572.

This, the smallest of the three species, is, unlike the preceding two species, of very common occurrence on the island, being shot very frequently both during the spring migration and on its return passage

in August; of individuals of the latter migration season, only the first arrivals wear the pure breeding plumage, those which appear towards the end of the month being all more or less advanced in the moulting condition. This Diver is shot most frequently during the shooting season for Kittiwake Gulls in autumn, when both young and old individuals disport the winter plumage. Occasionally this bird occurs in inconceivable quantities, as, for instance, on the 2nd and 3rd of December 1879, when there was a moderate east wind, with about 13° F. of frost (—6° R.). The air was clear, but a snowstorm set in towards evening. Hundreds of thousands of Ducks, Geese, Swans, Curlews, Oystercatchers and Dunlins were migrating in astonishing multitudes from east to west. During the whole of the forenoon, moreover, from early morning, these Divers migrated in numbers before unequalled, and since that time never even approached. At a distance of about two miles from the island, as far as the eye or the telescope could reach, these birds were seen moving in one incessant stream, all of them, strange to say, travelling towards the north-east. This migration lasted till about noon, and was repeated on the next day in the same manner and in the same gigantic proportions. Whence all these birds could have come, and whither they were going, are questions which it is difficult, if not impossible, to answer; equally difficult is it to find a cause which could have induced so enormous a number of birds, never seen in companies under ordinary conditions, to congregate for one common purpose on this particular occasion. Contrary to the habits of its two larger congeners, this Diver shows a preference for flying, almost all the hundreds of individuals which are killed here during late autumn being shot on the wing; such individuals as are at any time seen to dive or swim near the island are invariably found to be emaciated and out of condition. Their flight, however, is not a regular migratory movement proceeding in a definite direction, but apparently a mere aimless roving about, confined almost without exception to solitary individuals. Sometimes one may succeed, by imitating its strange call-note, to decoy one of these birds within shooting range.

The Red-throated Diver is found breeding from Greenland and Iceland down to the Hebrides, Orkney and Shetland Islands; also in northern Scandinavia, Spitzbergen, Nova Zembla; and towards the east, throughout northern Asia, and the whole of Arctic America.

Guillemots—Uria.—The Guillemots are the most prominent of the few birds which make this island their regular annual breed-

ing home. The genus contains only four or five species. Of these *Uria troile* still breeds on Heligoland to the number of perhaps a thousand pairs. About fifty years ago their number was considerably larger, but the collapse of two or three of their breeding stations has reduced them to a single colony.

384.—Common Guillemot [DÜNNSCHNABEL-LUMME].

URIA TROILE, Linn.

Heligolandish: in the summer plumage, Skütt = *Guillemot*. Winter plumage: Spitztk-Dogger, Dogger being the named applied to the Razorbill in winter plumage. Spitztk-Dogger = thin or pointedly-billed *Auk*.

Uria lomvia.	Naumann, xii. 508.
Common Guillemot.	Dresser, viii. 567.
Guillemot à capuchon.	Temminck, *Manuel*, ii. 921, iv. 573.

Of the nearly four hundred species of birds comprised in the avifauna of Heligoland only three species regularly, year after year, have made their breeding home upon this island rock, these being the Guillemots, a few pairs of the Razorbill, and about twenty pairs of Sparrows; but these have been joined within the last few years by a few pairs of Starlings and House Martins.

At present the Guillemots on the island are restricted to a portion of the cliff of a length of about three hundred feet, the cliff being about two hundred feet in height; this spot is known in the language of Heligoland as *Bre-ad Hörn* = Broad Horn. At this place a swarm of some two thousand of these birds, during some months of the year, imparts to the cliff on this part of the island the characters of a vast bird-station or 'loomery' in the Arctic regions. It is astonishing with what pertinacity these birds adhere to the place they have once chosen for their home. Thus, on this island, a ravine only about a hundred feet broad separates the portion of the cliff frequented by them from a rocky prominence exactly similar in form, and presenting in the many recesses which penetrate its strata numerous spots equally adapted for breeding purposes; nevertheless, the birds never attempt to use this place as a breeding station, or even as a temporary resting place, whereas on their own portion of the cliff they are so crowded near and upon each other that each member of the flock can only maintain his few square inches of ground by constant strife and ceaseless brawling. If one of them flies away for a time, and afterwards wishes to return to its place, those which have remained behind will endeavour to keep it off with open and projected beak, and it is only after suffering one or two repulses

that it is able to recover a footing. But the birds thus densely crowded upon the face of the cliff form merely a background to a striking scene. Perhaps ten times their number are seen swarming in endless confusion upward and downward, appearing and disappearing from all sides, and at all heights, without break or rest, like some countless and bewildering insect-swarm. Long chains of birds, composed of loose groups of ten, fifteen, thirty, and even a hundred individuals, keep coming up from the sea with storm-like haste, sweep past their breeding stations in an ascending curve, sending as they pass a hasty greeting to their breeding spouses, and again turning seawards re-descend to the surface of the water. In addition to these countless myriads of birds swarming about in all directions in the air, equally innumerable long-extending companies are seen swimming near and far upon the sea, apparently at rest, but nevertheless all the time carrying on a most animated conversation in which everybody seems to be having his say at the same time.

It is, indeed, a fascinating picture which this breeding haunt of the Guillemots presents to the eye; rocked in one's boat, one may watch for hours, without tiring, this scene of never-slackening activity, and only reluctantly can one make up one's mind to leave it.

When I came to the island, fifty years ago, there were several other such breeding stations on the western side of the cliff: one of these was near the lighthouse, to the outside of the picturesque natural arch of rock known as Möhrmers Gatt; another was on a broad prominence adjacent to this arch, called Book-hörn; and a third on a rock about half the height of this prominence, and quite close to it, which is known as Heus-hörn. At this latter spot, rows of Guillemots used to sit at a height of only ten or fifteen feet from the surface of the water, and would calmly look down upon the boats which happened to row past beneath them. About fifteen years ago, however, the large natural arch collapsed, and since that time the Guillemots have also left the two other breeding stations near it. Another colony used to breed on the face of a large isolated rock at the northern extremity of the island, called the Hingst—*i.e.* Horse, and also on the outer face of another natural arch similar to the first, and only separated from the Hingst Rock by a narrow chasm. Both these places have, however, also fallen in; and the birds, thus deprived of all their former haunts, are now restricted to the one single habitation on the steep and lofty wall of the cliff. This, fortunately, is very firm, and has, so long as I have known it, not undergone the least alteration; hence we may hope that countless generations of Guillemots may continue to disport themselves there for many centuries to come, rejoicing in

the green waves and snowy surf which beat around the foundations of their rocky home.

The breeding season of the Guillemots commences in the second week in April, all the birds making their appearance at one and the same time; this, however, need not surprise us, for they frequently visit their breeding stations in their full number during all the winter months. On these visits they generally make their appearance early in the morning, remaining while it is high water and again disappearing with the setting in of the ebb. It is wonderful how several thousands of these birds manage to congregate for a rendezvous of this kind, inasmuch as throughout the whole winter they are only met with scattered on the sea, three, or at most five individuals, being the greatest number ever seen diving or swimming together at that season.

Towards the end of June and at the beginning of July (in 1882 on the 2nd of July) the young birds leave the cliff, and are conducted by their parents down to the sea; they are at that time still very small, covered with a close fur-like down and hairy feathers, and as yet display no trace of their future flight-feathers. Many different views have been expressed as to how these young creatures, which for the most part have been bred on steep cliffs several hundred feet above the sea, manage to get down to the water; in many quarters it has been asserted that the old birds carried their young down on their backs. This, however, is an utter impossibility. Any one who has had an opportunity of observing the manner in which the Guillemots fly off from the steep face of a cliff will have noticed that this movement partakes but little of the nature of a flight; but that the birds, with their heads directed downwards, really drop off at an angle of less than 25°; that this line of fall remains almost unchanged for the first fifty feet, and even then only slowly and gradually passes in a curve into a horizontal line of flight, continued at a very low elevation above the surface of the water; that a bird leaving its seat on the rocks in the manner described could not possibly carry anything on its back will need no further explanation. In Heligoland this descent of the young birds from the cliff to the sea is accomplished in the following manner. On very fine calm evenings at the end of June or the beginning of July one may hear soon after sunset, from a distance of more than a mile, the confused noise of a thousand voices, the calls of the parent birds—arr-r-r-r—orr-r-r-r—err-r-r-r—and mingled with these the countless tiny voices of their young offspring on the face of the cliff—irrr-r-r-idd—irrr-r-r-idd—uttered in timid and anxious accents. The old birds swim about quite close to the foot of the cliff, and the tone of their incessant calls has in it something really

persuasive and reasoning, as though they were saying in their language—'Now, do come down, don't be afraid, it is not so hard as it looks;' whilst the little timorous voices from above seem to reply quite distinctly—'I cannot, I am so afraid, it is so dreadfully high.' Nevertheless, in its distress, the little chick tries to get as near as possible to the mother waiting for it below, and keeps tripping about on the outermost ledge of rock, often of no more than a finger's breadth, until it ends by slipping off, and, turning two or three somersaults, lands with a faint splash on the surface of the water; both parents at once take charge of it between them, and swim off with it towards the open sea. This is the only way in which I have seen this change of habitat of the young birds accomplished during some fifty summers; and it has always been one of my greatest enjoyments to lie stretched on the grass on a calm and beautiful summer evening, and, cautiously spying over the edge of the cliff, to watch the doings of many hundreds of pairs of old birds and their young; one thing only in this proceeding has always filled me with astonishment—viz. how it is possible, amid all this noise and bustle, and with darkness already setting in, for each pair of parents at once to pick out its own offspring from among the large numbers continually arriving from above. The Guillemots of this island are placed under the protection of the law; they may in no wise be disturbed before St. James' Day, July 25th, by which time all the young birds have left the breeding stations, though hundreds of old ones always remain on the cliff, and now become the object of eager pursuit. As a rule, they may be taken at a short range, for the birds fly very quickly, and can stand a good shot.

This species breeds on the coasts of Labrador, southern Greenland, Iceland, the Faroes, and the islands of England, Scotland and Ireland, as well as on the coasts of Norway up to the Varanger Fjord; a breeding colony also exists on Bornholm.

385.—Ringed Guillemot [Ringellumme].

URIA RINGVIA, Brünnich.[1]

Heligolandish: Kringelt Skütt = *Ringed Guillemot.*

Uria hringvia.	Naumann, xii. 524.
Ringed Guillemot.	Dresser, viii. 570.
Guillemot bridé.	Temminck, *Manuel*, iv. 574.

This species occurs here only in inconsiderable numbers, hardly more than a hundred individuals being met with at any time. No

[1] A form of *Uria troile* (Linn.), the last-named species.

definite data as to its occurrence and numbers can be given, as it is apt to get lost among the crowds of the common species, both during flight as well as on the cliff. In flying off from its breeding stations the bird is at once recognisable when seen from above by the deeper slaty-black colour of the back, which in consequence appears somewhat larger than in the common species, though in general it is not so. In the course of the winter both old and younger birds are shot pretty frequently, such specimens distinctly displaying the white ring running round the eye, and prolonged as a streak over the ear and down the sides of the head.

This species is met with in larger or smaller numbers at all the breeding stations of the common species.

386.—Brünnich's Guillemot [Dickschnabel-Lumme].

URIA LOMVIA, Linn.[1]

Uria arra.	Naumann, xii. 535.
Brünnich's Guillemot.	Dresser, viii. 575.
Guillemot à gros-bec.	Temminck, *Manuel*, ii. 924, iv. 576.

I have never either seen or obtained this bird in the whole course of my long experience. Reymers, however, once shot an example in winter plumage. The bird breeds in northern Greenland, on Spitzbergen, Franz-Joseph Land, Nova Zembla, and the islands of Arctic America.

387.—Black Guillemot [Schwarze Lumme].

URIA GRYLLE, Cuv.[2]

Heligolandish: Rotjer. Name without further signification.

Cepphus grylle.	Naumann, xii. 461.
Black Guillemot.	Dresser, viii. 581.
Guillemot à miroir blanc.	Temminck, *Manuel*, ii. 925, iv. 577.

In its simple but beautiful summer dress of velvety black, with pure white patch on the wing, and the feet vermilion red, this bird is of extremely rare occurrence here, and I have indeed only once obtained it in this condition. Individuals in the process of moulting to the breeding plumage have, however, occurred repeatedly.

Young autumn birds are shot pretty frequently as early as August, while old and younger birds in winter plumage are killed

[1] *Uria brunnichi* (Sabine). [2] *Uria grylle* (Linn.).

still more frequently during the winter months, especially on the first advent of cold weather. Old birds in this plumage, with the head and neck covered with white, loose (*zerschlissen*), elongated feathers, have a very pretty appearance.

The Black Guillemot breeds on Newfoundland, on the coasts of Labrador, South Greenland, Iceland, the Faroes, and the western and northern coasts of Ireland and Scotland; also on the coasts of Scandinavia, and as far as the White Sea.

388.—Spitzbergen Guillemot [Arktische Lumme].

URIA MANDTI, Licht.

In an example of a Black Guillemot shot here during the summer, and preserved in my collection, the whole of the freshly-moulted plumage is of the same colour as in the preceding species, with the sole exception of the wings, in which the moult has only advanced to that portion of the large white patch which is next to the forearm. The feathers on this part are, however, not white, but of a uniform black, so that if the change of feathers had proceeded in the same manner to its completion, the whole outer side of the wing would have acquired a uniformly black colour. The example in question is a one-year-old bird, in which the tail-feathers are much worn and faded; some of the old white feathers of the wing have pale brown tips, and at their roots are not black, but of a very pale ash-grey. The specimen is a remarkably small one, with a very slender bill. At present I must leave it undecided whether this example is to be classed with *Uria mandti*, which breeds in Greenland, Spitzbergen, the Arctic coasts of Asia and North America, or with some other related species.

Auk—Alca.—Unless, as has been frequently done, one includes the Guillemots in this genus, the number of species comprised in it is a very small one. Leaving out of consideration the Great Auk (*Alca impennis*), now, by all accounts, apparently extinct, Europe only possesses three species, and these occur in Heligoland.

389.—Razorbill [Tordalk].

ALCA TORDA, Linn.

Heligolandish: In summer plumage, Korrid—a name probably used in imitation of the voice of the bird. Winter plumage, Dogger—a name without further signification.

Alca torda.	Naumann, xii. 606.
Razorbill.	Dresser, viii. 557.
Pingouin macroptère.	Temminck, *Manuel*, ii. 936, iv. 581.

Although annually represented by but very few pairs, this peculiar species must, nevertheless, be counted among the breeding birds of Heligoland. The Razorbills on this island deposit their eggs in a deep cleft of the conical rock at the northern extremity of the island called Nathurn-Stack. For several years a few pairs used to breed among the blocks of rock of a large *talus* at the foot of the cliff; but the tremendous surf which rages round this spot during the autumn and winter months has gradually destroyed this breeding station.

In the course of the autumn and winter months, these birds are shot very frequently, and eaten with great relish by Heligolanders; they are at that time of such extraordinary fatness that the lower parts of their thighs are only just visible beyond the mass of fat which envelopes the body.

This species breeds in Nova Scotia, Newfoundland, Labrador, South Greenland, Ireland, the Faroes, and also on the coasts of Great Britain and Scandinavia and as far as the White Sea.

390.—Little Auk [Kleiner Alk].

ALCA ALLE, Linn.[1]

Heligolandish: Lütj Dogger = *Little Auk.*

Mergulus alle.	Naumann, xii. 552.
Little Auk.	Dresser, viii. 591.
Guillemot nain.	Temminck, *Manuel*, ii. 928, iv. 578.

This species, the smallest of the diving birds, also comes to Heligoland from its Arctic home, of course only in late autumn and winter when the breeding season is over. The bird has not yet been

[1] *Mergulus alle* (Linn.).

seen in the spring plumage, but solitary examples are shot annually, and in some years even in pretty large numbers.

The breeding stations of this little bird are 'circumpolar,' between 70° and 80° N. latitude.

391.—Puffin [Papageitaucher].

ALCA ARCTICA, Linn.[1]

Heligolandish: Grönlandsk Düüfk = *Greenland Dove.*

Lunda arctica.	Naumann, xii. 577.
Puffin.	Dresser, viii. 599.
Macareux moine.	Temminck, *Manuel*, ii. 933, iv. 580.

This species used to breed on this island until the beginning of the 'thirties,' though its numbers were limited to only one or two pairs. These used to breed on a cone-shaped column of rock about thirty feet high, having at its upper portion a deep tubular recess excavated in the layers of stone—in fact, the place might have been specially designed as a breeding station for this bird. An old shoemaker called Koopmann, who, I believe, was the first to start bird-stuffing on the island, captured the breeding pairs in a net which he had arranged in front of the opening of the cavity; since that time none of these peculiar birds have bred here again. Nevertheless, almost every spring, at the time when the Guillemots swarm round this island in their thousands, several Puffins are usually mixed with the crowds of the former birds, a few of them being also generally shot. This, however, is all that can be recorded in regard to the occurrence of the species, unless it be that a young autumn bird is killed once in a way at intervals of many years.

It breeds on the rocky coasts of Labrador, South Greenland, Iceland, Spitzbergen, on Varanger Fjord, the coasts and islands of Great Britain, and as far south as the Atlantic coasts of Portugal.

Grebe—Podiceps.—This genus contains about sixteen species. In the form of the foot they seem related to the Waterhens, but in structure, mode of life, and habits, they represent the most perfect

[1] *Fratercula arctica* (Linn.).

development of a swimming and diving bird. They never go on land, even building their nest on the water in such a manner that the eggs are for the most part half immersed. Europe possesses five species of these remarkable birds, all of which are also visitors to Heligoland.

392.—Great Crested Grebe [Grosser Lappentaucher].

PODICEPS CRISTATUS, Latham.[1]

Heligolandish : Groot Siedn = *Great Silky (Grebe).*

Colymbus cristatus.	Naumann, ix. 686.
Great Crested Grebe.	Dresser, viii. 629.
Grèbe huppé.	Temminck, *Manuel*, ii. 717, iv. 448.

The breeding zone of this bird having its northern limit in the south of Sweden and Finland, and only stragglers being met with in Norway, it need not surprise us that it is also of extremely rare occurrence in the neighbourhood of this island. Now and then at intervals of years, young birds in different stages are occasionally shot during the winter months. In spring, when the crest is but half-developed, it has only been seen here on two occasions.

The species belongs to the Old World, and breeds from the south of Sweden to Japan, and from the Cape of Good Hope to New Zealand.

393.—Red-necked Grebe [Rothhals-Lappentaucher].

PODICEPS RUBRICOLLIS, Latham.[2]

Heligolandish : Siedn = *Silky (Grebe).*

Colymbus rubricollis.	Naumann, ix. 720.
Red-necked Grebe.	Dresser, viii. 639.
Grèbe jou-gris.	Temminck, *Manuel*, ii. 720, iv. 448.

Old birds of this species are seen in spring dress only on rare occasions; it is more than twenty years since the last example

[1] *Podicipes cristatus* (Linn.).

[2] *Podicipes griseigena* (Bodd).

showing this plumage was shot. That is preserved in my collection. Young birds of the year, displaying the pretty striped markings on the sides of the head, are shot frequently in autumn, but old birds in winter plumage are very rare.

The breeding area of this species ranges from about the eastern half of Germany, through Denmark, Scandinavia, Finland, and Lapland, to within the same parallels of latitude through Asia and America.

394.—Sclavonian Grebe [Gehörnter Lappentaucher].

PODICEPS CORNUTUS, Latham.[1]

Heligolandish: Siedn = *Silky* (*Grebe*).

Colymbus cornutus.	Naumann, ix. 739.
Sclavonian Grebe.	Dresser, viii. 646.
Grèbe cornu.	Temminck, *Manuel*, ii. 721, iv. 450.

Of the five species of Grebe which visit Heligoland, the present one is by far the commonest; this remark, however, only applies to birds in winter plumage; old individuals in summer plumage I have only obtained twice in the course of fifty years, the first being an old, not very pretty female, which was shot on the sea, and another afterwards, which during the night dashed against the glasses of the lighthouse and was instantly killed. During late autumn individuals in their first winter plumage are often shot, and old birds in pure white plumage of satiny gloss are met with in the course of the winter, especially during severe cold.

The breeding zone of this species seems to extend farther north than that of any of the others enumerated; it reaches to Finmark and northern Lapland, and thence stretches across the whole of northern Asia, as well as through the whole of the northern portion of North America.

[1] *Poicipes auritus* (Linn.).

395.—Eared Grebe [Ohren-Lappentaucher].

PODICEPS AURITUS, Latham.[1]

Colymbus auritus.	Naumann, ix. 768.
Eared Grebe.	Dresser, viii. 645.
Grèbe oreillard.	Temminck, *Manuel*, ii. 725, iv. 451.

This bird—the specimen was in its winter plumage—has only been seen and shot here once. This rare occurrence is explained by the range of its breeding haunts, which, though extending from Spain to Japan, only advance to a limited extent to the north of the coasts of North Germany; thus Collett has only once obtained it in Norway. In Africa its nesting stations extend to the southernmost parts of that continent.

396.—Little Grebe [Kleiner Lappentaucher].

PODICEPS MINOR, Latham.[2]

Heligolandish: Lütj Siedn = *Little Silky* (*Grebe*).

Colymbus minor.	Naumann, ix. 785.
Little Grebe.	Dresser, viii. 659.
Grèbe castagneux.	Temminck, *Manuel*, ii. 727, iv. 452.

This gnome-like little bird, the smallest of the Grebes, occurs here in sufficient quantities to be well known to everybody; though old individuals in fine plumage are much less numerous. Young birds of the year are by no means of uncommon occurrence, and now and then one may even be met with late in autumn.

The following instance illustrates to what remarkable shifts birds are sometimes obliged to resort during their migrations. Fifty years ago when Reymers held the ornithological sovereignty of this island, the majority of the houses were provided with large barrels and casks for catching rain-water, at that time the only fresh-water supplies of the island. Just such an arrangement existed at Reymers' house. Early one morning he heard his wife calling out loudly—'Peter, Peter, make haste and come, there is a rat in our water-butt!' But instead of the familiar rodent, honest old Peter, to his great joy, found a Little Grebe diving up and down in the butt with lightning-like rapidity; nor was it by any means an easy task to secure it.

[1] *Podicipes nigricollis* (Brehm).

[2] *Podicipes fluviatilis* (Tunstall)

This species is very widely distributed; its breeding range extends from northern Scandinavia to southern Africa, and from eastern Asia to the south of Australia.

With this my report on the Birds of Heligoland closes. It is not without a certain feeling of sadness that I take my leave of those dear companions of many years, whose voices, manifold and familiar, have come down to me like friendly greetings from the heights above during many a late hour of night spent at my desk over these leaves, whilst over the skylight of the room which serves me at once for museum and for studio their countless hosts were speeding onward towards their distant homes.

May these records be a welcome gift to all my fellow-workers in the same field of Natural History! With this aspiration I lay down my pen on this, the 19th day of May 1890, my seventy-seventh birthday.

THE END



[*At page* 588.

THE AUTHOR IN HIS SHOOTING DRESS, 1893.

CORRECTIONS BY THE AUTHOR

THE following list of corrections has been supplied by the author, but unfortunately the sheets were printed off before its arrival :—

For Snipe *read* Woodcock, on pages 6, 7, 18, 44, 55, 58, 75, 85, 86, 87, 91, 99, 171, 193, 196, 197.

Delete 'ploughed,' on pages 96, 195, 197.

Delete from 'Quite' to 'migration,' page 66, lines 23-25.

Delete 'nocturnal butterflies and,' page 87, lines 19 and 20.

Delete 'at least,' page 111, line 14 from foot.

Page 5 line 25, *for* Plovers *read* Lapwings.
,, 6 ,, 10, *for* Rooks *read* Crows.
,, 7 ,, 8, *for* white and red-spotted *read* white-spotted and entirely blue.
,, 26 ,, 3 from foot, *for* two *read* eight.
,, 41 ,, 14 from foot, *for* east to west *read* west to east.
,, 49 ,, 16 from foot, *for* 358 *read* 353.
,, 53 ,, 10 from foot, *for* a mile *read* four miles.
,, 59 ,, 17, *for* westerly *read* easterly.
,, 86 ,, last, *for* Cranes *read* Crows.
,, 88 ,, 18, *for* Red *read* Pied.
,, 105 ,, 20 and 21, *for* started on their migration *read* arrived.
,, 112 ,, 8 *et seq.*, *for* 'I shot (30th May) the strange songster, and brought down my first Little Bunting. *Ibid.* p. 153. I shot the little songster (7th June), and it proved to be a male Scarlet Bullfinch (*Carpodacus erythrinus*)' *read* 'I shot (30th May) my first Little Bunting, and on the 7th June a Scarlet Bullfinch (*Carpodacus erythrinus*), both proved to be males.'
,, 152 ,, 1, *for* birds of the Snipe species *read Scolopacidæ*.
,, 152 ,, 11, *for* head *read* back.
,, 155 ,, 9, *for* less dark *read* darker.
,, 157 ,, 14, *for* Snipe *read Scolopacidæ*.
,, 194 ,, 1, *for* south *read* east.
,, 196 ,, 25, *for* sunset *read* sunrise.
,, 210 ,, 2, *for* twenty *read* fifty.
,, 231 ,, 27, *for* westerly *read* north-westerly.

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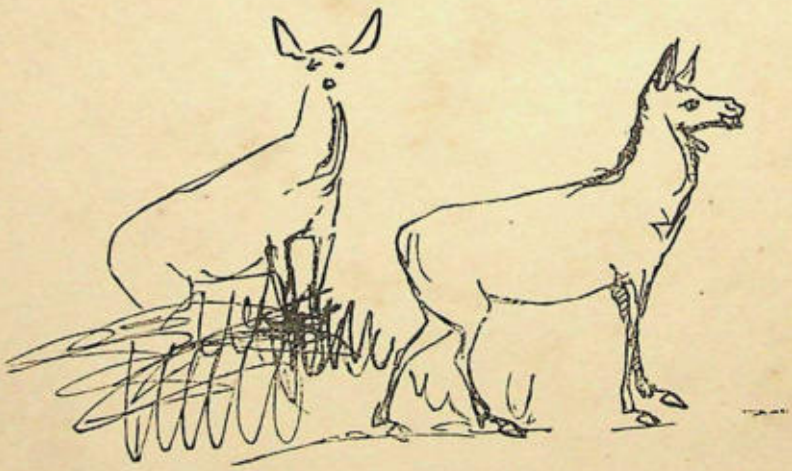
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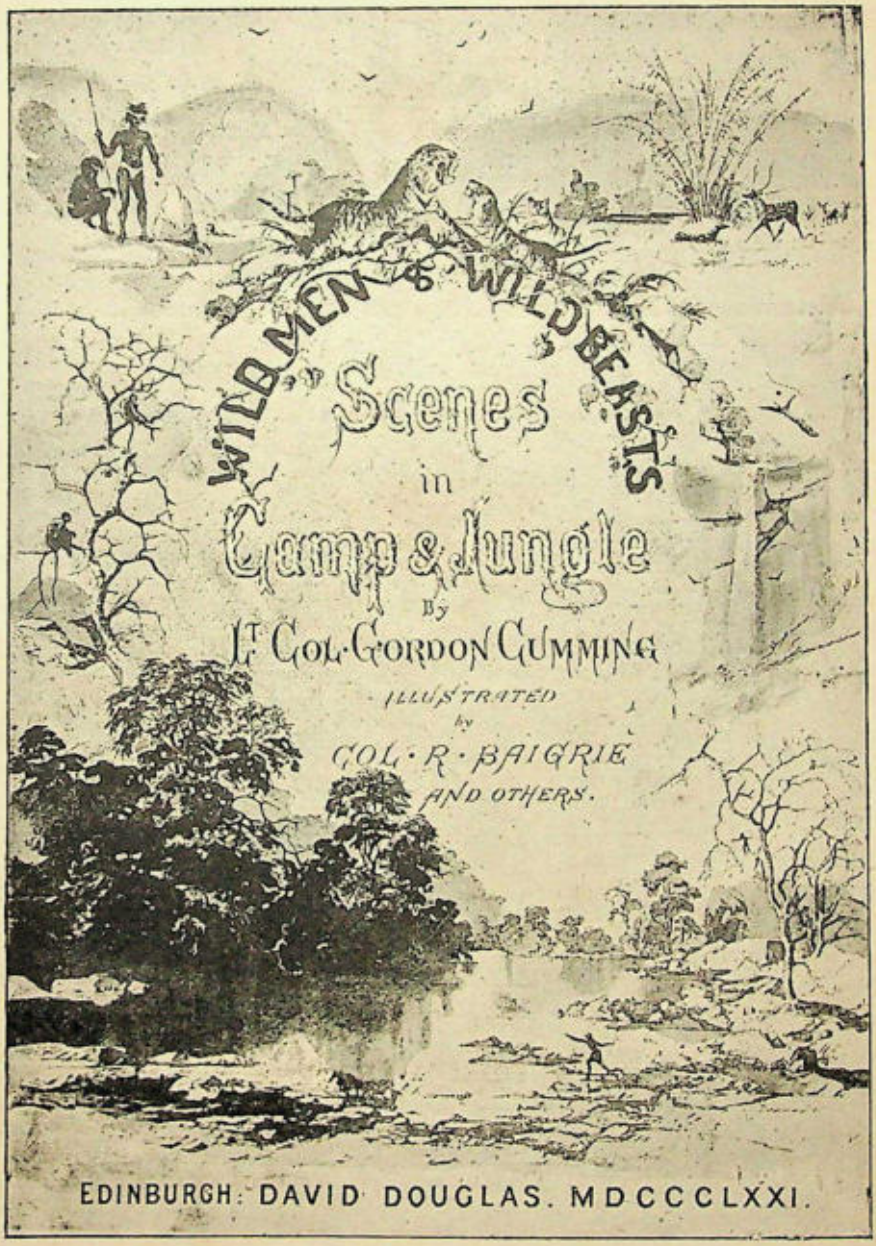


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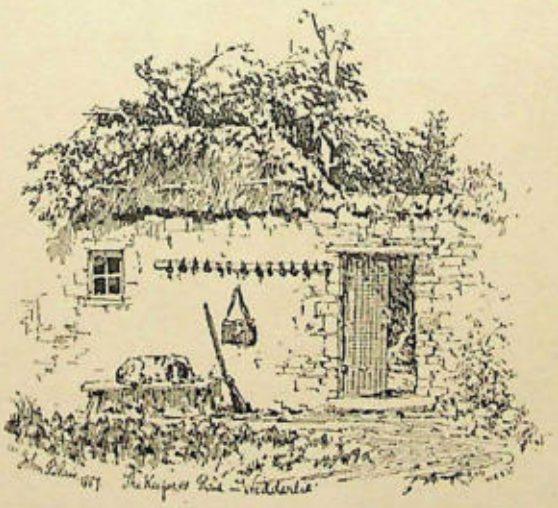
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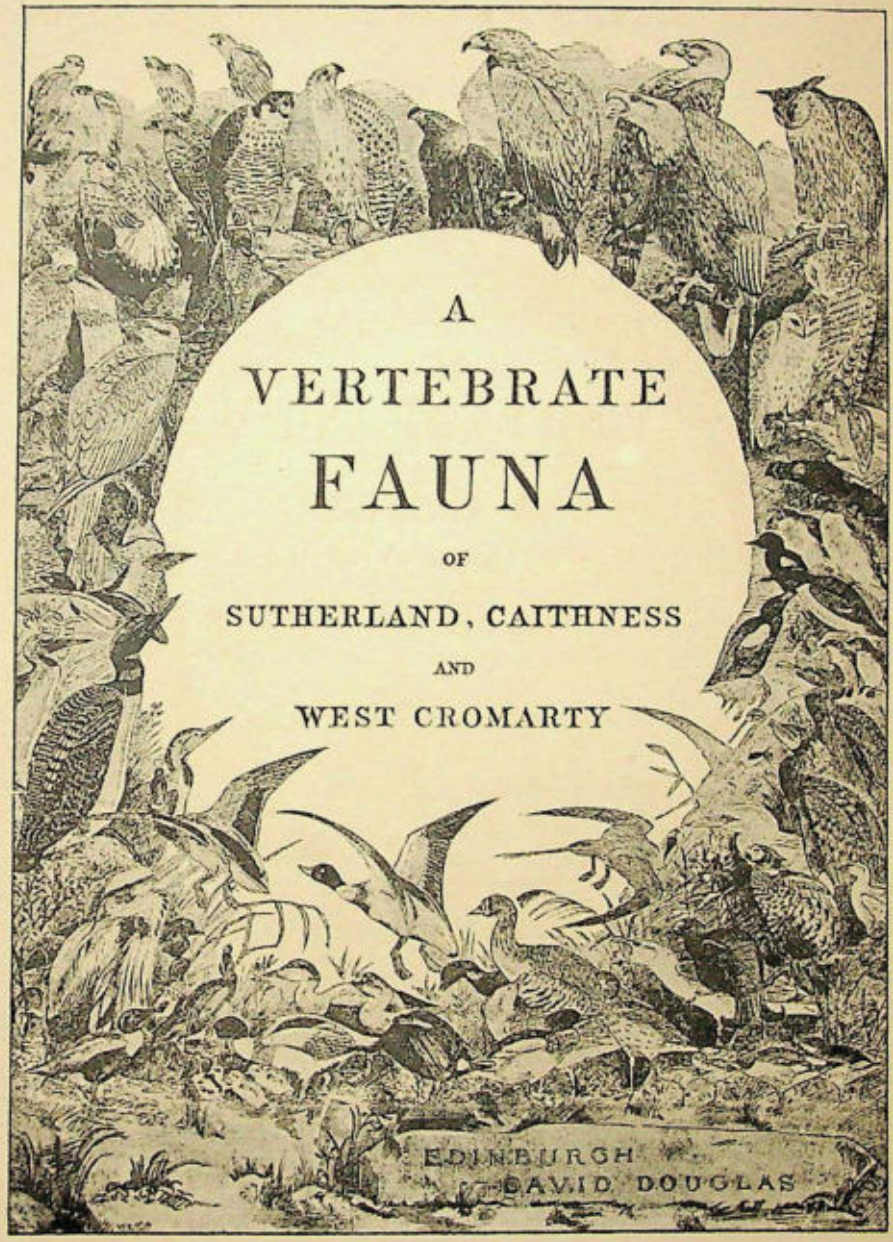
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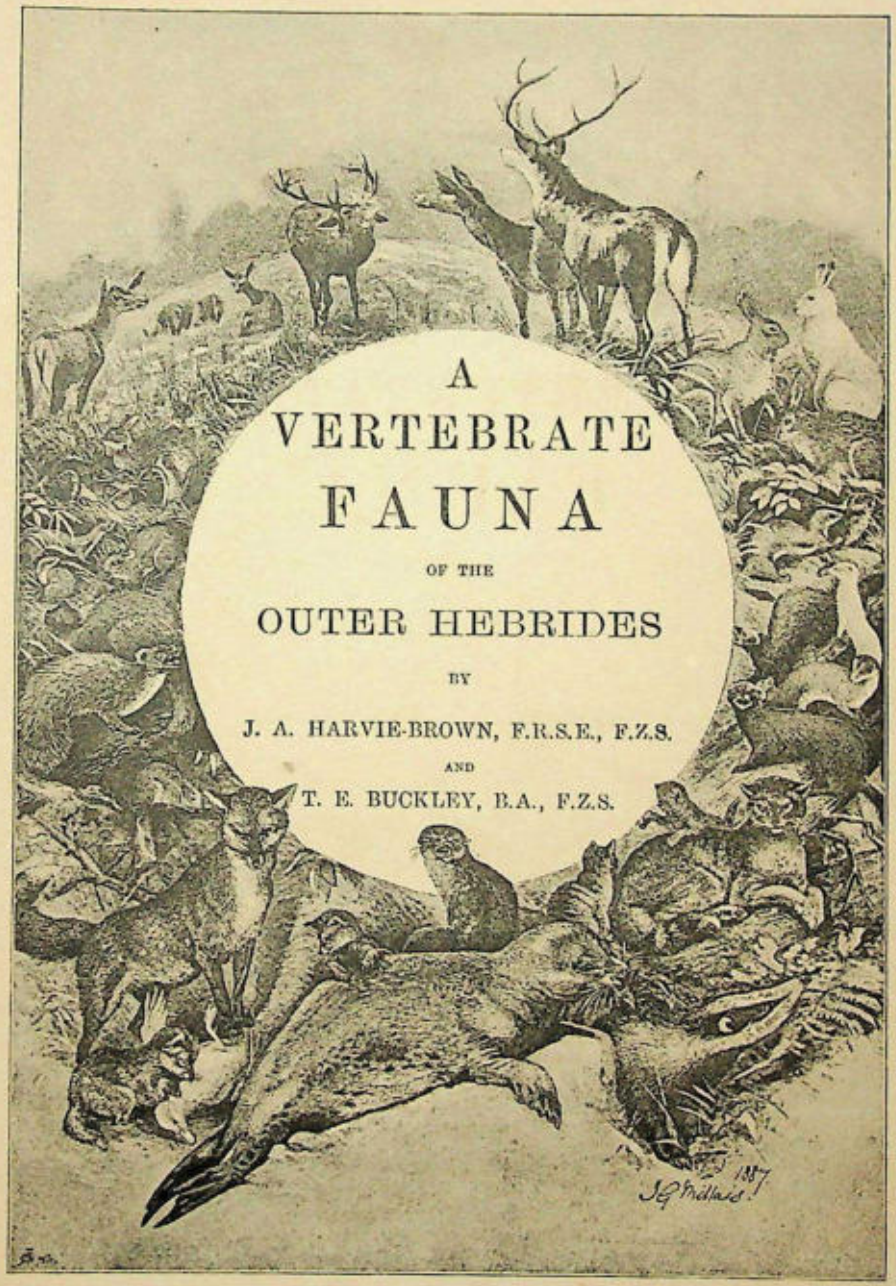
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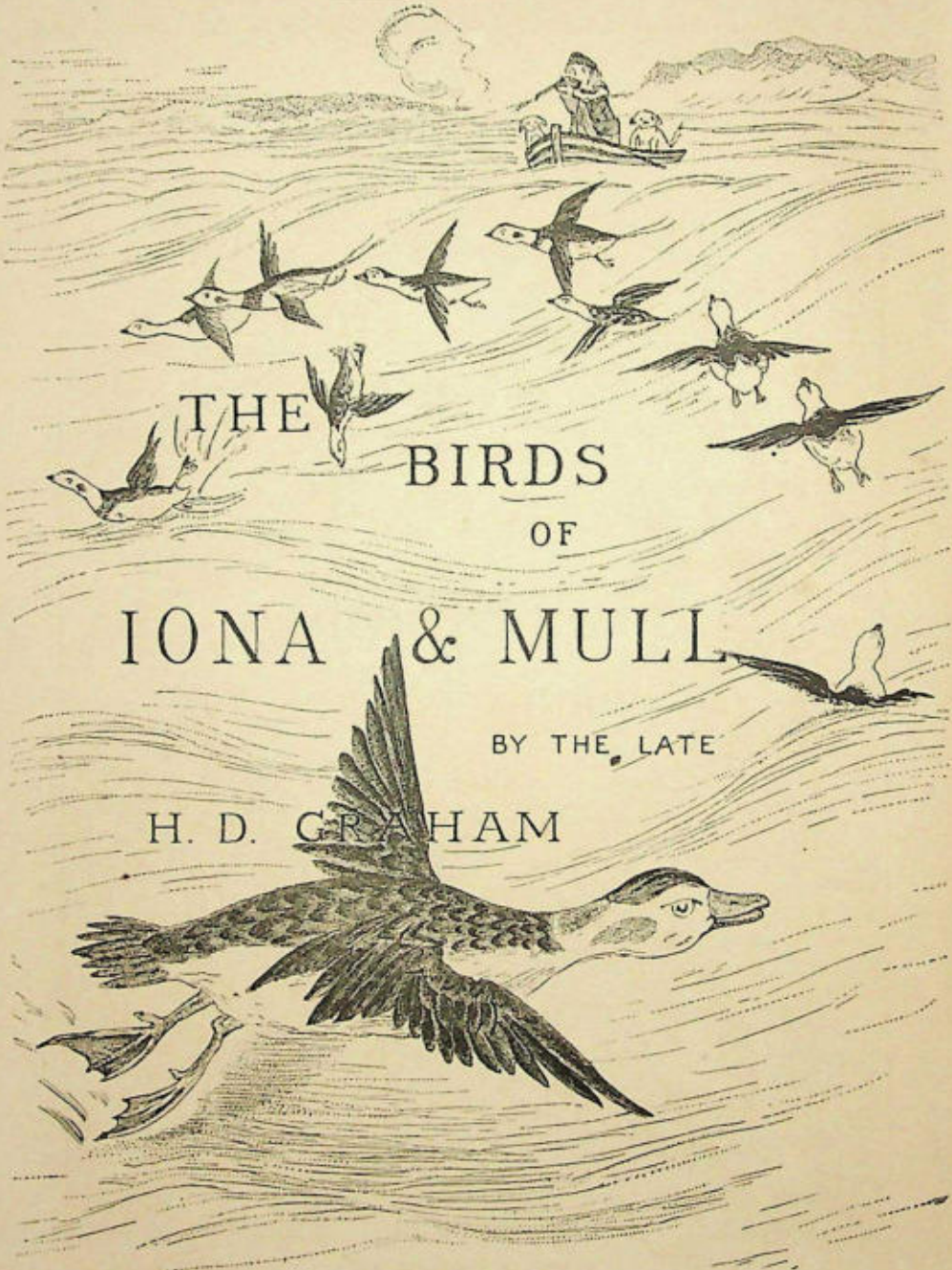
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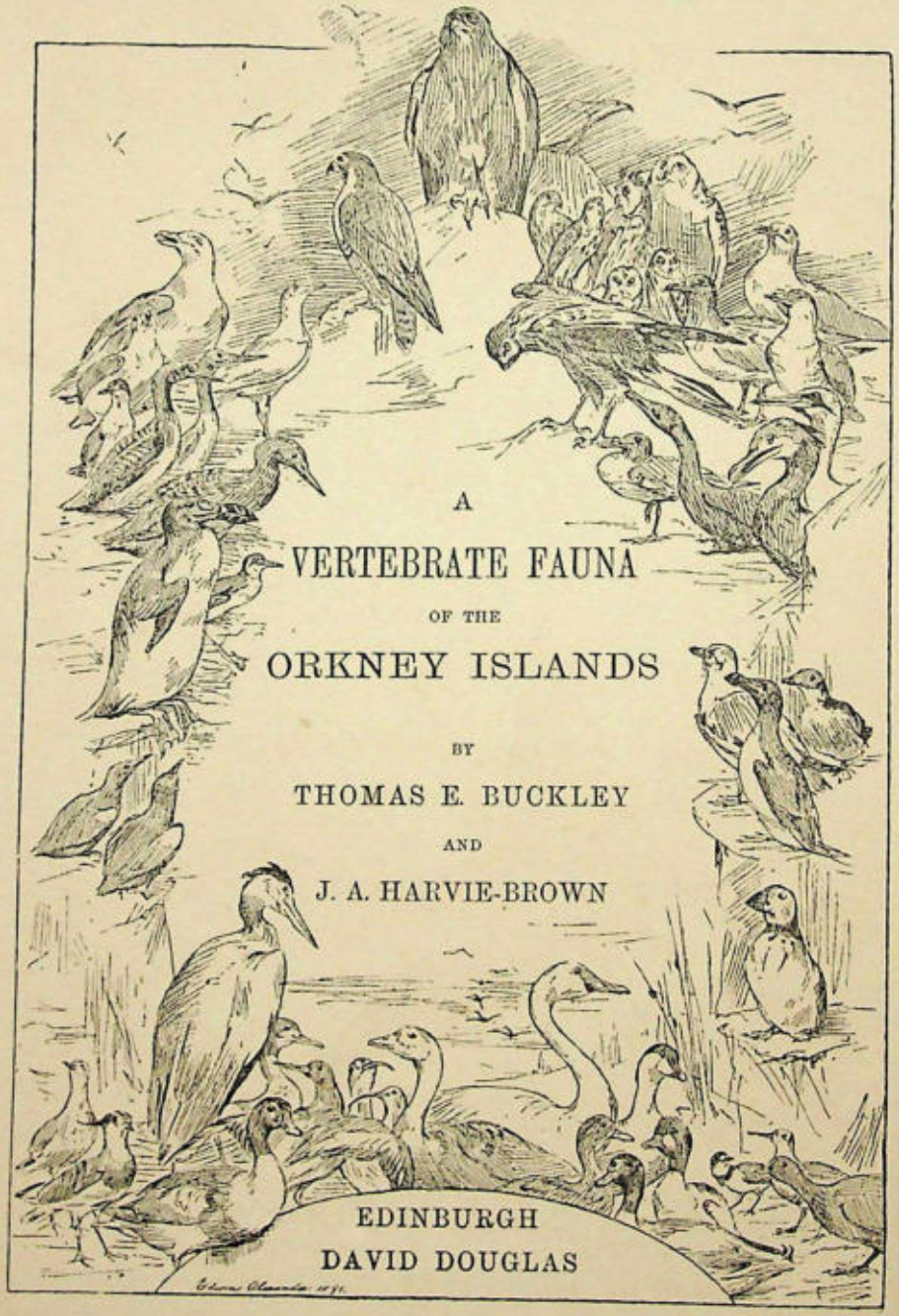
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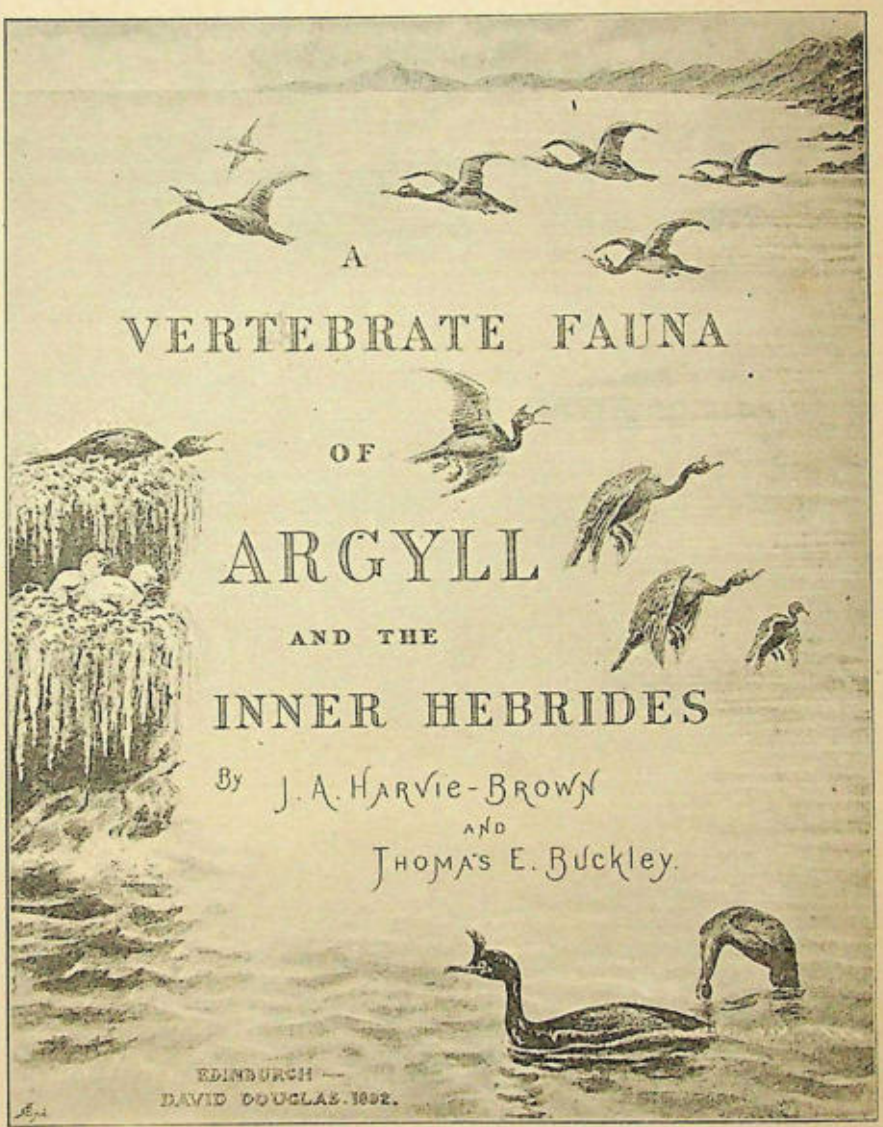
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