THE

GEOGRAPHICAL DISTRIBUTION

OF THE FAMILY

CHARADRIDÆ,

OR THE

PLOVERS, SANDPIPERS, SNIPES,

AND THEIR ALLIES.

BY

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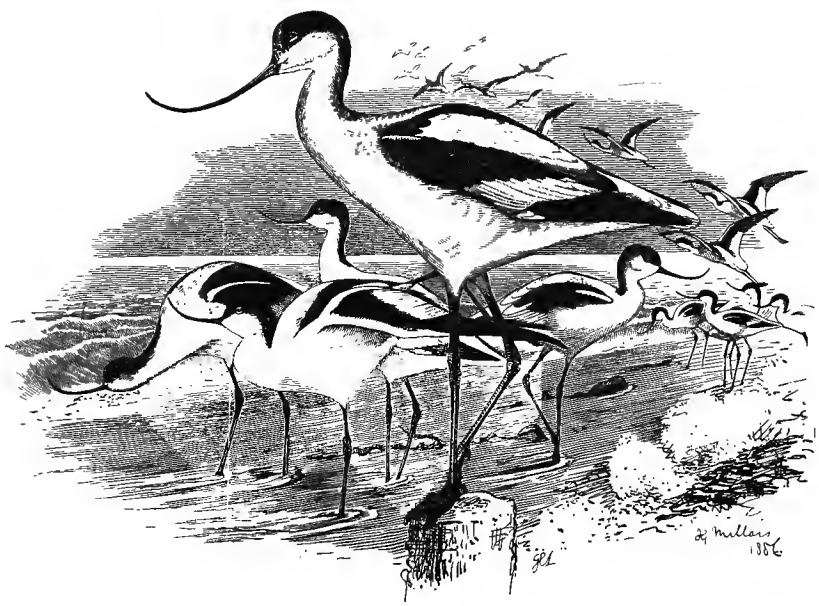

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"Concerning the names of Birds we did not much trouble ourselves, there having been disputing enough about them long ago; but have for the most part followed *Gesner* and *Aldrovandus*, being unwilling to disturb what is settled, or dispossess Names that may for their use now plead prescription. For to what purpose is it eternally to wrangle about things, which certainly to determine is either absolutely impossible, or next door to it? Especially seeing if by immense labour it might at last be found out, by what Names every Species was known to the Ancients, the advantage that would thence accrue would not countervail the pains."

JOHN RAY, *in the Preface to the Ornithology of Francis Willughby.*
1678.

"In the difficult matters of synonymy and the orthography of generic names, I have been guided rather by general utility than by any fixed rules. When I have taken a whole family group from a modern author of repute, I have generally followed his nomenclature throughout. In other cases I use the names which are to be found in a majority of modern authors, rather than follow the strict rule of priority in adopting some newly discovered appellation of early date."

ALFRED RUSSEL WALLACE, *in the Preface to the 'Geographical Distribution of Animals.'*
1876.

"So far as regards specific names, I have throughout this work set the Rules of the British Association at defiance, being convinced that, so far as ornithology is concerned, they have done infinitely more harm than good. . . . . I have adopted a scheme which appears to me to be the most practical of any which have been suggested. It may not satisfy the requirements of poetical justice; but it is at least consistent with common sense. I adopt the specific name which has been *most used* by previous writers. It is not necessary for me to encumber my nomenclature with a third name, either to denote the species to which it refers, or to flatter the vanity of the author who described it; all my names are *auctorum plurimorum*."

HENRY SEEBOHM, *in the Introduction to 'A History of British Birds.'*
1883.

PREFACE.

About twenty years ago Mr. J. E. Harting began to collect information relating to the group of birds commonly called the Limicolæ, with the intention of publishing a monograph of them. In the course of his studies he contributed from time to time articles on this group of birds to 'The Ibis' and to the 'Proceedings' of the Zoological Society; but subsequently his attention drifted into other channels, until in 1884 he abandoned the idea of writing a monograph, and offered his collection of birds for sale.

I was then writing on the British species belonging to the group, which had always been an especial favourite of mine, and was glad of the opportunity of making my collection more complete. I therefore bought the Harting collection, which, with the Swinhoe collection, already in my Museum, and the Shelley collection of African Limicolæ since acquired, provided me with ample material for study as soon as the last part of the 'History of British Birds' had gone to press.

The result of this study is the present volume. Acting in accordance with the old proverb "*bis dat qui cito dat*," I determined not to write a monograph. What I had to say on the habits of these birds I had already said in the work referred to: on the other hand, I found that the study of all the species contained in the group threw quite a different light upon their geographical distribution, and enabled me to correct what appeared to be errors in their classification—their mutual relationship, in fact; so I determined to make these two subjects the theme of the book.

To reduce the cost I limited the Plates to those of birds which had either been badly figured or not figured at all, and limited the descriptions to little more than diagnoses. Only those who have tried to write a diagnosis of a species, to put down briefly but clearly the characters that apply to it, at all ages and seasons, and apply only to it, can appreciate the difficulties that have to be overcome. These difficulties are multiplied ten-fold when the diagnosis of a genus has to be written. The diagnosis must apply to every species in the genus and must be inapplicable to any species outside the genus. I cannot hope that all my diagnoses are perfect; I can only say that I have done my best to make them so.

The earlier writers on Ornithology, of whom we may accept Brisson and Linneus as typical examples, attempted to diagnose the genera of birds. To the best of their ability

they endeavoured to enumerate the characters which were sufficient to determine the genus, leaving out of the diagnosis other characters, which may be very interesting and very important, but are not absolutely necessary. Modern ornithologists belong to two schools; those belonging to the old school (than whom no better example can be found than Yarrell) simply enumerate the so-called structural characters, leaving the reader to find out for himself, if he can, which of them are diagnostic. No great fault can be found with this mode of procedure, except perhaps that it may be regarded as an attempt to "play for safety," which not unfrequently proves a great incentive to the use of strong language on the part of the bewildered but irascible student, who tries in vain to determine the genus of a strange bird.

Dresser, in his 'Birds of Europe,' has adopted a most original course: he has simply catalogued the structural characters of the type of each genus, without pointing out which of them are common to all the species, and which of them are exceptional; and, of the former, without a hint as to whether they are common to allied genera, or are diagnostic of the genus the type of which he is describing.

The new school of modern ornithologists (of whom Ridgway and Sharpe may be accepted as typical examples) boldly take the bull by the horns, and attempt to construct diagnostic keys to the genera. They may or may not be successful,—unfortunately many of these keys are lamentable failures, and will not turn in the lock; but all honour to the men who at least try to give definiteness to our knowledge.

My thanks are due to many ornithologists for much valuable assistance. Firstly, to Mr. Harting, for allowing me free access to his notes, and for permitting me to undertake, with his help, a work upon a group of birds with which his name has been so long associated; secondly, to Mr. Sharpe and the other officials of the British Museum, for giving me access to the National Collections, even during the interregnum and semi-chaos of the incorporation of the Hume collection; thirdly, to Messrs. Salvin and Godman, for the loan of rare birds from South America; and, fourthly, to the Smithsonian Institution in Washington, for the loan of equally rare birds from the Pacific Islands.

It only remains for me to explain the use which I have endeavoured to make of these and other materials to which I had access—to give, in short, a *résumé* of the points of view from which the Geographical Distribution of these birds may be studied.

After having written a book, to add a preface in order to tell the reader the conclusion at which it was intended to arrive, looks very much like the action of the legendary little boy who made a picture of a quadruped with long ears, and then wrote under it "This is a donkey." The little boy was not quite sure that a stranger would recognize his pictorial efforts—not that he had any doubt as to the intelligence of the stranger, but because he mistrusted his own powers of representation.

The object which I set before me was to try and discover the origin of the various

species of Plovers, Sandpipers, and Snipes. The first difficulty to be overcome was the determination of the species.

Most English ornithologists regard species as fixed quantities to be accepted or rejected according to circumstances. The hereditary conservatism of Englishmen has for the most part prevented them from realizing the important fact, that if the theory of evolution be true there must always be species in process of being evolved or differentiated. They have accepted the theory of evolution without accepting its inevitable consequences.

The hereditary progressive tendency of American thought has prevented the ornithologists of that country from committing the same blunder, and with them the recognition of subspecies is as much a matter of course as the admission that many species, even amongst those whose range of geographical distribution is very wide, show no tendency to split up into local races.

In this case no reasonable man can doubt that the Americans are perfectly right, and the majority of Englishmen hopelessly wrong.

The imperative necessity of recognizing subspecies immediately started the difficulty of their definition. To define the indefinite is no easy task, but the imperfection of the systems of nomenclature makes it absolutely necessary. I flatter myself that I have hit the happy medium by defining the difference between two forms to be *specific in all cases where they do not intergrade*, without making unnecessary inquiries as to the reasons why they do not do so; and to be only *subspecific in all cases where they do intergrade*, without making unnecessary inquiries as to how the intergradation is accomplished.

Having thus satisfactorily settled one boundary of subspecies, I decided to define the other boundary geographically. Whatever individual variation be found within the range of a species, if it be not also capable of being defined geographically I do not regard it of subspecific value.

My next difficulty was the definition and limitation of genera. The præ-Darwinian ornithologists supposed that species differed in colour, and genera in what they were pleased to call structural characters, such as the shape of the bill, feet, wings, tail, &c. Here it seems to me that both English and American ornithologists are for the most part wrong.

The post-Darwinian ornithologist must approach the subject from an entirely different standpoint. No *à priori* theories as to the respective generic value of colour and structure can be tolerated for a moment. It may be a matter of opinion as to how far a genus should be permitted to extend, but it is an inexorable law that *no species can be admitted into a genus unless it be nearer related to some one species in that genus than it is to any or every species outside*. Modern genera *must be genetic*, they must indicate *affinity*; but genera founded upon the shape of the bill or the number of the toes often associate birds together whose similarity is only one of *analogy*, where like causes have produced like

effects, in very distinct genealogical lines. I have found that in many cases the colour or the pattern of the colour of such parts of the plumage as are unaffected by age, sex, or season, and which is therefore presumably of ancient origin, is apparently of much greater value in ascertaining the relationship of many birds than the so-called structural characters, which are compelled by the laws of evolution to change with the changing habits or environment of the species.

In order to split up a species it must be dispersed. The chief causes of the dispersal of the ancestors of the Charadriidæ have probably been two Glacial Epochs. The Præ-Pliocene Glacial Epoch compelled the ancestral species to emigrate from its old home in the Polar Basin. It emigrated in various directions, and a score of parties were thus isolated in a score of localities, where they met with difficulties of various kinds. Emigration produced Isolation, and Isolation in more or less different environments caused Evolution to proceed on different lines, the final result being Differentiation.

Half the species thus differentiated remained in their new homes; but the other half followed the retreating cold to the old home in the Polar Basin, where most of them lived long enough to become again circumpolar. The Post-Pliocene Glacial Epoch again dispersed them with similar results, until finally many of them returned again to the Polar Basin, which, for the third time, became the great breeding-ground of the Charadriidæ.

The habits of Migration, originally formed for the purpose of seeking light, and strengthened by the experience of emigration, became an annual necessity when a semi-arctic condition of the Polar Basin again ensued, and culminated in the catastrophe which exterminated the Rhinoceros, the Hippopotamus, the Elephant, the Mammoth, and Palæolithic Man in the Palæarctic Region. This catastrophe I believe to have been the floods caused by the sudden melting of vast accumulations of snow, which must have begun when the climate became cold enough to allow the excessive rainfall of the later Pleistocene Age to accumulate in winter in the form of snow on the mountains, and which must have periodically occurred so long as the excessive rainfall continued. In Chapter VI. I have described the great annual catastrophe which, even with the present reduced rainfall, takes place in Siberia, and to a lesser extent in the valleys of the Nile and the Danube. This semi-arctic condition of the Polar Basin still exists, and the partial isolation thus produced has caused and is causing the production of subspecies.

To each of these great factors in the Differentiation of the species and subspecies of the Charadriidæ I have endeavoured to devote as much space as the limits of the work would allow. A large part of the book is occupied with details respecting each species or subspecies, the various names by which it has been called, the characters by which it may be recognized, its summer and winter range, and the probable course of the emigration of its ancestors.

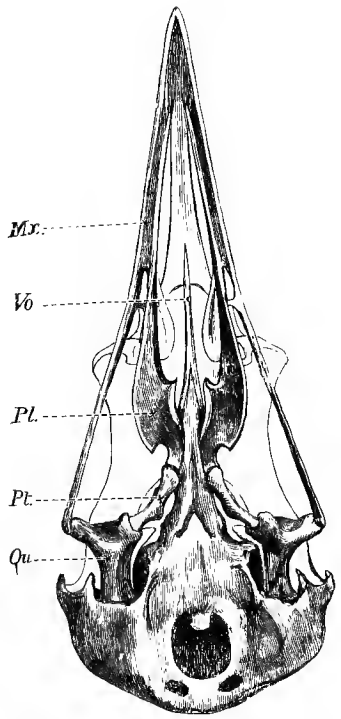
In discussing the Glacial Epoch I have endeavoured to place before the reader a clear idea of the main features of Croll's theory, which appears on the whole to be more plausible than any other that has hitherto been advanced. Croll lays great stress upon

the effect of changes in the elevation of land and in the direction of oceanic currents; and it seems very probable that the apparently simple action of the changes of the eccentricity of the earth's orbit has been greatly complicated by these and other causes.

It must, however, be left to competent Geologists to decide in what way the Glacial Epochs were caused. All that the ornithologist requires is a knowledge of the existence of two long-continued breaks in the continuity of bird-life in the Polar Basin, during which the birds were dispersed and isolated for a sufficient length of time to give them an opportunity of being modified to suit the various conditions of their temporary homes; so that the one species which lived on the shores of the Arctic Ocean before the Præ-Pliocene Glacial Epoch became differentiated into nearly two hundred species after the Post-Pliocene Glacial Epoch had passed away, and for at least the third time opened the gates of Paradise to the Charadriidæ.

There seems to be a tendency amongst modern Biologists to modify the theory of Evolution as propounded by Darwin in two directions. One party, headed by Weismann, desires to eliminate the effects of Use and Disuse; and another, of whom Romanes is the exponent, wishes to minimize the importance of Isolation. In each case it is thought that too much importance was attached by Darwin to the point under consideration. I think exactly the opposite. I think that the relative importance of the hereditary effects of Use or Disuse, and the necessary part which Isolation plays in the Differentiation of species, appear to be much underestimated by Darwin, and I have endeavoured to bring some evidence to show that this is the case.

Finally, I beg to commend my book with all its faults, which I am sure are many, and with all its blunders, which I hope are few, to the careful consideration of ornithologists. It possesses at least the merit of originality, and (if an author may be permitted to pass sentence on his own work) it does not quite deserve the critical remarks once made to a writer: "Your book is both good and new; but that part which is good is not new, and that part which is new is not good."



Under view of the skull of the Lapwing (*Vanellus cristatus*).

Mx. The Maxilla. *Vo.* The Vomer. *Pl.* The Palatine bone. *Qu.* The Quadrate bone.

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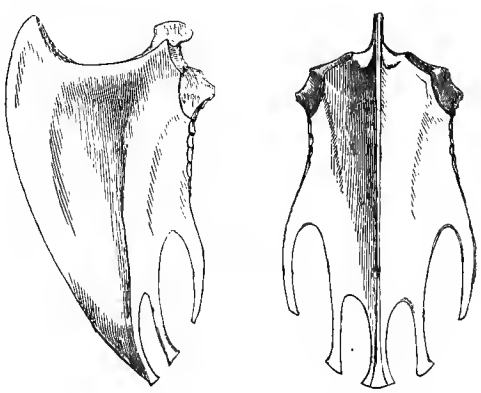
SYSTEMATIC INDEX AND DIAGNOSES.

Family CHARADRIIDÆ.

[1] I have followed Sundevall in making "remex" feminine (*vide* Sundev. Meth. Nat. Av. Tent. p. xxxvi).



Sternum of *Cursorius gallicus*.

LIST OF PLATES.

GEOGRAPHICAL DISTRIBUTION

OF

THE CHARADRIIDÆ.

CHAPTER I.

CLASSIFICATION OF BIRDS.

The Plovers, the Sandpipers, and the Snipes form three groups of birds which are very nearly allied, and may be conveniently classed together in a family, to which the name of *Charadriidæ* has been given.

Position of the Charadriidæ.

The precise position of this family in the Avian System is difficult to determine, for the sufficient reason that ornithologists are not yet agreed upon a classification of birds; but the following rude attempt may enable the student to form some idea of the groups to which they are nearest related.

Unsatisfactory state of the Classification of Birds.

The Classification of Birds, in its progress from the artificial system of the last century to the natural system, which may possibly be discovered in the next, is passing through an intermediate stage to which the word chaos is not altogether inapplicable. Cuvier's modification of the division of birds into six Orders, adopted by Linnæus, and founded for the most part on the structure of the feet, is acknowledged by every ornithologist to be wrong; but it would be difficult to find two ornithologists who had studied this branch of the subject and who agreed as to the number, to say nothing of the names, of the Orders which are to take the place of the Cuvierian ones. The latest contribution to the legion of new systems which have appeared is that of Mr. Sclater, published in the 'Ibis' for 1880. In this scheme no fewer than twenty-six Orders are recognized. That these groups may approximately represent a natural arrangement I am not prepared to deny, but for all practical purposes a primary division into so large a number as a score or more units is of little value. It is impossible that these twenty-six mountains in the ornithological range can be exactly equidistant from each other; and surely some ornithologist can be found with

Sclater's System.

a range of vision wide enough, and a faculty of generalization acute enough, to see the half-dozen or so groups of collateral ranges or outlying spurs, which lead up to, and culminate in, the great central plateau of the Passeres.

Huxley's System.

It seems probable that the ornithological Orders of the future will be based upon, or slightly modified from, the four or five great groups which Huxley proposed after his elaborate study of the palatine bones of birds. Of these groups the Schizognathæ contain the birds with which I propose to deal in the present volume. It seems to form a homogeneous assemblage, and would perhaps do so still more if the Pigeons were expelled from it, on the ground that their young are born helpless and naked. The two characters, the arrangement of the palatine bones and the condition of the new-born young, seem to offer a basis for a very simple classification of birds; and though the latter character may not deserve to be made of so much importance, it will probably be found to be correlated with many other minor characters, the aggregate of which may justify its adoption.

Provisional classification founded on Huxley's and Sundevall's systems.

Birds might then be divided into five Orders, which may be compared to a group of mountains like the Himalayas. The Passeres and their allies represent the great central plateau, around which the other four Orders are grouped, like collateral chains leading down to the plains in various directions.

These Orders may be briefly summarized as follows :—

Order I. ANSERIFORMES.

Anseriformes.

Owls, Eagles, Herons, Flamingoes, Ducks, Cormorants, and their allies.

This group of birds may be roughly defined as Desmognathous Dasypædes—though many of the Owls are in some respects Schizognathous, and there may be some difficulty in describing the difference in the condition of the young of the Herons and that of some of the Picarian birds.

Order II. CUCULIFORMES.

Cuculiformes.

Goatsuckers, Cuckoos, Woodpeckers, Parrots, Kingfishers, Hornbills, Rollers, Toucans, Jacamars, Pigeons, and their allies.

This group of birds contains the Saurognathæ (Woodpeckers), the Schizognathous Gymnopædes (Goatsuckers and Pigeons), and the Desmognathous Gymnopædes (the rest). It is very closely connected with the preceding Order by the Storks and Cormorants, which are Desmognathous, and have young born blind and helpless, though covered with down. The Pigeons, being Schizognathous, are nearly allied to the Charadriformes, especially to the Sand-Grouse; and the Goatsuckers are said to be nearly allied to the Owls.

Order III. PASSERIFORMES.

Passeri-formes.

PASSERINE BIRDS, HUMMING-BIRDS, SWIFTS, and their allies.

This group of birds may be defined as Ægithognathous Gymnopædes. They may be regarded as the great central or dominant group of birds at the present time, by far the most numerous in species, the most highly and the most recently differentiated, and consequently so intimately connected, that the genera are very difficult to define. The Humming-Birds and the Swifts are the most aberrant families, the former being more or less Schizognathous.

Order IV. CHARADRIFORMES.

Charadri-formes.

PENGUINS, DIVERS, GREBES[1], AUKS, GULLS, PETRELS, PLOVERS, SNIPES, CRANES, RAILS, PHEASANTS, TINAMOUS, and their allies.

This group of birds may be defined as Schizognathous Dasypædes, to which may be added the Carinate Dromæognathous birds. The latter (the Tinamous) are an intermediate link between the Charadriformes and the Struthioformes, but appear on the whole to be nearest related to the Phasianidæ than to any of the Struthious birds. The Penguins are very aberrant, but do not belong to any other Order.

Order V. STRUTHIOFORMES.

Struthio-formes.

OSTRICHES, CASSOWARIES, APTERYX, and their allies.

This group of birds may be defined as Noncarinate Dromæognathous Dasypædes. It represents the Ratitæ of most authors, a small survival of a once numerously represented Order, now rapidly approaching extinction. It may be regarded as the least changed group of birds, dating very far back in its origin, and consequently showing wide gaps between the genera.

Some ornithologists have created Orders to include fossil birds. This seems to me to be absurd. The consistent evolutionist must believe that a perfect series of intermediate forms exists, or has existed, between every species of bird now known and the original species (half bird, half reptile) from which all birds and many reptiles are descended. What

Fossil birds.

[1] It is impossible for a field naturalist to regard the Grebes as nearly related to the Divers. Their habits under water are entirely different; they never use their wings under water as the Divers and Auks do, but, like Ducks, keep them pressed tight to their bodies. They cover their eggs, as is usual amongst Ducks, but absolutely unknown amongst Divers and Auks. Finally, Charadriform birds lay smooth, coloured and spotted eggs, or, like the Petrels, show that they have only recently ceased to do so. Grebes, on the other hand, lay rough eggs without a trace of a spot, and exactly resembling eggs of the Cormorant, Pelican, and other near allies of the Duck. The arrangement of their palatine bones notwithstanding, there can be little doubt that Grebes are modified Ducks. Possibly a future biologist may discover some character by which the Grebes may be removed from the Charadriformes to a more natural position.

is the use of attempting to classify such an infinite series, from a few bones, belonging to half a dozen broken links of the endless chain?

The total number of species of birds known to ornithologists may be roughly estimated at 10,000, which are distributed amongst these Orders approximately as follows:—

Total number of species of birds.

Anseriformes	1000
Cuculiformes	1900
Passeriformes	5980
Charadriformes	1100
Struthioformes	20
Species of Birds	10,000

The birds treated of in this volume belong to the Order Charadriformes, which may be divided into seven Suborders without much difficulty:—

Suborders of Charadriformes.

Crypturi, or Tinamous	40
Gallinæ, or Game Birds	310
Grallæ, or Cranes and Rails	150
Limicolæ, or Plovers and Snipes	280
Gaviæ, or Gulls and Auks	200
Procellaridæ, or Petrels	100
Impennes, or Penguins	20
Species of Charadriformes	1100

Of these seven Suborders, the one to which our attention must be directed is the Limicolæ, which appears to consist of one large family, surrounded by seven small ones:—

Families of Limicolæ.

Pteroclidæ [1], or Sand-Grouse	16
Turnicidæ [2], or Hemipodes	25
Thinocoridæ [3], or Quail-Plovers	6
Dromadidæ [4], or Crab-Plovers	1
Charadriidæ, or Plovers and Snipes	192
Otididæ [5], or Bustards	28
Parridæ [6], or Jacanas	10
Chionidæ [4], or Sheathbills	2
Species of Limicolæ	280

[1] "The Sand-Grouse are borderers, and although lower than the Grouse in many respects, being but little removed from the struthious type, yet are related, and that intimately, to the Plovers and the Pigeons." (Parker, Trans. Zool. Soc. v. p. 237.)

Neither the exact limits of the Limicolæ, nor the precise number of Families into which this Suborder may be most conveniently divided, can be regarded as in any degree definitely settled; but the foregoing families may be provisionally included in it.

Following up the simile of a great mountain-range like the Himalayas, we find that the outlying range of Limicolæ is a miniature model of the grand whole. It, too, has a great plateau, surrounded by little peaks or spurs, but some lead down to lower ranges whilst others lead up to higher mountains. Thus, to drop the metaphor, the Pteroclidæ form a stepping-stone to the Pigeons, the Turnicidæ and Thinocoridæ to the Game Birds, the Dromadidæ to both the Gulls and the more distant Herons, whilst the Chionidæ form a second link to the Gulls, the Parridæ to the Rails, and the Otididæ to the Cranes. To go back to the simile of the mountain-range, we find that they all lead up to the great central plateau, blending with it so naturally that it is impossible to draw an artificial hard-and-fast line where one begins and the other ends, and leaving here and there a few isolated peaks so exactly between two outlying spurs that it is a toss-up to which they belong. But in spite of this impossibility of determining the precise limits of each Family or Order, or to lay down with mathematical accuracy the line where two may march together, the broad features of the landscape are unmistakable. It is not necessary that classification be always absolutely definite to be scientific, which is another word for natural. Nature has drawn a sufficient number of definite lines to enable us to map out the great divisions; but it must often happen that these lines cross a species, and then it is a matter of perfect indifference to which side of the line it is referred. The worst thing that we can do is to act as modern ornithologists are too apt to do, to split the line which Nature has drawn, and to give undue importance to the doubtful species or groups, and allow them to set up a genus, or a family, or an order of their own, so that our hard-and-fast line may pass between them. A line which never passes over a species or a higher group is sure to be an artificial one. If there is no mystery in the landscape it cannot be true to Nature, for Nature abhors a hard-and-fast line more than she

Nearest allies of the Limicolæ.

Principles of classification.

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[2] "The chief relations of *Hemipodius* are on one side with *Tinamus*, on another with *Syrrhaptes*, and on a third with the Plovers." (Huxley, Proc. Zool. Soc. 1868, p. 304.)

[3] "In their myology these genera," *Cursorius* and *Glareola*, "do not differ in any essential points from *Thinocorus* and *Attagis*; and it is with these that I cannot help thinking that they are most allied." (Garrod, Proc. Zool. Soc. 1877, p. 418.)

[4] "The Limicoline genera *Dromas* and *Chionis* have many points of resemblance to the Laridæ." (Newton, 'Ornithology,' p. 45.)

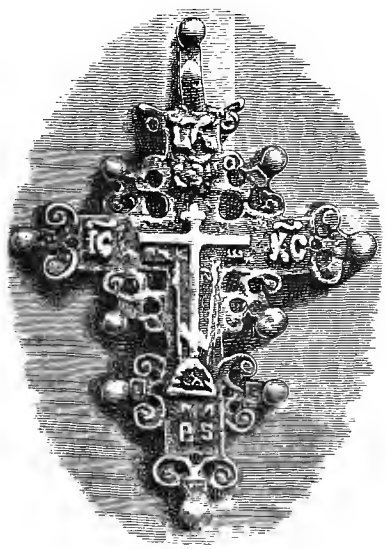
[5] "It has just been proposed" (by the writer) "to re-transfer to the Limicolæ one of the families, Otididæ, kept in it" (the Alectorides) "by Mr. Sclater." (Newton, 'Ornithology,' p. 45.)

"The Bustards are gigantic Plovers." (Parker, 'Shoulder-girdle and Sternum,' p. 158.)

[6] "As regards the position of the Parridæ in the group Pluviales, it appears to me that they form a well-marked family, with no very obvious relationships to any of the other families of that group, approaching, however, perhaps most nearly to the Charadriidæ." (Forbes, Proc. Zool. Soc. 1881, p. 647.)

abhors a vacuum. But for our purpose of classification we are obliged to draw definite lines; all that is necessary is to state our characters with absolute precision, and where they are necessarily more or less artificial, candidly to admit that they are so.

I presume it would be possible to write a diagnosis of the Family Charadriidæ founded upon external characters, but it would probably be very complicated and for the most part artificial. To write one founded upon internal characters is beyond my power.



CHAPTER II.

THE EVOLUTION OF BIRDS.

The geographical distribution of the Charadriidæ appears to indicate that the family originated on the shores of the Arctic Ocean and the adjoining steppes and prairies. The chief factor in their subsequent dispersal and differentiation must have been Glacial Epochs; but before entering upon the cause of differentiation, it is necessary to say a few words on the process itself.

Truth of the theory of Evolution assumed.

I propose to take for granted the truth of the statement, that the species of Charadriidæ existing at the present time are the modified descendants of a common ancestral species; that they were not specially created in the various localities where they are now found, but have emigrated thither from a common centre.

Demonstrated by Darwin and Wallace.

This theory, the theory of Evolution, was started as an hypothesis by Buffon, and defended and modified by Lamarck and others, but was regarded by most scientific men as a wild dream, until Darwin and Wallace, after years of patient accumulation of materials, overwhelmed the learned world with such a vast array of facts, that with scarcely an exception scientific men acknowledged their defeat, and the hypothesis of Evolution was raised to the rank of a theory, as firmly based on facts as Newton's theory of Gravitation, or the undulatory theory of Light.

Natural Selection, the guide, not the cause of Evolution.

But when we admit that the exhaustive arguments in favour of the theory of Evolution, propounded by Darwin in his remarkable book on the 'Origin of Species,' prove its truth, so far as speculation on such remote events are capable of proof, we may at the same time doubt whether Natural Selection be, in any sense, the cause of the Origin of Species. It has probably played a very important part in the history of Evolution, but its *rôle* has been that of increasing the rapidity with which the process of development has proceeded.

Of itself it has probably been absolutely powerless to originate a species: the machinery by which species have been evolved has been completely independent of Natural Selection, and could have produced all the results which we call the evolution of species without its aid, though the process would have been slow, had there been no struggle for life to increase its pace.

The great charm of Darwin's theory of Natural Selection is its simplicity. The theory of Evolution by descent with modification had a great deal to recommend it; but the difficulty always presented itself, by what possible machinery could it be worked? To

Its simplicity the great charm of Darwin's theory.

suppose a special creation of every species was bad enough and looked weak, as if the clock always wanted mending or altering to make it go right. But to suppose, not precisely a special creation, but a special interference, in a given direction with the law of *like producing like*, at every generation, was a thousand times worse; and, consequently, of two evils scientific men chose the least, and the theory of Evolution was laid on the shelf until Charles Darwin and Wallace took it down again. The fact of the survival of the fittest in the struggle for existence is such a simple theory that a child can understand it; and not only the scientific world, but almost every educated man, accepted the new theory of Evolution as soon as they saw, or thought they saw, the simplicity of the machinery by which it is produced.

That like produces like is an axiom which, taken broadly, is proved not by thousands, but by millions of facts. That nevertheless children always vary slightly from their parents is equally self-evident. That these variations are accidental is a conclusion easily arrived at by an unscientific mind, and even men of science, one might say even the greatest men of science, have been content to call variations produced by undiscoverable or undiscovered causes, *fortuitous* variations. That individuals possessing a useful variation should live long and leave many descendants, whilst those possessing a harmful variation should die early and leave few descendants, seems to be a truism. That variations are hereditary is a fact, which, if not of universal application, is almost so; and the preservation and gradual extension of useful variations in the course of millions of generations is a corollary which most scientific minds have easily accepted. The whole argument is perfectly fascinating in its simplicity, and having been accepted so universally, it is difficult to imagine that there can be a hitch in it.

Fortuitous variations its weak point.

Simultaneous appearance of a variation.

That there is a hitch in it can scarcely be doubted by any unbiassed mind who reads the literature relating to the "swamping effects," as Romanes calls it, of interbreeding. To remove the hitch it is necessary to assume that the same beneficial variation should arise simultaneously in a sufficient number of individuals to prevent its being swamped by the interbreeding of the individuals who possess it with those that do not. This Romanes calls "a very large assumption" (Journ. Linn. Soc., Zoology, xix. p. 343); but Wallace replies (Fortnightly Review, 1886, Sept., p. 307) "that which Mr. Romanes regards as a very large assumption is, I maintain, a very general fact, and, at the present time, one of the best established facts in natural history."

Doubted by Romanes.

Admitted by Wallace.

If it be so, and I see no reason to doubt the statement, it seems to me that the following corollaries are inevitable.

Cannot be accidental.

The simultaneous appearance, and its repetition in successive generations, of a beneficial variation in a large number of individuals, in the same locality, cannot possibly be ascribed to chance.

The admission that such coincidences might occur once in a thousand years is perhaps not a very large assumption, but the suggestion that rare accidents of this kind are an important part of the machinery of Evolution is simply puerile—so much so, in fact, that no writer has ever hinted at the possibility of its truth.

Whatever may be the cause of coincident variations, our ignorance of them cannot blind our eyes to the effects. They exist, and must have existed from time immemorial. The unknown causes may be few or many, and may even have changed, but the effects are there, and must always have been there, otherwise the whole theory of Evolution falls to the ground.

Coincident variations necessary to Evolution.

The fact that variations do simultaneously appear in a large number of individuals in the same locality, and are repeated for many successive generations, is the only foundation upon which a theory of Evolution can be built, and, when once admitted, is all-sufficient.

And all-sufficient.

The basis of the theory of Evolution is the principle of descent with modification. To take existing species of birds as an example, it assumes that every bird is a blood-relation of all other birds. The Blackbird is a near relation of the Thrush, and it would not be necessary to trace their genealogy very far back to arrive at their common ancestor. To find the common ancestor of the Blackbird and the Swallow, it would be necessary to search the records much further back; and to find that of the Blackbird and the Snipe, it would be necessary to go further back still; whilst to find that of the Blackbird and the Ostrich, it would be necessary to go back almost to the original species of bird from which all existing species are descended. To produce these multitudinous modifications in the descendants of ancient species, it is obvious that the apparent law that like produces like, that children resemble their parents, must be modified in some way. The fact that children differ slightly from their parents is as self-evident as that they bear a strong resemblance to them. The variation of children from their parents is not accidental. Science does not admit the existence of accident. So far as we know, children would exactly resemble their parents, if they were subjected to precisely the same influence during the process of growth to puberty, but this is impossible. The external influences of their surroundings are never precisely the same; climates change; and the relation between a species and its supply of food varies alternately with good or bad seasons, and is permanently affected by the natural increase of population. The internal influences must also differ; the transmitted experience, inherited habits, or inherited memory, explain it as you will, call it what you like, are cumulative, so that in this respect also every child stands on a slightly different platform from its parents. The consequence is that no individual is precisely in the same position, when it produces children, as its parents were, when it was produced. If the condition be a higher one, it is obvious that if the process goes on long enough the accumulated slight variations of a great number of generations must tend to an important advance in the species. The machinery of Evolution is there; the object of inquiry must be to discover the laws which govern the direction of variation, which are consequently the laws which govern the origin of species.

Descent from common ancestors.

Modification often the result of external influences.

Sometimes of internal influences.

One cause of variation in an organ is the amount of use or disuse to which it is subjected during the period of growth, whilst it is in a more or less plastic state. Practice makes perfect. This law applies not only to accomplishments, such as riding, skating, tight-rope dancing, or violin playing, but also to the organs required in the accomplishment, provided that the practice begins early enough, before the organs have arrived at maturity.

Causes of variation.

Use or disuse.

Thousands of facts can be adduced in support of this theory; many are given by Darwin in his wonderful book on the 'Origin of Species,' and others present themselves to the reader. No better illustration of the effects of constant use in the development of the human frame can be found than that of the extraordinary strength of muscle, and suppleness of limb, which are acquired by acrobats trained from early childhood. Darwin gives an excellent example of the double effect of use and disuse in his comparison of the domestic and the wild Ducks. The Duck, when it has been domesticated for many generations, walks much more, and flies much less than it did in a wild state. The consequence is that the wings of the domestic Duck have grown less, and its feet larger. Darwin ascertained that the difference was not confined to the flesh or the muscles, but that it extended even to the bones. He found that the bones of the wings of the wild Duck weighed more than those of the domestic bird, whilst exactly the contrary was the case in the bones of the legs and feet. I once heard a well-known hatter say that high-priced hats were, on an average, larger than low-priced hats, the only possible explanation being, that the men who wore high-priced hats, and for the most part lived by their brains, had on an average larger heads than those who wore low-priced hats, and for the most part lived by manual labour. The statistics of the glove-maker, and the boot-makers, would doubtless be more striking, though in the opposite direction, especially in the case of women's hands and feet, where the difference of use and disuse is greater. In none of these cases can Natural or Artificial Selection have taken place. Darwin fully recognized the importance of the accumulated results of use and disuse during many generations in modifying an organ; but his reputation is based upon the fact that he was the first writer who clearly showed the important part which natural selection plays in increasing the rapidity with which these infinitesimally small modifications may be accumulated, by the constant weeding out, in the struggle for existence, of those individuals which lagged behind in the race. It must, however, always be remembered that protective selection, or sexual selection, or selection of any kind is *only selection*. It is not a *cause* of variation, it can only select from the variations that present themselves such as are beneficial, and, by causing the possessors of the beneficial variation to survive in the struggle for existence, transmit it to the next generation.

Limbs of animals.

Of the human race.

Natural Selection not a cause of variation.

The ultimate causes of variation are very subtle and difficult to trace. Why does an organ grow larger or more perfect with use, and smaller or less perfect with disuse? Is it because the act of use sends blood and vital energy to the part used? Did the wings of each individual Great Auk fail to reach the dimensions attained by its ancestor because it neglected the use of them during its minority? And, if so, why did generation after generation of Great Auks neglect to use their wings? Was it because there was no struggle for existence? Was food so plentiful that the assistance of its wings in diving was unnecessary? And was the Great Auk so powerful that it did not require to escape by flight from its enemies until man arrived upon the scene? It seems as if the ultimate cause of the variation in the wings of the Great Auk, which finally caused the extinction of the species, must be found in the inherited habits of the bird. It is difficult to imagine how selection of any kind could have effected the modification. It can scarcely be sup-

Degradation of the wings of the Great Auk.

posed to be a case of the survival of the fittest. In the first place, one cannot imagine any purpose for which the diminished size of the wing could render the species more fit; and, in the second place, the species did not survive.

Action of Natural Selection.

That protective and sexual selection have played an important part in hastening the evolution of species is all but universally admitted; but their influence has probably been spasmodic, and, when dealing with so-called fortuitous variation, even if we admit the possibility of its surviving the swamping effects of interbreeding, comparatively slow—spasmodic, because it could only operate during periods when there was a struggle for existence; slow, because the variations from which selection could be made might be in any direction, and only those in a favourable direction could be used. On the other hand, the modification of species caused by use or disuse would be constantly in operation (as long as the inherited habit continued), and always in a definite direction, whether the conditions of existence were such as to warrant the application to them of the term struggle or not.

Inherited habit.

If we admit that the inherited habit, which impels a bird or other animal to use or disuse any organ, is the most important factor in the modification of individuals—one which, if it is continued for a sufficient number of generations, produces a modification of the species—we have only shifted the difficulty one stage backwards. What is the cause of the difference in the habits of one species from another? In other words, assuming the various species to have had a common ancestor, what is the cause of the change in the habits of birds or other animals? If men and birds be descended from a common vertebrate ancestor, it is probable that the causes of the change of habits in the one are more or less similar to those which have operated in the case of the other. Why are the French a thrifty race? and why are the English and the Russians spendthrifts? Is it because the former nation is more intelligent than the two latter, and has seen the great advantage to be derived from thrift; and has practised this virtue, and left as a legacy to its children the priceless gift of a hereditary habit of thrift? Or is it because the superior intelligence possessed by the Englishman, and the command of abundance of food enjoyed by the Russian, have rendered the acquisition of the habit of thrift unnecessary; whilst the poor Frenchman has been literally starved into his thrifty habits in the bitter struggle for existence, aggravated by centuries of cruel misgovernment? If the hereditary habits of the most highly developed animals are derived less from intelligent choice than from the inexorable law of the survival of the fittest in the struggle for existence, we may fairly agree with Darwin that Natural Selection is after all a very potent factor in the modification of the descendants of most species.

Change of habits.

Importance of Natural Selection in modifying habits.

Definite variations.

When Darwin uses the expressions accidental, fortuitous, or spontaneous variation, he does not mean that the variations are due to chance or accident. Science does not admit the existence of chance [1]. Every apparently accidental variation is due to a definite

[1] "I have hitherto sometimes spoken as if the variations * * * had been due to chance. This of course is a wholly incorrect expression, but it serves to acknowledge plainly our ignorance of the cause of each particular variation." (Darwin, 'Origin of Species,' 5th edition, p. 165.)

cause. The term accidental is used in a relative, not in an absolute, sense. When he speaks of fortuitous variation, he does not mean that the variation occurred without a sufficient cause; but that having been produced by an unknown cause, the fact of its being a beneficial or a harmful variation, or neither one nor the other (neutral in fact), is an accident.

Darwin's use of the word fortuitous.

Those naturalists who believe in the "swamping effects of interbreeding" hold that the modification of a species by the careful selection of a special variation for many generations can only be produced artificially, by preventing the interbreeding of individuals possessing the variation with those that do not, and by picking out two or more individuals who possess a similar variation, and isolating them, so that they may interbreed only with those that do.

Artificial selection.

A consequence of this assumption is that, in order to modify a species without artificial means, there must be special variation arising simultaneously amongst a number of individuals in the same locality for many generations. Variations of this kind could not in any sense be accidental, and must be produced either by the peculiar environment of the species during its continuance, or proceed from an innate tendency in the species itself.

To say that Plants and Animals "have an innate tendency towards perfection or progressive development," is to prove too much. Evolution, apparently, takes place only when it is required. Some of the simplest forms of animal life appear to have lived on unchanged for countless ages, showing no tendency towards progressive development. It is fair to assume that they are exactly adapted to their environment, and that any change in the direction of progressive development would be to their disadvantage. That they remain unchanged may be explained in two ways. One theory assumes that, although there have been during the lifetime of the least complex species a practically infinite series of slight modifications, none of them have been beneficial to the species, and therefore none of them have survived. The other theory admits that a variety of causes must have produced a variety of isolated variations from time to time, which, being isolated, therefore did not survive.

Evolution solely teleological.

Animals appear to have an innate tendency towards development, if the modifications so caused are for the immediate or even ultimate benefit of the species. Expressed in other words, the fact appears to be that this innate tendency lies dormant until aroused by a sense of need or by a state of need. Instead therefore of using the term accidental variation, the terms beneficial variation or teleological variation must be used.

The theory of Teleological or Beneficial Variation is apparently open to two objections. In the first place, it only covers part of the ground; and in the second place, it can scarcely be regarded as less miraculous than special creation. That it only covers part of the ground is self-evident, if we admit that many, we might almost say most, specific differences are of so trivial a nature that we cannot conceive them to be of any use. In point of fact, the theory of Beneficial Variation can only be applicable to the variations that

Beneficial variation.

are beneficial, and is confessedly inapplicable to variations that are not so. But the question arises, Do variations survive that are not beneficial? Upon this point authorities differ. Wallace argues that the fact of the survival of a variation is proof positive that it was the fittest variation offered to the choice of Natural Selection at the time; and that, if we fail to perceive that such variation was beneficial, the fault is not in the variation but in our imperfect powers of perception. This is a very plausible theory, so plausible, indeed, that it may be regarded as a probable hypothesis; but unfortunately its acceptance does not remove the great difficulty of the swamping effects of interbreeding, by which isolated variations, however beneficial, must inevitably disappear after a few generations. To this Wallace replies, that variations are not isolated, that no fact in natural history is better established than the fact that variations occur simultaneously, in a great number of individuals, in the same area. I have not the least doubt that Wallace is perfectly right. If it were not so, the theory of Evolution must inevitably fall to the ground. But it seems to me that, by the admission of this fact, Wallace has dethroned his theory of Natural Selection from its proud position as the main factor in the Origin of Species. Variations which occur simultaneously, in the same area, in a great number of individuals, and for a great number of generations, cannot possibly be fortuitous; but if they be definite, they are quite capable of accounting for all the facts of Evolution, in districts where there is no struggle for existence, without the aid of selection of any kind. If once we admit that variation is not fortuitous, Natural Selection can no longer be regarded as the *cause* of Evolution, but only its *guide*.

All surviving variations beneficial.

Variations seldom isolated.

Therefore not accidental.

Natural Selection cannot produce Evolution; it only quickens its pace, and prevents it from going astray. The differentiation of species can only take place in Isolation, either of time or space. The causes of Evolution are the causes of Variation, some of which we know, but the most important of which we have not yet discovered. It is, however, necessary that the question should be studied from the Darwinian point of view. It will scarcely be denied that, as an exponent of Evolution, Darwin stands head and shoulders above all his rivals. Darwin disposed of the difficulty of apparently useless variations in two ways: many characters are confined to the male, many are only assumed when the male becomes adult, and many are only temporarily assumed, being laid aside when the breeding-season is over, to be reassumed the following spring.

Isolation necessary.

These characters are ascribed by Darwin to the influence of Sexual Selection.

Sexual selection.

Other characters, common to both sexes, are ascribed to correlation, the apparently useless character being, for some inexplicable reason, generally associated with an obviously useful character, the frequency of the coincidence leading to the conclusion that the two characters are really, and not only apparently, connected.

Correlation: a term used to express ignorance of the true cause.

The law of correlation adds nothing to our knowledge, unless the discovery that a cause exists, of which we are ignorant, may be regarded as such.

If Wallace be right in his theory that all variation which survives must of necessity be beneficial, irrespective of our ability to discover the benefit, then of course the theory of

beneficial variation does cover all the ground. If Romanes be right in his estimate of the swamping effects of interbreeding, it follows that all variations which survive must be definite; and the term definite variation, as opposed to fortuitous variation, must be used in place of beneficial variation, in order to cover all the ground.

Mysterious nature of definite variation.

The second objection to Teleological Variation, which applies equally to Definite Variation, whether it be beneficial or otherwise, that it appears to be scarcely less miraculous than special creation, is not very easy to dispose of. There are some causes of variation which we can easily understand, as, for instance, the change from yellow to red in the colour of a Canary, when it has been fed for some time on Cayenne pepper.

Climatic variation apparently less mysterious.

There are other causes which we readily accept without understanding them, as for instance the effect of the climate of the north of Siberia, especially that of the peninsula of Kamtschatka, in exaggerating the white in the plumage of many species of birds, such as the Nuthatch, the Lesser Spotted Woodpecker, the Marsh Tit, the Magpie, &c.

Effects of use and disuse, in reality mysterious.

The effects of use and disuse, in lengthening the primaries of migratory birds, and shortening those of residents, are so obvious that we cannot dissociate cause and effect, though, if we were asked to explain the *modus operandi*, we should be obliged to conceal our absolute ignorance of it, by the expression that long primaries are generally found correlated with migratory habits.

Are we using less scientific language when we say that white eggs are generally found correlated with a nest in a hole, or some equally concealed situation, and coloured eggs with an exposed position amongst objects somewhat similar to them in colour? Although we cannot explain either set of facts, it somehow seems more possible that the increased use of the wings, in consequence of the adoption of migratory habits, should cause a lengthening of the primaries, than that the greater risk of destruction, in consequence of the adoption of an exposed breeding-site, should cause colour to be deposited on the eggs in the oviduct. The connection between cause and effect in the latter case appears to be so remote, so impossible to imagine, that we are tempted to call it miraculous.

Mysterious nature of other laws of Nature.

But are not the operations of other laws of Nature to all appearances equally miraculous? The egg of a Tortoise, and that of a Cormorant, are very similar in appearance. The development of the embryo in each is at first very similar, but that of the one is arrested at an earlier stage than that of the other, and had previously been proceeding on lines slightly divergent from, though nearly parallel to, that of the other. We explain this by assuming that each egg was produced by its respective parents with the self-contained potentiality of developing, under certain physical conditions (of heat &c.), in a definite direction. If the history of the embryo be an epitome of the history of the species for almost countless ages, why may not the potentiality of future development be self-contained within every individual, and only require the aid of its environment to modify within certain limits its precise direction? The necessity to develop, in a more or less definite and beneficial direction, which appears to be characteristic of organic matter, may possibly be

The force which produces Evolution probably analogous to the forces which operate on inorganic matter.

analogous to the various forces (or energy) which are characteristic of inorganic matter. The one is as mysterious as the other. Both are equally inexplicable, equally unquestionable, equally subject to inexorable law; so much so indeed that a Wallace can predict the discovery of a new species of moth in Madagascar as certainly as a Leverrier can foretell the discovery of a new planet in the solar system.

Difference between the two theories.

The difference between the two theories amounts to this. In the one case we have accidental variation, in the other teleological variation; but whereas the former is entirely dependent upon the aid of protective selection, sexual selection, or some other kind of selection, to advance a single step in the direction of evolution, the latter is self-sufficient, and capable of producing unaided all the assumed results of evolution.

But the advocates of accidental variation may reply that, in assuming the existence of teleological variation, we are begging the question; what we seek to explain is how variation can be teleological; we all know that it *is* teleological; what the theory of Natural Selection provides is a *mechanical explanation of teleological variation*. No doubt it attempts to do so, but, so far as I am able to judge, an ever-increasing number of biologists are of the opinion that it fails in the attempt.

It may be objected that teleological variation is too mysterious to be accepted as a scientific dogma; but it must not be forgotten that many other accepted dogmas are equally mysterious, such as chemical affinity or magnetic attraction.

Variation that survives generally definite.

So many modifications are obviously caused by definite variation, as, for example, the modifications of the wings of birds to suit their migratory habits—so many modifications must have been caused by definite variation, as, for example, the deposit of colour upon eggs in the oviduct to suit the habit of building in exposed situations—that it is very easy to assume that all variation that survives, so as permanently to modify a species, is definite.

Evolution the result of a force.

The laws which govern Energy (force or condition of inorganic matter) are so absolutely mysterious that I am unable to see anything unscientific in the theory that organic matter may also have its peculiar energy (forces or conditions), and that one of these produces the effects which may be called beneficial or teleological variation.

The theory of Evolution as a working hypothesis unaffected.

It is possible that the mystery of Evolution by descent with modification, caused by teleological variation, may never be unravelled; but the value of the theory of Evolution to the biologist as a working hypothesis is not thereby lessened. It is impossible to be too grateful to Darwin for having taught us the truth of Evolution. Many great men before him *said* it was true, but it was reserved for Darwin to *convince* us of its truth. Darwin's theory of Natural Selection may be modified, or even disproved and forgotten; but the fact will remain that no one man in the nineteenth century has exercised a tithe of the influence on scientific thought that has been wielded by Darwin. As the Titan who destroyed the fetish of Special Creation, Darwin stands as the most prominent object in the scientific landscape of the present century.

Obligation of naturalists to Darwin immeasurable.

CHAPTER III.

THE DIFFERENTIATION OF SPECIES.

Evolution may proceed without differentiation.

In the preceding chapter we discussed the swamping effects of interbreeding, and assumed that it must have prevented the perpetuation of isolated instances of new beneficial variations. In order to accumulate a very great number of very small variations, which appears to be the only way in which, for example, man can have been produced from the ancestral ape, it seems as if the slight modifications of each successive generation must have been in a definite direction, and must have occurred amongst a great number of individuals, at the same time, in the same place, and for a great number of generations.

The origin of species is, however, still unaccounted for. There is no reason why Evolution should not go on indefinitely modifying a species from generation to generation until a preglacial monkey becomes a man, and yet no second contemporary species be originated. The origination of a second species is prevented by interbreeding. So long as the area of distribution of the species is continuous and not too large, the constant intermarriage which takes place between the males of one family and the females of another distributes the inherited and transmittable modifications throughout the race or species; which may advance or retrograde according to circumstances, but is prevented by interbreeding from originating a second species.

Variations of this nature, which for want of a better name we call definite variations, are amply sufficient to account for all the known facts of Evolution, which may proceed slowly but surely, and we believe has thus proceeded from time immemorial, the rapidity of its progress constantly retarded by the swamping effects of interbreeding, and constantly accelerated by Natural Selection, or the weeding out of the least fit in the struggle for life.

Geographical Isolation.

In order to originate a second species it is necessary to counteract the levelling effects of interbreeding by isolating some of the individuals comprising the species, so that there may be two colonies, which are unable to communicate with each other, and consequently unable to interbreed. It is not necessary to insist upon the importance of Isolation as the only agent by which contemporary species can be multiplied. It is recognized by Darwin,

over and over again, though he seems to have underestimated its importance[1], and it forms the keynote of Wallace's 'Island Life.' The more the geographical distribtion of birds is studied, the more doubtful it seems to be that any species of bird has ever been differentiated without the aid of geographical isolation.

A theory of isolation has, however, recently been propounded by Mr. Romanes, in a paper read before the Linnean Society on the 6th of May last year, entitled "Physiological Selection; an Additional Suggestion on the Origin of Species," which is deserving of special attention. Mr. Romanes has done great service in calling attention to the "swamping effects of free intercrossing;" but the only conclusion at which I can arrive is that the theory of Physiological Selection is untenable, though the paper is a very valuable contribution to the literature of Evolution. It is seldom that the difficulties of *Natural Selection from Fortuitous Variations* have been so clearly, so impartially, but so candidly set forth. If Mr. Romanes has failed to prescribe a remedy, he has accurately diagnosed the disease; but, in my opinion, he has attacked the wrong organ. I agree with him that Natural Selection from Fortuitous Variations will only account to a very limited extent for the evolution of an existing species, and not at all for the differentiation of a new one. The point on which we differ is as to how the theory is to be amended so as to make it work. Mr. Romanes proposes to add Physiological Selection to Natural Selection to make it perfect. I fail to see that the position is thereby improved. I think that the weak point lies not in the Selection but in the Variation. If the variations be accidental I cannot see how they can be perpetuated, either by Natural or by Physiological Selection, except under a combination of coincidences so extraordinary that it can only be regarded as phenomenal. If the variations be not accidental then no kind of Selection is required to cause Evolution; its only function is to increase the pace at which Evolution proceeds. It is impossible to avoid coming to the conclusion that Variation is not accidental, that there is no such thing as Fortuitous Variation, and that Spontaneous Variation, like Spontaneous Generation, is a myth.

Physiological Isolation as propounded by Romanes.

The theory of Physiological Isolation propounded by Mr. Romanes is an attempt to account for the sudden creation of a species without going through the preliminary stages of subspecies, incipient species, imperfectly segregated species, inosculating species, morphological species, or by whatever name a species in the process of formation may be called. It assumes that the number of species is so great that geographical isolation cannot account for their existence, an argument very analogous to that of a naturalist who should say that the number of men in this country is so great that they cannot all have been children, and should thereupon invent a theory to account for the production of adults

[1] "Isolation also is an important element in the changes effected through Natural Selection. * * * Moritz Wagner has lately published an interesting essay on this subject, and has shown that the service rendered by isolation in preventing crosses between newly formed varieties is probably greater even than I have supposed." (Darwin, 'Origin of Species,' 5th ed. p. 120.)

without the necessity of passing through the intermediate stages of childhood. There is no hard-and-fast line between so-called (one might say pedantically so-called) morphological species and physiological species. The degree of sterility between species varies indefinitely from absolute sterility to nearly absolute fertility. There are cases in which the fertility increases for some stages of the differentiation, as if Nature was making a desperate struggle to prevent the formation of the inevitable new species. There is not a shred of evidence in support of the theory that any physiological species exists that has not passed through a series of stages in which it was, to use the scientific cant of the day, only a morphological species.

Morphological species.

Steinheim fossils.

The history of the Steinheim fossil shells (*Planorbis multiformis*) is a most convincing proof that differentiation cannot take place without isolation, though evolution may go on to an indefinite extent. It also proves that variation is not fortuitous, but only occurs to an extent sufficient to produce evolution when some adequate cause presents itself, and on such occasions affects a large proportion of individuals, so that it is the exceptional individuals which do not vary that are swamped by interbreeding. For anything we know to the contrary, the "variation-periods" may have been glacial epochs; but, be that as it may, we may be absolutely certain that they had a cause, and cannot possibly be ascribed to accident. In this little lake-basin we have the most interesting record of, 1st, a species remaining constant until the need of variation arose; 2nd, variation occurring simultaneously in a majority of the individuals composing it; 3rd, the "swamping effects" of interbreeding upon the minority; 4th, the evolution of a new species, which remained constant as before, until a fresh need of variation arose; and, 5th, the impossibility of differentiating a species into two species without the aid of isolation.

Transmutation of species.

Transmutation may go on to any extent without geographical isolation; for example, a preglacial species may differ specifically from its postglacial descendants. But even transmutation cannot take place without isolation of some kind. The specific differences which are produced by the accumulation of a long series of successive slight variations protected by isolation of *space*, we call the result of differentiation; those produced in the same way by isolation of *time*, we call the result of transmutation.

Siberian species of Willow-Wren.

If we could see the preglacial ancestors of the Willow-Wrens which breed in the Yenesay valley and winter in India, we should probably find that they were specifically distinct from all their descendants. But there are four other species of Willow-Wren breeding in the same valley. How can we account for their differentiation? Where were they isolated? And when? The answer appears to be easy enough. They were isolated during the last glacial epoch in their present winter-quarters, where they were compelled for the time being to breed in a climate which was made, for the time being, suitable for their purpose, by the same causes which made their present breeding-grounds for the time being unsuitable. *Phylloscopus trochilus* was possibly isolated in the valley of the Nile; *P. tristis* in Turkestan and Baloochistan; *P. fuscatus* in India; *P. superciliosus* in Burma; and *P. borealis* in the Malay Archipelago.

In Mr. Romanes's paper the subject is treated at considerable length. In the preamble three great difficulties are set forth, which the writer regards as inexplicable by the theory of Natural Selection, and an "additional theory" is propounded in order to explain them.

Fertility of species and varieties.

The first difficulty is stated to be "the difference between natural species and domesticated varieties in respect of fertility." Stated thus briefly, the difficulty is scarcely apparent. It would be a matter of surprise if any two *species* were as fertile when crossed as any two *varieties* when paired together, whether those varieties be natural or domesticated. What Mr. Romanes really means is this:—What is the explanation of the fact that, as a general rule, two forms can be, to all appearance, differentiated from each other under domestication to a greater extent than has been the case in a state of nature, without producing sterility when crossed? Mr. Romanes asserts that Darwin realized the force of this difficulty and failed to explain it away. It may be rash to attempt anything which so acute an observer and so accurate a reasoner as Darwin did not succeed in performing; but there is surely an obvious explanation of this curious fact. The animals which have been domesticated by man are a few species, which, for some unknown reason, are able to adapt themselves to new or strange environments with more ease than usual. That is the reason why their domestication has been possible. Surely this facility to cope with the unfamiliar would stand them in good stead, even in their embryonic condition. It seems reasonable to expect that if the male spermatozoa be placed in a female element to which the species is not accustomed, the ease with which it is able to adapt itself to a somewhat new environment should vary precisely in accordance with the ease with which the species is able to adapt itself to new environments in later stages than that of the embryo. Amongst birds fertile hybrids occur most frequently amongst the species which form the families of the Phasianidæ and Anatidæ, the very families to which most of our domestic birds belong. It may be an inexplicable fact that species differ so remarkably in their capacity to thrive under the changed conditions of domestication; but I cannot see any difficulty in the fact that the embryo of a species which cannot be domesticated should perish very early, as is often the case, or grow up with imperfect reproductive organs when nourished in the body of an animal belonging to a different species from itself.

Fertile hybrids.

Trivial nature of specific differences.

Another difficulty is stated to be "that the features which serve to distinguish allied species are frequently, if not usually, of a kind with which Natural Selection can have had nothing whatever to do." I fully admit the truth of the statement, and I presume that few naturalists would be prepared to deny that "distinctions of specific value frequently have reference to structures which are without any utilitarian significance." Syllogistically put, the argument stands as follows:—

Natural Selection can only perpetuate those accidental variations which are beneficial to the species; consequently variations that arise which are not beneficial are not perpetuated; specific differences are frequently, if not usually, without any utilitarian significance; therefore they cannot have been produced by Natural Selection. To my mind the false premise in this argument is the assumption that variation is accidental. Variation

The law of "like produces like."

is not accidental. Variation is, to a large extent, the result of the difference in the forces which are brought to bear upon the individual, or upon the organ, between conception and puberty. Like produces like, and under like circumstances offspring would doubtless resemble their parents. But the circumstances never are alike. The state of health of the parents, the quality and quantity of the food, the variations of climate, the amount of use or disuse of each organ that circumstances may demand: these and a hundred other influences determine the points in which the offspring shall exceed or fall short of, in fact shall vary from, their parents. The result is that every generation starts from a slightly different platform to the last. It is this variation which to a large extent produces Evolution, or descent with modification. The variation is perpetuated because it occurs in many; perhaps, one might say, more or less in all the individuals in one district at the same time, for like causes produce like effects. There can be no doubt that the effects of this variation are hastened by Natural Selection; the unfit are continually being weeded out in the struggle for existence; but descent with modification can proceed without any struggle for existence, though the modification is not so rapid. But neither variation nor natural selection can originate a new species alone. *The ancestral ape might have become modified into man in the course of ages without a second species having been produced.* To understand the differentiation of species, we must discuss Mr. Romanes's other difficulty. This "consists in the swamping influence upon an incipient variety of free intercrossing." This is unquestionably a very grave difficulty, to my mind an absolutely fatal one, to the theory of accidental variation. The force of the difficulty is admirably illustrated by Mr. Romanes by a quotation from the 'North British Review,' in which a white man is supposed to be stranded on an island inhabited by negroes, with whom he would intermarry, and where the result is fairly assumed to be, not the gradual whitening of the negroes on that island, nor the origination of a white species or variety, but the gradual swamping of the white strain by intermarrying, until, after a sufficient number of generations, it disappeared altogether.

Swamping effects of inter-breeding.

Physiological Selection defined by Romanes.

Mr. Romanes proposes to modify the theory of Natural Selection so as to remove these three difficulties, by adding to it a theory, to which he gives the name of "Physiological Selection." The new theory is described as follows:—"Wherever, among all the possible variations of the highly variable reproductive system, there arises towards any parent form any degree of sterility which does not extend to the varietal form, there a new species must necessarily take its origin." This proposition is true, if for the word *must* be substituted *may, under certain circumstances.* To make the theory of "Physiological Selection" tenable it must be stated as follows:—

Definition of the Author.

Amongst the innumerable accidental variations which are constantly being produced by unknown causes, and which are invariably swamped by interbreeding, there sometimes arises a variation in the reproductive organs, preventing the possessor of it from being fertile with the rest of the species. Of the innumerable variations of which the reproductive organs are capable, a similar, or rather a corresponding, variation sometimes occurs simultaneously in another individual of the opposite sex, and sometimes these two individuals

discover each other, and, being mutually fertile, they intermarry and begin a family, which, being fertile *inter se*, but barren in relation to the rest of the species, is practically isolated from its fellows, so that any slight peculiarity which its members may simultaneously develop, or which both parents happened to possess, is not swamped by interbreeding, but goes on developing, until in process of time a new species is produced in the midst of the old one.

Improbable coincidences.

It is needless to state that Mr. Romanes does not present his theory in such an improbable form, which most readers will regard as self-condemned and needing no refutation. It seems to me, however, that the theory would break down if any one of the improbabilities should be absent. To make it work we must presuppose :—1st, the special variation of the reproductive organs must occur in two individuals, otherwise the possible ancestor of the new species would leave no descendants; 2nd, it must occur at the same time in both; 3rd, it must occur at the same place; 4th, the two individuals must be of opposite sexes; 5th, they must each of them possess some other variation, or their progeny would not differ from that of the rest of the species; and, 6th, the variation must be the same in both, or appear simultaneously in the majority of their children, otherwise it would be swamped by interbreeding within the physiologically isolated family.

Reductio ad absurdum.

Is it possible to conceive that, in an island inhabited by negroes, the birth of a negro with a reproductive system so modified as to render its possessor sterile with the rest of the negroes, but fertile with a correspondingly modified negro of the opposite sex—even supposing such an extraordinary coincidence as their simultaneous appearance to occur on the island—" must necessarily " cause a new race, to say nothing of species, to take its origin ?

The theory of Mr. Romanes, ingenious as it is, and plausible as it appears to be when stated as an abstract proposition, is found, when practically applied, not only to demand an impossible number of coincidences, but coincidences of such a character, that, once granted, the additional coincidence of fertility *inter se*, but sterility outside the family, is almost, if not quite, an unnecessary incumbrance to it. Under any circumstances it amounts to nothing more than Physiological Isolation, and is as inadequate to produce Evolution as Geographical Isolation is. It might perhaps be admitted as an additional form of Isolation were it required. The ornithologist at any rate does not require any such aid to differentiation. Amongst birds there does not seem to be a shred of evidence in favour of the theory. So far as is known, no species has ever been differentiated without the aid of Geographical Isolation, though Evolution may have gone on to an unknown extent; and, so far as we can judge, Geographical Isolation must always, sooner or later, be followed by differentiation.

Remarkable absence of the term Isolation in Romanes's paper.

It is a remarkable circumstance that only once in the seventy-five pages of Mr. Romanes's paper does the word Isolation occur, and then in a footnote. In a paper relating to the origin of species it is like the play of Hamlet with the part of Hamlet omitted. Evolution may go on from age to age, but without Isolation no new species can

be produced. However much a species can be changed by Evolution, "the swamping effects of intercrossing" prevent there being at any given time more than one species. The fact of Isolation is, however, repeatedly implied, as, for example, in the phrase "when the barrier to intercrossing, instead of being physiological, is geographical." Isolation forms such a very important part of the theory of Natural Selection as propounded by Darwin, notably so in Wallace's vindication of the theory in 'Island Life,' that the absence of the term strikes the reader as unusual. It seems as if Mr. Romanes regarded Isolation and Selection as interchangeable terms. He is continually comparing "geographical barriers" with "physiological barriers," but he never speaks of Geographical Selection, though constantly using the term Physiological Selection. It seems to me that the part which Geographical Isolation plays in the differentiation of species is to the minutest detail strictly analogous to the part which is ascribed by Mr. Romanes to Physiological Selection. If it exists at all, it is neither more nor less than an additional mode of Isolation; and if it be necessary to give it a name, that name certainly ought not to be Physiological Selection, but might appropriately be Physiological Isolation. Now we know that Geographical Isolation does form a barrier to intercrossing, and that by means of this barrier Evolution is able, not only to further the development of a species, but to split it in two races, which develop in different directions, and in process of time become so widely differentiated that they no longer interbreed, even when the geographical barrier is broken down and the areas of their distribution overlap. If, however, variation were accidental, the effect of Isolation, whether geographical or physiological, would only be temporary. Under a regime of accidental variation Evolution has to begin *de novo* at every generation, and after two or three generations the swamping effects of intercrossing would surely be apparent, even within the isolated family. It would be necessary for Physiological Selection to step in again. The six conditions must again coincide; but even then the progress would not be in the same direction as before, unless we assume a seventh coincidence, namely, that the variation protected by the new Isolation was of the same kind as that which had been protected by the old one. It seems to me that no selection of any kind is able to perpetuate a variation, however important to the welfare of the species it may be, except when a variation occurs simultaneously in a number of individuals inhabiting the same area. The *modus operandi* of Evolution is probably as follows:—

Effects of Geographical Isolations.

Operations of Evolution.

In every species there is a tendency to vary in definite directions: the variations are hereditary and cumulative, so that evolution goes on steadily, though slowly, from generation to generation, but without partial or complete isolation no second species can be evolved. Variation may change a species; but so long as free interbreeding is possible a species may advance or retrograde, but it cannot split into two. If, however, a part of the species be isolated from the rest differentiation commences, the evolution of the two colonies does not proceed exactly in the same direction, and the rapidity with which differentiation takes place is exactly in proportion to the difference in the circumstances in which the two colonies are placed. Wherever there is a struggle for existence (and it can only be in very

exceptional cases that there is none), the weeding out of those individuals who, from some cause or other, have neglected to adapt themselves to inexorable circumstances, materially increases the rapidity at which evolution progresses.

So far everything is plain sailing, but a difficulty presents itself. What is the cause of variation? If a Canary be fed exclusively on Cayenne pepper it becomes scarlet; if a Bullfinch be fed exclusively on hempseed it becomes black. It can be no advantage to the Canary to become red, or to the Bullfinch to become black. This is the direct action of food. If a wild Duck be tamed, in a few generations its wings decrease in size and its legs become larger. The housewife, in choosing her Ducks for the pot, does not select the longest-winged or the weakest-legged birds. This is the result of use and disuse. One great cause of variation is unquestionably the action of surrounding circumstances; but there are variations which appear to be independent of surrounding circumstances. How is it possible for any voluntary action on the part of a bird to cause spots to appear on its eggs, or how can surrounding circumstances modify the deposit of colour from the glands in the oviduct of a bird? The only possible answer to this question is, that organisms have the power of adapting themselves, or of being adapted by outward circumstances within certain limits, to altered conditions. But what appears much more remarkable is that they evidently have also the power of varying or of being varied in a direction which, to all appearances, is not of any present advantage, but which the accumulated results of several generations make eventually of great advantage. It is impossible to imagine that selection of any kind can operate in these cases; and whether the mysterious power lie in the embryo, or in the individual cells or protoplasm, which collectively are the embryo—or whether the wishes of the mother have power to affect the development in her womb, as Sir Kenelm Digby and the old school of astrologers and alchemists believed—it is probably a force or a power as absolutely inherent in organic life as the attraction of gravitation is in inorganic matter. We can no more explain the one than we can the other. Facts like these have to be accepted as axioms. We prove their truth by observation; we cannot prove their truth by the aid of our reasoning powers; they are the premisses upon which we reason.

Causes of variation.

Their mysterious character.

The fact that offspring do vary from their parents in points which appear to be incapable of being affected by external surroundings, but *so simultaneously*[1] *that the variations are not swamped by interbreeding*, and therefore cannot be ascribed to accident, *seems to be incontrovertible*. That many of these variations are of a distinctly utilitarian character is equally obvious. To suppose that the wishes of the mother have power to affect the development of the embryo would only be to shift the difficulty a stage backward. It would be as impossible to explain the influence of the mother as the fact of the variation of the embryo. Perhaps some day embryologists will be able to explain this mystery,

Absurd explanations.

[1] Mr. Romanes ('Nineteenth Century,' No. 119, p. 71) says that I am "sublimely ignorant" of this fact. The only alteration I have made in the text of my paper read at the British Association is to emphasize the statement by means of italics.

which seems to be the only possible key to the explanation of the theory of EVOLUTION BY DESCENT WITH MODIFICATION, and DIFFERENTIATION BY MODIFICATION IN ISOLATION.

Summary of the facts of Evolution.

We may sum up the known facts of Evolution as follows:—All birds are descended from semireptilian ancestors, most probably from one species of semireptile. Each generation slightly varied from the preceding one until the species became exactly adapted to its environment. The variation was most rapid where the need of variation was greatest, and trivial or imperceptible where no need for it existed. The variations were not accidental, because they occurred simultaneously, in a number of individuals, in the same locality and continued for many generations. The rapidity with which the modifications accumulated was constantly increased by the greater longevity and consequent prolificness of the individuals which had acquired them, and constantly retarded by their interbreeding with those which had not, the two causes combined preventing differentiation. The causes of variation appear to be both subjective and objective; birds appear to have modified their organs by use or disuse, or to have had them modified in some unknown way by surrounding circumstances. The causes of differentiation are Isolation either of time or space: of time, causing the birds of an island to differ specifically from their ancestors of a hundred thousand years ago; of space, causing the birds of one island to differ specifically from those of another. The principal cause of geographical isolation has been emigration, and the principal necessity to emigrate has been overcrowding of population, frequently produced by the contraction of the area of distribution by a glacial epoch.

The laws of Evolution only apply to organic matter.

It seems probable that not only all animals, but also all plants, had a common origin, and that the original monad developed, and its descendants became differentiated, in the course of ages according to the laws of Evolution into the multitudinous species which now represent organic life on our world. There is not, however, a shred of evidence to be found in favour of the theory that the laws of Evolution apply in the least degree to inorganic matter. On the contrary, there is every reason to believe that the species of inorganic matter, or, as they are usually called, the elements of matter, have always been differentiated and will always continue so without a shadow of modification, crossbreeding and interbreeding in every possible combination notwithstanding. We may temporarily modify them by heat or by some other force, but they inevitably revert back to their original condition, if placed in similar circumstances. Every known fact bearing upon the question supports the theory that the laws of Evolution apply to all organic life, and have nothing whatever to do with inorganic matter. The gradual development of the solar system, from a widely diffused nebulous matter to its present condition, may have presented a series of changes somewhat similar to those which have taken place in the development of organic life; but if we apply the term Evolution to the latter process, it would be a great mistake to apply it also to the former, which has proceeded on divergent lines, governed by different laws, and probably tending to quite other ends.

CHAPTER IV.

THE GLACIAL EPOCH.

Of the 222 species and subspecies of Charadriidæ, we may regard 64 as Arctic in their distribution during the breeding-season. 95 breed in the Temperate Regions, 51 in the Northern Hemisphere, and 44 in the Southern, whilst in the Tropics between them 63 species breed.

The Polar basin the centre of distribution of the Charadriidæ.

Of the 19 genera to which these species are referable, no fewer than 14 are represented in the New World as well as in the Old. Four are confined to the Old World and only one to the New.

When we consider, further, that about half the species are shore birds, and that of the other half most are steppe or prairie birds, leaving a small minority who frequent forests or the banks of rivers, it does not seem unreasonable to assume that the Polar Basin was the centre of their distribution.

If we could drive them out from this centre, and isolate them in nineteen different localities further south, and keep them there long enough to differentiate them into 19 species, the origin of their present genera would be satisfactorily accounted for.

Past changes required to account for present distribution.

The machinery required by the ornithologist to account for the present differentiation of species in this family is as follows:—First, a mild climate at the North Pole, where the ancestral species might increase and multiply until it became circumpolar. Second, a glacial period to drive them south in every direction, and isolate them in various distant regions, where there could be no interbreeding between one party and another, where the conditions of life (climate, food, enemies, &c.) should vary in the different regions, and where any resultant variations in the species should be rapidly seized upon by natural selection in consequence of a greatly intensified struggle for existence, caused by unusual overcrowding of the bird population, so that the modification of one party should proceed on different lines to those of another party for a sufficient length of time to differentiate the one ancestral species of the family into nineteen species, the ancestors of the present genera.

Third, a mild period at the North Pole to allow 5 species to go back as far as the Siberian steppes, leaving one species in the southern hemisphere of the New World and one in the tropics of the Old World, whilst the remaining 12 out of the 19 species returned to their old home, where, the tension of overpopulation being removed, they might each

increase and extend their area of distribution until, instead of one circumpolar species inhabiting the shores of the Polar Sea, a dozen circumpolar species should do so.

Fourth, a second glacial period to disperse each of these 17 species, and isolate parties of each of them in various southern regions of various climates, as parties of their common ancestor were isolated, so that the 17 species may become a couple of hundred.

Fifth, a mild climate at the North Pole, again to allow about 60 of these species once more to return to the family home, and to become in a few instances circumpolar again.

Sixth, and last, a partial return of the glacial condition of the Polar Sea, so that free intercourse across it should be discontinued, and interbreeding confined to the birds living near Behring Straits, so that Canadian species should in some cases be only subspecifically distinct from their Siberian allies.

If Geologists can supply us with these six conditions, we ought to be grateful to them for such valuable aid in the explanation of such an interesting problem as that of the geographical distribution of the Charadriidæ, whilst at the same time we ask them to acknowledge the value even of such feeble support as is implied in the harmony between their theories and our hypothesis.

To ascertain whether this harmony exists, it is necessary to examine briefly the latest theory of the Glacial Epoch.

Croll's theory appears to me to account for the occasional occurrence of a glacial epoch very satisfactorily.

Croll's theory of the Glacial Epoch.

The inclination of the axis of the earth to the plane of the ecliptic causes the annual alternation of continuous day during summer and continuous night during winter at the Poles. At the South Pole, which is at the present time in the middle of a mild glacial period, the heat of summer is insufficient to melt the snow on the land which has accumulated during winter; but at the North Pole the heat of summer melts all the snow which has accumulated during winter on the land near the sea-level, and some portion of that on the Greenland mountains, besides a considerable thickness of the ice on the sea near the Pole. So far as I have been able to learn from my three visits to the Arctic Regions, and from information obtained from the narrations of Arctic travellers, the condition of affairs at and near the North Pole is as follows:—During summer and winter there is very little wind. Nearly all the snow which falls during the year falls in late autumn, and nearly all the rain which falls descends in late spring. The normal condition of the weather in winter is perpetual starlight, and that of summer continuous sunshine. In May and October gales are common, probably having the same origin as the equinoctial gales of our latitudes. At the North Pole every wind is a south wind, and any disturbance of the atmosphere of importance must bring air laden with moisture from the tropics, in October to fall in snow, in May to fall in rain to melt the snow. The question is, How can a glacial epoch be produced? I think we may at once dismiss the idea that the length or severity of the winter is an important factor. No amount of cold in winter can produce a glacial epoch, unless there is a great mass of snow or ice in which the cold may be stored; nor, on

Arctic climate.

the other hand, can it be supposed that any amount of sunshine will melt the snow in a dry air without wind. Any one who has spent a spring in the Arctic Regions, or has visited the southern regions of perpetual snow in summer, must have noticed that, although the sun's rays are hot enough to blister the skin, they seem to glance harmless from the white snow. Dry air is incapable of absorbing heat. Even in windy weather, on some of the highest passes of the Himalayas, the thermometer may stand at freezing-point in the shade, although the sun is so hot that the blackened bulb of a thermometer may register more than two hundred degrees.

Changes requisite to produce a Glacial Epoch.

To produce a Glacial Epoch it is necessary either *to increase the moisture of the autumn gales, or to decrease that of the spring gales*, or, better still, to do both. If the autumn gales are dry, they may blow as hard as they like, but they will deposit little snow; and if the spring gales are dry they will also be cold, and will melt it very slowly.

Eccentricity of the earth's orbit.

The earth does not revolve round the sun in a circle but in an ellipse, in one of the foci of which the sun is placed. This eccentricity of the earth's orbit varies in amount, according to the relative position of the rest of the planets. When the eccentricity of the earth's orbit is great, the difference in the amount of heat received by the earth from the sun, when the former is in perihelion, and that received when it is in aphelion, is probably sufficient to make an important difference in the amount of moisture held in suspension by the earth's atmosphere at the two periods. When the eccentricity of the earth's orbit is great during the four months or so of perihelion, the hot though short summer produces abundance of vapour, which in autumn is carried by the equinoctial gales towards the Pole entering winter in aphelion, and produces great quantities of snow, whilst at the Pole emerging from winter in perihelion the extra heat and moisture of the air melts the snow rapidly. Six months later the opposite state of things produces the same result. During the half of the earth's progress round the sun, in which it is furthest from that body, the atmosphere is cooler and less charged with moisture. The snow at the Pole emerging from winter in aphelion is much longer in melting in consequence of the dryness and coolness of the south wind; whilst at the Pole entering winter in perihelion the less amount of moisture in the air causes a smaller deposit of snow. In both cases the same result must be produced, a glacial epoch at the Pole which has its winter in aphelion, and a tropical epoch at the Pole which has its winter in perihelion. If this be the cause of the Glacial Epoch, it follows that the intensity of these periods must increase as the eccentricity of the earth's orbit increases, and they must disappear altogether when the orbit of the earth is circular. The precession of the equinox, which takes 21,000 years to complete, reverses the condition of either Pole; so that a Glacial Epoch at each Pole lasts for 10,500 years, followed by a tropical epoch of the same duration, and this must be repeated as long as the unusual eccentricity of the earth's orbit continues.

Effect of the earth in aphelion and in perihelion.

Dependent on the amount of the eccentricity.

Wallace, in his 'Island Life,' argues at considerable length against the theory of tropical interglacial periods extending to the Pole during the Glacial Epoch. He appears

Interglacial periods not affecting the Poles.

to believe that the ice never left the Polar Basin during the last Glacial Epoch, though its southern range ebbed and flowed with the precession of the equinox, causing great alterations of climate in subarctic regions. This theory is supported, as far as it goes, by the evidence derived from a study of the geographical distribution of the Charadriidæ.

Fossil remains of birds.

The facts to be learned by a study of fossil birds are very few. Fossil birds are rare and very fragmentary. The fossil remains of mammals are often found in caves, where they had taken refuge, and where they were drowned during floods, and their bones preserved in the mud and sand washed in by the water. Other fossil remains of mammals have been deposited in the mud at the mouths of rivers. It is obvious, however, that neither of these accidents, if we may so call them, can often happen to birds. Very few species would be likely to seek refuge in a cave, nor would their dead bodies be likely to sink in the bed of a river. The air-cavities in the bones of a bird make it so light that it must float on the surface of the water and eventually be washed ashore, when it naturally falls a prey to one of the carrion-eating beasts or birds, which are the scavengers of the coast. The fossilization of a bird is a comparatively rare event, and their remains few and fragmentary. It seems probable that traces of birds are found in the Triassic formation; no actual remains of birds have been found, but footprints, which appear to be those of birds, occur. The celebrated Archæopteryx was found in Bavaria in a limestone-formation belonging to the Jurassic period. Like the majority of the birds of the Cretaceous fauna, the Archæopteryx shows its affinity to its semireptile ancestors by its teeth. These toothed birds appear to have become extinct before the beginning of the Tertiary Period; but Milne-Edwards, in his treatise on the Miocene fossils of France, comes to the conclusion that some of the fragments of fossil skeletons of birds must be referred to existing Limicoline genera, such as *Numenius*, *Tringa*, *Totanus*, and *Himantopus*. We must therefore look to a period which may be the Glacial Epoch, of which there appears to be some geological evidence in Eocene times[1], and which may possibly have been caused by the remarkable increase in the eccentricity of the earth's orbit, which Croll shows as having occurred from eight to nine hundred thousand years ago, as the time when the ancestors of the present Charadriine genera were differentiated, and previous to which they formed one species, living on the shores of the Polar Basin.

Causes of their rarity.

Probability of an Eocene Glacial Epoch.

It is probably impossible to form anything more than a wild guess at the date of these wonderful phenomena, but we may be reasonably allowed to believe that they occurred, and that the effect of their occurrence was the differentiation of Charadriine birds, first into genera, and secondly into species: so that, in this family at least, the genera are not absolutely artificial, but are to a large extent the impress upon this group of birds of great geological events.

In order to make the narrative intelligible, I propose to call the last Glacial Epoch,

[1] "With respect to more ancient Glacial periods, several geologists are convinced from direct evidence that such occurred during the Miocene and Eocene formations." (Darwin, 'Origin of Species,' 5th ed. p. 452.)

during which it seems to me that many of the present species of Charadriidæ were differentiated, the Post-Pliocene Glacial Epoch, which, according to Croll, occurred during the last period of great eccentricity of the earth's orbit. Speaking in round figures, we may say that it is 200 thousand years since the Post-Pliocene Glacial Epoch began, and that it lasted rather more than 100 thousand years, so that it is rather less than 100 thousand years since it came to an end.

Post-Pliocene Glacial Epoch.

The Glacial Epoch which differentiated the genera of Charadriidæ may have been Miocene or even Eocene, but if the palæontologic evidence be of any value, it must at least have been Præ-Pliocene; and it is not beyond the bounds of possibility that this Præ-Pliocene Glacial Epoch was caused by the period of great eccentricity of the earth's orbit, which occurred from 800 to 900 thousand years ago.

Præ-Pliocene Glacial Epoch.

It would, however, be a great mistake to attach any importance to these dates, which may after all be wildly wrong. The point to which I desire to call especial attention is the nature and sequence of those great events, which appear to me to have left indelible traces upon the existing species of Charadriidæ, which no one can fail to see who carefully studies the geographical distribution of this interesting family.

Fact important, exact date unimportant.

Accepting these data as all the evidence that we can at present obtain on the subject, we may proceed to fill in the details of this hypothetical history of the family Charadriidæ.

Some time before the Pliocene Age, the ancestors of the two hundred species, which are now classed in the family of Charadriidæ, consisted of only one species, which lived during nine months of the year on the shores of the Polar Basin. How long it had lived there, or whence it came, it is impossible to say. It may have emigrated to the land of the midnight sun any time before the Præ-Pliocene Glacial Epoch, which must have banished all bird-life from the Arctic Regions. At any rate it had been there long enough to have become circumpolar, and possibly long enough to have acquired the habit of feeding by night, as well as by day, so as to reduce the risk of long migrations in search of light, during the three months' winter darkness, to a minimum. The wandering habits, acquired by the necessity of making a short trip southwards every winter, and the old custom, so conspicuous amongst most birds, of driving away their young to find breeding-grounds at a distance from their parents, no doubt kept them well mixed together; so that modification was slow, and whatever change gradually took place, was shared by the whole species, being continually distributed by constant interbreeding. The comparatively small area of the Polar Basin, with its archipelagos of islands, offered every facility for constant intermarriages between individuals from various districts, who crossed and recrossed the Arctic Ocean at will in search of an unoccupied breeding-ground or an unmarried mate. The conditions of life remained much the same year after year, and neither isolation, nor its usual concomitant differentiation, took place. But the coming on of a glacial period changed all this.

Original home of the ancestral species.

The species kept homogeneous by interbreeding.

Ice began to form at the North Pole: perpetual snow covered the mountain-ranges of Greenland: glaciers crept down to the sea; and in spite of the short hot summer, the

Emigration caused by the first Glacial Epoch.

winters became longer and longer, until they met, and banished bird-life from the Arctic Ocean for perhaps 100 thousand years. Fortunately the ancestors of the Charadriidæ had already acquired migratory habits, and were doubtless familiar with the four coast-lines leading south; but every year their summer breeding-grounds were pushed further south, and their winter range had to be extended. In the struggle for existence some parties left the shores altogether and established themselves on the banks of rivers and lakes, whilst others even abandoned their aquatic habits and became residents of the prairies. It would be carrying hypothesis too far to try and discover where the ancestors of each genus were isolated and differentiated, though in many cases strong circumstantial evidence is not wanting; but when the glacial period passed away, and was followed by a warm period, we may be sure that the long residence in various isolated localities, differing in climate, in food, in the kind of protections against enemies, and in the character of the enemies themselves, produced a variety of modifications, the accumulation of which was greatly accelerated by the increased struggle for existence, caused by the emigration of the Arctic birds to the already overcrowded districts further south; the final result being that the one species which left the Polar Basin at the beginning of the Præ-Pliocene glacial period, returned when it was over, not one, but ten species, leaving at least ten others which never returned at all.

Differentiation when isolated in different localities.

Return to the Polar Basin.

The disappearance of apparently perpetual winter at the North Pole, the melting away of the ice in the Arctic Ocean, and the retreat of the glaciers almost to the tops of the highest mountains, lessened for a time the fierceness of the struggle for existence, by opening up once more the finest breeding-ground in the world for shore-feeding birds. The ten species met in the Polar Basin, where their common ancestors had lived about half a million years previously, and probably found its coasts and its islands as desirable a place of residence as their ancestors had done—so much so, indeed, that only one out of the ten failed to become circumpolar.

During the Miocene Period the conditions of life were probably so easy, that few of the ten species were greatly modified, but what modification did take place became by constant interbreeding the common property of the species. But whilst *interbreeding* was the universal rule, those birds which neglected it and adopted the system of *in and in breeding* producing degenerate offspring, which were soon stamped out in the struggle for existence, *cross breeding* between any two of the ten species never occurred, or, if it did happen in exceptional cases, produced no permanent result, the offspring being barren hybrids which died out of themselves.

But this paradise of waders was not eternal; the same fate befell the ten species as had befallen the one species (their common ancestor) five hundred thousand years or more previously. Another glacial period came on; the Arctic Ocean again became a sea of ice, and the glaciers crept down again from their mountain homes and almost covered the land.

The first important break in the continuity of the area of distribution of each species was doubtless a barrier of ice, extending from the sea of ice at the North Pole, and coming

down in a wedge along the mountains of Greenland. The area of distribution was originally a disk; the accumulation of ice round the pole made it a ring, and the glaciers of Greenland cut the ring in two, so that the birds of Scandinavia could no longer interbreed with those of Labrador. This partial discontinuity of the area of distribution allowed Evolution to modify the species at each end of the horseshoe in different directions; but the differentiations could only be subspecific, as interbreeding must have taken place along the whole line, the birds of each bay intermarrying with those in the next, so that the result was probably a Scandinavian species, which appeared to be quite distinct from its ally in Labrador, until it was found that the two species were connected together by a complete series of intermediate forms, the Kamtschatkan form being perhaps midway between the two extremes.

Emigration caused by the second Glacial Epoch.

As the severity of the Glacial Period increased, the cracked ring must have been broken into two pieces by glaciers, one coming down from the Rocky Mountains, and the other from Nova Zembla or the mountains of Eastern Siberia. The shore birds were thus isolated in three colonies—one on the Atlantic coast of America, one on the Atlantic coast of Europe, and the third on the Pacific coast of Alaska and East Siberia.

Later on, when the Arctic ice filled the Polar basin, the birds retreating before it on the shores of the Pacific must also have been isolated in two parties, one being compelled to follow the coast of Asia, and the other that of America.

During the Præ-Pliocene glacial period the Charadriidæ were differentiated into genera, during the Post-Pliocene into species. To try and find out the locality where each genus was differentiated is too hazardous a task, but to attempt the discovery of the locality where each *species* was isolated and differentiated is seldom entirely hopeless. It seems probable that the habits of migration, formed originally when the birds extended their range beyond the Arctic Circle, and were compelled to wander in search of light during the three months' night, and developed to a much greater degree when they were compelled, by the increasing severity of the winters, to absent themselves from their breeding-grounds for six months in search of food, became so deeply impressed upon the species, that they were never wholly abandoned, even during the warm climate which followed the last glacial epoch. It seems to be a reasonable hypothesis that the locality where a species is now most abundant in winter was its winter home during the glacial period, where it was isolated and differentiated, and whence it has migrated to its breeding-grounds every spring for the last hundred thousand years. The pertinacity with which ancient routes of migration are retained is exemplified in the history of many species of Charadriidæ. The Common Dotterel (*Charadrius morinellus*) appears to have gradually extended its range during the breeding-seasons from the Atlantic to the Pacific, but its ancient winter-quarters of North Africa are still, so far as we know, the only winter-quarters of the species. On the other hand, the Curlew Sandpiper (*Tringa subarquata*) winters in South Africa, India, and Australia. As no difference can be found in the Curlew Sandpipers wintering in these three localities, we must infer one of two hypotheses, either that India and South Africa have only recently

Locality where each species was isolated and differentiated.

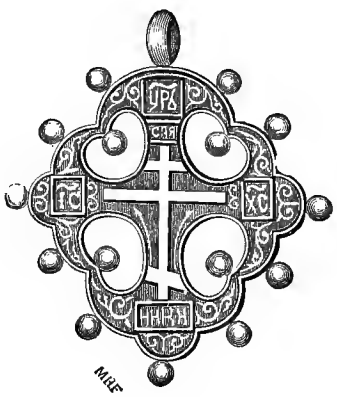
been discovered by this species, or that the birds wintering in these three isolated localities meet in summer on a common breeding-ground.

Post-Glacial modification.

Modification is probably proceeding very slowly with these species at the present time; they are all migratory birds; at their breeding-grounds they have an unlimited supply of food and very few enemies; their great struggle for existence is the necessity for braving the perils of migration twice a year, and the survivors are those who are fittest to run the gauntlet of storms. But there is evidence of considerable post-glacial modification.

Glacial theory of dispersal.

The Curlew (*Numenius arquatus*), which winters in Africa, is slightly different from its oriental representative (*Numenius arquatus lineatus*), which winters in Australia, and the European Dunlin (*Tringa alpina*) is said to differ from its representative in America. It is impossible to say to what extent post-glacial modification may have taken place, because in the absence of isolation it has not produced differentiation. In what manner and to what extent isolation has permitted (not caused) differentiation to take place in the family of Charadriidæ is the object of the present book. How far I have succeeded in the task I must leave my readers to decide. I hope they will agree with me that the circumstantial evidence which I have collected on the subject is sufficient to warrant my giving it the title of the Glacial Theory of Dispersal. At all events I trust they will neither hastily condemn my ideas as "unverified hypotheses of speculative philosophy," nor rush into the opposite extreme, and jump to the conclusion that the Glacial Epochs have been an important factor in the differentiation of tropical and subtropical genera and species.



CHAPTER V.

MIGRATION.

Hibernation of Birds.

It is a very remarkable fact that the evidence of the most trustworthy witnesses cannot always be relied upon. The old superstitions that Bernicle Geese were hatched from the mollusk whose name they bear, that Cuckoos turned into Sparrow-Hawks in autumn, and that Swallows spent the winter buried in the mud at the bottom of rivers, are too absurd to be worthy of refutation; but there are still a few credulous ornithologists who are not yet convinced that birds have not occasionally been found in a state of Hibernation. There cannot, however, be the shadow of a doubt that the well-authenticated stories of Swallows having been found in a torpid state in hollow trees, or in holes of walls or rocks, are pure myths. There is not a shred of truth in these narratives, any more than there is in the equally impossible stories of live toads being found in solid rocks; and it is most curious that, now science has proved these alleged facts to be impossible, no further evidence of their truth is forthcoming. It only shows how cautiously evidence apparently the most trustworthy should be received.

The Hibernation of birds is a *theory*, the evidence in support of which has completely broken down. The Migration of birds is a *fact*, as completely authenticated as the fact of their existence. Not only is the disappearance of a species from its breeding-grounds the signal for its appearance at its winter-quarters, but there are numerous halfway houses, so to speak, where any observer may, at the proper season of the year, see birds by the thousand in the act of migration.

Migration not universal.

All birds do not migrate, neither is migration confined to any family or genus of birds; nor does it invariably extend to all the individuals which collectively represent a species. The habit of migration is to a large extent climatic. The Robin is a resident in England, where the winters are comparatively mild; it is a migrant in Germany, where frost is much more frequent and severe. Birds breeding in the tropics are always resident, except when they breed on mountains, where a subtropical, or even an arctic climate, causes them to descend into the valleys for the winter.

To old-fashioned ornithologists who still believe that each species of bird was separately created in the locality where it now breeds, migration appears to be an exceptional factor in the life of birds, whilst they regard any theory of the emigration of birds as a myth.

The modern ornithologist has discovered that migration is the rule and not the exception, and, holding the theory that all birds are descended from common ancestors, he is obliged to admit that the only possible way in which they could have become practically cosmopolitan was by emigration, and that, too, on no insignificant scale. The emigrations of birds have been as widespread and as complicated as those of the human race, though they have been unchronicled by historians, and have left but few traces behind them, except the present areas of the distribution of nearly allied species, which are most suggestive of the past history of the genus.

Emigration of Birds.

The Charadriidæ may be regarded as the most migratory family of birds. In no group of birds is the percentage of migratory species greater, nor do any migratory birds undertake journeys of such extraordinary length. The Sanderling (*Tringa arenaria*) breeds on the shores of the Arctic Ocean; I have shot it in the lagoon of the Petchora in lat. 70° north, in the middle of the breeding-season, and have watched it in our winter feeding on the coast of South Africa, about eight thousand miles further south. The Knot (*Tringa canutus*) has even a wider range, breeding further north, and sometimes wintering further south; there can be little doubt that some of its "fly-lines" measure ten thousand miles. It is not remarkable that birds that perform such extraordinary feats of migration require new sets of flight-feathers before each journey. As soon as the duties of incubation are over most Waders may be seen in full moult, with perhaps a primary and a secondary in each wing only half-grown, all the quills being gradually renewed during the month of September. Precisely the same state of things may be seen in South Africa during the month of March.

Distance covered by migrants.

Emigration, being doubtless an older habit than migration, ought perhaps to be discussed first, but it is undoubtedly wiser to begin with the subject with which we are best acquainted—to proceed from the known to the unknown.

Origin of the Charadriidæ.

The Charadriidæ are unquestionably an arctic family. Of 190 species which it comprises 70 breed within the Arctic Circle; and of 19 genera only 9 are unrepresented in the Arctic Region. They probably originated on the shores of the Polar Basin; and it is not an improbable assumption that their habits of migration were acquired in the Arctic Regions in pre-Eocene times, when the conditions of life near the Pole were very different to what they are now. The first migrations of the ancestors of the Charadriidæ were probably not in search of *warmth*, for the climate of the Polar Basin was in those remote ages mild enough; nor in search of *food*, which was probably abundant all the year round; but in search of *light*, during the two or three months when the sun never rose above the horizon.

Origin of Migration.

The habit of migration thus formed became deeply rooted in the species, in accordance with the law of heredity; and doubtless acquired additional force when the terrors of a Glacial Epoch exterminated the conservative party amongst the Charadriidæ (if any of them were foolish enough to neglect to adapt themselves to the changed circumstances), and

compelled the survivors to extend their migrations far and wide, until the shores of nearly all the rest of the world were visited on passage or included in the winter range of some species of the family.

Classification of migrants.

The British ornithologist naturally classifies migratory birds into three groups—birds which, like the Swallow and the Cuckoo, come to our shores in spring to breed, and, having bred, leave them again in autumn to winter elsewhere; birds which, like the Fieldfare and the Widgeon, come to our islands in autumn and spend the winter with us, but leave again in spring in search of better breeding-grounds; and birds which, like the Little Stint and the Dusky Redshank, are migratory birds *par excellence*, being only seen on our shores for a month in spring, and again for a month in autumn, in the act of migrating to and from breeding-grounds far away to our north, and winter-quarters far away to our south. An examination of the geographical ranges of these various birds will, however, show that they only differ in their relation to our islands. They all represent birds which breed in the north and winter in the south. Every migratory bird wintering in England goes north to breed, and every migratory bird breeding in England goes south to winter. It is a rule without exception in the northern hemisphere that each bird breeds in the extreme north point of its migrations. To make the rule apply to the southern hemisphere as well it must be modified as follows:—Each bird breeds in the coldest climate which it visits on its migrations.

Relation of climate to Migration.

Migration on the south coast of England.

Any ornithologist who visits the Sussex Downs on a fine day in autumn—no better place could be selected than those between Brighton and Shoreham—may see small parties of birds passing up and down the coast, many of them unfortunately falling victims to the bird-catchers, who lure them down to their destruction by miserable call-birds pinioned within the flap-nets. If he be a novice he will scarcely be likely to regard their apparent flitting to and fro as in any way connected with migration. But by-and-by he will probably discover that the birds which are moving in the direction of Dover are soft-billed insect-eating species, who are migrating east to cross the Straits on their way to warmer winter-quarters down south; whilst those who are migrating towards the Land's End are hard-billed seed-eating species, who are migrating west, having crossed over the German Ocean from Scandinavia, possibly by way of Heligoland, and are now following the English coast-line, continually sending small parties inland to winter in our mild climate.

The former birds are migrating out of England, the latter are migrating into it in autumn; and these two parties represent two more or less distinct classes of migrants.

Gipsy migrants.

The hard-billed seed-eating birds may be called Gipsy migrants. Their home is wherever they can find food. In winter they are perpetually hovering on the outskirts of the frost, perpetually being driven southwards by snowstorms, but continually trying to force a passage to their breeding-grounds. The consequence is that their movements depend largely upon the weather; in some seasons they are very abundant, in others very rare.

Sometimes, during a mild series of winters further north, they are absent for several years, whilst an unusually severe winter in the north often causes unexpected migration, sometimes in large numbers, of rare birds to our islands.

Regular migrants.

The soft-billed insect-eating birds may be called Regular migrants; their migrations are remarkably constant, and their appearance in their breeding-grounds may be confidently looked for almost to a day. Each species has its fixed time of migration, which appears to be very slightly affected by the condition of the weather. Good weather does not seem to hasten the arrival of these birds at their breeding-grounds, nor does bad weather retard their movements. In their winter-quarters they are almost as punctual; and though many of these are reached by somewhat circuitous routes, it is remarkable how few birds lose their way on migration.

Relation of Summer to Winter range.

As a general rule, amongst regular migrants the further north a bird goes to breed, the further south it goes to winter. As regards species this is very easy to prove, but as regards individuals the statement has often been questioned. The Barn-Swallow is one of those conspicuous birds which is easily identified, and which is so numerous that its absence is quickly detected. Unfortunately we have no reliable records of the departure of Swallows from Central Africa; but when I was in Natal during the last week in March Barn-Swallows were swarming in countless thousands on the coarse marine herbage on the sand-hills between the sea and the lagoons at the mouth of the Umgeni River. Most of the adults were in splendid glossy blue plumage, having just completed their moult; but most of the birds of the year had only moulted about half their quills, and would probably not be in a condition to migrate for at least a fortnight.

Migration of Barn-Swallows.

Barn-Swallows arrive in North Africa very early during the last half of February, in Southern Europe during the first half of March, but in Central Europe not until the last half of that month. It is perfectly certain that the Natal Swallows if they leave during the first half of April, even allowing them only a few days in which to accomplish a journey of five or six thousand miles, must go to some part of North Europe or to North-west Asia, since the Swallows which breed further south have arrived at their breeding-grounds before the South-African birds have left their winter-quarters. So far as it goes, this evidence is conclusive that, in the case of the Barn-Swallow, the individuals which go furthest north to breed go furthest south to winter.

Moulting of Barn-Swallows.

The Barn-Swallow, and probably every other species of Hirundinæ, only moults once in the year. After having migrated six or seven thousand miles to their breeding-grounds, spent nearly six months in the stormy summer of Northern Europe, again migrated six or seven thousand miles back to their winter-quarters, and spent another six months during the rainy season of Natal, it is a wonder that the poor birds have any feathers left. Some of those which I shot had been in a lamentable condition; the old feathers that still remained had faded to a rusty brown and were worn to shreds. The plumage of the young birds, though they had only run the gauntlet of one journey and of one summer, is

so much more tender than that of adults, that they were in the worst condition; the old feathers were no better than rusty rags.

Emigration of Swallows.

The most interesting fact in connection with this single moult of the Swallow is that it takes place in March instead of September. The natural inference to be drawn from such a circumstance is, that the Swallows belong to the southern hemisphere, and have only comparatively recently (probably in post-glacial times) emigrated to the Palæarctic or Nearctic Regions. This theory is confirmed by a glance at their geographical distribution. The genus *Hirundo*, as restricted by Sharpe in the 'Catalogue of Birds,' contains 27 species, of which 16 breed only in the Ethiopian Region, 2 both in the Ethiopian and Oriental Regions, 2 only in the Oriental Region, 1 both in the Oriental and Palæarctic Regions, 1 both in the Oriental and Australian Regions, 2 only in the Australian Region, 2 only in the Neotropical Region, and the remaining 1 both in the Nearctic, Palæarctic, and Ethiopian Regions. Of the 11 genera recognized by the same author, *Hirundo* is the only one which is cosmopolitan in its range; 2 are confined to the Ethiopian, and 1 each to the Australian and Neotropical Regions, whilst no genus is confined to the Palæarctic or Nearctic Regions. The evidence that the Swallow had an Antarctic origin seems to be conclusive.

Hirundo an Antarctic genus.

Birds resident where summer and winter quarters overlap.

It not unfrequently happens that the breeding-range of a species overlaps its winter range. Under these circumstances it is probably a rule, with scarcely an exception, that the birds breeding in the overlapping part are residents who never migrate at all. The habit of migration is not a whim. If, on an average of seasons, it is possible for the birds to find food in their breeding-grounds during the winter, they doubtless remain there. It is scarcely conceivable that birds would brave the perils of migration without an adequate cause. The mortality of birds on migration is very great; many are caught in storms whilst crossing the Ocean, as the dead bodies which are washed upon the beach often prove. It is not an uncommon thing to find birds newly arrived at their destination—at Spern Head, for example—so fatigued as to be readily caught by the hand.

Migration in the southern hemisphere.

Little or nothing has been written of the migration of birds in the southern hemisphere, but it is almost as important a fact in the history of the birds of Natal as in that of British birds, though the difference in the geographic relations of the two countries modifies the details in many ways. It is a remarkable fact that whilst there are very many birds breeding in the northern hemisphere and wintering in the southern, it is not known that any land-bird breeds in the southern hemisphere and habitually winters in the northern. It seems probable that most of the accidental visits of southern species of land-birds to the northern hemisphere which have been from time to time recorded are of doubtful authenticity; and amongst sea-birds this practice is confined to one or two species of Petrel, of which it is not unlikely that undiscovered breeding-grounds exist in the northern hemisphere. One cause of this apparent anomaly may be the difference in the distribution of the land. North of the British Islands, and a similar latitude on the continent of Europe

Few or no winter migrants from the southern hemisphere

and Asia, is an Arctic region, which is the breeding-ground of great numbers of migratory birds. Many of these winter in our islands, whilst others are regular spring and autumn visitors, passing along our coasts on migration, from their Arctic breeding-grounds to their winter-quarters in Southern Europe or Africa. In the southern hemisphere there are no Antarctic breeding-grounds, whence similar migrants could visit Natal. No part of South Africa is cold enough to be a breeding-ground of Arctic birds, and the land at the Antarctic pole is too cold for them. The natural consequence of this state of things is, that in South Africa there are no migrants from the Antarctic Region, either in winter, or passing through in spring and autumn to winter further north. To compensate for the absence of such an important section of migratory birds, Natal and other parts of South Africa are visited every year by an equally important section of migratory birds, a migration which has no parallel in the northern hemisphere.

Winter visitors to the southern hemisphere.

The fact that in the Antarctic Region there is no land suitable for the breeding of birds, except a few species of Penguin and Petrel, is the cause of the apparently anomalous circumstance that the northern hemisphere is only accidentally visited by migratory birds whose breeding-grounds are in the southern hemisphere. South Africa is, however, visited by numerous regular migrants from the northern hemisphere—birds who spend half the year, from September to March, in the summer of the southern hemisphere surrounded by other species, some of them congeneric, busily engaged in the duties of incubation, but they themselves looking on with absolute indifference. In addition to the Plovers and Sandpipers, and the Barn-Swallows which have already been mentioned, many other species, such as the Swift (*Cypselus apus*), the Willow-Wren (*Phylloscopus trochilus*), the Sedge-Warbler (*Acrocephalus phragmitis*), the Great Sedge-Warbler (*Acrocephalus turdoides*), which breed in Northern Europe and North-western Asia, cross the tropics and enjoy a second summer in the Transvaal, Natal, and other parts of South Africa. The fact that these birds, which spend the summer in Europe, are found in South Africa during the South-African breeding-season, has given rise to the legend that some birds breed twice in the year—in June in Europe, and in December in South Africa. It is very difficult to prove a negative, but when the evidence of these alleged cases of double breeding is carefully examined, it always proves to be unsatisfactory. Andersson, in his 'Birds of Damara-Land,' remarks of the Barn-Swallow that it breeds in that country; but there can be little doubt that the Swallow which he mistook for the Barn-Swallow was the White-throated Swallow (*Hirundo albigularis*), a species which he does not mention, and which he probably mistook for the female of our bird. His further remark that, in consequence of the scarcity of houses, it breeds in rocks and *trees*, adds still more doubt to the accuracy of his observations. I have seen the Barn-Swallow breeding under overhanging cliffs in the Dobrudscha, but I never heard of its having been found nesting in a tree. Nordmann's Pratincole (*Glareola melanoptera*) is also stated, on the authority of Mrs. Barber, to breed in South Africa; but as this bird and the Wattled Starling (*Dilophus carunculatus*) are both known in that country as the Small

Double breeding a myth.

Alleged double breeding of Barn-Swallows.

Of Nordmanu's Pratincole.

Locust-bird, it seems very probable that the two species have been confused together either by Mrs. Barber or by Mr. Layard. It is a significant fact that the Layard collection of eggs in the Museum at Cape Town, which is a very good one, reflecting great credit on the energy of the collector, does not profess to contain an African egg of the Pratincole. The Quail (*Coturnix communis*) certainly does breed in South Africa; but this bird is a partial resident in Natal and the Cape Colony, its numbers being probably increased by migratory, but non-breeding, birds in spring. There is no reason to suppose that the breeding-area of its distribution is discontinuous; and, in the absence of any evidence to the contrary, it is fair to assume that it breeds throughout Africa, as the Heron, several species of Egret, the Black-winged Stilt, and the Avocet are known to do. It is possible that there may be species of birds breeding both in Europe and in South Africa, but wintering only in Central Africa; in which case we should find the curious anomaly of a species of bird found all the year round in Tropical Africa, but not breeding there, half the individuals being absent from March to September, in order to breed in the northern hemisphere, and the other half being absent from September to March, in order to breed in the southern hemisphere. But before such a theory could be accepted, it must be supported by facts which are not open to suspicion.

Quail not an example of double breeding.

The winters of South Africa are much milder than those of England; they approach much nearer in climate to those of the Riviera; snow is almost unknown, but in many places the nights are cold, and as in South Europe, so in Natal, many birds, for the most part insect-feeding species, leave in autumn for warmer climes. Amongst these, several species of Swallow (*Hirundo albigularis*, *H. semirufa*, *H. cucullata*), most of the Cuckoos, and some of the Warblers are conspicuous examples.

Summer migrants to the southern hemisphere.

It is rather remarkable that the delicate-looking Sun-birds, which vie with the Humming-birds in the brilliancy and metallic lustre of their plumage, are able to brave the winters of Natal without migrating. The representative of our Sand-Martin, *Cotyle paludicola*, and that of the South-European Rock-Martin, *Cotyle cincta*, must also be included amongst the residents.

There is in the British Islands a great deal of local wandering amongst birds, and in Natal this internal migration is even more conspicuous. The climate of South Africa varies in different localities. The rainy season is, as a rule, during the summer, but there is a slip of country near the coast, extending from Cape Town to Knysna, where the rain falls in winter, and between the two districts is a belt of country of uncertain rainfall, where in some years it rains every month, and in others little or no rain falls for a whole year. These changes of climate necessitate great changes of residence amongst the bird-population. Some birds feed principally on grasshoppers, and migrate far and wide in search of large erratic flights of these insects. Man has been described as a cooking animal, but Nordmann's Pratincole very much prefers to eat its locusts cooked. It may be said to spend its time in migrating in enormous flocks in search of roasted grasshoppers. The grass in

Local migration in South Africa.

Migrants in search of roasted grasshoppers.

Natal is of such rank growth that large patches of veldt are burnt off every year to clear the ground. The Pratincole (*Glareola melanoptera*), the Lapwing (*Vanellus melanopterus*), and the Courser (*Cursorius rufus*) are always on the look-out for these grass-fires, and feed eagerly upon the scorched insects left in their wake. For days together flights of Pratincoles pass over the veldt, perhaps not to be seen again for weeks or even months. The flights of ants are also a source of great attraction to some birds. For about a week early in March a flock of perhaps three hundred Eastern Red-legged Falcons (*Falco amurensis*) frequented the farm in Natal where I was stopping. They spent the day hawking like Swallows at a great height in the air, and at night they roosted all together on the naked branches of some tall trees in the bush. It is remarkable that these birds are not known to breed west of Irkutsk, their summer-quarters being apparently confined to the valley of the Amoor in South-eastern Siberia, though their winter-range extends from the eastern provinces of the Cape Colony, through India, to China.

Eastern Red-legged Falcon.

Local migration of Snipe.

The South-African Snipe (*Scolopax æquatorialis*) is only known from South Africa, where it is a resident, breeding all over the country in the vleys or marshes. In exceptionally dry seasons many of these vleys dry up, and the ground becomes too hard to be probed by the soft bills of the Snipe in search of food. The Snipe are consequently obliged to migrate for a season to vleys where there is still abundance of moisture; and thus it often happens that large bags are obtained where a week before only a few scattered pairs could be found.

Alleged double breeding of Stork.

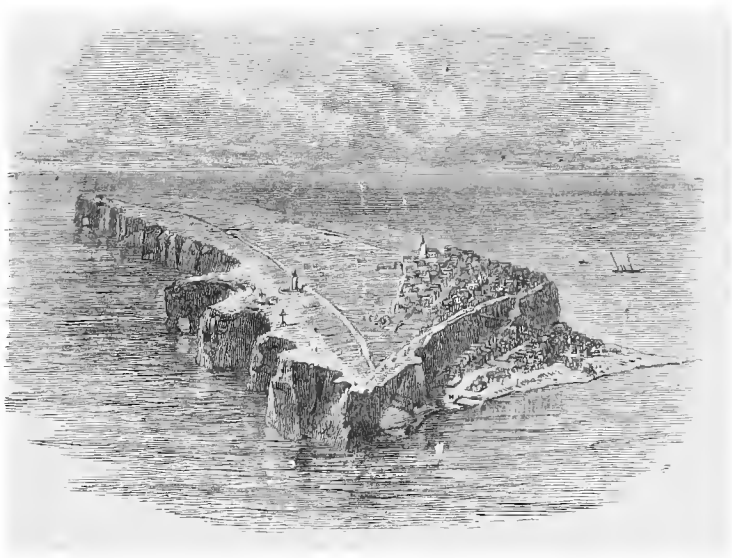
One of the most conspicuous birds in Natal during the month that I spent in the country was the White Stork (*Ciconia alba*). In riding across the veldt it was seldom that one or two pairs were not visible, and sometimes large flocks collected together to roost on the bare branches of some venerable tree in the bush. No bird could be better known to the colonists, amongst whom it is familiar as the Great Locust-bird. But the only instance that I heard of (and I made many inquiries) of the breeding of this bird in Natal, was that of a pair which once bred on the ground nearly twenty years ago. Even supposing the identification of the species to have been correct, the fact of the nest being on the ground in a country where houses, rocks, and trees abound is presumptive evidence that the bird which made the nest was unable to fly, and persuaded its mate to remain with it in their winter-quarters.

Heligoland.

There are many places where migration may be easily studied. The fly-lines of a great many species pass through Malta, and of perhaps still more through Gibraltar, but in no place has more migration been seen and recorded than on the island of Heligoland. This comparatively bare rock, which rises perpendicularly from the sea about 150 feet, scarcely measures 200 acres in extent, and contains perhaps 2000 inhabitants. In conjunction with Sandy Island, about a mile away, exposing say 50 acres of uninhabited sand-hills and beach at low water, reduced to scarcely half that extent at high tide, it has been visited by more species of birds than have been recorded from any country of Europe. The fact is that Heligoland is the only part of the world of which the ornithology has

been properly worked. Every boy on the island is a born and bred ornithologist. The fisherman steers with a gun by his side, the peasant digs his potatoes with a gun on the turf and a heap of birds on his coat. Every unfortunate bird that visits the island has to run the gauntlet of forty or more guns, to say nothing of scores of catapults and blowpipes. Every bird which appears is whistled within range with marvellous skill. Long before sunrise the island is bristling with guns, and after dark the netters are busy at their throstle-bushes ; whilst at midnight the birds commit suicide against the lighthouse. The common birds are eaten, the rare ones are sold to the bird-stuffer, and the unknown ones are taken to the celebrated ornithologist Gätke.

Destruction of birds.



Although the island is about twenty miles from the coast there is not a month in the year during which migration cannot be observed. One of the most valuable contributions to our knowledge of ornithology that has ever been published is a digest of Gätke's observations for the year 1885. The following extracts relating to some of the birds which comprise the family Charadriidæ are taken from the seventh Annual Report on the Migration of Birds, published by the Committee of the British Association for the Advancement of Science. These observations show in a most forcible manner to what extent migration takes place, even in midwinter. It can scarcely be supposed that Curlew and Golden Plover fly twenty miles out to sea for the sake of feeding on the beach of Sandy Island, which does not measure a couple of miles, even at ebb-tide. Probably these flocks which visit Heligoland in winter breed in Yorkshire and Scotland, migrating from shore to shore in winter (as the Snipes and the Coursers do from coast to coast in South Africa) in search of new feeding-grounds. The Curlews, on the other hand, who spend a quiet winter

enjoying the summer sun on the mud-flats of Durban Bay, probably migrate to breed on the tundras around Archangel.

	WOODCOCK.	GOLDEN PLOVER.	CURLEW.	DOTTEREL.	
JAN.		] many.	] many.		JAN.
FEB.		—many.			FEB.
MAR.	} stragglers. —eight killed. } 250 killed.	] few. —hundreds.] very many. —stragglers.	] very many.		MAR.
APR.	—50 killed. } stragglers.	—very many. } stragglers.	} few. —stragglers.		APR.
MAY.				—some.] some.	MAY.
JUNE.		—one.			JUNE.
JULY.			} many, all young. { many young, a few old.		JULY.
AUG.		] few, all young.		—many.	AUG.
SEPT.		] many, all young.] few. } many.	—many. —some.] some.		SEPT.
OCT.	} few. —many.] 250 killed.	—few. —some.	—great many.		OCT.
NOV.	} stragglers. } few.	—few.			NOV.
DEC.		] many.			DEC.

Migration of Passerine birds.

It must not be supposed that the greater proportion of birds migrating across Heligoland are water-birds; on the contrary, the species which appear in the greatest numbers are small Passerine birds who, presumably possessing weaker powers of flight, are most anxious to find a temporary rest on such adventurous journeys. The following notes from Gätke's diary are most interesting :—

Oct. 1870. Thousands of Great Tits.
Feb. 1876. Tens of thousands of Sky-Larks.
Jan. 1878. Countless numbers of Fieldfares.
Dec. 1879. Millions of Red-throated Divers.
Sept. 1880. Thousands of Siskins.
Nov. 1880. Thousands of Shore-Larks.
Sept. 1881. Immense flights of Common Buzzard.
Oct. 1881. Thousands of Snow-Buntings.
Oct. 1882. Countless numbers of Hedge-Sparrows. Thousands of Jays. Myriads of Goldcrests.
Sept. 1883. Enormous number of Redstarts.

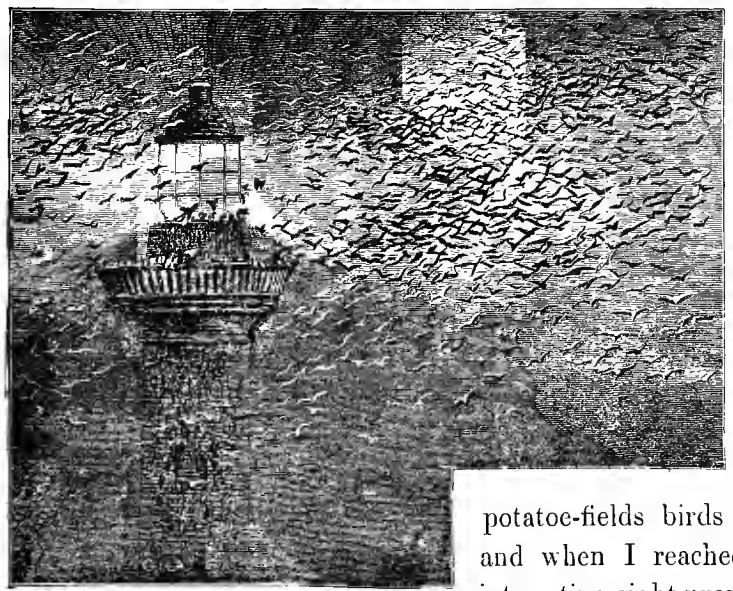
The casual visitor to Heligoland, who frequents the Restaurant to enjoy the oysters and the lobsters, or rows across to Sandy Island to bathe on the shore and take a constitutional on the dunes, seldom sees much migration. Now and then a flock of Waders may be detected hurrying past; flocks of Pipits or Wheatears occasionally land on the island, feed for an hour or two, and then pass on; and sometimes a scattered and straggling stream of Hooded Crows, of heavy and laborious flight, will continue all day long. Most birds migrate by night; very few come within sight of the island, and of those that do, not one in ten thousand stops to rest. Every flock which passes over probably drops a few tired or hungry birds, and after a migration-night a walk through the potatoe-fields in the early morning is most curious and interesting. The variety of species, and the incongruous way in which they are mixed, is quite startling. The potatoe-fields are practically the only cover on the island; and all sorts of birds seek this shelter in which to feed, to rest, or to hide. Perhaps the first bird you flush is a Sky-Lark; the report of your gun may start a Golden Plover or a Jack Snipe; then, may be, you see some small birds picking insects off the potatoe-leaves, and you presently secure a Little Bunting, an Aquatic Warbler, and a Shore-Lark. Your next shot may be a Corncrake, followed by a Ring-Ouzel, a Richard's Pipit, or a Teal. Then perhaps a Great Spotted Woodpecker or a Short-eared Owl attracts your attention. You can scarcely take a step without putting up a bird of some species. But every night is not a migration-night. Sometimes day after day, for a week or more, you may diligently tramp the potatoes without finding a single bird. Migration is a question of wind and weather. By long experience the Heligolanders know when to expect an arrival of birds; and on favourable nights they watch by their "throstle-bushes" to secure their game. There are scarcely any trees on the island, so the peasants make artificial bushes, with a net on one side, into which the poor Thrushes are driven with sticks and lanterns as soon as they alight. Some hundreds are thus frequently caught in one night. The islanders describe with great gusto the impetuous arrival of the birds. On a sudden, without a moment's warning, a rush and whirl of wings is heard, and the throstle-bush swarms with Blackbirds and Thrushes, not dropped, but

Migration on Heligoland.

apparently shot like an arrow from a bow, perpendicularly down from the invisible heights of mid-air.

Migration of Sky-Larks.

The migration of Sky-Larks as observed on Heligoland is even more remarkable. On the 6th of November, 1868, fifteen thousand of these birds were caught by the islanders. On the 12th of October, 1876, I had the good fortune to witness one of these great migrations of Sky-Larks. For a week previously, whilst I was on the island, the weather was unfavourable; there were scarcely half a dozen birds on the island. On the 11th I shot three Shore-Larks, and was informed that the appearance of this Arctic species was a very hopeful sign. On the following day the west winds, which had been blowing hard for some days, slackened a little; in the afternoon it was calm with a rising barometer; and in the evening a breeze sprang up from the south-east. Gätke advised me to retire early, and to be up before sunrise in the morning, when, in all probability, I should find the island swarming with birds. Soon after midnight I was awakened with the news that the migrants had arrived. Hastily dressing, I at once made for the lighthouse. The night was almost pitch dark, but the town was all astir. In every street men with large lanterns and nets, like an angler's landing-net, were walking towards the lighthouse. As I crossed the potatoe-fields birds continually got up at my feet, and when I reached the lighthouse an intensely interesting sight presented itself. The whole of the zone of light within range of the mirrors was alive with birds coming and going. Nothing else was visible in the darkness of the night but the lantern of the lighthouse vignetted in a drifting sea of birds. From the darkness in the east, clouds of birds were continually emerging in an uninterrupted stream; a few swerved from their course, fluttered for a moment as if dazzled by the light, and then gradually vanished with the rest in the western gloom. Occasionally a bird wheeled round the lighthouse and then passed on, and occasionally one fluttered against the glass, like a moth against a lamp, tried to perch on the wire-netting, and was caught by the lighthouse man. I should be afraid to hazard a guess as to the hundreds of thousands that must have passed in a couple of hours; but the stray birds which the lighthouse man succeeded in securing amounted to nearly three hundred. The scene from the balcony of the lighthouse was equally interesting; in every



direction the birds were flying like a swarm of bees, and every few seconds one flew against the glass. All the birds seemed to be flying up wind, and it was only on the lee-side of the light that any birds were caught. They were nearly all Sky-Larks, but in the heap captured I saw one Redstart and one Reed-Bunting. The air was filled with the warbling cry of the Larks; now and then a Thrush was heard, and once a Heron screamed as it passed by. The night was starless and the town was invisible; but the island looked like the outskirts of a gas-lighted city, being sprinkled over with lanterns. Many of the Larks alighted on the ground to rest, and allowed the Heligolanders to pass their nets over them. About three o'clock in the morning a heavy thunderstorm came on with deluges of rain, and a few breaks in the clouds revealed the stars. The migration came to an end, or continued above the range of our vision, and, we will hope, above the reach of the tempest.

Order of migration.

There are one or two curious and interesting facts connected with the order in which birds migrate. The migration of each species lasts about a month, but in autumn it is not an uncommon thing to see a straggler or two arrive before the regular period of migration is due. These *avant-courières* arrive in various stages of plumage, loaf about on our shores in a desultory manner for a few days, and then disappear. Some of them are in summer plumage, some in winter dress, whilst others are in a transition stage, moulting as they migrate. They are supposed to consist of barren birds, odd birds who have been unable to find a mate, or birds whose nests have been destroyed too late in the season to allow a second nest to be made. Having nothing else to do, the hereditary instinct to migrate not being checked by the parental instinct, they yield to its first impulses and drift southwards before the main body of the species. This apparently premature migration has, however, its uses. When the period of migration of any species really begins, astounding as the fact is, it is nevertheless true that the birds of the year are the first to migrate, birds which of course have never migrated before. These birds have inherited from their parents an irresistible impulse to migrate, but there is no reason to suppose that they have also inherited an infallible knowledge of the road. It may take them years to learn the various landmarks necessary to keep them from straying from the route; but they are doubtless led by some of the *avant-courières*, of which mention has been made. By the time that the birds of the year have left, which may roughly be stated at a week, the males have finished their autumnal moult; and the second week of the migration of any species generally marks the passage of the males; most of the females migrate during the third week; whilst the fourth week is devoted to the cripples, which come straggling in as best they may, in an almost ludicrous manner—birds which have lost a leg or some of their toes, birds with half a tail, or a great hole in one wing, birds with one mandible abnormally long, or with some other defect. In spring the order is slightly varied, the adult males come first, then the adult females, who are followed by the birds of the year, though many of these, presumably those which are hatched late, or from some other cause, are less precocious than the rest, stop

Young migrate before their parents.

Order of migration in spring.

short before the journey is completed [1], or never migrate at all, remaining the whole year in their winter-quarters [2]. As in autumn, the cripples bring up the rear.

Accidental visitors.

It is not an uncommon thing for birds to lose their way on migration. The list of British birds contains a long catalogue of accidental visitors, most of which are migratory birds which now and then take the wrong turning, get into the wrong stream of migration, and make their appearance in our islands as strangers from far distant lands—some from Siberia, others from Southern Europe, and not unfrequently, especially amongst the group of birds of which this volume treats, from North America. Of these unexpected visitors who have lost their way, by far the greater number are birds of the year on their first journey to unknown winter-quarters. It is not to be wondered at that little birds so absolutely inexperienced should often lose their way and find themselves in strange winter-quarters.

More numerous than supposed.

The wonder is that so few birds do go astray, but probably many more than we have any idea of take the wrong turning. No doubt most of them winter with us or pass on further south without being discovered. Very few accidental visitors to our shores are caught. It is only on the island of Heligoland that an approximate estimate can be formed of the number of accidental visitors that occur on migration; and even there a comparatively small proportion of the strangers are caught or even seen. In the opinion of the veteran ornithologist who has kept watch on this lonely island for nearly half a century, and chronicled the visits of such extraordinary and unlikely guests, that for some years ornithologists suspected that they were the victims of a hoax—in Mr. Gätke's opinion the birds which have passed over the island of Heligoland without being identified are even more extraordinary and interesting than those which adorn the walls of his studio.

Palmén's fly-lines.

There has been much disputing amongst ornithologists as to the routes, or "fly-lines" as the Americans aptly call them, of migratory birds. Dr. Palmén wrote a very interesting work on the "Zugstrassen der Vögel," in which he attempted to map out the fly-lines of a score of birds breeding in the high north and wintering in the far south. He further attempted to classify their routes; but as his researches only apply to so small a proportion of migrants, his classification has little or no practical value. It is impossible to lay down any system of routes that can be applied to migratory birds as a whole. Each species has its own system of fly-lines, which continually cross those of other species, sometimes at right angles; and it not unfrequently happens that two species use the same route for some distance; but whilst one species may be travelling from east to west, the other may be migrating from west to east at the same season of the year. The Sedge-Warblers (*Acrocephalus phragmitis*) and the Willow-Wrens (*Phylloscopus trochilus*), which breed in the valley of the Yenesay, probably all winter in South Africa; whilst the Black-headed Buntings (*Emberiza melanocephala*) and the Rose-coloured Starlings (*Pastor roseus*), which breed from Italy to the Crimea, all winter in India.

Each species has its own fly-lines.

[1] Seebohm, 'Ibis,' 1879, p. 162.

[2] Seebohm, 'British Birds,' iii. p. 97.

The fact is that the routes of migration are practically innumerable, but very important lessons are to be learnt from their study. In most cases the present route of migration may be regarded as an index to the past lines of emigration of the species.

The periodical change which many birds are in the habit of making from northern breeding-grounds to southern winter-quarters is called migration. Other changes have taken place in the residence of birds of perhaps greater magnitude, but of an abnormal rather than of a periodical character, which are more correctly regarded as emigration. The most remarkable instance of the emigration of birds which has been observed during the last century was the emigration of many hundreds, if not of thousands, of Sand-Grouse into Europe in 1863. Pallas's Sand-Grouse (*Syrrhaptes paradoxus*) is a resident in the treeless steppes and deserts of the centre of Asia north of the Himalayas, from Lake Balkash in North-eastern Turkistan to Lob-Nor in North-eastern Mongolia. North of this district it is a summer migrant to South Siberia, migrating in autumn to winter in the east in South-east Mongolia and North China, and in the west to the Kirghiz steppes. This curious bird was discovered rather more than a century ago by Pallas, the celebrated Russian naturalist, who may be regarded as the pioneer of Siberian ornithology. Ornithologists are not agreed as to the place in the system of birds which the Sand-Grouse occupy. Pallas thought they were Grouse, other ornithologists regard them as nearest allied to the Pigeons; but there are valid reasons for supposing them to be near relations of the Plovers, especially of the Pratincoles and Coursers. Although a few examples were procured by the Moravians at the extreme western limits of their western winter range on the Kirghiz steppes, near Sarepta, on the Volga, in 1853, very little further information respecting Pallas's Sand-Grouse was obtained until Radde, another Russian naturalist, visited their breeding-ground in Dauria in 1856. In 1859 a few stragglers wandered into Western Europe, and were obtained at Wilna in Poland, near Hobro in Jutland, near Zandvoort in Holland, at Walpole St. Peter's, in Norfolk, New Romney in Kent, and Tremadoc in North Wales, and were justly regarded as very rare and very interesting wanderers from Central Asia. In 1863, however, the ornithologists of Europe were startled by a most extraordinary phenomenon: about the middle of May many hundreds, if not thousands, of these interesting birds appeared suddenly in Europe and were shot as far south as the valley of the Danube, North Italy, and the Pyrenees, and as far north as Denmark and Scandinavia, a few even reaching Archangel. Great numbers passed Heligoland and arrived on almost every part of the east coast of the British Islands, whence they spread inland to nearly every county of Great Britain, a few reaching the Scilly Islands, North-west Ireland, the Shetlands, and the Faroes. In many places they attempted to breed, and several clutches of their eggs were obtained, especially on the sandy coasts of Denmark and Holland; but, as might have been expected, they were soon exterminated by sportsmen, gamekeepers, and collectors of rare birds. This remarkable instance of emigration remains almost unique in the history of Ornithology; but there can be little

Emigration of Pallas's Sand-Grouse.

Attempt to breed in Europe.

doubt that it is only one of many others, by means of which the present geographical distribution of birds can alone be explained.

Emigration of Woodcocks.

As a typical example of emigration we may take the journeys which the ancestors of the nearest allies of the Woodcock (*Scolopax rusticola*) must have made in order to have become distributed as they now are. This bird is very closely allied to three other species. These four Snipes differ from all other species of the genus in having the under surface of the tail-feathers tipped with silvery white, and in having the dark bands on the crown transverse instead of longitudinal. It is not known that they differ structurally from the other species of *Scolopax* in any way; but two peculiarities of colour so marked are a coincidence too extraordinary to have been separately acquired by each of the four species, and may be accepted as a proof of a comparatively recent common origin. The Common Woodcock, being the most numerous species, having the widest range and occupying the central position geographically, may fairly be regarded as representing the least changed descendants of the common ancestors, and as inhabiting the original area of distribution. This may be described as a belt of land extending across Europe and Asia, from England to Japan, only reaching the Arctic Circle in Scandinavia, and only extending to the southern parts of the Palæarctic Region, where high elevations on the Alps, the Caucasus, or the Himalayas reduce the mean temperature during the breeding-season to a moderate figure.

Range of Common Woodcock.

American Woodcock.

The American Woodcock (*Scolopax minor*) breeds in a somewhat similar temperature on the American continent. The ancestors of this species must either have crossed the Atlantic or reached America by way of Behring Straits. As the present range of the American Woodcock only extends about halfway across the continent, and is confined to the Atlantic half, we may dismiss the Behring-Sea route as inadmissible; and we may regard the theory that the emigrants crossed the Atlantic as placed beyond doubt, since we learn that the Common Woodcock is still found on the Azores, and accidentally wanders to America, where it has been recorded from Newfoundland, New Jersey, and Virginia. The distance from the Azores to the nearest point of Europe is at least a thousand miles, and from those islands to Newfoundland considerably more. The fact that Woodcocks occasionally make these journeys proves that the feat is by no means impossible. The other two species so nearly allied to our Woodcock are probably the descendants of emigrants from Japan. The Moluccan Woodcock (*Scolopax rochusseni*) is a resident in the Molucca Islands; and Horsfield's Woodcock (*Scolopax saturata*) is only known from Java and Western New Guinea. These localities are easily reached without any difficulty.

Other Woodcocks.

It is not necessary to give further details of the emigration of other Limicoline birds, as the subject will be more fully treated of in the following chapters, and an attempt will be made to show the chief lines of emigration followed by the ancestors of each genus.

Hitherto we have spoken of emigration as an exceptional event, occurring at a long interval of time from a similar exodus, and produced by exceptional causes, such as a glacial

epoch; there is, however, in many species a constant widening of the area of distribution, in consequence of the gradual increase in the number of the individuals which compose the species, which is in its results the equivalent of emigration, and might be called "constant" as opposed to "spasmodic" emigration. The evidence of this past emigration must be sought for in the route of the present migration. As a typical example of a species whose present distribution shows indelible traces of a gradual, but ultimately a very great, extension of its original range, we cannot select a better bird than the Arctic Tern (*Sterna arctica*).

Gradual extension of range.

"The geographical distribution and the migrations of the Arctic Tern are perhaps more curious and interesting than those of any other British bird; but no ornithologist appears to have understood their peculiarities or attempted to explain them. The Arctic Tern appears to have been originally an oceanic species, visiting in summer the North Atlantic, and breeding in Spitzbergen, the coast of Norway, the basin of the Baltic, the Faroes, Iceland, Greenland, the shores of Baffin's and Hudson Bays, and the east coasts of Canada and the United States as far south as Massachusetts. In winter its range was confined, as it now is, to the Atlantic. It visits the Azores, the Canaries, and the west coast of Africa down to the Cape. It enters the Mediterranean as far east as the Adriatic, and has been known to round the Cape and wander as far as Madagascar. On the American side it ranges as far south as the coasts of Brazil, occasionally crossing the isthmus of Panama to the coasts of Northern Peru. This winter range appears to have always been extensive enough; but as their numbers increased, the Arctic Terns appear to have extended their breeding-range east and west. The eastern line of migration apparently extends across country from the Gulf of Finland to the lower valleys of the Petchora, the Obb, the Yenesay, and the Lena, down which some of the birds migrate to the Arctic Ocean, following the break-up of the ice on these great rivers. The western line of migration extends along the shores and lakes of Arctic America, the two streams of migrants meeting at Behring's Straits, where the Arctic Tern breeds in great numbers, although it apparently is unknown in the North Pacific. This geographical distribution, if I have understood it rightly, is a most interesting case of the breeding-range having been extended until it has become circumpolar; but, in consequence of the old routes of migration having been strictly observed, the winter-quarters remain unchanged. In point of fact, the Arctic Tern has not yet discovered the existence of the Pacific Ocean, and evidently regards Behring's Sea and the Bay of Panama as a couple of lakes!" [1].

Range of Arctic Tern.

Other equally interesting examples of recent important extensions of range may be found amongst European birds. The Petchora Pipit (*Anthus gustavi*) and the Arctic Willow-Wren (*Phylloscopus borealis*) both winter in the islands of the Malay Archipelago. The natural breeding-grounds of Arctic birds wintering in this locality is North-east Siberia, to which it is almost certain they were once restricted. Both species have now extended their breeding-grounds until they include North-eastern Europe, where they nest in company with other migratory birds belonging to the same genera; but instead of

Fly-lines of Arctic birds.

[1] Seebohm, 'British Birds,' iii. p. 285.

accompanying them on their annual journeys up the valley of the Petchora, and down that of the Kama into the valley of the Volga, and thence by way of the Red Sea or the Nile to South Africa, the natural winter-quarters of birds breeding in Arctic Europe, they retrace the steps of their gradual emigration across half a dozen Arctic valleys, to follow their old fly-line down the Pacific coast of Asia.

There are many other facts connected with emigration and migration that are of great interest, but which would require a large volume to do them justice. The assemblage of migratory birds in large flocks, which in many cases wait for a favourable wind (they prefer a beam-wind) before they venture to cross wide stretches of sea, and consequently start all together as soon as the weather is suitable, and arrive on the other coast in enormous numbers or "rushes"; the keen sight of birds and their extraordinary memory for locality; the great variety of routes chosen, and the pertinacity with which each species keeps to its own route—these and many other facts all point in one direction. The desire to migrate is a hereditary impulse, to which the descendants of migratory birds are subject in spring and autumn, which has during the lapse of ages acquired a force almost, if not quite, as irresistible as the hereditary impulse to breed in the spring. On the other hand, the routes of migration have to be learned by individual experience. The theory that the knowledge of when and where to migrate is a mysterious gift of nature, the miraculous quality of which is attempted to be concealed under the semi-scientific term of *instinct*, is no longer tenable. Birds may not have such highly developed reasoning-powers as we have, but their memories and power of perception must exceed those of the cleverest Zulu, probably as much as the almost miraculous development of these qualities in the African exceeds the coarse and blunted faculties of the European.

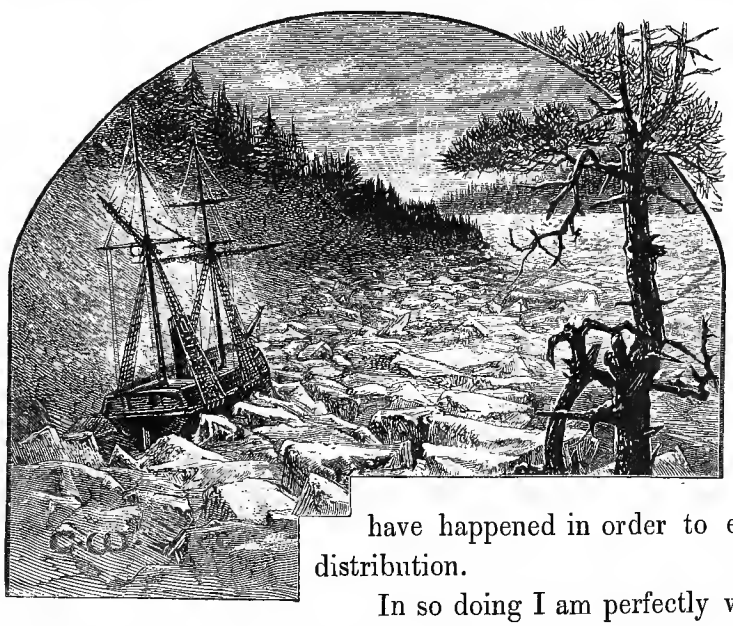
So-called "Instinct."

The conclusion to which all these interesting facts point is that emigration has played a most important part in the distribution of birds, and that in many cases the present routes of migratory birds furnish a key to the direction which it must have taken in ages so remote that we can scarcely realize the lapse of time since it occurred.

CHAPTER VI.

THE PARADISE OF THE CHARADRIIDÆ.

This work is not a monograph of the group of birds which comprises the Plovers, the Sandpipers, the Snipes, and their nearest allies; it treats only of the classification of the family Charadriidæ into subfamilies, genera, subgenera, species, and subspecies. I propose for the most part to confine the description of each of these groups of individuals to those characters which are diagnostic, and to make the geographical distribution of each species the *pièce de résistance* of my bill of fare. In the preliminary chapters I have endeavoured to show the general character of the laws of evolution by which these various groups have become differentiated, and I have tried to point out the main events in the past history of each species which must have happened in order to explain its present geographical distribution.



In so doing I am perfectly well aware that I have left out the most interesting branch of my subject. I have said little or nothing about the habits of the birds of which I treat; but what little I could add on this, to all true lovers of Nature profoundly interesting, I might say intensely fascinating, subject, I have already written in 'Siberia in Europe' and 'Siberia in Asia,' or in the 'History of British Birds.' There is, however, one branch of the local distribution of the Charadriidæ to which it may be well to devote a chapter, and gather into a focus the scattered allusions to the locality whence, in my opinion, the ancestors of the family originally emigrated, and whither so many of their descendants annually migrate to breed.

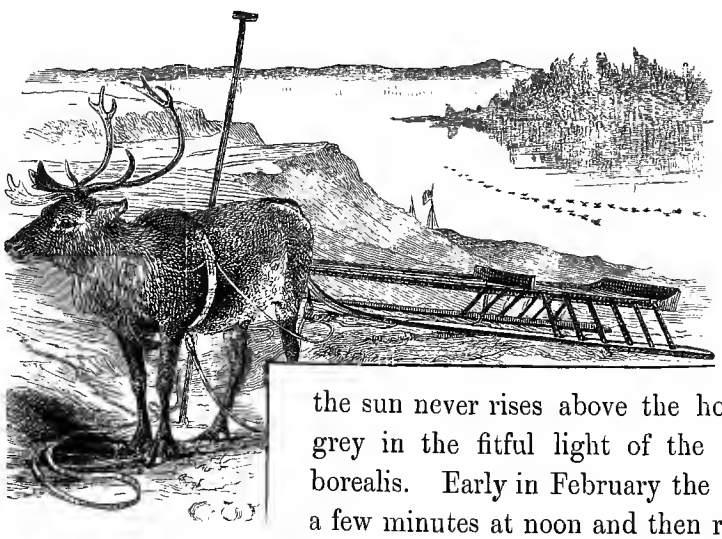
Habits of Charadriidæ already described.

The feldts of Lapland, the tundras of Siberia, and the barren grounds of Canada, in fact the fur-countries of the two hemispheres, are the paradise of the Charadriidæ, and as such require some description. They may roughly be characterized as the shores of the Polar Basin, bounded on the north by the Arctic Ocean, and on the south by the northern limit of forest-growth. I have endeavoured to point out the vicissitudes to which these districts have been subjected during the last million years, which may be regarded as typical of the changes which they now annually undergo, and which I propose briefly to describe in this chapter.

Arctic breeding-grounds.

I have called this district a paradise, and so it is for two or three months of the year. Nowhere else in the whole world can you find such an abundance of animal and vegetable life, brilliant flowers, birds both gay of plumage and melodious of song, where perpetual day smiles on sea and river and lake. For the rest of the year I admit that it is dreary, almost, but not quite, as depressing as a South-African karroo. For eight months or more (according to the latitude) every trace of vegetable life is completely hidden under a thick blanket, which absolutely covers every plant and bush: far as the eye can reach in every direction nothing is to be seen but an interminable undulating plain of white snow.

Their appearance in winter.



During six months of this time animal life is only traceable by the footprints of a reindeer or a fox in the snow, or by the rare visit of a raven or of a snowy owl which may have wandered beyond the limit of forest-growth whither it had retired for the winter. For a couple of months in midwinter the sun never rises above the horizon, and the white snow looks grey in the fitful light of the moon, the stars, or the aurora borealis. Early in February the sun just peeps upon the scene for a few minutes at noon and then retires. Day by day he prolongs his visit, until February, March, April, and May have passed, and continuous night has become continuous day. At midday the sun's rays are hot enough to blister the skin, but they glance harmless from the white snow, and for a few days the extraordinary anomaly presents itself of continuous day in midwinter.

Continuous day in midwinter.

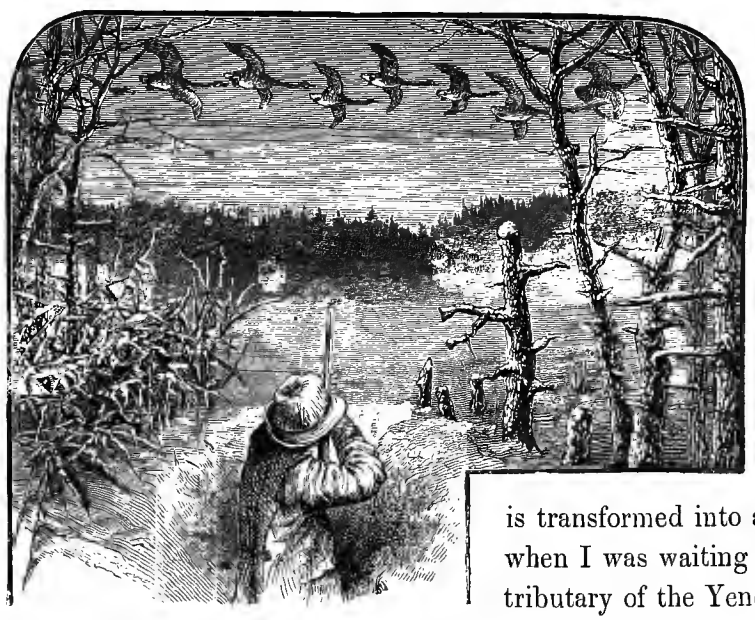
But if it were possible to obtain a bird's-eye view of the Arctic ice and snow from the North Pole, a still more extraordinary phenomenon would be visible. The disk of snow surrounding the North Pole at the end of May extends for about two thousand miles in every direction where land exists, and is melting away on its circumference at the rate of about four miles an hour. The snow is six feet deep, and as it takes a week or more to melt, it is in process of being melted for a belt of several hundred miles round the

circumference. This belt is crowded with migratory birds eager to push forward to their breeding-grounds—hurrying on over the melting snow so long as the south wind makes the bare places soft enough to feed on, but perpetually being driven back by the north wind, which locks up their food in its ice-chest. The great majority of migratory birds follow the river-courses—partly because they are landmarks which guide them on their long and venturesome journeys, and partly because the rapid rising of the rivers and the steepness of their banks causes open water and bare ground to be a hundred miles ahead of similar feeding-places elsewhere.

Crowds of migratory birds.

It is impossible to overestimate the important *rôle* which the wind plays in the melting of the snow on the tundras, the breaking up of the ice on the rivers, and consequently in controlling the migration of birds. In watching the sudden arrival of summer on the Arctic Circle, both in the valley of the Petchora in East Russia, and in the valley of the Yenesay in Central Siberia, I was impressed with the fact that the influence of the sun was nearly nothing, whilst that of the south wind was almost everything. The great annual battle between summer and winter in these regions is the one event of the year, like the rising of the Nile in Egypt; it only lasts a fortnight, during which a cold winter is transformed into a hot summer. Ten years ago, when I was waiting for the arrival of summer on a tributary of the Yenesay in lat. 66½°, a few hundred miles south of the limit of forest-growth, the only sign of approaching summer, before the end of the first week of May, was the arrival of a few species of migratory birds, of which Snow-Buntings and Redpoles were the commonest. On the 5th of May a solitary Swan was seen, and on the 9th we had the first attempt at rain for more than six months, which brought a solitary Goose in its train; the following day half a dozen Geese were seen, and on the 16th we actually saw a Barn-Swallow. But we soon discovered that one Swallow does not make a summer, though several flocks of Geese seemed to think it did. The last half of May was stormy; there were signs of rapid thawing further south as the level of the river rose considerably; many flocks of Geese and Swans passed us; but even as late as the 30th of May it was midwinter, both where we were and further north, for all the flocks of Geese were flying south, having evidently been unable to find any open water. On the 1st of June the crash came. Summer, in league with the sun, had been fighting

Comparative influence of sun and wind.



Earliest arrivals of migratory birds.

Sudden arrival of summer.

winter and the north wind, and had been hopelessly beaten; but on the 1st of June an alliance with the south wind was ratified. The sun retired in dudgeon behind the clouds, leaving the battle in the hands of his ally, before whose blast the armies of winter vanished into thin water and retreated to the pole; the ice on the river, three or four miles wide and six feet thick, was broken into a thousand pieces like fine crockery, and the snow melted like butter on hot toast. Although the onward march of triumphant summer was at the average rate of four miles an hour, the beaten forces of winter made many desperate stands which sometimes lasted for twelve hours. Many obstacles caused a temporary stoppage in the break up of the ice, such as a sudden bend in the river or a group of islands. When this occurred, the river rose so rapidly that it began to flow up all its tributaries in the north. During one day I calculated that at least 50,000 acres of pack-ice and ice-floes had been marched up-stream past the place where we were watching this gigantic convulsion of nature. But the next day the river fell again and a great part of the ice was marched back again, though much of it was left stranded high and dry in the forests where the river-banks were low and the country flooded. These sudden falls in the level of the water were caused by the breaking up of the ice lower down the great river which dammed it up, until the accumulated pressure from behind became irresistible and forced everything before it—icebergs twenty to thirty feet high sometimes driving down the river at a speed of from ten to twenty miles an hour, the constant roar of the crashing ice being audible for miles.

Desperate resistance of winter.

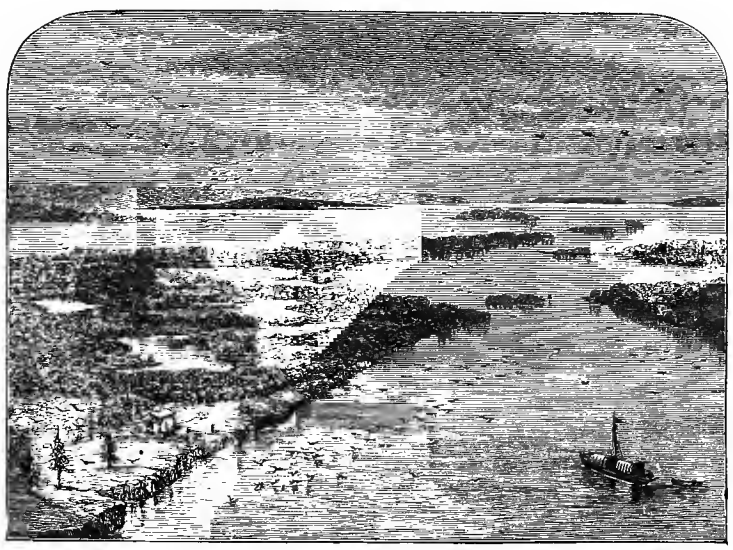
Retreat and advance of winter.

Although the river alternately rose and fell, it was constantly rising on an average, and in ten days, although it was three or four miles wide, the total rise was seventy feet. It was a wonderful sight to watch the armies of winter alternately advancing and retreating: sometimes the pack-ice and ice-floes were so tightly jammed together that it seemed possible to scramble across them to the opposite shore. At other times there was much open water, and the icebergs "calved" as they went along with much commotion and splashing that might be heard half a mile off. No doubt it is the grounding of the icebergs which causes this operation to take place. The icebergs are formed, in the first instance, by large ice-floes, perhaps half a mile long and very broad, which move down the river at the rate of four miles an hour, rush headlong against some promontory in consequence of a bend in the river, and being unable to stop on account of their great weight, pile themselves up on the bank in ranges of ice-mountains, which soon freeze together into nearly solid masses, and become icebergs when the river rises high enough to float them off. The layers of ice piled one on the top of the other are imperfectly frozen together, and in floating along, whenever the iceberg grounds, the velocity of the enormous mass will not allow it to stop, so it passes on, leaving part of the bottom layer of ice behind. The moment it has passed, the piece left behind rises to the surface, like a whale coming up to breathe. Some of the "calves," as the natives call them, rise from a considerable depth; they come up with a huge splash and rock about for some time before they settle down to their floating-level.

Calving of icebergs.

The grand battle between summer and winter only lasts a fortnight, when the final march past of the beaten winter forces begins, and for seven days more the ragtag and bobtail of the great Arctic army comes straggling down the river—worn and weather-beaten little icebergs, dirty ice-floes that look like floating mud-banks, and scattered pack-ice in the last stages of consumption. Winter is finally vanquished for the year, and the fragments of his beaten army are compelled to retreat to the triumphant music of thousands of song-birds, amidst the waving of green leaves and the illumination of gay flowers of every hue. The transformation-scene is perfect. In a fortnight the endless waves of monotonous white snow have vanished, and between the northern limit of forest-growth and the shores of the Polar Basin smiles a fairy-land full of the most delightful little lakes

Final march past.



Midsummer on the tundra.

and tarns, where Phalaropes swim about amongst Ducks and Geese and Swans, and upon whose margins Stints and Sandpipers trip over the moss and the stranded potamogetons, feeding upon the larvæ of mosquitoes or on the fermenting frozen fruit of last year's autumn.

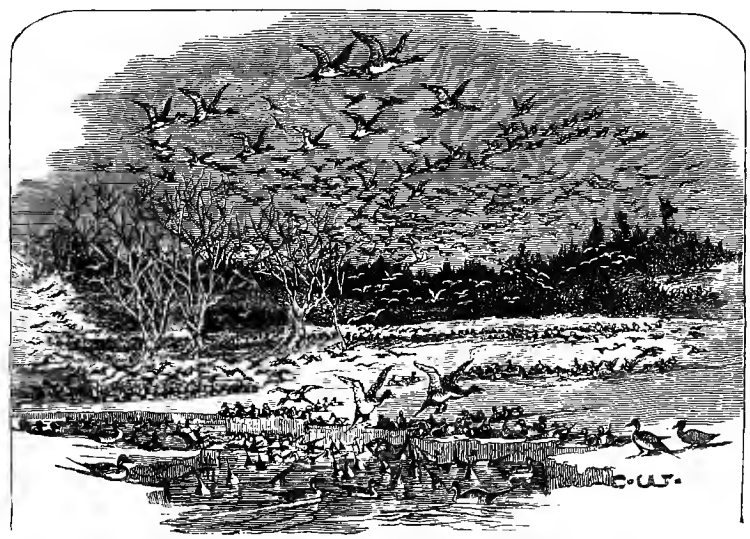
It is incredible how rapidly the transformation was completed. Twelve hours after the snow had melted the wood-anemone was in flower, and twenty-four hours afterwards the yellow flowers of the marsh-marigold opened. In a short time the country looked like an English garden run wild. On the Arctic Circle wild onions, wild rhubarb, pansies, Jacob's-ladder, purple anemones, dwarf roses, and a hundred other flowers made the country quite gay; whilst on the tundras wild fruits of various kinds—crowberry, cranberry, cloudberry, arctic strawberry—were blended with reindeer-moss and other lichens, together with the most characteristic flowers of an Alpine flora—gentians, saxifrages, forget-me-nots, pinks, monkshoods, both blue and yellow, and sheets of the *Silene acaulis* with

Sudden appearance of flowers.

its deep red flowers. The Alpine rhododendron was replaced by a somewhat similar shrub, *Ledum palustre*; but the flora, on the whole, was that of the Engadine, brought down to the level of the sea.

Sudden arrival of birds.

Although the first rush of migratory birds across the Arctic Circle was almost bewildering, every piece of open water and every patch of bare ground swarming with them, a new species on an average arriving every two hours for several days, the period of migration lasted more than a month. Very little migration was observable until about the 22nd of May, although a few stragglers arrived earlier, but during the next fortnight the migration was prodigious. In addition to enormous numbers of Passerine birds, countless



flocks of Geese, Swans, and Ducks arrived, together with a great many Gulls and Terns and Birds of Prey. During the next fortnight, from the 5th to the 19th of June, fresh species of Passerine birds continued to arrive, and the main migration of the species belonging to the family Charadriidæ took place. The Common and Pintailed Snipes (*Scolopax gallinago* and *stenura*) were the first to arrive, in company with the Asiatic Golden Plover (*Charadrius fulvus*), on the 5th. The Wood-Sandpiper (*Totanus glareola*) and Temminck's Stint (*Tringa temmincki*) arrived on the 6th. The Golden Plover (*Charadrius pluvialis*) arrived on the 7th, and the Ringed Plover (*Charadrius hiaticula*) with the Terek Sandpiper (*Totanus terek*) on the 8th. The Ruff (*Totanus pugnax*) and the Dotterel (*Charadrius morinellus*) arrived on the 9th, the Great Snipe (*Scolopax major*) on the 11th, and the Common Sandpiper (*Totanus hypoleucus*) on the 12th. On the 15th the Green Sandpiper (*Totanus ochropus*), the Red-necked Phalarope (*Phalaropus hyperboreus*), and a solitary Curlew Sandpiper (*Tringa subarquata*) arrived. Although migration continued until the end of the month, during which many new species of Passerine birds arrived, I

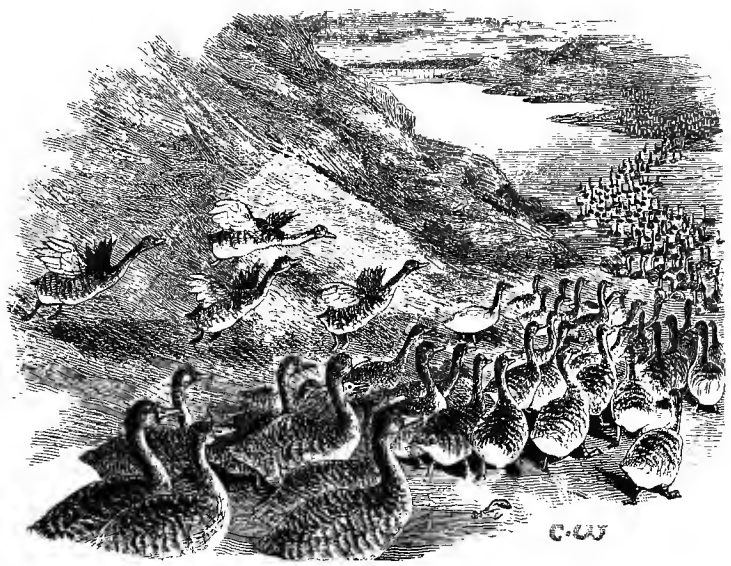
Arrival of Plovers, Snipes, and Sandpipers.

did not add a new species of Charadriine bird to my list until we reached the tundra beyond the limit of forest-growth.

Some species of Charadriine birds reach their breeding-grounds in the Arctic Regions without making a journey across country; their hereditary attachment to the sea-shore is so great that even on migration they prefer to follow the coast. Neither in East Russia nor in Central Siberia did we see anything either of the Dunlin (*Tringa alpina*) or the Little Stint (*Tringa minuta*) until we reached their breeding-grounds; and the Grey Plover (*Charadrius helveticus*) evidently belongs to the same class. Having arrived at their breeding-grounds, however, all these species retire inland to breed, and all of them arrive in breeding-dress—the mud-colour and white, which characterize their plumage as they feed, almost invisible to the prying eyes of enemies, on the mud-flats at low tide, being exchanged for a more or

Coast migrants.

Breeding-dress protective.



Geese moulting as they migrate.

less gay livery, in which golden yellow, or the richest chestnut-red, or even a velvety black, harmonizes equally with the deep colours of their summer home. On the other hand, the Snipes and the Lapwings, that frequent the marshes and swamps both in their summer and winter homes, scarcely differ in the colour of their plumage with the seasons.

Summer in the Arctic Regions is so short that it is entirely devoted to breeding, and in most species to moulting. The Dunlin and the Red-necked Phalarope moult their quills whilst the young are still in down. The Common Sandpiper, on the other hand, appears to find the summer too short for both operations: in spring he moults before he migrates, as I have had ample opportunities of proving in South Africa; in autumn he migrates before he moults, as any one may prove by shooting examples before they leave our shores.

Protective colours of eggs.

Not only are the colours of the birds belonging to the Charadriidæ which breed in the Arctic Regions protective, but those of their eggs are still more so; they almost exactly resemble the ground upon which they are placed. None of these birds make nests; they merely scratch a hollow or slight depression in the ground—sand, earth, moss, bog, grass, or whatever it may be which they select, and where their eggs, generally four (in a few species only two or three), are placed. The eggs are consequently extremely difficult to find. No species of the Charadriidæ lays white eggs, and every species lays eggs with two sets of spots upon them, the first set being very much duller in colour than the second in consequence of a layer of ground-colour which passes over it and half conceals it. If the ground-colour on the pale spots be carefully scratched away with a knife, they will soon appear as dark as the others.

Hatching of the young.

Very few eggs are laid on the tundra before the last week of June. At the end of July young in down are running about, and at the end of August the return migration has begun. Early in the latter month the sun begins to dip for a few moments below the horizon, and every succeeding midnight sees him hide longer and longer, until in September the nights are cold, the frost kills vegetation, and early in October winter sets in; all this wonderful abundance of bird-life vanishes, snow falls not to melt again for eight months; the nights get longer and longer until, towards the end of November, the sun ceases to take his midday peep at the endless fields of snow, and for the next two months night and silence reign supreme. The Ice-angel has closed the gates of the paradise of the Charadriidæ; and the birds are banished to the coasts of the temperate and tropical regions of the world, where they may be found everywhere.

Return of winter.

Enormous winter range.

It is very remarkable to what enormous distances some of the birds belonging to this group wander in winter. Many of them which breed in the Arctic Regions cross the tropics to winter in the summer of the southern hemisphere; some even occasionally go as far as New Zealand, as the Asiatic Golden Plover (*Charadrius fulvus*), the Turnstone (*Strepsilas interpres*), the Asiatic form of the Pectoral Sandpiper (*Tringa acuminata*), the Asiatic form of the Bar-tailed Godwit (*Limosa rufa uropygialis*), the Australian Curlew (*Numenius cyanopus*), the Oriental Whimbrel (*Numenius phæopus variegatus*), and the Knot (*Tringa canutus*). The number of birds breeding in the Arctic Region and belonging to the Charadriidæ which visit Australia in winter is much greater. In addition to the seven species which visit New Zealand, thirteen other species visit the larger island, making the number of Arctic Charadriidæ which visit Australia at least twenty. Quite as many visit South Africa, and a considerable number stray as far as South America; but so little is known of the ornithology of the latter region that it would be difficult to say how many species of Charadriidæ winter in the temperate regions of that continent, in addition to the species which are residents there.

CHAPTER VII.

ZOOLOGICAL REGIONS.

Zoological Regions of the Charadriidæ.

To write upon the Geographical distribution of the Charadriidæ and to omit all mention of the Zoological Regions of Sclater and others would be unpardonable; but these Zoological Regions have nothing whatever to do with the group of birds under consideration.

In making these remarks I am only stating a fact, and not in any the least degree suggesting that the importance of these Zoological Regions has been over-valued.

No one appreciates their value more than I do, but the fact remains that they have apparently not even a remote connection with the geographical distribution of the Charadriidæ. These birds only recognize three Regions :—

Arctic Region.

First, an Arctic Region, whence they originally sprung, and whither more than a quarter of them still migrate every spring to breed. We may take the month of July as the height of the breeding-season—a period when in these regions there is everywhere an unlimited supply of food, perpetual daylight, and a mean temperature for the month varying from 60° in the lower latitudes to 40° in the higher ones.

Tropical Region.

Second, a Tropical Region, where about the same number of species (rather more than a fourth of the whole) breed and reside all the year round. Here also there appears to be an ample if not unlimited supply of food; but the duration of daylight is lessened by one half, and the mean temperature of July, north of the equator, and of January, south of the line, varies according to locality from 90° to 77°.

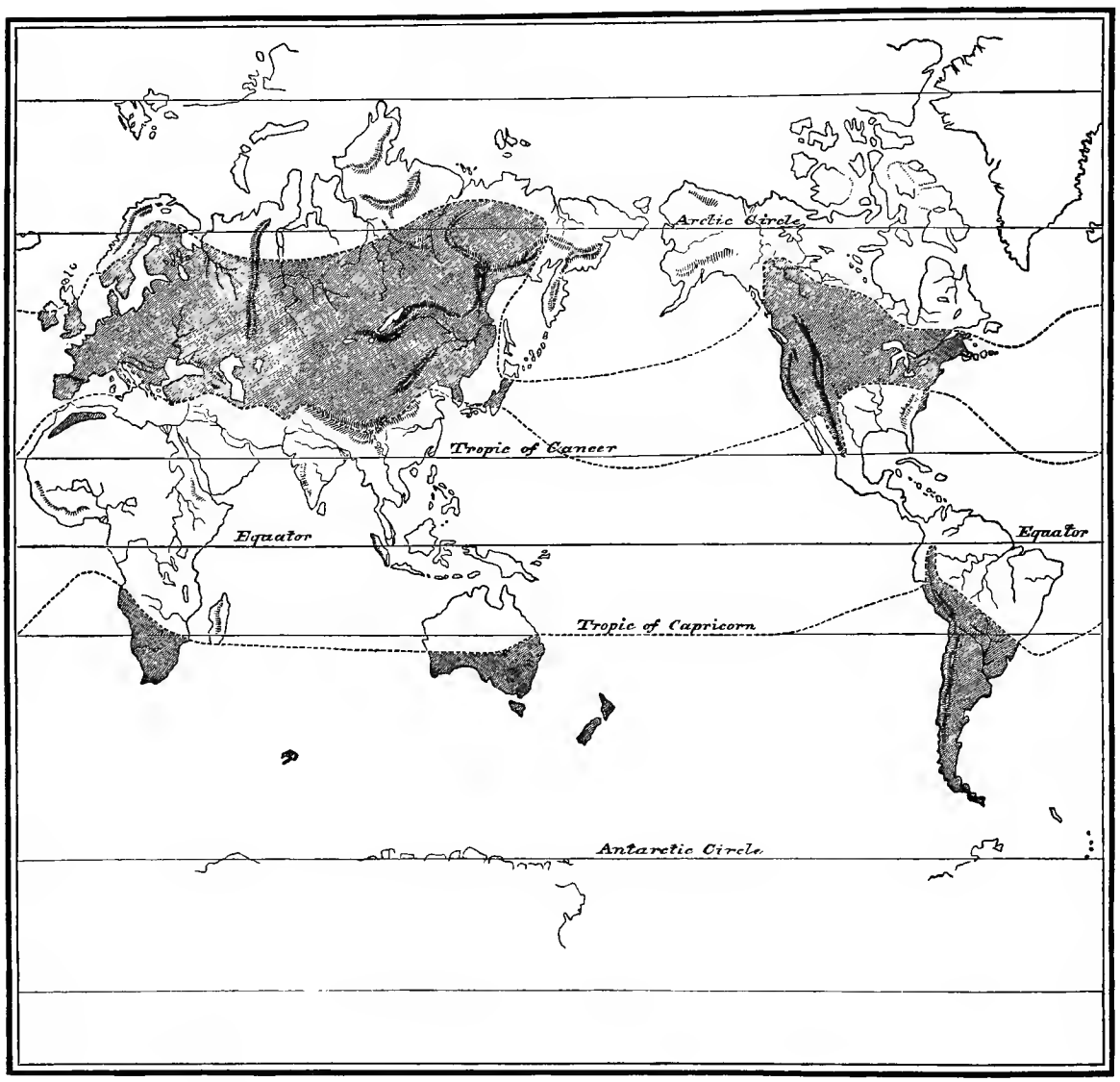
Temperate Region.

The third Region has a mean temperature during the breeding-season varying from 77° to 60°, and may consequently be called the Temperate Region. Geographically it is split into two subregions by the Tropical Region, the limit of the north Temperate Region being decided by the isothermals of July, and those of the south Temperate Region by the isothermals of January.

The boundaries of these Regions are deflected from the longitudinal parallels by oceanic currents and other causes. The Gulf-stream, which raises the January isothermal of 32° from the Black Sea almost to the latitude of the North Cape in the Atlantic, has exactly the contrary effect in summer, depressing the July isothermal of 60° from the White

Sea to the latitude of Edinburgh in the British Islands. On the Pacific coast of Asia the July isothermal of 60° is depressed still further south, almost to the latitude of the Pyrenees, apparently by the cold stored in the nearly land-locked Sea of Okhotsk.

In South Africa the isothermal of 77° is raised towards the equator on the west coast



by a cold current from the Antarctic Ocean, but is depressed down to the tropic of Capricorn on the east coast by the warm Mozambique current, though the effect of the latter is diminished inland by the rapid rise of the Drakenberg Range.

In South America somewhat similar causes produce the same effect. Humboldt's current raises the isothermals on the coasts of Chili and Peru, its effects being increased inland by the rapid rise of the Andes.

The result of these causes is that the locality on the west coasts of South Africa and South America where the mean temperature of July is 77° is more than a thousand miles further north than it is on the east coasts of the two continents.

In the annexed map the upper dotted line represents the isothermal of 60° for the month of July; the white space above it consequently represents the Arctic Region of the Charadriidæ, where the mean temperature of the month of July is 60° or less.

The dark space below this line represents the North Temperate Region of these birds, where the mean temperature of the month of July ranges from 60° to 77°.

The middle dotted line represents the isothermal of 77° for the month of July, and the lower dotted line the same isothermal for the month of January. Between these two lines is a white space which represents the Tropical Region of the Charadriidæ, where the mean temperature of the month of July north of the Equator, and that of the month of January south of the Equator, ranges from 77° to 90°. The dark spaces below the lower dotted line represent the South Temperate Region of the Charadriidæ, where the mean temperature of the month of January ranges from 77° to 60° at the Cape, but down to 45° at Cape Horn and Kerguelen Island. The latter locality is not visited by any species belonging to the Charadriidæ; but it contains a *Chionis*, which also belongs to the Limicolæ, and is represented by allied species in the Crozets and the Falkland Islands. Possibly a more logical way of treating the subject would be to regard Kerguelen Island, the South Island of New Zealand, Patagonia, the Falkland Islands, Tristan d'Acunha, and the Crozets, where the mean temperature of the month of January is below 60°, as an Antarctic Region. My reason for not doing so is that the Antarctic Region is only visited for breeding-purposes by half a dozen species of Charadriidæ, belonging to genera essentially temperate in their range.

Antarctic Region.

If, however, we were to extend our range to the whole of the suborder Limicolæ, we should be compelled to recognize an Antarctic Region, having characteristic genera apparently so distinct from those comprising the Charadriidæ as to warrant their being placed in separate families, Chionidæ and Thinocoridæ. The Antarctic Region appears to be also the centre of dispersal of two suborders—the Procellaridæ and the Impennes; so that it must be regarded as a very important Region when the distribution of the whole order Charadriformes is considered.

If I am right in supposing that the post-pliocene glacial epoch was the main factor in the dispersal and consequent isolation which resulted in the differentiation of the present species of Charadriidæ, and that to find the common ancestors of the species now belonging to different genera it is necessary to go beyond the præ-pliocene glacial epoch, it is only fair to assume that as the Antarctic Region is characterized by Limicoline forms belonging to different families, the few species of Charadriidæ which encroach on its limits are stragglers from the north polar basin, and that their ancestors were isolated from the ancestors of the Antarctic Limicolæ possibly so long ago as Eocene times.

The distribution of the genera of the Charadriidæ during the breeding-season is as follows:—

Arctic genera.

Three genera—*Tringa*, *Ereunetes*, and *Strepsilas*—containing together 28 species, may be regarded as entirely arctic; four other genera—*Totanus*, *Limosa*, *Numenius*, and *Phalaropus*—may also be regarded as arctic. They contain together 38 species, of which 21 may be said to be entirely arctic, 8 arctic and temperate, and 9 entirely temperate.

Temperate genera.

Five genera—*Charadrius*, *Himantopus*, *Hæmatopus*, *Ibidorhynchus*, and *Scolopax*—may be looked upon as belonging to the Temperate Regions, inasmuch as out of 92 species 56 breed in these climates, about half of them in the northern hemisphere and half in the southern. Of the remaining 36 species belonging to these five genera, 15 are arctic and 21 tropic.

Tropic genera.

The remaining seven genera may be regarded as tropic. *Œdicnemus*, *Cursorius*, *Vanellus*, *Lobivanellus*, *Glareola*, *Phegornis*, and *Rhynchæa* together consist of 66 species, of which 44 may be regarded as tropical and 22 as temperate. Regarded from the Sclaterian point of view, 1 genus only, *Ibidorhynchus*, can be regarded as Palæarctic, but as it only contains 1 species its evidence is not very conclusive. The Ethiopian Region can only lay claim to 1 genus, *Cursorius*; but out of the 12 species which it contains, 1 is Palæarctic and 2 Oriental. The Oriental Region can scarcely lay claim to any genus. The Australian Region might possibly claim *Himantopus*; but out of 8 species, 4 do not breed within its limits, but are scattered over all the other regions. The Neotropical Region might perhaps be allowed to claim half a genus, *Scolopax*, in partnership with the Palæarctic Region: this genus contains 27 species, of which 10 are Neotropical and 9 Palæarctic, the remaining 8 being distributed over the other regions. The Nearctic Region can fairly claim 1 genus, *Ereunetes*, 5 out of the 6 species breeding within its limits. The Nearctic and Palæarctic Regions might claim 6 genera as partners, viz., *Numenius*, *Phalaropus*, *Limosa*, *Totanus*, *Tringa*, and *Strepsilas*. Of the 61 species which these genera contain, 30 breed only in the Palæarctic and 24 only in the Nearctic Regions, whilst 7 breed in both. The remaining 8 genera—*Œdicnemus*, *Charadrius*, *Vanellus*, *Lobivanellus*, *Glareola*, *Hæmatopus*, *Phegornis*, and *Rhynchæa*—contain 108 species, of which 23 may be regarded as Palæarctic, 24 as Ethiopian, 13 as Oriental, 21 as Australian, 19 as Neotropical, and 8 as Nearctic, so that they cannot be said to belong to any one or two regions.

Relations of Charadriine genera to the Sclaterian Regions.

The inevitable conclusion is that the Charadriidæ do pay considerable attention to the Climatic or Isothermal Regions, but appear practically to ignore the Sclaterian Regions.

Finally, it may be wise again to point out that the climatic regions cannot be applied to all animals, or even to birds as a whole, but that they do apply in a remarkable manner to the family of birds under consideration.

CHAPTER VIII.

ON SUBSPECIFIC FORMS.

It is a very remarkable fact, one not very creditable to the intelligence of ornithologists, that a chapter on the importance of a due recognition of the existence of imperfectly segregated species should be necessary at the present time. Nearly thirty years have elapsed since Darwin and Wallace laid before scientific men such an array of facts to prove the truth of the theory of Evolution that every student of Biology accessible to reason has adopted it. Nevertheless most ornithologists still speak and write of species on the old lines, and whilst admitting the truth of Darwin's theory of Evolution, ignore its existence as a working hypothesis.

Theory of Evolution practically ignored by ornithologists.

It cannot be too strongly impressed upon ornithologists that if the theory of Evolution be true there must always be, at any one moment in the history of birds, a number of species in the process of disintegration. There may be differences of opinion as to the name by which they should be called, or the best way of recognizing them in ornithological nomenclature, but there cannot be any difference of opinion as to the necessity of giving due importance to the fact of their existence. We may call them subspecies, conspecies, morphological species, inosculating species, intergrading species, imperfectly segregated species, species in process of differentiation, varieties, local forms, geographical races, climatic forms, or by any other name; but there are two things that we may *not* do, we may neither elevate them to the rank of species nor ignore their existence.

Importance of recognizing subspecies.

The great stumbling-block which has prevented so many ornithologists from practically accepting the Darwinian view of species is the want of a hard-and-fast line between species and subspecies. A moment's consideration must convince everyone who accepts the theory of Evolution that between absolutely segregated species and species which are only beginning to segregate there must be species which are in various states of segregation. Some species are so completely differentiated from their nearest relations that they may inhabit the same area without any cross-breeding between them. Others not quite so absolutely differentiated may be made to cross in confinement, the produce being barren hybrids. A third stage towards imperfect differentiation may be represented by two nearly allied species, which occasionally cross in a state of nature, but the produce being barren the hybrids die off without leaving any descendants. The last stage of cross-

Classification of species.

breeding is reached in species which, when artificially crossed in confinement, produce a more or less fertile hybrid, but which do not do so in a wild state, either because the inclination to cross is absent, or because the opportunity of doing so is prevented by the isolation of their respective geographical areas. The first stage of interbreeding, as distinguished from intercrossing, is represented by two subspecifically distinct forms, having isolated areas of distribution, but where the difference between them is so slight that the ranges of their respective variations overlap; so that in the case, for example, of a large continental form and a small island form, the smallest continental examples are indistinguishable from the largest insular examples, and which would presumably interbreed if they had an opportunity of doing so. The final stages of subspecific forms are represented by species so closely allied that they habitually interbreed whenever the areas of their distribution overlap, and habitually produce offspring of various degrees of fertility—a condition of things which, if the fertility continue for a sufficient number of generations, must inevitably produce an unbroken series of intermediate forms.

Where the area of distribution is small, the interbreeding which consequently takes place must soon produce a homogeneous but intermediate species. It is probable, however, that the formation of a new species from the blending of two forms which have emigrated to the same locality has not been of very frequent occurrence. Intermediate forms generally occur in the middle of the area of distribution of a species which has a very wide range, and which has been modified in different directions at each extremity of its range, sometimes to such an extent that the individuals at the two extremes have become specifically distinct from each other, though remaining only subspecifically distinct from the intermediate forms which connect them.

Practical difference between species and subspecies.

In practice it will be found that the most convenient line that can be drawn between a species and a subspecies is to regard two forms as specifically distinct, however near they may be to each other, whenever they are *not* connected by intermediate forms; and to regard two forms as only subspecifically distinct, however wide may be the distance between the extremes, whenever they *are* connected by a series of intermediate forms—without reference in the one case to *how* the intermediate forms are produced, or in the other to *why* they are *not* produced.

Clearheadedness of American ornithologists on this point.

It is only doing scant justice to American ornithologists to admit that to them belongs the credit of having for the first time formed a clear conception of the difference between a species and a subspecies, and of having at once recognized the fact in a scientific manner in their nomenclature. It may be a moot point whether the use of trinomials or polynomials be the best mode of expressing the recognition of subspecies. That is a matter of detail which is only of secondary importance. The primary truth, the recognition of which in some way or other is of vital importance to a clear understanding of the facts of Zoology, is that species in the process of differentiation do exist in considerable numbers.

The American ornithologists were not the first writers on birds who used a trinomial

nomenclature, but they were the first to use it in a strictly scientific manner. Schlegel, in his 'Revue Critique des Oiseaux d'Europe,' made use of many trinomial names of birds. On the very first page we find *Falco candicans* distinguished from *Falco candicans islandicus*. The same idea may be traced up to Linnæus, who distinguishes, in his 'Systema Naturæ' (on page 125 of the 1st volume of the 12th edition), between *Falco fulvus* and *Falco fulvus* β. *canadensis*; and down to Sharpe, who discriminates, in his 'Catalogue of Birds in the British Museum' (on page 6 of the 1st volume), between *Gyps fulvus* and subspecies α. *Gyps hispaniolensis*. But none of these writers seem to have had any definite idea of what they meant by a subspecies, they appear to use the term in an absolutely arbitrary manner; and we may safely say that they did not use it in the Darwinian sense of an imperfectly differentiated species, which was still fertile with the parent form, and was consequently connected with it by a potentially infinite series of intermediate forms. The fact of the existence of species which consist of two or more typical forms which are connected together by an unbroken series of intermediate forms between the geographically separated extremes—for example, the fact that such apparently distinct species as *Sitta europæa* and *Sitta cæsia* are thus connected, and are consequently only subspecifically distinct—is the most important ornithological fact which has been discovered during the last half-century. It is a fact which has been clearly recognized by American ornithologists, and its tardy or doubtful recognition by British writers on birds is one of those psychological puzzles that are very difficult to believe, much less to explain. Some ornithologists are apparently so obtuse that they are unable to understand the problem; others are prepared to admit the truth of the theory of Evolution as an abstract proposition, but are prevented by an overruling hereditary conservatism from practically applying it to ornithology; whilst a third class are unable to reconcile the facts of Evolution with their theories of the origin of species, and, consequently, are afraid to acknowledge any truth which appears to be inconsistent with their inherited superstitions.

Vague use of trinomials.

Conservative views of British ornithologists.

It is, however, only fair to remember that much allowance must be made for the narrow, because insular, views of British ornithologists. The collections at Washington contain magnificent series of Nearctic birds from the Atlantic to the Pacific; whereas the British-Museum collection, in spite of its wealth of Oriental species, is very poor in Palæarctic series. Ten years ago it scarcely possessed a workable series of any Palæarctic species, though a few of the localities between Western Europe and North-eastern Asia are now represented in some of the commoner species.

CHAPTER IX.

CHARADRIIDÆ.

Diagnosis of family.

THE diagnosis of the family of which this work treats can only be written by some ornithologist who possesses an accurate knowledge of the external and internal characters of all birds, an ideal naturalist who does not yet exist.

Subfamilies.

The birds comprised in the family may be separated into three groups or subfamilies. The diagnosis of these three subfamilies is a very easy matter, but they are so intimately connected with each other that the subdivision must be regarded as very probably artificial to a considerable extent.

KEY TO THE SUBFAMILIES.

a. Middle and outer toes connected by a web at the base.

a^1. Nasal aperture extending beyond the basal fourth of the bill. . **CHARADRIINÆ.**

b^1. Nasal aperture not extending beyond the basal fourth of the bill **TOTANINÆ.**

b. Toes all cleft to the base . . . . . **SCOLOPACINÆ.**

Subfamily **CHARADRIINÆ.**

Diagnosis.

CHARADRIIDÆ digito externo cum medio ad basin membranâ connexo: narium aperturâ ultra partem quartam rostri a basi extensâ.

The Charadriinæ may be diagnosed as follows:—

Characters of sub-family.

Charadriidæ having the outer and middle toes united by a web at the base; and having the nasal aperture extending beyond the basal fourth of the bill.

About a hundred birds belonging to this family possess both these characters, and appear to be more nearly related to each other than they are to the remaining species.

Genera.

They may be divided into six well-marked genera, most of which are founded upon so-called structural characters, but some are dependent upon characters of comparatively small importance, though in most cases it will be found that these apparently insignificant

characters are correlated with others of much greater importance, which are only omitted in consequence of a difficulty in clearly defining them.

Climatic distribution.

Although there cannot be much doubt that the group of species which form the subfamily Charadriinæ had an Arctic origin, only 6 species can now be regarded as Arctic. No fewer than 50 species or subspecies breed in the Temperate Regions, in climates of which the mean temperature of July in the northern hemisphere and that of January in the southern hemisphere (dates which may be regarded as the height of the breeding-season in each) varies from 60° to 77°. It is quite possible that during the Pliocene age this temperature may have been the normal degree of heat in the Arctic Regions, though the mean temperature of July now varies in that district according to latitude from only 40° to 60°. The remaining 48 species or subspecies of the Charadriinæ have succeeded in adapting themselves to a tropical climate, where the mean temperature of the two months selected varies from 77° to 90°. It must, however, be borne in mind that in the tropics the date of the breeding-season of these birds varies locally to a remarkable degree, and frequently extends over a much longer period than a month[1].

Habits.

None of the Charadriinæ are forest-birds, and many of them still retain what appears to me to have been their habit so long ago as the Pliocene Age—the habit of frequenting the sea-shore, where they find abundance of food on the sandy beach or on the mud-flats left exposed at low tide. A few seem to have slightly modified this habit so far as to seek their food on the banks of rivers and lakes rather than on the sea-shore. Some find most of their food on marshy swamps; but the greater number of species belonging to this subfamily appear to have been forced, in the struggle for existence, to adapt themselves to a life on dry arid plains. A still greater divergence from their original habits must have been achieved by the Pratincoles, who actually obtain most of their food on the wing like Swallows.

The fact that out of 104 species or subspecies only 19 are found in the New World, and that out of 6 genera 3 are entirely unrepresented on the American continent, is a strong argument for coming to the conclusion that this subfamily represents a natural group, the common ancestors of which had already been isolated and differentiated from their allies who lived on the shores of the Polar Basin in the Pliocene Age. We may perhaps follow the argument a step further, and suggest the probability that the great Asiatic steppes was the locality where the subfamily Charadriinæ was isolated and differentiated, where its members changed their habits, and that the descendants of some of them, who are now shore-feeding birds, have not so much retained their ancestral habits as reverted back to them.

Ancient home.

Pseudogenera.

The species contained in this subfamily have been distributed amongst no fewer than

[1] Of the breeding of the Cream-coloured Courser (*Cursorius gallicus*) Hume writes ('Nests and Eggs of Indian Birds,' p. 564):—"July was the month in which I found them" (the eggs), "and it is in this month generally that the great bulk *are* found; but the Khan has taken them *from* the middle of March to the middle of August, and the laying-season varies a good deal according to the rains."

forty genera, in addition to which twenty more generic names have been invented, raising the whole number of generic names in this subfamily to sixty. These I propose to reduce to six, which may be diagnosed as follows :—

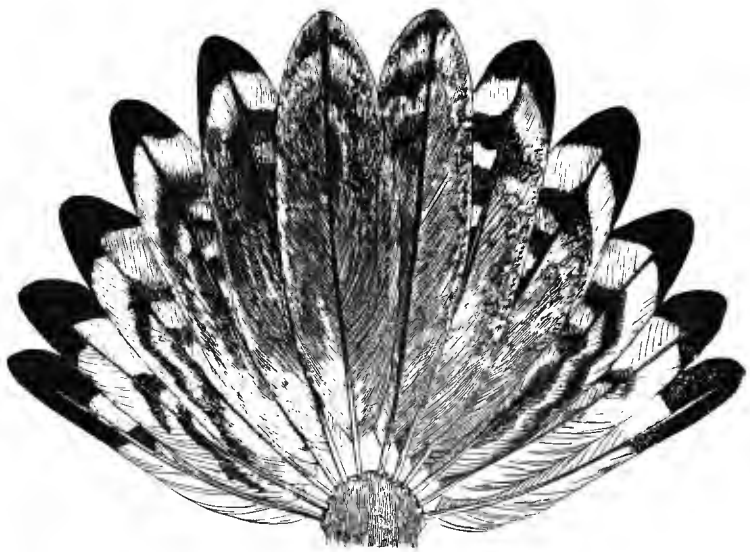
Key to the Genera.

a. Outer tail-feathers an inch or more shorter than the central ones . . ŒDICNEMUS.
b. Central tail-feathers never an inch longer than the outer ones.
  a^1. Bill like that of a Bustard, with no nasal groove.
    a^2. A hind toe; tail more or less forked . . . . . GLAREOLA.
    b^2. No hind toe; tail nearly even . . . . . CURSORIUS.
  b^1. Nasal aperture placed in a conspicuous groove.
    c^2. A lobe or wattle between the eye and the bill . . . . . LOBIVANELLUS.
    d^2. No lobe on the side of the head.
      a^3. Basal third or more of central tail-feathers white. With or without a spur on the wing . . . . . VANELLUS.
      b^3. Little or no white at the base of the central tail-feathers. No spur on the wing . . . . . CHARADRIUS.

Of these characters the only one respecting which the student is likely to have any doubt is the presence or absence of a nasal groove. Fortunately this character appears generally to be correlated with other differences in the shape of the bill. Wherever there is a distinct nasal groove there is also a marked depression at or near the centre of the outline of the culmen. The terminal half, more or less, of the profile of the culmen forms an arch, called the vault of the culmen, and the basal half is a nearly straight line forming an angle at its junction with the vault, and parallel to the chord of the arc. In those species where there is no nasal groove there is usually no depression in the curve of the profile of the culmen, which is convex throughout its whole length, the amount of curvature being very small at the base, but very rapid at the apex. The difference in the shape of the two kinds of bill is seen at a glance by comparing Plate X. with Plate XI.

It is believed that these six genera are natural, or, in other words, represent relationship or genetic affinity. So far as it is possible to know, each of these genera fulfils the conditions of a true genus; it contains no species which is not more closely related to *some* other species within its limits than to *any* other species outside. Nevertheless it must be admitted that the characters by which these genera are diagnosed are anything but satisfactory. The rounded tail of *Œdicnemus* is reproduced in some species of *Charadrius*; the nasal groove appears to be in a transition state in *Œdicnemus*; the fork of the tail almost disappears in some species of *Glareola*; the wattle on the face is very rudimentary in some species of *Lobivanellus*; and the white bases of the central tail-feathers, which characterize the genera *Vanellus* and *Lobivanellus*, appear in two species of *Cursorius*, *C. bitorquatus* and *C. chalcopterus*, which are also aberrant in having a depression in the culmen. The spur on the wing is only found in *Vanellus* and *Lobivanellus*, but is not present in all the species of either genera; and the hind toe, though always present in *Glareola* and never in *Œdicnemus* or *Cursorius*, is of no generic value in the other three genera.

CHAPTER X.



Tail of *Œdicnemus crepitans*; half natural size.

Genus ŒDICNEMUS.

CHARADRIINÆ tarso omninò reticulato: rectricibus mediis quam rectrices externi valdè longioribus (25 millim. aut plus). Diagnosis.

THE Stone-Curlews form a remarkably compact genus of birds, very closely related to each other, and well defined from all surrounding genera. They may be briefly diagnosed as follows:—

Charadriinæ *having the tarsus reticulated; and the central feathers of the tail more than an inch longer than the outer ones.* Generic characters.

The latter character is a very artificial one. The tails of *Charadrius vociferus*, *C. tricollaris*, and the two allies of the latter are proportionately as much graduated, though their much smaller size reduces the amount of graduation to less than an inch.

Other generic characters.

The most distinctive character of the genus *Œdicnemus*—one that is unaffected by difference of age, sex, or season, and is common to every species and subspecies of the group—is to be found in the distribution of the black markings on the tail-feathers. This is apparently one of the oldest characters of the genus, inherited from the ancestral species of Stone-Curlew, and handed down unchanged during the many centuries required to differentiate it into a dozen Stone-Curlews (a period which, there is reason to suppose, was not less than a hundred thousand years). The distribution of the white patches on the quills is equally characteristic.

How distinguished from the Bustards.

The Stone-Curlews appear to be very closely allied to the Bustards; but the middle toe is united to both the others by a very distinct web at the base, which is not the case with the Bustards.

Subgenus *Esacus*.

Two species are generally placed in a different genus (*Esacus*)[1], chiefly on account of their aberrant habits—one frequenting the banks of rivers, and the other living for the most part on the sea-shore; but they possess no characters to warrant such a separation, nor are these two species the only members of the genus which prefer mud-banks to dry plains as feeding-grounds. There is no reason to suppose that the dispersal, isolation, and differentiation of the Stone-Curlews, which are steppe species, happened after the separation of the river-bank or sea-shore species.

Synonymy of the Genus ŒDICNEMUS.

	Type.
Œdicnemus, *Temminck, Man. d'Orn.* p. 322 (1815)	Œ. crepitans.
Burhinus, *Illiger, apud Lesson, Traité d'Orn.* p. 547 (1831)	Œ. magnirostris.
Carvanaca, *Hodgson, Journ. As. Soc. Beng.* v. p. 775 (1836)	Œ. recurvirostris.
Esacus, *Lesson, apud Gray, Genera of Birds,* iii. p. 535 (1844)	Œ. magnirostris.
Orthorhamphus, *Salvadori, Cat. Ucc. Borneo,* p. 312 (1874)	Œ. magnirostris.

Determination of the type.

The Stone-Curlew was placed by Linnæus in his genus *Charadrius*, which also included the three-toed species of the genera *Vanellus* and *Lobivanellus*, together with the three-toed section of the genus *Himantopus*.

Brisson retained the Stone-Curlew in his synonymous genus; but turned out the species belonging to *Himantopus*, and changed the name of the original genus to *Pluvialis*.

Latham placed the Stone-Curlew in the genus *Otis*; but in 1815 Temminck provided the genus *Œdicnemus* for its reception.

Temminck having adopted the specific name given to the European Stone-Curlew by Linnæus for his new genus, that species must of necessity be regarded as the type.

[1] It is remarkable that the genus *Esacus* should have been so universally adopted. There never was a worse genus, or one the recognition of which is more mischievous. To break up a well-defined genus like *Œdicnemus* destroys the value of all reasoning based upon the geographical distribution of genera. The alleged differences in the sternum of the two groups (Blasius, Journ. f. Orn. 1884, p. 229) are probably exaggerated, or are of little taxonomic value.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Palæarctic Region.

Œ. crepitans . . . . . *South-west.*

Oriental Region.

Œ. indicus . . . . . *India and Burma.* . . . . Œ. recurvirostris.

Indo-Malayan S.R.

Australian Region. . . . . Œ. magnirostris.

Austro-Malayan S.R.

Œ. grallarius . . . . . *East Australia.*

Ethiopian Region.

Œ. capensis . . . . . *South Africa.* . . . . Œ. vermiculatus.

Œ. senegalensis . . . . . *West Africa.*

Upper Nile. . . . . Œ. affinis.

Neotropical Region.

St. Domingo. . . . . Œ. dominicensis.

Tropical part. . . . . Œ. bistriatus.

Peru. . . . . Œ. superciliaris.

Distribution as regards climate.

The genus *Œdicnemus* does not contain many species, and must be regarded as a tropical one at the present time. The species are distributed during the breeding-season as follows:—

Temperate Eurasia	1	
South Africa	2	
Southern Australia	1	
Temperate species	—	4
Tropical America	3	
Tropical Africa	2	
Tropical Asia	3	
Tropical species	—	8
Species and subspecies of *Œdicnemus* . .	—	12

Distribution as regards Wallace's Regions.

The geographical distribution of the Stone-Curlews is somewhat peculiar, and bears little or no relation to the zoological regions of Sclater and Wallace. In the New World

the Stone-Curlews are confined to the tropics. In Europe they are only found in the west and south, where the winters are mild; in Africa they appear to be universally distributed; whilst in Asia they appear in every region, but are universally distributed over none. In the Asiatic Palæarctic Region they are confined to the south-west; in the Oriental Region to the western half, and in the Australian Region to the eastern half.

Local distribution.

Of the nine species of Stone-Curlews five are almost as much steppe birds as the Bustards; whilst the other four frequent the mud-flats on the banks of rivers or the sea-shore. They possess, however, one peculiarity in common: they are all very nocturnal in their habits, feeding principally at night, and hiding as much as possible by day. This fact suggests the theory that they were formerly residents on the Arctic tundras, where the annual recurrence of three months' night compelled them to acquire nocturnal habits during the period before they were finally driven south by the constantly increasing cold of the post-pliocene glacial epoch. The absence of any species of the genus from the steppes of Mongolia and China and the prairies of North America suggests the theory that they were formerly more of coast-birds than they are now; and that when they were obliged to leave the Arctic tundras, instead of emigrating across country to the steppes of Asia or the prairies of America, they joined the host of emigrants which followed the four coast-lines leading southwards from the Polar Basin. It seems probable that their early adoption of nocturnal habits prevented the necessity for the acquisition of migratory habits, so that we may assume that they retired southwards as soon as the winters became too cold to give them the necessary supply of food; and having found suitable homes in the south, they became permanent residents there, and did not return northwards when the glacial epoch was over.

Ancient migrations.

Œ. recurvirostris and *Œ. magnirostris*, and possibly *Œ. grallarius*, are descendants of the party which followed the Asiatic shores of the Pacific, and eventually found homes on the rivers of India, the coasts of the islands of the Malay Archipelago, and the plains of Eastern Australia—in which three localities they were isolated from each other, and eventually differentiated into the three species at present existing in these three districts. These three species agree in being of large size and in possessing nearly black ear-coverts. *Œ. superciliaris* probably represents the party which followed the American shores of the Pacific, and is now only known from the coast-regions of Peru. Its nearest ally (*Œ. bistriatus*) must have followed the American shores of the Atlantic, and found a home in Mexico and Tropical America, whence a post-glacial emigration led to the isolation of the ancestors of *Œ. dominicensis* on the island of St. Domingo. The remaining four species are the descendants of the party which followed the European shores of the Atlantic. *Œ. crepitans* was probably isolated on the shores of the Mediterranean, whence it spread in post-glacial times to Western Asia and India; having in the meantime despatched a party of emigrants up the valley of the Nile, where they became differentiated into *Œ. senegalensis*, which gradually spread into West Africa. A second party followed the coast of West Africa, and became differentiated there into *Œ. vermiculatus*, which gradually spread

into South Africa. Both these last-mentioned species remained shore or river-bank birds; but a third party (the ancestors of *Œ. capensis*) was isolated on the high plateaus from Abyssinia to South Africa, where, in post-glacial times, the descendants of the birds inhabiting the northern plateaus were isolated and partially differentiated from those inhabiting the southern plateaus, the former being now recognized as a subspecies under the name of *Œ. capensis affinis*.

KEY TO THE SPECIES.

bistriatus.

Upper parts vermiculated . **superciliaris.**

Median wing-coverts grey, with dark shaft-streak . **vermiculatus** . . (Breast conspicuously streaked. No dark eye-stripe.)

senegalensis . .

crepitans . . . . (Breast conspicuously streaked. No dark eye-stripe.)

Upper parts broadly barred. **capensis** . . . . (Breast conspicuously streaked. No dark eye-stripe.)

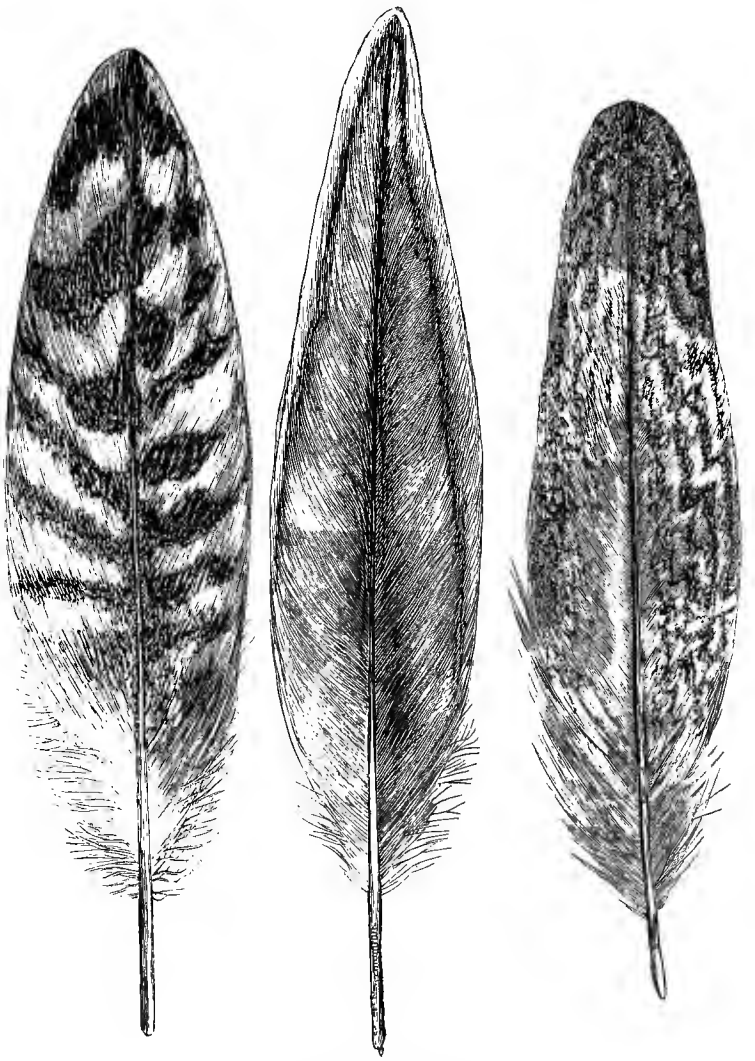
grallarius . . . (Breast conspicuously streaked. No dark eye-stripe.)

Ear-coverts nearly black . . **magnirostris.**

recurvirostris . . Line of gape recurved.

These characters apply to birds of both sexes, in all stages of plumage. Five of these species have the breast very conspicuously marked with broad dark streaks, which are either entirely absent in the other four species, or are represented by very indistinct shaft-lines. The four plain-breasted species have conspicuous dark superciliary stripes, which are not found in the five striped-breasted species. The fact that in this genus these two characters appear to be always correlated, can scarcely be regarded as a mere coincidence, and may be a sufficient reason for dividing the genera into two sections—the five species with dark stripes on the breast being regarded as Typical Stone-Curlews, and the four species with a dark stripe over each eye as Aberrant Stone-Curlews.

*** *Typical Stone-Curlews, without black eye-stripes; but with breasts conspicuously streaked.*



Longest tertials of

Œ. capensis. *Œ. crepitans.* *Œ. vermiculatus.*

ŒDICNEMUS CREPITANS.

EUROPEAN STONE-CURLEW.

Diagnosis. ŒDICNEMUS pectore striato: fasciâ pallidâ, fasciâque brunneâ inter tectrices minores et majores: tectricibus majoribus albo terminatis.

Variations. THIS species varies in size, and in the number of primaries which have white spots on

them. The variations being more or less geographical, the extremes are regarded as subspecifically distinct.

Synonymy.

Charadrius œdicnemus, *Linneus, Syst. Nat.* i. p. 151 (1758); *Linn. Syst. Nat.* i. p. 255 (1766).
Pluvialis major, *Brisson, Orn.* v. p. 76 (1760).
Charadrius scolopax, *Gmelin, Reise Russl.* iii. p. 87 (1774).
Charadrius illyricus, *Piller, It. Poseg. Sclav.* p. 26 (1783).
Otis œdicnemus (*Linn.*), *Latham, Gen. Syn. Suppl.* i. p. 290 (1787).
Œdicnemus crepitans, *Temminck, Man. d'Orn.* p. 322 (1815).
Fedoa œdicnemus (*Linn.*), *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 28 (1816).
Oedicnemus griseus, *Koch, Syst. baier. Zool.* i. p. 266 (1816).
Œdicnemus europæus, *Vieillot, N. Dict. d'Hist. Nat.* xxiii. p. 230 (1818).
Oidicnemus bellonii, *Fleming, Brit. Anim.* p. 114 (1828).

Literature.

Plates.—Daub. Pl. Eul. no. 919; Gould, Birds Gt. Brit. iv. pl. 35; Dresser, Birds of Europe, vii. pl. 512 (immature) [1].
Habits.—Seebohm, British Birds, ii. p. 596.
Eggs.—Seebohm, British Birds, pl. 21. figs. 6, 7.

Specific characters.

The European Stone-Curlew requires several characters to diagnose it from its eight congeners. The first character, *breast conspicuously streaked*, disposes of four of them. Two more are at once rejected by the second character, *a distinct pale narrow band, outside which is a dark band, across the wing between the lesser and greater coverts*. The two remaining species may be excluded by the character *greater wing-coverts tipped with white*. *Œ. vermiculatus* is also excluded by the absence of the transverse vermiculations on the mantle, scapulars, and tertials [2] which characterize the African bird. *Œ. grallarius* is also

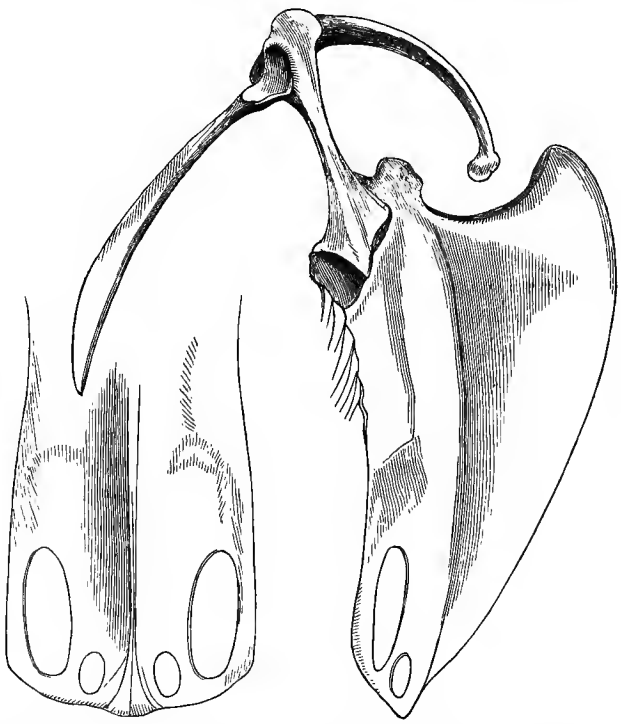
[1] Dresser ('Birds of Europe,' vii. p. 402) states that the young are larger than the adults, and have the central tail-feathers less boldly marked. There cannot be any doubt that he is wrong on both points. Young in first plumage are smaller than adults, and have the central tail-feathers barred to the base, besides having traces of bars on the scapulars and tertials; these bars disappear with age, until only two are left at the end of the central tail-feathers. Dresser's alleged figure of the adult bird is obviously that of a young bird in first plumage, with the pale buff bar across the wing-coverts concealed in a mysterious manner by the scapulars.

[2] The quills are divisible into three groups—primaries, secondaries, and tertials—which often differ from each other in pattern of colour to a remarkable extent. The old ornithologists appear to have assumed that the primaries were attached to the phalanges or digits (hence sometimes called digital quills), the secondaries to the cubitus (hence the term cubital quills), and the tertials to the humerus (hence the term humeral quills). Some modern ornithologists assume that the primaries are always attached to the ulna, and the secondaries and tertials to the pinion, and therefore that there are no such things as tertials, which they call innermost secondaries. It seems to me that these ornithologists are wrong both in their conclusions and in their facts. Even supposing that their assumptions were true, it would be no reason whatever for ignoring the differences between the secondaries and tertials, which is quite as great as that between the primaries and secondaries. But I have the best authority for denying the truth of these assumptions. It appears

a much larger bird (tarsus more than 4 inches), and is further excluded by the absence of white on the fourth primary, the Australian bird having a white patch across the first *four* primaries. It has also a barred tail from tip to base, a character only found in young in first plumage of the European species.

Geographical distribution.

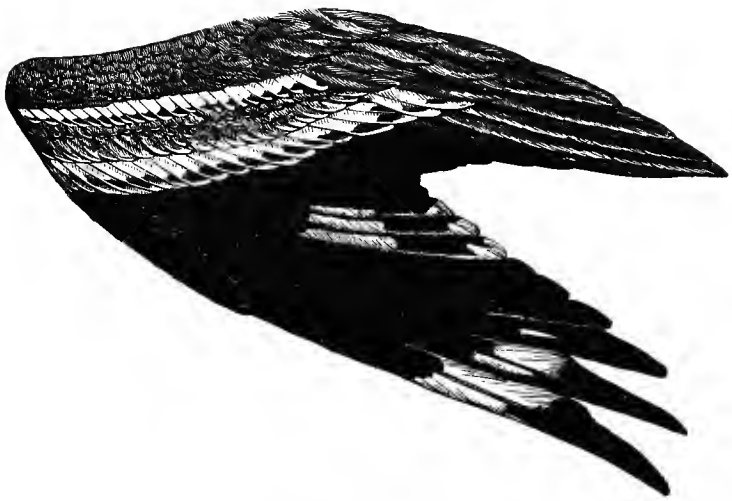
Except in England the Stone-Curlew does not breed north of the Baltic. It is a resident throughout the basin of the Mediterranean; but to France, Holland, Belgium, Germany, and South Russia it is a summer migrant. It has only occurred twice in Denmark, and is not found in the Baltic provinces. Its northern range in South Russia has not been accurately determined; but it is common at Sarepta, and may range up to



lat. 50°. It is a resident in the Canary Islands, and an occasional straggler to Madeira. It is said to be a resident throughout North Africa; but its numbers are largely increased during winter. It is also a resident in Palestine, Asia Minor, and Persia. It is a summer visitor to Russian Turkestan, and probably also to West Siberia south of lat. 48°, as Finsch records it from the steppes north of Lake Saisan. These birds doubtless winter in India and in the basin of the Red Sea.

(Nitzsch, 'Pterylography,' p. 112) that the first secondary "is sometimes the last on the pinion (*Phasianus*), sometimes the first on the ulna (*Tetrao*);" whilst the tertials are often placed partly on the cubitus and partly on the humerus (Sundevall, 'Ibis,' 1886, p. 404).

It is quite evident that the quills must be classed on their merits, and not with regard to the accident of their positions. An additional reason of a very practical kind why the term innermost secondaries is a bad one is that in describing a bird it is often necessary to mention the outermost secondaries and the innermost secondaries, in addition to the tertials.



(Half natural size.)

ŒDICNEMUS CREPITANS INDICUS.

INDIAN STONE-CURLEW.

ŒDICNEMUS CREPITANS alis brevioribus, et primariis magis albo notatis. Diagnosis.

THE Indian Stone-Curlew and the European Stone-Curlew are connected together by a series of intermediate forms. Variations.

Œdicnemus indicus, *Salvadori, Atti Soc. Ital. Sc. Nat.* viii. pt. iv. p. 375 (1865). Synonymy.

PLATES.—Unfigured. Literature.

HABITS.—Legge, Birds of Ceylon, p. 969.

EGGS.—Hume, Nests and Eggs of Indian Birds, p. 581. Average size much less than those of the European form.

The resident Stone-Curlews of India and Ceylon may fairly be regarded as subspecifically distinct from their European allies. In consequence of their migratory habits, the latter birds have acquired longer wings, and are larger birds altogether. European Stone-Curlews vary in *length of wing* from 10 inches to 9 inches, whilst those which are residents in India *vary from* 9 *inches to* 8 *inches*. In European examples the white patches on the primaries are rarely seen on the third, whilst in Indian examples they are rarely if ever absent from it. The white on the outer web of the seventh primary is also much greater in Indian than in European examples. Subspecific characters.

The Indian Stone-Curlew is a resident in Baluchistan, India, Ceylon, and Burma, and might claim to be regarded as specifically distinct were it not that intermediate forms reside in North Africa, from Morocco to Egypt, and in Asia Minor and Persia.

(Half natural size.)

ŒDICNEMUS SENEGALENSIS.

SWAINSON'S STONE-CURLEW.

Diagnosis. ŒDICNEMUS pectore striato : strigâ pallidâ inter tectrices minores et majores absente : tectricibus mediis cinereis brunneo striatis.

Variations. I HAVE been unable to detect any difference between examples from East and West Africa.

Synonymy. Œdicnemus senegalensis, *Swainson, Birds West Africa,* ii. p. 228 (1837).
Œdicnemus inornatus, *Salvadori, Atti Soc. Ital. Sc. Nat.* viii. p. 381 (1865).
Œdicnemus assimilis, *Brehm, fide Bädeker, Journ. Orn.* 1853, *Suppl.* p. 117.

Literature. PLATES.—Unfigured.
HABITS.—Hereinafter described.
EGGS.—Bädeker, Journ. Orn. 1853, pl. v. fig. 3. Indistinguishable from those of *Œ. crepitans indicus,* but smaller than those of typical *Œ. crepitans.*

English name. Swainson's Stone-Curlew was named by its discoverer the Senegal Thick-knee, but as it has since been found to range across the continent to Abyssinia the name is no longer appropriate. It is perfectly distinct from all its allies, though it was confused with the European Stone-Curlew by Blanford (Geol. & Zool. Abyss. p. 428) and by Finsch (Trans. Zool. Soc. vii. p. 294). It belongs to the same section as the European species, having its *breast conspicuously streaked,* but differs from our bird in many ways: there is no trace of

a pale bar across the wing except on each side of the black band across the greater wing-coverts; the *median wing-coverts are uniform grey with dark shaft-lines*, exactly as in *Œ. vermiculatus*, and quite different from our bird, which has dark bases as well as shaft-lines to these feathers, causing a second dark band across the wing, the white band being between them. The median wing-coverts are consequently quite different also from those of *Œ. capensis*, which are all broadly barred with dark brown. Specific characters.

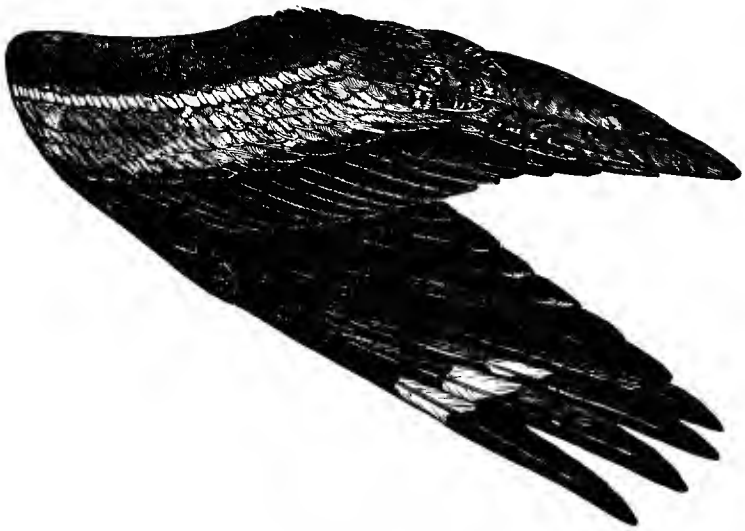
It ranges across the African continent from Senegambia and the Niger (Hartlaub, Journ. Orn. 1854, p. 213) to Nubia, Abyssinia (Heuglin, Orn. N.O.-Afr. p. 990), and the adjoining Shoa District (Salvadori, *loc. cit.*). It has been erroneously recorded from Natal (Gurney, Ibis, 1873, p. 259) and the Zambesi (Kirk, Ibis, 1864, p. 331). Geographical distribution.

It is very nearly related to the Indian form of *Œ. crepitans*, but in both forms of that species the dark bar across the shoulder is emphasized by a pale margin (white in adults and buff in birds of the year). Nearest allies.

It appears to be still nearer related to *Œ. vermiculatus*, if we may accept the similarity of the markings on the wing-coverts as evidence of consanguinity. It appears also to resemble that species in frequenting the banks of rivers rather than dry plains.

I have been unable to find any description of the habits of this species, but am fortunately able to supply the deficiency from notes furnished me by Capt. Verner, who met with it during the last expedition to the Soudan in 1885. Habits.

"In April, near Ambukol, I found many of these birds nesting. I was unaware at the time that there was such a distinct species as *Œ. senegalensis*, but I remarked that some I shot had greyish wing-coverts, and did not present the barred appearance of these parts, conspicuous in our species. The eggs of *Œ. senegalensis* are very similar to those of *Œ. crepitans*, but are decidedly smaller in size, and, generally speaking, much bolder in colouring; and of three clutches taken by me, the average size is from 1·9 to 1·95 inch in length, and 1·4 to 1·5 inch in breadth. In colour they are of a warm stone tint, blotched, spotted, and streaked with two shades of dark brown, with faint lilac spots here and there showing under the surface. I found this species nesting all along the Nile as far down as the 3rd Cataract. I *saw* others all the way down the river, but cannot say for certain whether they were *Œ. crepitans* or *Œ. senegalensis*. The call of the latter species is peculiarly melodious and mournful, beginning with two or three piping cries of the same pitch, and continuing in a descending scale. I have the most vivid recollection of hearing it for the first time on the night of January 19th, when we were bivouacked on the bank of the river at Abu Kru, above Metemneh, having fought our way down there just before sunset. It was bitterly cold, and sleep for more than a few minutes was almost impossible, and all night long the Stone-Curlews kept flitting along the shore with their mournful call. The only other sound was that of our poor fellows who were wounded, and the occasional clanging call of the Egyptian Wild Goose."



(Half natural size.)

ŒDICNEMUS VERMICULATUS.

VERMICULATED STONE-CURLEW.

Diagnosis. ŒDICNEMUS pectore striato: dorso transversim vermiculato.

Variations. It is not known that examples of the Vermiculated Stone-Curlew from West Africa differ in any respect from examples from South Africa.

Synonymy. Œdicnemus natalensis, *Gray, List Birds Brit. Mus.* iii. p. 59 (1844, descript. null.).
Œdicnemus vermiculatus, *Cabanis, Journ. Orn.* 1868, p. 413.

Literature. PLATES.—Cabanis, Decken's Reisen Ost-Africa, iii. pl. xvi.
HABITS.—Gurney, Ibis, 1873, p. 259 (erroneously called *Œ. senegalensis*).
EGGS.—Unknown.

Specific characters. The Vermiculated Stone-Curlew is a very distinct species, and is easily diagnosed from its congeners. No other species belonging to that section of the genus in which *the breast is conspicuously streaked* has the *feathers of the upper parts* not only longitudinally streaked with dark brown, but also *finely vermiculated with transverse brown zigzag markings*.

Geographical distribution.

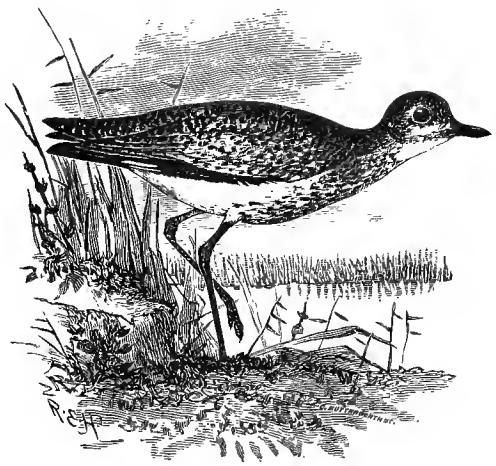
It was discovered by Dr. Krauss in Natal (British Museum), and has since been obtained in that colony by Ayres (Gurney, Ibis, 1873, p. 259). An example in the Stuttgard Museum from the Orange River may possibly have been collected by Krauss in Basuto-Land. I have a skin in my collection sent by Kirk from the Zambesi, and it was obtained in Masai-Land by Von der Decken. It is probably found throughout the valley of the Orange River, as Verreaux received it from Namaqua-Land. Bocage describes it accurately from Angola, but it is not known to have occurred in Damara-Land. Its range extends into West Africa; there are several fine examples in the Leyden Museum collected by Büttikofer in Liberia.

Nearest allies.

This species is somewhat intermediate between *Œ. crepitans* and *Œ. senegalensis*, though perfectly distinct from either. In the former species the wing-coverts are crossed by six more or less distinct bands—brown, white, brown, white, brown, white; in the latter the second, third, and fourth are merged in a broad grey band; in *Œ. vermiculatus* the third and fourth only are merged in a broad grey band.

Habits.

When Graham Hutchinson and I were shooting at the mouth of the Umgeni River in Natal, we came upon a party of these birds feeding on the mud-flats left by the receding tide on the shores of the lagoon. Hutchinson told me that in the Transvaal he only found it on the river-banks, never on the veldt where *Œ. capensis* breeds.



ŒDICNEMUS CAPENSIS.

SOUTH-AFRICAN STONE-CURLEW.

Diagnosis.

Œdicnemus tectricibus omnibus et scapularibus brunneo fasciatis.

Variations. It is not known whether the area of distribution of this species is interrupted, but examples collected north of the Equator have shorter legs than those obtained south of the line, and may fairly be regarded as subspecifically distinct.

Synonymy. Œdicnemus capensis, *Lichtenstein, Verz. Doubl. Mus. Berol.* p. 69 (1823).
Œdicnemus maculosus, *Temminck, Planches Col.* no. 292 (1824).
Œdicnemus macronemus, *Lichtenstein, Vers. Vög. Kaffernl.* p. 19 (1842).

Literature. Plates.—Temm. Pl. Col. no. 292.
Habits.—Sharpe, Layard's Birds South Africa, p. 645.
Eggs.—Harting, Proc. Zool. Soc. 1874, p. 457; Thienemann, Vogeleiern, pl. lvii. figs. 3*a*, 3*b*.
Indistinguishable from small and handsome varieties of eggs of *Œ. crepitans*.

Specific characters. The South-African Stone-Curlew may at once be recognized by the bold spots, or rather blotches, on the upper parts, which take the form of *broad bars across the tertials and wing-coverts*.

Geographical distribution. It inhabits Angola (Bocage, Orn. d'Angola, p. 424), Benguela, Damara-Land, and Great Namaqua-Land, the Cape Colony, Natal, the Transvaal, and the Matabele Country (Buckley, Ibis, 1874, p. 388), and has occurred as far north as Masai-Land (Fischer, Journ. Orn. 1885, p. 116).

ŒDICNEMUS CAPENSIS AFFINIS.

RÜPPELL'S STONE-CURLEW.

Diagnosis. Œdicnemus capensis tarso breviore (minus quam 90 millim.).

Synonymy. Œdicnemus affinis, *Rüppell, Mus. Senck.* ii. p. 210 (1837).

Literature. Plates.—Rüppell, Syst. Ueb. Vög. N.O.-Afrik. pl. 42.
Habits.—Heuglin, Orn. N.O.-Afrik. p. 990.
Eggs.—Unknown.

Rüppell's Stone-Curlew only differs from its southern ally in having a shorter *tarsus*, which *varies* in length from 3·0 to 3·2 inch. The tarsus of the South-African Stone-Curlew (*Œ. capensis*) varies in adult birds from 3·7 to 4·2 inch. An example of young in first plumage of the latter species in the British Museum, collected by Dr. Smith at the Cape, measures 3·35 inch in length of tarsus. Subspecific characters.

Rüppell's Stone-Curlew is a local race of the South-African Stone-Curlew, and is a resident in the Bogos Country, Kordofan, the south-western shores of the Red Sea (Heuglin, Ibis, 1859, p. 344), Abyssinia, and Somali-Land (Speke, Ibis, 1860, p. 248). It is described as frequenting the coast and the sandy plains, not ascending the mountains quite as far as 3000 feet. Geographical distribution.

(Half natural size.)

ŒDICNEMUS GRALLARIUS.

EAST-AUSTRALIAN STONE-CURLEW.

ŒDICNEMUS remigibus exterioribus quatuor versus apicem plagâ albâ magnâ notatis. Diagnosis.

Variations. Gould (Handbook to the Birds of Australia, ii. p. 212) remarks that on the north coast of Australia the Stone-Curlews have longer tarsi and shorter wings, but the few examples which I have been able to examine do not confirm this idea.

Synonymy.

Charadrius grallarius, } *Latham, Index Orn. Suppl.* pp. lxvi, lxvii (1801).
Charadrius frenatus, }

Œdicnemus longipes, *Geoffroy St.-Hilaire, fide Vieillot, N. Dict. d'Hist. Nat.* xxiii. p. 232 (1818).

Charadrius giganteus (*Licht.*), } *fide Wagler, Isis*, 1829, p. 647.
Œdicnemus giganteus, *Licht.*, }

Œdicnemus grallarius (*Lath.*), *Gray, Genera of Birds*, iii. p. 535 (1844).

Burhinus grallarius (*Lath.*), *Bonap. Compt. Rend.* xliii. p. 416 (1856).

Literature.

Plates.—Temminck, Pl. Col. no. 386; Gould, Birds of Australia, vi. pl. 5.

Habits.—Gould, Handb. Birds Austr. ii. p. 210. Described as almost exactly resembling those of the European Stone-Curlew. Gould says that it frequents the same description of country, dry sandy or grassy plains, especially those which are rocky; but Ramsay says that it is also found on the sea-coast.

Eggs.—Harting, Proc. Zool. Soc. 1874, p. 459; Ramsay, Proc. Zool. Soc. 1877, p. 335; Thienemann, Vogeleiern, pl. lvii. fig. 2. Typical eggs are indistinguishable from those of *Œ. recurvirostris*.

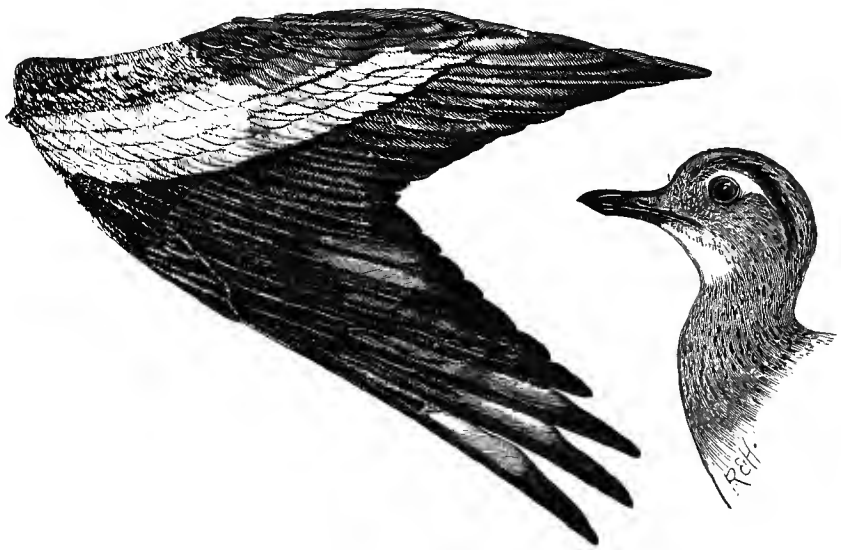
Specific characters.

The East-Australian Stone-Curlew may be distinguished from all its congeners by the *large white spot across both webs of the fourth primary*, as well as of the first, second, and third. It is the only large Stone-Curlew with *conspicuous stripes on the breast*.

Geographical distribution.

It is only known from the eastern half of the Australian continent, from the Gulf of Carpentaria in the north to Queensland, South Australia, and New South Wales. It may possibly be only a winter visitor to the tropical portion of its range. In all these species, which are remarkable for their long legs, the tarsi of young birds are shorter than those of adults; and with many species which are partial migrants, the residents are adults and the migrants the younger birds. The North-Australian birds may be migrants, more or less immature, and consequently ought to have, on an average, shorter legs than the older birds, instead of longer ones as Gould imagined.

*** *Aberrant Stone-Curlews, with conspicuous black eye-stripes; but with scarcely perceptible streaks on the breast.*



(Half natural size.)

ŒDICNEMUS BISTRIATUS.

CENTRAL-AMERICAN STONE-CURLEW.

Diagnosis.

ŒDICNEMUS pectore vix striato: dorso striato sed non fasciato: regionibus paroticis pallescentibus.

Variations.

IT is not known that this species is subject to any variations (except those attributable to age and season) on the American continent; but examples from the island of St. Domingo are regarded as subspecifically distinct on account of their smaller size.

Synonymy.

Charadrius bistriatus, *Wagler, Isis,* 1829, p. 648.
Œdicnemus vocifer, *L'Herminier, Mag. de Zool.* 1837, pl. 84.
Œdicnemus americanus, *Swainson, Anim. Menag.* p. 349 (1838).
Œdicnemus bistriatus (*Wagler*), *Gray, Genera of Birds,* iii. p. 535 (1844).
Œdicnemus mexicanus, *Licht. fide Schlegel, Mus. Pays-Bas,* iv. p. 19 (1865).

Literature.

PLATES.—L'Herminier, Mag. de Zool. 1837, pl. 84.

HABITS.—Taylor, Ibis, 1860, p. 314. Described as similar to those of the European Stone-Curlew. The bird lives on the prairies.

EGGS.—Owen, Ibis, 1861, p. 68. Are exactly like finely-marked eggs of *Œ. crepitans,* but larger (2·3 × 1·6 inch).

Specific characters.

The Central-American Stone-Curlew belongs to that section of the genus in which there is *a conspicuous black band over each eye*, and in which the breast is scarcely streaked. From two of the three other species belonging to this section it may be distinguished by its *comparatively pale ear-coverts*, which are almost black in *Œ. magnirostris* and *Œ. recurvirostris*. From its nearest ally, *Œ. superciliaris*, it may be distinguished either by its larger size (wing from carpal joint more than 9 inches) or by the *markings on the back*, which are *all longitudinal*.

Geographical distribution.

It is a resident in Central America (Sclater, Proc. Zool. Soc. 1865, p. 397), ranging northwards into Mexico and southwards into tropical South America, where it has occurred in Colombia, Venezuela, and Northern Brazil (Sclater and Salvin, Ex. Orn. p. 60).

Difference between Old and New WorldStone-Curlews.

The American Stone-Curlews differ from their Old-World allies in the distribution of the white on the primaries. Instead of a subterminal bar across both webs of the first and second, and sometimes the third and fourth primaries, the white is confined to the inner web and extends almost to the base of the feather.

ŒDICNEMUS BISTRIATUS DOMINICENSIS.

ST.-DOMINGO STONE-CURLEW.

Diagnosis.

ŒDICNEMUS BISTRIATUS magnitudine minimâ.

Synonymy.

Œdicnemus dominicensis, *Cory, Journ. Boston Zool. Soc.* ii. p. 46 (1883).

Literature.

PLATES.—Unfigured.
HABITS.—Undescribed.
EGGS.—Unknown.

Subspecific characters.

The St.-Domingo Stone-Curlew appears to be, from the description, only a dwarf race or island form of *Œ. bistriatus*. The dimensions of the two forms are as follows:—

	Œ. bistriatus.	*Œ. dominicensis.*
Wing	10 inches.	$8\frac{1}{2}$ inches.
Tail	$4\frac{3}{4}$,,	$3\frac{3}{4}$,,
Tarsus	$4\frac{3}{4}$,,	$3\frac{3}{4}$,,
Bill	$1\frac{3}{4}$,,	$1\frac{1}{2}$,,

Geographical distribution.

It is only known from the island of St. Domingo.

(Half natural size.)

ŒDICNEMUS SUPERCILIARIS.

PERUVIAN STONE-CURLEW.

Œdicnemus dorso vermiculato sive angustè fasciato; strigâ nigrâ latâ supra oculum utrumque. — Diagnosis.

Sclater and Salvin figure an undoubtedly immature bird with the wing-coverts, scapulars, and tertials vermiculated, but with a very conspicuous black stripe on the side of the neck below as well as above the white eye-stripe. Two other examples in their collection, one immature and the other apparently adult, show no trace of the second black stripe. Taczanowski, who examined the skins, ignores the differences, probably thinking that it was impossible that a second species could occur in Western Peru. The subject requires further investigation; but the only conclusion that can be drawn from the evidence available at present is that the black band below the white eye-stripe is confined to the young in first plumage. — Variations.

Œdicnemus superciliaris, *Tschudi, Wiegm. Arch.* 1843, p. 388. — Synonymy.

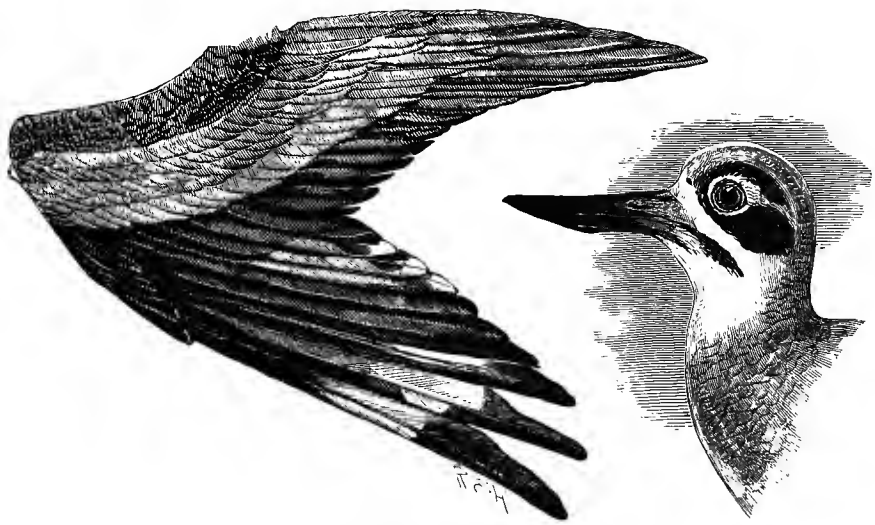
Plates.—Sclater and Salvin, Exotic Orn. pl. xxx. (young in first plumage).
Habits.—Stolzmann, Tacz. Orn. Pérou, iii. p. 334.
Eggs.—Unknown. — Literature.

Specific characters.

The Peruvian Stone-Curlew is one of the aberrant species which possess the conspicuous character of having *a broad black stripe over each eye*, a feature which in this genus appears to be always correlated with the absence of conspicuous streaks on the breast. From the other (three) species belonging to this section it may be distinguished either by its smaller size (wing from carpal joint less than 9 inches) or by the markings on the *feathers of the back*, which have not only a dark shaft-streak, but are also *transversely barred or vermiculated*. It has also no trace of a white bar across the wing-coverts, a feature found in all other species of the genus except in *Œ. bistriatus*, *Œ. senegalensis*, and *Œ. capensis*.

Geographical distribution.

It is only known from the coast-region of Peru.



(Half natural size.)

ŒDICNEMUS RECURVIROSTRIS.

GREAT INDIAN STONE-CURLEW.

Diagnosis. ŒDICNEMUS maxillâ recurvatâ.

Variations. THERE seems to be no difference between Indian and Ceylonese examples.

Synonymy. Œdicnemus recurvirostris, *Cuvier, Règne An.* i. p. 500 (1829).
Esacus recurvirostris (*Cuvier*), *Lesson, Traité d'Orn.* p. 547 (1831).
Carvanaca griseus, *Hodgson, Journ. As. Soc. Beng.* v. p. 776 (1836).

Literature.

Plates.—Gray, Genera of Birds, iii. pl. cxlii.

Habits.—Legge, Birds of Ceylon, p. 974.

Eggs.—Harting, Proc. Zool. Soc. 1874, p. 455; Hume, Nests and Eggs Ind. Birds, iii. p. 579.
Indistinguishable from eggs of *Œ. grallarius*.

Specific characters.

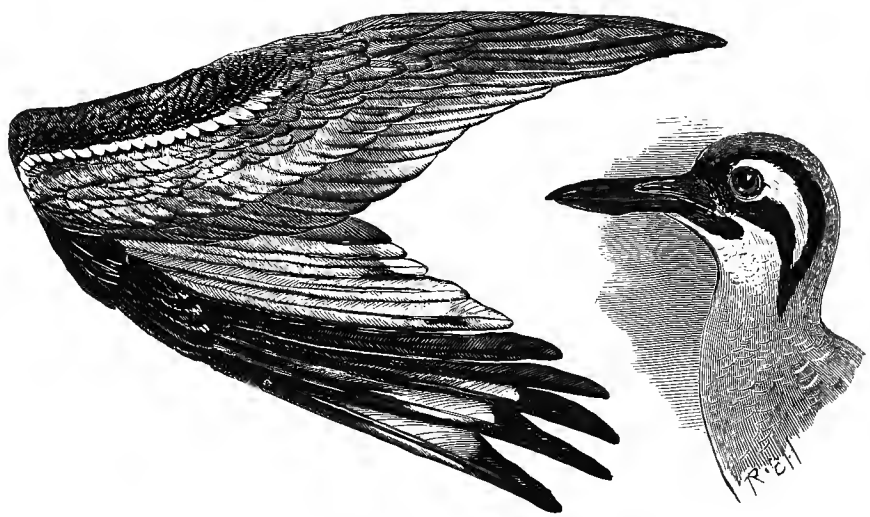
The Great Indian Stone-Curlew may always be recognized by its *upturned bill*; the line of the gape is recurved, so that the upper profile of the bill is nearly straight.

Geographical distribution.

It is a resident in India, Burma, and Ceylon, breeding in March and April on sand-banks and rocky islets in the beds of rivers, and in Ceylon on the sea-shore.

Nearest allies.

It is nearest related to *Œ. magnirostris*, which, like it, has a short tarsus (not an inch longer than the bill) and no pale edges to the feathers of the upper parts.



(Half natural size.)

ŒDICNEMUS MAGNIROSTRIS.

AUSTRO-MALAYAN STONE-CURLEW.

Diagnosis.

Œdicnemus loris nigris.

Variations.

It is not known that the Austro-Malayan Stone-Curlew is subject to any variation notwithstanding its wide range.

Synonymy.

Œdicnemus magnirostris, *Geoffroy St.-Hilaire, fide Vieillot, N. Dict. d'Hist. Nat.* xxiii. p. 231 (1818).

Burhinus magnirostris (*Vieill.*), *Lesson, Traité d'Orn.* p. 547 (1831).

Esacus magnirostris (*Vieill.*), *Gray, List Gen. & Subgen. Birds,* p. 83 (1841).

Orthorhamphus magnirostris (*Vieill.*), *Salvadori, Cat. Ucc. Borneo,* p. 312 (1874).

Charadrius magnirostris, *Lath.*,
Burhinus magnirostris (*Lath.*), } *apud auctores multos.*

Literature.

Plates.—Temminck, Pl. Col. no. 387 ; Gould, Birds of Australia, vi. pl. 6.

Habits.—Gould, Handb. Birds Austr. ii. p. 213. It is described as preferring the low flat shores of the sea.

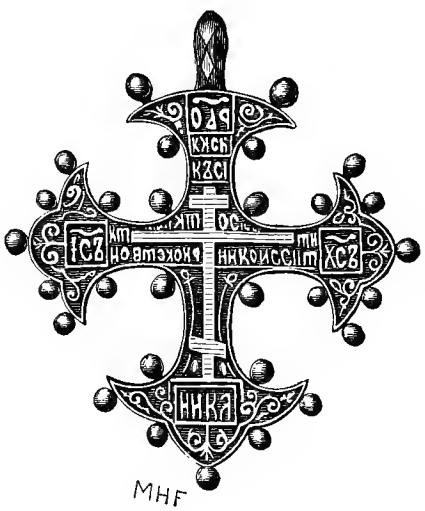
Eggs.—Thienemann, Vogeleiern, pl. lvii. fig. 1 (incorrectly named *Esacus recurvirostris*) ; Hume, Nests and Eggs of Indian Birds, iii. p. 581. Resemble eggs of *Œ. crepitans,* but are much larger (2·6 × 1·75 inch).

Specific characters.

The Austro-Malayan Stone-Curlew may be easily recognized either by its *black lores* or by its great *bill,* which is *more than ¾ inch deep at the nostrils.* Its ear-coverts are nearly black, and it further resembles *Œ. recurvirostris* in having nearly uniform upper parts, and a great deal of white on the innermost primaries.

Geographical distribution.

It is a resident on the coasts of the islands of the Malay Archipelago (Wallace, Proc. Zool. Soc. 1862, p. 346), ranging westwards beyond Sumatra to the Andaman Islands (Hume, Stray Feathers, 1874, p. 290), northwards to the Philippine Islands (Walden, Trans. Zool. Soc. ix. p. 227), and southwards and eastwards along the north coast of Australia to New Caledonia (Layard, Ibis, 1882, p. 532).



CHAPTER XI.

Genus CHARADRIUS.

CHARADRIINÆ sulco nasali obvio : alis haud calcaratis : rectricibus mediis ferè omninò brunneis et quam rectrices laterales non valdè longioribus (nunquam 25 millim.). Diagnosis of genus.

THE Plovers differ from the Stone-Curlews in *never having the central feathers of the tail nearly as much as an inch longer than the outer ones.* The *nasal aperture* being *placed in a distinct groove*, prevents them from being confounded with the Coursers or the Pratincoles. Finally, the *absence of white at the base of the central tail-feathers, which are uniform brown for more than two thirds of their length*, excludes the Lapwings, most of which are further excluded by the absence of lobes on the lores or spurs on the wings. Generic characters.

The synonymy of the genus *Charadrius* is another appalling instance of the "furor genericus," especially on the part of the arch genus-splitter Bonaparte. A genus has been provided for about every two species !

Synonymy of the Genus CHARADRIUS.

	Type.
Charadrius, *Linneus, Syst. Nat.* i. p. 150 (1758) ; *Linn. Syst. Nat.* i. p. 253 (1766).	No type.
Pluvialis, *Brisson, Orn.* v. p. 42 (1760)	C. pluvialis.
Squatarola, *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 29 (1816) . . .	C. helveticus.
Ægialitis, *Boie, Isis,* 1822, p. 558	C. hiaticula.
Eudromias, *Brehm, Vög. Deutschl.* p. 545 (1831)	C. morinellus.
Anarhynchus, *Quoy and Gaimard, Voy. Astrol., Zool.* i. p. 252 (1833) . .	C. frontalis.
Oreophilus, *Jardine and Selby, Ill. Orn.* iii. pl. 151 (1835)	C. totanirostris.
Erythrogonys, *Gould, Proc. Zool. Soc.* 1837, p. 135	C. rufiventris.
Hiaticula, *Gray, List Gen. Birds,* p. 85 (1840)	C. hiaticula.
Thinornis, *Gray, Zool. Voy. Ereb. & Terr.* p. 11 (1846)	C. novæ-zealandiæ.
Pluvianellus, *Hombron and Jacquinot, fide Gray, Gen. Birds,* iii. p. 549 (1846)	C. sociabilis.

Oxyechus, Ochthodromus, Zonibyx,	*Reichenbach, fide Bonap. Compt. Rend.* xliii. p. 418 (1856)	C. vociferus. C. wilsoni. C. modestus.
Morinellus, Pluviorhynchus, Cirrepidesmus, Leucopolius,	*Bonap. Compt. Rend.* xliii. p. 417 (1856)	C. morinellus. C. obscurus. C. geoffroyi. C. marginatus.
Ægialophilus, *Gould, Handb. Birds Austr.* ii. p. 234 (1865)		C. cantianus.
Podasocys, *Coues, Proc. Philad. Ac. Nat. Sc.* 1866, p. 96		C. montanus.

The characters upon which these genera are founded are mostly unimportant differences in the shape of the bill, which are probably of little or no taxonomic value.

Determination of the type.

It is quite impossible to guess which species Linneus would have regarded as the type of the genus *Charadrius*, had the idea of the necessity of providing each genus with a so-called typical species (which may or may not be an aberrant species according to circumstances) ever occurred to the great Swedish naturalist. In the tenth edition of his great work the first species on the list is *C. cristatus*, which unquestionably refers to *Vanellus spinosus*, a fact which he discovered before the twelfth edition, where the first species on the list is *C. hiaticula*. The Golden Plover (*C. pluvialis*) has by common consent been accepted as the type of the restricted genus *Charadrius*, probably on the ground that Brisson (who evidently recognized the importance of a type, though he omitted to point it out in his usual manner in this genus) regarded it as so emphatically the typical Plover that he changed the name of the genus from *Charadrius* to *Pluvialis*.

Geographical distribution.

The range of the genus *Charadrius* is almost cosmopolitan, but two thirds of the species breed in the temperate zones of both hemispheres. It is rather remarkable that the genus is almost unrepresented in the Pacific Islands, the only species known to visit them being *C. fulvus*.

Climatic distribution.

During the breeding-season the species are distributed as follows :—

Arctic America	2	
Arctic Eurasia	4	
Arctic species		— 6
Temperate North America	6	
Temperate South America	4	
Southern Australia and New Zealand . .	9	
South Africa	1	
Temperate Eurasia	9	
Temperate species		— 29
Tropical America	1	
Tropical Asia	3	
Tropical Africa	6	
Tropical species		— 10
Species and subspecies of *Charadrius* . .		— 45

Local distribution.

Many of the Plovers are shore-birds; some of them frequent the banks of rivers and lakes, whilst others resemble the Coursers and the Lapwings in living on the plains, especially during the breeding-season.

Subgeneric groups.

The species belonging to the genus *Charadrius* may be conveniently arranged in three subgeneric groups:—

Pluviales, or typical Plovers and Dotterels.
Hiaticulæ, or Ringed Plovers.
Ægialophili, or Sand-Plovers.

In dividing the genus *Charadrius* into subgeneric groups, it is important to ascertain which characters are old, and which have been more recently acquired. The oldest characters are presumably those which are common to both seasons, to both sexes, and to young as well as to adult birds [1].

Trustworthy characters.

The black subterminal bar across the tail-feathers, and the white at the base of the outer web of the innermost primaries, appear to be very old characters, common to some allied genera, and wherever found always constant.

The subgenus Pluvialis must be diagnosed as follows:—

Diagnosis of subgenera.

Charadrii having *any one or two* of the following characters: coloured axillaries; a hind toe; a barred tail; or a dark patch on the belly.

The subgenus Hiaticula must be diagnosed as:—

Charadrii having *all* the following characters: white axillaries; no hind toe; white belly; and a dark subterminal band across the tail.

[1] When young birds differ in the colour of their plumage from adults, it is generally supposed that they more closely resemble some remote ancestor; and in popular parlance they are said to "hark back to their ancestors." Darwin (Origin of Species, 5th ed. p. 529) says that "from the many slight successive variations having supervened in the several species at a not early age, and having been inherited at a corresponding age, the young will be left but little modified and will resemble each other much more closely than do the adults—just as we have seen with the breeds of the Pigeon. We may extend this view to widely distinct structures and to whole classes." Thus it is supposed that the ancestral Spotted Woodpecker had a red crown, because the young in first plumage of all the species of the genus *Picus* have red crowns, though this feature is retained in the adult of only three or four of the species. It consequently happens that the young of nearly allied species differ less from each other than the adults of the same species do, inasmuch as the young of each species hark back to the common ancestors of both. There are, however, some startling exceptions to this rule. When I described *Picus japonicus* I had no idea how good a species it was. Now that the young in first plumage have been received from Japan, it is found that they differ far more from the young of *P. major* than the adults of the two species do. The young of our birds have nearly uniform buffish-white underparts, whilst those of the Japanese species are profusely streaked with black on the flanks, and more or less so on the throat and breast. The young of *P. numidicus* and of *P. major* also differ more from each other than the adults of the two species do, those of the former having much darker foreheads than those of the latter (this difference is, however, grossly exaggerated in the plates of Dresser's 'Birds of Europe,' one being coloured much too white and the other much too black). The young of *P. syriacus* and of *P. major* also differ more from each other than the adults do, the former being profusely marked with crimson on the upper breast, a character of which traces only are found in rare instances in the latter, or in adult birds of either species.

The subgenus ÆGIALOPHILUS must be diagnosed as:—

CHARADRII having *all* the following characters: white axillaries; no hind toe; white belly; but no dark subterminal band across the tail.

Subgenus PLUVIALIS.

Diagnosis of subgenus.

CHARADRII aut axillaribus haud albis; aut halluce parvo; aut caudâ fasciatâ; aut abdomine magnâ maculâ nigrâ ornato.

THE Plovers and Dotterels form a subgeneric group of birds belonging to the genus *Charadrius*, which are easily diagnosed from their congeners. It would, however, be unwise to place them in a separate genus, as it is very probable that some of the characters of the group denote analogy rather than affinity.

True Plovers.

The true Plovers are characterized by their barred tails, though in the young in first plumage the bars are only indicated by spots on the margin. They also present a slight structural difference from their allies; the hexagonal scales on the tarsus are reticulated more minutely and in a slightly different way, but the great variations in the scutellations of the tarsus in this genus suggest that it is not a character of much importance. The fact that in breeding-dress the underparts are black may be of more significance, though this is more or less the case with many of the Dotterels.

Dotterels.

The Dotterels form a somewhat heterogeneous assemblage, but have so many characters in common with the true Plovers, that it is most convenient to class them together.

Subgeneric characters.

The group so constituted forms a subgenus *Pluvialis*, containing 10 species. Of these five differ from all other species of the genus *Charadrius* in having coloured axillaries. One of the five has a hind toe, a character also found in three other species which are included in this subgenus on that account, but have white axillaries. Two others of the five species which have coloured axillaries have also barred tails, a character shared by a fourth species with white axillaries. Another of the species having coloured axillaries has also a dark patch on the belly, which is found at all ages and seasons, and in both sexes, a character shared by the fifth species with white axillaries, and in the breeding-season by four other species.

When we consider that none of these characters are possessed by any species belonging to the other two subgenera into which we have divided the genus *Charadrius*, and that the four sections are linked together by other characters, the Dotterels and Plovers regarded as one subgenus do not seem quite so heterogeneous as they at first sight appear.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Three toes.	ARCTIC REGION.	*Four toes.*
C. VIRGINICUS	*American.*	C. HELVETICUS.
C. MORINELLUS	*Eurasian.*	
C. FULVUS	*East Asian.*	
C. PLUVIALIS	*West Eurasian.*	
	PALÆARCTIC REGION.	
C. VEREDUS	*Mongolia.*	
	AUSTRALIAN REGION.	
C. AUSTRALIS	*South.*	C. RUFIVENTRIS.
	NEOTROPICAL REGION.	
	Falkland Islands.	C. MODESTUS.
	Tierra del Fuego.	C. SOCIABILIS.
C. TOTANIROSTRIS	*Patagonia.*	

Emigrations.

If we regard the true Plovers as congeneric with the rest of the group (and it is very difficult to imagine that *C. obscurus* can belong to a different genus from that which contains *C. helveticus*), it seems most probable that they emigrated along the Pacific coast of America until they came to the Aleutian Islands, where the ancestors of *C. fulvus* and *C. pluvialis* crossed over to Asia, the former becoming isolated in India, and the latter in Africa, whilst the ancestors of *C. helveticus* followed the coast to South America. During the warm post-glacial period all three returned to the polar basin, and one of them, although very imperfectly isolated east and west of Behring Straits, has through the lapse of time become imperfectly differentiated into two subspecies, which are distinguished as *C. fulvus* and *C. virginicus*.

There seems to be some plausibility about this theory of the distribution of the true Plovers; but if we regard them as post-glacial species, a still more probable theory of distribution presents itself.

If we assume that their ancestors were a circumpolar species during the post-glacial period, and that the first interruption in the continuity of the area of their distribution was caused by the glaciers of Greenland, it is reasonable to suppose that the consequence of this semi-isolation was the differentiation of the Hudson's Bay Plovers into Grey Plovers with black axillaries from the Lapland Plovers which became Golden Plovers with white axillaries, the two being connected together by a series of intermediate forms producing a Plover with grey axillaries at Behring Straits, which was partially split in two when

the birds were forced to leave the Polar Basin, but were able to keep up some communication by way of the Aleutian Islands.

The Dotterels probably came down from the Polar regions by way of the European coast and emigrated eastwards. *C. morinellus* was probably isolated in the basin of the Mediterranean; *C. veredus* in the islands of the Malay Archipelago; *C. rufiventris* in North Australia; *C. australis* in South Australia; *C. sociabilis* in Patagonia; and *C. modestus* in the Falkland Islands; whilst *C. totanirostris* emigrating westwards probably reached South America across the Atlantic.

KEY TO THE SPECIES.

- A hind toe . . . . . :
  - **rufiventris** . . . — Innermost primaries and secondaries broadly tipped with white.
  - **sociabilis** . . . . — Middle toe and claw longer than tarsus.
  - **modestus.**
  - **helveticus** . . . .
  - Underparts more or less black in summer, white in winter:
    - **pluvialis** . . . . — Barred tail.
    - **fulvus** . . . . .
    - **morinellus** . . . — Grey axillaries.
  - Middle toe without the claw less than half length of tarsus:
    - **veredus** . . . .
    - **totanirostris.**
  - **australis** . . . . — Buff-chestnut axillaries.

The species belonging to the subgeneric group of *Pluviales* are very easy to diagnose. There is no difficulty in finding well-marked characters, which are unaffected by age, sex, or season. The colour of the underparts, which varies with the seasons, is only introduced to link the species more closely together: the key is complete without this character. Other more important characters, such as the black axillaries of *C. helveticus*, are omitted because the key is complete without them.

Other characters.

The characters which appear to be of importance in the division of the other subgenera of *Charadrius* do not help us much in the classification of the subgenus *Pluvialis*; but it may be interesting to know how they are distributed.

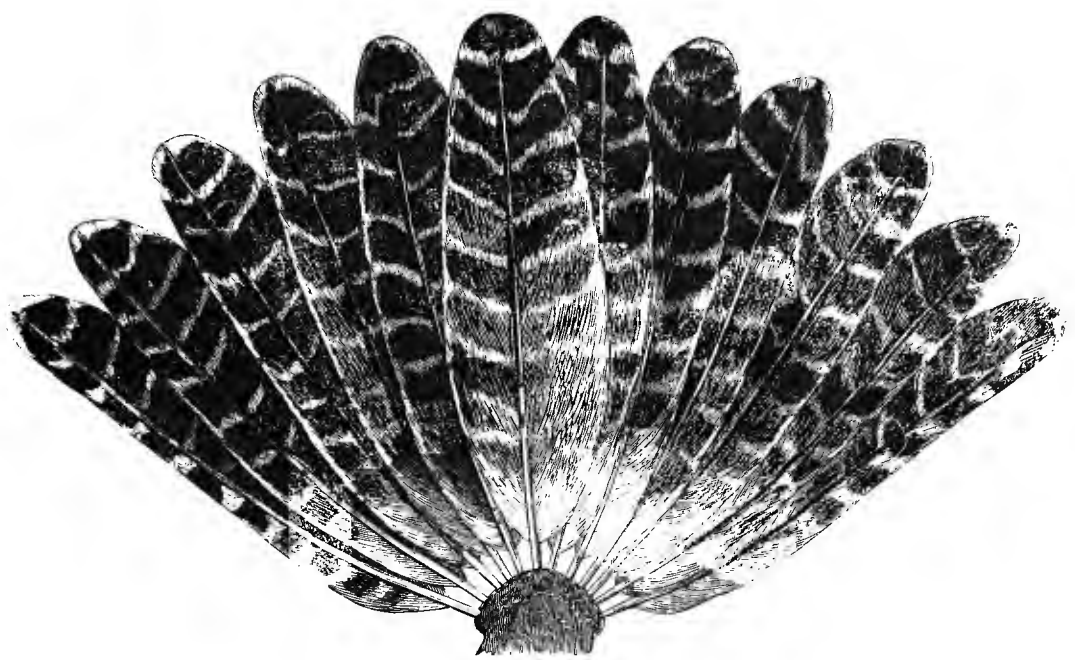
The black subterminal band across the tail appears in *C. morinellus* and *C. totanirostris*, and to some extent in *C. veredus* and *C. australis*.

The absence of the white at or near the base of the outer webs of the innermost primaries is absolute in *C. rufiventris*, *C. modestus*, *C. fulvus*, *C. morinellus*, and *C. veredus*; but in *C. fulvus virginicus* the brown of this part is more or less mottled with white, and in *C. australis* the white is replaced by buff.

The nearly black central upper tail-coverts are more or less developed in *C. modestus* and in *C. rufiventris*.

*** *Subgeneric group Pluviales.*

† *Typical Plovers.*



CHARADRIUS PLUVIALIS.

GOLDEN PLOVER.

Diagnosis.

CHARADRIUS caudâ fasciatâ, axillaribus albis.

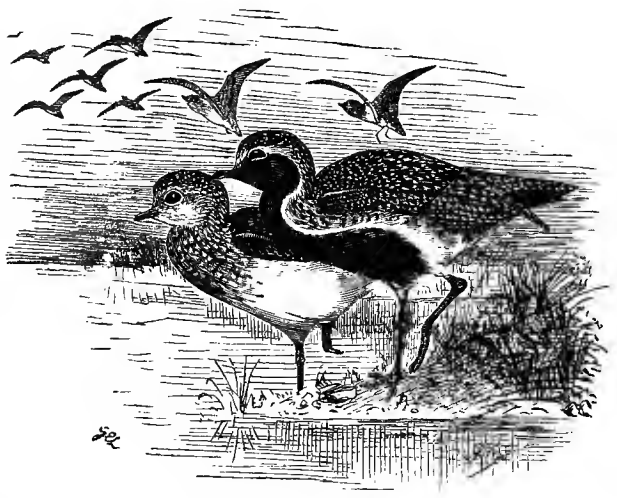
Variations. ALTHOUGH Brehm subdivided the Golden Plover into four species, there seems to be no evidence of the existence of any local races of this bird. Few species vary so little.

Synonymy. Charadrius apricarius, *Linneus, Syst. Nat.* i. p. 150 (1758); *Bechstein, Naturg. Deutschl.* iii. p. 203 (1793).
Pluvialis aurea, *Brisson, Orn.* v. p. 43 (1760); *Macgillivray, Hist. Brit. B.* iv. p. 94 (1852).
Charadrius pluvialis, *Linneus, Syst. Nat.* i. p. 254 (1766).
Charadrius aureus (*Briss.*), *Müller, Natursyst. Suppl.* p. 118 (1776).
Charadrius auratus, *Suckow, Naturg. der Thiere,* ii. p. 1592 (1801).
Pluvialis apricarius (*Linn.*), *Bonap. Cat. Met. Ucc. Eur.* p. 57 (1842).

Literature. PLATES.—Gould, Birds of Great Brit. iv. pls. 38, 39; Dresser, Birds of Europe, vii. pl. 515. fig. 1, and pl. 518. fig. 1.
HABITS.—Seebohm, British Birds, iii. p. 35.
EGGS.—Seebohm, British Birds, pl. 25. figs. 1, 2, 3.

Specific characters. The Golden Plover is easily diagnosed by two characters: *all the tail-feathers barred, axillaries white.*

Geographical distribution. The Golden Plover is very local in England during the breeding-season, south of Derbyshire. It is said to breed in the extreme south-west of England and in several localities in Wales, but its true home is on the moors and mountains of the north. From the Grouse-moors of Derbyshire northwards to the Orkney and Shetland Islands it is more or less abundant during summer. In winter it is more widely dispersed, frequenting all the coasts and many of the inland districts. In Ireland it is generally distributed, breeding on the moors and high lands.



The chief breeding-places of the Golden Plover are the fjelds of Norway and the tundras of Russia and Siberia as far east as the valley of the Yenesay. It also breeds sparingly on similar ground as far south as the moors of Holland, Belgium, and North Germany. In the rest of Central and Southern Europe it is principally known as passing through on migration, a few remaining over the winter. Its principal winter-quarters are the basin of the Mediterranean, whence it occasionally straggles to Madeira, and as far

south as Natal and the Cape. The Siberian birds appear to pass through Turkestan on migration, a few remaining to winter in Baluchistan; but the greater number probably migrate as far as Africa. It is a common summer visitor to Iceland and the Faroes, but has been erroneously recorded from Greenland (Reinhardt, Ibis, 1861, p. 9).

Its nearest ally is the Asiatic Golden Plover (*C. fulvus*).

Although the Golden Plover breeds on the mountains and moors, it is a coast bird in winter, and to enable it to feed in such an exposed situation with impunity it loses its black breast in autumn. Seasonal changes.

CHARADRIUS FULVUS.

ASIATIC GOLDEN PLOVER.

Charadrius caudâ fasciatâ, axillaribus fumosis. Diagnosis.

American Golden Plovers differ slightly from most Asiatic examples, and may be regarded as subspecifically distinct. Variations.

Synonymy.

Charadrius fulvus, *Gmelin, Syst. Nat.* i. p. 687 (1788).
Charadrius xanthocheilus, *Wagler, Syst. Av.* p. 68 (1827).
Charadrius taitensis, *Lesson, Man. d'Orn.* ii. p. 321 (1828).
Charadrius glaucopus, *Lichtenstein, Forster's Descr. Anim. It. Mar. Austr.* p. 176 (1844).
Charadrius pluvialis orientalis, *Temminck et Schlegel, Faun. Japon.* p. 104 (1847).
Pluvialis longipes, *Temm., fide*
Pluvialis xanthocheilus (*Wagl.*),
Pluvialis taitensis (*Less.*),
Pluvialis fulvus (*Gmel.*),
} *Bonap. Compt. Rend.* xliii. p. 417 (1856).
Charadrius dominicus fulvus, *Ridgway, Proc. U. S. Nat. Mus.* iii. p. 198 (1880).

Literature.

Plates.—Jardine & Selby, Ill. Orn. ii. pl. lxxxv.; Gould, Birds of Australia, vi. pl. 13; Dresser, Birds of Europe, vii. pls. 516, 517.
Habits.—Seebohm, British Birds, iii. p. 40.
Eggs.—Seebohm, British Birds, pl. 25. fig. 5.

Specific characters.

The Asiatic Golden Plover may easily be distinguished from all its congeners (except from its nearest ally in America) by its *barred tail* and *grey axillaries*.

Geographical distribution.

The Asiatic Golden Plover breeds[1] on the tundras of Eastern Siberia, from the valley of the Yenesay to the Pacific. It passes through Japan, South Siberia, and Mongolia on migration, and winters in India, the Burma peninsula, China, the islands of the Malay Archipelago, Australia, and the islands of the Pacific Ocean. It has been known to stray as far as New Zealand in the east, and to the Mekran coast, Malta, Algeria, Poland, and Heligoland in the west.

Seasonal changes.

Like most species which breed inland and feed chiefly on the coast during winter, its summer plumage (especially its black belly) is changed in autumn for a less conspicuous garb.

CHARADRIUS FULVUS AMERICANUS.

AMERICAN GOLDEN PLOVER.

Diagnosis. CHARADRIUS FULVUS magnitudine majore, tertiariis brevioribus.

Variations. THIS species completely intergrades with the preceding, and must therefore be regarded as only subspecifically distinct.

Synonymy.

Pluvialis dominicensis aurea, *Brisson, Orn.* v. p. 48 (1760).
Charadrius dominicus, *Müller, Syst. Nat.* p. 116 (1776).
Charadrius virginicus, *Bechstein, fide Licht. Verz. Doubl.* p. 70 (1823).
Charadrius marmoratus, *Wagler, Syst. Av.* p. 71 (1827).
Pluvialis virginicus (*Licht.*), *Bonap. Compt. Rend.* xliii. p. 417 (1856).
Pluvialis fulvus americanus[2], *Schlegel, Mus. Pays-Bas, Cursores,* p. 53 (1865).

[1] The alleged instances of this species breeding in New Caledonia (Layard, Ibis, 1879, p. 107), on the island of Formosa (Swinhoe, Ibis, 1863, p. 404), and in New Zealand (Robson, Trans. N.-Z. Inst. 1883, p. 308) are either myths or refer to wounded birds, who being unable to migrate, persuaded their mates to remain with them and breed in their winter-quarters. As might be expected, in every case the evidence breaks down. In the first the bird was only seen, not obtained, in the second the alleged eggs are obviously those of a much smaller bird, and in the third the bird alleged to have been breeding was obviously in winter plumage.

[2] Of the three names, *americanus, dominicus,* and *virginicus,* the first is the most expressive, the second is the oldest, and the third has been most used. I adopt the first, on the ground that in accepting a trinomial nomenclature as a necessary evil an ornithologist has a perfect right to dictate the terms on which he accepts it. The only way to prevent the indefinite multiplication of trinomials is to make them temporary. The best name of the American Golden Plover is "The American form of *Charadrius fulvus*," and any ornithologist who likes to abbreviate this into *Charadrius fulvus americanus* is at liberty to do so. In very few cases in a variable species can a sentence be avoided. On describing a skin of this species from Japan it is generally necessary to say "an intermediate form between the typical and American forms of *Charadrius fulvus,* but more nearly approaching the former than the latter." I know of no system of nomenclature that is capable of expressing this, and less definite information than this is scarcely worth having.

Charadrius fulvus, *var.* virginicus (*Licht.*), *Coues, Key N.-Amer. Birds*, p. 243 (1872).
Charadrius pluvialis, *var.* virginicus (*Licht.*), *Ridgway, Ann. Lyc.* x. p. 383 (1874).

Literature.

PLATES.—Wilson, Am. Orn. pl. 50. fig. 5; Audubon, Birds Am. v. pl. 316.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 139.
EGGS.—Absolutely indistinguishable from those of the Asiatic Golden Plover.

Geographical distribution.

The Eastern Golden Plover is represented on the American continent by a species so nearly allied to the Asiatic bird that there can be little doubt that it is conspecific with it. The American Golden Plover (*Charadrius americanus*) is a slightly larger bird, varying in length of wing from 6·8 to 7·5 inch; the wing of the Asiatic species varying from 6·0 to 6·7 inch. The innermost secondaries of the American bird are supposed to be relatively shorter, the distance from their tips to the tip of the wing varying from $1\frac{1}{2}$ to 2 inches, whilst in the Asiatic species it usually measures only from 0·5 to 0·8 inch. What appear to be intermediate forms occur on the Pacific coast of Asia. Examples from Japan, China, Formosa, Hainan, Borneo, and Cape York vary in length of wing from 6·2 to 6·9 inch, and in distance from the tips of the innermost secondaries to the tip of the wing from 1·2 to 2·3 inch.

The American Golden Plover is an exclusively arctic bird, in summer breeding on the moors above the limit of forest-growth (Blakiston, Ibis, 1863, p. 129), from Alaska to Greenland (Reinhardt, Ibis, 1861, p. 9). In autumn it migrates southwards (Newton, Ibis, 1859, p. 255), to winter in South America. On migration it passes the Bermudas in large flocks (Reid, Zoologist, 1877, p. 474), and has once occurred on Heligoland (Seebohm, Ibis, 1877, p. 165), and once on the European continent (Gurney, Ibis, 1883, p. 198). It appears for the most part to winter south of the tropics (Taczanowski, Proc. Zool. Soc. 1874, p. 559), and has occurred as far south as Chili on the west coast (Bridges, Proc. Zool. Soc. 1843, p. 118), and Buenos Ayres on the east (Durnford, Ibis, 1877, p. 197).

It does not differ in its habits or in the changes of its plumage from its Asiatic ally, from which it can only be separated with great difficulty.

CHARADRIUS HELVETICUS.

GREY PLOVER.

Diagnosis. CHARADRIUS axillaribus nigris.

Variations. IT is not known that any differences exist between examples from the Old World and those from the American continent.

Synonymy.

Tringa squatarola, *Linneus, Syst. Nat.* i. p. 149 (1758); *Linn. Syst. Nat.* i. p. 252 (1766).
Vanellus griseus,
Vanellus varius,
Vanellus helveticus, } *Brisson, Orn.* v. pp. 100, 103, 106 (1760).
Tringa helvetica (*Briss.*),
Tringa varia (*Briss.*), } *Linneus, Syst. Nat.* i. pp. 250, 252 (1766).
Charadrius hypomelus, *Pallas, Reise Russ. Reichs,* iii. p. 699 (1773).
Charadrius nævius, *Gmelin, Syst. Nat.* i. p. 692 (1788).
Vanellus melanogaster, *Bechstein, Naturg. Deutschl.* iv. p. 356 (1809).
Squatarola grisea (*Briss.*), *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 29 (1816).
Squatarola squatarola (*Linn.*), *Cuvier, Règne An.* i. p. 467 (1817).
Squatarola varia (*Briss.*), *Boie, Isis,* 1822, p. 558.
Charadrius helveticus (*Briss.*), *Lichtenstein, Verz. Doubl. Zool. Mus. Berlin,* p. 70 (1823).
Charadrius pardela, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 142 (1826).
Squatarola cinerea, *Fleming, Brit. An.* p. 111 (1828).

Charadrius squatarola (*Linn.*), *Naumann, Vög. Deutschl.* vii. p. 249 (1834).
Squatarola melanogaster (*Bechst.*), *Malherbe, Faun. Orn. Sicil.* p. 166 (1840).
Squatarola helvetica (*Briss.*), *Keyserling & Blasius, Wirb. Eur.* p. 207 (1843).
Vanellus squatarola (*Briss.*), *Schlegel, Rev. Crit.* p. lxxxiv (1844).
Pluvialis squatarola (*Linn.*), *Macgillivray, Hist. Brit. B.* iv. p. 86 (1852).
Squatarola wilsoni, *Lichtenstein, Nomencl. Av.* p. 95 (1854).
Squatarola rhynchomega, *Bonap. Compt. Rend.* xliii. p. 416 (1856).
Pluvialis varius (*Briss.*), *Degland & Gerbe, Orn. Eur.* p. 127 (1867).
Charadrius varius (*Briss.*), *Finsch & Hartlaub, Vög. Ost-Afr.* p. 644 (1870).

Literature.

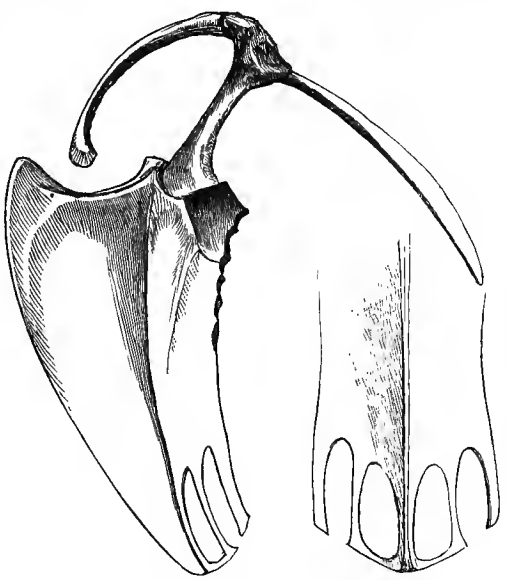
Plates.—Gould, Birds Great Britain, iv. pls. 36, 37; Dresser, Birds of Europe, vii. pls. 517, 518, 519.
Habits.—Seebohm, British Birds, iii. p. 44.
Eggs.—Seebohm & Harvie-Brown, Ibis, 1876, pl. v.; Seebohm, British Birds, pl. 25. figs. 7, 8, 9.

Specific characters.

The Grey Plover is easily diagnosed by its *black axillaries*.

Geographical distribution.

The Grey Plover is found more or less commonly on the coasts of the British Islands, chiefly during autumn migration, but occasionally in winter and spring. It is far less numerous on the west coasts than on the east. It frequents in small numbers the inner islands on the west coast of Scotland, but only occurs sparingly in the Outer Hebrides. In Ireland it is still less common, although it appears regularly every season.

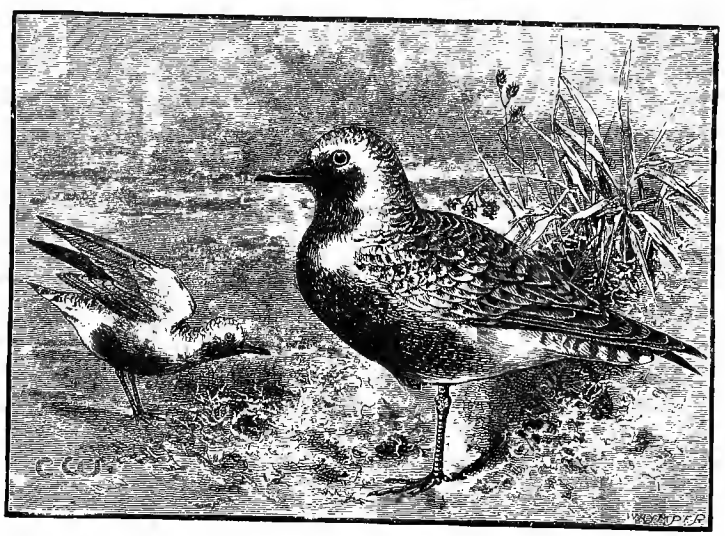


The Grey Plover is a circumpolar bird, but has only been known to breed on the tundras above the limit of forest-growth. It appears to be very local in its distribution during the breeding-season. It is not known with certainty to breed anywhere except in the lower valley of the Petchora, on the Taimyr peninsula, and the delta of the Lena, in the north of Siberia, in Alaska, on the banks of the Anderson river, and on Melville peninsula. It passes through Central and Southern Europe on migration, and winters in the basin of the Mediterranean and in South Africa. The eastern birds pass through South Siberia, Turkestan, Mongolia, and Japan on migration, and winter in India, South China, Australia, and the islands of the Malay archipelago, including New Guinea, the Salomon Islands, &c. In the New World its range has not been so accurately determined, but it is known to

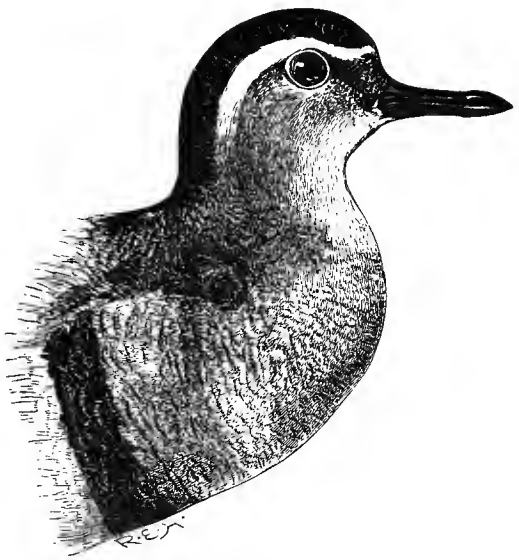
pass the Bermudas on migration (Reid, Zoologist, 1877, p. 474), to winter in the West Indies and in several parts of South America as far south as Peru and Brazil.

Close affinity to the Golden Plovers.

In its habits and seasonal changes of plumage the Grey Plover scarcely differs from the Golden Plovers, and the yellow colour of its young in down, as well as young in first plumage, proves its near relationship to those birds.



†† *Dotterels.*



CHARADRIUS MODESTUS.

FALKLAND-ISLAND DOTTEREL.

Diagnosis.

CHARADRIUS halluce parvo: axillaribus albis: secundariis ferè omninò brunneis.

Variations.

EXAMPLES from Tierra del Fuego are certainly subspecifically, and possibly specifically, distinct.

Synonymy.

Charadrius modestus, *Lichtenstein, Verz. Doubl.* p. 71 (1823).
Tringa urvillii, *Garnot, Ann. Sc. Nat.* vii. p. 46 (1826).
Vanellus cinctus, *Lesson, Voyage Coquille, Zool.* i. p. 720 (1826).
Squatarola cincta (*Lesson*), } *Gould, Zool. Voyage 'Beagle,'* p. 126 (1841).
Squatarola fusca, }
Zonibyx modesta (*Licht.*), *Bonap. Compt. Rend.* xliii. p. 417 (1856).
Eudromias urvillii (*Garnot*), *Sclater, Proc. Zool. Soc.* 1860, p. 386.
Vanellus modesta (*Licht.*), *Burmeister, Syst. Uebers. Thier. Bras.* pt. iii. p. 362 (1856).
Eudromias modestus (*Licht.*), *Harting, Ibis,* 1870, p. 202.
Morinellus modestus (*Licht.*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 48 (1873).

Literature.

PLATES.—Lesson & Garnot, Voy. Coquille, Atlas, Zool. pl. 43.
HABITS.—Abbott, Ibis, 1861, p. 155.
EGGS.—Gould, Proc. Zool. Soc. 1859, p. 95. Examples in the British Museum exactly resemble typical eggs of *C. morinellus* in colour, but measure 1·8 by 1·2 inch.

Specific characters.

The Falkland-Island Dotterel possesses *a hind toe*; has *white axillaries*; and its *secondaries are uniform brown, with a little white principally at the tip of the four or five innermost.* In breeding-plumage it is a very handsome bird; the sexes are alike, but young in first plumage and adults in winter have the whole of the underparts white, with a broad band of brown across the breast.

Geographical distribution.

It is not known to breed anywhere except upon the Falkland Islands; but upon Tierra del Fuego it is represented by a nearly allied local race, the distinction between which and the typical form is hereafter described. The Falkland-Island Dotterel migrates northwards in autumn, and has occurred in various localities on the east coast of Patagonia, and as far north as Buenos Ayres (Sclater & Salvin, Proc. Zool. Soc. 1868, p. 144) and Uraguay, where Darwin procured it during the voyage of the 'Beagle.' I have an example collected by Capt. Harrison at Santa Lucia, Rio de la Plate, which is unquestionably the Falkland-Island form.

Seasonal distribution.

It arrives on the Falkland Islands early in September and leaves during April. It is an inland bird during the breeding-season, but on migration and during winter it becomes a shore bird, as might be inferred from the fact of its plain winter dress.

CHARADRIUS MODESTUS RUBECOLA.

CHILIAN DOTTEREL. (PLATE I.)

Diagnosis.

CHARADRIUS MODESTUS magnitudine minore: colore obscuriore.

Variations.

THE Chilian and Falkland-Island Dotterels appear to intergrade.

Synonymy.

Charadrius rubecola, *Vigors, Zool. Journ.* iv. p. 96 (1829).
Squatarola urvillii (*Garnot*), *apud Bridges, Proc. Zool. Soc.* 1843, p. 118.
Hiaticula fusca (*Gould*), *apud Cassin, U.S. Expl. Exp., Mamm. & Orn.* p. 328 (1858).

Literature.

PLATES.—Jardine & Selby, Ill. Orn. ii. pl. 110.
HABITS.—Darwin, Gould's Zool. Voy. 'Beagle,' p. 126.
EGGS.—Unknown.

The Chilian Dotterel is so closely allied to the Falkland-Island Dotterel that it can scarcely be regarded as more than subspecifically distinct. Gould, who seldom described a bad species, or allowed a good one to escape his notice, discovered the difference between the two races, but unfortunately gave a new name to the wrong one. Gay (Hist. Chile, Zool. p. 401) also pointed out the fact, and it is also recognized by Cassin (U.S. Expl. Exp. Mamm. & Orn. p. 328); but recent writers on Neotropical Ornithology appear to have ignored it.

Subspecific characters.

The Chilian Dotterel is a smaller bird than its ally, with a proportionately shorter tarsus. The *wing from the carpal joint* measures 5·4 *to* 5·6 *inch*, instead of 5·8 to 5·9 inch; and the tarsus 1·1 to 1·2 inch instead of 1·4 to 1·5 inch. The contrast in colour is also very marked. The *upper parts* of the Chilian birds are *blackish brown* instead of greyish brown. The *chin, throat, and sides of the neck are uniform slate-grey*, whilst in the allied form the sides and front of the neck are pale slate-grey, shading into nearly white on the upper throat and chin. Even in winter plumage the darker upper parts are conspicuous.

Geographical distribution.

The Chilian Dotterel breeds on Tierra del Fuego, and probably on the opposite shores of the Straits of Magellan, migrating northwards to winter on the coasts of Chili, where it is common as far north as Valparaiso (Bridges, Proc. Zool. Soc. 1843, p. 118), and on the coast of Patagonia, where it has recently been obtained by Mr. Young in Tova Harbour (lat. 45° south), in full breeding plumage, on the 26th of August.

CHARADRIUS SOCIABILIS.

MAGELLANIC PLOVER. (PLATE II.)

Diagnosis.

CHARADRIUS halluce parvo: tarso quam digitus medius cum ungue breviore.

Variations.

ONLY three examples of this species are known.

Synonymy.

Pluvianellus socialis, *Hombron & Jacquinot, fide Gray, Genera of Birds*, iii. p. 549 (1846).
Pluvianellus sociabilis, *Hombron & Jacquinot, Voy. au Pôle Sud &c.* iii. p. 125 (1853).
Strepsilas sociabilis (*Homb. & Jacq.*), *Giebel, Thes. Orn.* iii. p. 541 (1877).

Literature.

PLATES.—Homb. & Jacq. Voy. au Pôle Sud &c. pl. 30.
HABITS.—Described by Mr. Young as closely resembling those of the Ringed Plover.
EGGS.—Unknown.

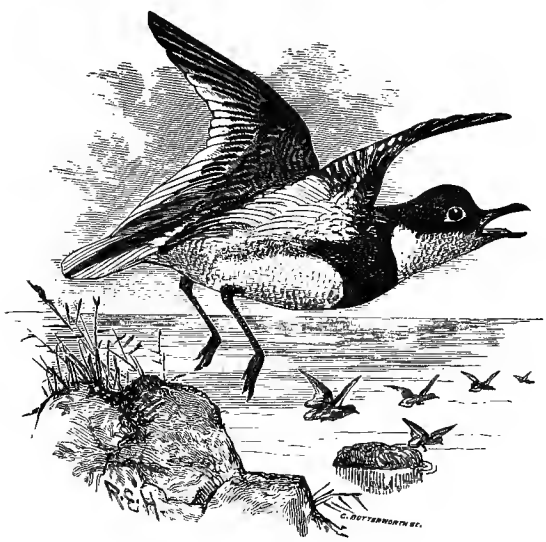
Specific characters.

The Magellanic Plover may be at once distinguished from those of its congeners which, like it, are furnished with *a hind toe*, by its *short tarsus*, which is *not so long as the middle toe and claw*.

Geographical distribution.

It was originally discovered nearly fifty years ago in the Straits of Magellan; but the type in the Paris Museum, and a second example obtained at the same time and now in the British Museum, remained unique until last year, when Mr. John Young shot one bird out of a flock of five or six which frequented a rocky point in Tova Harbour on the coast of Patagonia, in lat. 45° south.

The irides and the legs and feet of this bird are described by Mr. Young as pink, exactly the ordinary tint of red tape, a colour with which he must be very familiar at the War Office. The secondaries are grey, gradually becoming whiter as they approach the tertials, which suddenly become very grey.



CHARADRIUS RUFIVENTRIS.

AUSTRALIAN FOUR-TOED DOTTEREL. (PLATE III.)

Diagnosis.

CHARADRIUS halluce parvo: primariis interioribus et secundariis omnibus latè albo terminatis.

Variations.

IT is not known that this species is subject to any local variation.

Synonymy.

Erythrogonys cinctus, *Gould, Proc. Zool. Soc.* 1837, p. 155.
Vanellus rufiventer, *Lesson, L'Echo du Monde Savant,* 1844, p. 207.
Vanellus cinctus (*Gould*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 59 (1865).

Literature.

Plates.—Gould, Birds of Australia, vi. pl. 21.
Habits.—Gould, Handb. Birds Austr. ii. p. 240.
Eggs.—Campbell, Nests and Eggs of Australian Birds, p. 54.

The Australian Four-toed Dotterel was originally described by Temminck (Cat. Syst. Cab. d'Orn. pp. 172, 259) in 1807, as Le Vanneau Nain de la Nouvelle Galle Méridionale, but it did not receive a Latin name until it was rediscovered by Gould, who called it the Red-kneed Dotterel, and gave it the scientific name of *Erythrogonys cinctus.* Lesson afterwards discovered that the genus was a hopelessly bad one, and that the new Australian species belonged to the same genus as the South-American Dotterel, to which he had given the same specific name. The *Vanellus cinctus* of Lesson, dating from 1826, though superseded by *Charadrius modestus* of Lichtenstein, dating from 1823, nevertheless supersedes *Erythrogonys cinctus* of Gould, dating only from 1837, so that Lesson was obliged to rename Gould's species.

Nomenclature.

It may always be recognized by the *broad white tips of its secondaries and innermost primaries.*

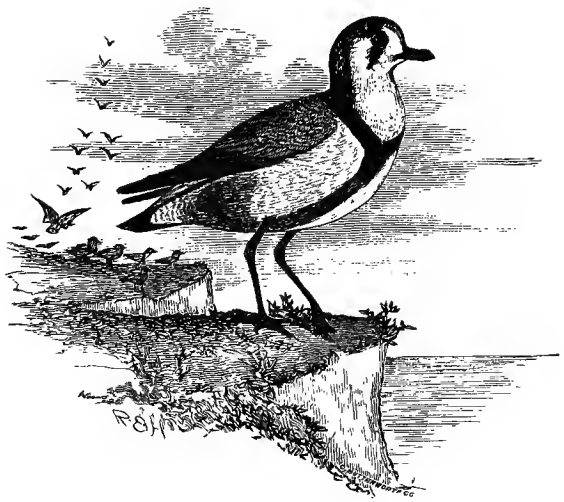
Specific characters.

It is a summer visitor to South Australia, New South Wales, and Victoria, wintering in Queensland. It is said to frequent the banks of lakes and rivers, and rarely if ever to visit the coast, even in winter; consequently it wears its conspicuous summer dress all the year round.

Geographical distribution.

The broad white tips of the innermost primaries and of all the secondaries of this bird are very remarkable. It is a common occurrence to find the pattern of the colour of the primaries different from that of the secondaries, but the rule is that it suddenly changes at the first secondary—in other words, *the pattern of the colour is correlated with the structure.* The Australian Four-toed Dotterel is one of the comparatively few exceptions to this rule. The white tips of the secondaries are continued on the five innermost primaries, but (as if to protest against the apparent violation of the law) a slight change in the distribution of the colours is made; on the few outermost secondaries the amount of white is about the same on both webs, but on the few innermost primaries which adjoin them there is more white on the inner web than on the outer, so that after all the rule is not violated—pattern of colour is correlated with structure. This law, which bears some analogy to the golden rule in architecture that you may ornament construction but must not construct ornament, is scarcely reconcilable with the theory of natural selection from fortuitous variations. As Butler would say, if the quills got their white tips from the mere toss up of the dice, surely the secondaries must have cheated a little!

Correlation of colour with structure.



CHARADRIUS AUSTRALIS.

AUSTRALIAN DOTTEREL.

Diagnosis. CHARADRIUS axillaribus fulvis.

Variations. THE only variation known in this species is due to age.

Synonymy. Eudromias australis, *Gould, Proc. Zool. Soc.* 1840, p. 174.
Morinellus australis, *Gould, Bonap. Compt. Rend.* xliii. p. 417 (1856).

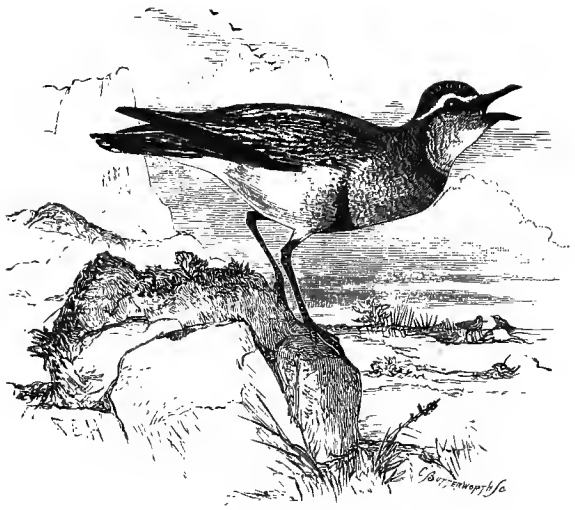
Literature. PLATES.—Gould, Birds of Australia, vi. pl. 15.
HABITS.—Gould, Handb. Birds Austr. ii. p. 227.
EGGS.—Campbell, Nests and Eggs of Australian Birds, p. 53.

Specific characters. The Australian Dotterel may always be recognized by its *dark buff axillaries*, or by the *chestnut-buff on the outer webs of the innermost primaries*.

Geographical distribution. It appears to be confined to the southern half of Australia, where it inhabits the sandy plains of the interior. It has not been recorded either from West Australia or Tasmania.

It is difficult to say which it most resembles, *Charadrius hiaticula*, *Charadrius morinellus*, or *Cursorius bicinctus*, but its resemblance to the latter is probably an example of analogy rather than of affinity.

Plumage of young. Young in first plumage have the chestnut on the belly, but are without the black on the head, neck, and breast. It is not known that the colour of the plumage of adult birds varies either with sex or season.



CHARADRIUS TOTANIROSTRIS.

SLENDER-BILLED DOTTEREL. (PLATE IV.)

CHARADRIUS abdomine maculâ nigrâ magnâ ornato: axillaribus albis: caudâ strigâ nigrâ prope apicem fasciatâ. Diagnosis.

No local forms of this species are known. Variations.

Charadrius ruficollis[1], *Licht. fide Wagler, Isis,* 1829, p. 653. Synonymy.
Oreopholus totanirostris, *Jardine & Selby, Ill. Orn.* iii. pl. 151 (1835).
Hoplopterus ruficollis (*Wagler*), *Gray, Genera of Birds,* iii. p. 542 (1847).
Dromiceius lessoni, *Lesson, fide* } *Bonap. Compt. Rend.* xliii. p. 597 (1856).
Oreophilus ruficollis (*Wagler*), }
Morinellus totanirostris (*Jard. & Selb.*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 47 (1865).

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[1] The name of *Charadrius ruficollis* is a very objectionable one, as it has been applied to other species of Plovers. There is an apparently mythical *C. ruficollis* of Cuvier, which frequently crops up in the synonymy. In 1844 Schlegel (Rev. Crit. Ois. Eur. p. 95) quotes it as a MS. name in the Paris Museum, and refers it to *C. mongolicus*. Pucheran in his paper on Cuvier's types in the Paris Museum (Rev. et Mag. Zool. 1851, p. 282) suggests that it may be Temminck's Pluvier à poitrine rousse (Cat. Syst. Cab. d'Orn. pp. 173, 262), a Plover from Namaqua Land, which was doubtless an example of *Charadrius asiaticus*. Hartlaub doubtfully refers the *C. ruficollis* of Cuvier to *C. mongolicus* (Journ. Orn. 1855, p. 420); but in 1873 Heuglin adds it without a query to the synonyms of that species (Orn. Nordost Afric. ii. p. 1023). Wagler quotes it as a MS. name of Lichtenstein in the Berlin Museum. Under any circumstances the wisest plan is to allow the name to vanish in the limbo of synonyms.

Literature.

PLATES.—Jardine & Selby, Ill. Orn. iii. pl. 151.
HABITS.—Durnford, Ibis, 1877, p. 42.
EGGS.—Unknown.

Specific characters.

The Slender-billed Dotterel has many claims to be regarded as subgenerically distinct from its allies, though its slender bill is not one of them. It may be recognized by its combination of three characters—*a large black patch on the belly, white axillaries,* and a *black subterminal band across the tail-feathers.*

Geographical distribution.

The Slender-billed Dotterel is generally distributed throughout temperate South America, as far south as the Straits of Magellan (Cunningham, Ibis, 1870, p. 499); but it is probably only a summer visitor to that district, as it is only a partial resident in Central Patagonia (Durnford, Ibis, 1878, p. 402), great numbers migrating southwards in spring. On the east coast it occurs as far north as Buenos Ayres (Durnford, Ibis, 1877, p. 197; confirmed by Capt. Harrison); and on the west it is found in Chili (Bridges, Proc. Zool. Soc. 1843, p. 117), and on the mountain plateaux of Bolivia (d'Orbigny, in the Leyden Museum) and Peru (Whitely, Proc. Zool. Soc. 1867, p. 989).

Young.

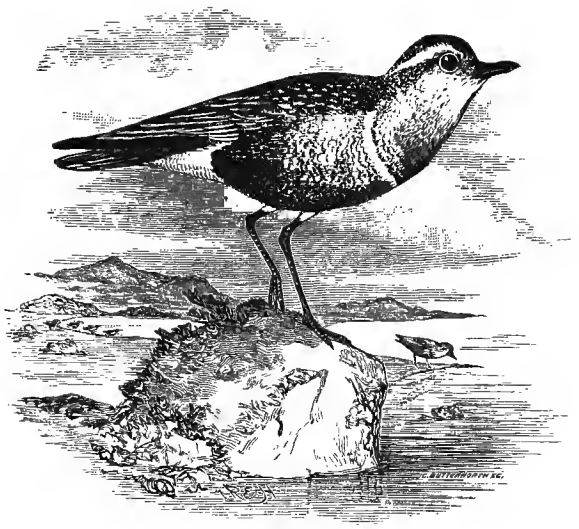
Durnford found young in down in Patagonia on the 30th of December, but its eggs appear to be unknown. I have an example of the young in first plumage from the neighbourhood of Santa Elena in Patagonia; the black patch on the belly is well developed. The black patch does not disappear in winter, and is equally conspicuous in examples procured in March, June, August, and December.

Nearly allied to the Common Dotterel.

It resembles *C. morinellus* in the shape and colour of its tail, in the pattern of the colour on its head and neck, but differs from it in having white axillaries, and white on the outer web of the innermost primaries.

Habits.

I am indebted to Mr. H. B. James for an interesting account of the habits of this bird in Chili :—"The first time I saw this bird was in the province of Tarapaca, on the plains which are destitute of all moisture, about 3500 feet above sea-level. It was in September; they were generally in small flocks of perhaps a dozen, but sometimes I saw a single bird. I imagine these must have been stragglers on migration, as both further north and south they appear in immense numbers. Near Coquimbo they arrive about the middle of April, and show excellent sport; moreover they are very good indeed to eat. They do not frequent the low marshy grounds, but keep to the higher plains, which have at that time of the year some little moisture on them. To the south of Valparaiso they arrive a little later in still larger flocks, and remain there until the middle of September; there the ground is fairly wet all winter. There is no cover except grass on the plains where they congregate, so it is difficult to approach within shot. I have often followed them up two or three hundred yards without getting a chance, they keeping up a run just out of range. Good bags may be made by four or five guns stationed half a mile apart round the plain, and with a dog to put them up; they usually circle round, and give overhead shots. I have known fifty couple killed in one day on the plains about Talca in the above manner. Landbeck says they go up to the Cordillera to breed."



CHARADRIUS MORINELLUS.

DOTTEREL.

CHARADRIUS axillaribus fuscis : rostro quam digitus medius breviore. Diagnosis.

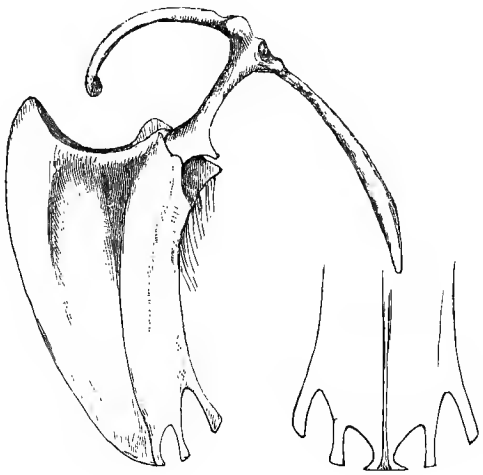
BREHM divides the Dotterel into three species, founded upon the relative heights of the forehead and crown, probably individual variations of no geographical significance. Variations.

Charadrius morinellus, *Linneus, Syst. Nat.* i. p. 150 (1758) ; *Linn. Syst. Nat.* i. p. 254 (1766). Synonymy.
Pluvialis minor, *sive* morinellus, *Brisson, Orn.* v. p. 54 (1760).
Charadrius tartaricus, *Pallas, Reise Russ. Reichs,* ii. p. 715 (1773).
Charadrius sibiricus, *Gmelin, Syst. Nat.* i. p. 690 (1788).
Eudromias morinella (*Linn.*), *Brehm, Vög. Deutschl.* p. 545 (1831).
Pluvialis morinellus (*Linn.*), *Macgillivray, Man. Brit. Birds,* ii. p. 50 (1842).
Morinellus sibiricus (*Gmel.*), *Bonap. Compt. Rend.* xliii. p. 417 (1856).

PLATES.—Daub. Pl. Enl. no. 822; Gould, Birds Gr. Brit. iv. pl. 43 ; Dresser, Birds of Europe, vii. pl. 526. Literature.
HABITS.—Seebohm, British Birds, iii. p. 30.
EGGS.—Seebohm, British Birds, pl. 26. figs. 1, 2, 3.

Specific characters.

The Dotterel has *grey axillaries*. In breeding-plumage it is easily distinguished by its black belly and chestnut lower breast and flanks; and at all seasons its short bill is remarkable; its *bill* from the frontal feathers is *shorter than the middle toe without the claw*.



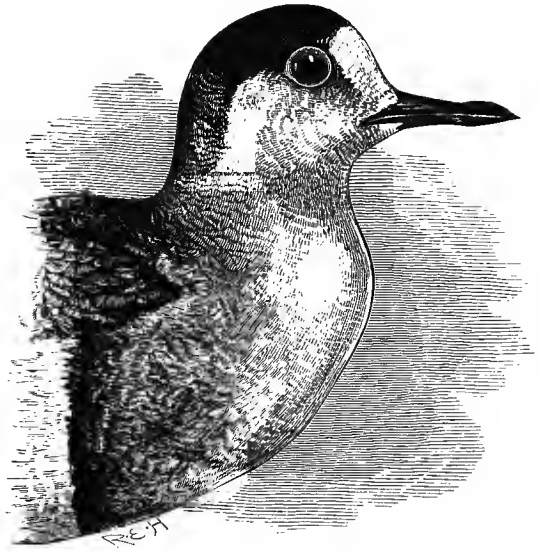
Geographical distribution.

The Dotterel, like the Ringed Plover, is a Western Palæarctic bird, which has probably only recently extended its breeding-range into Asia. It breeds on the tundras above the limits of forest-growth from the Atlantic to the Pacific, and winters in Africa north of the equator. It passes through West Siberia, Turkestan, and Central Europe on migration, a few remaining to breed on the Alps, the mountains of Great Britain, and Scandinavia, and a few remaining to winter on the northern shores of the Mediterranean. The Dotterel has never been known to occur in the Oriental Region or in South-east Siberia, and its alleged occurrence in Japan (Cassin, Proc. Ac. Nat. Sc. Philad. 1858, p. 195) is probably based on a case of mistaken identity.

Nearest ally.

It has no very near relation, but is probably less distantly allied to *C. veredus* than to any other species.

The Common Dotterel has been generically separated from the Common Ringed Plover on the ground that the former "has a very peculiar and characteristic sternum," which is said to "differ greatly" from that of the latter (Dresser, Birds of Europe, vii. p. 481). It is a gross abuse of anatomical characters to separate the subgenus *Eudromias* from the subgenus *Ægialitis* on the ground that they differ in the shape of the sternum. The alleged differences, if they exist at all, of which I can find no evidence after a careful examination of several examples of each, are supposed to be in the shape of the posterior extremity of the sternum. This is a character which varies greatly with age, and appears to be of very little generic value in the Charadriidæ. As Messrs. A. & E. Newton very cautiously remark (Phil. Trans. Royal Soc. 1869, p. 337), "the characters afforded by the posterior extremity of the sternum are certainly not so constant in birds generally as those to be deduced from the anterior end."



CHARADRIUS VEREDUS.

ORIENTAL DOTTEREL.

Diagnosis.

CHARADRIUS axillaribus fuscis: digito medio quam rostrum breviore.

Variations.

IT is not known that this species is subject to any local variation.

Synonymy.

Charadrius veredus, *Gould, Proc. Zool. Soc.* 1848, p. 38.
Ægialites veredus (*Gould*), *Swinhoe, Proc. Zool. Soc.* 1870, p. 141.
Eudromias veredus (*Gould*), *Harting, Ibis*, 1870, p. 209.

Literature.

PLATES.—Gould, Birds of Australia, vi. pl. 14; Harting, Ibis, 1870, pl. vi.; David & Oust. Ois. Chine, pl. 120.
HABITS.—Prjevalski, Rowley's Orn. Misc. ii. p. 434.
EGGS.—Unknown.

Specific characters.

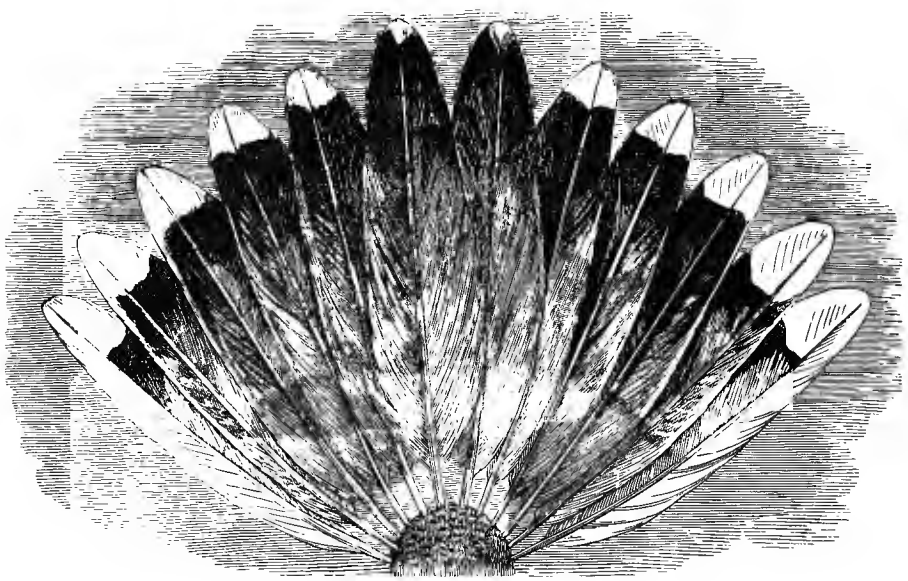
The Oriental Dotterel has *grey axillaries* like the Common Dotterel, *C. morinellus*, and the Oriental Golden Plover, *C. fulvus*, and its American ally. Its white belly distinguishes it from either of these species in summer plumage, but at all ages and seasons its small

Courser-like foot is the best character: the *middle toe without the claw* is *shorter than the bill*, and *less than half the length of the tarsus*.

Geographical distribution.

The Oriental Dotterel breeds in Mongolia, and winters from Java to Australia. I have an example from Samarcand.

It is nearest allied to the Common Dotterel, with which it agrees in the important character of having no white on the outer web of the innermost primaries.



Tail of *Charadrius hiaticula*.

Subgenus HIATICULA.

Diagnosis of subgenus.

CHARADRII axillaribus albis: halluce nullo: abdomine albo: caudâ fasciâ obscurâ prope apicem ornatâ.

Subgeneric characters.

THE characteristic feature of the Ringed Plovers is the *dark subterminal band across the tail-feathers*, a character which separates them from the Sand-Plovers, the Typical Plovers, and the Four-toed Dotterels. In order to separate them from the four Three-toed Dotterels, which have a more or less developed black subterminal band across the tail, it is necessary

to add two more characters. *Axillaries white*, effectually excludes *C. morinellus*, *C. veredus*, and *C. australis*; whilst *belly white*, excludes *C. totanirostris* at all ages and seasons.

The Ringed Plovers appear to be a well-characterized group, though their characters are all dependent upon colour or pattern of colour, and cannot be regarded as structural, at least so far as they are known. These birds may be described as follows :—

Other characters.

A dark ring passes round the neck—black in males in breeding-dress; brown in males in winter-dress, in females at all seasons, and in birds of the year of both sexes. Above this dark ring is generally a white ring, but this is in one species confined to a white collar at the back of the neck, and in another species both collars are absent. The legs and feet are always pale, and the base of the bill is generally pale. The hind toe is always absent. The two centre tail-feathers are brown at the base, nearly black towards the end, with a spot of white at the extreme tip; each succeeding feather has a longer white tip, and is paler at the base, until the outer web of the outer feather is pure white, but otherwise the black subterminal band is very conspicuous. The axillaries are always white, as is also the belly.

They may be subdivided into two groups, one of which has white at the base of the outer webs of the innermost primaries, whilst the other has no white on the outer webs of the primaries. The former may be diagnosed as follows :—

Hiaticulæ typicæ.

Subgeneric group *Hiaticulæ typicæ*, primariorum interiorum pogoniis externis pro magnâ parte albis.

The latter may be diagnosed as :—

Hiaticulæ minores.

Subgeneric group *Hiaticulæ minores*, primariorum interiorum pogoniis externis omninò brunneis.

Emigrations.

Of the first group *C. hiaticula* may be regarded as the type. They seem to have escaped from the Polar Basin along the Atlantic coast of America. *C. semipalmatus* returned to the north when the Glacial Period was over, and subsequently spread westwards to Alaska, having been isolated in Central America, whilst *C. melodus* was probably isolated in the West Indies. *C. hiaticula* seems to have crossed over by way of Iceland from Greenland, and to have subsequently spread eastwards as far as the valley of the Yenesay. It was probably isolated in Africa, where it still winters, and whence emigrating parties crossed over to Australia and subsequently to New Zealand, becoming respectively *C. monachus* and *C. novæ-zelandiæ*, their greatly changed conditions of life favouring rapid differentiation. *C. vociferus* may have been differentiated in the valley of the Amazon, whence a colony crossed over to West Africa and intermarried with some of the ancestors of *C. minor*, as hereinafter suggested.

Of the second group *C. minor* may be regarded as the type. They appear to represent the Plovers which escaped from the Polar Basin up the great Asiatic rivers, and they are for the most part river and lake Plovers rather than shore birds.

During the Glacial Period they seem to have been differentiated into four species: *C. tricollaris* and its post-glacial allies *C. forbesi* and *C. bifrontatus* were isolated in

Africa, *C. minor* and its post-glacial ally *C. jerdoni* in India, *C. placidus* in China, and *C. nigrifrons* in Australia.

It seems probable that the ancestors of *C. tricollaris* met with a party of emigrants from Brazil, part of the ancestors of *C. vociferus*, at such an early stage of their differentiation that they coalesced, and founded a species intermediate between the two, an instance of the extinction of subspecies by interbreeding, according to the theory of Menzbier. In post-glacial times the three-banded Plovers of West Africa appear to have become completely differentiated from those of South Africa, the former becoming *C. forbesi* and the latter *C. tricollaris*; some of which afterwards emigrated to Madagascar and became *C. bifrontatus*.

In a slightly different way *C. jerdoni* may have become partially differentiated in Ceylon and Southern India, the resident birds probably breeding earlier than those which migrate northwards to breed, an example of physiological isolation (miscalled by Romanes physiological selection).

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Hiaticulæ typicæ.		*Hiaticulæ minores.*
	PALÆARCTIC REGION.	
C. HIATICULA	*North-west.*	
	South.	C. MINOR.
	South-east.	C. PLACIDUS.
	ETHIOPIAN REGION.	
	West Africa.	C. FORBESI.
	South and East Africa.	C. TRICOLLARIS.
	Madagascar.	C. BIFRONTATUS.
	ORIENTAL REGION.	
	India and Burma.	C. JERDONI.
	AUSTRALIAN REGION.	
	East Australia.	C. NIGRIFRONS.
C. MONACHUS	*South Australia.*	
C. NOVÆ-ZELANDIÆ	*New Zealand.*	
	NEARCTIC REGION.	
C. SEMIPALMATUS	*North.*	
C. VOCIFERUS	*South.*	
C. MELODUS	*East.*	
C. CIRCUMCINCTUS	*Central.*	

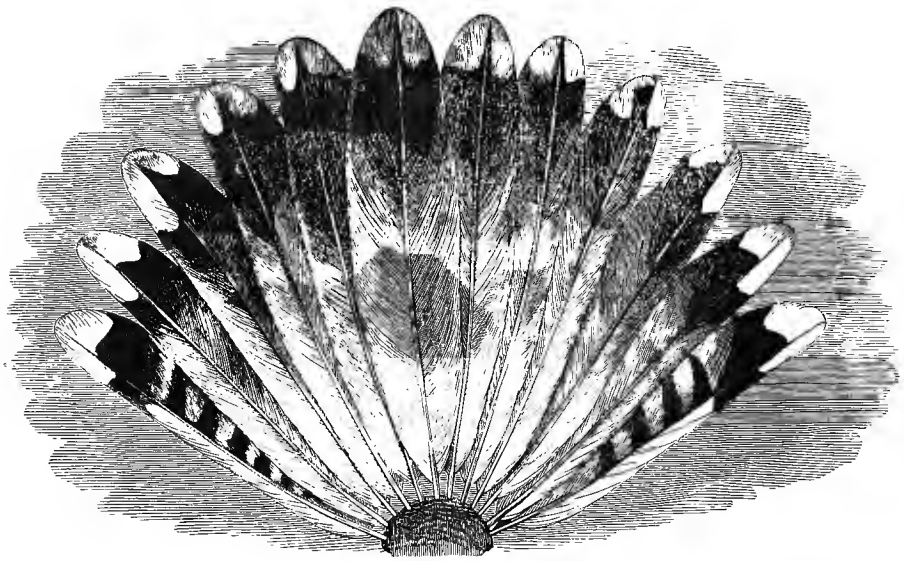
KEY TO THE SPECIES.

So far as I have been able to ascertain all the following characters are found in both sexes, in young as well as adults, and at all seasons. Where the dark bands across the breast are black in adult birds they are brown in young in first plumage. The chestnut-red scapulars of the adult of *C. nigrifrons* are represented in the young by chestnut-red on some of the wing-coverts.

- **nigrifrons** . . . . — Scapulars or wing-coverts chestnut-red.
- **minor.**
- Outer tail-feather $\frac{1}{6}$ shorter than longest.
  - **placidus.**
  - **bifrontatus** . . . — A broad brown band between the white forehead and the base of the bill.
  - **tricollaris** . . . — Two dark bands across the breast.
- Outer tail-feather crossed by three bars on the inner web.
  - **forbesi** . . . . .
  - **vociferus** . . . . — Two dark bands across the breast.
- **hiaticula** . . . .
- Outer and middle toe webbed to second joint
  - **semipalmatus** . .
- Mantle pale grey . . . .
  - **melodus** . . . . — White at base of outer web of innermost primaries.
  - **monachus** . . . .
  - **novæ-zelandiæ** . . — Central upper tail-coverts nearly black.

There can be no doubt that all these birds are very nearly related to each other. Of the twelve species only two have been made the types of new genera, *C. vociferus* and *C. novæ-zelandiæ*. The former is probably more nearly related to *C. hiaticula* than it is to its admitted congener *C. tricollaris*; and the latter is probably more nearly allied to *C. monachus* than to any other bird.

*** *Subgeneric group Typical Hiaticulæ.*
† *New-World Species.*



CHARADRIUS VOCIFERUS.

KILLDEER PLOVER.

Diagnosis. CHARADRIUS uropygio et supracaudalibus rufis.

Variations. THIS species is not known to vary throughout its wide range.

Synonymy.

Charadrius vociferus, *Linneus, Syst. Nat.* i. p. 150 (1758) ; *Linn. Syst. Nat.* i. p. 253 (1766).
Pluvialis virginiana torquata,
Pluvialis dominicensis torquata,
Pluvialis jamaicensis torquata,
} *Brisson, Orn.* v. pp. 68, 70, 75 (1760).
Charadrius torquatus, *Linneus, Syst. Nat.* i. p. 255 (1766).
Charadrius jamaicensis, *Gmelin, Syst. Nat.* i. p. 685 (1788).
Ægialites vociferus (*Linn.*), *Bonap. Comp. List B. Eur. & N. Amer.* p. 45 (1838).
Hiaticula vocifera (*Linn.*), *Gray, List Birds Brit. Mus.* iii. p. 71 (1844).
Oxyechus vociferus (*Linn.*), *Bonap. Compt. Rend.* xliii. p. 417 (1856).

Literature.

PLATES.—Wilson, Am. Orn. pl. 59. fig. 6 ; Audubon, Birds Am. v. pl. 317.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 148.
EGGS.—Secbohm, British Birds, pl. 26. fig. 4.

The Killdeer Plover may always be recognized by its *chestnut-buff lower back, rump, and upper tail-coverts.* Young in first plumage only differ from adults in having every feather of the upper parts margined with buff. Specific characters.

It breeds throughout the United States of America and in Southern Canada. In the Southern States it is a resident, but to the Northern States and to Canada it is only a summer visitor, migrating in autumn to Mexico, the West Indies, Central America, and various portions of South America, Colombia (Salmon, Proc. Zool. Soc. 1879, p. 547), Peru (Whitely, Proc. Zool. Soc. 1868, p. 176), and possibly some other localities. It is said that a few remain to breed in Mexico and Jamaica. The fact that it passes the Bermuda Islands regularly on migration in small flocks makes it not improbable that it may occasionally visit the British Islands. Two occurrences are on record. Geographical distribution.

The Killdeer Plover is an inland species and is seldom seen near the coast, except on migration; consequently the variations attributable to differences of sex or season are very slight. Local distribution.

CHARADRIUS MELODUS.

AMERICAN PIPING-PLOVER.

CHARADRIUS, subgen. *Hiaticulæ typicæ,* dorso et supracaudalibus centralibus pallidis griseis. Diagnosis.

INLAND birds differ from examples from the coast as hereinafter described. Variations.

Charadrius melodus, *Ord, Wilson's Am. Orn.* vii. p. 71 (1824). Synonymy.
Charadrius okeni, *Wagler, Syst. Av.* p. 63 (1827).
Ægialites melodus (*Ord*), *Bonap. Comp. List B. Eur. & N. Amer.* p. 45 (1838).
Hiaticula meloda (*Ord*), *Gray, List Birds Brit. Mus.* iii. p. 69 (1844).

PLATES.—Wilson, Am. Orn. pl. 37. fig. 2; Audubon, Birds Am. v. pl. 321. Literature.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 160.
EGGS.—Described by Brewer in the same volume, p. 163.

The Piping-Plover may be distinguished from the adults of most of its allies by its *white lores*; but since immature birds of many of the Plovers also have nearly white

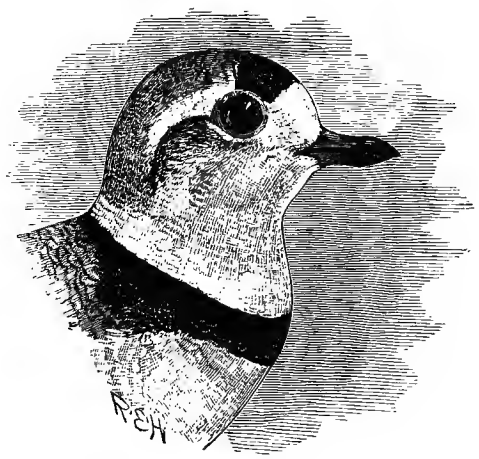
lores, it is necessary to add another diagnosis: *mantle and central upper tail-coverts pale grey.*

Geographical distribution.

It is said to be almost exclusively a sea-shore bird, breeding on the Atlantic coasts of Canada and the more northerly of the States. It is a winter visitor to the coasts of the Southern States, but is said to be a resident in Florida and some of the West Indies. It occasionally appears on the Bermudas (Reid, Zoologist, 1877, p. 475).

It appears to be nearest allied to *C. hiaticula*, though it has become considerably differentiated from that species.

According to the American ornithologists, a colony of Piping-Plovers breed inland in the valley of the Missouri, and are said to have developed a complete black pectoral band; whilst the coast birds, probably finding it too conspicuous in such an exposed situation, have only acquired it on the sides of the breast.



CHARADRIUS MELODUS CIRCUMCINCTUS.

WESTERN PIPING-PLOVER.

Diagnosis. CHARADRIUS MELODUS collari nigro pectorali integro.

Synonymy. Ægialitis melodus, *var.* circumcinctus, *Coues, Check-list N. Amer. B.* p. 133 (1873).

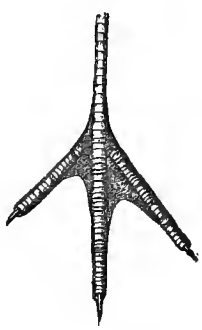
PLATES.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 161 (figure of head). Literature.

HABITS. } Described in the same volume, p. 163, as similar to those of *C. melodus*.
EGGS. }

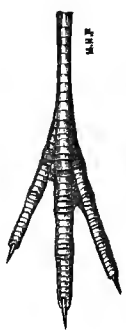
The Western Piping-Plover only differs from the eastern form in having the black ring round the neck meeting on the breast. Subspecific characters.

It is said to inhabit (presumably as a summer visitor only) the basin of the Missouri, breeding on the banks of the rivers and the shores of the lakes. Geographical distribution.

In both forms of this species the black ring round the neck and the black band across the forehead are wanting in young in first plumage, but in adult birds they vary in intensity very slightly in consequence of sex, and not at all in relation to season.



C. semipalmatus.



C. hiaticula.

CHARADRIUS SEMIPALMATUS.

SEMIPALMATED RINGED PLOVER.

CHARADRIUS digitorum non solum externo cum medio, sed etiam medio cum interno membranâ connexo. Diagnosis.

Variations.

No local races of this species are known.

Synonymy.

Charadrius semipalmatus, *Kaup, Isis*, 1825, p. 1376.
Charadrius brevirostris, *Wied, Beitr. Nat. Bras.* iv. p. 769 (1833).
Hiaticula semipalmata (*Kaup*), *Gray, List Birds Brit. Mus.* iii. p. 70 (1844).
Ægialeus semipalmatus (*Kaup*), *Bonap. Compt. Rend.* xliii. p. 417 (1856).
Ægialitis semipalmatus (*Kaup*), *Cabanis, Journ. Orn.* 1856, p. 425.

Literature.

Plates.—Wilson, Am. Orn. pl. 59. fig. 3.
Habits.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 154.
Eggs.—Thienemann, Abbild. Vogeleiern, pl. lix. fig. 5.

Specific characters.

The Semipalmated Ringed Plover possesses all the characters of the Ringed Plover (*C. hiaticula*), except that the *web between the outer and middle toes reaches to the second joint*, and that between the inner and middle toes is well developed.

Geographical distribution.

It breeds in the Arctic and Sub-arctic Regions of North America from Alaska to Greenland. On migration it passes along both coasts as well as in the interior, and occurs annually in the Bermudas (Reid, Zoologist, 1877, p. 475); and in winter it is found in the tropical regions of both continents, on all the West-India Islands, and on the Galapagos Archipelago (Salvin, Trans. Zool. Soc. ix. p. 501). In South America Reeve procured it from the coast of Ecuador (Tacz. Proc. Zool. Soc. 1885, p. 119); and Capt. Markham obtained it on the coasts of Peru and in Coquimbo Bay in Chili, about lat. 30° south (Salvin, Proc. Zool. Soc. 1883, p. 428). East of the Andes, Jelski obtained it in Central Peru (Tacz. Proc. Zool. Soc. 1874, p. 560); Wallace found it at the mouth of the Amazons (Sclater and Salvin, Proc. Zool. Soc. 1867, p. 591); and I have examples collected by Capt. Harrison at Santa Catharina, in lat. 28° south, and at Port Desire, in lat. 48° south.

It is authoritatively stated (Nelson, 'Cruise of the Corwin,' p. 84) that the Semipalmated Plover is found "on both shores of Behring Sea, extending on the Alaskan coast from the peninsula of Alaska north to Point Barrow, and along the entire north-eastern Asiatic coast." As this species has never been found wintering on any of the Asiatic shores of the Pacific, we may reasonably conclude that the Asiatic birds have only recently extended their range so far west, and migrate eastwards in autumn. This fact (considered in relation with the range of the European ally of this species, which breeds from the American shores of Davis Straits across Greenland and Iceland to the Taimyr peninsula in Siberia) strongly supports the theory that the ancestors of this little group of birds, which I have called *Hiaticulæ majores*, did not escape from the Polar Basin along either shore of the Pacific Ocean.

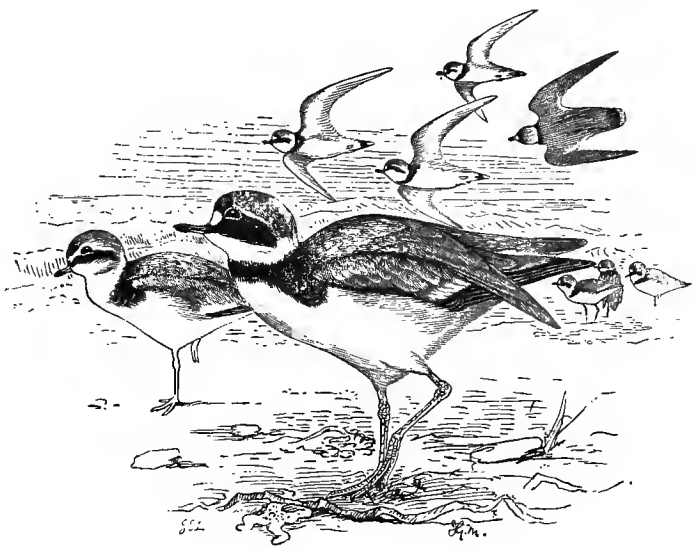
Like its European representative, its favourite feeding-grounds are the sandy shores of islands and the mud-flats exposed at low water in the lagoons and estuaries of rivers. At its breeding-grounds in the Arctic Regions and during migration it is much less of a coast-bird, and often frequents the banks of rivers and lakes, and is sometimes found on sandy flats at some distance from water.

The extraordinary similarity between this species and its Palæarctic ally, at all ages and seasons, is a remarkable proof of the greater importance in some instances of colour and pattern of colour than of what are called structural characters. The Palæarctic species has a slightly longer bill, and the white spot behind the eye is very distinct. In the Nearctic species the postocular patch is either entirely absent or so small as to escape notice; otherwise the only difference discoverable between the two species is the exceptional development of the web between the outer and middle toes of *C. semipalmatus*.

Small generic value of structural characters.

*** *Subgeneric group Typical Hiaticulæ.*

†† *Old-World Species.*



CHARADRIUS HIATICULA.

RINGED PLOVER.

Diagnosis.

Charadrius, subgen. *Hiaticulæ typicæ*, dorso et supracaudalibus fusco-griseis: digitis internis ad basin liberis: pectore et rectricibus lateralibus non nisi fasciâ unâ obscurâ ornatis.

Variations.

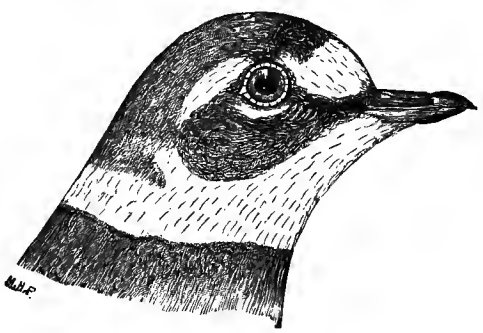
The Ringed Plovers breeding in the British Islands are on an average larger birds than those breeding on the continent, and may therefore claim to be regarded as subspecifically distinct.

Synonymy. Charadrius hiaticula, *Linneus, Syst. Nat.* i. p. 150 (1758); *Linn. Syst. Nat.* i. p. 253 (1766).
Pluvialis torquata minor, *Brisson, Orn.* v. p. 63 (1760).
Ægialitis hiaticula (*Linn.*), *Boie, Isis,* 1822, p. 558.
Hiaticula annulata, *Gray, List Gen. B.* p. 65 (1840).
Hiaticula hiaticula (*Linn.*), *Lichtenstein, Nomencl. Av.* p. 94 (1854).
Ægialites auritus, *Heuglin, Syst. Uebers. Vög. N.O.-Afr.* p. 56 (1856).

Literature. Plates.—Daub. Pl. Enl. no. 920; Dresser, Birds of Europe, vii. pl. 525.
Habits.—Seebohm, British Birds, iii. p. 20.
Eggs.—Seebohm, British Birds, pl. 26. fig. 6.

Specific characters. The Ringed Plover has the whole of the *underparts pure white, with the exception of the lores and a single broad breast-band,* both of which are black in adult male, brown in female and young. *Nearly the central half of the outer webs of the innermost primaries* is *white*; and the *web between the outer and middle toes only reaches to the first joint.*

Geographical distribution. It breeds in Greenland, Iceland, Spitzbergen, and Nova Zembla. It is a regular summer visitor to the whole of Europe north of the Alps, and to Asia at least as far east as the Taimyr peninsula. In South Siberia it is not known to have occurred east of Lake Baikal, but it breeds regularly in Western Siberia and sparingly in Turkestan. It probably passes through Persia on migration, and winters in the basin of the Mediterranean and in Africa, where it has been found in almost every part of the continent. There seems to be little doubt that it breeds in Cumberland Bay, on the American side of Davis Strait; and it has been recorded as an accidental straggler in India and Australia, but on very unsatisfactory evidence. Heuglin suggests that some remain on the shores of the Red Sea to breed, but the evidence is not at all conclusive.



Its nearest ally is unquestionably *C. semipalmatus.*

CHARADRIUS HIATICULA MAJOR.

BRITISH RINGED PLOVER.

Diagnosis. Charadrius hiaticula magnitudine majore.

Variations. The British Ringed Plover completely intergrades with its continental ally.

Synonymy. Pluvialis torquata, *Brisson, Orn.* v. p. 60 (1760).
Charadrius torquata (*Briss.*), *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 28 (1816, *nec Linn.*).

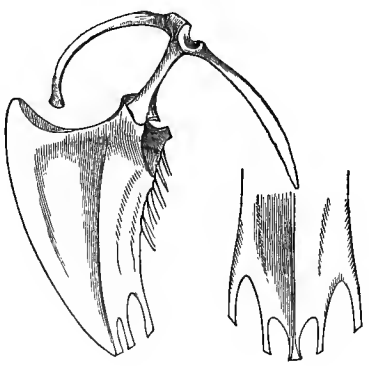
Hiaticula torquata (*Briss.*), *Gray, List Birds Brit. Mus.* iii. p. 68 (1844, *nec Linn.*).
Charadrius major, *Tristram, fide Gray, Hand-l. B.* iii. p. 15 (1871).

Literature.

PLATES.—Gould, Birds of Gt. Britain, iv. pl. 41; Brisson, Orn. v. pl. v. fig. 1.
HABITS.—Seebohm, British Birds, iii. p. 20.
EGGS.—Seebohm, British Birds, pl. 26. fig. 5.

Subspecific characters.

A large race of the Ringed Plover (*wing* 5·5 *to* 5·0 instead of 5·2 to 4·8 inch) is a resident in the British Islands. The upper parts are paler in colour, and the legs and feet are stouter than in the smaller race, which passes our islands on migration. It is difficult to determine the precise range of this large race; but it probably extends to the coasts of France, as I have examples from Havre which unquestionably belong to it. The eggs of the large race are conspicuously larger than those of the smaller form.



CHARADRIUS MONACHUS.

HOODED RINGED PLOVER. (PLATE V.)

Diagnosis.

CHARADRIUS, subgen. *Hiaticulæ typicæ*, supracaudalibus centralibus ferè nigris : dorso pallidè griseo.

Variations.

No local races of this species are known.

Synonymy.

Charadrius cucullatus, *Vieillot, N. Dict. d'Hist. Nat.* xxvii. p. 136 (1818).
Charadrius monachus, *Geoffr. fide Wagler, Syst. Av.* p. 60 (1827).
Ægialitis monachus (*Wagler*), *Gould, Syn. Birds Austr.* pl. 32. fig. 2 (1837).
Hiaticula monacha (*Wagler*), *Gray, List Birds Brit. Mus.* iii. p. 70 (1844).

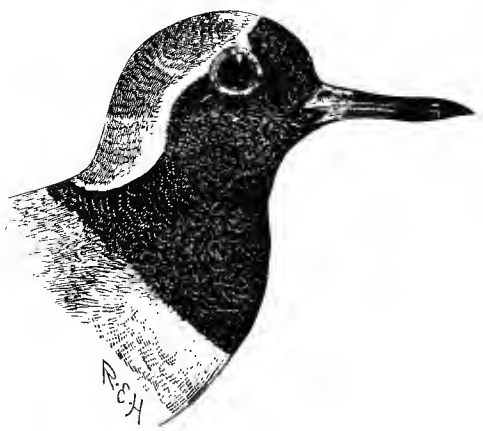
Literature.

PLATES.—Gould, Birds of Australia, vi. pl. 18.
HABITS.—Gould, Handb. Birds Austr. ii. p. 231.
EGGS.—Campbell, Nests and Eggs of Australian Birds, p. 54.

Specific characters.

Geographical distribution.

The Hooded Ringed Plover is the only species of typical *Hiaticulæ* which combines the two characters of a *pale grey back* and *nearly black central upper tail-coverts*. It is a resident on the coasts of the southern half of Australia, and is especially common on Tasmania and the adjacent islands in Bass's Straits. Sexual selection appears to have given this species a black head, but protective selection seems to have restricted it to the male sex and the breeding-season, in consequence of the exposed character of its haunts.



CHARADRIUS NOVÆ-ZELANDIÆ.

NEW-ZEALAND PLOVER.

Diagnosis.

CHARADRIUS rostri tarsique longitudine æquali.

Variations.

EXAMPLES from Auckland Island, presumably young birds, have been described as distinct from the New-Zealand species, but this is generally admitted to be an error.

Synonymy.

Charadrius novæ-seelandiæ, *Gmelin, Syst. Nat.* i. p. 684 (1788).
Charadrius dudoroa, *Wagler, Syst. Av.* p. 60 (1827).
Hiaticula novæ-seelandiæ (*Gmel.*), *Gray, Dieff. Trav.* ii. p. 195 (1843).
Charadrius torquatula, *Lichtenstein, Forster's Descr. Anim. It. Mar. Austr.* p. 108 (1844).
Thinornis novæ-seelandiæ (*Gmel.*), Thinornis rossii, } *Gray, Zool. Voy. Ereb. & Terr., Birds,* p. 12 (1846).
Strepsilas novæ-zeelandiæ (*Gmel.*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 45 (1865).

Literature.

Plates.—Buller, Birds of New Zealand, pl. 23.
Habits.—Potts, Zoologist, 1875, p. 4485.
Eggs.—Potts, Zoologist, 1885, p. 422.

Specific characters.

The New-Zealand Plover when adult may be recognized by its combination of two characters—a *black throat* and *a band of white across the crown*, but neither of these characters are found in females or young birds. The diagnosis, *bill as long as the tarsus*, applies to all ages.

Geographical distribution.

The New-Zealand Plover is a resident on the coasts of the island whose name it bears, and has occurred on some of the neighbouring islands, Auckland Island, Pitt's Island, &c.

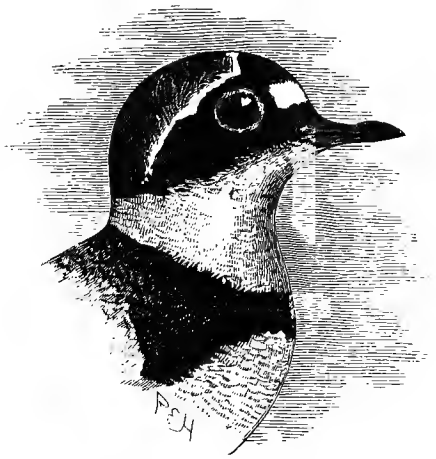
The pseudo-genus *Thinornis*.

There can be no reason for placing this bird in a genus of its own. It is very closely related to *C. monachus*; both species have black throats and foreheads, and a great deal of white on the outer web of the innermost primaries, and still more on both webs of the innermost true secondaries. Both species have the legs and feet and the basal portions of the bill yellow. There can scarcely be any doubt that both species are slightly modified forms of *C. hiaticula*, and so far from either of them being generically distinct they obviously belong to the same subsection of the same subgenus. The true relationship of these birds is best seen by a comparison of the young in first plumage of *C. novæ-zelandiæ* and of *C. hiaticula*. Both have white foreheads, white throats, and a white spot behind the eye, besides agreeing in the colour of their bills, legs, feet, wings, and tail.

Being a shore bird, it is probable that the male assumes the duller plumage of the female in autumn. Buller's 'Birds of New Zealand' unfortunately throws no light on the subject; but as we are promised a new edition of this interesting and valuable work, it is to be hoped that this information and many other important omissions will be supplied. It is not necessary to enter into elaborate details of the changes of plumage or the habits of birds which only migrate to New Zealand when the breeding-season is over, as is the case with some of the Charadriidæ; but it is necessary to do so when the species is peculiar to the district. Where else can we expect to find such information?

*** *Subgeneric group Hiaticulæ minores.*

† *Old-World Species.*



CHARADRIUS MINOR.

LITTLE RINGED PLOVER.

Diagnosis. CHARADRIUS, subgen. *Hiaticulæ minores,* rectricibus lateralibus quam rectrices mediæ vix brevioribus (haud 7 millim.) : scapularibus dorso concoloribus.

Variations. THE Little Ringed Plovers breeding in the tropics are regarded as subspecifically distinct on account of their smaller size.

Synonymy.

Charadrius dubius, *Scopoli, Del. Flor. et Faun. Insubr.* p. 96 (1786, *ex Sonnerat*).
Charadrius erythropus, *Gmelin, Syst. Nat.* i. p. 684 (1788, *ex Sonnerat*).
Charadrius curonicus, *Gmelin, Syst. Nat.* i. p. 692 (1788, *ex Beseke*).
Charadrius philippinus, *Latham, Index Orn.* ii. p. 745 (1790, *ex Sonnerat*).
Charadrius minor, *Wolf & Meyer, Vög. Deutschl.* i. p. 182 (1805).
Charadrius fluviatilis, *Bechstein, Naturg. Deutschl.* iv. p. 422 (1809).
Charadrius pusillus, *Horsfield, Trans. Linn. Soc.* xiii. p. 187 (1822).
Ægialitis minor (*Wolf & Meyer*), *Boie, Isis,* 1822, p. 558.
Charadrius minutus, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 144 (1826).
Charadrius hiaticuloides, *Franklin, Proc. Zool. Soc.* 1831, p. 125.
Charadrius intermedius, *Ménétries, Cat. Rais. Cauc.* p. 53 (1832).

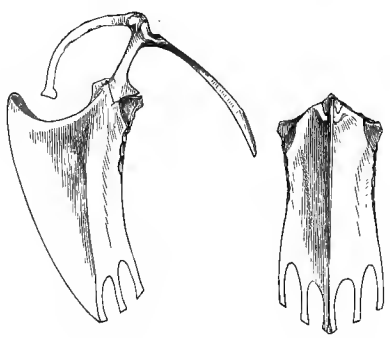
Charadrius zonatus, *Swainson, B. of W. Afr.* ii. p. 235 (1837).
Ægialitis curonicus (*Gmel.*), *Keyserling u. Blasius, Wirb. Eur.* p. lxxi (1840).
Hiaticula philippina (*Lath.*), Hiaticula pusilla (*Horsf.*), } *Blyth, Cat. B. Mus. As. Soc.* pp. 263, 264 (1849).
Hiaticula curonica (*Gmel.*), *Lichtenstein, Nomencl. Av.* p. 94 (1854).
Ægialites zonatus (*Swains.*), *Hartlaub, Orn. W.-Afr.* p. 216 (1857).
Ægialites pusillus (*Horsf.*), *Swinhoe, Ibis,* 1860, p. 63.
Ægialites philippinus (*Lath.*), *Swinhoe, Ibis,* 1861, p. 342.
Ægialitis minutus (*Pall.*), *Jerdon, B. India,* ii. p. 641 (1864).
Pluvialis fluviatilis (*Bechst.*), *Droste, Vog. Borkum,* p. 153 (1869).
Ægialitis microrhynchus, *Ridgway, Am. Nat.* viii. p. 109 (1874).

Literature.

Plates.—Daub. Pl. Enl. no. 921; Gould, Birds of Gt. Brit. iv. pl. 42; Dresser, Birds of Europe, vii. pl. 524.
Habits.—Seebohm, British Birds, iii. p. 16.
Eggs.—Seebohm, British Birds, pl. 26. fig. 8.

Specific characters.

The Little Ringed Plover has all the characters of Hodgson's Ringed Plover except that the *outer tail-feathers are less than a quarter of an inch shorter than the central ones.*

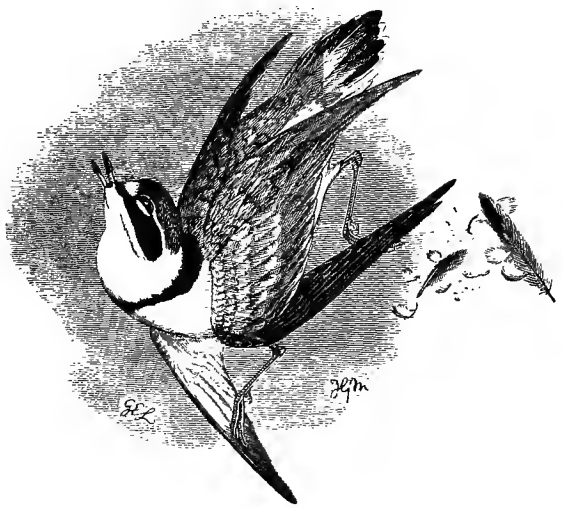


It is a smaller bird, with a wing about $4\frac{1}{2}$ instead of $5\frac{1}{2}$ inches long from the carpal joint. The additional character, *scapulars the same colour as the back*, is sufficient to distinguish it from the only species belonging to the same group which is not excluded by the shape of the tail.

Geographical distribution.

The Little Ringed Plover is a summer visitor to the whole of Europe north of the basin of the Mediterranean and south of about lat. 60°, between which and the Arctic Circle it can only be regarded as an accidental straggler. It is a resident in the basin of the Mediterranean. South of the Great Desert it is only known as a winter visitor, extending on the west coast of Africa as far south as the equator; but on the east coast its winter range appears to be much greater, extending to Mozambique and the Mauritius. On the

Asiatic continent it is a summer visitor throughout the Palæarctic Region as far north as lat. 60°, and a winter visitor throughout the greater part of the Oriental Region, wandering into the Australian Region as far as Celebes and New Guinea.



Seasonal changes.

Young in first plumage have the black on the head and neck replaced by brown; but little or no difference can be traced to the effects of sex or season, as might be expected of inland species, which seldom frequent the sea-shore even in winter, and consequently do not require to assume for protective purposes the colour of the mud-flats.

CHARADRIUS MINOR JERDONI.

JERDON'S RINGED PLOVER.

Diagnosis. CHARADRIUS MINOR magnitude minore.

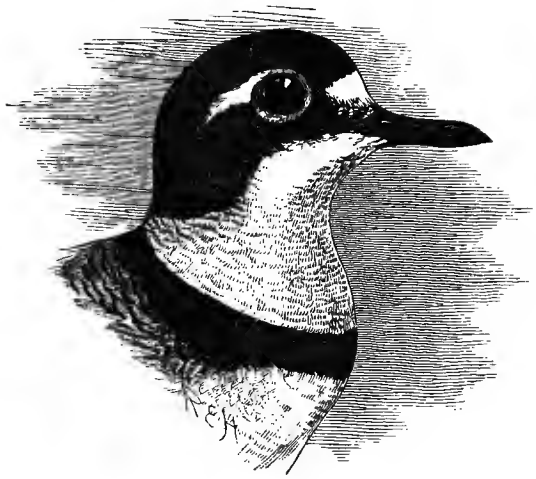
Variations. TROPICAL examples completely intergrade with those from Temperate Regions.

Synonymy. Ægialitis jerdoni, *Legge, Proc. Zool. Soc.* 1880, p. 39.

Literature. PLATES.—None.
HABITS.—Legge, Birds of Ceylon, p. 956.
EGGS.—Hume, Nests and Eggs of Indian Birds, p. 572. On an average slightly smaller than those of the typical form.

Geographical distribution. A small race of the Little Ringed Plover is a resident in India, Ceylon, Burma, and Cochin China.

Specific characters. It is said to differ from its Palæarctic ally in being smaller (wing 3·9 to 4·25 instead of 4·3 to 4·7 inch), in having the edges of the eyelids swollen and protuberant, and in having the basal half of the lower mandible yellow. It is possible that it may be entitled to rank as a subspecies.



CHARADRIUS PLACIDUS.

HODGSON'S RINGED PLOVER.

Diagnosis.

CHARADRIUS, subgen. *Hiaticulæ minores*, pectore non nisi fasciâ unâ obscurâ ornato : rectricibus lateralibus quam rectrices mediæ valdè brevioribus (circa 13 millim.).

Variations.

No local races of this species are known.

Synonymy.

Charadrius placidus, *Gray, Cat. Mamm. &c. Nepal &c. Hodgson*, p. 70 (1863).
Charadrius longipes, *David, Bull. Nouvelles Archives*, 1867, p. 38.
Ægialitis hartingi, *Swinhoe, Proc. Zool. Soc.* 1870, p. 136.
Eudromias tenuirostris, *Hume, Stray Feathers*, 1872, p. 17.
Ægialites placidus (*Gray*), *Swinhoe, Ibis*, 1874, p. 162.

Literature.

PLATES.—Swinhoe, Proc. Zool. Soc. 1870, pl. xii.
HABITS.—Swinhoe, Proc. Zool. Soc. 1870, p. 136.
EGGS.—Unknown.

Specific characters.

Hodgson's Ringed Plover has *a black subterminal band across the four outer tail-feathers on each side*, and the *outer feathers* are *half an inch shorter than the central* ones. It has *no white on the outer webs of the primaries*, but the *forehead* and the *whole of the underparts* (*except a single dark band across the breast*) are *white*.

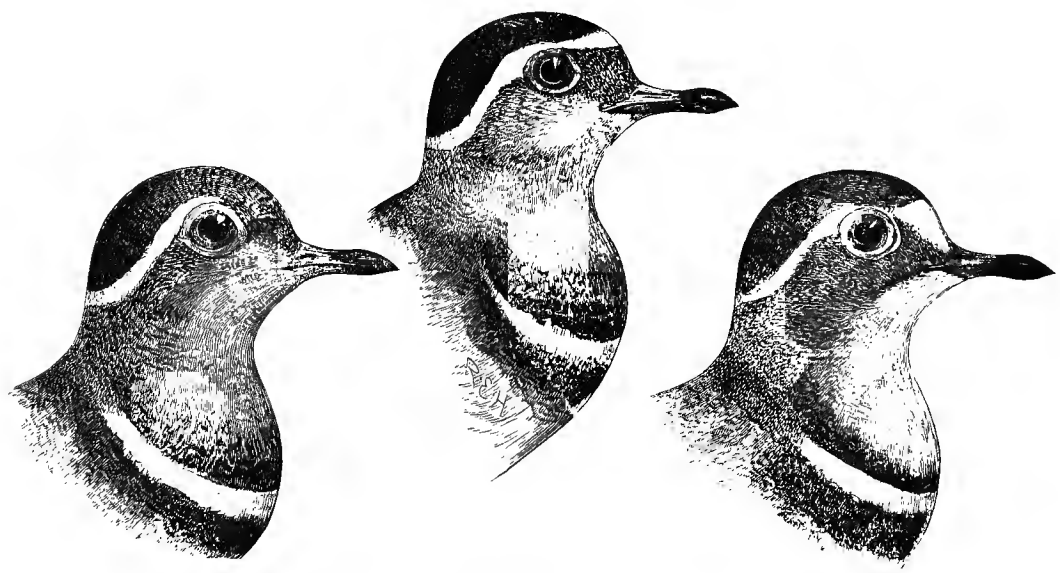
Geographical distribution.

It was first discovered in Nepal, and probably ranges through the Eastern Himalayas to the valley of the Yang-tze-kiang, whence it extends to all the Japanese islands.

It appears to be nearest allied to *C. minor*, from which it differs only in being larger, in having a more graduated tail, and when adult in having the shafts of all the primaries brown. Young in first plumage, which may be recognized by the buff margins of the feathers of the upper parts, have the shaft of the first primary white, as in *C. minor*.

Young in first plumage.

Like the Little Ringed Plover, it is more partial to the banks of rivers and lakes than to the sea-shore, and, like that species, the variation in colour attributable to differences of sex or season are very slight. The fact that in young in first plumage the black is replaced by brown probably denotes that its ancestors were shore birds.



C. forbesi. *C. bifrontatus.* *C. tricollaris.*

CHARADRIUS TRICOLLARIS.

TEMMINCK'S THREE-BANDED PLOVER.

Diagnosis. CHARADRIUS, subgen. *Hiaticulæ minores,* pectore fasciis duabus obscuris ornato: fronte usque ad rostrum albâ.

Variations.

It is not improbable that future researches may discover intermediate forms between this species and its two very close allies.

Synonymy.

Charadrius tricollaris, *Vieillot*[1], *N. Dict. d'Hist. Nat.* xxvii. p. 147 (1818).
Charadrius bitorquatus, *Lichtenstein, Verz. Doubl.* p. 71 (1823).
Hiaticula tricollaris (*Vieill.*), *Gray, List Birds Brit. Mus.* iii. p. 69 (1844).
Ægialites cinereicollis, *Heuglin, Syst. Ueb. Vög. N.O.-Afr.* p. 582 (1855).
Ægialitis tricollaris (*Vieill.*), *Hartlaub, Orn. Westafr.* p. 216 (1857).
Ægialitis bitorquatus (*Licht.*), *Heuglin, Peterm. Geogr. Mitth.* 1869, p. 417.

Literature.

Plates.—Heuglin, Orn. N.O.-Afr. pl. xxxiv. fig. 5.
Habits.—Sharpe, Layard's Birds South Africa, p. 662.
Eggs.—Thienemann, Abbild. Vogeleiern, pl. lix. fig. 7; Harting, Proc. Zool. Soc. 1874, pl. lx. fig. 5.

Specific characters.

The Three-banded Plover, as it has hitherto been called, is not the only Three-banded Plover, as its name seems to imply, but is only one of several Plovers which have *two black bands across the breast*, separated from each other by a third band, which is white, like the rest of the underparts. In immature plumage these bands are brown. From the other Three-banded Plovers it may be diagnosed by the colour of its *forehead*, which is *white to the bill*, and by the *outer tail-feather on each side*, which is *white, with one subterminal dark band across the inner web*.

Geographical distribution.

It is a resident throughout South Africa, as far north as Abyssinia in the east, and Loango (Bocage, Orn. d'Angola, p. 433) and the Gaboon (Heuglin, Orn. N.O.-Afr. p. 1027) in the west.

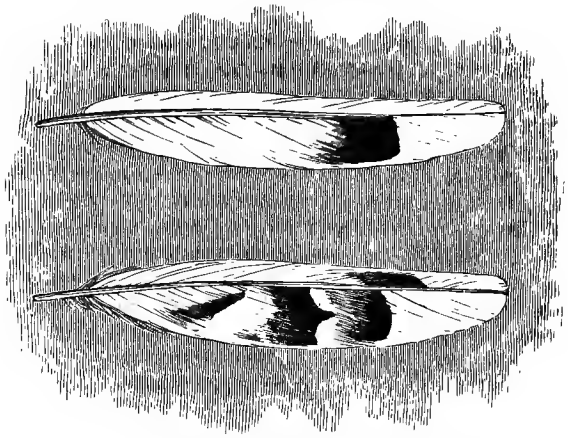
It appears to be a modified form of *C. minor*, very nearly allied to *C. forbesi*, and still nearer to *C. bifrontatus*.

Habits.

There is scarcely any difference between the male and female, and the characteristic markings appear in young in first plumage, but the black is replaced by brown. Although it frequents the sea-shore, as well as the banks of inland rivers and lakes, the winter plumage scarcely differs from that of summer. Heuglin found it in Abyssinia up to 7000 feet above the level of the sea. I found it common on the banks of the rivers far inland in Natal, and sparingly on the sand-banks in Durban Bay. It can scarcely be regarded as a coast-bird, but it is especially fond of inland tidal flats. It was extremely abundant on the salt-swamps a short distance up the Salt River in Table Bay, and was very tame. On one occasion I saw eight within a square yard. They called to each other *weet, weet, wit, wit, wit*, and when alarmed flew off with a scream.

[1] Temminck described the Three-banded Plover in 1807 (Cat. Syst. Cab. d'Orn. pp. 173, 262), from one of Levaillant's examples, as "Le petit plovier à double collier d'Afrique," but omitted to give it a Latin name.

Outer tail-feather of *C. tricollaris*.



Outer tail-feather of *C. forbesi*.

CHARADRIUS FORBESI.

FORBES'S THREE-BANDED PLOVER.

Diagnosis. CHARADRIUS, subgen. *Hiaticulæ minores*, rectricum lateralium pogoniis internis fasciis tribus nigris ornatis.

Variations. IT is not known that this species is subject to any variation, but it is not improbable that it may hereafter be found to intergrade with *C. tricollaris*.

Synonymy. Ægialitis forbesi, *Shelley, Ibis*, 1883, p. 560.
Ægialitis nigris, *Harting, Zoologist*, 1883, p. 418.
Ægialitis indicus (*Lath.*)[1], *apud auctores multos*.

Literature. PLATES.—Shelley, Ibis, 1883, pl. xiv.
HABITS.—Undescribed.
EGGS.—Unknown.

Specific characters. Forbes's Three-banded Plover is the only species in the genus which combines the two characters of *inner web of outer tail-feathers crossed by three dark bars* and *outer web of innermost primaries uniform brown*. It is not only without the white on these feathers which is characteristic of the typical *Hiaticulæ*, but has also no white on the forehead.

[1] *Charadrius indicus* of Latham (Ind. Orn. ii. p. 750) is founded on the *Pluvialis minima indica* of Brisson (Ornithologia, ii. p. 234, 1763 edition), described from a bird said to have come from the East Indies. It was probably an example of *Charadrius tricollaris* from East Africa, but as the colour of the forehead is not mentioned it is impossible to say.

It is a resident in West Africa. It is unquestionably most nearly allied to *C. tricollaris* and, like that species, is principally an inland bird, differing very slightly in the colours of its plumage in consequence of age, sex, or season. Geographical distribution.

CHARADRIUS BIFRONTATUS.

MADAGASCAR THREE-BANDED PLOVER.

Diagnosis.

Charadrius, subgen. *Hiaticulæ minores*, pectore fasciis duabus obscuris ornato : fronte albâ ad basin brunneâ : rectricibus lateralibus non nisi fasciâ unâ obscurâ ornatis.

Variations.

It is not known that this species varies.

Synonymy.

Charadrius bifrontatus, *Cabanis, Journ. Orn.* 1882, p. 112.

Literature.

Plates.—Cabanis, Journ. Orn. 1885, pl. vi. fig. 5.
Habits.—Grandidier, Ois. de Madagascar, p. 510.
Eggs.—Unknown.

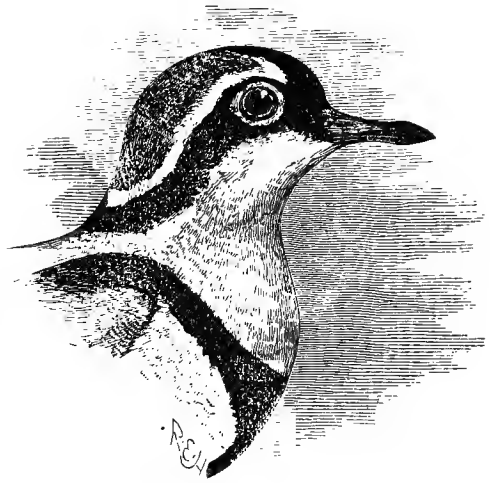
Specific characters.

The Madagascar Three-banded Plover is somewhat intermediate between its West-African and South-African allies. It agrees with them in having the *breast crossed by two dark bands*, and with the latter in having the *outer tail-feathers crossed by only one dark bar*, and in having the *white* eye-stripe meeting *across the forehead*; but it differs from it in two points, also found in the former species. The *grey* on the lores and ear-coverts *extends* downwards over the chin and throat as far as the upper black band, and *upwards across the lower forehead.*

Geographical distribution.

It is supposed to be confined to the island of Madagascar. It is found inland, and probably occasionally on the coast. It is not known to differ from its nearest allies in its variations of plumage.

It appears to be a perfectly good species, and it is very remarkable that it should have escaped detection so long. Milne-Edwards and Grandidier, in their magnificent work on the birds of Madagascar, describe it correctly; they remark: "les joues et la gorge sont, ainsi que la front, d'un gris cendre;" and in their synonymy they refer to Heuglin's plate of the head of the allied species in East and South Africa, in which the forehead and throat are pure white!



CHARADRIUS NIGRIFRONS.

BLACK-FRONTED PLOVER.

Diagnosis. CHARADRIUS scapularibus rufis.

Variations. No geographical races of this species are known.

Synonymy.
Charadrius melanops, *Vieillot, N. Dict. d'Hist. Nat.* xxvii. p. 139 (1818).
Charadrius nigrifrons, *Cuvier, fide Temm. Pl. Col.* no. 47. fig. 1 (1823).
Ægialitis nigrifrons (*Temm.*), *Boie, Isis,* 1826, p. 978.
Charadrius russatus, *Jerdon, Madras Journ.* 1840, p. 213.
Hiaticula nigrifrons (*Temm.*), *Gray, List Birds Brit. Mus.* iii. p. 71 (1844).

Literature.
PLATES.—Temminck, Pl. Col. no. 47; Gould, Syn. Birds Austr. pl. 32. fig. 1; Gould, Birds Austr. vi. pl. 20.
HABITS.—Gould, Handb. Birds of Australia, ii. p. 232.
EGGS.—Harting, Proc. Zool. Soc. 1874, pl. lx. fig. 9.

Specific characters. The Black-fronted Plover may be recognized by its *chestnut-red scapulars.* In young in first plumage the chestnut is paler, and is distributed over the wing-coverts as well as the scapulars.

It is a resident in southern and eastern Australia, frequenting the rivers rather than the coast. It is not seen north of Port Denison, nor in Western Australia, nor in Tasmania, but has occurred once in India (near Madras). Geographical distribution.

It appears to be a considerably modified *C. minor*, and, like that species, to vary very slightly with sex or season.

Subgenus ÆGIALOPHILUS.

CHARADRII caudâ non fasciâ nigrescente prope apicem ornatâ : primariarum interiorum pogoniis externis ad basin albis. Diagnosis of subgenus.

THE Sand-Plovers form a well-defined subgeneric group, of which the Kentish Plover (*C. cantianus*) may be regarded as the type. They may be briefly diagnosed as having the *base of the outer web of the innermost primaries white* (which forms a white wing-patch, somewhat similar to, though more basal than, that of *C. hiaticula* and its allies), but having *no black subterminal band across the tail.* The latter is either entirely absent or is so rudimentary as to consist of only a darker shade across some of the feathers, whilst the broad white tips are only represented by a narrow pale margin. Subgeneric characters.

All the Sand-Plovers have white axillaries and white bellies, but none of them have a hind toe.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Majores.	PALÆARCTIC REGION.	*Minores.*
	South.	C. CANTIANUS.
C. ASIATICUS	*Caspian Basin.*	
C. MONGOLICUS	*Mongolia.*	
	ETHIOPIAN REGION.	
	St. Helena.	C. SANCTÆ-HELENÆ.
	Inland plains.	C. PECUARIUS.
	West Africa to Madagascar.	C. TENELLUS.
	South Africa.	C. MARGINATUS.

Majores.		*Minores.*
	ORIENTAL REGION.	
C. GEOFFROYI	*Coasts of China and Japan.*	
	South China.	C. DEALBATUS.
	Malay Archipelago.	C. PERONI.
	AUSTRALIAN REGION.	
C. BICINCTUS	*Coast of Australia.*	C. RUFICAPILLUS.
	Coast of New Zealand.	
C. FRONTALIS	*Plains of New Zealand.*	
C. OBSCURUS	*Mountains of New Zealand.*	
	NEARCTIC REGION.	
C. MONTANUS	*United States Prairies.*	
C. WILSONI	*Atlantic coast of Southern Half.*	C. NIVOSUS.
	Pacific coast of Southern Half.	
	NEOTROPICAL REGION.	
	Pacific coast of Northern Half.	
	Atlantic coast of Northern Half.	
	Northern Half.	C. COLLARIS.
	Chili.	C. OCCIDENTALIS.
C. FALKLANDICUS	*Patagonia.*	

Emigrations.

The Sand-Plovers appear to have escaped from the Polar Basin along the Asiatic coast and to have found temporary residence in localities where the conformation of the land favoured their isolation in many districts, and their consequent differentiation into many species.

C frontalis appears to have been isolated, and rapidly and greatly differentiated, in New Zealand.

C. mongolicus chose Australia for its winter-quarters, where some of them became residents, and, changing their time of breeding to suit the changed seasons, were soon physiologically isolated from the rest, and became consequently differentiated into *C. bicinctus*, a species which in post-glacial times sent a colony to Patagonia, which has since become *C. falklandicus*.

C. geoffroyi was isolated on the coasts of Burma and the Malay Peninsula, and during the struggle for existence caused by the crowding of such small winter-quarters at the height of the glacial period sent off colonies to America and New Zealand, which became respectively *C. wilsoni* and *C. obscurus*.

C. cantianus was isolated in India, where it multiplied to such an extent on the coasts

that repeated colonies were obliged to seek fresh homes. One of these became a resident in South China, and is now known as *C. dealbatus*, which in its turn crossed over to California and is now *C. nivosus*. These were probably post-glacial emigrants which have not yet become completely differentiated. *C. peroni* probably represents a second case of the extinction of a species by interbreeding, as explained by Menzbier, and appears to be the result of the fusion of a party of the ancestors of *C. cantianus* with one of those of *C. hiaticula* before they were sufficiently differentiated to make interbreeding impossible.

C. ruficapillus represents a colony of *C. cantianus* which emigrated to Australia; *C. marginatus* and *C. tenellus* others which crossed over to South Africa, whilst the ancestors of *C. collaris* crossed the Pacific to South America.

C. asiaticus appears to have foresworn the sea-coast and to have become differentiated in Central Africa, whence it migrated to the basin of the Caspian, and during the warm post-glacial period it sent a colony across the Polar Basin to America, where it retained its inland habits and became slightly differentiated into *C. montanus*.

C. pecuarius appears to have been isolated in West Africa, whence it colonized St. Helena at a comparatively recent date, *C. sanctæ-helenæ* being probably a post-glacial form.

Division of the subgenus.

There are about a score of species and subspecies of Sand-Plovers, all very closely related to each other, so closely indeed that only four out of the twenty have been removed by the genus-splitters on the ground that their bills differed in shape from the others. The form of the bill is frequently an important character, but in the genus *Charadrius* the variations are so slight that it is impossible to believe that they have any taxonomic value; they are obviously the result of pure accident, such, for example, as the nature of the food and the facilities for obtaining it in the various localities where the species have been dispersed. To unite *C. geoffroyi* with *C. wilsoni* is reasonable; but at the same time to separate *C. geoffroyi* from *C. mongolicus* is a *reductio ad absurdum* which goes far to prove that in this group of birds the slight differences in the shape of the bill are of very recent origin, and are of no value whatever in determining relationship.

For convenience of diagnosis it is advisable to divide the species comprised in the subgenus *Ægialophilus* into two or more groups.

The presence or absence of a white collar might be chosen as a character were it not for the inconvenient fact that out of the eight species which possess that feature, in three of them (*C. wilsoni*, *C. nivosus*, and *C. tenellus*) it is frequently so obscure as to be practically useless.

Inconvenient characters.

The colour of the feet is equally uncertain as a character; regarding some species ornithologists differ in opinion: the colour of the feet of *C. nivosus* and of *C. montanus* is doubtful; whilst in other species it would divide such forms as *C. cantianus* and *C. dealbatus*, which are evidently conspecific.

All the larger species have the central upper tail-coverts nearly the same colour as the rest of the upper parts, but in all the small species they are very much darker, almost black.

There is one notable exception to this rule in *C. falklandicus*, which is one of the larger species, but has nearly black central upper tail-coverts. In some examples of *C. nivosus* and *C. collaris* the difference of colour between the central upper tail-coverts and the rest of the upper parts is not very striking.

Size the most easy character.

The most obvious character by which the Sand-Plovers may be divided into two groups is that of size, but here again it is difficult to find a hard-and-fast line. Three species appear to be intermediate—*C. wilsoni*, *C. sanctæ-helenæ*, and *C. occidentalis*. They vary in length of wing from 4·5 to 4·8 inch. All the other species fall naturally into two groups—one containing the small species, in which the wing from the carpal joint measures 4·5 inch or less; and the other containing the large species, in which the wing measures 4·8 inch or more. The relationship of the three species which are intermediate in size is not very easy to determine, but that of the two latter is with the group of small-sized species, and that of the former probably with the larger species. In order to place them there the definitions of the two sections of the subgenus must stand as follows:—

Sections of the subgenus.

Ægialophili majores.—Length of wing from carpal joint $4\frac{3}{4}$ inches or more. In order to exclude the two species which occasionally reach this size, but obviously belong to the next group, and to include the one which occasionally falls short of it, no species can be admitted (1) with black legs if the lores be white, (2) nor with the primary-coverts much (about $\frac{1}{2}$ inch) shorter than the outermost secondaries; (3) nor under any circumstances can a species be excluded if the terminal vault of the bill measure as much as ·4 inch.

Ægialophili minores.—Length of wing from carpal joint $4\frac{1}{2}$ inches or less. In order to include two species which occasionally slightly exceed these dimensions, and to exclude one which occasionally comes within them, *Ægialophili* possessing either of the two following characters must also be included: (1) black legs associated with white lores, (2) primary-coverts much (about $\frac{1}{2}$ inch) shorter than the secondaries; and (3) no species can be admitted with a bill the terminal vault of which measures as much as ·4 inch.

The two groups thus defined appear to be natural ones, though it has been necessary to resort to artificial and somewhat complicated characters to make them so. It is worthy of note that with one exception, *C. cantianus*, all the small species breed in the Tropical Region; and with only one exception, *C. wilsoni*, all the large species breed in the Temperate Region.

ÆGIALOPHILI MAJORES.

Ægialophili aut alis longioribus (120 ad 180 millim.); aut maxillæ arcu longiore (10 ad 13 millim.): specie pedibus nigris cum loris albis, et specie primariarum tectricibus quam secundariæ valdè brevioribus (circa 13 millim.) exceptis.

I have found it absolutely impossible to construct a perfectly satisfactory key to the species of this group, for the reasons hereinafter stated.

KEY TO THE SPECIES.

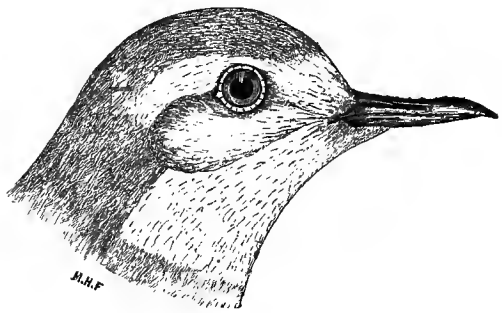
The following key is imperfect, because it does not enable the student to discriminate between the young in first plumage of *C. mongolicus* and *C. bicinctus*, neither of which show any trace of one or more dark bands across the breast.

- Lores pure white . . . . . **asiaticus** . . .
  - **montanus** . . . — Legs and feet pale.
  - **wilsoni** . . . .
- Terminal vault of bill ·5 (adult) to ·4 (juv.) inch long.
  - **geoffroyi.**
  - **obscurus** . . . . — Middle toe and claw $1\frac{1}{8}$ inches long.
  - **frontalis** . . . . — Bill bent sideways.
- **mongolicus.**
- Breast of adult crossed by two bands:
  - Black and chestnut . **bicinctus.**
  - Both black . . . **falklandicus** . . — Upper tail-coverts nearly black.

Young in first plumage of *C. mongolicus* and *C. bicinctus* are very difficult to distinguish, and it is not absolutely certain that they can in all cases be distinguished. The bill of *C. mongolicus* is generally, but not always in young birds, stouter than that of *C. bicinctus*. The length of tail is a better character, though it also is not always reliable in the case of young birds; but if it exceed two inches the bird may be referred to *C. bicinctus*, and if it fall short of that dimension it probably belongs to a young bird of *C. mongolicus*. In both species adults have longer tails.

*** *Subgeneric group Ægialophili majores.*

† *Old-World Species.*



CHARADRIUS ASIATICUS.

CASPIAN SAND-PLOVER.

Diagnosis. CHARADRIUS, subgen. *Ægialophili majores,* pedibus pallidis: loris albis.

Variations. No local races of this species are known.

Synonymy.

Charadrius asiaticus, *Pallas, Reise Russ. Reichs,* ii. p. 715 (1773).
Charadrius caspius, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 136 (1826).
Charadrius jugularis, *Wagler, Syst. Av.* p. 69 (1827).
Eudromias asiaticus (*Pall.*), *Keyserling u. Blasius, Wirb. Eur.* p. lxx (1840).
Charadrius damarensis, *Strickland, Contrib. Orn.* 1852, p. 158.
Morinellus caspius (*Pall.*), *Bonap. Compt. Rend.* xliii. p. 417 (1856).
Morinellus asiaticus (*Pall.*), *Degland & Gerbe, Orn. Eur.* ii. p. 132 (1867).

Literature.

PLATES.—Harting, Ibis, 1870, pl. v. (legs wrongly coloured); Dresser, Birds of Europe, vii. pl. 522.
HABITS.—Dresser, Birds of Europe, vii. p. 479.
EGGS.—Middendorff, Sib. Reise, ii. pl. xix. fig. 4.

Specific characters.

The Caspian Sand-Plover is one of the larger species of the subgenus *Ægialophilus,* the wing from the carpal joint varying from 6·1 to 5·4 inch. It may be distinguished from its allies by its *pure white lores* and *pale legs and feet.* It is also exceptional in never having any black marks on the head or neck, even in most adult plumage.

Its similarity to the Oriental Dotterel (*C. veredus*) is very remarkable. The adult males of both species agree in most details of their plumage. They both have white lores, a white throat, a chestnut breast shading into black where it joins the white belly, a slender bill, pale legs, and small feet, and neither of them ever have any black on the forehead; but the Dotterel differs from the Plover in having grey axillaries, and no white bases to the outer webs of the innermost primaries, two characters which are unaffected by age, sex, or season.

Remarkable resemblance to *C. veredus*.

The Caspian Sand-Plover breeds in the basins of the Caspian and Aral Seas, and winters throughout South Africa. It appears to prefer sandy plains sparsely covered with vegetation, but when these become parched for want of rain it frequents the banks of rivers or inland seas. Thus it is found on the shores of the Caspian (Radde, Ornis Caucasica, p. 416), and possibly on those of the Red Sea (Heuglin, Orn. N.O.-Afr. ii. p. 1019). Its occurrence in Egypt is, however, very doubtful. Its line of migration appears to be across Arabia to the valley of the Upper Nile (I have a skin shot by Blanford on August 15th at Rairo in Habab), and it winters in Africa south of the line. I have skins from Damara-Land, Cape Colony, and Natal; it has occurred as far north as Angola (Bocage, Orn. d'Angola, p. 430) in the west, and the Transvaal (Ayres, Ibis, 1871, p. 263) in the east. Its alleged occurrence in Java (Horsfield, Trans. Linn. Soc. xiii. p. 187) probably refers to *C. geoffroyi*.

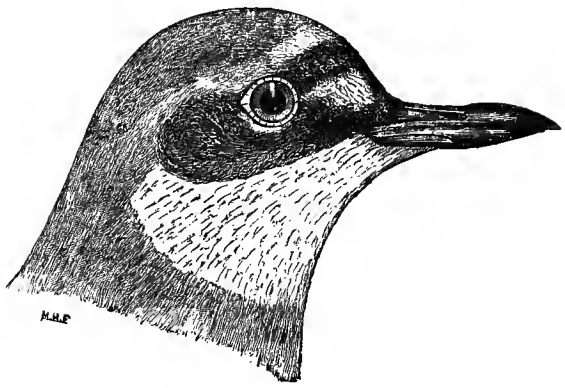
Geographical distribution.

Females are less brilliantly coloured than males, the chestnut on the breast is replaced by brown suffused with chestnut, and the black band below it is absent. Males in winter plumage are supposed to resemble females; but I have a skin collected by Andersson on February 13th in full breeding-dress, and another on December 27th in nearly full breeding-dress, both from Objimbinque, and a third in November not quite so mature. I have also two skins from Natal: one, shot by Major Feilden in November (Zoologist, 1882, p. 460), is a young female; but the other, obtained by Capt. Reid (Zoologist, 1882, p. 342) on December 26th, is a young male, and has almost assumed the chestnut breast and the black band below it. Radde implies that this black band is only found in very old birds, but this must be an error. It seems to me that all the supposed adult males in winter plumage are birds of the year, and that the plumage of adult birds does not vary with the seasons.

Seasonal and other variations.

If we regard the pale colour of the legs and feet as denoting affinity, the nearest allies of the Caspian Sand-Plover are two American species—*C. montanus* inhabiting the inland temperate regions, and *C. wilsoni* living on the tropical coasts. On the other hand, if we accept the verdict of the American ornithologists, who found their genera in this group on the shape of the bill, we may regard *C. asiaticus* as nearest allied to *C. montanus*, but must look upon *C. wilsoni* as nearest related to *C. geoffroyi*. I have accepted this conclusion provisionally, though I feel confident that future writers will discover its fallacy.

Nearest allies.



CHARADRIUS GEOFFROYI.

GREATER SAND-PLOVER.

Diagnosis. CHARADRIUS, subgen. *Ægialophili majores,* maxillæ arcu longiore (circa 13 millim.) : rostro recto : pedibus nigris, parvis (digit. med. cum ungue circa 22 millim.).

Variations. IT is not known that this species is subject to any geographical variations.

Synonymy.

Charadrius geoffroyi, *Wagler, Syst. Av.* p. 61 (1827).
Charadrius leschenaulti, *Lesson, Man. d'Orn.* ii. p. 322 (1828).
Charadrius columbinus, *Hemprich u. Ehrenberg, fide Wagler, Isis,* 1829, p. 650.
Charadrius griseus, *Lesson, Traité d'Orn.* p. 554 (1831).
Charadrius rufinus, *Blyth, Ann. & Mag. Nat. Hist.* xii. p. 169 (1843).
Hiaticula geoffroyi (*Wagl.*), *Rüppell, Vög. N.O.-Afr.* p. 118 (1845).
Hiaticula columbina (*Wagl.*), *Lichtenstein, Nom. Av.* p. 94 (1854).
Cirrepidesmus geoffroyi (*Wagl.*), *Bonap. Compt. Rend.* xliii. p. 417 (1856).
Ægialites geoffroyi (*Wagl.*), *Heuglin, Syst. Uebers. Vög. N.O.-Afr.* p. 56 (1856).
Ægialites leschenaulti (*Less.*), *Swinhoe, Proc. Zool. Soc.* 1863, p. 309.
Eudromias geoffroyi (*Wagl.*), *Meyer, Journ. Orn.* 1873, p. 405.
Eudromias crassirostris, *Severtzow, Turkest. Jevotnie,* p. 146 (1873).

Literature.

PLATES.—Harting, Ibis, 1870, pl. xi. ; Dresser, Birds of Europe, vii. pl. 521.
HABITS.—Legge, Birds of Ceylon, p. 939.
EGGS.—Hereinafter mentioned.

Specific characters. The Greater Sand-Plover is one of the larger allies of the Kentish Plover (*C. cantianus*), which belongs to the group of *Ægialophili majores.* Its long straight thick *bill, varying in*

length from ·8 *to* ·95 *inch from the frontal feathers, of which the terminal vault occupies about half*, distinguishes it from all its allies except from *C. obscurus*. From this species it is most easily distinguished by its smaller size (wing from carpal joint varying from $5\frac{1}{4}$ to $5\frac{3}{4}$ inches) and much smaller foot (*middle toe and claw about* ·9 *inch*). The adult male in summer has a chestnut upper breast.

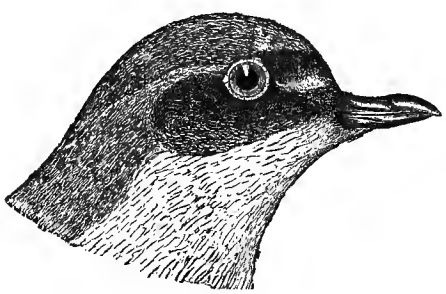
Geographical distribution.

Although the Greater Sand-Plover has a very wide range in winter (extending from South Africa through India, Burma, South China, Japan, to the Malay Archipelago and Australia), its summer-quarters are somewhat doubtful. As it is not known to have occurred in Turkestan or Siberia, and was not detected by Prjevalski in Mongolia, but occurs throughout the summer, apparently in full breeding-plumage, on the coasts of Japan, Formosa, and Hainan, I think we may fairly assume that it breeds in the latter localities, and that the larger series of eggs obtained by Swinhoe (Seebohm, Ibis, 1879, p. 154) are eggs of this species, whilst the two smaller ones are those of *Rhynchæa capensis*.

Heuglin (Orn. N.O.-Afr. ii. p. 1022) says that it occurs on the coasts of the Red Sea from June to November, and must consequently breed there, but the conclusion seems to me more than doubtful.

Seasonal changes.

The Greater Sand-Plover appears to be exclusively a sea-coast species. The chestnut on the breast is duller in the female, but the very conspicuous black markings on the forehead, lores, and ear-coverts appear to be entirely confined to the adult male in breeding-dress, being replaced by greyish brown in all other plumages.



CHARADRIUS MONGOLICUS.

MONGOLIAN SAND-PLOVER.

Diagnosis.

Charadrius, subgen. *Ægialophili majores*, pedibus nigris: rostro brevi (maxillæ arcu $7\frac{1}{2}$ millim. aut minore): pectore fasciis duabus obscuris nunquam ornato: caudâ brevi (minus quam 50 millim. in juv.): supracaudalibus pallidis.

Variations. No local races of this species are known.

Synonymy.

Charadrius mongolus, *Pallas, Reise Russ. Reichs*, iii. p. 700 (1773).
Charadrius mongolicus, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 136 (1826).
Charadrius cirrhcpidesmos, Charadrius gularis, } *Wagler, Syst. Av.* pp. 61, 69 (1827).
Charadrius sanguineus, *Lesson, Man. d'Orn.* ii. p. 330 (1828).
Charadrius pyrrhothorax, *Temminck, fide Gould, Birds Eur.* iv. pl. 299 (1837).
Ægialites pyrrhothorax (*Temm.*), *Keyserling u. Blasius, Wirb. Eur.* p. lxx (1840).
Charadrius rufinellus, *Blyth, Ann. & Mag. Nat. Hist.* xii. p. 169 (1843).
Charadrius ruficollis, *Cuvier, fide Schlegel, Rev. Crit. Ois. Eur.* p. 95 (1844).
Charadrius subrufinus, *Hodgson, Gray's Zool. Misc.* 1844, p. 86.
Hiaticula inornata, *Gould, Birds of Australia*, vi. pl. 19 (1848).
Hiaticula inconspicua, *Lichtenstein, Nom. Av.* p. 94 (1854).
Pluviorhynchus mongolus (*Pall.*), Cirrepidesmus pyrrhothorax (*Temm.*), } *Bonap. Compt. Rend.* xliii. p. 417 (1856).
Charadrius inornatus (*Gould*), *Gray, Proc. Zool. Soc.* 1858, p. 187.
Ochthodromus inornatus (*Gould*), *Gould, Handb. Birds Austr.* ii. p. 237 (1865).
Ægialitis mongolicus (*Pall.*), *Swinhoe, Ibis*, 1870, p. 360.
Cirrepidesmus mongolicus (*Pall.*), *Hume, Stray Feathers*, 1873, p. 230.
Ægialitis mastersi, *Ramsay, Proc. Linn. Soc. N. S. Wales*, i. p. 135 (1876).
Eudromias mongolicus (*Pall.*), *Severtzow, Ibis*, 1876, p. 327.

Literature.

Plates.—Middendorff, Sib. Reise, ii. pl. xix. figs. 2, 3; Gould, Birds of Europe, pl. 299; Gould, Birds of Australia, vi. pl. 19.
Habits.—Radde, Reisen im Süden von Ost-Sibirien, ii. p. 324.
Eggs.—Unknown.

The Mongolian Sand-Plover in the breeding-dress of the adult male is distinguished by having a white throat and a chestnut breast; but as the chestnut breast disappears in autumn, a more elaborate diagnosis is necessary. It belongs to the group of *Ægialophili majores*, the wing from carpal joint varying in length from 5·4 to 4·9 inch; and may be distinguished from *C. asiaticus* and *C. montanus* by its *black legs*; from *C. wilsoni*, *C. obscurus*, *C. geoffroyi*, and *C. frontalis* by its short *bill with a terminal vault of* ·3 *inch or less*; and from *C. falklandicus* and *C. bicinctus* in adult plumage by never having the breast crossed by two bands. Young in first plumage of *C. falklandicus*, *C. bicinctus*, and *C. mongolicus* are very difficult to determine, but the latter have the upper tail-coverts paler than the rump, and the tail short (under two inches).

Geographical distribution.

The Mongolian Sand-Plover breeds in Asia from Eastern Turkestan to the valley of the Amoor, and winters on the coasts from the mouth of the Red Sea to the islands of the Malay Archipelago and Australia.

It is an inland bird during the breeding-season, but in winter it is almost entirely confined to the sea-coast. The female differs from the male in having the chestnut on the breast less brilliant than in the male; the chestnut eye-stripe and nape are almost obsolete, and the conspicuous black markings on the forehead, lores, and ear-coverts are replaced by brown. Both the chestnut on the breast and the black markings on the head are replaced by brown in the winter dress of both sexes, and in young in first plumage. Variations due to age, sex, and season.

The Mongolian Sand-Plover is nearest related to *C. geoffroyi* [1], but it is also very nearly allied to *C. bicinctus*, so closely indeed that it is sometimes very difficult to determine the young in first plumage. Nearest allies.

CHARADRIUS BICINCTUS.

CHESTNUT-BANDED PLOVER.

Diagnosis.

Charadrius, subgen. *Ægialophili majores*, pedibus nigris: maxillæ arcu brevi (circa 8 millim.): pectore aut (in adult.) nigro albo et castaneo fasciato, aut (in juv.) vix fasciato: supracaudalibus non albo terminatis.

Variations.

No local races of this species are known.

Synonymy.

Charadrius bicinctus, *Jardine & Selby, Ill. Orn.* i. pl. 28 (1825).
Ægialitis bicinctus (*Jard. & Selby*), *Gould, Syn. Birds Austr.* pl. 32. fig. 3 (1837).
Hiaticula bicincta (*Jard. & Selby*), *Gould, Birds of Australia*, vi. pl. 16 (1848).
Ochthodromus bicinctus (*Jard. & Selby*), *Gould, Handb. Birds Austr.* ii. p. 238 (1865).

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[1] Dresser's remark (Birds of Europe, vii. p. 476) that *Charadrius mongolicus* and *C. geoffroyi* are "only just specifically separable" is very extraordinary. Baird, Brewer, and Ridgway, who appear to me to place an exaggerated value on the shape of the bill (Water-Birds N. Amer. i. p. 168), evidently regard these two birds as generically distinct! Though I have placed them in the same subsection of the same subgenus, I look upon them as perfectly good species, never to be confounded at any age or in any plumage. Of the two opposite errors it is difficult to say which is the more mistaken view.

Literature.

PLATES.—Jard. & Selby, Ill. Orn. i. pl. 28; Gould, Birds of Australia, vi. pl. 16.
HABITS.—Potts, Trans. New Zealand Inst. ii. p. 67.
EGGS.—Buller, Birds of New Zealand, p. 211.

Specific characters of adults.

The Chestnut-banded Plover in breeding-plumage is easily recognized by the bands across its breast, the upper narrow and black, separated by a narrow white band from the lower one, which is broad and chestnut. These two bands are acquired in the first autumn, before the feathers of the upper parts have lost their rusty margins. When once acquired they are never entirely lost, though they become very obscure in winter, as might be expected of birds which principally frequent the shore. There is no difference between the plumage of the male and that of the female, but young birds before their first autumn moult are difficult to diagnose. From the young of *C. asiaticus* and *C. montanus* they are at once distinguished by their *black legs*; from those of *C. wilsoni*, *C. obscurus*, *C. geoffroyi*, and *C. frontalis* by the smallness of the *terminal arch of the bill*, which *measures* ·3 *inch or less* instead of ·4 inch or more.

Specific characters of young.

From the young of *C. falklandicus* they may be distinguished by not having the upper tail-coverts conspicuously darker than the rump; but with the young of *C. mongolicus* they are often confounded. The usually longer tarsus and more slender bill are variable characters which cannot be relied upon, and there is no difference in length of wing. The only available characters appear to be that the young of *C. bicinctus* has the *tail slightly more than two inches long*, with the *central upper tail-coverts of the same colour as the rest of the upper parts*; whilst the young of *C. mongolicus* has the tail slightly less than two inches long, the central upper tail-coverts having white margins.

The latter character is as conspicuous in adult birds (except in abraded plumage), and is strongly marked in *C. geoffroyi*, but less distinctly in *C. asiaticus*, *C. obscurus*, and *C. montanus*.

This species belongs to the group of *Ægialophili majores*, the length of wing varying from 5·3 to 4·9 inch.

The Chestnut-banded Plover is principally a shore bird, and frequents the entire coast of Australia, Tasmania, New Zealand, and Lord Howe's Island. After the breeding-season it associates in flocks, which occasionally visit the grassy plains inland. Travers found it on the Chatham Islands (Hutton, Ibis, 1872, p. 246), nearly 500 miles east of New Zealand; but its alleged occurrence in Hainan and in Calcutta are obviously cases of mistaken identity. Both skins are in my collection; the first mentioned is an example of *C. mongolicus*, and the last of *C. dealbatus*.

It is nearest allied to *C. falklandicus*, and very closely so to *C. mongolicus*; from the parent stock of which both species must be regarded as post-glacial offshoots.

CHARADRIUS OBSCURUS.

NEW-ZEALAND DOTTEREL. (Plate VI.)

Diagnosis.

Charadrius, subgen. *Ægialophili majores*, pedibus majoribus (dig. med. cum ung. circa 30 millim.) : nec rectricibus nec scapularibus transversim striatis.

Variations.

No local races of this species are known.

Synonymy.

Charadrius obscurus, *Gmelin, Syst. Nat.* i. p. 686 (1788).
Charadrius glareola, *Lichtenstein, Forster's Descr. Anim. It. Mar. Austr.* p. 109 (1844).
Pluviorhynchus obscurus (*Gmel.*), *Bonap. Compt. Rend.* xliii. p. 417 (1856).

Literature.

Plates.—Gray, Zool. Voy. Erebus & Terror, pl. ix.
Habits.—Buller, Birds of New Zealand, p. 208.
Eggs.—Potts, Trans. New Zealand Institute, ii. p. 68.

Specific characters.

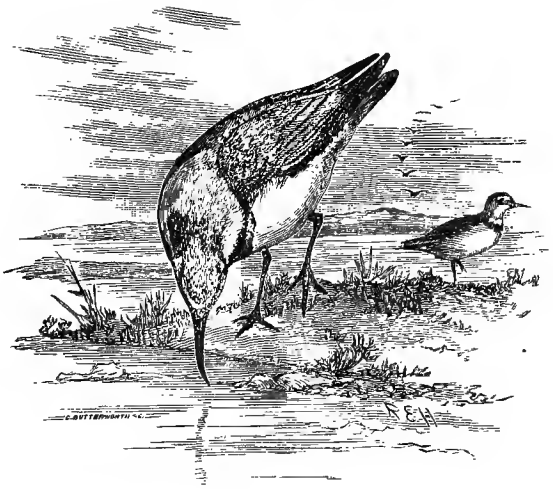
The New-Zealand Dotterel is apparently an overgrown Sand-Plover, and may be diagnosed from all its congeners (except those which have barred tails) by its great feet, the *middle toe and claw measuring* $1\frac{1}{8}$ *inch. The tail-feathers are uniform grey or brown, with narrow pale margins.*

Like all other species of Charadriidæ the New-Zealand Dotterel moults twice in the year. I have an example collected by Dr. Haast at Saltwater Creek, Canterbury, in May in winter plumage, with no chestnut margins to the feathers of the upper parts, and with the underparts white, obscurely marked with grey on the upper breast and upper flanks. Another example, collected by Mr. Travers in the Province of Nelson in June, is moulting its primaries, and has changed half its white feathers on the breast to chestnut. Two examples collected by Dr. Haast on the Waimakariri River, in September and October, are in full breeding-plumage, with the whole of the underparts chestnut except the chin, axillaries, and under wing and tail-coverts, which are white. Two other examples, collected by Baron von Hügel at Riverton, Southland, in December, are both moulting their primaries ; one is in nearly full winter plumage, but the other still retains many of the chestnut feathers of the summer plumage on the breast.

Geographical distribution.

It breeds in the mountains of New Zealand, descending to the coast in winter.

It appears to be nearest allied to *C. geoffroyi*, and is the largest species of the subgenus, the wing from carpal joint varying in length from 6·8 to 5·9 inch.



CHARADRIUS FRONTALIS.

WRY-BILLED PLOVER.

Diagnosis. CHARADRIUS rostro dextrorso curvato.

Variations. THE alleged variations of this species are supposed to be myths.

Synonymy.

Anarhynchus frontalis, *Quoy & Gaimard, Voy. Astrol., Zool.* i. p. 252 (1833).
Thinornis frontalis (*Quoy & Gaim.*), *Gray, Genera of Birds,* iii. p. 545 (1848).
Anarhynchus albifrons, *Schlegel, Handleid.* i. p. 435 (1857).
Charadrius frontalis (*Quoy & Gaim.*), *Gray, Ibis,* 1862, p. 234.
Hæmatopus frontalis (*Quoy & Gaim.*), *Finsch, Journ. Orn.* 1867, p. 346.

Literature.

PLATES.—Harting, Ibis, 1869, pl. viii.
HABITS.—Buller, Birds of New Zealand, p. 216[1].
EGGS.—Harting, Proc. Zool. Soc. 1874, pl. lx. fig. 11.

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[1] The account of the Wry-billed Plover is full of blunders and omissions. Gray's misstatement that the wry bill was accidental is corrected (it is quite perceptible in the young in down, Newton, Proc. Zool. Soc. 1870, p. 673); but a story that the pectoral band is broader on the right than on the left side of the breast is attempted to be explained by the laws of protective selection! The fact that the male has a black band over the white forehead is not mentioned, nor does it appear to have occurred to the writer that there may or may not be any difference between summer and winter plumage. The black pectoral band is said to be duller in the female than in the male, an assertion contradicted by sexed skins from Haast, Wilson Saunders, &c. in my collection. Young are said to have no pectoral band, but in a young bird in my collection the pectoral band is represented by a grey patch on each side of the breast.

The Wry-billed Plover may be always recognized by the remarkable peculiarity of its *bill*, which *curves* considerably *towards the right*. It belongs to the group of *Ægialophili majores*, the wing from carpal joint varying in length from 5·1 to 4·7 inch. Specific characters.

It is an inland species confined to New Zealand. Geographical distribution.

*** *Subgeneric group Ægialophili majores.*

†† *New-World Species.*

CHARADRIUS MONTANUS.

ROCKY-MOUNTAIN PLOVER.

Charadrius, subgen. *Ægialophili majores*, pedibus pallidis : loris nigris aut brunneis : caudâ longâ (58 ad 65 millim.). Diagnosis.

Even the lynx eyes of American ornithologists have not been able to subdivide this species into geographical races. Variations.

Charadrius montanus, *Townshend, Journ. Ac. Nat. Sc. Phil.* vii. p. 192 (1837). Synonymy.
Ægialitis montanus (*Townsh.*), *Baird, Cassin, & Lawrence, Birds N. Amer.* p. 693 (1858).
Podasocys montanus (*Townsh.*), *Coues, Pr. Ac. Nat. Sc. Phil.* 1866, p. 96.
Ægialitis asiaticus, *var.* montanus (*Townsh.*), *Coues, Key N. Amer. Birds*, p. 245 (1872).
Eudromias montanus (*Townsh.*), *Coues, Check-list N. Amer. Birds*, p. 135 (1873).

Plates.—Audubon, Birds Am. v. pl. 318. Literature.
Habits.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 172.
Eggs.—Described by Brewer on p. 175 of the above-mentioned volume.

The Rocky-Mountain Plover is the American representative of *C. asiaticus*, and principally differs from the winter plumage of that species in having the rudiments of a dark subterminal band across the tail, but it has no trace of either black or white nuchal collar. It belongs to the group of *Ægialophili majores*, the wing from carpal joint varying Specific characters.

from 6·2 to 5·7 inch. Its *pale legs and feet*[1] distinguish it from all its allies, except from *C. asiaticus*. In breeding-dress the two species are very different, the latter having *white lores*, no black on the head, but a black band below the chestnut breast; whilst the American species has black lores, a great deal of black on the crown adjoining the white forehead, but no black band across the underparts. In winter plumage the comparative length of the *tail* is the best distinction, that of the Asiatic bird *measuring* 2·0 to 2·1 inch, and that of the American species 2·3 *to* 2·6 *inch*.

Local distribution.

The Rocky-Mountain Plover is not specially a mountain species. It lives on the dry grassy prairies of North America, throughout the United States, and is probably only a summer visitor to the northernmost part of its range.

Although it is not a shore bird it loses the black markings on the head in autumn, but it is not known that the sexes differ in colour.

CHARADRIUS WILSONI.

WILSON'S PLOVER.

Diagnosis. CHARADRIUS, subgen. *Ægialophili majores*, pedibus pallidis: maxillæ arcu longiore (circa 11½ millim.).

Variations. SOME American ornithologists recognize a tropical form of this species, which is supposed to be more rusty on the nape, darker on the back, and in the female on the lores.

Synonymy.

Charadrius wilsonius, *Ord, Wilson, Am. Orn.* ix. p. 77 (1825).
Charadrius crassirostris, *Spix, Av. Bras.* ii. p. 77 (1825).
Ægialites wilsonius (*Ord*), *Bonap. Comp. List B. Eur. & N. Amer.* p. 45 (1838).
Hiaticula wilsoni (*Ord*), *Gray, List Birds Brit. Mus.* iii. p. 70 (1844).
Ochthodromus wilsonius (*Ord*), *Reichenb. fide Bonaparte, Compt. Rend.* xliii. p. 418 (1856).
Ægialitis wilsonius, *var.* rufinuchus, *Ridgway, Amer. Nat.* viii. p. 109 (1874).
Ochthodromus wilsonius rufinuchus (*Ridgw.*), *Baird, Brewer, & Ridgway, Water-Birds of N. Amer.* i. p. 168 (1884).

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[1] The legs and feet of *C. montanus* certainly look pale enough in the dried skin, but authorities differ. "Legs *yellow*" (Baird, Cassin, & Lawrence, Birds N. Amer. p. 693); "Feet *light dull brownish yellow*" (Audubon, Orn. Biogr. iv. p. 363); "legs *pale*" (Coues, Key N.-Amer. Birds, p. 604); legs *greenish grey*" (Dresser, Ibis, 1866, p. 34); "legs and feet *leaden blue*" (Coues, Ibis, 1866, p. 267). Baird, Brewer, and Ridgway, to whom we naturally look to find an explanation of these conflicting statements, preserve a discreet silence on the subject.

Literature.

PLATES.—Wilson, Am. Orn. pl. 73. fig. 5; Audubon, Birds Am. v. pl. 319.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 168.
EGGS.—Described by Brewer on p. 171 of the above-mentioned volume.

Subspecific characters.

Wilson's Plover is one of the connecting links between the *Ægialophili majores* and the *Ægialophili minores*, but on account of its large *bill with the terminal vault measuring nearly half an inch*, is perhaps better classed amongst the larger than amongst the smaller species. It is the only species of the group which combines the character of a large bill with *pale legs and feet*. The fact that its central upper tail-coverts are of almost the same colour as the rest of the upper parts is an argument against placing it in the group of smaller species, all of which have very dark central upper tail-coverts.

Sexual variations.

The adult male has a black band across the breast. In the female and bird of the year it is brown. In young in first plumage it may possibly be absent.

Geographical distribution.

Wilson's Sand-Plover is essentially a shore bird, breeding, and probably resident, on the coasts of tropical and subtropical America, as far north as California and New York, and as far south as Peru and Brazil.

It breeds on the Belize coast of British Honduras (Salvin, Ibis, 1864, p. 387), but is said to be only an autumn visitor to the island of Trinidad. On the west coast of South America it has occurred as far south as the southern shores of the Bay of Guayaquil in the extreme north of Peru (Taczanowski, Proc. Zool. Soc. 1877, p. 330). On the east coast Goering obtained it in Venezuela (Sclater & Salvin, Proc. Zool. Soc. 1868, p. 169); I have an example from Cape Orange, between French Guiana and Brazil, and one obtained by Capt. Harrison at Camamu, a hundred miles south of Bahia.

Nearest allies.

It appears to be most nearly allied to *C. geoffroyi* and *C. collaris*; from the latter it scarcely differs except in its larger size and paler central upper tail-coverts. Its length of wing from carpal joint varies from 4·8 to 4·5 inch.

CHARADRIUS FALKLANDICUS.

PATAGONIAN PLOVER.

Diagnosis.

CHARADRIUS, subgen. *Ægialophili majores*, pectore fasciis duabus, aut nigris (in adult.), aut griseis (in juv.), ornato: caudâ æquali, non cuneatâ.

Variations.

No local races of this species are known.

Synonymy.

Charadrius falklandicus, *Latham, Index Orn.* ii. p. 747 (1790).
Charadrius trifasciatus, *Lichtenstein, Verz. Doubl.* p. 71 (1823).
Charadrius annuligerus, *Wagler, Syst. Av.* p. 59 (1827).
Charadrius pyrrhocephalus, *Lesson, Voyage Coquille, Zool.* p. 719 (1826).
Hiaticula bifasciata, *Fraser, Proc. Zool. Soc.* 1843, p. 118.
Hiaticula falklandica (*Lath.*), *Gray, List Birds Brit. Mus.* iii. p. 71 (1844).

Literature.

Plates.—Portlock's Voyage, p. 36.
Habits.—Abbott, Ibis, 1861, p. 155; Gibson, Ibis, 1880, p. 163.
Eggs.—Harting, Proc. Zool. Soc. 1874, pl. lx. fig. 6.

Specific characters.

The Patagonian Plover has *two dark bands across the breast* (which are black in adult, brown in birds of the year, and almost obsolete in young in first plumage); the *four outer tail-feathers* are *nearly equal in length*, and show *scarcely a trace of a dark subterminal bar*. It is very closely related to *C. bicinctus*, which principally differs from it in having, when adult, the lower bar across the breast chestnut instead of black.

Analogous colour of *C. bifrontatus*.

It is very remarkable that the upper half of the forehead is white, whilst the lower half is brownish grey. The only other species of the genus which has this peculiar coloration is *C. bifrontatus* from Madagascar. It is perhaps only a singular coincidence that both species should have the breast crossed by two dark bands. As the forehead of the young in first plumage is white to the base of the bill in the Falkland-Island species, it is probable that this character has been only recently acquired. Young birds

Plumage of young.

(Durnford, Ibis, 1878, p. 402) further differ from adults in having no black band above the white forehead, and in having the two pectoral bands brown instead of black, and sometimes very obscure. Portlock states that the female differs from the male in having no rusty nuchal collar. It is not known that summer plumage differs from that of winter, but it is probable that the rusty nuchal collar is confined to the male in breeding-plumage. It belongs to the group of *Ægialophili majores*, the wing from carpal joint varying in length from 5·2 to 4·9 inch; but it is the only species in the group which has the central upper tail-coverts nearly black, a character very useful in distinguishing very young birds, in which the two dark pectoral bands are sometimes very obscure.

Geographical distribution.

It is described as a summer visitor to the Falkland Islands, breeding in September and October on the banks near the beach. In Patagonia it appears to be more of an inland bird and a resident, as is also the case near Buenos Ayres, which is probably the northern limit of its range on the Atlantic coast. On the Pacific coast it naturally ranges further north. I have an example from Coquimbo, and it has occurred in many other localities in Chili.

*** *Genus* Charadrius ; *subgenus* Ægialophilus ; *section of subgenus*

ÆGIALOPHILI MINORES.

Ægialophili aut alis brevibus (90 ad 115 millim.), cum maxillæ arcu brevi (10 ad 6 millim.) ; aut pedibus nigris cum loris albis ; aut primariarum tectricibus quam secundariæ valdè brevioribus (circa 13 millim.).

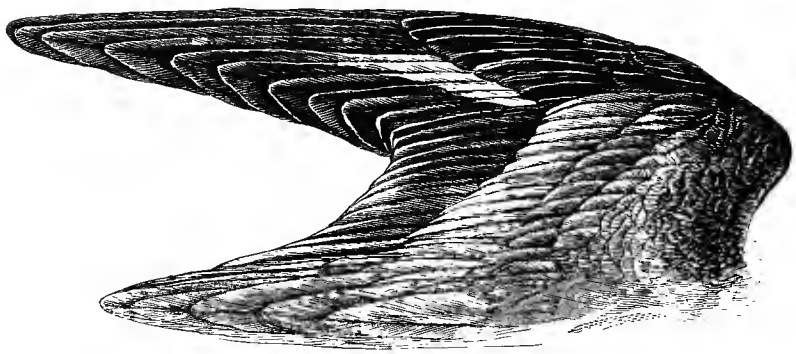
KEY TO THE SPECIES.

- Shaft of third primary dark from end to end.
  - **pecuarius.**
  - **sanctæ-helenæ** . . — Shortest primary projecting half an inch beyond the primary-coverts.
- Legs nearly black.
  - **cantianus.**
  - **ruficapillus** . . .
  - Differs from *ruficapillus* in having white lores.
    - **occidentalis** . . .
    - **collaris** . . . .
    - — Nape brown or rusty, without traces of a white collar.
  - No dark patches on sides of neck, or other traces of dark pectoral band.
    - **tenellus** . . . .
    - **marginatus** . . . — Tenth and eleventh secondaries pure white.
    - **nivosus** . . . . — Differs from *dealbatus* in having white lores.
    - **dealbatus.**
    - **peroni** . . . . . — Below the white collar either a black or rusty collar, sometimes meeting across the breast.

All these characters are found in both sexes, in young as well as in adult, and at all seasons. *C. occidentalis* and *C. nivosus* are the only species in this group which have white lores.

*** *Subgeneric group Ægialophili minores.*

† *Ethiopian Species.*



CHARADRIUS PECUARIUS.

KITTLITZ'S PLOVER.

Diagnosis. CHARADRIUS, subgen. *Ægialophili minores*, pedibus nigris: primariæ tertiæ rhachi omninò fusco: primariarum tectricorum et secundariarum longitudine æquali.

Variations. THERE are no variations due to season, and scarcely any due to sex in this species. Those due to age are hereinafter described. In spite of its wide range and sedentary habits, no local variations are known.

Synonymy.

Charadrius varius, *Vieillot, N. Dict. d'Hist. Nat.* xxvii. p. 143 (1818, *nec Brisson, Linneus, Nitzsch, &c.*).
Charadrius pecuarius, *Temminck, Pl. Col.* no. 183 (1823).
Charadrius pastor, *Cuvier, fide Lesson, Man. d'Orn.* ii. p. 319 (1828).
Hiaticula pecuaria (*Temm.*), *Rüppell, Syst. Ueb. Vög. N.O.-Afr.* p. 118 (1845).
Ægialitis pecuarius kittlitzii, *Reichenbach, Handb. Spec. Orn.* pl. cv. fig. 1063 (1851).
Charadrius isabellinus, *Müller, Naumannia*, 1851, p. 29.
Ægialites longipes, *Heuglin, Syst. Ueb. Vög. N.O.-Afr.* p. 56 (1856).
Leucopolius pecuarius (*Temm.*), Leucopolius kittlitzi (*Reichenb.*), *Bonap. Compt. Rend.* xliii. p. 417 (1856).
Ægialites pecuarius (*Temm.*), *Hartlaub, Orn. Westafr.* p. 215 (1857).
Charadrius kittlitzi (*Reich.*), *Layard, Birds S. Africa*, p. 297 (1867).

Literature.

PLATES.—Temm. Pl. Col. no. 183; Harting, Ibis, 1873, pl. viii.
HABITS.—Sharpe, Layard's Birds of S. Africa, p. 661.
EGGS.—Harting, Proc. Zool. Soc. 1874, pl. lx. fig. 4 (measure 1·22 × ·88 inch).

Specific characters.

Kittlitz's Plover and its close ally in St. Helena differ, when adult, from the other Plovers in having the *dark line from the lores passing underneath the eye and meeting on the nape*, thus isolating the pale collar from the pale throat. Young in first plumage may generally be recognized by their long tarsi, which measure $1\frac{1}{4}$ inches; but a safer diagnosis of this species and its close ally in St. Helena is *shaft of the third primary dark from end to end*. It is rather smaller than its island representative, the *bill is less than $\frac{3}{4}$ inch from the frontal feathers*, and it has a less rounded wing; the secondaries are much shorter, not reaching beyond the primary-coverts. The length of wing from carpal joint varies from 4·4 to 3·9 inch.

It is described as an inland species, occasionally visiting the sea-shore, and appears to be pretty generally distributed over the Ethiopian Region.

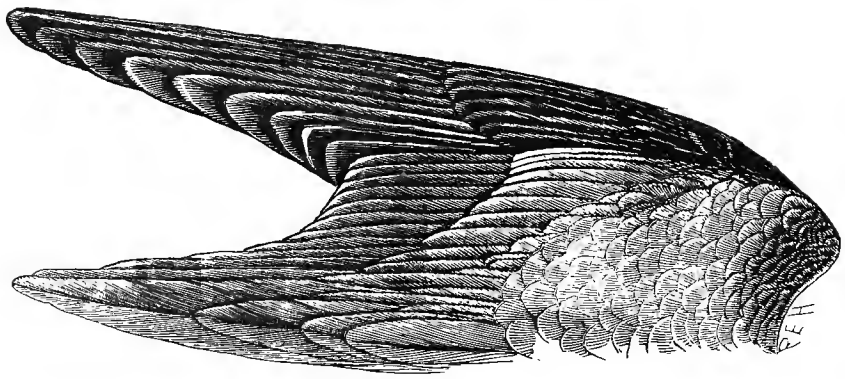
Geographical distribution.

I have examples from the Cape Verd Islands, Fantee (Ussher), Angola (Monteiro), Damara-Land (Andersson), Cape Colony (Layard), the Transvaal (Ayres), and Egypt (Shelley). Hartlaub records it from Madagascar (Vög. Madag. p. 291); Heuglin says that it is not uncommon on the banks of the Blue and White Niles (Orn. N.O.-Afr. ii. p. 1035); and Jesse found it on the shores of the Red Sea (Finsch, Trans. Zool. Soc. vii. p. 297).

Young plumage.

In young in first plumage the outer web of the sixth primary (as well as of the seventh, eighth, ninth, and tenth) is white towards the base, there is no black on the head or neck, very little buff on the breast, but the nape is so much suffused with buff that the pale collar is scarcely traceable. It is not known that the winter plumage differs from that of summer; but the female has less black above the forehead than the male.

The wings of this species are less rounded than those of *C. sanctæ-helenæ*, but more so than those of *C. cantianus*. It is not, strictly speaking, a migratory bird like the latter species, but during the dry season it has to wander far and wide in search of food. It is difficult to imagine how more rounded wings could be advantageous to the island species, or in what way they could have been altered by Natural Selection, but it is open to the advocates of that theory to argue that they have not altered. It is possible to assume that since the isolation of the three species the wings of *C. sanctæ-helenæ* (which does not migrate at all) have altered very little, but that those of *C. pecuarius* (which migrates locally to a considerable extent) have become rather less rounded, whilst those of *C cantianus* (which has to cross the sea in its migrations) have altered most. But whether these differences have been produced by degradation by disuse on the part of the island species, or by development on that of the continental forms, the correlation between long narrow wings and migratory habits, and that between shorter broader wings and sedentary habits is very interesting.



CHARADRIUS SANCTÆ-HELENÆ.

ST.-HELENA PLOVER.

Diagnosis. CHARADRIUS, subgen. *Ægialophili minores,* primariarum tectricibus quam secundariæ valdè brevioribus (circa 13 millim.).

Variations. THE restricted area of distribution of this species prevents local races from forming.

Synonymy. Ægialitis sanctæ-helenæ, *Harting, Ibis,* 1873, p. 260.

Literature. PLATES.—Harting, Ibis, 1873, pl. ix.
HABITS.—Layard, Ibis, 1867, p. 250.
EGGS, in the British Museum, exactly resemble those of *C. pecuarius* in colour and markings, but are slightly larger, measuring 1·4 by ·9 inch.

Specific characters. The St.-Helena Plover is perfectly distinct from its continental ally. The length of wing from carpal joint varying from 4·6 to 4·3 inch, cannot always be relied upon, nor does it differ in colour (nor in the variations of colour depending upon age, sex, or season), except that the white bases of the innermost primaries are so suffused with brown as to be easily overlooked. The diagnoses of *C. sanctæ-helenæ* and *C. pecuarius* agree, therefore, in the first two characters of *black legs and feet,* and *shaft of third primary nearly black,* but the shape of the wing in the two species is quite different. The wing of the St.-Helena bird is much broader than that of its ally, so much so that the *secondaries extend about half an inch beyond the primary-coverts.*

Geographical distribution.

It is described as an inland bird, but confined to the island of St. Helena. Island species are generally smaller than their continental allies; for example, the *Merulæ* of Ceylon and the Fiji Islands are smaller than their very close allies in the Himalayas and China, and the Little Ringed and Kentish Plovers of Ceylon are both small races of Palæarctic species. The cause of all these variations of size is probably a climatic one, and has no relation to the insular or continental locality. *Merula* and *Charadrius* are both arctic genera, and the smaller species are small not because they live on islands, but because they are somewhat out of their element in tropical climates. The mean temperature of Ceylon and the Fiji Islands is 78°, at least 10° higher than that of the Himalayas or South China. The mean temperature of St. Helena is about 10° lower than that of West Africa, so that *C. pecuarius*, when it emigrated to St. Helena, found a more congenial climate, and did not decrease in size as the descendants of the birds which remained in the tropics were obliged to do.

Insular forms.

The much more rounded wings of the St.-Helena species may be accounted for by the comparatively equable climate of the island making it unnecessary for its bird population to wander far in search of food, or periodically to change their residence.

CHARADRIUS MARGINATUS.

WHITE-BREASTED PLOVER.

Diagnosis.

Charadrius, subgen. *Ægialophili minores*, pedibus pallidis: pectoris lateribus pallidis vix brunneo lavatis: nuchæ collari albo obscurissimo.

Variations.

Tropical forms of this species are smaller and have much less white on the inner secondaries, and may consequently be regarded as subspecifically distinct.

Synonymy.

Charadrius marginatus, *Vieillot, N. Dict. d'Hist. Nat.* xxvii. p. 138 (1818).
Charadrius leucopolius, *Wagler, Syst. Av.* p. 65 (1827).
Charadrius nivifrons, *Cuvier, fide Lesson, Traité d'Orn.* p. 544 (1831).
Hiaticula marginata (*Vieill.*), *Gray, List Birds Brit. Mus.* iii. p. 69 (1844).
Hiaticula leucopolia (*Wagl.*), *Lichtenstein, Nom. Av.* p. 94 (1854).
Leucopolius nivifrons (*Less.*), *Bonap. Compt. Rend.* xliii. p. 417 (1856).
Ægialitis marginatus (*Vieill.*), *Hartlaub, Orn. Westafr.* p. 216 (1857).

Ægialites niveifrons (*Lesson*), *Cabanis, Decken's Reisen in Ost-Afrika*, iii. pt. i. p. 46 (1869).
Ægialitis albidipectus, *Ridgway* [1], *Proc. U. S. Nat. Mus.* v. p. 526 (1883).

Literature.

PLATES.—Unfigured.
HABITS.—Sharpe, Birds of South Africa, p. 659.
EGGS.—Layard, Birds of South Africa, p. 298.

Specific characters.

The White-breasted Plover is an Ethiopian form of the Kentish Plover. Besides the characters which it shares with all the *Ægialophili minores*, it agrees with the Kentish Plover and its nearest allies in having the white or rusty collar not cut off from the white throat by the black stripe from the eyes, as is the case with *C. pecuarius* and *C. sanctæ-helenæ* when adult. Both these species are, however, excluded, together with *C. ruficapillus*, *C. cantianus*, and *C. occidentalis*, by the character *pale legs and feet*. From *C. collaris* and from adult males in breeding-plumage of *C. nivosus*, *C. dealbatus*, and *C. peroni*, it may be distinguished by the *absence of black on the sides of the breast*. In winter plumage it is almost impossible to distinguish it from the three last-named species, but its nuchal collar is never so clearly defined as it is in *C. peroni*, the lores are seldom so white as they are in *C. nivosus*; the dark patch under the shoulder is paler and smaller than it is either in *C. nivosus* or in *C. dealbatus*; and the tarsus is longer than it is in *C. nivosus*, but not so long as it is in *C. peroni* or in *C. dealbatus*.

It is probably specifically distinct from all its allies except from *C. tenellus*, which may have originated in a cross between *C. ruficapillus* and *C. cantianus*, before they had become quite so much differentiated as they now appear to be.

It is subject to the same variation of size as its Palæarctic ally, the length of wing from the carpal joint varying from 4·5 inch in large examples from South Africa to 3·7 in small examples from West Africa.

Geographical distribution.

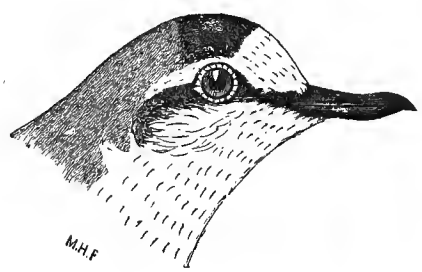
There seems to be no reliable evidence of the occurrence of the White-breasted Plover in East Africa north of the Line. Heuglin obtained a single very bleached example on the Arabian coast of the Red Sea, which was probably a diseased example of *C. cantianus* that was unable to moult in spring, and consequently did not migrate. Blanford records it as common at Zulla on the Abyssinian coast in June; but the only example in the British Museum is one from Massowa, which belongs to the dwarf form of *C. cantianus*. Jesse brought home no examples of *C. marginatus*, but found *C. pecuarius* in small flocks at Zoulla on the Red Sea in June, which was probably the species which Blanford mistook for *C. marginatus* (Finsch, Trans. Zool. Soc. vii. p. 297). Fischer obtained examples in

[1] This bird is described from an example in the Smithsonian Institution at Washington, labelled "Chili S. Abri." There is no history attached to it, and the locality may fairly be assumed to be some obscure town in S. Africa.

Masai-Land (Journ. Orn. 1884, p. 178), which appear to be the same species as examples in the British Museum from Lake Nyassa and Tete. Examples from West Africa from the Gold Coast are very similar. Examples from the Cape Colony, where it is found both on the coast and on "any extensive inland pieces of water," are somewhat different; they are rather larger in size, paler in colour, less suffused with rusty red, both on the upper and under parts, have darker and thicker legs, and have the nuchal collar white instead of rusty, which makes it much more conspicuous, and have the last three [1] secondaries (next the tertials) pure white. Examples from Angola and the coast of Damara-Land on the one side, and from the coast of Natal and Madagascar on the other, are, however, so completely intermediate that under no circumstances can the tropical form be regarded as more than subspecifically distinct.

Breeding-season.

It is difficult to say when this species breeds; Andersson says April in Damara-Land; Layard says November at the Cape. I have examples in breeding-dress from the Gold Coast dated February and April; from Natal in January and April; and from Madagascar in October; and in the British Museum are examples in breeding-dress from the Cape Colony dated 4th April and 22nd June.



CHARADRIUS MARGINATUS TENELLUS.

TROPICAL WHITE-BREASTED PLOVER.

Diagnosis.

CHARADRIUS MARGINATUS magnitudine minore: colore pallidiore, vix fulvo lavato: secundariis interioribus haud omninò albis.

Variations.

THIS race appears completely to integrade with the typical form.

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[1] The ninth, tenth, and eleventh.

Synonymy.

Charadrius pallidus, *Strickland, Jardine's Contr. Orn.* 1852, p. 158.
Hiaticula heywoodi, *Thomas, fide Bonap. Compt. Rend.* xliii. p. 417 (1856).
Charadrius tenellus, *Hartlaub, Orn. Beitr. Faun. Madag.* p. 72 (1861).
Charadrius venustus, *Fischer & Reichenow, Journ. Orn.* 1884, p. 178.
Ægialitis venusta (*Fisch. & Reich.*), *Cab. Journ. Orn.* 1884, p. 437.
Ægialitis mechowi, *Cabanis, Journ. Orn.* 1884, p. 437.

Literature.

PLATES.—Previously unfigured.
HABITS.—Not known to differ from those of its conspecific ally.
EGGS.—Milne-Edwards & Grandidier, Hist. Nat. Ois. Madag., Atlas, iii. pl. 305. fig. 5.

The differences between the tropical form of the White-breasted Plover and the typical or South-African form have been already pointed out, and their respective ranges, so far as they are known, described.

Geographical distribution.

The tropical form ranges from West Africa (probably across the continent) to Lake Nyassa and Madagascar. Examples from Natal approach the typical form slightly, whilst those from Damara-Land scarcely differ from it. This distribution, which shows that the typical form extends nearly a thousand miles further north on the west than on the east coast, looks rather remarkable, but it corresponds almost exactly with the isothermal lines for January, which is probably the breeding-season of most birds in the southern hemisphere.

*** *Subgeneric group Ægialophili minores.*
†† *Australian, Oriental, and Palæarctic Species.*

CHARADRIUS RUFICAPILLUS.

RED-CAPPED PLOVER.

Diagnosis.

CHARADRIUS, subgen. *Ægialophili minores*, pedibus nigris: nuchâ nec collari nigro nec collari albo ornatâ: loris aut (in adult.) nigris, aut (in juv.) brunneis.

Variations.

No local races of this species are known.

Synonymy.

Charadrius ruficapillus, *Temm. Pl. Col.* no. 47. fig. 2 (1823).
Ægialitis canus, *Gould, Proc. Zool. Soc.* 1837, p. 154.
Hiaticula ruficapilla (*Temm.*), *Gray, List Birds Brit. Mus.* iii. p. 71 (1844).
Ægialophilus ruficapillus (*Temm.*), *Gould, Handb. Birds Austr.* ii. p. 235 (1865).

Literature.

Plates.—Temminck, Pl. Col. no. 47; Gould, Birds of Australia, vi. pl. 17.
Habits.—Gould, Handb. Birds Austr. ii. p. 235.
Eggs.—Harting, Proc. Zool. Soc. 1874, pl. lx. fig. 8.

Specific characters.

The Red-capped Plover is the Australian representative of the Kentish Plover, and therefore belongs to the section of the genus distinguished as *Ægialophili minores*. In this section there are five species, of which it is one, which have *nearly black legs and feet*. Of the other four three may be disposed of because they have white nuchal collars, emphasized in the adult birds of two species by black collars below them. The Red-capped Plover has *neither black nor white nuchal collar*, but the rusty red on the head and neck is sometimes confined to the nape, and forms a rusty-red nuchal collar. The fourth dark-legged species may be disposed of by the smaller size of the Australian species, and by the fact that when adult it has *black lores*, and when young *brown lores*. The lores of its Chilian ally are always white. The latter is a small species, as might be expected of a *Charadrius* whose range is for the most part tropical. The length of wing from carpal joint varies from 4·2 to 3·8 inch.

Plumage of young.

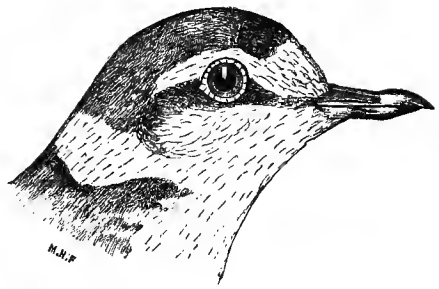
The female scarcely differs from the male in colour, nor is it known that winter plumage differs from that of summer; but in young in first plumage, and apparently in birds of the year, the black on the head, neck, and sides of the breast is replaced by brown, and the rusty red of the head and nape is scarcely perceptible.

Geographical distribution.

It is a resident on almost every part of the Australian and Tasmanian coasts, frequently ascending the creeks and rivers for some distance into the interior. It has once occurred in New Zealand (Kirk, Trans. New Zealand Inst. xii. p. 246).

Nearest allies.

It is rather remarkable that the nearest ally of this Australian species should be *C. occidentalis*, on the Pacific side of the Andes, and that its next nearest ally should be *C. collaris*, on the Atlantic side of that range. If the absence of a white nuchal collar be an important character, which seems probable, we may assume its next nearest relation to be *C. tenellus*, from Madagascar, which in South Africa may have intermarried with *C. cantianus* to produce *C. marginatus*. It is, however, not unlikely that the fact that the partial differentiation of *C. marginatus* from the older and tropical form, *C. tenellus*, should have been in the direction of *C. cantianus* is only a coincidence.



CHARADRIUS PERONI.

MALAY SAND-PLOVER.

Diagnosis. CHARADRIUS, subgen. *Ægialophili minores*, pedibus pallidis: infra nuchæ collare album fasciâ aut nigrâ (in adult.), aut ferrugineâ (in juv.), sæpe pectore conjunctâ.

Variations. IN this species, as in *C. melodus*, the black nuchal collar sometimes meets across the breast, but it is not known that this peculiarity has any geographical significance.

Synonymy. Charadrius peroni, *S. Müller, Temm. fide Schlegel, Mus. Pays-Bas, Cursores*, p. 33 (1865).
Ægialites perronii (*Temm.*), *Swinhoe, Proc. Zool. Soc.* 1870, p. 139.

Literature. PLATES.—Walden, Trans. Zool. Soc. viii. pl. x. fig. 2.
HABITS.—Undescribed.
EGGS, in the British Museum, collected by Low on Labuan, measure 1·3 by ·9 inch; the markings resemble those of typical eggs of *C. cantianus*, but on a cream-coloured ground.

Specific characters. The Malay Sand-Plover is perfectly distinct from any of its allies. It belongs to the section of the genus which I have characterized as *Ægialophili minores*, and when adult may be distinguished from all its allies by its combination of the two characters, *black nuchal collar* and *pale legs and feet*. There is no difference between the plumage of winter and that of summer, nor is it known that adult males differ from adult females; but in young in first plumage the black on the crown, lores, ear-coverts, breast, and back is all replaced by rust-colour, causing it to resemble *C. nivosus* or *C. dealbatus*. The two latter species being, however, only resident forms of the migratory *C. cantianus*, have not yet acquired the rounded wings of resident birds. In all three forms of *C. cantianus* the distance from the carpal joint to the end of the longest primary-coverts is greater than that

to the end of the shortest secondary; and that from the tip of the shortest primary to the tip of the longest is equal to or greater than that to the carpal joint. In both cases it is the reverse in *C. peroni*, whose comparatively longer secondaries and shorter primaries prove that it has been a resident species for a much longer period than the two resident forms of *C. cantianus* [1].

Geographical distribution.

The Malay Sand-Plover is a resident in Java, Borneo, Celebes, the Philippine Islands, and probably some of the other islands of the Malay Archipelago. There are examples in the Leyden Museum from Semao, a small island off the west coast of Timor, which appears to be the eastern limit of its range. I have examples from Borneo and Java. Lord Tweeddale recorded it from the Philippine Islands (Proc. Zool. Soc. 1878, pp. 711, 344), and also from Celebes (Trans. Zool. Soc. viii. p. 90).

Allied species.

It is rather a smaller bird than the Kentish Plover, the length of wing from carpal joint varying from 4·1 to 3·6 inch. Its small size is probably not connected with the fact that it lives upon islands and not upon a continent, but has doubtless some relation to another fact in its history, that it belongs to a somewhat arctic genus, and has decreased in size in the uncongenial climate of the tropics. It has several points of resemblance to *C. pecuarius*—the black nuchal collar, the mottled appearance produced by the pale margins of the feathers of the upper parts, and the proportionally long and slender tarsi. In many respects it is so exactly intermediate between the Common Ringed Plover (*Charadrius hiaticula*) and the Kentish Sand-Plover (*C. cantianus*) that it might almost be mistaken for a hybrid between the two. It is nevertheless a perfectly distinct species. The colour of its tail, the three outer feathers on each side unspotted white, shows its affinity to the latter species; whilst its pale legs and *black* as well as white rings round the neck exactly resemble the former, except that the black ring seldom meets on the breast (a peculiarity also found in *C. melodus*).

I have been unable to find any allusion to the habits of this species, which doubtless resemble those of the Kentish Plover, though they appear never to have been described. There are few parts of the world from which it is more difficult to obtain skins of birds, or of which less information respecting the habits of their feathered inhabitants is forthcoming, than the Dutch colonies; and this is all the more remarkable because the ornithological department of the Museum of Leyden is the third, if not the second, in importance of all the ornithological collections in the world.

[1] Harting's identification of *Charadrius peroni* with *C. dealbatus*, cautiously quoted by Legge (Birds of Ceylon, p. 948), and rashly adopted by me (British Birds, iii. p. 25), is a blunder which neither of us ought to have committed after the publication of Lord Walden's excellent plate in the 'Transactions of the Zoological Society,' and the care which Swinhoe took (Proc. Zool. Soc. 1870, p. 139) to point out the difference between the two species.

CHARADRIUS CANTIANUS.

KENTISH PLOVER.

Diagnosis. CHARADRIUS, subgen. *Ægialophili minores,* nuchâ non collari nigro sed collari albo ornatâ : pectore utrinque maculâ fuscâ : primariæ tertiæ rhachide pro majore parte albâ.

Variations. THE Kentish Plover might be supposed, from its most inappropriate name, to be confined to the south-east corner of England. On the contrary its range extends eastwards for 250 degrees of latitude. It is not surprising, therefore, that it may be subdivided into several races or subspecies.

Synonymy.

Charadrius cantianus, *Latham, Index Orn. Suppl.* p. lxvi (1801).
Charadrius albifrons, *Wolf & Meyer, Vög. Deutschl.* i. p. 180 (1805).
Charadrius littoralis, *Bechstein, Naturg. Deutschl.* iv. p. 430 (1809).
Ægialitis cantianus (*Lath.*), *Boie, Isis,* 1822, p. 558.
Hiaticula cantiana (*Lath.*), *Blyth, Cat. B. Mus. As. Soc.* p. 263 (1849).
Hiaticula elegans, *Lichtenstein, Nomencl. Av.* p. 94 (1854).
Ægialophilus cantianus (*Lath.*), *Gould, Handb. B. Austr.* ii. p. 234 (1865).

Literature.

PLATES.—Gould, Birds Gt. Brit. iv. pl. 40 ; Dresser, Birds of Europe, vii. pl. 523.
HABITS.—Seebohm, British Birds, iii. p. 25.
EGGS.—Seebohm, British Birds, pl. 26. figs. 7, 9.

Specific characters.

The Kentish Plover, or Common Sand-Plover, may be regarded as the type of a subgenus of *Charadrius*, to which the name of *Ægialophilus* was given by Gould. It belongs to the smaller section of the group, as the *wings* vary from 4·5 *to* 4·1 *inch* in length from the carpal joint. It may be diagnosed from the other small species of this subgenus by its *white nuchal collar joining the white throat*, in which respect it resembles *C. peroni* and *C. marginatus*. From the latter it differs in having *a dark patch* (black in adult male in breeding-dress, otherwise brown) *on the side of the breast*, but this *black patch* does *not extend round the base of the neck* as in the former species. From immature examples of *C. pecuarius* and *C. sanctæ-helenæ* it is easily distinguished by the *central portion of the shafts of the third primaries being white*.

It may be subdivided into three or four races, the typical or Palæarctic form being distinguished by its *black legs*.

Geographical distribution.

So far as is known, the Kentish Plover only breeds on the margins of salt-lakes or on the sea-shore, nevertheless its breeding-range extends from the Atlantic to the Pacific. It is a regular summer visitor to the coasts of South Sweden, Denmark, Holland, Belgium, and France. It is a resident on the coasts of Spain, Portugal, the Azores, Canaries, Madeira, and on both shores of the Mediterranean. To the salt-marshes on the steppes of Southern Russia, the shores of the Caspian, the margins of the salt-lakes of Turkestan, South Dauria, and Mongolia it is a summer visitor. The Kentish Plovers which breed in the northernmost portion of their range in Europe appear to winter on the coasts of Africa, where they have been said to stray as far south as the Cape Colony, but I have never seen an example from South Africa. The Asiatic birds winter on the Mekran coast in India, Ceylon, Burma, the Malay peninsula, China, and Japan.

Seasonal and other changes.

The black markings on the lores, behind the eyes, above the white forehead, and on the sides of the breast are confined to the male in breeding-dress, and are replaced by brown in the other plumages.

CHARADRIUS CANTIANUS MINUTUS.

TROPICAL KENTISH PLOVER.

Diagnosis.

CHARADRIUS CANTIANUS magnitudine minore.

Variations.

IT appears completely to intergrade with the typical form.

Synonymy.

So far as I have been able to learn no name has been given to this subspecies, though it is possible that the *Charadrius alexandrinus* of Hasselquist (Linneus, Syst. Nat. i. p. 253) may refer to it.

Literature.

PLATES.—Unfigured.

HABITS.—Legge, Birds of Ceylon, p. 950.

EGGS.—Described by Legge in the above-mentioned volume as slightly smaller than eggs of the more northerly race.

Subspecific characters.

The tropical form of the Common Sand-Plover, or Kentish Plover as it has unfortunately been named, is only a dwarf race of its migratory ally. The length of the wing from the carpal joint varies from 4·2 to 3·7 inch. The legs are also said to be somewhat paler than those of the typical form.

So far as is known, the small race of the Common Sand-Plover is a resident on the southern shores of the Red Sea, where it was obtained by Blanford, who erroneously identified it as *C. niveifrons* (Geol. and Zool. Abyss. p. 429), and on the island of Ceylon, where Legge found it breeding on the margins of the salt-lagoons.

CHARADRIUS CANTIANUS DEALBATUS.

CHINESE KENTISH PLOVER.

Diagnosis.

CHARADRIUS CANTIANUS loris fuscis, pedibus pallidis.

Variations.

THE Chinese form of this species completely intergrades both with the American and European forms.

Synonymy.

Ægialites dealbatus, *Swinhoe, Proc. Zool. Soc.* 1870, p. 138.

Literature.

PLATES.—None.

HABITS.—Swinhoe, Ibis, 1860, p. 429.

EGGS, obtained by Swinhoe, are indistinguishable from those of the typical form.

Subspecific characters.

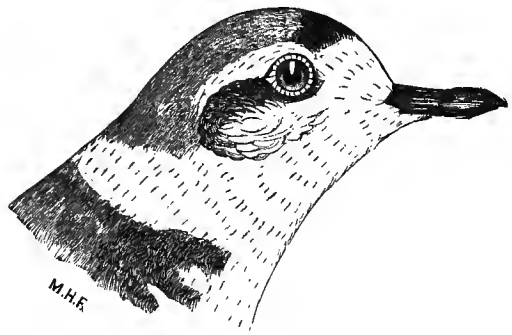
The Chinese form of the Kentish Plover only differs from its Western ally in being on an average a slightly larger bird, with *pale* instead of dark *legs*. In the latter respect it agrees with the American form of the same species, which differs from it only in having no *black on the lores*. On the American shore of the Pacific it is said that all three forms occur together with intermediate examples.

Geographical distribution.

It is a resident on the coasts of South China, Formosa, and Hainan.

*** *Subgeneric group Ægialophili minores.*

††† *Nearctic and Neotropical Species.*



CHARADRIUS CANTIANUS NIVOSUS.

AMERICAN KENTISH PLOVER.

Diagnosis.

CHARADRIUS CANTIANUS loris albis: pedibus pallidis.

Variations.

CHARADRIUS CANTIANUS is very distinct from *Charadrius nivosus*. The Eurasian species is a larger bird, with a longer bill and longer and blacker legs, darker lores, and darker upper parts generally than its American ally. The ranges of the two species do not approach within seven thousand miles of each other, so that there can scarcely be any possibility of interbreeding between the two races. Nevertheless it is possible to find small pale-legged and pale-lored birds in China, which, when compared with large dark-legged, dark-lored birds from California, would not merely be not distinguishable, but would be unhesitatingly referred to the wrong species if judged by their merits instead of their nationality. Under these circumstances it seems to me impossible to regard them as more than subspecifically distinct, though the areas of their distribution are not only not continuous, but separated by a chasm nearly eight thousand miles across.

Synonymy.

Ægialitis nivosa, *Baird, Cassin, & Lawrence, Birds N. Amer.* p. 696 (1858).

Ægialitis cantianus, *var.* nivosus, *Coues, Check-list N. Am. B.* p. 135 (1873).

Ægialitis alexandrina nivosa (*Cassin*), *Baird, Brewer, & Ridgway, Water-Birds N. Amer.* i. p. 164 (1884).

Literature.

PLATES.—Baird, Lawrence, & Cassin, Birds N. Amer. pl. xc.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 164.
EGGS.—Described by Brewer on p. 167 of the above-mentioned volume.

Subspecific characters.

The American form of the Kentish Plover is on an average a slightly smaller bird than its European and Asiatic allies, varying in length of wing from the carpal joint from 4·4 to 4·0 inch. Typical examples have *pale legs and feet*[1], like *C. dealbatus*, but differ from both forms in having *white lores*. It is said that on the American continent intermediate forms in both respects are found, some examples having dark legs and others black lores.

Geographical distribution.

The American Kentish Plover is a salt-water bird, and is said to be a resident on the shores of the Pacific from California to Northern Chili. Its range extends eastwards to the southern shores of the Great Salt Lake in Utah[2], in about the same latitude as Cape Mendocino on the coast, which appears to be its northern limit.

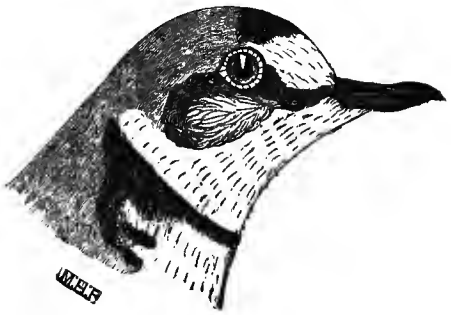
I have examples collected by Whitely (Sclater and Salvin, Proc. Zool. Soc. 1868, p. 176) and by Howard Saunders in Peru, and by Mr. G. F. Mathew near Valparaiso, which appears to be the southern limit of its range. It is said to be a resident in California, and there is no evidence that it is a migratory bird in any part of its range.

Seasonal and other changes.

Another point on which this species appears to be in a transition state is in its seasonal and sexual changes of plumage. In the Eurasian form the black markings over the forehead, on the lores, behind the eyes, and on the sides of the breast are replaced by brown in the female and young, and in the winter plumage of both sexes. In the American form the black markings vary very much in extent, and are seldom entirely absent, except in very young birds.

[1] Authorities vary as to the colour of the legs of this species. Ten examples in my collection have all pale enough legs now, whatever they may have had when they were alive. Baird, Cassin, and Lawrence (*loc. cit.*) say "legs light"; Baird, Brewer, and Ridgway (*loc. cit.*) say "legs dull slate colour, toes black"; Coues (Key N. Amer. Birds, rev. ed. p. 603) says "legs black"; but Coues (Ibis, 1866, p. 275) says "legs pale livid blue, feet blackish."

[2] Its alleged occurrence in Guatemala (Salvin, Ibis, 1863, p. 191) is an error, the species referred to being unquestionably *C. collaris*. It is doubtful to what species the *Ægialitis tenuirostris* (Lawrence, Ann. Lyc. N. York, vii. p. 455) from Cuba must be referred, but it is much more likely that the bird described was an example of *Charadrius melodus* than of *Charadrius nivosus*.



CHARADRIUS COLLARIS.

AZARA'S SAND-PLOVER.

Diagnosis.

CHARADRIUS, subgen. *Ægialophili minores*, pedibus pallidis: nuchâ nec collari nigro, nec collari albo ornatâ: pectore fasciâ nigrâ notato.

Variations.

No local races of this species are known.

Synonymy.

Charadrius collaris, *Vieillot, N. Dict. d'Hist. Nat.* xxvii. p. 136 (1818).
Charadrius azaræ, *Temminck, Pl. Col.* no. 184 (1823).
Charadrius larvatus, *Lesson, Man. d'Orn.* ii. p. 318 (1828).
Hiaticula azaræ (*Temm.*), *Gray, List Birds Brit. Mus.* iii. p. 70 (1844).
Hiaticula collaris (*Vieill.*), *Sclater, Proc. Zool. Soc.* 1860, p. 290.
Ægialites collaris (*Vieill.*), *Sclater & Salvin, Proc. Zool. Soc.* 1869, p. 252.
Ægialitis gracilis, *Cabanis, Journ. Orn.* 1872, p. 158.

Literature.

PLATES.—Temminck, Pl. Col. no. 184.
HABITS.—Bartlett, Proc. Zool. Soc. 1873, p. 309.
EGGS.—Harting, Proc. Zool. Soc. 1874, pl. lx. fig. 7.

Specific characters.

Azara's Sand-Plover is a tropical form of the Kentish Plover (*C. cantianus*), but the *black pectoral band is complete in adult birds, and nearly so in young in first plumage.* Otherwise it is difficult to distinguish from some other representatives of the Kentish Plover (*C. marginatus*, *C. nivosus*, and *C. dealbatus*), all of which, like it, have *pale legs.* From *C. peroni*, which also has pale legs, it is easily distinguished by the *absence of either a white or black nuchal collar.*

The plumage of male and female birds, both in summer and winter, presents no

Variations due to age, sex, and season.

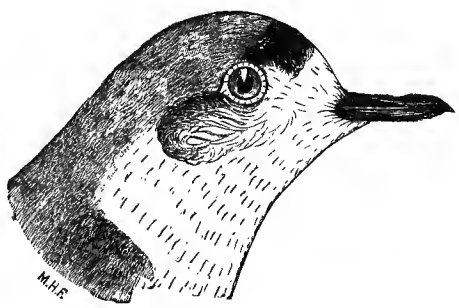
variations, but young in first plumage have little or no black above the white forehead, and the pectoral band is brown and interrupted in the middle.

It is one of the smallest species in the genus, the length of wing from carpal joint varying from 4·2 to 3·6 inch. It is a miniature of *C. wilsoni*, and is a resident in the tropical portions of Central and South America.

Geographical distribution.

I have examples from Peru, and Fraser found it in Ecuador (Sclater, Proc. Zool. Soc. 1860, p. 290). I have examples from Colombia and Venezuela. In Brazil it is found throughout the coast; Wallace found it at the mouth of the Amazon (Sclater & Salvin, Proc. Zool. Soc. 1867, p. 591); and I have examples from Bahia, Rio Grande, and Rio de la Plata. Salvin obtained an example from Guatemala (Ibis, 1866, p. 196), but it is not known to have occurred in Chili (Sclater, Proc. Zool. Soc. 1867, p. 331).

It appears to be an inland species; Bartlett found it breeding on the sandy banks of some of the tributaries of the Amazon in Eastern Peru (Proc. Zool. Soc. 1873, p. 309); and Durnford met with it in the extreme north-west of the Argentine Republic (Ibis, 1880, p. 424), and on dry sandy ground in the province of Buenos Ayres (Ibis, 1878, p. 67). These two localities represent, so far as is known, the southern limit of its range, which appears to extend seven hundred miles further south on the Atlantic than on the Pacific coasts, a boundary of distribution corresponding almost exactly with the isothermal lines for January, which is probably the breeding-season.



CHARADRIUS OCCIDENTALIS.

CABANIS'S SAND-PLOVER.

Diagnosis. CHARADRIUS, subgen. *Ægialophili minores*, pedibus nigris: loris albis.

Variations. No local races of this species are known.

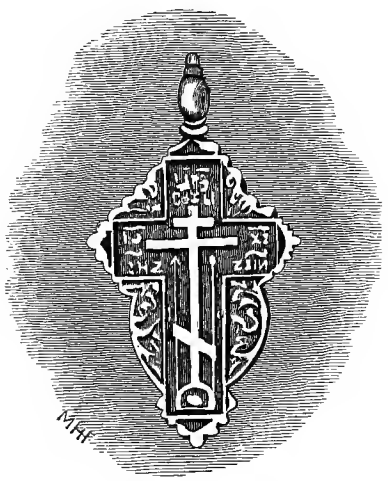
Ægialitis occidentalis, *Cabanis, Journ. Orn.* 1872, p. 158. Synonymy.

Plates.—Cabanis, Journ. Orn. 1885, pl. vi. fig. 1 (head only). Literature.
Habits.—Undescribed.
Eggs.—Unknown.

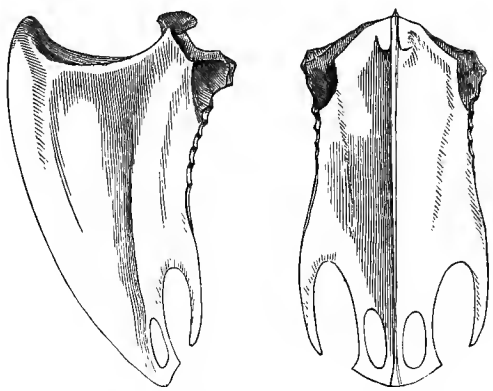
Cabanis's Sand-Plover belongs to the subgeneric group *Ægialophili minores*, and appears to be perfectly distinct from any of its allies, having *black legs* and *white lores*. Specific characters.

It is only known from the mountain plateaux in the extreme north of Chili. It is quite distinct from *C. nivosus*, which is a smaller bird, with paler feet and a white nuchal collar. It appears to be nearest related to *C. ruficapillus*, though it is probably a temperate form of its tropical ally *C. collaris*. It is a larger bird than any of its tropical allies, the wing from carpal joint measuring about $4\frac{3}{4}$ inches. It is no doubt subject to some variation in size, but it is only known from the type in the Berlin Museum, which Herr Reichenow informs me came from Chili, and from the small series obtained from Tarapacá by Mr. H. B. James (Sclater, Proc. Zool. Soc. 1886, p. 403). Geographical distribution. Nearest allies.

Males scarcely differ from females, but young in first plumage and adults in winter plumage are unknown.



CHAPTER XII.



Sternum of *Lobivanellus pectoralis*.

Genus LOBIVANELLUS.

Diagnosis of genus. CHARADRIINÆ loris carunculis ornatis.

Generic characters. THE Wattled Lapwings are closely related to the species contained in the genus *Vanellus*, but may be distinguished from them, as well as from all the other species belonging to the family, by the possession of *lobes or wattles attached to the skin between the eyes and the base of the bill*.

Taxonomic value of wattles. It is somewhat doubtful whether the presence or absence of a lobe or wattle on the side of the head be a generic character of real value, but its appearance in the young in first plumage suggests an ancient origin. It is quite possible that wattles, as well as spurs or hind toes, have been independently acquired or lost, and that the Wattled Lapwings are not more closely related to each other than they are to some of the Lapwings without wattles. But whether the genus *Lobivanellus* be a natural or an artificial one (the determination of which must be left to the decision of the anatomists), it is at least a very

convenient one, and some facts of its geographical distribution appear to be in favour of its validity.

Geographical distribution.

The Lapwings having wattles are almost as numerous as those which are without these peculiar appendages, but the former are distributed over a much smaller area. There are no Wattled Lapwings in the New World, and the only part of the Palæarctic Region in which they occur is in the valley of the Hoang-Ho and in Southern Japan, a debatable ground, the ornithological affinities of which are perhaps more Oriental than Palæarctic, and which belong to the Tropical Region of the Charadriidæ Six species inhabit the Ethiopian Region and four the Oriental Region, whilst the remaining three belong to the Australian Region. Of the true Lapwings no less than four breed within the confines of the Palæarctic Region, five are found in the Ethiopian Region, whilst only one is found during the breeding-season in the Oriental Region and none in the Australian Region, but no less than three are Neotropical.

Emigrations.

A possible explanation of the differences in these distributions may be that the two genera originated during the Pre-Pliocene Glacial Epoch, when the family of Charadriidæ appears to have been dispersed, isolated, and differentiated into the species which became the ancestors of the present genera. When the Post-Pliocene Glacial Period came on, the true Lapwings, which had probably been isolated in West Africa and afterwards spread over the western half of the Palæarctic Region, were again driven south, one detachment reaching India, but the greater part keeping west, some crossing the line to struggle for existence with the Wattled Lapwings in the Ethiopian Region, whilst others hung on the outskirts of the glaciers, and the more adventurous crossed the Atlantic into South America.

The Wattled Lapwings, on the other hand, were probably isolated in India, and afterwards spread into Mongolia. When they were driven south again by the Post-Pliocene Glacial Epoch, they seem to have followed both coasts, or crossed both seas, some emigrating west into the Ethiopian Region and others east into the Australian Region.

Synonymy of the Genus LOBIVANELLUS.

		Type.
Lobivanellus, Sarciophorus,	*Strickland, Proc. Zool. Soc.* 1841, pp. 32, 33	L. senegalensis. L. tectus.
Lobipluvia,	*Bonap. Compt. Rend.* xliii. p. 418 (1856)	L. malabaricus.
Xiphidiopterus, Sarcogrammus, Tylibyx,	*Reichenb. fide Bonap. Compt. Rend.* xliii. pp. 418, 419 (1856)	L. albiceps. L. indicus. L. melanocephalus.

The Wattled Lapwings have shared no better fate than their cousins in the hands of the great genus-splitters Reichenbach and Bonaparte.

The only Wattled Lapwing known to Brisson or Linneus was the Grey-flanked

Wattled Lapwing (*Lobivanellus senegalensis*). The ornithologist placed it in the genus *Vanellus*; but the botanist removed it to the genus *Parra*, in consequence of the lobes on its face and the spurs on its wings.

Determination of the type.

When Strickland established the genus *Lobivanellus* he omitted to say which of the various species which he placed in it should be regarded as the type, although, in the following year, we find his name at the head of the committee who signed the Report addressed to the British Association, declaring the importance of so doing. The species already named being the one which was first discovered, and being furnished not only with well-developed lobes on its lores, but also with spurs on its wings and hind toes on its feet, may reasonably be accepted as the type.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Three-toed.		*Four-toed.*
	PALÆARCTIC REGION.	
	Dauria to North China.	L. CINEREUS.
	ETHIOPIAN REGION.	
L. SUPERCILIOSUS, L. ALBICEPS, L. TECTUS	*Tropical Africa.*	L. SENEGALENSIS.
	East Africa.	L. MELANOCEPHALUS.
	South Africa.	L. LATERALIS.
	ORIENTAL REGION.	
	S. Persia to India.	L. INDICUS.
L. MALABARICUS	*India.*	
	Burma and Cochin China.	L. ATRONUCHALIS.
	Java to Timor.	L. CUCULLATUS.
	AUSTRALIAN REGION.	
	N. Australia and adjoining Islands.	L. PERSONATUS.
L. PECTORALIS	*East Australia.*	L. LOBATUS.

The Wattled Lapwings are entirely unrepresented on the American continent, being found neither in the Nearctic nor in the Neotropical Regions.

The genus *Lobivanellus* contains as many species as its nearest ally *Vanellus*; but it is decidedly more tropic in its distribution, as may be seen from the following *résumé*:—

Climatic distribution.

Temperate Eurasia	1	
South Africa	1	
Temperate Australia	2	
Temperate species	—	4
Tropical Asia	5	
Tropical Africa	5	
Tropical species	—	10
Species and subspecies of *Lobivanellus*	—	14

The Wattled Lapwings, like their cousins the true Lapwings, are not sea-shore but either river-bank or steppe birds, and consequently we find that the laws of their distribution are Passerine, except that they show a great tendency to disperse in climatic zones—a Batrachian or Piscatorial peculiarity.

The most northerly species of this genus, *L. cinereus* (a migratory species, breeding on the Mongolian steppes and wintering in India), is probably the least changed representative of the ancestors of the genus. It has a small wattle, a hind toe, but only the rudiments of a spur. The earliest emigrants from Mongolia of the ancestral species appear to have settled in two colonies, one in India and the other in Cochin China. The latter are still represented by *L. atronuchalis*, which in its turn despatched parties of emigrants to East Australia (the ancestors of *L. pectoralis*) and to India (the ancestors of *L. indicus*), where the imperfect isolation prevented the differentiation from being complete; whence they afterwards extended their range into Africa, the ancestors of *L. melanocephalus* being isolated in Abyssinia, those of *L. superciliosus* further south beyond Lake Tanganyika, and those of *L. tectus* more to the west. All these species agree in having black heads and small wattles, and very small or only rudimentary spurs; and the three species which respectively breed in India, Cochin China, and Australia, further agree in having bronzed wing-coverts. The other colony, which originally emigrated to India, is still represented in that conntry by *L. malabaricus*, in Java, Sumatra, and Timor by *L. cucullatus*, in North Australia and some of the adjoining islands by *L. personatus*, and in East Australia by *L. lobatus*. It also appears to have despatched colonies to Africa, whose descendants became *L. lateralis* in South Africa, *L. senegalensis* in West Africa, and *L. albiceps* in Central Africa. All these seven species agree in having very large wattles, and, with the exception of the Indian species, large spurs. The four Asiatic and Australian species have black heads, and, with the exception of the Indian species, uniform greater wing-coverts without white tips. The three African species have white foreheads and crowns. The fact

that these characters harmonize so well with the geographical distribution of the species which possess them is strong evidence of their taxonomic value. The presence or absence of a hind toe, on the other hand, is obviously of less genetic value. In the first place, because it is easy to assume that the hind toe, which has become rudimentary from disuse, might become obsolete independently, whilst it is impossible to suppose that the rudimentary wattle acquired by the ancestral species of Wattled Lapwings should have been independently developed in a three-toed, as well as in a four-toed, subgenus, to almost precisely the same model. And in the second place, because the large-wattled species of India is connected with the large-wattled species of Australia, through a large-wattled species in Sumatra and Java; and the various small-wattled species form an unbroken line from Mongolia through China, Cochin China, to East Australia; whilst there is no three-toed species between India and East Australia.

In constructing a key to the species, I have made what I regard as a natural key for adult birds, and a more artificial one for young in first plumage.

KEY TO THE SPECIES.

A.—With large wattles, almost meeting across the forehead, and hanging down on each side of the bill.

A hind toe . . . . . { **albiceps** . . . . } Forehead and crown white.
senegalensis . . . }
lateralis . . . . }
cucullatus . . . } Flanks very dark.
lobatus . . . . . } Wing-coverts uniform greyish brown.
personatus . . . } Black on forehead and crown disappearing in a point on the nape.
malabaricus . . . }

All these species except the last are furnished with well-developed spurs on the wing. Some of these characters are not found in young in first plumage.

B.—With very small wattles.

A white collar on the hind neck.

- **atronuchalis** . .
- **indicus** . . . . .

A hind toe. Pale legs.

No purple-bronze on wing-coverts.

- **melanocephalus** .
- **cinereus** . . . . .

Black subterminal band obsolete on outer tail-feathers.

- **superciliosus** . .
- **tectus.**
- **pectoralis.**

In all these species the spur on the wing is almost or quite obsolete. Some of these characters may not be found in young in first plumage; but in the two following keys it is believed that no characters are included which are affected by age, sex, or season.

A.—With small hind toe.

cucullatus.

Throat and centre of breast white.

- **lobatus** . . . . . Legs and feet reddish purple.
- **personatus.**

Greater wing-coverts tipped with white.

- **melanocephalus** . Black band across central tail-feathers less than an inch.
- **indicus** . . . . White terminal band across tail more than half an inch.
- **senegalensis.**
- **lateralis** . . . . More than basal half of outer web of first secondary white.
- **cinereus** . . . . Outer tail-feathers and secondaries white.

I have not seen the young of *L. cucullatus*, but probably all the foregoing characters are found in the young in first plumage as well as in the adult.

B.—No hind toe.

pectoralis.

Legs pale, greenish yellow or yellowish green. Wattles very large.

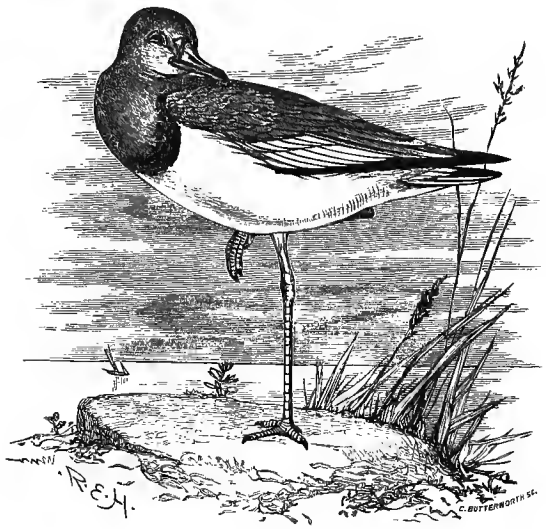
- **tectus** . . . . . — Primary-coverts nearly all white.
- **albiceps** . . . . . — Primary-coverts nearly all white.
- **malabaricus** . . . — Black subterminal band obsolete on outer tail-feathers.
- **superciliosus** . . — Black subterminal band obsolete on outer tail-feathers.

So far as is known these characters are constant at all ages, sexes, and seasons.

Perhaps the most interesting fact connected with the specific characters of the Wattled Lapwings is the correlation of large wattles with well-developed spurs. Out of 14 species there is only one exception to the rule. All the species which have small wattles have only rudimentary spurs, and all but one of the species which have large wattles have well-developed spurs. The natural inference to be drawn from this fact is that the same cause that produced the wattles also produced the spurs; and that this cause must have been sexual selection at once suggests itself. It must not be forgotten, however, that both spurs and wattles appear to be as well-developed in the females as in the males, and that many of the Lapwings that have no wattles at all are provided with spurs.

There can, however, be no doubt that both spurs and wattles have been independently developed in many cases. In the family Parridæ, which is very closely related to the Charadriidæ, all the species are furnished with well-developed metacarpal spurs, and some of them with facial wattles. The genus *Lobivanellus* may perhaps be regarded as so closely related to the genus *Parra* that their spurs and wattles may be inherited from common ancestors; but there can be no doubt of the independent origin of the spur in the Spur-winged Goose (*Plectropterus gambensis*) or of the wattle in the New-Zealand Wattled Crows (*Glaucopis wilsoni* and *G. cinerea*).

*** *Subgeneric group Lobivanelli : with a hind toe.*



LOBIVANELLUS CINEREUS.

GREY-HEADED WATTLED LAPWING.

LOBIVANELLUS secundariis albis : halluce parvo. Diagnosis.

Pluvianus cinereus, *Blyth, Journ. As. Soc. Beng.* xi. p. 587 (1842). Synonymy.
Lobivanellus inornatus, *Temminck & Schlegel, Fauna Japonica, Aves,* p. 106 (1847).
Lobivanellus cinereus (*Blyth*), *Blyth, Cat. Birds Mus. As. Soc.* p. 261 (1849).
Sarcogrammus inornatus (*Temm. et Schlegel*), *Bonaparte, Compt. Rend.* xliii. p. 418 (1856).
Chettusia inornata (*Temm. et Schlegel*), *Jerdon, Birds of India,* iii. p. 646 (1864).
Chætusia cinerea (*Blyth*), *Blyth, Ibis,* 1867, p. 165.

PLATES.—Temm. et Schlegel, Fauna Jap., Aves, pl. 63. Literature.
HABITS.—Jerdon, Birds of India, iii. p. 646.
EGGS.—Unknown (probably taken by Prjevalski).

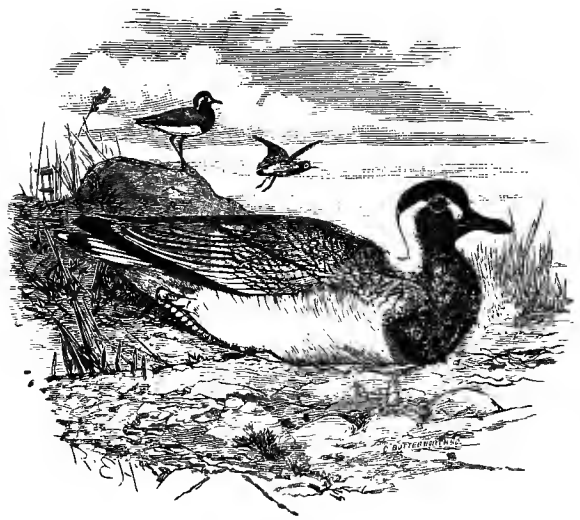
The Grey-headed Wattled Lapwing has *a hind toe,* but may be easily distinguished from those species which are also furnished with this appendage by its *pure white secondaries.* Specific characters.

Geographical distribution.

It breeds in South-east Mongolia, North China, and Japan, and winters in North-east India and the Burma Peninsula.

Nearest allies.

The Grey-headed Wattled Lapwing can only claim admission to the genus *Lobivanellus* by virtue of a small wattle on the lores. It must be regarded as a connecting link between that genus and *Vanellus*. It is probably not very distantly related to *V. leucurus*; and since it is the only species of Wattled Lapwing which still inhabits the immediate neighbourhood of the great steppes, where the common ancestors of the two genera appear to have lived, we may perhaps assume that it is one of their least changed descendants.



LOBIVANELLUS INDICUS.

BRONZE-WINGED WATTLED LAPWING.

Diagnosis.

LOBIVANELLUS rectricum fasciâ albâ terminali latâ (circa 15 ad 20 millim.).

Variations.

THE Bronze-winged Wattled Lapwings east of the Ganges differ so much from the typical form that they must certainly be regarded as subspecifically distinct. Legge says that examples from Ceylon are smaller than those from the mainland, the former varying in length

of wing from 8·0 to 8·4 inch, whilst the latter vary from 8·6 to 9·2 inch. My series from the continent confirms the measurements given by Legge, but my solitary skin from Ceylon measures 8·6 inch.

Synonymy.

Tringa indica, *Boddaert, Table Pl. Enl.* no. 807, p. 50 (1783).
Parra goensis, *Gmelin, Syst. Nat.* i. p. 706 (1788).
Tringa goensis (*Gmel.*), *Latham, Index Orn.* ii. p. 727 (1790).
Vanellus goensis (*Gmel.*), *Vieillot, N. Dict. d'Hist. Nat.* xxxv. p. 208 (1819).
Charadrius atrogularis, *Wagler, Syst. Av.* p. 75 (1827).
Lobivanellus goensis (*Gmel.*), *Strickland, Proc. Zool. Soc.* 1841, p. 33.
Chettusia indica (*Bodd.*), *Gray, Genera of Birds,* iii. p. 541 (1847).
Sarcogrammus goensis (*Gmel.*), *Bonap. Compt. Rend.* xliii. p. 418 (1856).
Lobivanellus indicus (*Bodd.*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 68 (1864).

Literature.

Plates.—Daub. Pl. Enl. no. 807; Gould, Cent. Him. Birds, pl. 78.
Habits.—Legge, Birds of Ceylon, p. 962.
Eggs.—Hume, Nests and Eggs of Indian Birds, p. 574; exactly resembling eggs of *Charadrius morinellus* in size and colour, but not quite so boldly blotched.

Specific characters.

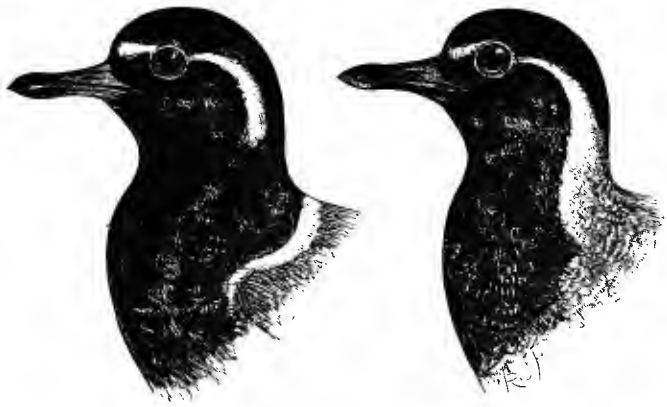
The Bronze-winged Wattled Lapwing is the only species of the genus which has, when adult, a black throat and upper breast, and no white at the back of the neck. It may be distinguished at all ages by the width of the *white band at the end of the tail*, which *exceeds half an inch*.

Allies.

The Bronze-winged Wattled Lapwing is represented in the Burma peninsula by a very close ally, which principally differs from it in having the black on the breast meeting at the back of the neck, and separated by a white collar from the brown back. The amount of black on the hind neck varies so much that it is not always easy to say to which form some examples belong.

Geographical distribution.

The typical form is a resident in South Persia, Baloochistan, India, and Ceylon. Blanford obtained it as far west as the neighbourhood of Shiraz (Blanford, Eastern Persia, ii. p. 281) and in several localities in Baloochistan. To Gilgit (Scully, Ibis, 1881, p. 587), and possibly to Cashmere, it is only a summer migrant; but in the rest of India and Ceylon it is for the most part a resident, breeding in great abundance both on the plains and on the hills, up to three or four thousand feet above the level of the sea. Colonel Swinhoe obtained it at Kandahar (Ibis, 1882, p. 120), but Severtzow did not meet with it in Turkestan. It frequents similar localities to those chosen by our Common Lapwing, but breeds in all sorts of places, sometimes even on the flat roofs of houses two stories high.



(Half natural size.)

L. atronuchalis. *L. indicus.*

LOBIVANELLUS INDICUS ATRONUCHALIS.

BLYTH'S WATTLED LAPWING.

Diagnosis. LOBIVANELLUS INDICUS nuchâ nigrâ.

Variations. INTERMEDIATE forms between the eastern and western races of this species are frequently met with.

Synonymy. Sareogramma atrogularis, *Blyth, Journ. As. Soc. Beng.* xxxi. p. 345 (1862).
Lobivanellus atronuchalis, *Jerdon, Birds of India,* iii. p. 648 (1864).

Literature. PLATES.—Unfigured.
HABITS.—Oates, Birds of British Burmah, ii. p. 374.
EGGS.—Hume, Nests and Eggs of Indian Birds, p. 576. Undistinguishable from eggs of *L. indicus.*

Specific characters. Blyth's Wattled Lapwing when adult may be distinguished from the Bronze-winged Wattled Lapwing by its having the *neck ornamented with a white collar.* It is not known that young in first plumage of the two forms differ.

Geographical distribution. It is a resident in Burmah and Cochin China.

Allies. Blyth's Wattled Lapwing is very closely related to the Bronze-winged Wattled Lapwing (*L. indicus*), and to the Black-breasted Wattled Lapwing (*L. pectoralis*). In all three species the wattles on the lores are small, the crown and upper breast are black, and the wing-coverts are more or less bronzed with purple, each of the three characters showing relationship with *Vanellus.*

LOBIVANELLUS CUCULLATUS.

BLACK-THIGHED WATTLED LAPWING.

Diagnosis.

LOBIVANELLUS abdomine nuchâque nigris : tectricibus haud albo terminatis.

Variations.

No local races of this species are known.

Synonymy.

Vanellus tricolor, *Horsfield, Trans. Linn. Soc.* xiii. p. 186 (1820, *nec Vieillot,* 1818).
Charadrius macropterus, *Wagler, Syst. Av.* p. 77 (1827).
Vanellus cucullatus, *Temminck* [1], *Pl. Col.* no. 505 (1830).
Lobivanellus { tricolor (*Horsfield*), / cucullatus (*Temm.*), } *Strickland, Proc. Zool. Soc.* 1841, p. 33.
Chettusia { macroptera (*Wagl.*), / cucullatus (*Temm.*), } *Gray, Genera of Birds,* iii. p. 541 (1847).

Literature.

PLATES.—Temm. Pl. Col. no. 505.
HABITS.—Undescribed.
EGGS.—Unknown.

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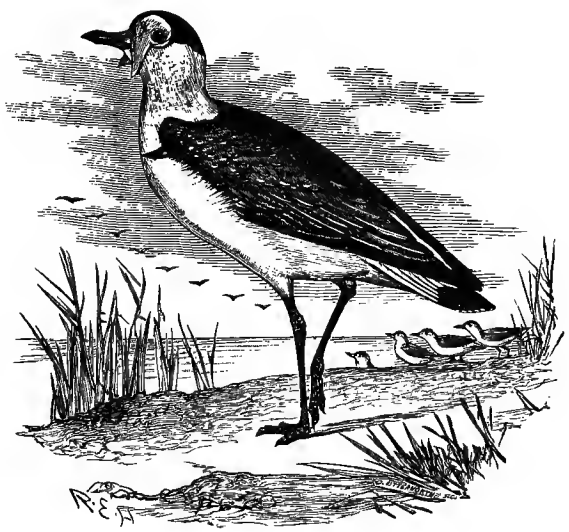
[1] It is curious that Temminck did not name this bird until 1830, inasmuch as he accurately described it in 1807 (Cat. Syst. Cab. d'Orn. pp. 172, 260) under the title of "Le grand Vanneau armé à lambeaux rouges de Ternate."

Specific characters.

The Black-thighed Wattled Lapwing, besides being the only species with black thighs, may be diagnosed by its combination of a black belly and a black forehead. I have never seen the young in first plumage, but probably the characters *greater wing-coverts not terminated with white* and *underparts mostly dark* are diagnostic at all ages.

It is a resident in Java, Sumatra, and Timor.

It is probably the result of an eastern emigration of some of the ancestors of *L. malabaricus*.



LOBIVANELLUS PERSONATUS.

GOULD'S WATTLED LAPWING.

Diagnosis. LOBIVANELLUS halluce parvo : cervice et corpore subtùs omninò albis.

Variations. No local races of this species have been discovered; and though it appears to be so closely related to *L. lobatus*, it is not known that intermediate forms occur.

Synonymy. Vanellus ludovicianus armatus, *Brisson, Orn.* v. p. 114 (1760).
Tringa miles, *Boddaert, Table Pl. Enl.* no. 835, p. 51 (1783).

Parra ludoviciana, *Gmelin, Syst. Nat.* i. p. 706 (1788).
Tringa ludoviciana (*Gmel.*), *Latham, Index Orn.* ii. p. 727 (1790).
Vanellus ludovicianus (*Gmel.*), *Vieillot, N. Dict. d'Hist. Nat.* xxxv. p. 208 (1819).
Charadrius ludovicianus (*Gmel.*), *Nitzsch, Ersch & Grub. Encycl.* xvi. p. 150 (1827).
Charadrius callaeas, *Wagler, Syst. Av.* p. 76 (1827).
Lobivanellus ludovicianus (*Gmel.*), *Strickland, Proc. Zool. Soc.* 1841, p. 33.
Lobivanellus personatus, *Gould, Proc. Zool. Soc.* 1842, p. 113.
Chettusia { personata (*Gould*), / miles (*Boddaert*), } *Gray, Genera of Birds*, iii. p. 541 (1847).
Lobivanellus miles (*Bodd.*), *Bonap. Compt. Rend.* xliii. p. 418 (1856).

Literature.

Plates.—Daub. Pl. Enl. no. 835; Gould, Birds of Australia, vi. pl. 10.
Habits.—Gould, Handb. Birds of Australia, ii. p. 220.
Eggs.—Campbell, Nests and Eggs of Australian Birds, p. 53.

Specific characters.

Gould's Wattled Lapwing has the *underparts and nape pure white*, and is furnished both with *spurs* and *hind toes*. This diagnosis bars all other species, including its representative in East Australia, *L. lobatus*, which differs from it in having a black collar at the back of the neck extending to the sides of the breast, and connected with the black crown by a narrow black band down the nape.

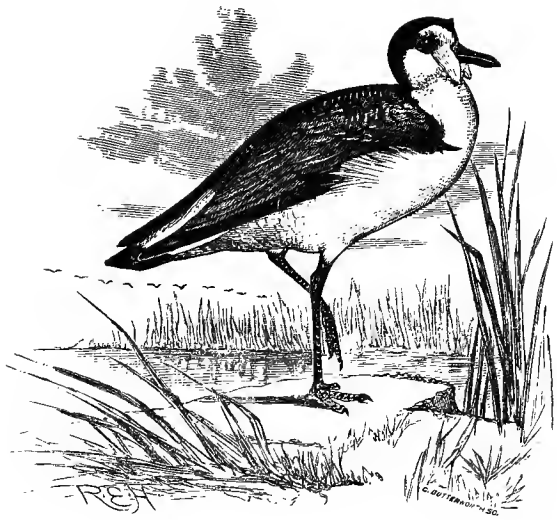
Geographical distribution.

It is a resident in North Australia; I have an example collected by Rosenberg in Arru; and it has occurred in Timor-laut (Forbes, Proc. Zool. Soc. 1884, p. 433), New Guinea (Ramsay, Proc. Linn. Soc. N. S. Wales, iv. p. 101), and some other adjacent islands.

It is said to be a common bird, living on the borders of lakes, on the seashore at the mouths of rivers, and on swamps, but also visiting the plains, generally in small flocks. It breeds in August and September, and is said to lay only two or three eggs, closely resembling those of *L. indicus*. It is a very handsome bird, having, like its close ally *L. lobatus*, yellow irides and wattles; but its legs and feet are much paler than those of its ally, a character which is very conspicuous even in the dried skins.

Allies.

The two Australian species appear to be nearest allied to *L. malabaricus*, but are much closer related to each other. There is, however, no reason to suppose that they intergrade, as appears to be the case with the two Bronze-winged Wattled Lapwings, which differ from each other in a very similar manner. *L. personatus* not only differs from its southern ally in having no black on the hind neck and in having much paler legs, but it is a slightly smaller bird, and is said to lay smaller eggs.



LOBIVANELLUS LOBATUS.

LATHAM'S WATTLED LAPWING.

Diagnosis. LOBIVANELLUS halluce parvo: corpore subtùs omninò albo: occipite nuchâque nigris.

Variations. THE black collar on the hind neck is somewhat variable in size, but appears never to be absent.

Synonymy.

Tringa lobata, *Latham, Index Orn. Suppl.* p. lxv (1801).
Vanellus lobatus (*Lath.*), *Vieillot, N. Dict. d'Hist. Nat.* xxxv. p. 209 (1819).
Vanellus novæ-hollandiæ, *Stephens, Shaw's Gen. Zool.* xi. p. 516 (1819).
Charadrius lobatus (*Lath.*), } *Wagler, Syst. Av.* pp. 75, 76 (1827).
Charadrius gallinaceus, }
Vanellus gallinaceus (*Wagler*), *Jardine & Selby, Ill. Orn.* ii. pl. 84 (1829).
Lobivanellus gallinaceus (*Wagler*), *Strickland, Proc. Zool. Soc.* 1841, p. 33.
Lobivanellus lobatus (*Lath.*), *Gould, Birds of Australia,* vi. pl. 9 (1842).
Chettusia lobata (*Lath.*), } *Gray, Genera of Birds,* iii. p. 541 (1847).
Chettusia gallinacea (*Wagler*), }

Literature.

PLATES.—Jardine and Selby, Ill. Orn. ii. pl. 84; Gould, Birds of Australia, vi. pl. 9.
HABITS.—Gould, Handb. Birds of Australia, ii. p. 218.
EGGS.—Ramsay, Ibis, 1867, pl. ix. fig. 2. Scarcely distinguishable from eggs of *Vanellus cristatus*.

Latham's Wattled Lapwing may be distinguished by the possession of *spurs, hind toes,* and *white underparts* from all the other Wattled Lapwings, except from its close ally *L. personatus*. The *black collar at the back of the neck* prevents any confusion with the latter species. Specific characters.

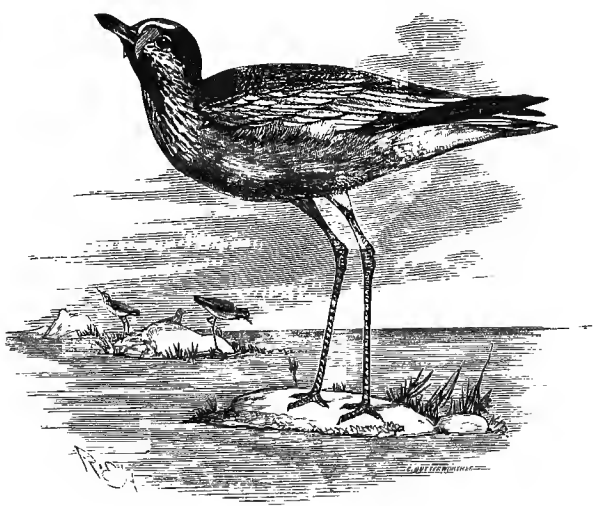
Latham's Wattled Lapwing is a resident in the eastern half of Australia, from Rockingham Bay to Tasmania. Its alleged occurrence in Celebes (Schlegel, Mus. Pays-Bas, Cursores, p. 67) requires confirmation. Geographical distribution.

It is very closely allied to *L. personatus*, and more distantly to *L. malabaricus*.

Young in first plumage, with black markings on the upper parts and the remains of down on the plumage, have nevertheless the wattles and the black nuchal collar well developed. Plumage of young.

*** *Subgeneric group Lobivanelli: with a hind toe.*

† *Ethiopian Species.*



LOBIVANELLUS SENEGALENSIS.

GREY-FLANKED WATTLED LAPWING.

Lobivanellus halluce parvo: secundariarum exteriorum duabus partibus (terminalibus) nigris, tertiâ parte (basali) albâ. Diagnosis.

No local races of this species are known, but examples are often met with without the Variations.

black on the throat or the white on the crown, though in every other respect they appear to be adult.

Synonymy.

Vanellus senegalensis armatus, *Brisson, Orn.* v. p. 111 (1760).
Parra senegalla, *Linneus, Syst. Nat.* i. p. 259 (1766).
Tringa senegalla (*Linn.*), *Latham, Index Orn.* ii. p. 728 (1790).
Vanellus albicapillus,
Vanellus senegallus (*Linn.*), } *Vieillot, N. Dict. d'Hist. Nat.* xxxv. pp. 205, 209 (1819).
Vanellus senegalensis (*Briss.*), *Stephens, Shaw's Gen. Zool.* xi. p. 515 (1819).
Charadrius albicapillus (*Vieill.*), *Wagler, Syst. Av.* p. 77 (1827).
Vanellus strigilatus, *Swainson, Birds W. Africa,* ii. p. 241 (1837).
Lobivanellus senegalus (*Linn.*),
Lobivanellus albicapillus (*Vieill.*), } *Strickland, Proc. Zool. Soc.* 1841, p. 33.
Chettusia albicapilla (*Vieill.*),
Chettusia senegalla (*Linn.*), } *Gray, Genera of Birds,* iii. p. 541 (1847).

Literature.

Plates.—Swainson, Birds West Africa, pl. xxvii.; Daub. Pl. Enl. no. 362.
Habits.—Sharpe, Layard's Birds of South Africa, p. 666.
Eggs.—Unknown.

Specific characters.

The Grey-flanked Wattled Lapwing is a northern race of the Dark-flanked Wattled Lapwing, and belongs to the group of species which are not only furnished with largely developed wattles, but also with spurs and hind toes. From the other species of the group its white forehead is, when adult, a sufficient distinction; and from its southern ally it may be distinguished either by the absence of the black on the flanks or by the colour of its outermost *secondaries*, which are *white with the terminal two thirds black.*

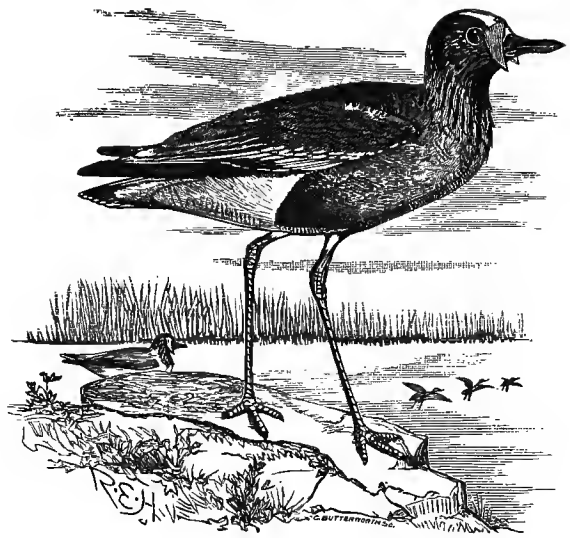
Geographical distribution.

It inhabits the Ethiopian Region north of the Equator. I have skins from Senegambia, the Gold Coast (Ussher), Nubia, and Abyssinia; Hartert obtained it on the Chadda River, an eastern tributary of the Niger (Journ. Orn. 1886, p. 609); and Heuglin records it from Kordofan and the valley of the White Nile.

Plumage of young.

Some ornithologists have supposed it to be the young of *L. lateralis*, but the difference between the amount of black and white on the secondaries in the two species is conclusive evidence that this is not the case. The young of *L. senegalensis* differ from the adult in having no black on the chin and upper throat, and in having neither black nor white on the forehead and crown.

It is nearest allied to *L. lateralis*, but is quite distinct from that species, though many ornithologists have erroneously united them.



LOBIVANELLUS LATERALIS.

DARK-FLANKED WATTLED LAPWING.

Diagnosis.

LOBIVANELLUS halluce parvo: secundariarum exteriorum partibus duabus (basalibus) albis, tertiâ parte (terminali) nigrâ.

Variations.

No local races of this species are known.

Synonymy.

Vanellus lateralis, *Smith, Ill. Zool. S. Africa, Aves,* pl. 23 (1839).
Chettusia lateralis (*Smith*), *Gray, Genera of Birds,* iii. p. 541 (1847).
Lobivanellus lateralis (*Smith*), *Ayres, Ibis,* 1873, p. 283.
Lobivanellus senegalus, *apud Schlegel, Kirk, Sharpe, &c.*

Literature.

PLATES.—Smith, Ill. Zool. S. Africa, Aves, pl. 23.
HABITS.—Andersson, Birds of Damara-Land, p. 267.
EGGS.—Unknown.

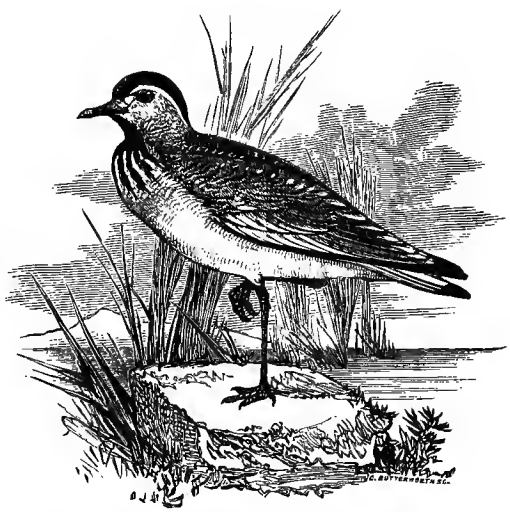
Specific characters.

The Dark-flanked Wattled Lapwing is a southern race of the Grey-flanked Wattled Lapwing, and principally differs from it when adult in having a black band across the flanks and belly. It has still more white on the *secondaries* than its near ally, the *basal two thirds* of the outermost being *white*. This character applies to young birds as well as to adults.

Both this species and its northern ally are probably the result of a western emigration of some of the ancestors of *L. malabaricus*.

Geographical distribution.

The Dark-flanked Wattled Lapwing appears to be confined to Africa south of the Equator. I have an example from Angola collected by Anchieta; Monteiro found it in Benguela (Proc. Zool. Soc. 1865, p. 90); I have skins from Damara-Land collected by Andersson; in the Cape Colony it is recorded by Layard from Port Elizabeth, and Ayres met with it in the Transvaal (Ibis, 1873, p. 283). My friend Graham Hutchinson found it in Swasiland, sometimes in long grass, but more often among the mimosa-thorn bushes on the sandy plains; he remarked its constant habit of bowing its head when not running about. Kirk records it from the Zambesi (Ibis, 1864, p. 331), where it has since been found by Holub (Beitr. Orn. Südafr. p. 240); and Böhm obtained it at Gonda west of Zanzibar (Journ. Orn. 1885, p. 39).



LOBIVANELLUS MELANOCEPHALUS.

RÜPPELL'S WATTLED LAPWING.

Diagnosis. LOBIVANELLUS halluce nullo: rectricum fasciâ nigrâ subterminali angustâ (haud 25 millim.).

Variations. No local races of this species are known.

Synonymy.

Lobivanellus melanocephalus, *Rüppell, Syst. Uebers. Vög. N.O.-Afr.* p. 115 (1845).
Chettusia melanocephala (*Rüpp.*), *Gray, Genera of Birds,* iii. p. 541 (1847).
Tylibyx melanocephalus (*Rüpp.*), *Bonap. Compt. Rend.* xliii. p. 419 (1856).
Vanellus melanocephalus (*Rüpp.*), *Giebel, Thes. Orn.* iii. p. 745 (1877).

Literature.

Plates.—Rüppell, Vög. N.O.-Afr. pl. 44.
Habits.—Heuglin, Orn. N.O.-Afr. ii. p. 1003; Blanford, Geol. & Zool. Abyss. p. 430.
Eggs.—Unknown.

Specific characters.

Rüppell's Wattled Lapwing having *a hind toe* but *no spur* can only be confused when adult with three other species, from which it is distinguished by its combination of the two characters: sides of neck grey, throat black. I have never seen the young in first plumage, but probably the character, *dark subterminal band across the tail very narrow* (*less than an inch*), will distinguish them from all their allies.

Geographical distribution.

It is a resident in Nubia, Abyssinia, and the upper valley of the Nile.

It resembles *L. cinereus* and *L. indicus* in its small wattle, absence of spur, and presence of hind toe, and being intermediate between them in colour, is probably closely allied to both.

*** *Subgeneric group Sarciophori: without a hind toe.*

LOBIVANELLUS ALBICEPS.

BLACK-SHOULDERED WATTLED LAPWING. (Plate VIII.)

Diagnosis.

Lobivanellus halluce nullo: calcaribus magnis.

Variations.

No local races of this species are known.

Synonymy.

Vanellus albiceps[1], *Gould, Proc. Zool. Soc.* 1834, p. 45.
Lobivanellus albiceps (*Gould*), *Strickland, Proc. Zool. Soc.* 1841, p. 33.
Sarciophorus albiceps (*Gould*), *Fraser, Zool. Typ.* pl. 64 (1849).
Xiphidiopterus albiceps (*Gould*), *Bonap. Compt. Rend.* xliii. p. 418 (1856).
Hoplopterus albiceps (*Gould*), *Heuglin, Orn. N.O.-Afr.* ii. p. 1007 (1873).

[1] How far this name is barred by the *Charadrius albiceps* of Temminck (Planches Coloriées, No. 526) published in 1832, and now ranking as a synonym of *Vanellus speciosus*, it is difficult to determine.

Literature.

PLATES.—Fraser, Zoologia Typica, pl. 64.

HABITS.—Büttikofer, Notes from the Leyden Museum, 1885, p. 236; Hartert, Journ. Orn. 1886, p. 609.

EGGS.—Unknown.

Specific characters.

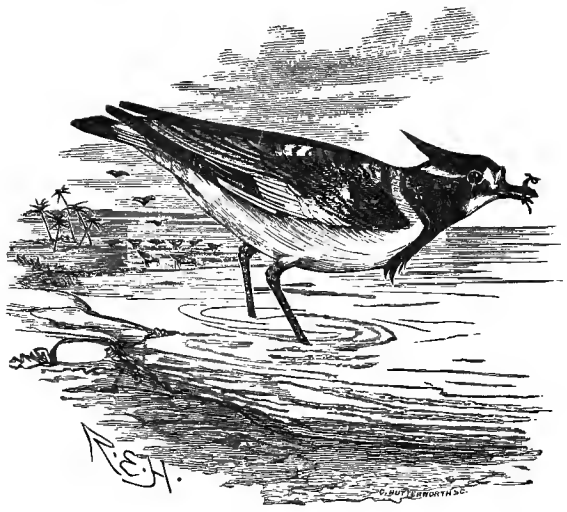
The Black-shouldered or White-crowned Wattled Lapwing is a very aberrant member of the genus, and may be diagnosed in many ways. In no other Lapwing does the white on the forehead extend over the crown and down the nape. It is the only species of the genus with black wing-coverts. It is also the only Lapwing which possesses *wattles and spurs, but has no hind toe.* An equally good diagnosis is primary-coverts and innermost primaries white. Its legs and feet are yellowish green.

Geographical distribution.

This species is very rare in collections, and was originally described by Gould from the Niger. Büttikofer obtained several examples in Western Liberia, which are now in the Leyden Museum; and it has been found in various localities in Senegambia (Rochebrune, 'Faune de la Sénégambie,' p. 283). Du Chaillu obtained it in Lower Guinea on the Kamma (Heuglin, Orn. N.O.-Afr. ii. p. 1007). I have an example obtained by Petit and Lucan on the Loango Coast, where it was also obtained by Falkenstein (Reichenow, Journ. Orn. 1877, p. 11). Its alleged occurrence on the island of Fernando Po appears to be a myth. The examples described by Gould, and obtained by Capt. Allen, were procured on the Niger (Allen and Thomson, Narr. Exp. River Niger, ii. p. 508), and not on the island of Fernando Po, as erroneously stated by Fraser, though they were exhibited by Gould at the meeting of the Zoological Society of London on the 10th of June, 1834, accompanied by some other objects of natural history from Fernando Po, an accident which appears to have given rise to the error. There can be little doubt that it has occurred as far east as the river Dender in Sennar (Antinori and Salvadori, Viagg. Bogos &c. p. 144), but it is somewhat doubtfully recorded from the Cape Colony. I have seen examples from the Transvaal, and it has been procured on the Zambesi and its tributaries in Albert's Land (Holub, Beitr. Orn. Südafr. p. 240).

It is said to frequent the sandy banks of rivers, where it feeds upon insects and small fish.

Although it has lost its hind toe it is probably nearest allied to *L. senegalensis* and *L. lateralis,* with both of which it agrees in having a white forehead and crown. Very little importance can, however, be attached to a character which is not found in the young as well as in the adult; and the Black-shouldered Wattled Lapwing must be regarded as a highly differentiated species, whose affinities it is very difficult to determine.



LOBIVANELLUS TECTUS.

CRESTED WATTLED LAPWING.

Diagnosis.

Lobivanellus halluce nullo : primariarum tectricibus albis : remigibus omnibus ad basin albis, ad terminum nigris.

Variations.

Examples from East and West Africa appear to be identical.

Synonymy.

Charadrius tectus, *Boddaert, Tabl. Pl. Enl.* no. 834, p. 51 (1783).
Charadrius pileatus, *Gmelin, Syst. Nat.* i. p. 691 (1788).
Sarciophorus pileatus (*Gmel.*), *Strickland, Proc. Zool. Soc.* 1841, p. 33.
Hoplopterus tectus (*Bodd.*), *Gray, Genera of Birds,* iii. p. 542 (1847).
Hoplopterus pileatus (*Gmel.*), *Reichenbach, Spec. Orn.* pl. xcix. fig. 702 (1848).
Lobivanellus pileatus (*Gmel.*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 65 (1865).
Sarciophorus tectus (*Bodd.*), *Blanford, Geol. & Zool. Abyss.* p. 430 (1870).
Chettusia pileata (*Gmel.*), *Finsch, Proc. Ac. Philad.* 1872, p. 32.
Sarciophorus latifrons, *Reichenow, Journ. Orn.* 1881, p. 334.

Literature.

Plates.—Daub. Pl. Enl. no. 834.
Habits.—Heuglin, Orn. N.O.-Afr. ii. p. 1008.
Eggs.—Unknown.

The Crested Wattled Lapwing differs from all its congeners, not only in having a well-

Specific characters.

developed black crest when adult, but also in having a narrow black band reaching from the throat down the breast almost to the belly.

At all ages it may be recognized by the amount of white on the *innermost primaries and outermost secondaries. The base of these feathers for about half the length of both webs is white,* the terminal half being nearly black. In this little group of five species the amount of white on the wing is an important character to distinguish the young in first plumage. In *L. albiceps* the primary-coverts and innermost primaries are white. In *L. tectus* the *primary-coverts are white,* but *the terminal half of the outermost secondaries is black.*

Geographical distribution.

The Crested Wattled Lapwing is found in Arabia Petræa, whence I have an example collected by Mr. Lord in the Wady-el-Arabah in 1869. I have also an example said to have come from Egypt, and Rüppell notes its occasional occurrence in that country (Syst. Uebers. Vög. N.O.-Afr. p. 118). It is not uncommon in Kordofan, Sennar, the province of Taka, the coast of Abyssinia, and the Dahlak Archipelago (Heuglin, Orn. N.O.-Afr. ii. p. 1009). It appears to occur as far east as the Gulf of Aden (if the Berdera of Reichenow be identical with Berbera); and probably ranges across Africa, as it has been recorded from Senegal (Schlegel, Mus. Pays-Bas, Cursores, p. 66).

LOBIVANELLUS MALABARICUS.

BUFFON'S WATTLED LAPWING.

Diagnosis.

Lobivanellus halluce nullo: rectricibus lateralibus albis: pedibus flavis.

Variations.

According to Legge examples from Ceylon are slightly smaller than those from the mainland. The former vary in length of wing from 7·7 to 7·8 inch, and the latter from 7·6 to 8·0 inch. Possibly a larger series might prove that the conclusion was an error.

Synonymy.

Charadrius malabricus, *Boddaert, Tabl. Pl. Enl.* no. 880, p. 53 (1783).
Charadrius bilobus, *Gmelin, Syst. Nat.* i. p. 691 (1788).
Sarciophorus bilobus (*Gmel.*), *Strickland, Proc. Zool. Soc.* 1841, p. 33.
Sarciophorus fuscus, *Hodgson, Gray's Zool. Misc.* 1844, p. 86.
Lobipluvia biloba (*Gmel.*), *Bonaparte, Compt. Rend.* xliii. p. 418 (1856).
Chettusia biloba (*Gmel.*), *Finsch, Proc. Ac. Philad.* 1872, p. 32.
Sarciophorus malabaricus (*Bodd.*), *Holdsworth, Proc. Zool. Soc.* 1872, p. 472.
Lobipluvia malabarica (*Bodd.*), *Hume, Nests and Eggs Ind. Birds*, iii. p. 577 (1875).

Literature.

Plates.—Daub. Pl. Enl. no. 880.
Habits.—Legge, Birds of Ceylon, p. 966.
Eggs.—Hume, Nests and Eggs of Indian Birds, iii. p. 577.

Specific characters.

Buffon's Wattled Lapwing when adult may be distinguished from its two congeners, which, like it, have *neither spur nor hind toe*, by its black chin, and at all ages by *its white outer tail-feathers*.

Geographical distribution.

It breeds on most of the dry uplands throughout India and Ceylon, and has once occurred in Scinde (Le Messurier, Stray Feathers, iii. p. 417), and once in Burma (Blanford, Ibis, 1870, p. 470). Like most birds breeding in tropical climates it lays its eggs much earlier in some localities than in others. Hume says that in India it lays in April and May; but Legge states that in Ceylon it breeds in June and July.

Nearest allies.

It seems both structurally and geographically to be a connecting-link between *L. cinereus* in Mongolia and the representatives of that species on the African continent, *L. senegalensis* and *L. lateralis*, especially when immature examples, before they have acquired the black on the crown and throat, are compared. In general appearance it very closely resembles its Mongolian ally, but it has lost its hind toe and greatly developed its facial wattle. It appears to be almost as nearly related to its African allies, which, like it, have greatly developed their wattles, but, unlike it, they have also developed formidable metacarpal spurs, and have retained the ancestral hind toe.

LOBIVANELLUS PECTORALIS.

BLACK-BREASTED WATTLED LAPWING.

Diagnosis. LOBIVANELLUS halluce nullo: rectricibus omnibus nigro fasciatis: primariarum omnium pogoniis externis nigris.

Variations. No local races of this species are known.

Synonymy. Charadrius tricolor, *Vieillot, N. Dict. d'Hist. Nat.* xxvii. p. 147 (1818, *nec Horsfield,* 1820).
Charadrius pectoralis, *Wagler, Syst. Av.* p. 58 (1827).
Sarciophorus tricolor (*Vieill.*), *Strickland, Proc. Zool. Soc.* 1841, p. 33.
Hoplopterus tricolor (*Vieill.*), *Gray, Genera of Birds,* iii. p. 542 (1847).
Charadrius vanelloides, *Peale, U. States Expl. Exp.* p. 240 (1848).
Sarciophorus pectoralis (*Wagler*), *Blyth, Cat. Birds Mus. As. Soc.* p. 261 (1849).
Lobivanellus pectoralis (*Wagler*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 65 (1865).
Chettusia pectoralis (*Wagler*), *Finsch, Proc. Ac. Philad.* 1872, p. 32.

Literature. PLATES.—Gould, Birds of Australia, iv. pl. 11.
HABITS.—Gould, Handb. Birds of Australia, ii. p. 222.
EGGS.—Ramsay, Ibis, 1867, pl. ix. fig. 3.

The Black-breasted Wattled Lapwing is the only species of the genus which combines the three characters of *throat white, hind toe absent, spur none*; but as the young in first plumage of some of its allies have white throats, it is necessary to add *a dark subterminal band across the median and greater wing-coverts.* Specific characters.

It inhabits the whole of South-east Australia and Tasmania. It is not known to be migratory. Geographical distribution.

It appears to be the Australian representative of the Bronze-winged Wattled Lapwing.

LOBIVANELLUS SUPERCILIOSUS.

BÖHM'S WATTLED LAPWING. (Plate IX.)

Lobivanellus halluce nullo : rectricibus lateralibus albis : pedibus rubris. Diagnosis.

Only three examples of this species are known. Variations.

Lobivanellus superciliosus, *Reichenow, Journ. Orn.* 1886, p. 116.
Sarciophorus superciliosus (*Reich.*), *Shelley, Ibis*, 1887, p. 418. Synonymy.

Plates.—Reichenow, Journ. Orn. 1886, pl. iii. fig. 2 (immature).
Habits.—Undescribed.
Eggs.—Unknown. Literature.

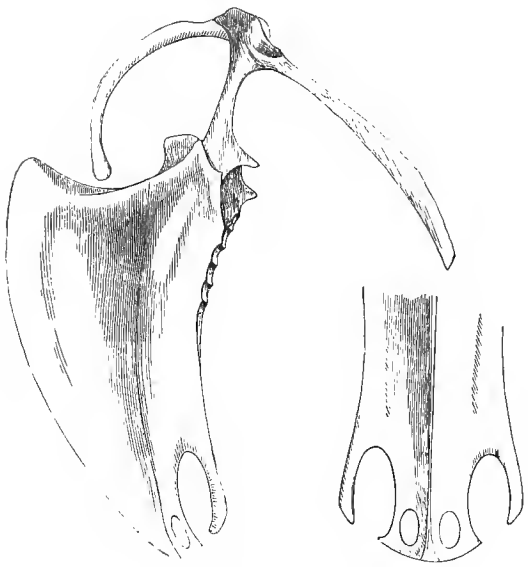
Böhm's Wattled Lapwing was only known from a single immature example from Central Africa in the Berlin Museum, until what appear to be the fully adult birds were obtained near the Camaroon Mountains.

In adult plumage it resembles *L. malabaricus* very closely. As in that species the *hind toe is absent,* and the *dark terminal band across the tail is obsolete on the outer feather on each side.* It may, however, be at once distinguished from its ally by the colour of its *legs and feet,* which are *dark red* instead of greenish yellow, and by the colour of the forehead and the pectoral band, which are rusty brown in the young and chestnut-red in the adult. Specific characters.

The immature example was obtained in Central Africa by Dr. Böhm and Herr Reichard in the district of Marungu on the south-west shores of Lake Tanganyika; and the adults were shot by Mr. Johnston on the marshes of the Rio del Rey, opposite the island of Fernando Po in the Gulf of Guinea.

The black head, dark legs, and the chestnut-red on the pectoral band are characteristic of *Vanellus gregarius*, whilst the position of the pectoral band, the absence of the hind toe, and the presence of a wattle are characteristic of *Lobivanellus cinereus*, and the black primaries of both. It seems probable that Böhm's Wattled Lapwing is the descendant of a party of the ancestors of the Wattled Lapwing which emigrated into West Africa in the company of a party of Unwattled Lapwings before these two sections of the family had become sufficiently differentiated to make interbreeding impossible, and that it is the result of a blend between the two which has retained some of the characters of each.

CHAPTER XIII.



Sternum of *Vanellus cristatus*.

Genus VANELLUS.

CHARADRIINÆ caudâ vix rotundatâ: sulco nasali obvio: loris carunculâ carentibus: alis sæpe calcaratis: rectricibus centralibus ad basin pro parte tertiâ albis. Diagnosis of genus.

THE Lapwings and the Plovers are very closely allied. Typical examples of *Vanellus*, *Lobivanellus*, and *Charadrius* are very distinct, but aberrant examples of the three genera sometimes approach each other very nearly. Nature has not very clearly differentiated these three genera; but since they contain more than sixty species, it is necessary for the practical ornithologist to cease to be a "lumper" and become a "splitter." There is, however, no need of any kind to rush into the opposite extreme, and make a score of genera where three will amply suffice. Most convenient to divide the Lapwings from the Plovers.

Characters of Lapwings.

The typical Lapwing has broad blunt wings, long secondaries, and short primaries, the first primary shorter than the second and third—characters denoting resident rather than migratory habits. It is a somewhat large bird, with a wing measuring from the carpal joint 7 to 10 inches, has a scutellated tarsus, and is furnished with one or other of various appendages, such as a spur to its wing, a wattle to its face, a crest to its crown, and a hind toe to its foot, sometimes with all of them—apparently denoting a comparative security from enemies obtained by living in places where there is plenty of cover.

Characters of Plovers.

The typical Plover, on the other hand, has narrow pointed wings, short secondaries and long primaries, with the first primary the longest—characters denoting migratory habits. It is a smaller bird, with a wing measuring only from 4 to 8 inches from the carpal joint, has a reticulated tarsus, and is furnished with neither spur, wattle, crest, nor hind toe—apparently denoting life in an exposed situation, where the exhibition of conspicuous plumage or the display of family quarrels would attract the attention of ever-watchful enemies.

Characters so obviously affected by the every-day life of a bird can scarcely be regarded as of much genetic value, and unfortunately the Lapwings intergrade with the Plovers to such an extent that it is very difficult to deal with the sixty or more species comprised in the two groups in a perfectly satisfactory manner.

In attempting to diagnose the thirteen species which are here included in the genus *Vanellus*, it is admitted that the external characters which distinguish them from their nearest allies are possibly arbitrary, and that the group may have to be rearranged on different lines when the anatomical and other internal characters have been investigated.

The thirteen or fourteen species which have lobes or wattles at the base of the bill may be conveniently disposed of in the genus *Lobivanellus*.

The five or six species which have spurs and no wattles are as easily determined to belong to the genus *Vanellus*.

Shape of wings an unreliable character.

There still remain forty species or more from which the other species belonging to the genus *Vanellus* have to be selected. I know of no so-called structural characters by which this may be done satisfactorily. To say first primary shorter than the second would exclude from the genus *Vanellus* such undoubted Lapwings as *V. leucurus*, *V. gregarius*, and one or two other more or less migratory species; and to say first primary not longer than the second would admit such undoubted Plovers as *Charadrius sanctæ-helenæ*, and one or two other species which have found breeding-grounds where the necessity to migrate no longer exists.

It is easier to draw a hard-and-fast line between the two groups of Lapwings and Plovers by selecting the colour of the rump, upper tail-coverts, and especially the central tail-feathers as the crucial test.

Colour of tail reliable.

In the typical Plovers these parts are a nearly uniform light or dark shade of grey or brown. Occasionally, as in *Charadrius vociferus* and *C. melodus*, the rump and upper tail-coverts differ in colour from the central tail-feathers, and occasionally, as in *C. cantianus*

and its allies, the upper tail-coverts and central tail-feathers differ somewhat in colour from the rump.

In the typical Lapwings the rump is some dark shade of brown or grey, suddenly separated from the pure white upper tail-coverts and basal portion of the central tail-feathers, which is again suddenly separated from the clearly defined broad black band across the tips of the central tail-feathers.

If this character be satisfactory it ought, of course, to apply to the nineteen species which we have already determined to be Lapwings because they have either spurs or wattles, or both. It applies to all of them; but two of the non-spurred and non-wattled Lapwings are slightly exceptional, *V. cristatus* and *V. leucurus*. The former has the black band across the central tail-feathers very sharply defined from the pure white basal half, but it appears to have lost its upper tail-coverts altogether; the latter has the white upper tail-coverts well developed and very clearly defined, but it has lost the black band across the central tail-feathers, which are pure white throughout.

The character *central tail-feathers white for nearly the basal half* excludes all the species belonging to the genus *Charadrius*, and includes all the Lapwings except *Vanellus crassirostris*, an aberrant species, in which only a third of the basal portion of the central tail-feathers is white; but as this species has a small though very sharp spur on its wing there is no doubt that it is a Lapwing and not a Plover.

The genus *Vanellus* must therefore be defined as

Generic characters.

CHARADRIINÆ having the nasal apertures placed in a well-defined groove, having no lobes on the sides of the head, but occasionally having spurs on the wings, and having at least the basal third of the central tail-feathers white.

Synonymy of the Genus VANELLUS.

	Type.
Vanellus, *Brisson, Orn.* v. p. 94 (1760)	V. cristatus.
Hoplopterus, *Bonap. Sagg. Distr. An. Vert.* p. 56 (1831)	V. spinosus.
Chettusia, *Bonap. Icon. Faun. Ital. Ucc., Introd.* p. 3 (1841)	V. gregarius.
Hoploxypterus, Ptiloscelys, *Bonap. Compt. Rend.* xliii. pp. 418, 419 (1856)	V. cayanus. V. resplendens.
Belonopterus, Stephanibyx, *Reichenb., fide Bonap. Compt. Rend.* xliii. pp. 418, 419 (1856)	V. cayennensis. V. coronatus.
Defilippia, *Salvad. Att. Soc. Ital. Sc. Nat.* viii. p. 373 (1865)	V. crassirostris.
Limnetes, *de Filippi, fide Finsch & Hartlaub, Vög. Ost-Afr.* iv. p. 64 (1870)	
Hemiparra, *de Filippi, fide Heuglin, Orn. N.O.-Afr.* ii. p. 994 (1873)	
Nomusia, *Heuglin, Orn. N.O.-Afr.* ii. p. 994 (1873)	

The synonymy of the genus *Vanellus* cannot be regarded as a credit to ornithologists, who seem to have shared the superstitious Bonaparte-worship of the day. It is almost a waste of paper to reprint such useless synonyms; but a line must be drawn

somewhere, and perhaps the wisest course is to admit all synonyms, except the generic names of Reichenbach and the specific names of Brehm.

Determination of the type.

Linneus placed the Lapwing in the genus *Tringa* because it has a hind toe; but Brisson removed the four-toed Lapwings and Plovers and placed them in a genus of their own. The Common Lapwing (*Vanellus cristatus*) has a double claim to be regarded as the type of the genus, first because it is the *Tringa vanellus* of Linneus, and secondly because it is the *Vanellus vanellus* of Brisson.

Climatic distribution.

The genus *Vanellus* is not a very large one, and has equal claims to be regarded as temperate or tropical. The distribution of the species is as follows :—

Temperate Eurasia	3	
South Africa	2	
Temperate South America	2	
Temperate species		— 7
Tropical Asia	1	
Tropical Africa	4	
Tropical America	2	
Tropical species		— 7
Species and subspecies of *Vanellus*		— 14

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Three-toed. — *Four-toed.*

Palæarctic Region.

Britain to Japan. — V. cristatus.
S.E. Russia to W. Turkestan. — V. gregarius.
W. Turkestan and Persia. — V. leucurus.

Oriental Region.

V. ventralis — *India and Burma.*

Ethiopian Region.

V. melanopterus — *East Africa.* — V. crassirostris.

V. spinosus — *North-east Africa.*, *West Africa.*, *Central Africa.*, *South-east Africa.*
V. inornatus — *North-east Africa.*, *West Africa.*, *Central Africa.*, *South-east Africa.*

V. speciosus — *South Africa.*
V. coronatus — *South Africa.*

Three-toed.	NEOTROPICAL REGION.	*Four-toed.*
V. RESPLENDENS	*Peru.*	
V. CAYANUS	*Brazil.*	. . . . . V. CAYENNENSIS.
	Chili.	. . . . . V. CHILENSIS.

Original home.

The Lapwings are neither birds of the shore nor of the forest, but of the open plain. The steppes, prairies, downs, cultivated or uncultivated, are their home. Their absence from North America suggests the idea that they were originally confined to the Old World, where two large tracts of country are, and probably have been for ages, exactly suited to their requirements: the great steppes of Western Asia which stretch away from Tomsk to Bucharest, and the Mongolian steppes which reach from Kashgar to Pekin. The Altai Mountains and the adjoining ranges separate these large tracts of country from each other, so that it is not unreasonable to suppose that if the ancestors of *Cursorius* and *Glareola* were isolated and differentiated from each other and from the Lapwings and Plovers during the Pre-Pliocene Glacial Epoch, the genera *Charadrius*, *Vanellus*, and *Lobivanellus* were differentiated from each other at a later date, during the succeeding interglacial epoch, which may account for their apparent closer relationship. During this period we may imagine that the ancestors of *Charadrius* were isolated on the shores of the Polar Basin, those of *Vanellus* on the steppes of Western Asia, and those of *Lobivanellus* on the Mongolian steppes.

Results of migration and emigration contrasted.

When these large tracts of land and the hundred little plains and marshes which surround them were rendered uninhabitable by an arctic winter, ever lengthening until the whole year was merged in a glacial epoch, the only resource of the bird-population must have been at first migration, and finally emigration. Those parties of birds which emigrated found suitable homes in various parts of the tropical and subtropical regions, where their isolation naturally allowed them to be differentiated into many species; whilst those which only migrated and returned every summer to breed in the vicinity of the glaciers interbred more with each other and became few species.

Emigration to South America.

The only difficulty in accounting for the geographical distribution of the Lapwings is their presence in South America. This is, however, more apparent than real. Although all the South-American Lapwings possess spurs on their wings and one of them has lost its hind toes, two of them are obviously most nearly related to the Common Lapwing. This species is a regular winter visitor, sometimes in great numbers, to the Canary Islands, and is occasionally seen on the Azores. There can be little doubt that one at least of these migrating parties was forced, in the struggle to find means of existence during the Post-Pliocene Glacial Epoch, to emigrate from the contracted and crowded winter-quarters and was fortunate enough to discover a new home in South America.

Emigration to Africa.

The fact that nearly half the species of the genus *Vanellus* breed in the Ethiopian Region suggests the theory that the distribution of the Lapwings is the result of successive emigration from the Kirghiz Steppes to Africa during the Post-Pliocene Glacial Epoch. These successive and successful parties must have reached the African continent at various

times and in various places, and must have remained isolated from each other for a sufficient length of time to have enabled them to become differentiated from each other so completely, that when, from the gradual extension of the area of distribution of each species, some of these areas impinged or overlapped, the various species had become so distinct that little or no cross-breeding took place.

Neotropical species.

The species which has the most arctic distribution is *V. cristatus*, which represents the descendants of those Lapwings which hung on the outskirts of the glaciers, and never emigrated to the tropics during the glacial epoch until towards its close, when a party crossed the Atlantic to South America, and gradually spread over the Brazilian and Chilian subregions. In so wide a range it is not remarkable that a partial differentiation subsequently took place, the birds in the north becoming *V. cayennensis*, and those in the south a larger race known as *V. cayennensis chilensis*. *V. resplendens* may be the result of an eastern emigration across the Pacific to Peru, where it has found a Palæarctic climate on the plateaus ten thousand feet above the sea.

Old-World tropical species.

It is impossible to say how early *V. gregarius* became differentiated from its allies; but it seems to represent a more southerly group of species, which may have originated on that part of the Kirghiz Steppes which lies west of the Ural Mountains, and extends across the Caspian into Turkestan. During the intense struggle for existence caused by the glacial epoch, parties from this colony seem to have emigrated into India (the ancestors of *V. ventralis*), into Persia (the ancestors of *V. leucurus*), to the coast of East Africa (the ancestors of *V. crassirostris*), and into Egypt (the ancestors of *V. spinosus*). The valley of the Nile seems to have become an Eldorado for the Lapwings, and many parties of emigrants seem to have ascended it, and to have found congenial homes in different parts of the continent of Africa—the ancestors of *V. inornatus* in the West, those of *V. melanopterus* in the East, those of *V. coronatus* in the South-west, and those of *V. speciosus* in the South-east, whilst an adventurous party seem to have crossed the Atlantic to South America, and to have become differentiated into *V. cayanus*.

In order to simplify the Key to the species they are divided into two purely artificial groups, those with a small hind toe and those without that appendage. There cannot be any doubt that the presence of a hind toe or of a spur is a character of only secondary importance in this genus. To subdivide the genus *Vanellus* on these lines is unscientific in the extreme, inasmuch as it separates the most closely allied species, associates together distantly allied species, and consequently makes the study of their geographical distribution impossible or misleading. For example, nothing can be more certain than the very close relationship between *V. cristatus*, *V. cayennensis*, and *V. resplendens*. They are unquestionably more nearly related to each other than they are to any other species of the genus; nevertheless the first has a hind toe and no spur, the second both a hind toe and a spur, whilst the third has a spur but no hind toe. Every species in the family of Charadriidæ appears to be gradually losing or to have recently lost its hind toe, probably by the action of what Darwin has called the law of degradation by disuse, and it appears to be seldom a feature of much genetic value whether the hind toe has almost or quite disappeared.

KEY TO THE SPECIES.

A.—With small hind toe.

Secondaries almost entirely black; wing-coverts bronzed with purple and green.

- **chilensis** . . . . Sides of neck lavender-grey.
- **cayennensis.**

No spurs . . . . . .

- **cristatus** . . . . Broad dark band across central tail-feathers, obsolete or nearly so on outer ones.
- **gregarius** . . . .
- **leucurus** . . . . All the tail-feathers white.
- **crassirostris.**

B.—With no hind toe.

Primary-coverts mostly white.

- **coronatus** . . . . No spurs.
- **melanopterus** . .

No white on wing-coverts .

- **inornatus** . . . . Dark legs.
- **speciosus** . . . .

Black shoulders . . . .

- **ventralis** . . . .
- **spinosus** . . . .

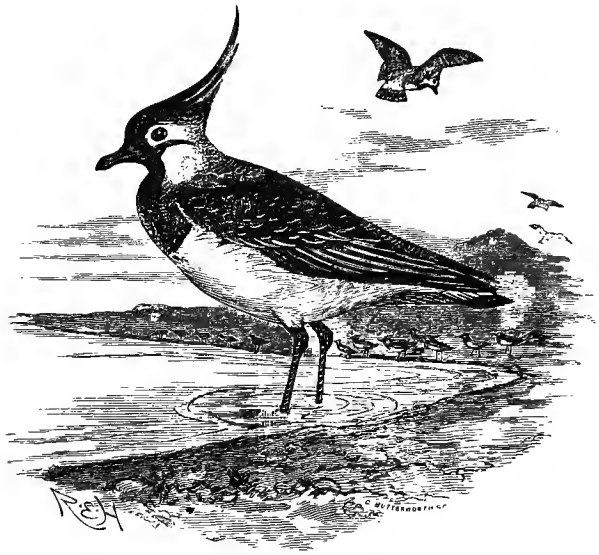
Wing-coverts bronzed with purple.

- **resplendens.**
- **cayanus** . . . . Outermost secondaries white with narrow black tips.

All these characters apply to young as well as to adults, except perhaps the spurs. The key is, however, complete without them.

*** *Subgeneric group Vanelli: with a hind toe but no spur.*

† *Old-World Species.*



VANELLUS CRISTATUS.

COMMON LAPWING.

Diagnosis. VANELLUS supracaudalibus et subcaudalibus rufis: subalaribus nigris.

Variations. ALTHOUGH the Common Lapwing is subject to considerable individual variation, especially in the amount of black on the throat and on the tail, it is impossible to distinguish examples from China and Japan from others obtained in Western Europe.

Synonymy.

Tringa vanellus, *Linneus, Syst. Nat.* i. p. 148 (1758); *Linn. Syst. Nat.* i. p. 248 (1766).
Vanellus vanellus, *Brisson, Orn.* v. p. 94 (1760).
Vanellus capella, *Schaeffer, Mus. Orn.* p. 49 (1789).
Vanellus vulgaris, *Bechstein, Orn. Taschenb.* ii. p. 313 (1803).
Vanellus cristatus, *Wolf et Meyer, Vög. Deutschl.* ii. p. 110 (1805).
Vanellus gavia, *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 29 (1816).
Charadrius gavia (*Leach*), *Lichtenstein, Verz. Doubl.* p. 70 (1823).
Charadrius vanellus (*Linn.*), *Pallas, Zoogr. Rosso-Asiat.* ii. p. 132 (1826).

Literature.

PLATES.—Daub. Pl. Enl. no. 242; Gould, Birds of Gr. Brit. iv. pl. 33; Dresser, Birds of Europe, vii. pl. 531.
HABITS.—Seebohm, British Birds, iii. p. 57.
EGGS.—Seebohm, British Birds, pl. 27. figs. 1, 2, 3, 5.

The Common Lapwing may be distinguished at all ages and seasons by its combination of two characters—the presence of *metallic gloss on most of the feathers of the upper parts*, and the *absence of white on the wing-coverts*. It is also the only Lapwing which has *chestnut-buff upper and under tail-coverts*. Specific characters.

The Common Lapwing has an undoubted right to its name. It is questionable whether any other species of the genus is as numerous, and it is certain that none has so wide a range. It is found halfway round the world, breeding from the Atlantic to the Pacific, and occasionally invading the American continent at each extremity of its range in Greenland and in Alaska. In Scandinavia it breeds as far north as the Arctic Circle, but in Siberia not further than lat. 55°. To the colder portion of its range it is only a summer visitor, but in the British Islands and in Central Europe south of the Baltic it is a resident. Its winter-quarters are North Africa (including the Canaries, Madeira, and the Azores), the basin of the Mediterranean, Asia Minor, Persia, North India, China, and Southern Japan. Geographical distribution.

Its nearest ally is doubtless *V. resplendens*, a species inhabiting the Andes of Ecuador and Peru. Nearest ally.

VANELLUS GREGARIUS.

SOCIABLE LAPWING.

Vanellus primariarum interiorum pogoniis internis albis vel albo marginatis, pogoniis externis nigris. Diagnosis.

Variations. No local races of this species are known.

Synonymy.

Charadrius gregarius, *Pallas, Reise Russ. Reichs*, i. p. 456 (1771).
Tringa keptuschka, *Lepechin, Tageb. Reise Russ. Reichs*, i. p. 229 (1774).
Tringa fasciata, *S. N. Gmelin, Reis. Russl.* ii. p. 194 (1774).
Vanellus gregarius (*Pall.*), *Vieillot, N. Dict. d'Hist. Nat.* xxxv. p. 215 (1819).
Charadrius keptuschka (*Lepech.*), *Wagler, Syst. Av.* p. 73 (1827).
Chettusia gregaria (*Pall.*), *Bonap. Faun. Ital. Ucc., Introd.* p. 12 (1832).
Charadrius wagleri, *Gray & Hardwicke, Ill. Ind. Orn.* pl. 50 (1835).
Vanellus keptuschka (*Lepech.*), *Temminck, Man. d'Orn.* iv. p. 360 (1840).
Vanellus pallidus, *Heuglin, Syst. Uebers. Vög. N.O.-Afr.* p. 55 (1855).
Chettusia wagleri (*Gray & Hardw.*), *Bonap. Compt. Rend.* xliii. p. 419 (1856).

Literature.

Plates.—Gould, Birds of Europe, pl. 292; Dresser, Birds of Europe, vii. pl. 528.
Habits.—Dresser, Birds of Europe, vii. p. 527.
Eggs.—An example in Mr. Crowley's collection, from Sarepta, and two examples in my collection, taken by Major Butler on the Mekran coast, are indistinguishable from small pale eggs of the Avocet.

Specific characters.

The Sociable Lapwing, when adult, may be recognized by its black belly and chestnut-red vent. At all ages it may be recognized by the colour of its *shortest primaries*, which are *black with the inner web white or margined with white.*

Geographical distribution.

It breeds on the steppes of South-east Russia, South-west Siberia, and Russian Turkestan, migrating in autumn to winter in North-east Africa and India. It has doubtfully been recorded as an accidental visitor to France and Spain, but there are three authentic records of its occurrence in Italy (Giglioli, Ibis, 1881, p. 208). Its breeding-range extends from the valley of the Lower Volga (whence I have several examples from Sarepta) as far east as the basin of Lake Saisan (Finsch, Reise West-Sibir. p. 131). Goebel did not find it in South-west Russia, nor has it been recorded by any of the travellers in South-east Siberia.

Nearest ally.

It seems to be nearest allied to *V. leucurus*, but is somewhat intermediate between that species and *V. ventralis*, agreeing with the former in its white outer tail-feathers, and in having more or less chestnut on the belly, and with the latter in having black on the crown and belly. *V. leucurus* and *V. ventralis* show their connection by the black on their wing-coverts, so that it seems probable that the three colonies were isolated about the same time.

VANELLUS LEUCURUS.

WHITE-TAILED LAPWING.

VANELLUS caudâ omninò albâ. Diagnosis.

No local races of this species are known. Variations.

Charadrius leucurus, *Lichtenstein, Verz. Doubl. Mus. Berlin*, p. 70 (1823). Synonymy.
Vanellus villotæi, *Audouin, Expl. Savign. Pl. Ois. Egypte*, p. 297 (1826).
Vanellus flavipes, *Savigny, fide Cuvier, Règne An.* i. p. 503 (1829).
Vanellus grallarius, *Lesson, Traité d'Orn.* p. 542 (1831).
Vanellus leucurus (*Licht.*), *Blyth, Journ. As. Soc. Beng.* xiii. p. 387 (1844).
Lobivanellus leucurus (*Licht.*), *Blyth, Cat. B. Mus. As. Soc.* p. 261 (1849).
Vanellus aralensis, *Eversmann, Bull. Acad. Mosc.* 1853, pt. ii. p. 497.
Chettusia leucura (*Licht.*), *Bonap. Compt. Rend.* xliii. p. 419 (1856).
Chettusia flavipes (*Sav.*), *Gray, Hand-list Birds*, iii. p. 11 (1871).
Chettusia villotæi (*Audouin*), *Shelley, Birds of Egypt*, p. 233 (1872).

PLATES.—Wright, Ibis, 1865, pl. x.; Dresser, Birds of Europe, vii. pl. 529. Literature.
HABITS.—Dresser, Birds of Europe, vii. p. 531.
EGGS.—Unknown.

The White-tailed Lapwing was probably first discovered by Savigny, but the publication of the results of his discoveries in Egypt was delayed in consequence of his loss of sight, so that Lichtenstein's name took precedence and became generally adopted. The bird was, however, accurately described by Temminck in 1807 (Cat. Syst. Cab. d'Orn. pp. 172, 261) under the name of "Le Vanneaux à queue blanche, ou Vanneaux échassier d'Egypte." Unfortunately no Latin name was given to the species by Temminck, nor can I find any authority for the name of *Vanellus flavipes*, which Cuvier says was given to it by Savigny.

Specific characters. The White-tailed Lapwing may always be recognized when adult by its *pure white tail*; and even young in first plumage only show slight traces of the black band at or near the tip.

Geographical distribution. The White-tailed Lapwing breeds in the salt steppes of Western Turkestan (Severtzoff, Journ. Orn. 1873, p. 366) and winters in North-east Africa and North India. Brehm's statement (Journ. Orn. 1866, p. 386) that it undoubtedly breeds in Egypt is denied by Heuglin, who only observed it during September to April, from Egypt to East Kordofan, and mentions its occurrence as far south as the Blue Nile. I have several examples from various localities in North India; Jerdon records it as far east as Calcutta, and it is very common all the winter in Southern Afghanistan (Col. Swinhoe, Ibis, 1882, p. 120). It is common in Southern Persia and Baluchistan from March to September (Blanford, Eastern Persia, ii. p. 280).

Accidental occurrences. On migration it has occurred accidentally in various parts of Europe; at Montpellier in the south of France (Jaub. et Barth. Richesse Orn. p. 452), Malta (Wright, Ibis, 1865, p. 459), Sarepta in South Russia (Cabanis, Journ. Orn. 1873, p. 80), and it is doubtfully recorded from Algeria (Loche) and Senegal (Schlegel).

Nearest ally. It appears to be nearest allied to *V. gregarius*.

VANELLUS CRASSIROSTRIS.

LONG-TOED LAPWING.

Diagnosis. VANELLUS remigibus omnibus (primâ, secundâ et tertiâ exceptis) omninò albis.

Variations. IT is not known that this species varies in any way.

Synonymy.

Vanellus macrocercus, *Heuglin, Syst. Uebers. Vög. N.O.-Afr.* p. 55 (1855) (descript. nullâ).
Chettusia crassirostris, *de Filippi, fide Hartlaub, Journ. Orn.* 1855, p. 427.
Chettusia macrocercus (*Heuglin*), *Bonap. Compt. Rend.* xliii. p. 419 (1856).
Vanellus crassirostris (*Hartlaub*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 60 (1865).
Defilippia crassirostris (*Hartlaub*), *Salvadori, Att. Soc. Ital. Sc. Nat.* viii. p. 373 (1865).
Hemiparra crassirostris (*de Filippi*), *Heuglin, Pet. Geogr. Mitth.* 1869, p. 415.
Limnetes crassirostris (*de Filippi*), *Finsch & Hartlaub, Vög. Ost-Afr.* p. 641 (1870).
Hoplopterus crassirostris (*de Filippi*), *Layard, Ibis,* 1871, p. 105.
Chettusia nivifrons, *Ogden, Proc. Ac. Nat. Sc. Philad.* 1871, p. 196.

Literature.

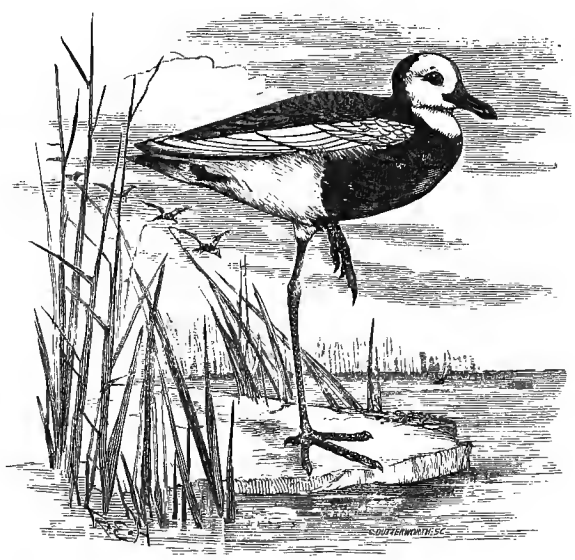
Plates.—Ogden, Proc. Ac. Nat. Sci. Philad. pl. i.; Heuglin, Orn. N.O.-Afr. ii. pl. xxxiii.
Habits.—Heuglin, Orn. N.O.-Afr. ii. p. 994.
Eggs.—Unknown.

Specific characters.

The Long-toed Lapwing may always be recognized by the great length of its toes, the middle toe and claw measuring more than one fourth of the length of the wing from the carpal joint. It may also be recognized by the extraordinary amount of *white* on *the wing, the first three primaries only being black,* in which respect it resembles *Lobivanellus albiceps.*

Geographical distribution.

The Long-toed Lapwing is a resident in East Africa. Its range extends from Nubia (Hartlaub, Journ. Orn. 1855, p. 427), along the valley of the White Nile (Salvadori, Journ. Orn. 1868, p. 67), as far south as lat. 7° N. (Heuglin, Orn. N.O.-Afr. ii. p. 995), across the line to Masai-Land (Fischer, Journ. Orn. 1879, pp. 296, 301, 337), the south-east shores of Lake Victoria Nyanza (Reichenow, Journ. Orn. 1887, p. 47), the basin of Lake Tanganyika (Böhm, Journ. Orn. 1886, p. 435), the valley of the Zambesi (Kirk, Ibis, 1864, p. 331), to Zulu-Land, where it is not uncommon on the shores of the lagoons in St. Lucia Bay (Layard, Ibis, 1871, p. 106).



Not allied to the Rails.

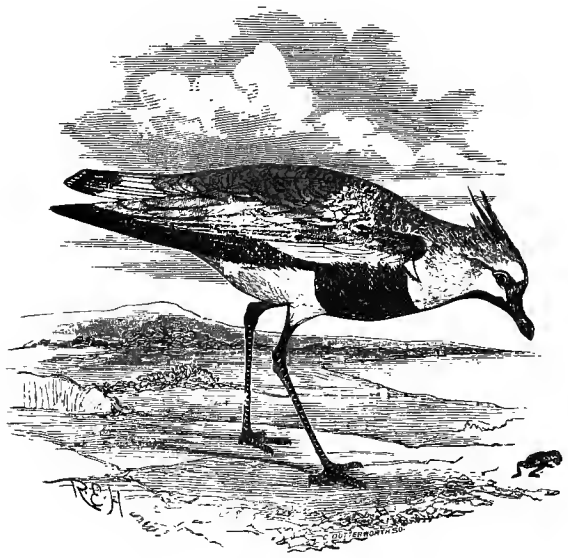
The affinities of this very aberrant Lapwing are difficult to determine, but its resemblance to the Jacanas and the Rails is probably only a case of analogy. In the struggle for existence the ancestors of this curious bird appear to have turned their backs upon the steppe (or "veldt" to use a South-African term), and to have found a suitable feeding-ground on the floating vegetation of rivers and lakes.

Nearest allies.

Similarity of habits has apparently produced similarity of structure, but there cannot be much doubt that the real affinities of *V. crassirostris* are with *V. speciosus, V. spinosus,* and *V. inornatus.*

*** *Subgeneric group Vanelli: with a hind toe and a spur.*

† *South-American Species.*



VANELLUS CAYENNENSIS.

CAYENNE LAPWING.

Diagnosis. VANELLUS halluce parvo: subalaribus albis: tectricibus splendidè iridescentibus.

Variations. SOUTHERN examples are so much greyer on the sides of the neck that they may fairly be regarded as subspecifically distinct.

Synonymy.

Parra cayennensis, *Gmelin, Syst. Nat.* i. p. 706 (1788).
Tringa cayennensis (*Gmel.*), *Latham, Index Orn.* ii. p. 727 (1790).
Vanellus cayennensis (*Gmel.*), *Vieillot, N. Dict. d'Hist. Nat.* xxxv. p. 206 (1819).
Charadrius cayennensis (*Gmel.*), *Lichtenstein, Verz. Doubl.* p. 70 (1823).
Charadrius lampronotus, *Wagler, Syst. Av.* p. 74 (1827).
Belonopterus cayennensis (*Gmel.*), *Bonap. Compt. Rend.* xliii. p. 418 (1856).

Literature.

PLATES.—Unfigured.
HABITS.—Gibson, Ibis, 1880, p. 161.
EGGS.—Thienemann, Abbild. Vogeleiern, pl. lviii. fig. 7; Harting, Proc. Zool. Soc. 1874, p. 457.

Specific characters.

The Cayenne Lapwing has the *scapulars and wing-coverts resplendent with metallic violet, green, and bronze.* Three other Lapwings possess this character. Of these the Cayenne Lapwing is most easily distinguished from *V. cristatus* by its *white under wing-coverts,* and from *V. resplendens* by its having *a small hind toe.* It is much more closely allied to *V. chilensis,* of which it is a tropical form; but typical examples may always be distinguished when adult, and probably also when young, by the colour of the *sides of the neck,* which is *sandy-brown* instead of lavender-grey.

Vanellus cayennensis and *V. chilensis* are the only two Lapwings which have a spur on the wing, a hind toe on the foot, but no lobe on the face. They are so closely allied that it is not always certain to which species some examples belong. One of these intermediate forms from Dutch Guiana, in the Leyden Museum, probably induced Schlegel to regard them as one species.

Geographical distribution.

It appears to be distributed throughout tropical South America east of the Andes. The Leyden Museum possesses examples from Dutch Guiana, Wallace found it at the mouth of the Amazon, and I have examples from Bahia (Wucherer), Rio de Janeiro, Rio Grande, and Buenos Ayres.

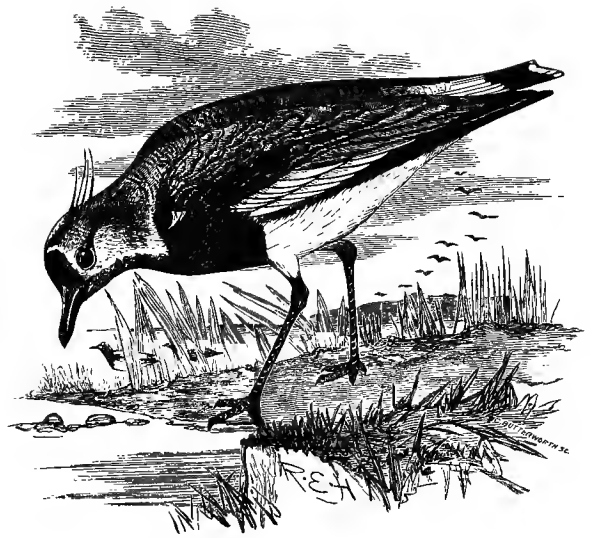
Nearest allies.

The Cayenne Lapwing has many points in common with its European representative. Both species have black on the breast and throat, metallic green on the back and wing-coverts, metallic red on the scapulars, small hind toes, and a well-developed crest; and there can be little doubt that the former species is the result of an emigration across the Atlantic of a party of Lapwings from the Old World during the Post-Pliocene Glacial Epoch. The Peruvian Lapwing may be regarded either as a later emigration from the modified descendants of these birds, or as an eastern emigration across the Pacific.

Early emigrations.

The latter hypothesis is, however, very improbable. The ancestors of *V. cayennensis* probably emigrated from the basin of the Mediterranean, and landed on the coast of Brazil, towards the close of the Post-Pliocene Glacial Epoch. The ancestors of *V. resplendens* were doubtless isolated from those of the rest of the party long before the latter was differentiated into an Eastern and a Western form, and we may assume that when they were compelled to cross the Andes, the easier road round the southern spurs was barred. There seems to be overwhelming evidence of some great inundation in South America, which destroyed the greater part of the Mammals of that continent and caused the great deposits of Pampas mud [1]. If this catastrophe was caused by the upheaval of the Andes, the Bronze-winged Lapwings of South America might have been thus isolated in two groups. If, on the other hand, the Andes are older than the last Glacial Epoch, and the catastrophe was caused by a temporary depression of the whole of South America (a rather improbable assumption), the Lapwings would be compelled to take refuge on the mountains which some of them crossed. When the Pampas were once more made accessible, the ancestors of *V. chilensis* gradually spread round the southern spurs and up the western slopes until their range has almost reached that of *V. resplendens.*

[1] This evidence is collected in Howorth's 'Mammoth and the Flood,' p. 325 to p. 366.



VANELLUS CAYENNENSIS CHILENSIS.

PATAGONIAN LAPWING.

Diagnosis. VANELLUS CAYENNENSIS colli lateribus cærulescentibus.

Variations. INTERMEDIATE forms between this race and the typical one occur.

Synonymy. Parra chilensis, *Molina, Saggio sulla Stor. Nat. Chil.* p. 258 (1782).
Vanellus chiliensis, *Yarrell, Proc. Zool. Soc.* 1847, p. 54.
Vanellus occidentalis, *Harting, Proc. Zool. Soc.* 1874, p. 451.

Literature. PLATES.—Unfigured.
HABITS.—Harting, Proc. Zool. Soc. 1874, p. 449.
EGGS.—Yarrell, Proc. Zool. Soc. 1847, p. 54.

Subspecific characters. The Patagonian Lapwing is a slightly larger bird (wing $10\frac{1}{4}$ to $9\frac{1}{2}$ inches instead of 9 to $8\frac{3}{4}$ inches) than the Cayenne Lapwing. The two forms are undoubtedly very closely allied, and some examples appear to be intermediate. Like the Cayenne species the Patagonian Lapwing has a small hind toe, the scapulars and wing-coverts are bronzed with orange, violet, and green, and the under wing-coverts are white; but it differs from it in having the occipital crest less developed, and especially in having the *sides of the neck lavender-grey*, instead of isabelline or sandy brown. The grey tint on the sides of the

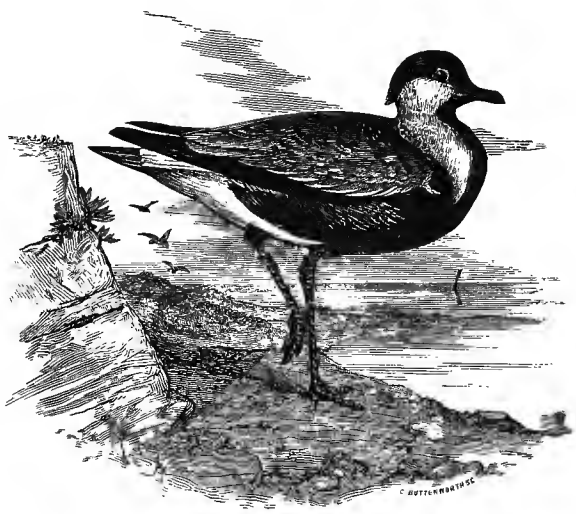
neck, as well as the violet-bronze on the wing-coverts, is quite distinct in young in first plumage. In climatic races of birds it often happens that slate-grey is associated with a dry climate, and brown with a wet one.

Geographical distribution.

It appears to be common near Santiago in Chili, whence many examples were sent by Read; but Mr. H. B. James informs me that it has not been obtained north of Coquimbo Bay. In Peru its place appears to be taken by *V. resplendens*. It is essentially a marsh bird, and is seldom seen except near swampy ground. It is found in the Falkland Islands, from which locality there is a specimen in the Leyden Museum. The 'Challenger' expedition procured it on Elizabeth Island in the Strait of Magellan.

*** *Subgeneric group Hoplopteri: with no hind toe.*

† *Old-World Species.*



VANELLUS SPINOSUS.

EGYPTIAN SPUR-WINGED LAPWING.

Diagnosis.

Vanellus halluce nullo: calcaribus magnis: pedibus nigris: tectricibus minoribus brunneis, majoribus albis.

Variations.

No local races of this species are known.

Synonymy.

Charadrius cristatus, *Linneus, Syst. Nat.* i. p. 150 (1758); *Stephens, Shaw's Gen. Zool.* xi. p. 483 (1819).
Pluvialis persica cristata, *Brisson, Orn.* v. p. 84 (1760).
Charadrius spinosus, *Linneus, Syst. Nat.* i. p. 256 (1766).
Charadrius persicus, *Bonnaterre, Enc. Méth.* i. p. 21 (1790).
Charadrius senegalensis, *Stephens, Shaw's Gen. Zool.* xi. p. 482 (1819).
Vanellus melasomus, *Swainson, Birds W. Africa,* ii. p. 237 (1837).
Hoplopterus spinosus (*Linn.*), *Bonap. Comp. List B. Eur. & N. Amer.* p. 46 (1838).
Hoplopterus persicus (*Bonn.*), *Gray, Genera of Birds,* iii. p. 542 (1847).
Vanellus spinosus (*Linn.*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 60 (1865).

Literature.

Plates.—Edwards, Nat. Hist. Birds, i. pl. 47; Daub. Pl. Enl. no. 801; Dresser, Birds of Europe, vii. pl. 530.
Habits.—Dresser, Birds of Europe, vii. p. 539.
Eggs.—Bree, Birds of Europe, iv. pl. i. fig. 2; Heuglin, Orn. N.O.-Afr. pl. xli. fig. 10; Harting, Proc. Zool. Soc. 1874, p. 456.

Specific characters.

The Egyptian Spur-winged Lapwing is the only species of the genus which has, when adult, the nape, crown, forehead, chin, throat, breast, and flanks black.

It has *large spurs, black legs,* but *no hind toe,* characters which it shares with *V. speciosus* and *V. ventralis.* From the former it may be distinguished by its *white greater wing-coverts,* and from the latter by its *brown lesser wing-coverts.*

Geographical distribution.

The Egyptian Spur-winged Lapwing breeds in Senegambia (Hartlaub, Journ. Orn. 1854, p. 216), the valley of the Niger (Hartert, Journ. Orn. 1886, p. 609), and probably across Central Africa, since it is very common in the marshes of East Kordofan, the lower valley of the White Nile, and its tributaries the Blue Nile and the Atbara River (Heuglin, Orn. N.O.-Afr. ii. p. 1005). To Palestine it appears to be a spring migrant (Tristram, Ibis, 1868, p. 324), occasionally wandering on migration to Malta (Wright, Ibis, 1869, p. 246), Dalmatia (Giglioli, Ann. Agric. 1881, no. 36, p. 118), Greece and Asia Minor (Krüper, Griech. Jahresz. iii. p. 268), and it has occurred in Cyprus (Müller, Journ. Orn. 1879, p. 391). It is said to breed in South Russia, and to have occurred in Persia, but the evidence is not very satisfactory. It is an extremely common resident in Egypt and Nubia, and is recorded by many travellers from the highlands of Abyssinia. Its southern range extends beyond the equator, since it is numerous in Masai-Land (Fischer, Journ. Orn. 1879, pp. 301, 337), and was obtained by Dr. Fischer on the southern shores of Lake Victoria Nyanza (Reichenow, Journ. Orn. 1887, p. 47).

It frequents the banks of rivers, lakes, or canals, and is fond of marshes and swamps.

VANELLUS SPECIOSUS.

BLACK-BACKED LAPWING.

Diagnosis.

Vanellus halluce nullo : calcaribus magnis : tarso rostroque nigris : tectricibus omnibus cinereis.

Variations.

No local races of this species are known.

Synonymy.

Charadrius speciosus, *Wagler, Isis*, 1829, p. 649.
Pluvianus armatus, *Jardine & Selby, Ill. Orn.* i. pl. 54 (1825).
Charadrius albiceps, *Temminck, Pl. Col.* no. 526 (1832).
Hoplopterus speciosus (*Wagler*),
Hoplopterus armatus (*Jard. & Selby*), } *Gray, Genera of Birds*, iii. p. 542 (1847).
Vanellus speciosus (*Wagler*), *Schlegel, Mus. Pays-Bas, Cursores*, p. 62 (1865).

Literature.

Plates.—Jard. & Selby, Ill. Orn. i. pl. 54; Temm. Pl. Col. no. 526.
Habits.—Sharpe, Layard's Birds S. Africa, p. 667.
Eggs.—Described in Andersson's Birds of Damara-Land, p. 268.

Specific characters.

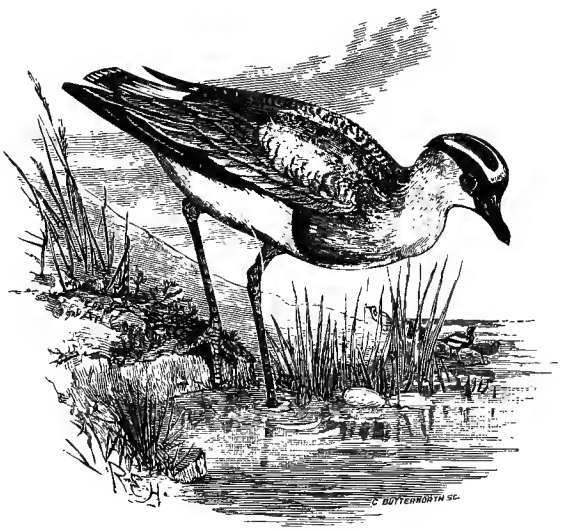
The Black-backed Lapwing is the only species of the genus which has, when adult, both a black mantle and a black throat. A more complicated diagnosis is *large spurs, no hind toe, black legs and bill, wing-coverts bluish grey without white tips.* It is doubtful whether all these characters are to be found in young in first plumage.

Geographical distribution.

The Black-backed Lapwing is possibly found throughout South Africa, but I cannot find any record of its occurrence in the Cape Colony. It is found in Angola and Benguela (Bocage, Orn. d'Angola, p. 427); I have examples collected by Andersson in Damara-Land and Great Namaqua-Land; it breeds abundantly in the Transvaal (Barratt, Ibis, 1876, p. 212), and in the Matebele Country (Buckley, Ibis, 1874, p. 387), and was obtained by Dr. Fischer in Ugogo, 300 miles west of Zanzibar (Reichenow, Journ. Orn. 1887, p. 47); but to Natal it appears to be only a winter visitor to the coast (Ayres, Ibis, 1865, p. 271), where it feeds on the mud-flats of the lagoons at the mouths of the rivers during low water. It breeds on the "vleys" or marshes, and frequents the banks of rivers and lakes.

Nearest ally.

It is the South-African representative of *V. spinosus*.



VANELLUS CORONATUS.

CROWNED LAPWING.

Diagnosis.

Vanellus halluce nullo: calcari nullo: primariarum tectricibus pro majore parte albis.

No geographical races of this species are known. Variations.

Synonymy.

Charadrius coronatus, *Boddaert, Tabl. Pl. Enl.* no. 800, p. 49 (1783).
Charadrius atricapillus, *Gmelin, Syst. Nat.* i. p. 686 (1788).
Pluvianus coronatus (*Bodd.*), *Stephens, Shaw's Gen. Zool.* xi. p. 488 (1819).
Chettusia coronata (*Bodd.*), *Gray, List Birds Brit. Mus.* iii. p. 64 (1844).
Hoplopterus coronatus (*Bodd.*), *Gray, Genera of Birds*, iii. p. 542 (1847).
Vanellus coronatus (*Bodd.*), *Rüppell, Syst. Ueb. Vög. N.O.-Afr.* p. 117 (1845).
Vanellus dinghami, *Verreaux, Rev. Zool.* 1855, p. 220.
Stephanibyx coronatus (*Bodd.*),
Stephanibyx dinghami (*Verreaux*), } *Bonap. Compt. Rend.* xliii. p. 419 (1856).

Literature.

Plates.—Daub. Pl. Enl. no. 800.
Habits.—Sharpe, Layard's Birds of S. Africa, p. 670.
Eggs.—Harting, Proc. Zool. Soc. 1874, p. 456; Thienemann, Abbild. Vogeleiern, pl. lviii. fig. 6.

Specific characters.

The Crowned Lapwing may be distinguished from the other species which, like it, have neither wattle, spur, nor hind toe, by the crown-like arrangement of the colours of its head. In the adult bird the crown is black, surrounded by a white ring, which in its turn is again encircled with black. A more reliable character, which appears to be constant at all ages, is to be found in the colour of the *primary-coverts*, which are *for the most part white*.

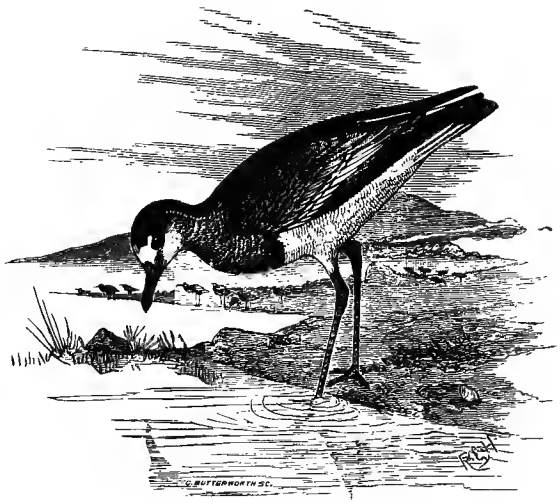
Geographical distribution.

The Crowned Lapwing is a resident in most parts of South Africa, but only on the "veldt" at a considerable elevation above the level of the sea. It is very common in Benguela (Bocage, Orn. d'Angola, p. 426); it is widely diffused throughout Damara-Land and Great Namaqua-Land (Andersson, Birds of Damara-Land, p. 268). Layard records it from various highlands throughout the Cape Colony; it is common in the Orange Free State (Barratt, Ibis, 1876, p. 191), and in the Transvaal (Buckley, Ibis, 1874, p. 387). I met with it in flocks near Colenso in Natal. Mr. Frank Oates found it in the Matebele Country, and Dr. Fischer obtained it in Masai-Land (Reichenow, Journ. Orn. 1887, p. 47), which is the northern limit of its known range.

Nearest allies.

It is difficult to say which species is most nearly allied to the Crowned Lapwing. The white primary-coverts are a very curious character, which partially appears in *V. leucurus* and in *V. cayanus*. In the former the inner primary-coverts have white bases, and in the latter the innermost primary-covert is nearly white. Two species of *Lobivanellus* have white primary-coverts, *L. tectus* and *L. albiceps*, so that possibly very great importance cannot be attached to the character as denoting near affinity.

It is possibly nearest related to *V. melanopterus*, of which it appears to be the western representative in South Africa.



VANELLUS MELANOPTERUS.

RÜPPELL'S LAPWING.

Diagnosis. VANELLUS halluce nullo: calcari nullo: pedibus rufis: primariarum tectricibus nigris.

Variations. No local races of this species are known.

Synonymy.

Charadrius melanopterus, *Cretzschmar, Rüpp. Atlas,* p. 46 (1826).
Charadrius spixii, *Wagler, Syst. Av.* p. 57 (1827).
Charadrius lugubris, *Lesson, Man. d'Orn.* ii. p. 328 (1828).
Hoplopterus spixii (*Wagl.*), *Gray, Genera of Birds,* iii. p. 542 (1847).
Charadrius frontalis, *Sundevall, Œfv. Vet. Handl.* 1850, p. 110.
Stephanibyx spixi (*Wagl.*), *Bonap. Compt. Rend.* xliii. p. 419 (1856).
Vanellus melanopterus (*Cretzschm.*), *Gurney, Ibis,* 1860, p. 217.
Vanellus spixii (*Wagl.*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 63 (1865).
Chettusia melanopterus (*Cretzschm.*), *Finsch & Hartlaub, Vög. Ost-Afr.* iv. p. 638 (1870).
Hoplopterus melanopterus (*Cretzschm.*), *Gray, Hand-l. Birds,* iii. p. 13 (1871).

Literature.

PLATES.—Cretzschm. Rüppell's Atlas, pl. xxxi.
HABITS.—Heuglin, Orn. N.O.-Afr. i. p. 1010.
EGGS.—Sharpe, Layard's Birds S. Africa, p. 669.

Specific characters.

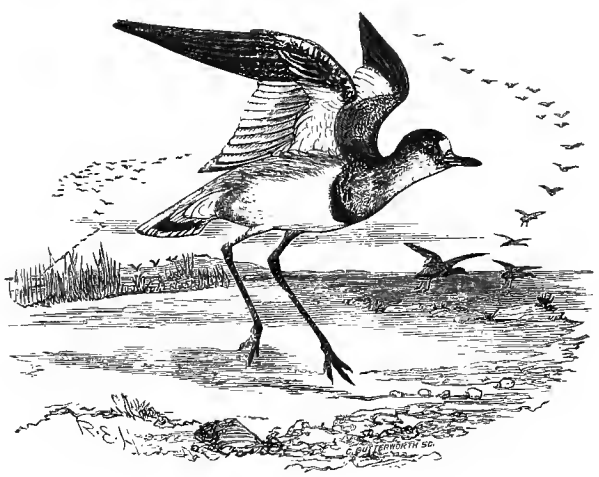
Rüppell's Lapwing, its western representative (Swainson's Lapwing), and its southern representative (the Crowned Lapwing) stand alone amongst the five-and-twenty species of the genera *Vanellus* and *Lobivanellus* in having *neither wattle, spur, nor hind toe*. In this respect they resemble the genus *Cursorius*, to which they are unquestionably very closely allied. Not only do they resemble in many important points of distribution of colour *C. chalcopterus*, but that species betrays its strain of Plover blood, probably inherited from a common ancestor, by the metallic colours on its wings. Rüppell's Lapwing may always be distinguished from its nearest ally *V. inornatus* by its *white under wing-coverts*, or by its *red legs*, and from *V. coronatus* by its *black primary-coverts*.

Geographical distribution.

Rüppell's Lapwing lives on the plateaus of East Africa. Its discoverer described it as frequent in Nubia and Abyssinia, but Heuglin doubted its occurrence in the former country. It is common on the highlands of the latter country (Blanford, Geol. & Zool. Abyss. p. 429). Rüppell found it in Arabia at Djedah, not far from Mecca; it is doubtfully recorded from Zanzibar and the Zambesi; but Dr. Fischer obtained it at Ugaia, to the east of Lake Victoria Nyanza (Reichenow, Journ. Orn. 1887, p. 47); and it is a common species on the high veldt of Natal, and at a lower elevation further south near East London, Port Elizabeth, and Mossel Bay.

Immature plumage.

In young in first plumage the white forehead and dark grey crown are replaced by brown, and the black margin between the brown breast and white belly is absent.



VANELLUS INORNATUS.

SWAINSON'S LAPWING.

Diagnosis.

Vanellus subalaribus brunneis : secundariis pro majore parte albis.

Variations. No intermediate forms between this species and *V. melanopterus* have yet been discovered.

Synonymy. Vanellus inornatus, *Swainson, Birds of West Africa*, ii. p. 239 (1837).
Hoplopterus inornatus (*Swains.*), *Gray, Genera of Birds*, iii. p. 542 (1847).
Charadrius melanopteroides, *Temminck, fide Schlegel, Mus. Pays-Bas, Cursores*, p. 63 (1865).

Literature. Plates.—Unfigured.
Habits.—Undescribed.
Eggs.—Unknown.

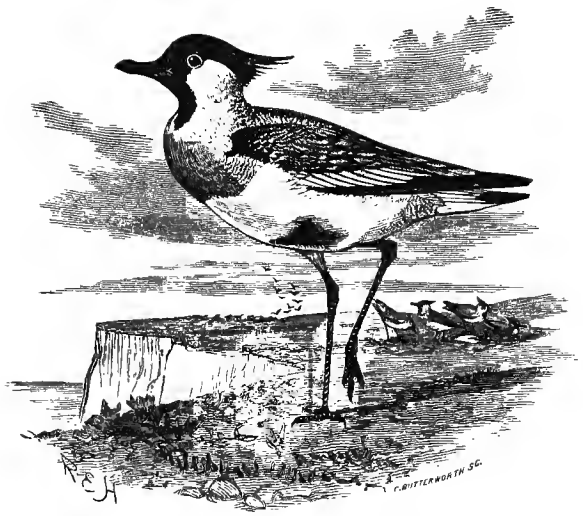
Specific characters. Swainson's Lapwing may perhaps be most easily diagnosed as the only species of the genus with *most of the under wing-coverts grey*. In all the other species they are white, except in the Common Lapwing, which has black under wing-coverts. It may also be recognized by the *white tips of the shortest primaries*, and especially of the adjoining secondaries.

Swainson's Lapwing appears to be a very good species, though closely allied to Rüppell's Lapwing, of which it is the West-African representative. The two species differ in the following important points :—

Comparison with *V. melanopterus*.

V. melanopterus.	*V. inornatus*.
Length of wing from carpal joint 8 to 9 in.	Length of wing from carpal joint about 7 in.
Primary under wing-coverts white.	Primary under wing-coverts grey.
Greater wing-coverts white.	Greater wing-coverts grey.
Primaries and outermost secondaries black.	Ninth and tenth primaries and first half-dozen secondaries broadly tipped with white.
Tail-feathers with a broad black band at or near the tip of all of them.	Two outer tail-feathers on each side white.

Geographical distribution. This species was originally described from West Africa, where it has been procured in Senegambia and on the Gold Coast (Hartlaub, Journ. Orn. 1854, p. 217); Falkenstein procured it on the Loango Coast (Reichenow, Journ. Orn. 1877, p. 11); Fischer obtained it at Zanzibar (Reichenow, Journ. Orn. 1880, p. 139); and I have an example collected by Kirk at Melinda a few degrees further north, and another shot by Mr. Harry Millar near Durban in Natal.



VANELLUS VENTRALIS.

INDIAN SPUR-WINGED LAPWING.

Diagnosis.

VANELLUS halluce nullo: humerorum tectricibus nigris: cristâ elongatâ: calcaribus magnis.

Variations.

No local races of this species are known.

Synonymy.

Pluvialis senegalensis armata, *Brisson, Orn.* v. p. 86 (1760, *locality probably erroneous*).
Charadrius ventralis, *Wagler, Syst. Av.* p. 59 (1827).
Charadrius duvaucelii, *Lesson, Man. d'Orn.* ii. p. 333 (1828).
Charadrius bicolor, *Temminck, Pl. Col., letterpress to* no. 526 (1832).
Philomachus ventralis (*Wagler*), *Hodgson, Gray's Zool. Miscell.* 1844, p. 86.
Hoplopterus ventralis (*Wagler*), *Blyth, Cat. Birds Mus. As. Soc.* p. 261 (1849).
Vanellus ventralis (*Wagler*), *Schlegel, Mus. Pays-Bas, Cursores*, p. 61 (1865).

Literature.

PLATES.—Gray and Hardwicke, Ill. Ind. Orn. pl. 50.
HABITS.—Jerdon, Birds of India, ii. p. 650.
EGGS.—Harting, Proc. Zool. Soc. 1874, pl. lx. fig. 3.

Specific characters.

The Indian Spur-winged Lapwing has a large *black patch on the* belly, emphasized by the pure white of the surrounding plumage. It has a similar patch on the lesser wing-coverts extending to the *carpal joint*. Either of these characters is diagnostic, and the latter is probably found in the young.

Geographical distribution.

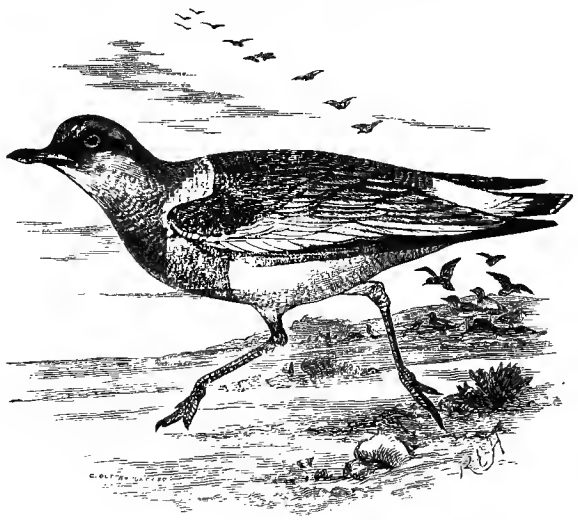
It is a resident in North India east of the valley of the Indus, Burma, Cochin China, and Hainan (Swinhoe, Ibis, 1870, p. 361). It ascends the valleys of the Himalayas into Sikkim, but is not found in South India or Ceylon. It frequents the banks of rivers.

Nearest allies.

It is the Oriental representative of *V. gregarius* and *V. leucurus*, agreeing with the former in having black on the crown and belly, and with the latter in having black on the wing-coverts.

*** *Subgeneric group Hoplopteri : with no hind toe.*

†† *South-American Species.*



VANELLUS RESPLENDENS.

PERUVIAN LAPWING.

Diagnosis. VANELLUS halluce nullo : tectricibus splendidè iridescentibus.

Variations. No local race of this species is known.

Synonymy.

Charadrius resplendens, *Tschudi, Wiegm. Arch.* 1843, p. 388.
Vanellus resplendens (*Tschudi*), } *Gray, Genera of Birds*, iii. p. 541 (1847).
Vanellus ptiloscelis, }
Ptiloscelys resplendens (*Tschudi*), *Bonap. Compt. Rend.* xliii. p. 419 (1856).

Literature.

PLATES.—Gray, Gen. Birds, iii. pl. 145.
HABITS.—Fraser, Proc. Zool. Soc. 1858, p. 556; Fraser, Proc. Zool. Soc. 1860, p. 82.
EGGS.—Unknown.

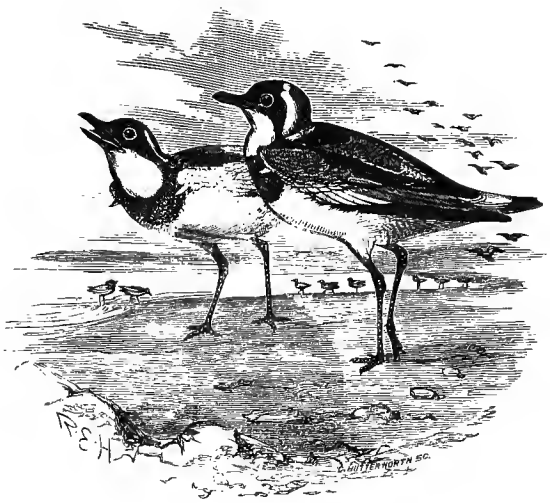
Specific characters.

The Peruvian Lapwing is the only *bronze-winged* Lapwing with *no hind toe* or without black on the head.

Geographical distribution.

It inhabits the Andes of Ecuador (Fraser), Peru (Taczanowski, Orn. Pérou, iii. p. 336), and the extreme north of Chili (Sclater, Proc. Zool. Soc. 1886, p. 403), where it is found on the plateaus ten thousand feet above the level of the sea.

It is nearest related to *V. cayennensis* and *V. occidentalis*, having, like them, a great deal of white on the wing-coverts. It has, however, lost its hind toe, and has acquired a very small spur, which is not visible above the feathers in immature birds. Nearest allies.



VANELLUS CAYANUS.

LITTLE WHITE-WINGED LAPWING. (PLATE X.)

VANELLUS alis calcaratis : halluce nullo : secundariis ferè omninò albis : pedibus pallidis. Diagnosis.

No local races of this species are known. Variations.

Charadrius cayanus, *Latham, Index Orn.* ii. p. 749 (1790). Synonymy.
Charadrius stolatus, *Wagler, Syst. Av.* p. 59 (1827).
Philomachus cayanus (*Lath.*), *Gould, Zool. Voy. Beagle,* iii. p. 127 (1841).
Hoplopterus cayanus (*Lath.*), *Gray, Genera of Birds,* iii. p. 542 (1847).
Hoploxypterus cayanus (*Lath.*), *Bonap. Compt. Rend.* xliii. p. 418 (1856).
Vanellus cayanus (*Lath.*), *Schlegel, Mus. Pays-Bas, Cursores,* p. 62 (1865).

PLATES.—Planches Enl. no. 833. Literature.
HABITS.—Wied, Beitr. Nat. Brasil. iv. p. 764.
EGGS.—Unknown.

The Little White-winged Lapwing appears to be found on almost every river-side in South America. Moore obtained it in Honduras (Proc. Zool. Soc. 1859, p. 63); Fraser found it in Ecuador (Proc. Zool. Soc. 1860, p. 290); Bartlett secured it on a tributary of Geographical distribution.

the Amazon in Eastern Peru (Proc. Zool. Soc. 1866, p. 199); Wallace records it from the Lower Amazons (Proc. Zool. Soc. 1867, p. 591); Prince Wied found it not uncommon in every part of Brazil which he visited; I have a skin from Rio de Janeiro, Azara obtained a skin from Paraguay, Cunningham found it in the Straits of Magellan (Ibis, 1868, p. 490), and Abbott shot it on the Falkland Islands (Ibis, 1861, p. 155).

It must be either very rare or very shy, for not one of the travellers named has a word to say of its habits except Prince Wied.

Specific characters.

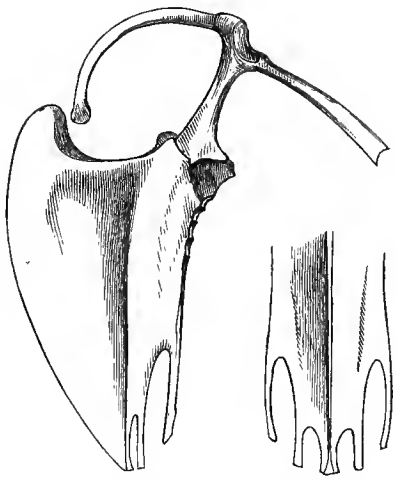
The Little White-winged Lapwing, or Three-toed Cayenne Lapwing, is the only species of the genus which, when adult, combines the two characters—forehead black, scapulars for the most part black.

Young birds may easily be recognized by their small size or by the combination of the two characters, *no hind toe* and *secondaries mostly white*.

Nearest allies.

It seems to be nearest related to *V. speciosus*, and is probably the result of an emigrating party of the ancestors of that species across the Atlantic from South Africa at a somewhat later date than the emigration which produced the other South-American Lapwings.

CHAPTER XIV.



Sternum of *Cursorius bitorquatus*.

Genus CURSORIUS.

CHARADRIINÆ caudâ æquali: tarso scutellato: halluce nullo: naribus vix in sulcis positis. Diagnosis of genus.

THE Coursers form a group of birds which are intermediate between the Pratincoles and the Lapwings, and are probably almost as closely allied to the Bustards and Stone-Curlews on the one hand, and to the Plovers on the other. The Lapwings and Plovers, like the Sandpipers, Snipes, and most other birds belonging to the family, have the nasal orifice placed in a groove or ditch which extends for some distance beyond it; but in *Otis*, *Cursorius*, and *Pratincola* there is *no nasal groove*, the nasal orifice being placed in a depression not more elongated than itself. From *Otis*, *Cursorius* may be distinguished by its *scutellated tarsus*, and from *Pratincola* by its having *neither a forked tail nor a hind toe*. Nearest allies. Generic characters.

The eggs of the Coursers, like those of the Pratincoles, differ from those of all other

species in the family in being very round. To find the breadth it is seldom necessary to deduct more than one fifth from the length, instead of about a third.

Geographical distribution.

The Coursers are desert birds, and feed upon the insects that are found upon sandy plains. It is therefore not surprising that most of the species are confined to the Ethiopian Region. The range of the genus *Cursorius* extends, however, northwards into Palæarctic Africa, and eastwards through Syria, Arabia, and Persia to India and Ceylon.

Synonymy of the Genus CURSORIUS.

	Type.
Cursorius, *Latham, Index Orn.* ii. p. 751 (1790)	C. gallicus.
Tachydromus, *Illiger, Prodromus,* p. 250 (1811)	C. gallicus.
Pluvianus, *Vieillot, N. Dict. d'Hist. Nat.* xxvii. p. 129 (1818)	C. ægyptius.
Cursor, *Wagler, Syst. Av.* p. 79 (1827)	C. gallicus.
Hyas, *Gloger, Froriep's Notizen,* xvi. p. 277 (1834)	C. gallicus.
Cheilodromas, *Rüppell, Mus. Senck.* ii. p. 208 (1837)	C. ægyptius.
Ammoptila, *Swainson, Nat. Hist. Class. Birds,* ii. p. 364 (1837)	C. ægyptius.
Macrotarsius, *Blyth, Journ. As. Soc. Beng.* xvii. pt. i. p. 254 (1848)	C. bitorquatus.
Rhinoptilus, *Strickland, Proc. Zool. Soc.* 1850, p. 220	C. chalcopterus.
Hemerodromus, *Heuglin, Ibis,* 1863, p. 31	C. cinctus.

Determination of the type.

There is no evidence to prove that Latham understood the modern idea of the necessity of providing a type to each genus; but the fact that he named the Cream-coloured Courser *Charadrius cursor*, and afterwards established the genus *Cursorius* for its reception, is a sufficient reason for regarding that species, which the majority of authors call by the name of *Cursorius gallicus*, as the type.

GEOGRAPHICAL DISTRIBUTION.

Neither white axillaries nor banded breast.		*White axillaries and banded breast.*
	PALÆARCTIC AND ORIENTAL REGIONS.	
C. GALLICUS	*Canary Isles to Scinde.*	
	ORIENTAL REGION.	
C. COROMANDELICUS	*India and Ceylon.*	
	Madras District.	C. BITORQUATUS.

Neither white axillaries nor banded breast.		*White axillaries and banded breast.*
	ETHIOPIAN REGION.	
C. SENEGALENSIS	*Throughout.*	C. CHALCOPTERUS.
	West Africa and Nile.	C. ÆGYPTIUS.
C. SOMALENSIS	*Somali-Land.*	
	South and East Africa.	C. CINCTUS. / C. BICINCTUS.
C. RUFUS	*South Africa.*	

Climatic distribution.

The genus *Cursorius* must be characterized as small and tropical. The species and subspecies are distributed as follows, but one of the tropical African species ranges eastwards into Scinde, and several of them encroach upon temperate Africa in the south :—

Temperate Africa	2	
Temperate species		— 2
Tropical Africa	8	
Tropical Asia	2	
Tropical species		— 10
Species and subspecies of *Cursorius*		— 12

It is not surprising that even such a compact interlaced genus as *Cursorius* should have had its share of ill-usage at the hands of the "splitters;" but it seems to me that the only natural subdivision is to regard the Coursers with white axillaries and under wing-coverts and a dark band across the breast as one group, leaving the remainder to form another group, each containing five species.

Ancient emigrations

The ancestors of the latter of these groups were probably resident in the Mediterranean subregion during the Interglacial Period. During the cold winters of the Post-Pliocene Glacial Period one party emigrated to India, and are now represented by *C. coromandelicus*, a second party emigrated to tropical Africa and became *C. rufus* and *C. senegalensis*, the former in the south and the latter in the west, whence, after the two species became differentiated, the latter gradually extended its range until it overlapped that of the former. The third party, instead of emigrating, adopted migratory habits, though not on a very extensive scale, and *C. somalensis* is probably the result of a small migratory party which overshot its mark and finally settled in Somali-Land. The three tropical species (two Ethiopian and one Oriental) have probably altered least in appearance, as they have altered least in climate and habits, whilst *C. gallicus* has altered most.

Precisely in the same way the banded Coursers that have the most southerly range have altered least, whilst the only one (*C. ægyptius*) which ranges almost into the Palæarctic Region has altered most.

KEY TO THE SPECIES.

The ten species of Coursers are very easily diagnosed. They each possess well-defined characters both in the adult and in immature plumage. In the following key no attempt is made to discriminate between the two local races or subspecies of *C. bicinctus*. One of these is only a pale form, and the other is little else than a dwarf race of the typical species.

Hind head slate-grey

- **gallicus** — Axillaries deep black.
- **somalensis** — Axillaries greyish buff.
- **rufus**
- **senegalensis** — Axillaries dark grey. *Large black patch on belly.*

Upper tail-coverts white

- **coromandelicus**

Inner primaries chestnut-buff.

- **bicinctus**
- **cinctus** — White on secondaries confined to a narrow margin. *Feathers of upper parts with pale margins.*

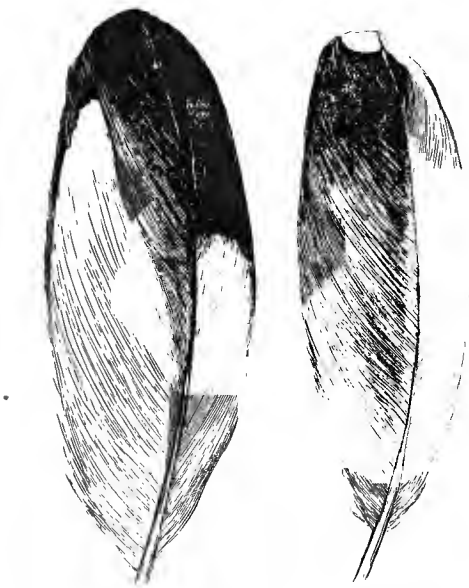
Upper tail-coverts white

- **chalcopterus.**
- **bitorquatus**
- **ægyptius** — White patches near ends of primaries.

Of the characters in italics the first two are only found in adult birds, and the last is found in young in first plumage of all the species. The key is, however, complete without any of these characters.

*** *Subgeneric group Cursorii: with no pectoral bands.*

Central Secondary Quills.



C. chalcopterus. *C. gallicus.*

CURSORIUS GALLICUS.

CREAM-COLOURED COURSER.

Cursorius axillaribus subalaribusque nigris. Diagnosis.

A Russian ornithologist (Zaroudnoi, Bull. Soc. Imp. Nat. Mosc. lxi. p. 327) describes a Courser from Akhal Tekeh, in the basin of the Murgab River on the Persian frontiers of Turkestan, as *Cursorius isabellinus*, var. *bogolubovi*. He says it is larger than our bird, and differs in the colour of its under wing-coverts; but he does not say how it differs, nor does he give any dimensions. Examples from India and Africa present no differences of any kind. Variations.

Pluvialis morinellus flavescens, *Gerini, Orn. Meth. Dig.* iv. p. 69 (1773). Synonymy.
Charadrius cursor, *Latham, Gen. Syn. Suppl.* i. p. 293 (1787).
Charadrius gallicus, *Gmelin, Syst. Nat.* i. p. 692 (1788).
Cursorius europæus, *Latham, Index Orn.* ii. p. 751 (1790).

Charadrius corrira, *Bonnaterre, Tabl. Encycl.* p. 23 (1790).
Cursorius isabellinus, *Meyer, Taschenb.* ii. p. 328 (1810).
Tachydromus gallicus (*Gmel.*), *Illiger, Prodromus,* p. 250 (1811).
Tachydromus europæus (*Lath*), *Vieillot, N. Dict. d'Hist. Nat.* viii. p. 293 (1817).
Cursor isabellinus (*Meyer*), *Wagler, Syst. Av.* p. 80 (1827).
Cursorius gallicus (*Gmel.*), *Bonap. Faun. Ital., Ucc., Introd.* (1832).
Cursor europæus (*Lath.*), *Naumann, Vög. Deutschl.* vii. p. 77 (1834).
Tachydromus isabellinus (*Meyer*), *Nitzsch, Syst. Pterylogr.* p. 201 (1840).
Cursorius jamesoni, *Jerdon, B. India,* ii. p. 875 (1863).

Literature.

PLATES.—Gerini, Orn. Meth. Dig. iv. pl. 474; Daub. Pl. Enl. no. 795; Gould, Birds of Gt. Brit. iv. pl. 44; Dresser, Birds of Europe, vii. pl. 514.
HABITS.—Seebohm, British Birds, iii. p. 63; Heuglin, Orn. N.O.-Afr. ii. p. 965.
EGGS.—Hewitson, Ibis, 1859, pl. ii. fig. 3; Seebohm, British Birds, pl. xx. fig. 9.

Specific characters.

The Cream-coloured Courser, when adult, has the hind head a bright slate-grey or lavender colour. This character is only found in two other Coursers, *C. somalensis* and *C. rufus*. The former may always be distinguished by its buff axillaries and innermost under wing-coverts, and the latter, when adult, by the large black patch on its belly. To distinguish the species at all ages this diagnosis must be slightly altered, but the new character, though less conspicuous, is quite as easy of determination.

The Cream-coloured Courser has the *axillaries and under wing-coverts nearly black*, and has *the outer web of the secondaries buff*. No other Courser fulfils both these conditions. The nearly black axillaries and under wing-coverts are found even in young in first plumage, showing the importance of the character; but the slate-grey hind head and the black belly are characters which only appear after the first moult. The buff outer webs of the secondaries are, however, found at all ages.

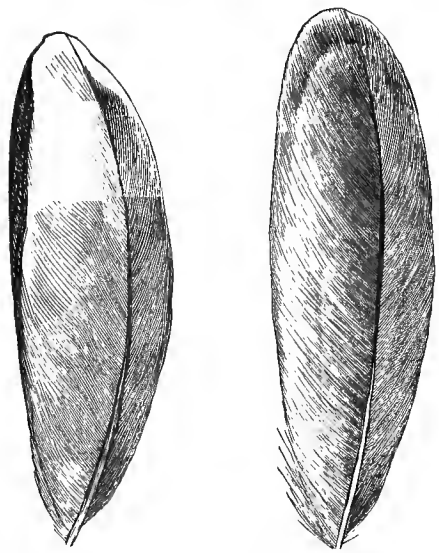
Geographical distribution.

It breeds in the Canary Islands (Bolle, Journ. Orn. 1857, p. 335), and in the whole of North Africa; but it has not been recorded from Senegambia or any other part of West Africa, though in East Africa it occurs as far south as Kordofan (Heuglin), and possibly Abyssinia (Rüppell, Vög. N.O.-Afr. p. 117). Eastwards its range extends to Arabia, Persia, Beluchistan (Blanford, Eastern Persia, ii. p. 281), the Punjaub, Scind, and Rajputana (Hume, Stray Feathers, i. p. 228). It does not breed north of the Trans-Caucasian steppes, but occasionally strays into Europe and even to the British Islands.

Nearest allies.

Its nearest allies appear to be *C. rufus* and *C. somalensis*, but it is difficult to determine which of them is its closest relation.

Central Secondary Quills.



C. somalensis. *C. bicinctus.*

CURSORIUS SOMALENSIS.

SOMALI COURSER. (Plate XI.)

Cursorius axillaribus supracaudalibusque isabellinis. Diagnosis.

No local races of this species are known. Variations.

Cursorius gallicus somalensis, *Shelley, Ibis,* 1885, p. 415.
Cursorius somalensis, *Shelley, Seebohm, Ibis,* 1886, p. 116. Synonymy.

Plates.—Unfigured.
Habits.—Lort Phillips, Ibis, 1885, p. 416.
Eggs.—Unknown. Literature.

The Somali Courser is a good species, which may be diagnosed as having the *hind head slate-grey* (like *C. gallicus* and *C. rufus*), but the *axillaries and innermost under wing-coverts greyish buff* (instead of nearly black). It further differs from *C. gallicus* in the Specific characters.

following particulars:—It is a much smaller bird, the wing measuring 5·3 inch, instead of from 6·0 to 6·3 inch; nevertheless it appears to have longer though more slender legs, the tarsus measuring 2·3 inch, instead of from 2·1 to 2·3 inch. The colour of the back and wing-coverts is much darker. The subterminal black bands on the tail-feathers are twice as broad, and are also traceable on the central ones. Finally, the dark margins of the inner webs of the secondaries are paler and scarcely occupy a fifth part of the web instead of more than half, and the colour of the outer webs is grey rather than buff.

Geographical distribution. It is only known from a single example which was obtained in Somali-Land by Mr. Lort Phillips, who states that it was fairly common in small flocks throughout the plateau.

CURSORIUS RUFUS.

BURCHELL'S COURSER.

Diagnosis. Cursorius secundariæ mediæ dimidio terminali albo.

Variations. It is not known that this species varies.

Synonymy.
Cursorius rufus, *Gould, Proc. Zool. Soc.* 1836, p. 81.
Tachydromus capensis, *Swainson, Birds W. Africa,* ii. p. 231 (1837).
Tachydromus burchellii, *Swainson, Nat. Hist. Class. Birds,* ii. p. 364 (1837).
Cursorius burchellii (*Swains.*), *Gray, Genera of Birds,* iii. p. 537 (1844).

Literature.
Plates.—Gould, Icones Avium, pl. 10.
Habits.—Sharpe, Layard's Birds of S. Africa, p. 653.
Eggs, in Mr. Crowley's collection, taken by Mr. Ayres in the Transvaal, measure $1\frac{1}{4} \times 1$ inch, and are scarcely distinguishable from eggs of *C. coromandelicus*.

Specific characters. Burchell's Courser, when adult, combines the two characters of having the *hind head slate-grey* and of having *dark brown or black on the belly*; but as neither of these characters appear in young in first plumage, it is safer to diagnose the species by the pattern of colour on the secondaries, which is constant at all ages. The middle secondary is white, with the basal two thirds of the outer web and the basal third of the inner web brown.

Burchell's Courser is only found in South Africa, where it frequents the Karroo and the high veldt, but does not descend to the lowlands near the coast. It is not uncommon in the Cape Colony. I have an example from Bechuana-Land, and it is very abundant up country in the Transvaal, and near Newcastle, in the extreme north of Natal (Feilden, Zoologist, 1882, p. 340). It is not found north of the Tropic of Capricorn. Andersson did not meet with it in Damara-Land, nor is it recorded by Buckley from the Matebele country. Geographical distribution.

It is probably nearest related to *C. senegalensis* and *C. coromandelicus*, which agree with it in having, when adult, a nearly black patch on the belly. Fortunately this character is correlated with grey axillaries, a feature probably of much earlier origin, as it appears in young in first plumage as well as in the adult. Nearest allies.

Central Secondary Quills.

C. coromandelicus. *C. senegalensis.*

CURSORIUS SENEGALENSIS.

LICHTENSTEIN'S COURSER.

Cursorius axillaribus fumosis: uropygio et supracaudalibus concoloribus: secundariarum pogoniis internis brunneo marginatis. Diagnosis.

Variations. Examples from West Africa do not appear to differ from those collected on the Zambesi.

Synonymy.

Cursorius temminckii, *Swainson, Zool. Illustr.* ii. pl. 106 (1822).
Tachydromus senegalensis, *Lichtenstein, Verz. Doubl.* p. 72 (1823).
Cursor temminckii (*Swains.*), *Wagler, Syst. Av.* p. 80 (1827).
Cursorius senegalensis (*Licht.*), *Rüppell, Syst. Uebers. Vög. N.O.-Afr.* p. 117 (1845).

Literature.

Plates.—Swainson, Zool. Illustr. ii. pl. 106; Swainson, Birds W. Africa, ii. pl. 24.
Habits.—Sharpe, Layard's Birds S. Africa, p. 654.
Eggs.—Unknown.

Specific characters.

Lichtenstein's Courser is the only species of the genus which, when adult, has a *black belly, but neither white upper tail-coverts nor a slate-grey hind head.* However, as the first and last of these characters are only found in adult birds, a second diagnosis is necessary, which will also apply to the young in first plumage. This is easily found in the unique pattern of the secondaries. The white is shaped like a thin wedge, the base of which runs out at the tip, whilst the thin end splits the brown of the inner web almost into halves.

Geographical distribution.

Lichtenstein's Courser is principally confined to the most tropical parts of Africa, and is much rarer than Burchell's Courser further south. Hartlaub records it from West Africa (Journ. Orn. 1854, p. 213), and I have examples from Senegambia (Bathurst, Quin), and from the Gold Coast (Accra, J. Smith). Heuglin records it from the Gaboon and Kordofan (Orn. N.O.-Afr. ii. p. 969). Monteiro found it common in Angola (Ibis, 1862, p. 335); Anchieta obtained many examples in Benguela (Bocage, Orn. d'Angola, p. 419); and I have an example from Ovampo-Land collected by Andersson at Ondonga. Sharpe says that it is generally distributed throughout the Cape Colony; but this statement is not confirmed by Layard, and I can find no evidence of its truth beyond the occurrence of a single example in the Eastern Province (Layard, Ibis, 1869, p. 375). Holub records it from the Orange Free State, West Griqua-Land, Bechuana-Land, and the Southern Transvaal (Beitr. Orn. Südafr. p. 246). Graham Hutchinson informed me that it was common, but local, on the open sandy veldt in Natal; and I have an example collected on Burg Mountain near Durban. I have also examples collected by Bradshaw near the Zambesi, and by Kirk at Melinda, in Zanzibar.

Nearest allies.

It appears to be closely related both to *C. rufus* and *C. coromandelicus*; but, if we may judge from the arrangement of the colour on the secondaries, it appears to be more nearly allied to the latter than to the former.

CURSORIUS COROMANDELICUS.

INDIAN COURSER.

Diagnosis.

Cursorius axillaribus fumosis: supracaudalibus albis.

Variations.

There seems to be no difference between examples from Lahore or Darjeeling and others from Ceylon.

Synonymy.

Charadrius coromandelicus, *Gmelin, Syst. Nat.* i. p. 692 (1788).
Cursorius asiaticus, *Latham, Index Orn.* ii. p. 751 (1790).
Tachydromus coromandelicus (*Gmel.*), *Illiger, Prodromus*, p. 250 (1811).
Cursor frenatus, *Wagler, Syst. Av. Gen.* p. 80 (1827).
Tachydromus asiaticus (*Lath.*), *Vieillot & Oudart, Gal. des Ois.* ii. p. 90 (1834).
Tachydromus orientalis, *Swainson, An. Menag.* p. 339 (1838).
Cursorius tarayensis, *Hodgson, Gray's Zool. Miscell.* p. 85 (1844).
Cursorius coromandelicus (*Gmel.*), *Gray, Cat. Mamm. &c. Nepal coll. Hodgson*, p. 131 (1846).

Literature.

Plates.—Daub. Pl. Enl. no. 892; Gould, Birds of Asia, vii. pl. 65; Vieillot, Gal. des Ois. ii. pl. 232.
Habits.—Legge, Birds of Ceylon, p. 977.
Eggs.—Hume, Nests and Eggs of Indian Birds, iii. p. 564.

Specific characters.

The Indian Courser, at the first glance, looks little more than a large form of Lichtenstein's Courser; but, when carefully examined, it presents many important points of difference besides that of size. It is the only Courser that combines the two characters of *white upper tail-coverts* and *grey axillaries*. As both these characters are found in the young in first plumage, a second diagnosis is not necessary.

Geographical distribution.

It appears to be generally distributed throughout India and Ceylon; but it is more local in the south, and does not occur in the extreme north-west. It occurs as far west as Eastern Scinde (Hume, Stray Feathers, iv. p. 10), but its range does not extend to the valley of the Indus. No species of this genus is known from Burma.

It is probably most nearly allied to *C. senegalensis* and *C. rufus*.

*** *Subgeneric group Hemerodromi : with pectoral bands.*

CURSORIUS BICINCTUS.

LEVAILLANT'S COURSER.

Diagnosis. CURSORIUS primariis interioribus secundariisque omnibus pro majore parte castaneis.

Variations. THIS is a very variable species, becoming very pale in the west and very small in the east.

Synonymy.
Cursorius africanus, *Temminck, Cat. Syst. Cab. d'Orn.* pp. 175, 263 (1807).
Tachydromus collaris, *Vieillot, N. Dict. d'Hist. Nat.* viii. p. 293 (1817).
Cursorius bicinctus, *Temminck, Man. d'Orn.* ii. p. 515 (1820).
Cursor bicinctus (*Temm.*), *Wagler, Syst. Av.* p. 80 (1822).
Cursorius grallator, *Leadbeater, Trans. Linn. Soc.* 1825, p. 92.
Tachydromus bicinctus (*Temm.*), *Swainson, Birds West Africa,* ii. p. 231 (1837).
Rhinoptilus bicinctus (*Temm.*), *Shelley, Ibis,* 1882, p. 363.

Literature.
PLATES.—Jardine & Selby, Ill. Orn. i. pl. 48.
HABITS.—Sharpe, Layard's Birds S. Africa, p. 654.
EGGS.—Thienemann, Abbild. Vogeleiern, pl. lviii. fig. 3. Examples in Mr. Crowley's collection, taken by Atmore in the Karroo district of Cape Colony, scarcely differ from eggs of *C. rufus*, except in being much paler in colour.

Specific characters. Levaillant's Chestnut-winged Courser may always be recognized by the *chestnut colour of its secondaries and of the terminal portion of some of the adjoining primaries.* It is essentially a Karroo species, and is found wherever these remarkable plateaus occur in South Africa. From Cradock in the east, up to Kimberley in the north, and then down to Worcester in the west, the railway passes through a country compared with which a Siberian tundra is a paradise. I have never seen anything so hopelessly dreary as the

The Karroo. Karroo. Every square yard is indelibly stamped with the two-fold signs of deluge and drought. It is walled in by naked weird hills, generally table-topped, from which every trace of vegetation and soil has been washed away by deluges of rain, leaving only a heap of disintegrating stones, tied together by layers of hard rock. The undulating valleys are bare mud or earth, thinly sprinkled over with dwarf herbs and bushes, seamed here and there

with dry watercourses, and torn up in the valleys with deep torrent-beds, which tell of floods carrying everything before them. But sometimes months and months pass by without a drop of rain, and what vegetation has been spared by the torrents of rain is burnt up by the scorching rays of a burning African sun.

The typical form of this species is a resident of most of the Karroo districts of the Cape Colony, and in similar country in the Transvaal (Ayres, Ibis, 1871, p. 263) and the Orange Free State (Barratt, Ibis, 1876, p. 212). It is not uncommon in various parts of Great Namaqua and Damara-Land (Andersson, Birds of Damara-Land, p. 261), and a single example is recorded from the valley of the White Nile (Heuglin, Orn. N.O.-Afr. ii. p. 975). Geographical distribution.

Young in first plumage are not quite so dark a buff as adults, but are not nearly so pale as adults of the Western form of this species. Plumage of young.

CURSORIUS BICINCTUS BISIGNATUS.

HARTLAUB'S COURSER.

CURSORIUS BICINCTUS colore pallidiore. Diagnosis.

INTERMEDIATE forms between this and the preceding frequently occur. Variations.

Cursorius bisignatus, *Hartlaub, Proc. Zool. Soc.* 1865, p. 87.
Cursorius bicinctus bisignatus (*Hartl.*), *Seebohm, Ibis,* 1886, p. 118. Synonymy.

PLATES.—Hartlaub, Proc. Zool. Soc. 1866, pl. vi.
HABITS.—Undescribed.
EGGS.—Unknown. Literature.

Hartlaub's Chestnut-winged Courser is only a pale form of Levaillant's Courser, and is also said to be slightly smaller. The *feathers of the upper parts are margined with nearly white instead of buff*, and the ground-colour of the underparts shows the same difference. Subspecific characters.

It inhabits Benguela and Ovampo-Land. I have a very characteristic example obtained by Andersson at Ondongo; but two other examples obtained by the same collector in Great Namaqua-Land are intermediate. Geographical distribution.

CURSORIUS BICINCTUS GRACILIS.

FISCHER'S COURSER.

Diagnosis. CURSORIUS BICINCTUS colore isabellino: magnitudine minore: gulâ vix striatâ.

Variations. THIS local race appears completely to intergrade with the typical form, both in size and colour.

Synonymy. Cursorius gracilis, *Fischer & Reichenow, Journ Orn.* 1884, p. 178.
Cursorius bicinctus gracilis (*Fisch. & Reich.*), *Seebohm, Ibis,* 1886, p. 118.

Literature. PLATES.—Unfigured.
HABITS.—Lort Phillips, Ibis, 1885, p. 416.
EGGS.—Unknown.

Geographical distribution. Fischer's Chestnut-winged Courser was discovered by the traveller whose name it bears in Masai-Land in Equatorial East Africa (Fischer, Journ. Orn. 1884, p. 178), and was afterwards procured by the same intrepid explorer in Usukuma, south of Lake Victoria Nyanza (Reichenow, Journ. Orn. 1887, p. 46). It has recently been procured to the north-east by Mr. E. Lort Phillips in Somali-Land (Shelley, Ibis, 1885, p. 416). Like Hartlaub's Courser it is slightly smaller than the typical form, but varies from it in colour

Subspecific characters. in the opposite direction. The buff shade is so rich that it approaches pale chestnut, and the white of the upper tail-coverts is suffused with buff. On the other hand, it resembles Hartlaub's Courser in having the dark shaft-lines on the throat less distinct, becoming almost obsolete on the upper throat.

Levaillant's Courser varies in length of wing from the carpal joint from 6·5 to 5·7 inch, whilst the same measurements of Fischer's Courser vary from 5·7 to 5·1 inch. The tarsus of the former race varies from 2·3 to 2·0 inch, and that of the latter from 2·0 to 1·8 inch.

In the colour of the secondaries, which in this genus vary remarkably wherever a specific difference is to be found, the three forms of Chestnut-winged Courser almost exactly resemble each other.

Central Secondary Quills.

C. cinctus. *C. bitorquatus.*

CURSORIUS CINCTUS.

HEUGLIN'S COURSER. (PLATE XII.)

CURSORIUS axillaribus supracaudalibusque albis: secundariis ferè omninò brunneis. Diagnosis.

No local races of this species are known. Variations.

Cursorius cinctus, *Heuglin, Syst. Uebers. Vög. N.O.-Afr.* p. 54 (1856). Synonymy.
Hemerodromus cinctus (*Heuglin*), *Heuglin, Ibis,* 1863, p. 31.
Rhinoptilus cinctus (*Heuglin*), *Shelley, Ibis,* 1885, p. 416.

PLATES.—Heuglin, Ibis, 1863, pl. i. Literature.
HABITS.—Undescribed.
EGGS.—Unknown.

Specific characters. Heuglin's Courser may be diagnosed by its *nearly uniform brown secondaries*. Levaillant's Courser has nearly uniform chestnut secondaries; but in all the other species there is much white and some nearly black on these feathers. As an additional character it may be useful to add upper tail-coverts white, which excludes five species, and axillaries white, which rejects a sixth.

Geographical distribution. Heuglin's Courser appears to be a very rare bird. It was originally described from the White Nile about 5° north of the equator (Heuglin, Orn. N.O.-Afr. ii. p. 972). Mr. Lort Phillips met with it near Berbera in Somali-Land about five degrees further north (Shelley, Ibis, 1885, p. 416); and it has been found in Bari-Land (Pelzeln, Ibis, 1864, p. 231). It has occurred in Masai-Land (Fischer, Journ. Orn. 1885, p. 115), and I have an example in my collection from Ovampo-Land (Andersson, Birds of Damara-Land, p. 262).

Nearest ally. It appears to be nearest related to *C. bicinctus*. Young in first plumage are unknown, nor has any description of its habits been published.

CURSORIUS CHALCOPTERUS.

BRONZE-WINGED COURSER.

Diagnosis. CURSORIUS supracaudalibus albis: secundariarum parte basali albâ, parte terminali nigrâ: primariis haud albo subterminali maculatis: (in adult.) remigum nigrarum terminis iridescentibus.

Variations. NOTWITHSTANDING its wide range this species is not known to vary.

Synonymy.

Cursorius chalcopterus, *Temminck, Pl. Col.* no. 298 (1824).
Cursor chalcopterus (*Temm.*), *Wagler, Syst. Av. Gen.* p. 81 (1827).
Tachydromus chalcopterus (*Temm.*), *Swainson, Birds W. Africa*, ii. p. 233 (1837).
Rhinoptilus chalcopterus (*Temm.*), *Strickland, Proc. Zool. Soc.* 1850, p. 220.
Cursorius superciliaris, *Heuglin, Journ. Orn.* 1865, p. 98.

Literature.

PLATES.—Temm. Pl. Col. no. 298; Gray, Genera of Birds, iii. pl. cxliii.
HABITS.—Sharpe, Layard's Birds S. Africa, p. 656.
EGGS.—Unknown.

Specific characters.

The Bronze-winged Courser, when adult, may be easily recognized by the *tips of its primaries* being *bronzed for about half an inch with green and red.* The metallic colours appear on the primaries before the last traces of down have been lost by the young birds, who must consequently moult their quills in their first autumn. In order to make the diagnosis cover the young in first plumage, other characters must be employed. *Upper tail-coverts white,* excludes five species; *secondaries black with white bases,* disposes of three more; leaving only *C. bitorquatus,* which is easily excluded by the character *no subterminal white patches on the primaries.*

Geographical distribution.

This species has a wide range from Senegambia (Rochebrune, Faune de la Sénégambie, p. 281) in the west, almost to the Red Sea (Finsch, Trans. Zool. Soc. vii. p. 294) in the east, and near both coasts in the south. It is found in Angola (Bocage, Orn. d'Angola, p. 420), Damara-Land (Andersson, Birds of Damara-Land, p. 263), and several collectors have obtained it in Natal. I saw examples in the collection of Mr. Harry Millar shot near Durban, but I can find no record of its recent occurrence in the Cape Colony. It has been found in Zanzibar (Fischer, Journ. Orn. 1885, p. 115) by more than one collector (Böhm, Journ. Orn. 1883, p. 340), and probably occurs throughout tropical Africa.

Allies.

It seems to be nearest allied to *C. bitorquatus,* whilst the metallic colours on its primaries probably show its affinity to the Lapwings.

CURSORIUS BITORQUATUS.

JERDON'S COURSER. (Plate XIII.)

Diagnosis.

Cursorius primariâ primâ maculâ albâ subterminali ornatâ.

Variations.

No local races of this species are known.

Synonymy.

Macrotarsius bitorquatus, *Jerdon, fide Blyth, Journ. As. Soc. Beng.* xvii. p. 254 (1848).
Rhinoptilus bitorquatus (*Jerdon*), *Strickland, Proc. Zool. Soc.* 1850, p. 220.
Cursorius bitorquatus (*Jerd.*), *Giebel, Thes. Orn.* i. p. 841 (1872).

Literature.

Plates.—Previously unfigured.
Habits.—Jerdon, Birds of India, iii. p. 628.
Eggs.—Unknown.

Specific characters.

Jerdon's Courser is the only species of this genus which combines the characters of having a *plain brown mantle* and *patches of white near the tips of the first three primaries.*

Geographical distribution.

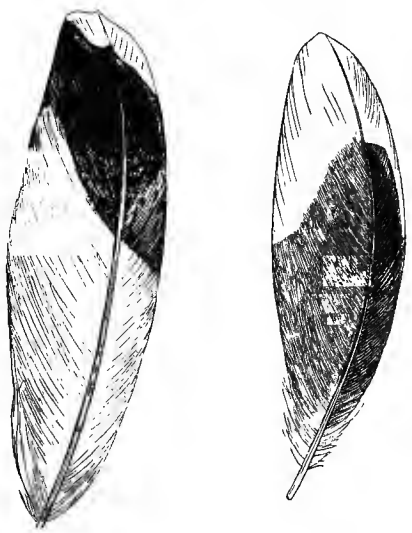
It appears to have a very limited range, having only been found in that part of the Indian peninsula which lies between one hundred miles and three hundred miles due north of Madras, and, curiously enough, only in open forest country.

Young in first plumage are unknown.

Nearest ally.

It is very closely allied to *C. chalcopterus*, from which it scarcely differs in the important character of the pattern of the colour of the secondaries.

Central Secondary Quills.



C. ægyptius. *C. rufus.*

CURSORIUS ÆGYPTIUS.

BLACK-BACKED COURSER.

Diagnosis.

CURSORIUS dorso scapularibusque nigris.

Variations.

EXAMPLES from West Africa appear to be slightly smaller than those from Egypt, the former varying in length of wing from 5·0 to 5·1 inch, and the latter from 5·2 to 5·5 inch.

Synonymy.

Charadrius ægyptius, *Linneus, Syst. Nat.* i. p. 150 (1758) ; *Linn. Syst. Nat.* i. p. 254 (1766).
Charadrius melanocephalus, *Gmelin, Syst. Nat.* i. p. 692 (1788).
Charadrius africanus, *Latham, Index Orn. Suppl.* p. lxvii (1801).
Pluvianus melanocephalus (*Gmel.*), Pluvianus chlorocephalus, } *Vieillot, N. Dict. d'Hist. Nat.* xxvii. p. 130 (1818).
Cursor charadroides, *Wagler, Syst. Av.* p. 81 (1827).
Ammoptila charadroides (*Wagl.*), *Swainson, Nat. Hist. Class. Birds*, ii. p. 364 (1837).
Cheilodromas melanocephalus (*Gmel.*), *Rüppell, Mus. Senckenb.* ii. p. 208 (1845).
Pluvianus ægyptius (*Linn.*), *Strickland, Ann. Mag. Nat. Hist.* ix. p. 348 (1852).
Hyas ægyptia (*Linn.*), *Cab. Journ. Orn.* 1854, p. 70.
Cursorius ægyptius (*Linn.*), *Schlegel, Mus. Pays-Bas, Cursores*, p. 14 (1865).

Literature.

Plates.—Daub. Pl. Enl. no. 918 ; Gould, Birds of Asia, vii. pl. 62 ; Dresser, Birds of Europe, vii. pl. 527.
Habits.—Dresser, Birds of Europe, vii. p. 521.
Eggs[1].—Bree, Birds of Europe, iv. pl. i. fig. 1.

Specific characters.

The Black-backed Courser, or Black-headed Plover, as it has been illogically called, may always be recognized by its *plain black mantle and scapulars*.

It has been placed by most writers in a genus by itself (*Pluvianus*), probably in consequence of its frequenting the muddy banks of rivers, like the Ringed Plovers ; but Schlegel was perfectly justified in allowing it to remain in the genus in which Wagler placed it. It agrees with *C. senegalensis* in having a shorter tarsus than usual, and with *C. bitorquatus* in having white bands across some of the primaries. It also agrees with the latter species in not having the claw of the middle toe pectinated ; but examples of *C. senegalensis* also occasionally show no trace of this peculiarity.

Geographical distribution.

The Black-backed Courser is a common resident in the valley of the Nile from Cairo to Kartoum. It has been recorded as an accidental visitor from Spain, Algeria, and Palestine, and somewhat doubtfully from Sweden. It has occurred several times on the coast of Senegambia, and I have a skin in my collection obtained by Governor Ussher on the Gold Coast. It is also a resident in the Gaboon, in Angola, in Abyssinia, and presumably in the intervening country of Central Africa.

The Black-backed Courser is unquestionably the most aberrant species of the genus, but in the conformation of its bill, which is the most important character in the definition of the genus, it is quite typical.

Habits.

So much interest attaches to the habits of this curious bird that I have great pleasure

[1] The egg figured by Harting (Proc. Zool. Soc. 1874, pl. lx. fig. 2) cannot be that of this species. It is too small, too pointed, and too dark-coloured ; the spots are too large, the egg is not heavy enough, and there were too many of them in the clutch.

in being able to confirm the accounts of Brehm and others of the remarkable way in which it protects its eggs. The narrative is from the pen of Capt. Verner, who met with this bird in the Soudan on the Nile Expedition of 1884–85.

"The Black-headed Plover is one of the commonest birds of the Nile, and is to be seen in pairs all along the course of the river throughout the year. Very often half a dozen or more pairs may be seen feeding together on the same sandbank. They are very noisy birds, and have a habit of uttering a shrill chattering cry whenever they take wing. Their brightly barred wings are very conspicuous as they skim along the surface of the water. I met with them everywhere during the Nile Expedition, and they were as common above Metemneh as near Assiout. During the months of March and April it was very evident that they were breeding; but although I searched diligently for their nests I was unsuccessful until the 20th April, when I accidentally came across a clutch of three eggs which were buried in the sand with the exception of a small portion of their tops. At the time I looked upon this as an accident, and as the eggs had a faded appearance I believed them to have belonged to a deserted nest over which the sand had drifted. In this assumption, however, I was mistaken, as I found out some weeks later. On this occasion I noticed a Black-headed Plover very busy with something on a sandbank about twenty yards from the water, which it left after a time and ran down to the stream; here, after wading about for a moment, it ran up the bank again to the same place and crouched there a minute or so, and then, running for some distance, took wing. Having marked the latter spot I proceeded to it, and following the bird's footmarks 'to heel,' came to the place where it had been so much occupied; this was easily identified by the number of tracks converging to the one point. At this precise spot I turned over the sand, and about half an inch below the surface discovered three fresh eggs which the artful little bird had completely buried. These were considerably richer in colouring than the clutch I had previously discovered (which, by the way, were hard-set), showing that the process of burying their eggs in the damp sand under the scorching rays of the sun has, as might be expected, a bleaching effect.

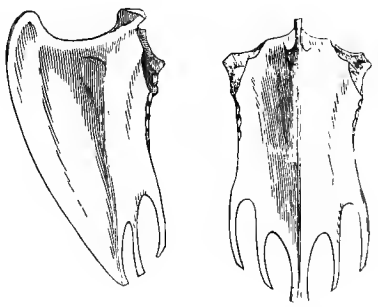
"It is almost unnecessary to say that there was no attempt of any sort at a nest. Taking into consideration the number of enemies from which these little birds have to guard their eggs, it is not very difficult to discover the reasons which prompt them to conceal their eggs in the sand; still I was unable to account in my own mind for the very energetic movements to and from the water which I had witnessed on this occasion, until I received an account from a cousin, Lieut. George Verner, of the Borderers, who was stationed about forty miles further down the river than I was, which solved the mystery as follows:—'On April 25th I was waiting in a boat alongside of a sandbank, and my attention was attracted by a pair of Black-headed Plovers which kept flitting about quite close to me. I noticed that one of them was continually wetting its breast at the water's edge about ten yards below our boat and then running up the bank to a spot about the same distance inshore of us, when it would squat down and remain about two minutes or

so, after which it would get up, and, running down to the water's edge above us, fly round to the spot where it had dabbled previously. After watching this operation repeated *several times* I got out of the boat, and at the spot where the bird had been crouching I found a clutch of eggs half buried in the sand, their tops only being visible; the *sand immediately surrounding them was moist*, although the bank I was on was an expanse of dry burning sand. Two days later I visited this nest again, and knowing the exact spot went straight to it, and at first thought it had been robbed as I could see no eggs; but, noticing the converging marks of the bird's feet, I removed the top layer of sand and found the eggs right enough, but completely buried.'

"From these observations, coupled with my own, but made quite independently, I think it may be taken as an established fact that the Black-headed Plover buries her eggs in the sand when she leaves them, and also that for some reason she damps the sand with which she covers them. The temperature of these dry sandbanks on the Nile is very great indeed during the summer months. It is a noticeable fact that the other three species which commonly nest on the same sandbanks, viz. the Scissor-billed Tern (*Rhynchops flavirostris*), the Spur-winged Plover (*Vanellus spinosus*), and the African Sand-Plover (*Charadrius pecuarius*), do not cover up their eggs in this manner. Without in any way wishing to detract from the character of the Black-headed Plover, I may remark that it appears to devote considerably less time to sitting than do other birds; and although it was the commonest occurrence to see the sandbanks dotted with the Terns and other Plovers engaged in incubation, I never once saw a Black-headed Plover so employed. Indeed the latter appeared to spend the whole day running about the water's edge in pairs, as if there were no such things as the responsibilities and duties of incubation.

"All the Black-headed Plover's eggs which have come into my possession are very uniform in size and shape, being 1·25 inch in length and ·95 inch to 1 inch in breadth. In shape they are unlike any of the Plovers' eggs, but resemble those of a Red Grouse, only they are rather more globular; the ground-colouring in freshly laid specimens is warm yellow stone-colour, and the whole surface of the eggs is thickly sprinkled with specks and short markings of a rich umber tint; besides these surface-markings there are faint obsolete grey spots all over the eggs."

CHAPTER XV.



Sternum of *Glareola orientalis*.

Genus GLAREOLA.

Diagnosis of genus. CHARADRIINÆ caudâ bifurcatâ vel emarginatâ: halluce parvo: naribus vix in sulcis positis.

Extraordinary errors. THE Pratincoles form a small but remarkably isolated group of birds, so completely differentiated from other genera that the earlier ornithologists were in doubt where they ought to be placed in the system of classification. Linneus actually included the Pratincole in his genus *Hirundo*, to which it undoubtedly bears a superficial resemblance, and Sundevall placed the genus *Glareola* in his family Caprimulginæ! In spite of its long, pointed wings, forked tail, short legs, and hind toe, the Pratincole is unquestionably a highly modified Courser.

Generic characters. In *Glareola*, as well as in *Cursorius*, the bill differs from that of all other genera of Charadriidæ, and resembles that of *Otis*, in having no nasal groove. This character alone could scarcely be regarded as of much significance, but conjoined with others its value is greater. *Glareola* resembles *Cursorius* in having in so many species black under wing-coverts, white upper tail-coverts, and a pectinated claw to the middle toe.

The genus *Glareola* may be diagnosed as Charadriidæ resembling *Cursorius* in having no nasal groove, but differing from it in having a more or less forked tail and a hind toe.

Synonymy of the Genus GLAREOLA.

	Type.
Glareola, *Brisson, Orn.* v. p. 141 (1760)	G. pratincola.
Trachelia, *Scopoli, Ann. I. Hist. Nat.* p. 110 (1769)	G. pratincola.
Pratincola, *Degland, Orn. Eur.* ii. p. 107 (1843)	G. pratincola.
Dromochelidon, *Landbeck, Jahresh. Ver. vat. Nat. Württemb.* 1846, p. 212	G. pratincola.
Stiltia, *Bonaparte, Compt. Rend.* xliii. p. 419 (1856)	G. grallaria.
Galachrysia, *Bonaparte, Compt. Rend.* xliii. p. 419 (1856)	G. lactea.

Determination of the type.

When Linneus wrote the tenth edition of his 'Systema Naturæ' in 1758, he does not appear to have been acquainted with the Pratincole; and when he wrote his twelfth edition, eight years afterwards, he probably only knew it from Brisson's plate (which certainly does look very much like a Swallow), otherwise he would scarcely have committed the blunder of placing it in the genus *Hirundo*!

The Common Pratincole (*Glareola pratincola*) being the *Glareola glareola* of Brisson, is therefore the type of the genus.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Large species.	PALÆARCTIC REGION.	*Small species.*
G. PRATINCOLA	*South-west.*	
G. MELANOPTERA	*South Central.*	
	ETHIOPIAN REGION.	
	Liberia and Niger.	G. MEGAPODA.
	Gold Coast, Niger, and Loango.	G. CINEREA.
	Loango, Gaboon, and Nubia.	G. NUCHALIS.
	Lake Albert Nyanza.	G. EMINI.
G. OCULARIS	*Madagascar.*	
	ORIENTAL REGION.	
G. ORIENTALIS	*Throughout, and north to Dauria.*	
	India, Burma, and Ceylon.	G. LACTEA.
	AUSTRALIAN REGION.	
G. GRALLARIA	*East Australia.*	

Climatic distribution.

The genus *Glareola* is a small one, and two-thirds of the species are tropical, though one of these extends its range to some distance into the temperate zone. The distribution of the species is as follows:—

Temperate Eurasia	2	
South Australia	1	
Temperate species	—	3
Tropical Asia	2	
Tropical Africa	5	
Tropical species	—	7
Species of *Glareola*	—	10

Habits.

The Pratincoles are birds of very powerful flight; like the Coursers they feed almost entirely upon insects, but, unlike their nearest relations, they catch their prey on the wing. They rival the Swallows in their power of flight, and in their structural modifications to attain it—a most interesting case, not of affinity, but of analogy.

Emigrations.

The Pratincoles doubtless originally migrated from the steppes of Siberia, one party (the ancestors of *G. pratincola* and *G. melanoptera*) travelling westwards, whilst another party crossed the Himalayas to the south, became differentiated into *G. orientalis* in India, and sent off offshoots a little later to Madagascar and Australia, which in process of time were isolated (if one may use such an expressive term) into *G. ocularis* and *G. grallaria*.

When the Pratincoles were driven south by the glacial cold, it is probable that *G. pratincola* was isolated and differentiated in the basin of the Mediterranean, and *G. melanoptera* in the valley of the Nile. Though the breeding-range of the latter species now extends fifty degrees further east in Siberia, it still comes back, presumably, to its old home every winter.

The small tropical Pratincoles were probably isolated from their larger subtropical allies before the latter were dispersed by the coming on of the Post-Pliocene Glacial Epoch; and are probably the result of an early emigration from the Siberian steppes to the Indian plains. The Little Indian Pratincole, as it has black feet and no nuchal collar, appears to be more nearly related to the larger group than its allies are, all of whom have pale feet, and when adult a nuchal collar. As it appears to be the least changed, we may presume that the ancestors of *G. lactea* were originally isolated in India, whence they spread westwards into Africa, when the Palæarctic birds were crowded down into the Oriental Region, and the struggle for existence became fast and furious.

The African birds developed a nuchal collar, and their feet and axillaries became paler. The ancestors of *G. nuchalis* were probably isolated in Nubia, and those of *G. emini* on the shores of the great Equatorial lakes, whence emigrating parties crossed

the continent to the west, the ancestors of *G. megapoda* finding a home on the northern shores of the Gulf of Guinea, and those of *G. cinerea* on the eastern shores of that Gulf.

The following key is sufficient to diagnose each species when adult, but it is interesting to know that in this genus chestnut or black axillaries appear to be always correlated with black legs and the absence of a nuchal collar; whilst white (*G. cinerea*) or grey axillaries (*G. megapoda*, *G. emini*, and *G. nuchalis*) appear to be always correlated with pale legs and the presence of a nuchal collar, which is chestnut-buff in the two former and white in the two latter.

KEY TO THE SPECIES.

- Outer rectrices more than half as long again as the central rectrices.
  - **grallaria** — Axillaries black.
  - **melanoptera** — Axillaries black.
  - **pratincola**
  - **orientalis** — Axillaries chestnut.
- Basal half of outer web of several rectrices margined with black.
  - **ocularis** — Axillaries chestnut.
  - **megapoda.**
  - **emini** — Nape with a white collar.
  - **nuchalis** — Nape with a white collar.
- Axillaries black
  - **cinerea** — Basal half of outer web of secondaries white.
  - **lactea** — Basal half of outer web of secondaries white.

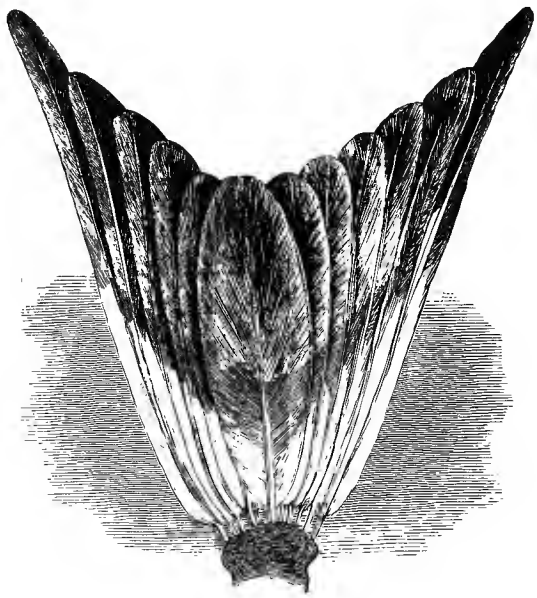
With the exception of the white nuchal collar, all these characters are believed to apply to young in first plumage, as well as to adults of both sexes and at all seasons. The young of *G. emini* and *G. nuchalis* are unknown, and it is possible that, like the young of *G. megapoda*, they have no nuchal collar.

Other characters.

Of these species the second, third, fourth, and fifth have the claw of the middle toe pectinated; the first five are large birds with wings measuring seven inches or more

from the carpal joint; and the second, third, and fourth, when adult, have the throat surrounded with a black line, which is represented by a row of black spots in the first. The four species which have a nuchal collar have pale legs and feet; and the six species without any collar have black legs and feet.

*** *Species with chestnut axillaries and black legs, but without a nuchal collar.*



Tail of young in first plumage.

GLAREOLA PRATINCOLA.

COMMON PRATINCOLE.

Diagnosis. GLAREOLA axillaribus castaneis : caudâ valdè furcatâ (juvenum etiam plus quam 30 millim.).

Variations. THE statement that intermediate forms between this species and *G. melanoptera* occur is very doubtful.

Synonymy.

Glareola glareola, Glareola torquata, Glareola senegalensis, Glareola nævia, } *Brisson, Orn.* v. { p. 141 (1760, adult). p. 145 (1760, immature). p. 148 (1760, immature). p. 147 (1760, young).

Hirundo pratincola, *Linneus, Syst. Nat.* i. p. 345 (1766).

Trachelia pratincola (*Linn.*), *Scopoli, Ann. I. Hist. Nat.* p. 110 (1769).

Glareola austriaca, *Gmelin, Syst. Nat.* i. p. 695 (1788).

Glareola pratincola (*Linn.*), *Leach, Trans. Linn. Soc.* xiii. p. 131 (1820).

Pratincola glareola (*Briss.*), *Degland, Orn. Eur.* ii. p. 107 (1843).

Glareola limbata, *Rüppell, Syst. Uebers.* p. 113, pl. 43 (1845, young).

Dromochelidon natrophila, *Landbeck, Jahresh. Ver. vat. Nat. Württemb.* 1846, p. 228.

Literature.

Plates.—Dresser, Birds of Europe, vii. pl. 513; Gould, Birds of Gt. Brit. iv. pl. 46.

Habits.—Seebohm, Brit. Birds, iii. p. 69.

Eggs.—Seebohm, Brit. Birds, pl. 24.

Specific characters.

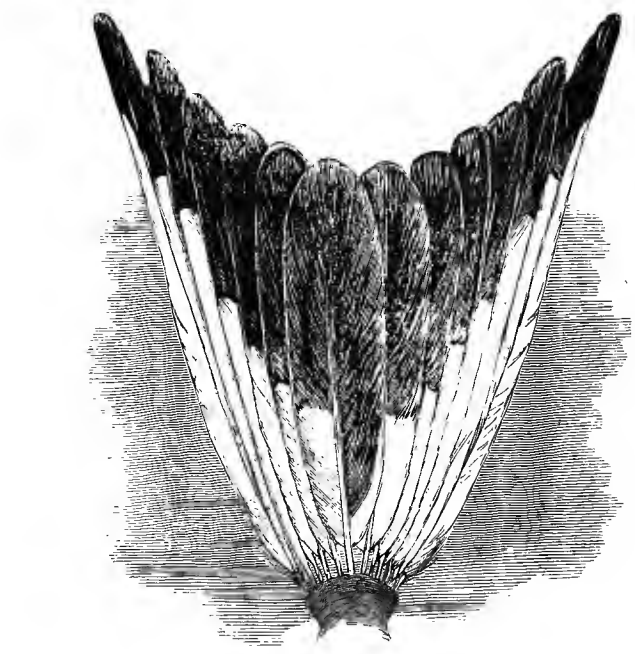
The Common Pratincole may be diagnosed by its *chestnut axillaries* and *deeply forked tail*. No other species of this genus combines both characters; young in first plumage of *G. melanoptera* have chestnut tips to their otherwise black axillaries, and young in first plumage of *G. pratincola* have the fork of the tail much less deep (sometimes as little as 1·25 inch) than in adults (in which the fork is occasionally as much as 2·7 inch).

Geographical distribution.

The Common Pratincole neither breeds so far north nor winters so far south as its ally *G. melanoptera*. It is a salt-water bird, living near the coast, or if inland preferring the neighbourhood of salt lakes. It is a summer visitor to the basins of the Mediterranean, the Black and Caspian Seas, and the salt lakes of Russian Turkestan as far east as Ala-kul (Finsch, Ibis, 1877, p. 52). It breeds in Spain and Algeria in considerable numbers; but in the south of France and Italy it is principally known on migration, though it breeds in Sardinia and Sicily. I found it common on the west coast of Greece at Missolonghi, in the valley of the Lower Danube, and on the coast of Asia Minor. It is a summer visitor to Palestine (Tristram, Fauna and Flora of Palestine, p. 128), and, in small numbers, to Persia (Blanford, Zool. and Geol. of Persia, ii. p. 282); but to Scinde (Butler, Stray Feathers, vii. p. 186) and to North India it can only be regarded as a rare visitor on migration, as it is to the British Islands and to North Europe. It passes through Egypt on migration (Shelley, Ibis, 1871, p. 144), and appears in incredible numbers in Kordofan and Senaar in October, wintering also in Abyssinia (Heuglin, Orn. N.O.-Afr. ii. p. 983) and in West Africa, where it has been recorded from Senegal, the Gambia (Hartlaub, Journ. Orn. 1854, p. 214), and the Gold Coast (Fraser, Proc. Zool. Soc. 1843, p. 53). To Angola (Monteiro, Proc. Zool. Soc. 1869, p. 571), Damara-Land (Andersson, Birds of Damara-Land, p. 265), the Cape Colony (Layard), and Natal (Ayres, Ibis, 1863, p. 329) it is probably only an accidental winter visitor.

Nearest allies.

The Common Pratincole is most nearly allied to Nordmann's Pratincole, and Severtzow says (Journ. Orn. 1875, p. 183) that intermediate forms between them occur in Turkestan, but I have never seen anything of the kind. The general direction of migration of the Common Pratincole leads to the supposition that its ancestors were isolated during the Post-Pliocene Glacial Epoch in North Africa.



GLAREOLA ORIENTALIS.

ORIENTAL PRATINCOLE.

Diagnosis. GLAREOLA axillaribus castaneis : rectricum pogoniorum externorum basalibus partibus totis albis : caudâ non valdè furcatâ (adultorum etiam minus quam 30 millim.).

Variations. IT is not known that this species is subject to any local variation.

Synonymy.

Glareola orientalis, *Leach, Trans. Linn. Soc.* xiii. p. 132 (1820).
Glareola thermophila, } *Hodgson, Gray's Zool. Miscell.* p. 86 (1844, young).
Glareola longipes, }

Literature.

Plates.—Gould, Birds of Australia, vi. pl. 23.
Habits.—Legge, Birds of Ceylon, p. 980.
Eggs.—Oates, Stray Feathers, vii. p. 49.

Specific characters.

The Oriental Pratincole may be diagnosed on three characters:—*Axillaries chestnut; basal half of outer webs of tail-feathers white; tail slightly forked, the central feathers less than an inch shorter than the outer ones.* These characters are found in young as well as in adult, but no other species of Pratincole combines the three.

Young.

Young birds have the tail less forked than old ones: the outer tail-feathers project beyond the central ones sometimes as much as 1·15 inch in the latter, and sometimes as little as ·7 inch in the former.

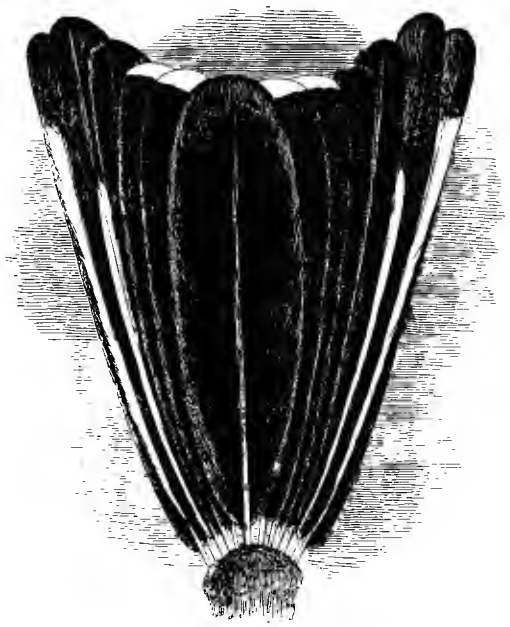
Geographical distribution.

It is found in India as far west as Scinde (Doig, Stray Feathers, viii. p. 375), Ceylon, the Burma Peninsula as far south as Singapore (Kelham, Ibis, 1882, p. 6), East Mongolia (Prjevalsky, Rowley's Orn. Miscellany, ii. p. 435), extending northwards into Dauria (Radde, Reisen im Süden von Ost-Sibirien, ii. p. 307)[1], China (there are examples in the Swinhoe collection from the neighbourhood of Pekin and the island of Formosa), Sumatra, Java, most of the islands of the Malay Archipelago, and the extreme north of Australia. Layard procured it on the Philippine Islands (Lord Walden, Ibis, 1872, p. 105); it has been recorded from the Andaman and Nicobar Islands (Hume, Stray Feathers, 1874, p. 284); the Leyden Museum possesses examples from Java, Borneo, and Timor (Schlegel, Mus. Pays-Bas, Cursores, p. 17); Buxton obtained it on Sumatra (Lord Tweeddale, Ibis, 1877, p. 322); I have examples from North Australia (Cape York) and from Siam; and Finsch records it from New Guinea, Celebes, and many of the smaller islands of the Malay Archipelago. It is probably a resident in most parts of its range, shifting its quarters from time to time during the cool season. In South Siberia, East Mongolia, and North China it is only found in summer, and to Australia it is probably only a winter visitor.

Nearest allies.

Its chestnut axillaries point to its close relationship on the one hand to *G. ocularis*, which it also resembles in its slightly forked tail, and on the other to *G. pratincola*, which has the same black gular line.

[1] Radde found this species breeding in South-east Dauria, on the salt plains of Nertchinsk, but wrongly identified it as *G. pratincola*. He mentions, however, the great amount of white on the tail-feathers of the Siberian bird when compared with European examples.



GLAREOLA OCULARIS.

MADAGASCAR PRATINCOLE.

Diagnosis. GLAREOLA axillaribus castaneis : rectricum pogoniis externis nigro marginatis.

Variations. No local races of this species are known.

Synonymy. Glareola ocularis, *Verreaux, S. Afr. Quart. Journ.* 1833, p. 80.
Glareola geoffroyi, *Pucheran, Rev. Zool.* 1845, p. 51.

Literature. PLATES.—Grandidier, Ois. Madag. pl. 256.
HABITS.—Roch and Newton, Ibis, 1863, p. 169.
EGGS.—Grandidier, Ois. Madag. pl. 306. fig. 7.

Specific characters. The Madagascar Pratincole may be distinguished at all ages by its *chestnut axillaries*, and by the *black margin of the outer web of most of its tail-feathers*. It is the only large Pratincole possessing the latter character. All the small Pratincoles which possess it have also a white or buff nuchal collar, of which there is no trace in the Madagascar species.

It is a resident in Madagascar, but has once been obtained in the neighbouring island of Mauritius (Grandidier, Ois. Madag. p. 646), and there is an example in the British Museum said to have been obtained on the Zambesi. Geographical distribution.

Its chestnut axillaries and slightly forked tail proclaim its relationship to *G. orientalis*; so that we may regard it as the result of an emigration from Ceylon during the Post-Pliocene Glacial Epoch, when the Oriental Region was overcrowded with birds driven out of Siberia by the cold. Nearest allies.

*** *Species with black axillaries and black legs, but without a nuchal collar.*

GLAREOLA MELANOPTERA.

NORDMANN'S PRATINCOLE.

GLAREOLA axillaribus nigris: caudâ valdè furcatâ (juvenum etiam plus quam 26 millim.). Diagnosis.

Variations. THE alleged intermediate forms between this species and *G. pratincola* are very doubtful.

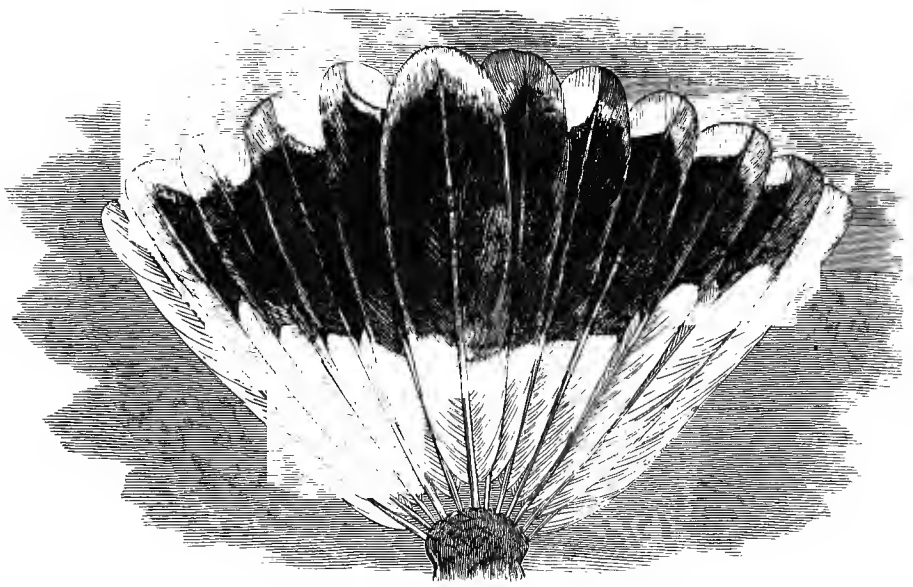
Synonymy. Glareola melanoptera, *Nordmann, Bull. Soc. Imp. Nat. Mosc.* xv. pt. ii. p. 314 (1842).
Glareola nordmanni, *Fischer, Bull. Soc. Imp. Nat. Mosc.* xv. pt. ii. p. 314 (1842).
Pratincola pallasi, *Bruch, fide Degland, Orn. Eur.* ii. p. 112 (1843).
Glareola pallasii, *Bruch, fide Schlegel, Rev. Crit.* p. lxxxi (1844).

Literature. PLATES.—Gould, Birds of Asia, vii. pl. 63; Ibis, 1868, pl. viii.
HABITS.—Dresser, Birds of Europe, vii. p. 419.
EGGS.—Thienemann, Abbild. Vogeleiern, pl. lviii. fig. 2.

Specific characters. Nordmann's Pratincole may always be distinguished by its *black axillaries* and *deeply forked tail*. These characters are not quite constant at all ages, but even in young in first plumage black is the prevailing colour of the axillaries, and the fork of the tail is never less than an inch.

Geographical distribution. Nordmann's Pratincole breeds in the Kirghiz Steppes from the plains of the Don, where it was first discovered by Nordmann, as far north as Omsk, where I examined examples in the museum of Professor Slowzoff, and as far east as Ala-kul, on the confines of Mongolia, where its range was found by Finsch to inosculate with that of the Common Pratincole. To all these regions it is only a summer visitor; and as it is not known to have occurred in Afghanistan or India, and only passes through Persia, Trans-Caucasia, Asia Minor, and Turkey on migration, it is probable that its winter-quarters are confined to Africa. Heuglin says that it passes through Egypt and Nubia on migration, whence it spreads over the whole of South Africa in winter. To the west it has been recorded from Prince's Island (Dohrn, Proc. Zool. Soc. 1866, p. 330) and the Gaboon; in the south it is seen in large flocks in Damara-Land, the Cape Colony, Natal, and the Transvaal; and in the east it is recorded from the Zambesi (Kirk, Ibis, 1864, p. 332). Layard quotes Mrs. Barber as an authority for the breeding of this bird in South Africa; but the evidence is not at all satisfactory, the "Locust-bird" referred to being, in all probability, the Wattled Starling (*Dilophus carunculatus*).

Nearest ally. Nordmann's Pratincole is so nearly allied to the Common Pratincole that it can scarcely be regarded as more than a steppe-form of its salt-marsh ally. In young in first plumage the axillaries are black margined with chestnut, so that we may fairly assume that the ancestors of Nordmann's Pratincole bore a close resemblance to the Common Pratincole, which appears to be the least changed descendant of the ancestral Pratincoles.



GLAREOLA GRALLARIA.

LONG-LEGGED PRATINCOLE.

Diagnosis.

Glareola tarso longo (40 ad 50 millim.) : axillaribus nigris : secundariis omninò brunneis : caudâ vix furcatâ.

Variations.

It is not known that this species varies in any way.

Synonymy.

Glareola isabella, *Vieillot, Nouv. Dict. d'Hist. Nat.* xiii. p. 221 (1817).
Glareola grallaria, *Temminck, Man. d'Orn.* ii. p. 503 (1820).
Glareola australis, *Leach, Trans. Linn. Soc.* xiii. p. 132 (1820).
Stiltia grallaria (*Temm.*), *Bonaparte, Compt. Rend.* xliii. p. 419 (1856).
Stiltia isabella (*Vieill.*), *Salvadori, Orn. Pap. e Mol.* iii. p. 286 (1882).

Literature.

Plates.—Gould, Birds of Australia, vi. pl. 22.
Habits.—Gould, Handb. Birds Austr. ii. p. 243.
Eggs.—Campbell, Nests and Eggs Austr. Birds, p. 54.

Specific characters.

The Long-legged Pratincole is easily distinguished by its *chestnut flanks, long tarsi* (1·6 to 1·9 inch), and *long first primary* (an inch or more longer than the second). Each

of these three characters is diagnostic, but the long legs will probably be found to be the safest guide to determine the young in first plumage.

Geographical distribution. It breeds in the eastern half of Australia, and is probably only a winter visitor to the islands of the Malay Archipelago, where it has occurred in Java, Borneo, New Guinea, Celebes, and many of the smaller islands.

Origin. The Long-legged Pratincole is probably the result of an emigration from the Burma peninsula, which occurred about the same time and from the same cause as that which is supposed to have proceeded from the adjoining peninsula, and resulted in the differentiation of the Madagascar species.

GLAREOLA LACTEA.

LITTLE INDIAN PRATINCOLE.

Diagnosis. GLAREOLA axillaribus nigris : secundariis pro majore parte albis.

Variations. No local races of this species are known.

Synonymy.

Glareola lactea, *Temminck, Man. d'Orn.* ii. p. 503 (1820).
Glareola nipalensis,
Glareola cinerascens,
Glareola gangetica,
} *Hodgson, Gray's Zool. Miscell.* p. 86 (1844).
Galachrysia lactea (*Temm.*), *Bonaparte, Compt. Rend.* xliii. p. 419 (1856).

Literature.

Plates.—Temm. Pl. Col. no. 399; Gould, Birds of Asia, vii. pl. 64.
Habits.—Legge, Birds of Ceylon, p. 984.
Eggs.—Harting, Proc. Zool. Soc. 1874, pl. lx. fig. 1.

Specific characters.

The Little Indian Pratincole is very easily diagnosed from its allies. *Axillaries black, secondaries with white bases to both webs* is simple enough; *axillaries black, wing from carpal joint less than seven inches* is equally good: as either diagnosis is applicable to immature as well as to adult birds.

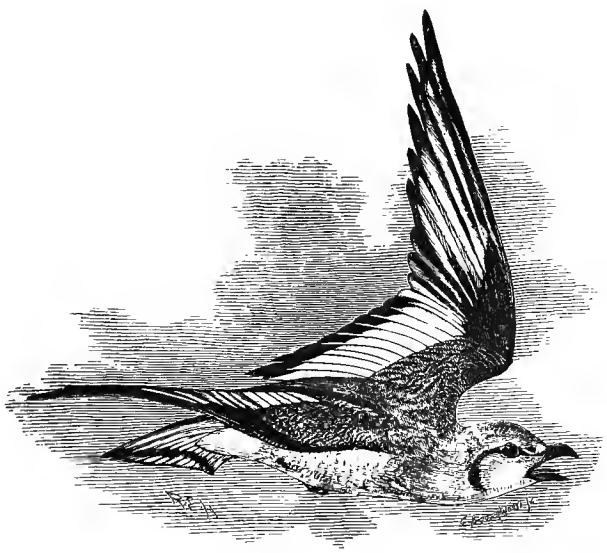
Nearest allies.

Its small size and the great amount of white on the primaries and secondaries apparently indicate its affinity to *G. cinerea*, though the latter as well as the other two small African species have acquired a nuchal collar and pale legs.

Geographical distribution.

The Little Indian Pratincole is a resident in India, Burma, and Ceylon, breeding in colonies on the sandbanks near salt lakes and great rivers from the Indus to the Ganges. Its habits scarcely differ from those of the larger species. In the daytime it is generally seen on the ground; but in the evening it hawks after insects in the air, like a Swallow, and it is remarkable for the efforts which it makes to wile an intruder from its nest.

*** *Species with white or grey axillaries, pale legs, and a nuchal collar.*



GLAREOLA CINEREA.

WHITE-WINGED PRATINCOLE.

Diagnosis.

Glareola axillaribus albis.

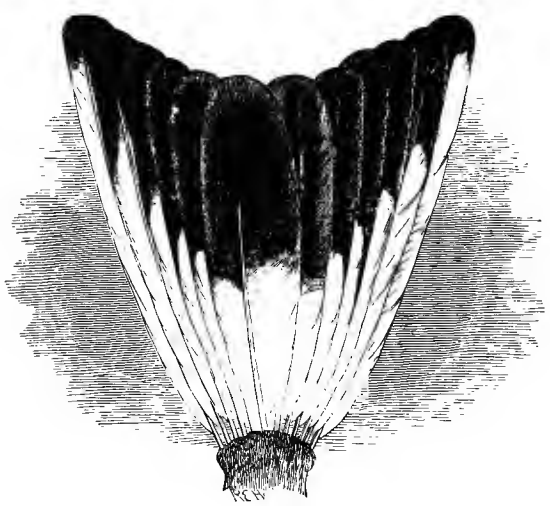
Variations. No local races of this species are known.

Synonymy. Glareola cinerea, *Fraser, Proc. Zool. Soc.* 1843, p. 26.
Galachrysia cinerea, *Bonaparte, Compt. Rend.* xliii. p. 419 (1856).

Literature. Plates.—Gray, Genera of Birds, iii. pl. cxliv.
Habits.—Forbes, Ibis, 1883, pp. 129, 514.
Eggs.—Hartert, Journ. Orn. 1886, p. 610.

Specific characters. The White-winged Pratincole is the only species of the genus which has *white axillaries*, a character common to old and young.

Geographical distribution. It is only known from West Africa, where it is a resident in the Fantee Country (Sharpe, Ibis, 1870, p. 487), the valley of the Niger (Forbes, Ibis, 1883, p. 129), the valley of the Ogowai (Bocage, Orn. d'Angola, p. 422), and the Loango coast (Falkenstein, Journ. Orn. 1877, p. 11).



GLAREOLA NUCHALIS.

WHITE-NAPED PRATINCOLE.

Diagnosis. Glareola axillaribus griseis : secundariarum pogoniis externis pro parte basali albis.

No local races of this species are known. Variations.

Glareola nuchalis, *Gray, Proc. Zool. Soc.* 1849, p. 63. Synonymy.
Glareola marchei, *Oustalet, Bull. Soc. Philom.* sér. 7, i. p. 104 (1877).

Plates.—Gray, Proc. Zool. Soc. 1849, pl. ix. (The wing-coverts are erroneously figured with white tips.) Literature.
Habits.—Undescribed.
Eggs.—Unknown.

The White-naped Pratincole may be distinguished from all its allies, except from *G. megapoda* and *G. emini*, by its *grey axillaries*, and from those species by having *a white patch on the outer webs*, as well as on the inner webs, *of the secondaries at the base*. When adult it may be recognized by its white nuchal collar; but as its ally *G. megapoda* has no collar in young in first plumage, it is probable that the young in first plumage of *G. nuchalis* are also without any collar. Specific characters.

The White-naped Pratincole is a very rare bird in collections The type is in the British Museum, and was obtained by Galton in Nubia. In the Paris Museum are examples obtained by Marche in the Gaboon; and in the Museums of Berlin and Leyden are others obtained by Falkenstein on the Loango coast "near the mountains" (Reichenow, Journ. Orn. 1877, p. 9). Geographical distribution.

It is nearest related to *G. megapoda*. Nearest ally.

GLAREOLA MEGAPODA.

BÜTTIKOFER'S PRATINCOLE.

Glareola axillaribus griseis: nuchâ collari rufo ornatâ. Diagnosis.

Variations. No local races of this species are known.

Synonymy.

Glareola megapoda, *Gray, List Birds Brit. Mus.* iii. p. 62 (1844, descript. null.).
Glareola nuchalis liberiæ, *Schlegel, Notes Leyd. Mus.* 1881, p. 58 (descript. exig.).
Glareola megapoda, *Büttikofer, Notes Leyd. Mus.* 1885, p. 233 (descript. bon.).

Literature.

PLATES.—Unfigured.
HABITS.—Undescribed.
EGGS, in the Leyden Museum, collected by Büttikofer in Liberia, resemble those of *G. lactea* in size, but those of *G. pratincola* in colour.

A neglected species.

It is remarkable that Gray appears never to have described this species. In 1844 he evidently regarded it as new; but in 1848, when its discoverers published the ornithological results of their expedition, he probably persuaded them that it was the young of *G. cinerea* (Allen and Thomson, Narr. Exp. Niger, ii. p. 507). In 1857 Hartlaub (Orn. Westafr. p. 211) regarded it as the young of *G. nuchalis*; but in 1870 Finsch and Hartlaub (Vög. Ostafr. p. 636), having examined the skins in the British Museum, came to the conclusion that it was, after all, a good species, though they apparently did not discover that it was undescribed. For more than ten years it remained in this neglected condition, although the British Museum possessed a small series of skins, until in 1881 it was rediscovered by Büttikofer in Liberia, and renamed by Schlegel, who separated it as a subspecies from *G. nuchalis* because the nuchal collar in adult birds was chestnut instead of white. If this had been the only difference between the two species Schlegel's course would probably have been the correct one; but in *G. megapoda the outer webs of the three outer tail-feathers on each side are margined with black down to their bases*, a character which distinguishes it from all other species of the genus except from *G. ocularis*. To complete its diagnosis it is only necessary to add *axillaries grey*. Adult birds of both sexes have a chestnut nuchal collar, which is very richly coloured in the male, but young in first plumage have no trace of a collar.

Specific characters.

Geographical distribution.

Büttikofer's Pratincole breeds in Liberia (Büttikofer) and near the mouth of the Niger (Allen and Thomson).

Nearest ally.

It is nearest related to *G. emini*, but has many points in common with *G. ocularis*, in spite of its smaller size. Young in first plumage are probably only distinguishable from young of *G. emini* by their smaller size, the length of wing from the carpal joint being $5\frac{1}{2}$ instead of 6 inches.

GLAREOLA EMINI.

EMIN'S PRATINCOLE.

Diagnosis.

GLAREOLA nuchâ collari albo ornatâ : secundariarum pogoniis externis omninò griseis.

Variations.

THIS species is only known from a single example.

Synonymy.

Glareola emini, *Shelley, Proc. Zool. Soc.* 1887, Nov.

Literature.

PLATES.—Unfigured.
HABITS.—Undescribed.
EGGS.—Unknown.

Specific characters.

This species appears to be quite distinct from *G. nuchalis*, though it resembles it in having *a white nuchal collar*. It is a larger bird, with the wing measuring more than 6 inches from the carpal joint, and has *no white on the outer web of the secondaries*. In the latter character it resembles *G. megapoda*, which also very nearly approaches it in size; but as that species has a rufous nuchal collar it may be regarded as quite distinct, though it is possible that the young of the two species may resemble each other very closely.

It was discovered by Dr. Emin Bey near Lake Albert Nyanza in Central Africa.

Nearest ally.

There can be little doubt that it is nearest related to *G. megapoda*.

CHAPTER XVI.

Subfamily **TOTANINÆ.**

Diagnosis. CHARADRIIDÆ digito externo cum medio ad basin membranâ connexo : naribus ultra partem quartam rostri ab basi non extensis.

Characters of subfamily. The Totaninæ may be diagnosed as follows :—

Charadriidæ having the outer and middle toes united by a web at the base; and having the nasal aperture situated within the basal fourth of the bill.

About sixty birds belonging to this subfamily possess both these characters; but the resemblance between one of them, *Ereunetes pusillus*, and a species in the next subfamily, *Tringa minutilla*, is so close that it is difficult to believe that they are not more nearly related to each other than each of them is to their respective congeners, in which case the first character of the subfamily must be regarded as denoting analogy rather than affinity.

Climatic distribution. The subfamily of Totaninæ is unquestionably both Arctic and Circumpolar. Of the 64 species and subspecies which it contains

27 are exclusively Arctic.
10 are Arctic and Temperate.
18 are exclusively Temperate.
9 are Temperate and Tropical.
0 are exclusively Tropical.

64

35 are exclusively Old-World.
2 are Circumpolar.
27 are exclusively New-World.

64

Of the 8 genera of which it consists, 7 are represented in both the Old and the New World, and the remaining genus is of very doubtful validity. There can scarcely be any doubt that the common ancestors of these 64 species were residents of the Polar Basin during the breeding-season before the Pre-Pliocene Glacial Epoch.

The Totaninæ may be divided into eight genera, the characters of some of which appear to be rather trivial.

KEY TO THE GENERA.

a. Tarsus scutellated at least for the front lower half.
  a^1. Bill slightly, if at all, decurved.
    a^2. A lobe or web on the side of the toes . . . . . PHALAROPUS.
    b^2. No web on the side of the toes.
      a^3. Frontal feathers extending in front of the gape . . . . . TOTANUS.
      b^3. Frontal feathers not extending beyond the gape.
        a^4. Tip of bill slightly expanded, hard and smooth . . . . LIMOSA.
        b^4. Tip of bill much expanded, soft and corrugated . . . . EREUNETES.
  b^1. Bill decurved so that a straight line from the gape to the tip passes below the lower outline of the under mandible . . . . . NUMENIUS.
b. Tarsus reticulated all round.
  c^1. Bill straight or recurved.
    c^2. Tarsus as long or longer than the bill . . . . . HIMANTOPUS.
    d^2. Tarsus much shorter than the bill . . . . . HÆMATOPUS.
  d^1. Bill much decurved . . . . . IBIDORHYNCHUS.

CHAPTER XVII.

Genus HIMANTOPUS.

Diagnosis. TOTANINÆ tarsis totis reticulatis et longissimis (digitis mediis duplo longioribus).

THE genus *Himantopus* contains eleven species, and embraces the Stilts, the Avocets, and the Peruvian Stilt and the Banded Avocet, which form the connecting-links between them.

This genus of birds is remarkably homogeneous and well differentiated from all allied genera, and contains species so closely related to each other, that there can be no possible reason for subdividing it in the way which has been adopted by most ornithologists.

Nearest allies. It is difficult to say to which genera *Himantopus* is nearest related. The softness of the plumage resembles that of *Phalaropus*; but this is probably an evidence of analogy rather than of affinity. The delicate reticulation of the tarsus is similar to that of the bar-tailed species of *Charadrius*, to which, in spite of the dissimilarity of the bill, the genus may possibly be more nearly allied. The eleven species included in *Himantopus* may be diagnosed from all the other species of the family Charadriidæ by the combination of three characters. Each of these is found in many other species of the family, but no species belonging to it combines all three, except the eleven species which constitute the genus *Himantopus*. These three characters are a long bill and a long and reticulated tarsus. The genus may therefore be diagnosed as follows :—

Generic characters. Charadriidæ having the tarsus covered all over with a network of fine hexagonal reticulations, having more than three fourths of the bill (measured from the frontal feathers) beyond the nasal orifice, and having the tarsus at least twice the length of the middle toe.

Synonymy of the Genus HIMANTOPUS.

	Type.
Recurvirostra, *Linneus, Syst. Nat.* i. p. 151 (1758) ; *Linn. Syst. Nat.* i. p. 256 (1766)	H. avocetta.
Himantopus, *Brisson, Orn.* v. p. 34 (1760)	H. melanopterus.
Avocetta, *Brisson, Orn.* vi. p. 538 (1760)	H. avocetta.
Macrotarsus, *Lacépède, Mém. de l'Inst.* iii. p. 518 (1801)	H. melanopterus.
Hypsibates, *Nitzsch, Ersch u. Grub. Encycl.* xvi. p. 150 (1827)	H. melanopterus.
Leptorhynchus, *Dubus, Mag. Zool.* v. pl. 45 (1835)	H. pectoralis.
Cladorhynchus, *Gray, List Gen. B.* p. 69 (1840)	H. pectoralis.

The Common Stilt (*Himantopus melanopterus*), being the *Charadrius himantopus* of Linnæus and the *Himantopus himantopus* of Brisson, has a double claim to be regarded as the type of the genus. The name *Recurvirostra* could scarcely be applied to the Stilts whose bills do not turn up. Determination of the type.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Avocets.		*Stilts.*
	ETHIOPIAN REGION.	
H. AVOCETTA	*Throughout.*	
	PALÆARCTIC REGION.	
	Southern half.	. . . H. MELANOPTERUS.
	ORIENTAL REGION.	
	India.	
	AUSTRALIAN REGION.	
H. RUBRICOLLIS	*Australia.*	. . . H. LEUCOCEPHALUS.
H. PECTORALIS		
	New Zealand.	. . . H. MELAS.
	Sandwich Islands.	. . . H. KNUDSENI.
	NEARCTIC REGION.	
H. AMERICANUS	*Southern half.*	
	NEOTROPICAL REGION.	. . . H. MEXICANUS.
	Mexico and Central America.	
	Peru.	. . . H. ANDINA.
	Chilian subregion.	. . . H. BRASILIENSIS.

The range of the genus is almost cosmopolitan, but it does not extend into the Arctic Region nor to most of the smaller islands of the Pacific. Five species breed in the Australian Region, two in the Nearctic, and two in the Neotropical Regions. The remaining two species breed in the Palæarctic Region, but one breeds also in the Oriental Region, and both in the Ethiopian Region. This information has little interest because it has little significance, except perhaps that Australia appears to have been the centre of distribution of the genus, an inference probably false. If the genus be split into three, bad is made worse, and the key to the geographical distribution is broken.

Climatic distribution.

The genus *Himantopus* is neither an Arctic nor a Tropical group of birds. Every species breeds in the Temperate Regions, but the breeding-range of three of them extends also to the tropics. They are distributed as follows:—

Temperate North America	1	
Temperate South America	2	
New Zealand and Temperate Australia	4	
Temperate species	—	7
Temperate and Tropical N. America	1	
Temperate Eurasia and Temperate and Tropical Africa	1	
Tropical Africa and Tropical and Temperate Eurasia	1	
Temperate and Tropical species	—	3
Sandwich Islands	1	
Tropical species	—	1
Species of *Himantopus*	—	11

Let us endeavour to trace the history of the ancestral form from which the eleven species now forming the genus *Himantopus* are descended, and let us try to follow its emigration, from the period when it consisted of only one species living on the shores of the north polar sea, down to the present time when its descendants have become eleven species scattered over the greater part of the globe.

Origin of species.

Probably the first split in the circle of circumpolar birds was the intervention of a glacier, stretching from the north pole down the mountains of Greenland. The semi-isolation caused by the stoppage of interbreeding between the birds of the Atlantic coast of America and that of Europe must naturally have produced a differentiation between the birds of Grinnel-Land and Scandinavia, and there is reason to believe that the former became Stilts and the latter Avocets; but inasmuch as interbreeding could take place between the birds of each bay and those of the next along the whole line in one direction, it can scarcely be doubted that at first the Stilts were connected by a series of intermediate forms with the Avocets. The next cause of isolation (which was probably complete) was most likely a glacier stretching across the north pole from the Rocky Mountains, either to Novaya Zemlya or to the mountains of Eastern Siberia. This must soon have been followed by the evacuation of the Polar Basin, and the emigration of the birds in four parties along the four shores leading to the south. The causes already enumerated must have produced an emigration of Stilts along one coast of the Atlantic, an emigration of Avocets along the other, whilst the emigration along the two coasts of the Pacific must have consisted on the one side of Avocets with a strong strain of Stilt in them, and on the other of Stilts with a strong strain of Avocet blood.

Commencement of emigrations.

The next step to take is to examine the eleven species of the genus, and ascertain if

all four parties of emigrants have left descendants, and to determine by what characters they may now be detected. The four groups of which we are in search are Stilts, Semi-Stilts, Avocets, and Semi-Avocets. The last three species on the list, *H. avocetta*, *H. rubricollis*, and *H. americanus*, are unquestionably thorough-bred Avocets, diagnosed as *mantle white, scapulars and secondaries for the most part white*; the first six, *H. mexicanus*, *H. knudseni*, *H. brasiliensis*, *H. leucocephalus*, *H. melas*, and *H. melanopterus*, are as unquestionably thorough-bred Stilts, having all the parts mentioned above black instead of white. These are the important characters which date farthest back; but it is worthy of note that in these two groups the black mantle &c. is correlated with a straight bill, very slightly webbed feet, and the absence of a hind toe; whilst the white mantle is correlated with a recurved bill, strongly webbed feet, and the presence of a hind toe. We have now two species left, *H. andinus* and *H. pectoralis*. The former is called an Avocet, and the latter a Stilt, by the writers who place an extravagant value on structural characters. In my opinion *H. andinus* is a model representative of a Semi-Stilt. It has the black mantle and wings of the Stilts, whilst its strain of Avocet blood crops up in the less important characters of its recurved bill, webbed feet, and hind toe. *H. pectoralis*, on the other hand, is an excellent Semi-Avocet, its white mantle and the white on its wings proclaiming it an Avocet, whilst its straight bill and the absence of a hind toe show its relationship to the Stilts.

Divide into four parties.

The third step in the argument is the apportioning of the four groups to the four routes. The case is a very simple one. The Semi-Stilt and the Semi-Avocet are, by the terms of the hypothesis, the representatives of the two Pacific-coast emigrations; and as the Semi-Stilt inhabits Peru, and the Semi-Avocet Australia, there can be no dispute that the Semi-Stilts emigrated along the American shores of the Pacific, and the Semi-Avocets along the Asiatic shores of that ocean. The Avocets consequently represent the Old-World pair, the true Avocets migrating along the Atlantic coast. The Stilts being the New-World couple, we must apportion the Atlantic coast of America to the true Stilts.

Routes of the Semi-Stilts and Semi-Avocets.

The ancestors of the true Avocets seem to have left the Polar Basin by way of the European shores of the Atlantic, and to have occupied Africa and the southern portion of the Palæarctic Region. Finding the Oriental Region already occupied during the breeding-season by the Stilts, they seem to have sent off a detachment to Australia. Here also the ground appears to have been partially occupied by congeneric species, so that a second emigration became necessary, which found a home on the west coast of the United States. The true Stilts are so closely related to each other that the precise order of their emigration is not very easy to determine, but we may begin by assuming that they left the Polar Basin along the Atlantic shores of America; thence they seem to have crossed the tropics to the Chilian subregion of South America and to the Sandwich Islands. A second detachment appears to have crossed the Atlantic to the Canary Islands and Spain, whence they spread eastwards up the Mediterranean to the Oriental Region and across the Ethiopian Region. Meanwhile the restricted area of the

Route of the Avocets.

Route of the Stilts.

Chilian subregion seems to have compelled some of the white-crowned Stilts to emigrate a second time; they seem to have crossed the Pacific to New Zealand and Australia.

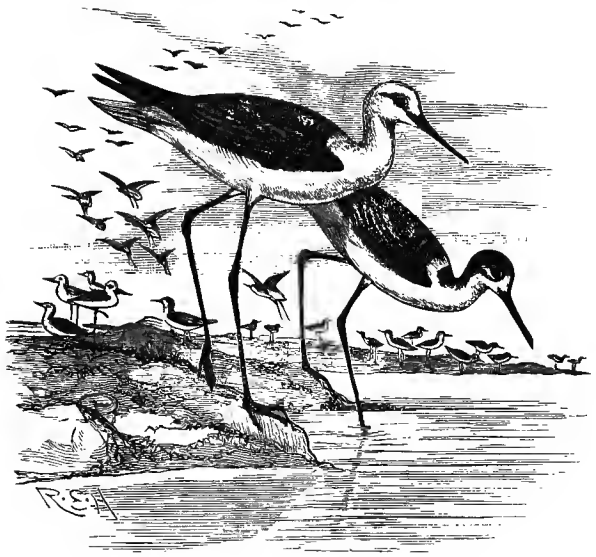
KEY TO THE SPECIES.

So far as is known, the following key to the species applies to young in first plumage as well as to adult birds.

- Mantle and wings black
  - **brasiliensis** — Black on neck reaching to ear-coverts but not to crown.
  - **melanopterus** — Black on neck, if present, separated from back.
  - **leucocephalus** — Black on neck not reaching to any part of head.
  - **mexicanus.**
  - **knudseni** — Posterior half of lores black.
  - **melas** — Axillaries black.
  - **andinus**
- Innermost primaries and secondaries white
  - Tertiaries white in adult, barred with white in young.
    - **pectoralis**
    - **rubricollis** — Toes deeply webbed.
    - **avocetta** — White on scapulars.
    - **americanus**

Of the eleven species contained in this genus the first six may be regarded as typical Stilts, with a black mantle and no hind toe; the seventh, *H. andinus*, is an aberrant Stilt, having a black mantle, but with a small hind toe. The eighth, *H. pectoralis*, is an aberrant Avocet, having a white mantle, but no hind toe; whilst the three last may be regarded as typical Avocets, with a white mantle and a small hind toe.

*** *Typical Stilts.*



HIMANTOPUS MELANOPTERUS.

COMMON STILT.

HIMANOPTUS alis omninò nigris : aut capite colloque albis (in adult.), aut pileo et collo postico nigris (in adolesc.) vel brunneis (in juv.), semper infra nucham albo. Diagnosis.

IMMATURE birds vary in the extent of black or brown on the head and neck. In nearly mature birds the crown only remains black ; but the presence or absence of black or brown on the ear-coverts appears to be accidental, and not to be affected by age or geographical distribution, though perhaps the dark ear-coverts are most frequent in eastern examples. Variations.

Charadrius himantopus, *Linneus, Syst. Nat.* i. p. 151 (1758) ; *Linn. Syst. Nat.* i. p.255 (1766). Synonymy.
Himantopus himantopus, *Brisson, Orn.* v. p. 34 (1760).
Himantopus plinii, *Gerini, Orn. Meth. Dig.* iv. p. 67 (1773).
Himantopus candidus, *Bonnaterre, Tabl. Encycl.* i. p. 24 (1790).
Himantopus vulgaris, *Bechstein, Orn. Taschenb.* ii. p. 325 (1803).
Cursorius himantopus (*Linn.*), *Turton, Brit. Faun.* p. 62 (1807).
Himantopus rufipes, *Bechstein, Naturg. Deutschl.* iii. p. 446 (1809).
Himantopus atropterus, *Meyer, Taschenb.* ii. p. 315 (1810).
Himantopus melanopterus, *Meyer, Ann. Wetter. Gesellsch.* iii. p. 177 (1814).

Himantopus albicollis, *Vieillot, N. Dict. d'Hist. Nat.* x. p. 41 (1817).
Hypsibates himantopus (*Linn.*), *Nitzsch, Ersch u. Grub. Encycl.* xvi. p. 150 (1827).
Himantopus asiaticus, *Lesson, Rev. Zool.* 1839, p. 44.
Himantopus intermedius, *Blyth, Cat. B. Mus. As. Soc.* p. 265 (1849).
Himantopus minor, *Natterer, fide Hartlaub, Journ Orn.* 1860, p. 170.
Himantopus albus, *Ellman, Zoologist,* 1861, p. 7470.
Himantopus europæus, *Sander, fide Gray, Hand-list of Birds,* iii. p. 47 (1871).
Himantopus autumnalis (*Hasselquist*), *apud Gray, Holdsworth, Legge, Heuglin, Walden, Gurney,* &c.

Literature.

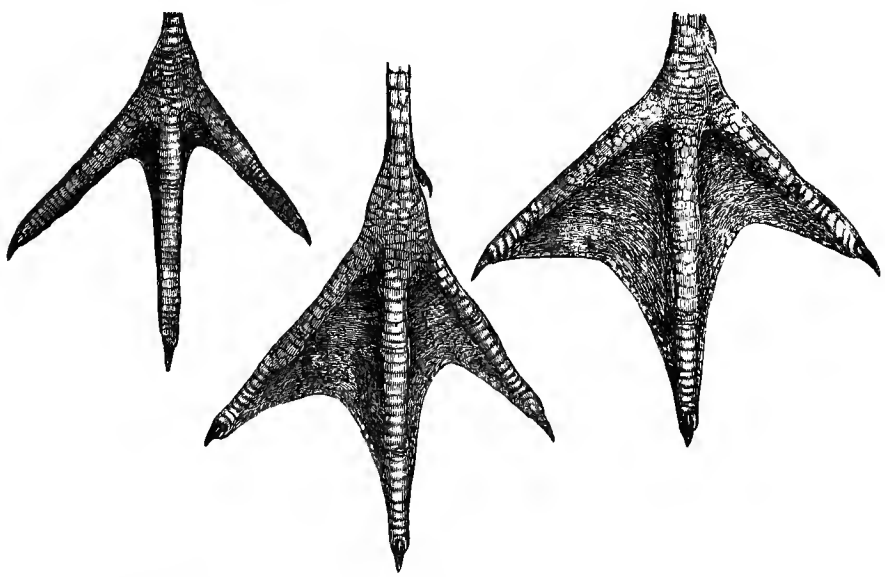
PLATES.—Dresser, Birds of Europe, vii. pls. 535, 536.
HABITS.—Seebohm, British Birds, iii. p. 79.
EGGS.—Seebohm, British Birds, pl. 24. figs. 4, 6.

Specific characters.

The Common Stilt, when in fully adult male plumage, may be recognized by its *pure white head and neck.* Less mature birds have *black on the back of the neck, extending over the crown,* but *not reaching the mantle.* Young in first plumage have the black replaced by brown, which is mottled with buff.

Geographical distribution.

The Common Stilt is most abundant during the breeding-season in India and Ceylon, where its numbers are increased during winter. Further east it is found during the cold



H. melanopterus. *H. andinus.* *H. avocetta.*

season in Burma; and stragglers have occurred in New Zealand, Timor, Borneo, Cochin China, the Philippine Islands, and North China. West of India it is a regular summer visitor to Afghanistan, Turkestan, North Persia, Palestine, Asia Minor, to the salt lakes of the Kalmuk and Kirghis steppes, the lagoons on the shores of the Black Sea, the delta

of the Rhone, and the marismas of Southern Spain and Portugal. It is an accidental straggler on migration to the rest of Europe as far north as the Baltic. It is a resident in many parts of Africa, where its numbers are largely increased during winter, and it has been found in the Canary Islands. It is said to be common and to breed on the coast of Madagascar; and eggs collected by Mr. Kotze on the Berg River are in the Cape Town Museum.

HIMANTOPUS MEXICANUS.

NORTH-AMERICAN STILT.

Diagnosis.

HIMANTOPUS halluce nullo: axillaribus lorisque albis: haud inter collum posticum et dorsum collari albo.

Variations.

INTERMEDIATE forms between this species and *H. brasiliensis* frequently occur, but may possibly prove to be immature examples of the latter.

Synonymy.

Himantopus mexicanus, *Brisson, Orn.* v. p. 36 (1760).
Charadrius mexicanus (*Briss.*), *Müller, Vollst. Natursyst. Suppl.* p. 117 (1776).
Himantopus nigricollis, *Vieillot, N. Dict. d'Hist. Nat.* x. p. 42 (1817).
Himantopus mexicanus (*Briss.*), *Ord, Wilson's Amer. Orn.* vii. p. 52 (1824).
Hypsibates nigricollis (*Vieill.*), *Cabanis, Schomb. Guian.* iii. p. 758 (1848).
Macrotarsus nigricollis (*Vieill.*), *Gundlach, Journ. Orn.* 1856, p. 422.

Literature. PLATES.—Wilson, Am. Orn. pl. 58. fig. 2; Sclater & Salvin, Proc. Zool. Soc. 1873, p. 453 (woodcut of head).
HABITS.—Baird, Brewer, and Ridgway, Water-Birds N. Amer. i. p. 346.
EGGS.—Thienemann, Abbild. Vogeleiern, pl. lxii. fig. 6.

Specific characters. The North-American Stilt is an intermediate form between the Common Stilt and the Chilian Stilt. It may be recognized by the distribution of the *black on the back of the neck*, which not only passes underneath the eye, but also extends over the crown and *joins the black on the mantle*. Young in first plumage resemble adults, except that the black is replaced by brown.

It breeds in the southern half of North America, and winters in the northern half of South America, but in the central portion of its range it is said to be a resident.

Geographical distribution. It does not appear to visit Canada, but in the United States it is found in California, and is especially common on the shores of the Great Salt Lake. To the east it is said to be common on the coast of New Jersey, and has occurred once on the Bermudas (Reid, Zoologist, 1877, p. 475). It is a summer visitor to the Southern States, but is probably a resident in Mexico and the West Indies. It is a winter visitor to Central America (Salvin, Ibis, 1865, p. 192), Colombia (Wyatt, Ibis, 1871, p. 383), the Lower Amazons (Wallace, Proc. Zool. Soc. 1867, p. 591), and the Galapagos Islands (Dr. Habel, Proc. Zool. Soc. 1870, p. 323).

HIMANTOPUS KNUDSENI.

SANDWICH-ISLAND STILT.

Diagnosis. HIMANTOPUS haud inter collum posticum et dorsum collari albo: loris parte anteriore albâ, parte posteriore nigrâ.

Variations. IT is not known that any local races of this species occur.

Synonymy. Himantopus knudseni, *Stejneger, Proc. U. States Nat. Mus.* 1887, p. 81.

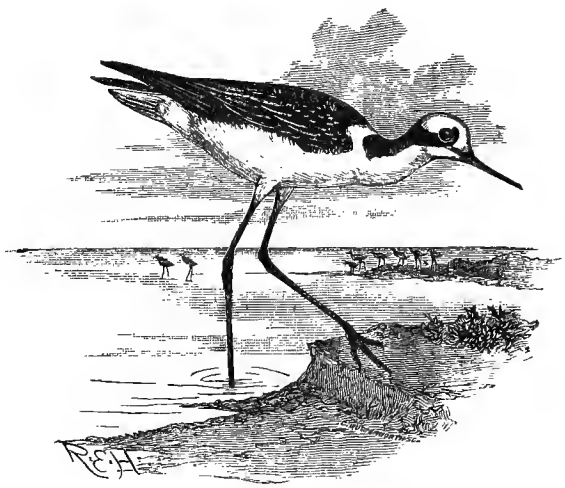
Specific characters. The Sandwich-Island Stilt is little more than an island form of *H. mexicanus*, but it appears to have become differentiated from the parent form in several ways. It has a

longer bill, a longer tail, and longer tarsi; but these characters are all of secondary importance, as none of them are likely to be found in the young. A more reliable feature is, however, to be found in the amount of black on the head and neck, which extends over the crown and down to the edge of the forehead, covering the posterior half of the lores, and also extends two thirds round the neck.

Geographical distribution.

It is only known from the Sandwich Islands, where it has been recorded from Honolulu (Pelzeln, Verh. zool.-bot. Ges. Wien, 1873, p. 159), Mani (Finsch, Ibis, 1880, p. 79), and Kanai (Stejneger, *loc. cit.*).

It is unquestionably most nearly related to *H. mexicanus*; but in the tendency of the black at the back of the neck to cover the sides, and even to be sparingly sprinkled over the front, it resembles *H. picatus*.



HIMANTOPUS BRASILIENSIS.

CHILIAN STILT.

Diagnosis.

HIMANTOPUS colli postici colore nigro super regionem paroticam, sed haud super pileum extenso.

Variations.

IT is not certain that *H. brasiliensis* is more than subspecifically distinct from *H. nigricollis*. I have several examples of the former species profusely marked with black on the crown, and one with very few traces of white on the collar. The former, which were collected by Read in Chili, I provisionally assume to be young birds after their first spring moult; and the latter, collected by Bartlett in Eastern Peru, being an isolated example, may possibly

be an instance of partial melanism. The subject requires further investigation, which may prove either that the two supposed species interbreed regularly and produce fertile offspring, or occasionally cross, producing barren hybrids.

Synonymy.

Himantopus brasiliensis, *Brehm, Vög. Deutschl.* p. 684 (1831).
Himantopus nigricollis, *auctorum multorum, nec Vieillot.*

Literature.

Plates.—Sclater and Salvin, Proc. Zool. Soc. 1873, p. 454 (woodcut of head); Baird, Brewer, and Ridgway, Water-Birds N. Amer. i. p. 345 (coloured plate of head).
Habits. } Durnford, Ibis, 1877, p. 198; Gibson, Ibis, 1880, p. 162; Durnford, Ibis, 1878,
Eggs. } p. 67.

Specific characters.

The Chilian Stilt may be recognized by the distribution of the *black on the back of the neck*, which extends *underneath the eye*, but *not on the crown*, and is separated from the black mantle by a white collar. Young in first plumage are supposed to differ from the young of *H. mexicanus* only in being duller in colour. At a very early age, long before the quills are moulted, the back of the neck becomes nearly black, leaving the crown and the collar at the bottom of the neck grey. Examples which may prove to be birds of the year when their first spring-moult is completed differ from adults in having the crown and the collar more or less mottled with black. It is possible, however, that this may be the result of crossing.

It breeds in the Chilian subregion of South America, many of the more southerly birds migrating northwards in autumn to winter in South Brazil.

Geographical distribution.

Hudson found it a resident near Buenos Ayres (Proc. Zool. Soc. 1868, p. 144); I have examples collected in Chili by Read probably near Valparaiso; Bartlett found it breeding in Eastern Peru (Proc. Zool. Soc. 1873, p. 310); Natterer obtained it in Western Brazil (Mus. Salvin and Godman); and it was originally described by Brehm from the latter country. Durnford confirmed Hudson's statement that it was, to some extent, a resident near Buenos Ayres, but adds that "the greater part leave in the spring and summer," so that its breeding-range must extend further south.

Nearest allies.

The Chilian Stilt appears to be most nearly related to the Australian Stilt, scarcely differing from it except in having a black band on the side of the head, and less white on the collar. It is, however, almost as nearly related to the North-American Stilt, being, in fact, an intermediate form between the two.

HIMANTOPUS LEUCOCEPHALUS.

AUSTRALIAN STILT.

Diagnosis.

HIMANTOPUS colli postici colore nigro nec ad caput nec ad dorsum extenso.

Variations.

INTERMEDIATE forms between this species and *H. melas* occur, but it is not known that they completely intergrade.

Synonymy.

Himantopus leucocephalus, *Gould, Proc. Zool. Soc.* 1837, p. 26.
Himantopus novæ-hollandiæ, *Bonaparte, Compt. Rend.* xliii. p. 421 (1856).

Literature.

PLATES.—Gould, Birds of Australia, vi. pl. 24.
HABITS.—Gould, Handb. B. Austr. ii. p. 246.
EGGS.—Campbell, Nests and Eggs of Australian Birds, p. 55.

Specific characters.

The Australian Stilt may be recognized when adult by the distribution of the *black on the back of the neck*, which *does not extend to any part of the head*, and is separated from the black mantle by a white collar. Young in first plumage are said to resemble the young of the Common Stilt.

Geographical distribution.

The Australian Stilt breeds in Australia, and has occurred in Tasmania. It may possibly be only a winter visitor to the Malay Archipelago, but it has been recorded from New Guinea, Celebes, Borneo, Java, Sumatra, the Philippines, and some of the smaller islands. Its alleged occurrence in New Zealand rests on very unsatisfactory evidence.

Nearest allies. It is most nearly related to the Black Stilt on the one hand, and on the other to the South-American Stilt.

HIMANTOPUS LEUCOCEPHALUS PICATUS.

NEW-ZEALAND PIED STILT.

Diagnosis. HIMANTOPUS LEUCOCEPHALUS collari albo inter collum posticum et dorsum nigro striato.

Variations. THE New-Zealand Pied Stilt is an intermediate form between the Australian Stilt and the Black Stilt. It completely intergrades with the former, and probably does so with the latter; but this is a question which the New-Zealand ornithologists seem unable to answer.

Synonymy. Himantopus picatus, *Ellman, Zoologist,* 1861, p. 7470.
Himantopus spicatus, *Potts, Trans. New Zealand Institute,* v. p. 198 (1872).

Literature. PLATES.—Unfigured.
HABITS.—Potts, Trans. New Zealand Institute, ii. p. 70.
EGGS, described by Potts on page 70 of the above-mentioned work as slightly smaller than those of *H. melas.*

Subspecific characters. Pied Stilts with white axillaries are found on both islands of New Zealand, having longer legs than the Black Stilt, the tarsus varying in adult birds from 3·7 to 4·4 inch. Most of these birds differ from *H. leucocephalus,* though very slightly. Either there are traces of black on the axillaries, or on the tail-feathers, or on the sides and front of the neck; and very often the white collar at the back of the neck is profusely streaked with black. It is, however, possible to find examples from Australia in which the white collar is slightly streaked with black, and which are indistinguishable from the whitest examples from New Zealand.

Probable origin. The New-Zealand Pied Stilt appears to be a colony of *H. leucocephalus* which has intermarried with the Black Stilt (*H. melas*), and shows a more or less conspicuous strain of the latter species. An example of the young in first plumage from New Zealand in the collection of Sir Walter Buller is, however, apparently pure-bred *H. leucocephalus* with white axillaries.

Potts remarks that it breeds on the swamps near the borders of pools and lakes in the South Island of New Zealand.

H. picatus. *H. melas.*

HIMANTOPUS MELAS.

BLACK STILT.

Himantopus axillaribus nigris. Diagnosis.

It is not known whether this species completely intergrades with *H. leucocephalus.* Variations.

Himantopus melas, *Hombr. & Jacq. Ann. Sc. Nat. Paris,* 2e sér. xvi. *Zool.* p. 320 (1841). Synonymy.
Himantopus novæ-zelandiæ, *Gould, Proc. Zool. Soc.* 1841, p. 8 (partim).
Himantopus niger, *Ellman, Zoologist,* 1861, p. 7470.

Plates.—Gould, Birds of Australia, vi. pl. 25. Literature.
Habits.—Potts, Trans. New Zealand Inst. ii. p. 70.
Eggs.—Harting, Proc. Zool. Soc. 1874, pl. lx. fig. 10.

The Black Stilt in adult summer plumage is *black all over,* more or less glossed with green on the upper parts. In immature and winter plumage it somewhat resembles *H. leucocephalus,* but may always be distinguished from it by its dark axillaries. The Black Stilt has on an average shorter legs than its Australian ally. Specific characters.

	Length of tarsi.	
	H. leucocephalus.	*H. melas.*
Young in first plumage.	4·0 in.	3·3 in.
Average of adults	4·4 in.	3·4 in.
Extreme	4·6 in.	3·7 in.

Geographical distribution.

The Black Stilt is a resident of New Zealand; its alleged occurrence in Australia appears to rest on insufficient evidence.

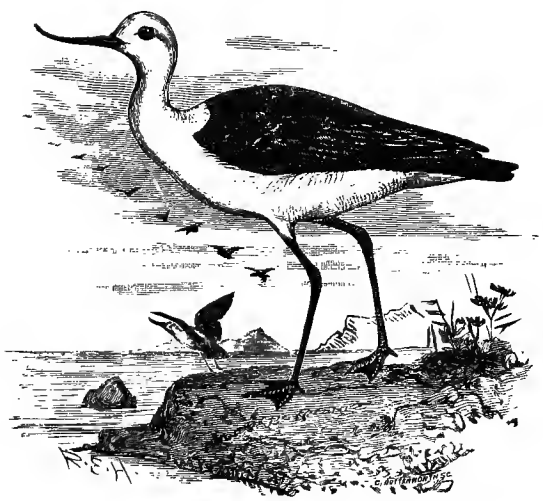
The approach of its winter plumage towards the adult dress of the Australian Stilt proves the close relationship of the two species; and the fact that the young in first plumage have the swollen joint between the tibia and the tarsus, so conspicuous in the young of *Œdicnemus*, points to its affinity with the birds of that genus.

Young.

Young in first plumage only differ from the same dress of *H. leucocephalus* in having dark brown axillaries, and dark outer webs to the tail-feathers.

Potts remarks that in the South Island of New Zealand this bird breeds on the sandy river-beds.

*** *Aberrant Stilt.*



HIMANTOPUS ANDINUS.

PERUVIAN STILT.

Diagnosis.

HIMANTOPUS secundariis omninò nigris: halluce parvo.

Variations.

THE very limited range of this species precludes the possibility of local races being formed.

Recurvirostra andina, *Philippi & Landbeck, Wiegm. Arch.* 1863, pt. i. p. 131. Synonymy.
Himantopus andinus (*Phil. & Landb.*), *Seebohm, Ibis,* 1886, p. 232.

PLATES.—Harting, Ibis, 1874, pl. ix. Literature.
HABITS.—Philippi & Landbeck, *loc. cit.*
EGGS.—Unknown.

The Peruvian Stilt is the only species of the genus having *webbed feet* and *a hind toe* which has *no white on the secondaries.* Specific characters.

It was for a long time only known from a single example obtained more than thirty years ago by Dr. Philippi near the salt lake of Atacama, about 16,000 feet above the level of the Pacific Ocean, on the confines of Peru and Chili. In 1886, however, three examples were obtained by Mr. Rahmer near Lake Huasco, about 10,000 feet above the sea, and about 200 miles further north. (Sclater, Proc. Zool. Soc. 1886, p. 404.) Geographical distribution.

It is specially interesting as an example of the connexion between the habits of a bird and the shape of its wings, a connexion doubtless of cause and effect. In the following table the Peruvian Stilt is compared with its two European representatives :— Non-migratory wings.

	Distance from carpal joint to tip of innermost primary.	From tip of innermost primary to tip of longest primary.
Peruvian Stilt	6 in.	$3\frac{1}{2}$ in.
Common Avocet	5 in.	$4\frac{1}{4}$ in.
Common Stilt	$4\frac{1}{2}$ in.	$5\frac{1}{4}$ in.

It is remarkable how the primaries are developed, apparently at the expense of the secondaries, in the two migratory species.

The Peruvian Stilt is the sole representative of the Semi-Stilts which, according to my hypothesis, emigrated from the Polar Basin along the Pacific coast of America. If the Stilts be regarded as generically distinct from the Avocets, the Peruvian Stilt has more right to demand a genus for itself than the Banded Avocet, for which the genus *Cladorhynchus* has been provided. The webbing of its feet is almost as much developed as that of the Avocets, with which it also agrees in having a recurved bill and a small hind toe. The black mantle, black scapulars, and black wings are, however, so utterly unlike any Avocet, and are so highly characteristic of every Stilt, that there can be no doubt that its affinities are as much or more with the latter than with the former. Nearest allies.

*** *Aberrant Avocet.*

HIMANTOPUS PECTORALIS.

BANDED AVOCET. (PLATE XIV.)

Diagnosis. HIMANTOPUS scapularibus omninò brunneis: interscapulario albo.

Variations. No local races of this species are known, but in young in first plumage and in adults in winter the whole of the underparts are white.

Synonymy.
Recurvirostra leucocephala, *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 103 (1816).
Recurvirostra orientalis, *Cuvier, Règ. An.* i. p. 496 (1817).
Leptorhynchus pectoralis, *Dubus, Mag. Zool.* v. pl. 45 (1835).
Himantopus palmatus, *Gould, Syn. Birds Austr.* ii. pl. 14 (1837).
Cladorhynchus pectoralis (*Dubus*), *Gray, List Gen. Birds*, p. 69 (1840).
Cladorhynchus orientalis (*Cuv.*), *Selys-Longchamps, Bull. d'Ac. Roy. Belg.* xviii. pt. i. p. 9 (1851).
Himantopus pectoralis (*Dubus*), *Schlegel, Mus. Pays-Bas, Scolopaces*, p. 108 (1864).
Cladorhynchus leucocephalus (*Vieill.*), *Harting, Ibis*, 1874, p. 252.

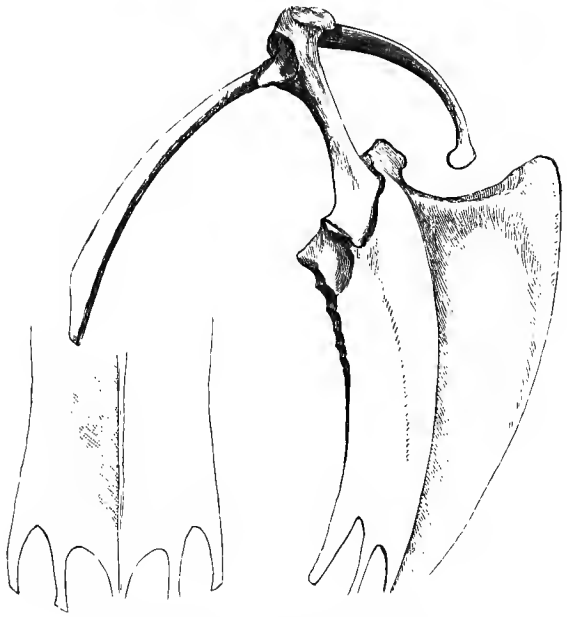
Literature.
PLATES.—Gould, Birds of Australia, vi. pl. 26.
HABITS.—Gould, Handb. B. Austr. ii. p. 248.
EGGS.—Campbell, Nests and Eggs of Australian Birds, p. 55.

Specific characters. The Banded Avocet may be distinguished at all ages and seasons by its *white mantle* and *brown scapulars*, a combination found in no other species of the genus. A second and equally good diagnosis is *webbed feet*, but *no hind toe*. In breeding-plumage the lower breast is chestnut, shading into a brown ventral band.

Geographical distribution. It is a resident in the southern half of Australia, and has occurred in Tasmania.

The Banded Avocet is the sole representative of the Semi-Avocets, which I have endeavoured to show probably emigrated from the Polar Basin along the Pacific coast of Asia. If we regard its white mantle, the great amount of white on its wing, and its deeply webbed toes as important characters we must unhesitatingly pronounce it to be an Avocet; but the straightness of its bill, the absence of any white on its scapulars, and the fact that it has only three toes are all arguments in favour of enrolling it amongst the Stilts. Inasmuch as Nature has not drawn a hard-and-fast line between the Avocets and the Stilts, it must surely be unwise for the scientific ornithologist to attempt to do so.

*** *Typical Avocets.*



Sternum of *Himantopus avocetta*.

HIMANTOPUS AVOCETTA.

COMMON AVOCET.

Himantopus remigibus tertii ordinis aut albis (in adult.) aut brunneis albo fasciatis (in juv.). Diagnosis.

Swinhoe's types of *Recurvirostra sinensis* are slightly suffused with grey on the mantle and hind neck; but other examples from China do not differ from North-European or African birds. Variations.

Recurvirostra avosetta, *Linneus, Syst. Nat.* i. p. 151 (1758); *Linn. Syst. Nat.* i. p. 256 (1766). Synonymy.
Avocetta avocetta, *Brisson, Orn.* vi. p. 538 (1760).
Scolopax avocetta (*Linn.*), *Scopoli, Ann. I. Hist. Nat.* p. 92 (1769).
Avocetta europæa, *Dumont, Dict. Sc. Nat.* iii. p. 339 (1816).
Recurvirostra sinensis, *Swinhoe, Ibis,* 1867, p. 401.
Himantopus avocetta (*Linn.*), *Seebohm, British Birds,* iii. p. 74 (1885).

Literature.

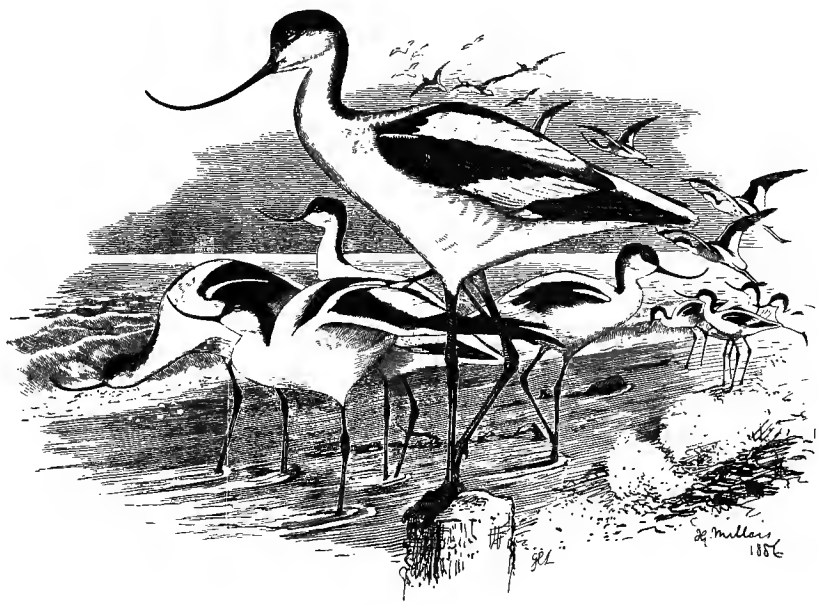
PLATES.—Dresser, Birds of Europe, vii. pl. 534; Gould, Birds of Gt. Britain, iv. pl. 53.
HABITS.—Seebohm, British Birds, iii. p. 74.
EGGS.—Seebohm, British Birds, pl. 24. figs. 2, 5.

Specific characters.

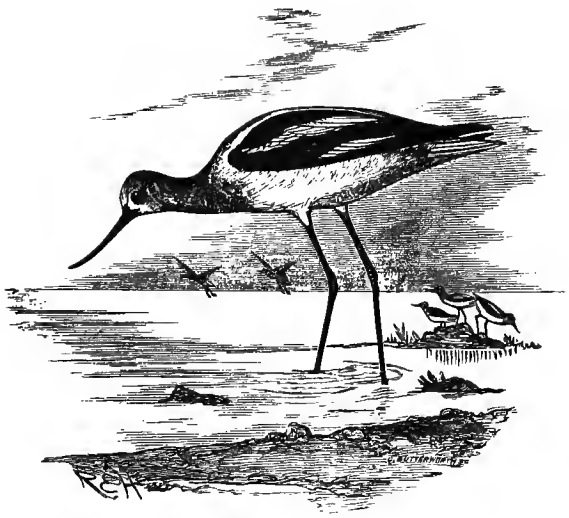
The Common Avocet may be distinguished by the colour of its *forehead, crown, and hind neck,* which are *black in the adult* and *brown in young* in first plumage. Its white innermost secondaries when adult are also peculiar to the species; in young in first plumage they are greyish brown obscurely barred with white.

Geographical distribution.

The increase of population and the drainage of marshes have restricted the breeding-places of the Avocet in Europe to the islands off the coasts of Denmark and Holland, the marshes of Southern Spain, the delta of the Rhone, and the lagoons on the shores of the Black Sea. To Southern Scandinavia and the rest of Central and Southern Europe, with the exception above mentioned, the Avocet has become, as it is in our islands, only an accidental visitor; but further east it is more abundant, breeding in Palestine and Persia, where it is a resident, and in North Turkestan, the extreme south-west of Siberia, South-east



Mongolia, and South Dauria, where it is a summer visitor, wintering in China, Formosa, Hainan, India, and occasionally Ceylon. It has been recorded from the main island of Japan. In Asia Minor it is principally known on passage, though a few are said to remain during the winter; and it is said to breed throughout Africa in suitable localities. It is common on the west coast of Madagascar, and probably breeds there.



HIMANTOPUS AMERICANUS.

NORTH-AMERICAN AVOCET.

Diagnosis. HIMANTOPUS secundariarum pogoniis externis et primariis interioribus pro majore parte brunneis.

Variations. No local races of this species are known.

Synonymy.
Recurvirostra americana, *Gmelin, Syst. Nat.* i. p. 693 (1788).
Recurvirostra occidentalis, *Vigors, Zool. Journ.* iv. p. 356 (1829).
Himantopus americanus (*Gmel.*), *Seebohm, British Birds,* iii. p. 75 (1885).

Literature.
PLATES.—Wilson, Amer. Orn. pl. 63. fig. 2; Gray, Genera of Birds, iii. pl. 155.
HABITS.—Baird, Brewer, and Ridgway, Water-Birds N. Amer. i. p. 341.
EGGS.—Thienemann, Abbild. Vogeleiern, pl. lxvi. fig. 3. Eggs in my collection are indistinguishable from those of the Common Avocet.

Specific characters. The North-American Avocet may be distinguished at all ages by the colour of its *secondaries,* which are *white, with the greater part of the outer web brown.* In breeding-plumage the head and neck are pale chestnut.

Geographical distribution.

It breeds in North America, as far north as the Great Slave Lake, and as far south as Texas. To the northern portion of its range it is only a summer visitor, wintering in Central America and the West Indies. Like its congeners it prefers the sandbanks near the shores of the sea, or the margins of salt lakes.

HIMANTOPUS RUBRICOLLIS.

AUSTRALIAN AVOCET.

Diagnosis. HIMANTOPUS secundariarum pogoniis ambobus albis: scapularibus albo ornatis: remigibus tertii ordinis haud albo ornatis.

Variations. No local races of this species are known. Examples from New Zealand do not differ from those from Australia.

Synonymy.

Recurvirostra novæ-hollandiæ, *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 103 (1816).
Recurvirostra rubricollis, *Temminck, Man. d'Orn.* ii. p. 592 (1820).
Avocetta novæ-zealandiæ, *Ellman, Zoologist,* 1861, p. 7470.
Himantopus novæ-hollandiæ (*Vieill.*), *Seebohm, British Birds,* iii. p. 75 (1885).
Himantopus rubricollis (*Temm.*), *Seebohm, Ibis,* 1886, p. 229.

Literature.

Plates.—Gould, Birds of Australia, vi. pl. 27.

Habits.—Buller, Birds of New Zealand, p. 201.

Eggs.—Campbell, Nests and Eggs of Australian Birds, p. 55. Indistinguishable from those of the Common Avocet.

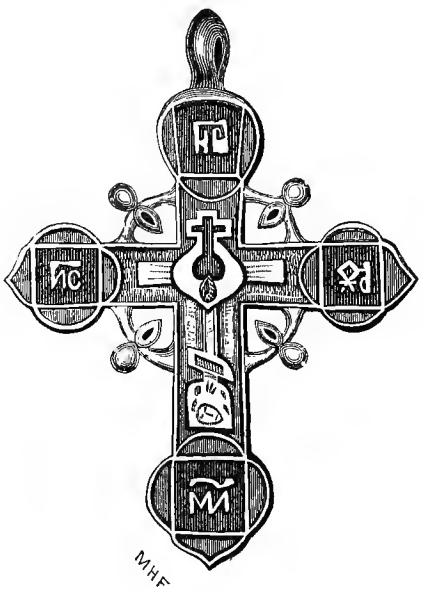
Specific characters.

The Australian Avocet may be diagnosed at all ages by its combination of the following characters:—*secondaries white* on both webs, a great deal of *white on the scapulars*, but *none on the tertials*. In breeding-plumage the head and neck are chestnut.

Geographical distribution.

It is found throughout Australia, except in the extreme north, and occasionally occurs in Tasmania, New Zealand, and Norfolk Island.

The Australian Avocet is an intermediate form between the Common Avocet and the North-American Avocet; it has less white on the wing than the former and more than the latter.



CHAPTER XVIII.

Genus HÆMATOPUS.

Diagnosis of genus.

CHARADRIINÆ rostro recto: tarso reticulato, quam rostrum breviore.

THE Oystercatchers are a small compact group of birds, very closely connected with each other, and very clearly differentiated from all other groups of birds.

Generic characters.

In the subfamily of *Charadriinæ* the scutellations of the tarsus vary to a remarkable degree. In some species the tarsus is covered both in front and at the back with broad scutellations, the front row being connected with the back row by fine reticulations which cover the side of the tarsus. In other species the front row of scutellated plates alone is present, the back of the tarsus as well as the sides being covered with fine reticulations; whilst in a third group the fine reticulations extend all round the tarsus. These three groups are obviously artificial, and are not separated from each other by a hard-and-fast line; but many genera include forms which are intermediate between one and the other. Nothing of this kind, however, occurs in the Oystercatchers; they all clearly and undoubtedly belong to the third category, in which the whole of the tarsus is covered by a fine network of small hexagonal reticulations. To this group belong also the Ibis-billed Oystercatcher (*Ibidorhynchus*), the Stone-Curlews (*Œdicnemus*), the Stilts and Avocets (*Himantopus*), and some of the Plovers (*Charadrius*). To distinguish the genus *Hæmatopus* from these genera it is necessary to take into consideration two other characters. Compared with the Stilts, Stone-Curlews, and Plovers, the Oystercatchers have long bills and short legs, so that the character of *bill longer than tarsus* effectually excludes these birds. It does not, however, exclude some of the Avocets, with their slender recurved bills, or the Ibis-billed Oystercatcher, with a bill decurved like that of a Curlew. The clumsy, nearly straight bill of the Oystercatchers distinguishes them from these birds. In spite, however, of the extraordinary fact that it possesses a bill of such a totally different shape from that of Oystercatchers, there can be no doubt that the Ibis-billed Oystercatcher is their nearest surviving relative; it is, in fact, nothing but an Oystercatcher with a modified bill. The bill of the Oystercatchers is very abnormal. Most birds have beautiful bills,

remarkable for the subtlety of their curves, but the bill of the Oystercatchers can only be regarded by an artist as "sadly out of drawing." The diagnosis of the genus *Hæmatopus* will therefore stand as follows:—

CHARADRIINÆ with a *nearly straight bill, longer than the tarsus, which is reticulated all round.* Each of these three characters may be found in other birds of this family, but no birds belonging to it combine all three characters, except the Oystercatchers.

Synonymy of the Genus HÆMATOPUS.

	Type.
Hæmatopus, *Linneus, Syst. Nat.* i. p. 152 (1758); *Linn. Syst. Nat.* i. p. 257 (1766)	H. ostralegus.
Ostralega, *Brisson, Orn.* v. p. 38 (1760)	H. ostralegus.
Melanibyx, *Reichenbach, fide Bonap. Compt. Rend.* xliii. p. 420 (1856) . . .	H. ater.

Determination of the type.

The European Oystercatcher (*Hæmatopus ostralegus*), being the only Oystercatcher which was known to Linneus or Brisson, is of necessity the type.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Pied.	PALÆARCTIC REGION.	*Black.*
H. OSTRALEGUS	*West.*	
H. OSCULANS	*East.*	
	ETHIOPIAN REGION.	
	Throughout.	H. CAPENSIS.
	AUSTRALIAN REGION.	
H. LONGIROSTRIS	*Throughout.*	H. UNICOLOR.
	NEARCTIC REGION.	
H. PALLIATUS	*South.*	
	West.	H. NIGER.
	NEOTROPICAL REGION.	
H. LEUCOPUS	*South.*	H. ATER.
H. GALAPAGENSIS	*Galapagos Islands.*	

Climatic distribution.

The distribution of the Oystercatchers is unique, and cannot be made to fit in with any system of geographical or zoological regions. It is so far independent of climate, that every species breeds in two climates, but very often on only one coast of them. The Oystercatchers are distributed as follows:—

Arctic and Temperate America	1	
Arctic and Temperate Eurasia	2	
Arctic and Temperate species	—	3
Tropical and North and South Temperate America .	1	
Subtropical shores of the Galapagos	1	
Tropical and South Temperate America	2	
Tropical and Temperate Africa	1	
Tropical and South Temperate Asia	2	
Tropical and Temperate species	—	7
Species and subspecies of *Hæmatopus*	—	10

The most remarkable fact in this unique distribution is the extended range of *H. palliatus*. This species is said to breed from Labrador to Patagonia on the Atlantic coast, and from California to Chili on the Pacific coast. No other bird in the family has a breeding-range at all equivalent to this.

The Oystercatchers must be regarded as belonging to the Temperate Region, within which every species breeds—one third of the species or subspecies breeding also in the Arctic Region, and the breeding-range of the remaining two thirds extending into the Tropical Region.

Local distribution.

The Oystercatchers are almost cosmopolitan in their range. They are strictly shore-birds, but few of them confine themselves to the sea-shore; they frequent the margins of lakes, the banks of great rivers, and are occasionally seen in other localities inland during migration. Some species are migratory, others resident, whilst some are migratory in one part of their range and sedentary in another part. They are semi-arctic birds, the limit of their northern range corresponding to a considerable extent with the isothermal lines of mean annual temperature. In North-west Europe, where the influence of the Gulf-stream raises the latitude of suitable climate, Oystercatchers breed as far north as lat. 70°, in East Russia and West Siberia up to 66°, but in East Siberia and on the American continent only up to about 60°. In the Southern Hemisphere the southern limit of their breeding-range is determined by the limitation of the land. No Oystercatcher is known to breed within the Tropics on the mainland, but they breed on some of the islands within the Tropics —the Bahamas, the Galapagos Islands, the islands on the north coast of Australia, and possibly elsewhere; otherwise Oystercatchers are only winter visitors to the Tropics.

Geographical distribution.

The geographical distribution of the Oystercatchers may be broadly stated as follows: Entirely absent from both the Arctic and Antarctic Regions; breed in the Temperate Regions

both north and south of the equator, both in the New and Old Worlds; winter visitors to the tropics of both hemispheres.

Original home.

There is abundant evidence in support of the hypothesis that the centre of dispersion of the *Charadriidæ* was the North Pole; and that the Oystercatchers were originally residents on the shore of the Polar Sea, whence they were dispersed and driven southwards by the arctic ice which formed and reformed during the Post-Pliocene Glacial Epoch. Isolated on various distant shores, the Oystercatchers were differentiated into several specific and subspecific forms. It is very interesting to trace their wanderings and to note their specific differences, which agree in a remarkable manner with the hypothesis of their polar origin and with their present geographical distribution, although the latter bears no sort of relation to the geographical regions laid down by Messrs. Sclater and Wallace, which refer to Passerine birds, but are seldom recognized by those belonging to other families.

Dispersal.

When the descent of an arctic climate upon the North Polar regions drove the residents of the Polar Basin into more southern latitudes, coast-birds like the Oystercatchers could escape by four routes: they could either follow the European or the American shores of the Atlantic, or the Asiatic or American shores of the Pacific. If they availed themselves of all four routes, the emigrants must soon have become isolated in four colonies, which eventually produced four species or groups of species. Behring's Straits lies 25° south of the Pole, and the Asiatic coast is connected by a row of islands with the Pacific coast as far as 40° from the Pole, so that isolation, and consequently differentiation, began late with the Pacific birds; whilst in the Atlantic the emigrants were probably effectually isolated for ever by Greenland's icy mountains at a distance of not more than 5° or 7° from the Pole. It is consequently reasonable to expect that the Pacific Oystercatchers should be nearer allied to each other than the Atlantic Oystercatchers are.

Emigration along Atlantic coast of Europe.

The facts that the European Oystercatcher (*H. ostralegus*) is a resident in Iceland, has been known to visit Greenland, and is a regular summer visitor to the coast of Lapland, seem to prove that the group to which it belongs left the Polar Basin in two streams or lines of emigration—one following the eastern shores of Greenland, crossing Iceland, the Faroes, and the coasts of Great Britain to the coasts of West Europe, where it coalesced with the other stream of birds which followed the coast of Scandinavia.

The West Coast of Africa south of Morocco appears to have been of such a desert character that the Oystercatchers were afraid to emigrate further in that direction. The basin of the Mediterranean, on the other hand, provided the necessary outlet for the surplus population, and the stream of emigration continued to flow eastwards from sea to sea, lake to lake, and river to river, at least as far as the Obb. The advanced party appear to have pushed forward still more to the east, and to have reached the valley of the Amoor, whence they never returned, but, following the course of that river to its mouth, they established an independent colony. The cessation of interbreeding between the birds of this colony and the parent stock soon caused a variation between them, and the eastern birds are

now generally regarded as specifically distinct, under the name of Japanese Oystercatcher (*H. osculans*), but the difference, though constant, is very slight.

Probably the same catastrophe which drove the Japanese Oystercatcher to the east, an unusually late cold spring, induced a second party to start from the winter-quarters in Ceylon, in order to emigrate in a different direction in search of more advantageous breeding-grounds, which they appear to have found in Australia, where they were in process of time differentiated into the Australian Pied Oystercatcher (*H. longirostris*).

These three species represent the group of Oystercatchers which emigrated along the Atlantic coast of the Old World, and may be characterized as having red legs and a white rump, as well as white bellies.

Emigration along Atlantic coast of America.

Their nearest allies are two or three species inhabiting the New World, which presumably emigrated along its Atlantic coast, a theory confirmed by the fact that their descendants range at present much further north on the east coast of America than they do on the west coast [1].

Leaving Greenland to the left, the ancestors of the North-American Pied Oystercatcher (*H. palliatus*) probably retreated from the Polar ice down Baffin's Bay, and gradually extending their range southwards along the Atlantic coast of North and South America, rounded Cape Horn, and turning northwards again along the Pacific coast of South America their descendants have extended their range northwards as far as Lower California, which appears to be the present limit of the emigration of this party. This route precisely corresponds (so far as is known) with the present range of the species, except that it is not now found north of Labrador.

The Falkland-Island Pied Oystercatcher (*H. leucopus*) is unquestionably an offshoot of the preceding species, which has become differentiated in consequence of its having become isolated on the Falkland Islands, whence it probably spread later to the islands off the Patagonian coast.

On the Galapagos Archipelago a species of Oystercatcher has recently been discovered which appears to be exactly intermediate been *H. palliatus* and *H. leucopus*, having the smaller dimensions of bill of the former, but the darker mantle of the latter. As the dimensions of the bill are a very variable character in this genus, and the colour of the mantle a very stable one, I have treated *H. galapagensis* as a subspecies of the latter form.

These two (or three) species represent the Atlantic New-World group of Oystercatchers, which may be characterized as having flesh-coloured legs, white bellies, and dark rumps.

Emigration along Pacific coast of America.

Turning now to the Pacific Ocean, it is obvious that the North-American Black Oystercatcher (*H. niger*) and its southern allied race, which range from Alaska to California, and from Chili through the Straits of Magellan to the Falkland Islands, emigrated along

[1] This difference cannot be explained by an equivalent difference in the range of the isothermal lines. On the Atlantic coast *H. palliatus* breeds as far north as the July isothermal of 52°, but on the Pacific coast it only ranges up to the July isothermal of 72°.

the Pacific coast of the New World. The South-American Black Oystercatcher (*H. niger ater*) is evidently the result of an emigration from the range of the preceding species, which has caused a colony to cross the Tropics and establish themselves as residents on the coasts of Chili, Patagonia, and the Falkland Islands; but the isolation of the two colonies thus produced does not appear to have lasted quite long enough for the complete differentiation of the two forms.

These two forms represent the Pacific New-World group of Oystercatchers, which may be characterized as having the whole of the plumage black and the legs flesh-coloured.

Emigration along Pacific coast of Asia.

There yet remain for consideration two very closely allied Oystercatchers, and we have yet undisposed of the route by way of the Pacific coast of the Old World. If the connection between them be a historical one, the ancestors of the Australian Black Oystercatcher (*H. unicolor*) must have followed the mountainous coast of China, and have crossed the too tropical Malay Archipelago to settle in Australia and New Zealand.

Instead of retracing their steps to the Behring Sea, the surplus population of the Australian Black Oystercatchers appear to have emigrated westwards to South Africa, which has resulted in a nearly allied, and not yet more than subspecifically distinct, race, the African Black Oystercatcher (*H. unicolor capensis*).

These two forms represent the Pacific Old-World group of Oystercatchers, which may be characterized as having the whole of the plumage black and the legs red.

We have now attempted to trace the history of the American detachment of Oystercatchers, and we have tried to follow the fortunes of the other portion which retreated along the shores of the Old World. The two American parties found a comparatively restricted coast-line at their disposal, and both of them seem to have been glad enough to retrace their steps, after the glacial climate had passed away, almost to the entrance of the Polar Sea. The Asiatic party, on the other hand, found a practically unlimited extent of coast-line suitable to their requirements. They seem to have had room and to spare in Australia, South Africa, and on some of the numerous islands in the southern half of the Eastern Hemisphere; consequently they never had occasion to recross the line to occupy once more their old route of emigration on the Pacific coast of Asia. But although they wandered to the other side of the world, the fact that the two Pacific parties travelled in company for more than two thousand miles further than the two Atlantic parties could have done has produced precisely the results which we anticipated: the Pacific Old-World Oystercatchers scarcely differ from the Pacific New-World Oystercatchers in anything beyond the colour of their legs.

This completes the list of Oystercatchers, a group of birds whose peculiarities of colour and whose geographical distribution bear unmistakable evidence of the Glacial Epoch almost as obvious as the geological evidence. We can trace almost with certainty the routes which the various parties took on their emigration from the shores of the Polar Basin. The great invasion of Europe by Pallas's Sand-Grouse in 1863 is almost the only instance of sudden migration which the present generation of ornithologists have witnessed, but the

gradual extension of the breeding-areas of many spccies of birds has been remarked over and over again. As regards the Oystercatchers, it seems to me that we can almost trace their history from the origin of the genus in the small area of the Polar Basin, its dispersal along the four great coast-lines or highways leading southwards, and its subsequent distribution, sometimes by sudden emigration, sometimes by a gradual extension of its range, until it has become nearly cosmopolitan.

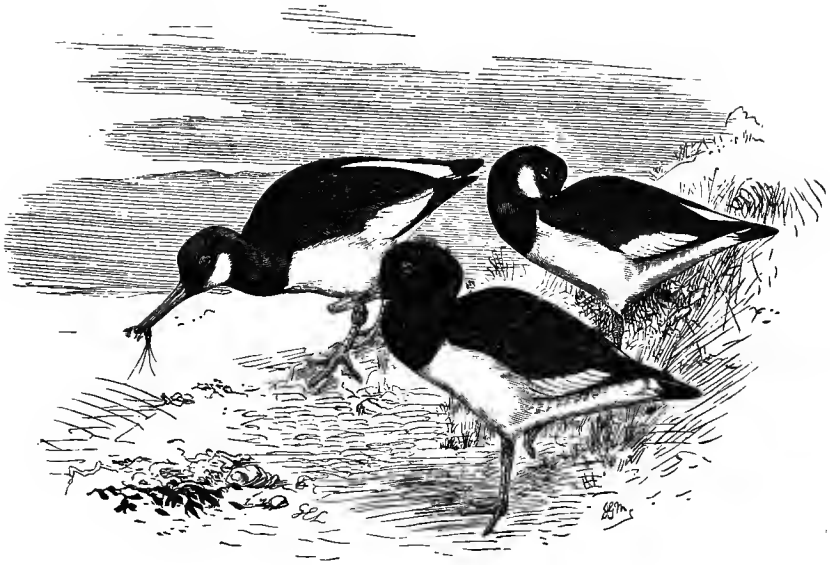
KEY TO THE SPECIES.

There appear to be seven distinct species of Oystercatchers, but three of them may be again subdivided into local races, which vary slightly in the length and thickness of the bill, as is hereafter explained. The seven species may be diagnosed as follows:—

- Legs pale flesh-colour . . .
  - **palliatus** . . . . — Mantle and rump greyish brown.
  - **leucopus** . . . .
- Entire plumage nearly black.
  - **niger** . . . . . — No white on primaries.
  - **unicolor** . . . .
- Rump white . . . . . .
  - **longirostris** . . . — No white on primaries.
  - **osculans.**
  - **ostralegus** . . . — White shaft-streak extending a little on outer web of 4th primary, much on 5th.

This key to the species applies to young in first plumage, as well as to adults. The young of *H. ostralegus* bears a superficial resemblance to *H. palliatus*, as does also that of *H. osculans*, in both species the black parts of the adult plumage being frequently brown in the young; but *H. palliatus* may always be recognized by its brown instead of white rump, or by the absence of white on its primaries. The differences between thesub specific allies of *H. leucopus*, *H. niger*, and *H. unicolor*, and their respective parent forms are pointed out in the pages devoted to each of the latter.

*** *Typical or Pied Oystercatchers.*



HÆMATOPUS OSTRALEGUS.

EUROPEAN OYSTERCATCHER.

HÆMATOPUS primariæ quartæ quintæque pogoniis externis maculâ albâ notatis. Diagnosis.

BREHM subdivided the Common Oystercatcher into three species, founded on alleged differences in the shape of the skull and feet and the number of quills, but modern ornithologists are unable to discover any local races of this species. Variations.

Hæmatopus ostralegus, *Linneus, Syst. Nat.* i. p. 152 (1758) ; *Linn. Syst. Nat.* i. p. 257 (1766). Synonymy.
Ostralega ostralega, *Brisson, Orn.* v. p. 38 (1760).
Scolopax pica, *Scopoli, Ann. I. Hist. Nat.* p. 95 (1769).
Ostralega pica (*Scop.*), *Bonnaterre, Encycl. Méth.* i. p. 26 (1790).
Hæmatopus hypoleuca, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 129 (1826).
Ostralega europæa, *Lesson, Man. d'Orn.* ii. p. 300 (1828).
Ostralegus vulgaris, *Lesson, Rev. Zool.* 1839, p. 47.
Ostralegus hæmatopus, *Macgillivray, Man. Brit. B.* ii. p. 59 (1842).
Hæmatopus macrorhynchus, *Blyth, Journ. As. Soc. Beng.* xiv. p. 548 (1845).

Literature.

PLATES.—Daub. Pl. Enl. no. 929; Gould, Birds of Gt. Brit. iv. pl. 44; Dresser, Birds of Europe, vii. pl. 533.

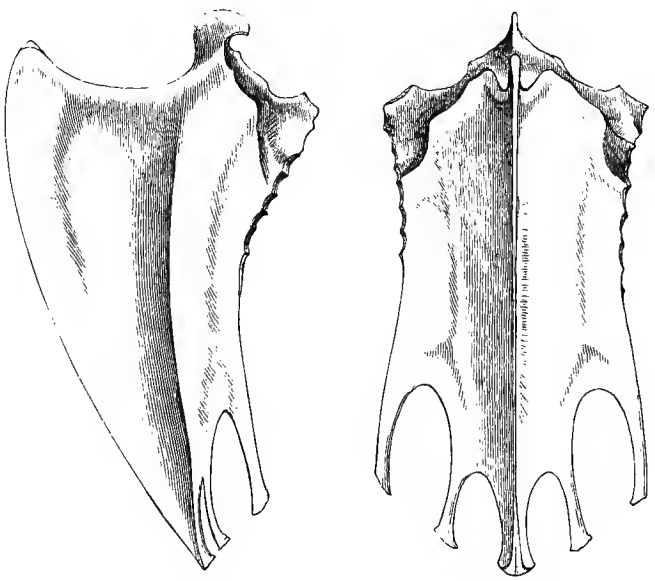
HABITS.—Seebohm, British Birds, iii. p. 4.

EGGS.—Seebohm, British Birds, pl. 24.

Specific characters.

The European Oystercatcher differs from the North-American Pied Oystercatcher in many important particulars besides the colour of its legs. Like all the Old-World Oystercatchers, it has *red legs*—perhaps dull crimson expresses the exact shade of red. The underparts are precisely like those of its ally; but its *lower back, rump, and upper tail-coverts are white*, whereas in the latter the upper tail-coverts only are white. The predominant colour of the secondaries, on the other hand, is black in the Pied Oystercatchers of the Old World, and white in those of the New World.

It may be recognized by having *the white on the primaries well marked on the outer webs of the fourth and fifth*, first appearing on the outside web of the third quill, and on the inside web of the first.



Geographical distribution.

The West Palæarctic species ranges from the Atlantic to the valley of the Obb. In the western portion of its distribution it is almost exclusively a sea-shore bird, but east of the Mediterranean and the White Sea it is only found during the breeding-season on the shores of lakes and rivers. It is a regular summer visitor to the coasts of North-west Europe as far north as land extends, and as far east as Archangel. Further east it is no longer found on the sea-shore, but ascends all the great rivers which empty themselves into the Black Sea, as well as the Volga and the Kama, crossing over to the Petchora, on the banks of which river, as also on those of the Obb, it ranges as far north as the Arctic

Circle. It has been recorded from Greenland, and is a resident in Iceland, the Faroes, and probably St. Kilda. It is a summer visitor to the shores of the Baltic, but on the coasts of North Germany, Great Britain, and France it is a resident. In the basin of the Mediterranean it is principally known as passing through on spring and autumn migration; but a few remain to breed in the delta of the Rhone and on the Adriatic coast, where also a few remain during winter. It winters on both coasts of Africa, on the west as far south as Senegambia, and on the east as far south as Mozambique. It is a resident in the Caucasus; but to the valleys of the South-Russian rivers, and to the lakes and rivers of Western Siberia and Turkestan, it is a summer visitor, wintering on the Mekran coast and the west coasts of India as far south as Ceylon.

HÆMATOPUS OSCULANS.

JAPANESE PIED OYSTERCATCHER.

Diagnosis. HÆMATOPUS primariæ sextæ (nec tertiæ, nec quartæ, nec quintæ) pogonio externo maculâ albâ ornato.

Variations. No local races of this species are known.

Synonymy. Hæmatopus osculans, *Swinhoe, Proc. Zool. Soc.* 1871, p. 405.

Literature. PLATES.—Unfigured.
HABITS.—Swinhoe, Ibis, 1861, p. 261; Swinhoe, Ibis, 1875, p. 129.
EGGS, in the Swinhoe collection, resemble those of the European species, but are much less spotted than usual.

Specific characters. The Japanese Pied Oystercatcher only differs from the British species, with which we are familiar, in having on an average a longer bill, in having the upper tail-coverts more constantly tipped with black, and in having much less white on the wings. *The white on the outside web of the primaries does not appear until the sixth quill*, and on the inside web not until the second quill; whereas in the European bird the white on the outside web appears on the third quill, and that on the inside web on the first.

Geographical distribution. The range of the Japanese Pied Oystercatcher extends for perhaps a hundred miles up the Amoor, and northwards to the shores of the Sea of Okhotsk, between East Siberia and Kamtschatka. Southwards it reaches the shores of North China, and in winter those of

South China. They still appear to retain some tradition of their western origin, and occasionally a bird will attempt to find its way back again across country, and appear as an unwonted visitor in Burma or Arrakan.

HÆMATOPUS LONGIROSTRIS.

AUSTRALIAN PIED OYSTERCATCHER.

Diagnosis. HÆMATOPUS uropygio albo: primariis haud albo maculatis.

Variations. No local races of this species are known, but it is said to interbreed with *H. unicolor*, the intermediate form thus produced being probably a barren hybrid.

Synonymy. Hæmatopus longirostris, *Vieillot, N. Dict. d'Hist. Nat.* xv. p. 410 (1817).
Hæmatopus picatus, *Vigors, King's Voy. Austr., Append.* p. 420 (1826).
Hæmatopus australasianus, *Gould, Proc. Zool. Soc.* 1837, p. 155.

Literature. PLATES.—Gould, Birds of Australia, vi. pl. 7.
HABITS.—Potts, Trans. New Zealand Inst. ii. p. 69; Gould, Handb. Birds Austr. ii. p. 215.
EGGS.—Campbell, Nests and Eggs of Australian Birds, p. 52.

Specific characters. The Australian Pied Oystercatcher may be recognized by its having a *white rump*, but *no white on the primaries*. It differs somewhat more from our birds than its Japanese ally. Both the eastern birds have light red legs, but the Australian species has lost all trace of white on its primaries, and the black of the mantle is also more developed, extending some distance on the lower back.

Geographical distribution. This species is a resident on the coasts of New Zealand, Tasmania, and Australia, but does not range further north than the southern shores of New Guinea and the other islands immediately to the north of Australia.

Potts remarks that it frequently ascends the rivers, sometimes as far as seventy miles from the coast, to breed. In this respect it agrees with its two nearest allies, *H. ostralegus* and *H. osculans*, but differs from its more distantly connected relations in the New World, *H. palliatus* and *H. leucopus*, which are said to be strictly coast-birds.

HÆMATOPUS PALLIATUS.

NORTH-AMERICAN PIED OYSTERCATCHER.

Diagnosis.

HÆMATOPUS dorso uropygioque brunneis.

Variations.

NOTWITHSTANDING the extraordinary breeding-range of this bird, no local races are known, except that on the Galapagos Archipelago a form occurs which may possibly prove to be an intermediate link between *H. palliatus* and *H. leucopus*, completely connecting them.

Synonymy.

Hæmatopus palliatus, *Temminck, Man. d'Orn.* ii. p. 532 (1820).
Hæmatopus brasiliensis, *Lichtenstein, Verz. Doubl.* p. 73 (1823).
Ostralega palliata (*Temm.*), *Lesson, Traité d'Orn.* p. 548 (1831).
Hæmatopus arctieus, *Jardine, Wilson's Amer. Orn.* iii. p. 35 (1832).

Literature.

PLATES.—Wilson, Am. Orn. pl. 64. fig. 2.
HABITS.—Baird, Brewer, and Ridgway, Water-Birds N. Amer. i. p. 112.
EGGS, described by Brewer, on p. 115 of the above-mentioned volume, as similar to those of the European speeies, but on an average slightly larger.

Specific characters.

The North-American Pied Oystercatcher, like *all* the other Oystercatchers, has the entire head and neck nearly black, and the bill red. It resembles *all* the *Pied* Oystercatchers in having the greater wing-coverts, the upper tail-coverts, and the underparts below the breast white. Further, it agrees with *all* the Oystercatchers of the *New* World in having pale flesh-coloured legs, and with its Falkland-Island ally in having white the predominant colour of the secondaries. Its specific character consists in having the rest of the plumage (*i. e.*, the *upper parts below the black neck, with the exception of the greater wing-coverts and the upper tail-coverts*) *dark brown*, instead of black.

Geographical distribution.

This species is said to be a partial resident on both coasts of Central America, breeding on many of the adjacent groups of islands, as the Tres Marias Islands in the Pacific, and Cuba and the Bahama Islands in the Atlantic. To the north of the latter locality it is a summer visitor to the Atlantic coast of the United States, and according to Audubon to Labrador. On the Pacific coast of the American continent it has not been recorded quite so far north as San Francisco. How far south its range extends along the coasts of South America it is difficult to determine, but it appears to range as far south as the Gulf of

St. George. Durnford believed that he met with this species breeding on the Atlantic coast of Patagonia in lat. 44°, and Mr. John Young has recently brought home an example from Tova Harbour in lat. 45°. I have examples of both this species and *H. leucopus* collected by Read in Chili, probably near Santiago.

It is a remarkable fact that this bird does not appear to ascend any of the large rivers of America, as the Pied Oystercatchers of the Old World very frequently do, especially during the breeding-season.

HÆMATOPUS LEUCOPUS.

FALKLAND-ISLAND PIED OYSTERCATCHER.

Diagnosis. Hæmatopus uropygio nigro: abdomine albo.

Variations. It is probable that the Oystercatcher found on the Galapagos may be a cross between *H. leucopus* and *H. palliatus*, but it is possible that the birds described by Ridgway are birds of the year of the former species.

Synonymy. Hæmatopus leucopus, *Garnot, fide Lesson and Garnot, Voy. Coquille, Zool.* i. p. 721 (1826).
Ostralega leucopus, *Lesson, fide Lesson and Garnot, Voy. Coquille, Zool.* i. p. 721 (1826).
Hæmatopus luctuosus, *Cuvier, Règne Animal*, i. p. 504 (1829).

Literature. Plates.—Jardine and Selby, Ill. Orn. iii. pl. 125 (incorrectly styled *H. palliatus*).
Habits.—Abbott, Ibis, 1861, p. 156.
Eggs, collected by Capt. Abbott, and now in the British Museum, resemble those of *H. palliatus* in size and character of spots, but are much darker in ground-colour.

Specific characters. The Falkland-Island Pied Oystercatcher is very nearly allied to the American Pied Oystercatcher, from which it principally differs in having the brown parts replaced by black. It has also on an average a decidedly shorter tarsus and foot, a more slender bill, much more black on the under wing-coverts, and the black on the breast extends somewhat lower down. It may always be recognized by its combination of the two characters *black rump* and *white belly*.

It breeds on the Falkland Islands and on the islands in the Straits of Magellan (Sharpe, Proc. Zool. Soc. 1881, p. 15). I have examples collected by Read in Chili; and Mr. Berkeley James informs me that the Santiago Museum contains examples shot near Valparaiso. Geographical distribution.

HÆMATOPUS LEUCOPUS GALAPAGENSIS.

GALAPAGOS PIED OYSTERCATCHER.

HÆMATOPUS LEUCOPUS tarso rostroque majoribus. Diagnosis.

IT is possible that the Oystercatcher found on the Galapagos may prove to be only the young in first or second plumage of *H. leucopus*, but the fact that it has a stouter bill than its southern ally is difficult to reconcile with this supposition. It is so exactly intermediate between *H. palliatus* and *H. leucopus* that there is some reason to suppose that it is a cross between the two. Variations.

Hæmatopus galapagensis, *Ridgway, Auk,* 1886, p. 331. Synonymy.

The Galapagos Oystercatcher resembles its Falkland-Island ally in having the back black like the head and neck, and also in having the black extending over the whole breast and on most of the under wing-coverts. In these respects it differs from the North-American Pied Oystercatcher, which has the back brown, contrasting with the black head and neck; the dark brown on the neck only extends to the upper breast, and nearly all the under wing-coverts are white. Subspecific characters.

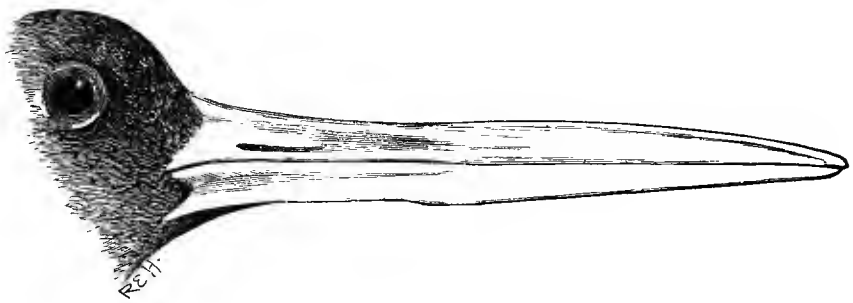
In the dimensions of its bill, legs, and feet, however, it agrees more closely with the northern species, as the following measurements prove:—

	Length of tarsus.	Greatest depth of bill.
H. palliatus . . .	2·0 to 2·3 in.	·45 to ·55 in.
H. galapagensis . .	2·1 to 2·2 in.	·5 in.
H. leucopus . . .	1·8 to 2·0 in.	·4 in.

The only examples known are three skins in the museum of the Smithsonian Institution, obtained on Chatham Island, one of the Galapagos group, by Dr. Jones. Geographical distribution.

The dimensions of the bill and feet of the Oystercatchers vary so much, and the colour so little, that I have treated the Galapagos form as a variety of *H. leucopus* rather than of *H. palliatus*, but a larger series may possibly modify this conclusion. I have not seen an example of the Galapagos bird.

*** *Aberrant or Black Oystercatchers.*



HÆMATOPUS UNICOLOR.

AUSTRALIAN BLACK OYSTERCATCHER.

Diagnosis. HÆMATOPUS omninò niger: pedibus rubris.

Variations. SIR WALTER BULLER informs me that many of the museums in New Zealand possess hybrids between *H. unicolor* and *H. longirostris*; but the rarity of these intermediate forms is presumptive evidence that they are barren, and that therefore the two species may be regarded as specifically distinct. It appears, however, completely to intergrade with the African Black Oystercatcher.

Synonymy. Hæmatopus unicolor, *Wagler, Isis*, 1832, p. 1230.
Hæmatopus fuliginosus, *Gould, Birds of Australia*, vi. pl. 8 (1848).
Hæmatopus ophthalmicus, *Ramsay, Proc. Linn. Soc. N. S. Wales*, i. p. 385 (1877).

Literature. PLATES.—Gould, Birds of Australia, vi. pl. 8; Gray, Zool. Voy. Erebus and Terror, pl. x.
HABITS.—Gould, Handb. Birds Austr. ii. p. 217.
EGGS.—Buller, Birds New Zealand, p. 225; Campbell, Nests and Eggs of Australian Birds, p. 52.

The Australian Black Oystercatcher resembles its American cousin in having the *whole of its plumage black*; but the basal half of the bill is slightly more elongated, and the colour of the *legs and feet is brick-red*, instead of pale flesh-colour. It is a resident throughout the coasts of New Zealand, Australia, and Tasmania. Specific characters.

HÆMATOPUS UNICOLOR CAPENSIS.

AFRICAN BLACK OYSTERCATCHER.

HÆMATOPUS UNICOLOR rostro breviore: pedum rubro colore potiùs purpurascente quam miniato. Diagnosis.

IT is often very difficult to distinguish some examples of the African form of this species from the Australian. Variations.

Hæmatopus capensis, *Lichtenstein, Verz. Doubl.* p. 73 (1823). Synonymy.
Hæmatopus moquini, *Bonap. fide Hartlaub, Orn. Westafr.* p. 218 (1857).

PLATES.—Gray, Genera of Birds, iii. pl. cxlvi. Literature.
HABITS.—Sharpe, Layard's Birds of South Africa, p. 672.
EGGS.—Andersson, Birds of Damara-Land, p. 277.

The African Black Oystercatcher is so closely allied to its Australian representative that many ornithologists do not discriminate between them. It may, however, be recognized by its shorter bill, the basal half of which is not exceptionally elongated, and by the colour of its legs and feet, which are not brick-red, but deep crimson. It can scarcely be regarded as more than subspecifically distinct from the Australian form, though the respective ranges of the two do not meet, and therefore no interbreeding can take place. It is probable, Subspecific characters.

however, that in a large series from each locality the longest-billed examples from Africa would be indistinguishable from the shortest-billed examples from Australia.

Geographical distribution. It is distributed along the entire coast of South Africa, ranging as far north as the Canary Islands in the west, and into the Red Sea in the east. It probably breeds south of the line, only wandering northwards in the autumn (about March). It is a somewhat remarkable fact that it has not been recorded from Madagascar.

HÆMATOPUS NIGER.

NORTH-AMERICAN BLACK OYSTERCATCHER.

Diagnosis. HÆMATOPUS omninò niger : pedibus pallidè carneis.

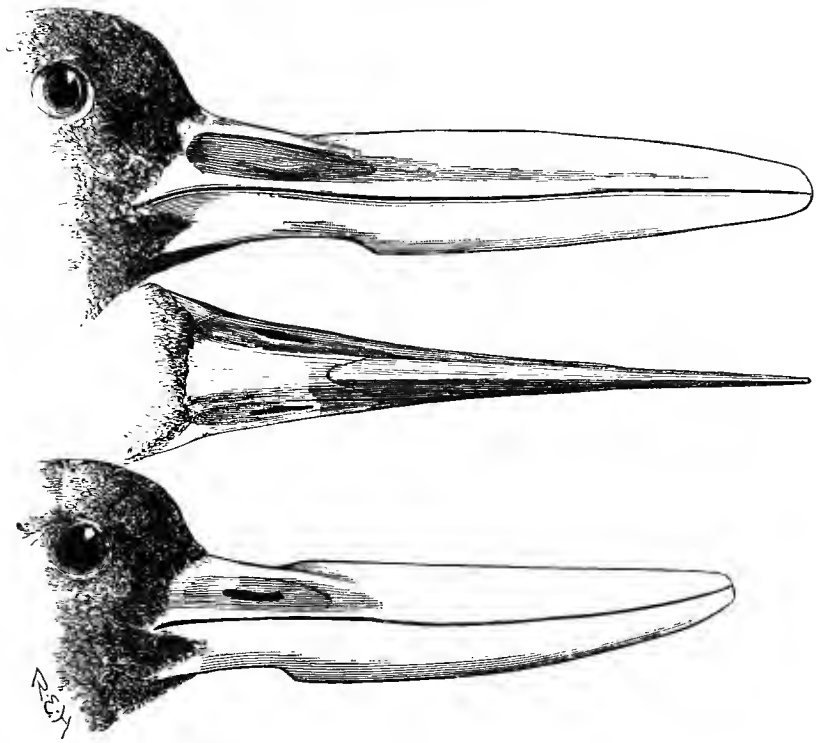
Variations. THE North-American and South-American Black Oystercatchers appear completely to intergrade.

Synonymy. Hæmatopus niger, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 131 (1826).
Hæmatopus bachmanni, *Audubon, Orn. Biogr.* v. p. 245 (1839).

Literature. PLATES.—Aud. Orn. Biogr. pl. 427 ; Aud. Birds Am. pl. 325.
HABITS.— Baird, Brewer, and Ridgway, Water-Birds N. Amer. i. p. 116.
EGGS, described by Brewer on p. 118 of the above-mentioned volume.

Specific characters. The North-American Black Oystercatcher, like all the Oystercatchers of the New World, has *pale flesh-coloured legs*, but, like all the Oystercatchers which passed through the Behring Sea, the whole of its *plumage* has become *black*.

Geographical distribution. This species is a summer visitor to the Aleutian Islands and the southern shores of Alaska, breeding as far south as the coast of Upper California, where it is probably a resident, and wintering on the coast of Lower California.



HÆMATOPUS NIGER ATER.

SOUTH-AMERICAN BLACK OYSTERCATCHER.

Hæmatopus niger rostro breviore et altiore. Diagnosis.

The North-American and South-American Oystercatchers appear completely to intergrade. Variations.

Ostralega atra, *Lesson, Traité d'Orn.* ii. p. 548 (1831). Synonymy.
Hæmatopus ater, *Vieillot, Gal. Ois.* ii. p. 88 (1834).
Hæmatopus townsendii, *Audubon, Orn. Biogr.* v. p. 247 (1839).
Hæmatopus niger ater (*Vieill.*), *Baird, Brewer, & Ridgway, Water-Birds N. Amer.* i. p. 109 (1884).

Plates.—Vieill. Gal. Ois. ii. pl. 230; Aud. Orn. Biogr. pl. 427; Aud. Birds Am. pl. 326. Literature.
Habits.—Abbott, Ibis, 1861, p. 155.
Eggs.—Gould, Proc. Zool. Soc. 1859, p. 96.

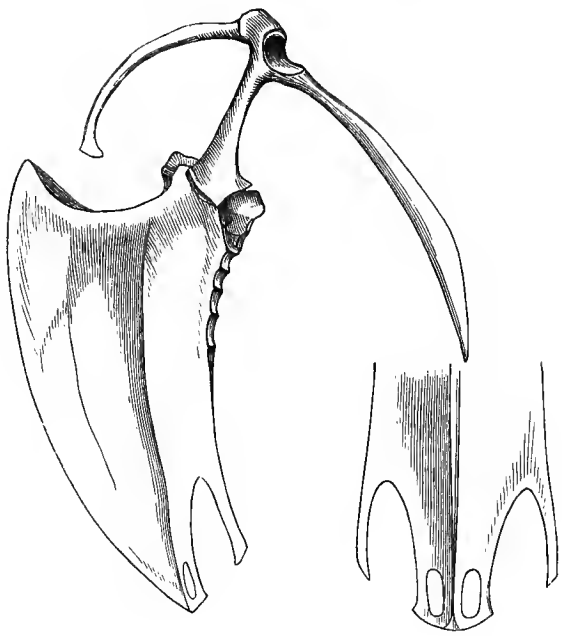
Subspecific characters.

The South-American Black Oystercatcher only differs from its more northern ally in having generally a *shorter and deeper bill*. Examples in my collection of the northern form have bills $3\frac{1}{4}$ inches in length and 0·5 in. in depth, whilst others from Chili have bills $2\frac{3}{4}$ in. in length and 0·6 in. in depth. It is said, however, that in a series of each the dimensions are found to overlap, so that American ornithologists very justly regard the two forms as only subspecifically distinct.

Geographical distribution.

Like its representative in the Northern Hemisphere, it appears to be confined to the Pacific coast of the American continent, except that its range extends through the Straits of Magellan to the Falkland Islands. It is doubtful whether it has ever occurred north of Chili, nor is there any evidence that it is a migratory bird. Two examples from Callao and one from Molle in South Peru in my collection appear to be somewhat intermediate, the bills being long like the North-American form, but deep like the South-American form. The bill of one of the Callao birds is represented in the upper figure of the woodcut.

CHAPTER XIX.



Genus IBIDORHYNCHUS.

CHARADRIIDÆ rostro valdè arcuato, tarso omninò reticulato. Diagnosis of genus.

THE Ibis-billed Oystercatcher is the sole representative of the genus which has almost unnecessarily been established for its reception. Generic characters.

The diagnosis of the genus *Ibidorhynchus* may be slightly altered from that of *Hæmatopus* as follows :—

CHARADRIIDÆ with a *much decurved bill*, and with the *tarsus reticulated all round.*

It probably represents the descendants of a party of Oystercatchers which escaped from the Polar Basin along none of the four coasts which lead from it, but ascended the Yenesay to find refuge in Mongolia from the cold of a Glacial Period.

It frequents the banks of mountain-streams, and is not known to have visited the coast. It is said to be capable of enduring great cold.

Synonymy of the Genus IBIDORHYNCHUS.

	Type.
Ibidorhyncha, *Vigors, Proc. Comm. Sc. and Corr. Zool. Soc.* i. p. 174 (1830) .	I. struthersi.
Chlorhynchus, *Hodgson, Journ. As. Soc. Beng.* iv. p. 701 (1835)	I. struthersi.
Falcirostra, *Severtzow, Turkest. Jevotn.* p. 146 (1873)	I. struthersi.

The fact that the Ibis-billed Oystercatcher was independently discovered by three ornithologists in different regions is the only excuse for the existence of a synonymy of the genus.

As it only contains one species there can be no dispute as to the type.

Origin of the genus.

The fact that the Ibis-billed Oystercatcher is a resident in Central Asia may be explained in two ways. It may have been driven into its present quarters by the Pre-Pliocene Glacial Epoch, and have remained there ever since, in which case it is entitled to full generic rank; or it may be the present representative of a party of the ancestors of the various species of *Hæmatopus* which escaped from the Polar Basin during the coming on of the Post-Pliocene Glacial Epoch, and, being unable to find a sea-shore, was obliged to modify itself to its novel environment or suffer the penalty of extermination. In the latter case it ought only to claim subgeneric rank. The fact that it fills up a rather important gap in the area of distribution of the genus *Hæmatopus* is a slight argument in favour of the latter view. Sundevall's opinion that it is nearest related to the genera *Rhynchæa* and *Numenius* is almost as absurd as the association of the Pratincoles with the Swallows by Linneus.

The genus *Ibidorhynchus* also agrees with *Hæmatopus* in belonging to the Temperate Region.

IBIDORHYNCHUS STRUTHERSI.

IBIS-BILLED OYSTERCATCHER.

Diagnosis. IBIDORHYNCHUS rostro pedibusque rubris.

Synonymy.

Ibidorhyncha struthersii, *Vigors, Proceedings of the Committee of Science and Correspondence of the Zoological Society*, i. p. 174 (1830).

Chlorhynchus strophiatus, *Hodyson, Journ. As. Soc. Beng.* iv. p. 701 (1835).

Numenius struthersii (*Vigors*), *Schlegel, Mus. Pays-Bas, Scolopaces*, p. 102 (1864).

Falcirostra kaufmanni, Falcirostra longipes, } *Severtzow, Turkest. Jevotn.* p. 146 (1873).

PLATES.—Gould, Cent. Birds Himalaya Mountains, pl. lxxix.; Gould, Birds of Asia, vii. pl. 61; David & Oust. Ois. Chine, pl. 118. Literature.

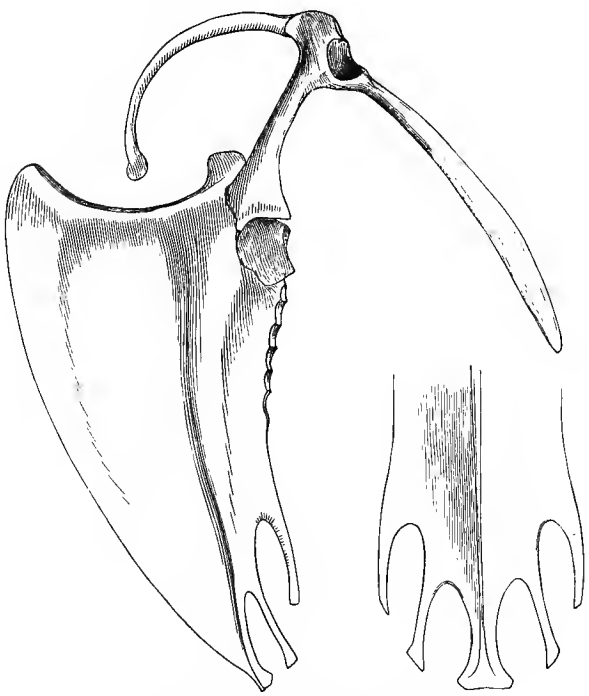
HABITS.—Jerdon, Birds of India, iii. p. 685.

EGGS.—Unknown.

The Ibis-billed Oystercatcher, somewhat pedantically called by Hodgson the Red-billed Erolia and the Gorgeted Chlorhynx, and misnamed the Red-billed Curlew by Jerdon, is an aberrant Oystercatcher, having little affinity with the Curlews, and still less with the Ibises.

It is a resident in Central Asia from Turkestan, east of the Sea of Aral, to the valley of the Hoang-ho in North China, occasionally wandering in winter to Cashmere, Nepal, and Sikkim. It may possibly breed at high elevations in the Himalayas. Geographical distribution.

CHAPTER XX.



Sternum of *Numenius phæopus*.

Genus NUMENIUS.

Diagnosis of genus.

TOTANINÆ rostro satis arcuato ut linea recta descripta ab rictu ad apicem infra lineam inferam mandibulæ transeat: acrotarsi dimidio infero scutellato.

Generic characters.

THE Curlews belong unmistakably to the Totaninæ. If the bill from the frontal feathers to the tip be divided into four equal parts, the whole of the nasal orifice is found to be situated within the basal fourth part; and the middle toe is united to the inner as well as to the outer one by a well-developed web at the base.

I find it impossible to construct an entirely satisfactory diagnosis of the genus

Numenius. Baird, Brewer, and Ridgway place the Curlews in their family *Scolopacidæ*; an assemblage of birds embracing my subfamilies of *Totaninæ* and *Scolopacinæ*, with the exception of the genera *Hæmatopus*, *Himantopus*, *Phalaropus*, and *Strepsilas*, each of which is elevated by them to the rank of a family. The diagnosis of the genus *Numenius*, according to these authors, is as follows :—

Scolopacidæ having a strongly decurved bill, longer than the tarsus and middle toe.

The objection to this diagnosis is that it excludes two species which have always been admitted to the genus, *Numenius borealis* and *N. minor*. What have these poor Curlews done that they should be turned out into the cold? It is rather remarkable that they are the only Curlews which have neglected to make any attempt to produce pale bars on the inner webs of their primaries. This neglect may be a specific misdemeanour, but can scarcely be regarded as a generic crime!

Let us see what Coues can do for us. His diagnosis of the genus *Numenius* may be tersely expressed as follows :—

Scolopacidæ having a very long decurved bill, and having the tarsus scutellated in front and reticulated behind.

This diagnosis is extremely satisfactory, with one exception. It excludes *Numenius minor* from the genus. This species has the whole of the tarsus unmistakably scutellated, both in front and at the back, and is in every respect a *Totanus*, except, perhaps, that no species of *Totanus* has the bill quite so much decurved. The difference in the amount of curvature of bill between *Numenius minor* and *N. phæopus* is, however, greater than that between *N. minor* and *Totanus bartrami*. Those ornithologists who are still wedded to the rostral system may, if they like, accept the following diagnosis of the genus *Numenius* :— Totaninæ having the arch of the bill sufficiently great that a straight line drawn from the gape to the point where the two mandibles meet at the tip will pass below the lower outline of the under mandible, and having the lower half of the tarsus scutellated in front.

The student may inquire why, if the so-called structural characters are so unsatisfactory, cannot the matter be settled by appeal to the colour-test? Because colour, and more particularly pattern of colour, dates much too far back to distinguish such closely-allied genera as *Numenius* and *Totanus*. The only important point in which *Numenius borealis*, *N. minor*, and *Totanus bartrami* differ in colour, or pattern of colour, is that the latter species has barred primaries; but unfortunately *T. bartrami* is the only *Totanus* that has barred primaries, and *N. borealis* and *N. minor* are the only species in the genus *Numenius* that have plain primaries.

This is clearly a case for the anatomist to decide, but in the meantime a wise conservatism may allow the two species to remain in the genera in which the instinct of ornithologists has already placed them.

The genus *Numenius*, like *Totanus* and *Charadrius*, may be in a transition state as regards the scutellation of the tarsus. *Numenius minor* and *N. borealis* are so nearly allied that it is difficult at once to find a perfectly satisfactory character upon which to separate

them; but though it is a remarkable fact that the back of the tarsus of the former is distinctly scutellated, whilst that of the latter is as clearly reticulated, the fact is not an isolated one. The case is almost an exact parallel to that of *Totanus incanus* and *T. brevipes*; and it is worthy of note that in both cases the New-World species is the one which has what is generally regarded as the older form of tarsus (*i. e.* reticulated instead of scutellated), but in the Curlew this character is normal, whilst in the Sandpiper it is exceptional.

Synonymy of the Genus NUMENIUS.

	Type.
Numenius, *Brisson, Orn.* v. p. 311 (1760)	N. arquatus.
Curlirius, *Rafinesque, Anal. de la Nature,* p. 71 (1815)	? N. phæopus.
Phæopus, *Cuvier, Règne An.* i. p. 485 (1817)	N. phæopus.
Cractiornis, *Gray, List Gen. and Subg. Birds,* p. 88 (1841)	N. arquatus.

Determination of the type.

The Curlews were placed by Linneus in the genus *Scolopax* on the ground of their having well-developed hind toes consisting of more than one joint. The Common Curlew (*Numenius arquatus*), being the *Numenius numenius* of Brisson, must be regarded as the type of the genus.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Curlews.	PALÆARCTIC REGION.	*Whimbrels.*
N. ARQUATUS	*West.*	N. PHÆOPUS.
N. TENUIROSTRIS	*South-west.*	
N. LINEATUS, N. CYANOPUS	*East.*	N. VARIEGATUS, N. MINUTUS.
	NEARCTIC REGION.	
N. LONGIROSTRIS	*East to West.*	N. HUDSONICUS, N. BOREALIS.
	West.	N. TAHITIENSIS.

Climatic distribution.

The genus *Numenius* is decidedly Arctic in its character. It contains 11 species and subspecies, which are distributed as follows:—

Arctic America	3	
Arctic Eurasia	4	
Arctic species		— 7
Temperate N. America	1	
Temperate Eurasia	3	
Temperate species		— 4
Species and subspecies of *Numenius*		— 11

The present geographical distribution of the Curlews can only be accounted for on the assumption that they were originally inhabitants of the Polar Basin. Of the eleven species and subspecies which comprise the genus *Numenius*, two, *N. borealis* and *N. hudsonicus*, are exclusively Arctic during the breeding-season. *N. tenuirostris*, breeding in the basin of the Mediterranean, might be called semi-tropic, but all the others may fairly be regarded as Arctic or Semi-Arctic.

Division into five groups.

The species belonging to the genus *Numenius* naturally fall into five groups, which probably escaped from the Polar Basin by five different routes, when the coming on of the Post-Pliocene Glacial Epoch drove them south.

The first group to be considered may be described as Pale-rumped Curlews. They may be diagnosed as having the lower back white, or white more or less streaked with brown, but with no mesial line on the crown. They represent the Atlantic-coast Curlews of the Old World, and consist of two species, one of which is divisible into two subspecies.

The Pale-rumped Curlews, being represented by two species in Europe, one in Asia, and being entirely absent from America, doubtless escaped from the ice by way of the Kara Sea, along the European coast, and up some of the great rivers of Western Siberia.

The fact that the range of *N. tenuirostris* does not extend further east than the Ural Mountains confirms the theory that the Pale-rumped Curlews escaped from the Polar Basin along the Atlantic shores of Europe. At the height of the Glacial Epoch they were probably isolated in two colonies, one in West Africa and the other in the valley of the Nile, for a period long enough to make them specifically distinct. When the Glacial Epoch had passed away, the West-African colony spread over the basin of the Mediterranean, whilst the East-African colony extended its summer range over the head of its ally east and west, until it finally extended from the Atlantic to the Pacific, whilst its winter range covered South Africa, and afterwards reached India, Burma, and the islands of the Malay Archipelago. The complete isolation of the African and Asian winter colonies of the Common Curlew produced variation in the species; but the uninterrupted area of their distribution in summer, combined with the much shorter period during which they have been isolated, have prevented the birds from these colonies from becoming completely differentiated.

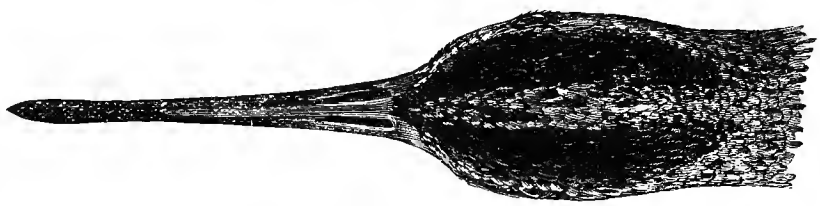
The second group comprises the Pale-rumped Whimbrels, which may be diagnosed as having the lower back and rump white, more or less streaked with brown, but always contrasting with the darker mantle, and the crown plain brown, with a pale mesial line. They represent the birds which left the Polar Basin along the east coast of Greenland, and, finding the west coast already occupied, crossed over to Europe by Iceland and the Faroes. From their present arctic habits it seems probable that they never crossed the Mediterranean, but remained during the Glacial Epoch on the outskirts of the ice, which they followed on its retreat, until they finally spread over the Arctic Region of the Old World.

The Whimbrel is so common in Iceland and the Faroes that it is natural to suppose that it emigrated to the Arctic Regions of the Old World by way of those islands along the

east coast of Greenland, where it is still found, and whence it has gradually spread to East Siberia. In the latter locality its rump is considerably streaked, leading to the supposition that when its range first touched that of its dark-rumped allies the species had not become quite so completely differentiated as they appear to be now, and that consequently some interbreeding took place between them, which has left its permanent mark on the Eastern form of the Common Whimbrel.

The birds comprised in the third group, the Dark-rumped Barred-winged Whimbrels, have the rump nearly the same colour as the mantle and lower back, the crown uniform dark brown, with an obscure pale mesial line, and more or less distinct bars across the

Curlew (*Numenius arquatus*).



Whimbrel (*Numenius phæopus*).

primaries and secondaries. They appear to represent the birds which emigrated down Baffin's Bay and the chains of American lakes. After the retreat of the ice they seem to have spread westwards to Alaska. Neither of the two species belonging to this group breed in the Old World, but the Hudsonian Whimbrel has occurred in Greenland and once in Iceland. The Pacific Island Whimbrel breeds in Alaska, but appears to be unacquainted with the coasts of China.

The birds comprised in the fourth group may be called Plain-winged Whimbrels, and are easily distinguished from all their allies by the absence of bars on their primaries and secondaries. They appear to represent the birds which escaped from the Polar ice through Behring Straits, and afterwards followed the Siberian coast. Of the two species with dark rumps and plain primaries, one breeds in East Arctic Siberia and the other in Arctic America. As the latter is unknown on the Pacific coast, it is most probable that it did not emigrate along the American shores of the Pacific, but is the result of a later emigration across Behring Straits to Arctic America.

The fifth and last group consists of the Dark-rumped Curlews. They may be diagnosed as having the rump pale brown, streaked with dark brown, like the mantle and lower back; and the crown pale brown, each feather having a dark centre. They appear to represent the birds which passed through Behring Straits, and followed the American

shore of the Pacific. Returning north, after the ice had disappeared, they spread eastward to the Atlantic, whilst a party crossed the Behring Sea into East Siberia, where they became differentiated into a closely allied, but now perfectly distinct, species.

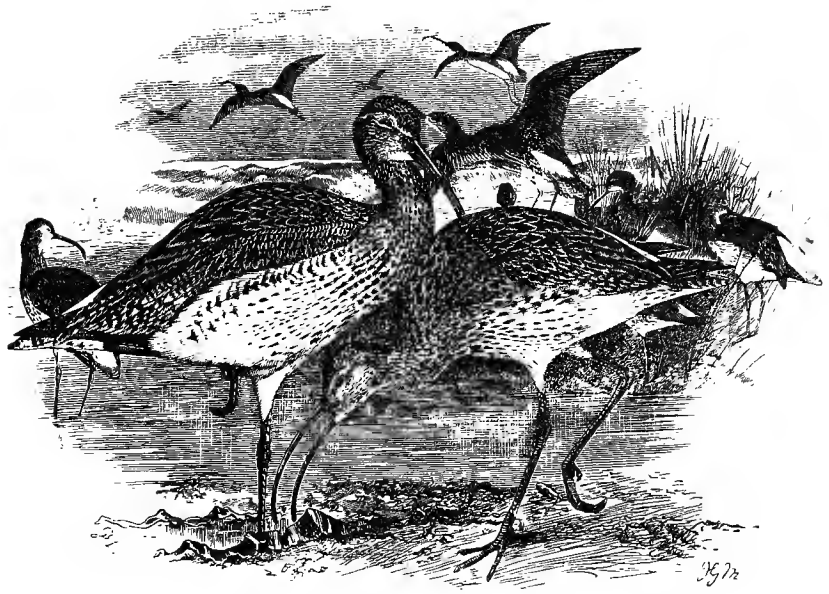
Of the two species belonging to this group one breeds in East Siberia and the other in sub-Arctic America. As the latter is more common on the Pacific coast of that continent than on the Atlantic, there is every reason to suppose that this group represents the Curlews which emigrated through Behring Straits along the American shores of the Pacific.

KEY TO THE SPECIES.

- Tarsus more than three inches long.
  - **longirostris** . . . — Axillaries pale chestnut without bars.
  - **cyanopus.**
  - Lower back and rump unstreaked white.
    - **arquatus** . . . . — Lower back much paler than mantle.
    - **lineatus** . . . .
    - **tenuirostris** . . .
    - **phæopus** . . . .
    - **variegatus** . . .
  - Crown plain brown with a pale mesial streak.
    - **tahitiensis** . . . — Shafts of feathers on thighs prolonged to long hairs.
    - **hudsonicus** . . . — Axillaries pale chestnut barred with brown.
    - **borealis** . . . .
    - Tarsus scutellated both back and front.
      - **minutus** . . . . — Scarcely any trace of bars on primaries or secondaries.

This key to the species and subspecies is a very satisfactory one, showing their mutual affinities in a very concise manner. All the characters are found in the young in first plumage as well as in the adults of both sexes, except one. The character of *lower back and rump unstreaked white* only applies to adult thoroughbred examples of *N. lineatus* and *N. phæopus*. The young in first plumage of both species, as well as intermediate forms between the former and *N. arquatus* and between the latter and *N. variegatus*, have these parts more or less streaked.

*** *Typical Curlews.*



NUMENIUS ARQUATUS.

COMMON CURLEW.

Diagnosis. NUMENIUS dorso postico, uropygioque quam dorsum superius valdè pallidioribus: tarso longiore (plus quam 75 millim.).

Variations. THE Eastern and Western forms of this species may fairly be regarded as subspecifically distinct.

Synonymy.

Scolopax arquata, *Linneus, Syst Nat.* i. p. 145 (1758); *Linn. Syst. Nat.* i. p. 242 (1766).
Numenius numenius,
Numenius madagascariensis, } *Brisson, Orn.* v. pp. 311, 322 (1760).
Scolopax madagascariensis (*Briss.*), *Linneus, Syst. Nat.* i. p. 242 (1766).
Numenius arquata (*Linn.*), *Latham, Gen. Syn. Suppl.* i. p. 291 (1787).
Numenius major, *Stephens, Shaw's Gen. Zool.* xii. pt. i. p. 26 (1824).
Numenius virgatus, *Cuvier, Règne An.* i. p. 521 (1829).
Cracticornis arquatus (*Linn.*), *Gray, List Gen. & Subgen. of Birds,* p. 88 (1841).

Literature.

PLATES.—Daub. Pl. Enl. no. 818; Gould, Birds Gt. Brit. iv. pl. 48; Dresser, Birds of Europe, viii. pl. 578.

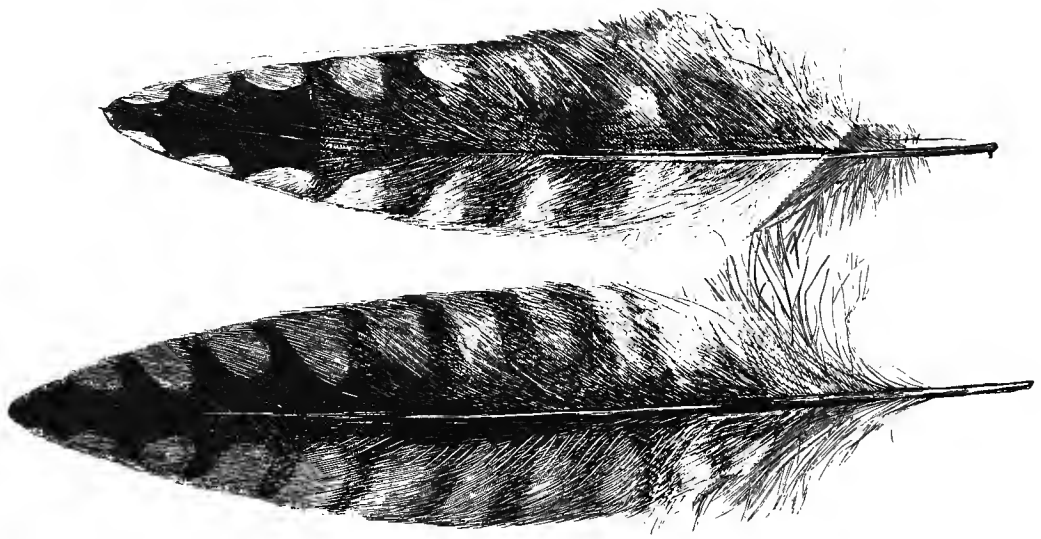
HABITS.—Seebohm, British Birds, iii. p. 94.

EGGS.—Seebohm, British Birds, pl. 33. figs. 1, 2.

Specific characters.

The Common Curlew only requires two characters to diagnose it from all its congeners except from the Oriental Curlew, from which it is only subspecifically distinct. These characters are, *lower back and rump much paler than the mantle*, and *tarsus more than three inches long*.

Tertiary of young.



Tertiary of adult.

Geographical distribution.

The Common Curlew is a resident in the British Islands, but can only be regarded as an accidental visitor on migration to the Faroes and Iceland. It is a summer visitor to the whole of Scandinavia, but in West Russia its range does not extend north of the delta of the Dvina, nor in East Russia north of the basin of the Volga. East of the Caspian it is replaced by the Oriental Curlew. It breeds as far south as Holland, and is said to do so in the delta of the Rhone, on the Kirghiz Steppes, and those of the Caucasus. It passes through South Europe, Asia Minor, and Persia on migration, and winters in Africa, occasionally visiting the Azores. I found it very abundant in Durban Bay in March, and was assured that a few examples, doubtless immature birds, remained in their South-African winter-quarters, as they are in the habit of doing on the southern coasts of the British Islands.

NUMENIUS ARQUATUS LINEATUS.

ORIENTAL CURLEW.

Diagnosis. NUMENIUS ARQUATUS dorso postico uropygioque albis, vix brunneo striatis.

Variations. THE Eastern and Western forms completely intergrade.

Synonymy.

Numenius lineatus, *Cuvier, Règne Anim.* i. p. 521 (1829).
Numenius nasicus, *Temminck, Man. d'Orn.* iv. p. 393 (1840).
Numenius arquatula, *Hodgson, Gray's Zool. Miscell.* i. p. 86 (1844).
Numenius cassini, *Swinhoe, Ibis,* 1867, p. 398.

Literature.

PLATES.—Unfigured.
HABITS.—Legge, Birds of Ceylon, p. 906.
EGGS.—Dybowski, Journ. Orn. 1873, p. 104. (Described as resembling those of the Common Curlew.)

The Eastern and Western forms of the Common Curlew differ as follows :—

Subspecific characters.

N. arquatus.	*N. lineatus.*
Lower back white, streaked with brown.	Lower back unspotted white.
Axillaries white, more or less spotted with brown.	Axillaries unspotted white.
Margins of scapulars and feathers on the upper back grey.	Margins of scapulars and feathers on the upper back nearly white.
Length of bill $4\frac{1}{2}$ to 7 inches.	Length of bill $5\frac{1}{2}$ to 8 inches.

None of these characters appear to be constant, and intermediate forms are very common *.

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* This is no excuse whatever for confounding the two forms together, as Dresser and other ornithologists have done. Although it may sometimes be difficult to determine to which form an individual may belong, a series of examples from Western Europe are always perfectly distinct from a series from Eastern Asia. Harting's theory (quoted by Oates in his 'Birds of British Burma,' ii. p. 412) that *N. lineatus* is the winter plumage of *N. arquatus* is ingenious, but contradicted by facts. Out of 40 dated skins in the Hume Collection from India and Burma, 6 only have the lower back streaked. Of these 6, 4 are adult females and 2 birds of the year, but all 6 were shot between Nov. 2 and Dec. 20. The remaining 34 have the lower back white without streaks, and consist of 17 adult females, 11 adult males, 3 males of the year, 2 females of the year, and 1 unsexed bird of the year. These 34 birds are distributed over every month in the year except June and July.

The Oriental Curlew breeds in Siberia, in the valley of the Obb as far north as the Arctic Circle, but in Eastern Siberia not further than Dauria and the southern tributaries of the Amoor. It passes through Turkestan on migration, and occasionally strays as far as the east coast of Africa; but its usual winter-quarters are India, Ceylon, Burma, and the islands of the Malay Archipelago. It not only frequents the sea-shore from the Mekran coast to Borneo, but occurs inland on the banks of rivers and lakes. It was probably this species which Prjevalski found breeding in the valley of the Hoang Ho. Geographical distribution.

NUMENIUS TENUIROSTRIS.

MEDITERRANEAN CURLEW.

NUMENIUS pileo æqualiter striato: tarso breviore (minus quam 75 millim.). Diagnosis.

No local races of this species are known. Variations.

Numenius tenuirostris, *Vieillot, N. Dict. d'Hist. Nat.* viii. p. 302 (1817). Synonymy.
Numenius syngenicos, *Von der Mühle, Orn. Griechenl.* p. 111 (1844).

PLATES.—Dresser, Birds of Europe, viii. pl. 577. Literature.
HABITS.—Dresser, Birds of Europe, viii. p. 237.
EGGS.—Dresser, Birds of Europe, viii. p. 239.

The Mediterranean Curlew is a very distinct species. It combines the colours of the Curlew with the dimensions of the Whimbrel. It scarcely differs from the Eastern form of the Common Curlew except in size and in its bill, which is not only absolutely but relatively smaller. The length of bill varies so much in the Curlews, being much greater in the female than in the male, that for diagnostic purposes the measurements of the tarsus are more reliable. The Mediterranean Curlew may be diagnosed by two characters. For the first, *tarsus less than three inches long* is the best, and for the second either *axillaries pure white* or *crown uniformly striated* excludes every other species in the genus. The latter character is the most reliable, as examples of the Whimbrel occasionally occur in which the bars across the axillaries are almost obsolete. Specific characters.

It is a resident in the basin of the Mediterranean, occasionally breeding as far north as latitude 50°, especially in South-east Russia, where it is a migratory bird. It has not been recorded from any locality east of the Ural Mountains. In Africa its numbers are increased in winter by migrants from Europe, but it is unknown in Tropical Africa. Geographical distribution.

NUMENIUS CYANOPUS.

AUSTRALIAN CURLEW.

Diagnosis. NUMENIUS pileo æqualiter striato: interscapulio et dorso postico concoloribus: axillaribus albescentibus brunneo fasciatis.

Variations. No local races of this species are known.

Synonymy.
Numenius cyanopus, *Vieillot, N. Dict. d'Hist. Nat.* viii. p. 306 (1817).
Numenius australis, *Gould, Proc. Zool. Soc.* 1837, p. 155.
Numenius major, *Temminck & Schlegel, Fauna Japonica, Aves,* pl. 66 (1847).
Numenius rostratus, *Lichtenstein, fide Bonap. Compt. Rend.* xliii. p. 597 (1856).
Numenius rufescens, *Gould, Proc. Zool. Soc.* 1862, p. 286.

Literature.
PLATES.—Temm. & Schlegel, Fauna Japonica, Aves, pl. 66; Gould, Birds of Australia, vi. pl. 42; Gould, Birds of Asia, vii. pl. 60.
HABITS.—Gould, Handbook Birds Austr. ii. p. 277.
EGGS.—Unknown.

Specific characters. The Curlews differ from the Whimbrels in having the *crown uniformly striated,* instead of plain brown with a more or less distinct pale mesial line. There are only two Curlews in which the *rump scarcely differs in colour from the rest of the upper parts,* instead of being pure white with or without streaks, in either case in strong contrast to the darker mantle. The Australian Curlew is one of these, and differs from the other (*N. longirostris*) in having the underparts, including the *axillaries, nearly white, streaked and barred with brown.* Both species are large, with tarsi more than three inches long.

Geographical distribution. Like its ally in the New World, it is a migratory bird, but the migrations of the Curlews on the Asiatic shores of the Pacific are on a very different scale to those of their cousins on the American shores of that ocean. The Australian Curlew breeds somewhere in Eastern Siberia, since it occurs on migration from Lake Baikal to the mouth of the Amoor, and along the coasts of Japan and China. It crosses the line to winter in Australia, and has also been recorded from Tasmania, New Guinea, Borneo, and some of the smaller islands of the Malay Archipelago.

NUMENIUS LONGIROSTRIS.

AMERICAN CURLEW.

Diagnosis.

NUMENIUS axillaribus pallidè castaneis.

Variations.

EXAMPLES from the Atlantic coast do not appear to differ in any way from others from the Pacific coast.

Synonymy.

Numenius longirostra, *Wilson, Am. Orn.* viii. p. 23 (1814).
Numenius melanopus, *Vieillot, N. Dict. d'Hist. Nat.* viii. p. 306 (1817).
Numenius rufus, *Vieillot, Gal. des Ois.* ii. p. 115 (1834).
Numenius occidentalis, *Woodhouse, Proc. Ac. Nat. Sci. Philad.* vi. p. 194 (1852).

Literature.

PLATES.—Wilson, Am. Orn. pl. 64. fig. 4; Audubon, Birds Am. vi. pl. 355.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 311.
EGGS.—Described by Brewer in the above-mentioned volume, p. 314.

Specific characters.

The American Curlew, like the other Curlews, differs from the Whimbrels in having a *uniformly striated crown*. From its nearest allies it differs in two very conspicuous points. In the first place the *rump*, instead of being pure white with or without streaks, but in either case in strong contrast to the darker mantle, *scarcely differs in colour from the rest of the upper parts*; and, in the second place, the *axillaries*, instead of being white barred or unbarred with brown, are *uniform deep buff*. It may be distinguished from its Siberian ally by the *absence of bars on the axillaries*, or by its *rich buff underparts, unstreaked on the lower breast and belly*.

Geographical distribution.

It breeds in Temperate North America, and winters in Mexico and Central America, but is a resident in many of the intervening districts. On the Pacific coast it has not been recorded further north than Vancouver Island. There is no evidence that it has occurred in Canada, but on the Atlantic coast it breeds as far north as Prince Edward's Island. It probably does not breed south of Texas, but it winters in Guatemala and in some of the West India Islands. I have not been able to find any reliable evidence of its occurrence in South America.

*** *Aberrant Curlews, or Whimbrels.*

Tertiary of adult.

Tertiary of young.

NUMENIUS PHÆOPUS.

COMMON WHIMBREL.

Diagnosis. NUMENIUS pileo brunneo, strigâ pallidâ centraliter notato: dorso postico uropygioque quam interscapulium valdè pallidioribus.

Variations. THE Eastern form of the Whimbrel differs very considerably from the Western form, and has every claim to be regarded as subspecifically distinct.

Synonymy. Scolopax phæopus, *Linneus, Syst. Nat.* i. p. 146 (1758); *Linn. Syst. Nat.* i. p. 243 (1766).
Numenius minor, *Brisson, Orn.* v. p. 317 (1760).
Numenius phæopus (*Linn.*), *Latham, Gen. Syn. Suppl.* i. p. 291 (1787).
Phæopus phæopus (*Linn.*), *Cuvier, Règne An.* i. p. 485 (1817).
Phæopus vulgaris, *Fleming, Philos. Zool.* ii. p. 254 (1822).
Phæopus arquatus, *Stephens, Shaw's Gen. Zool.* xii. pt. i. p. 36 (1824).
Numenius haesitatus, *Hartlaub, Orn. W.-Afr.* p. 233 (1857).
Numenius melanorhynchus, *Bonap. Compt. Rend.* xliii. p. 1021 (1856).

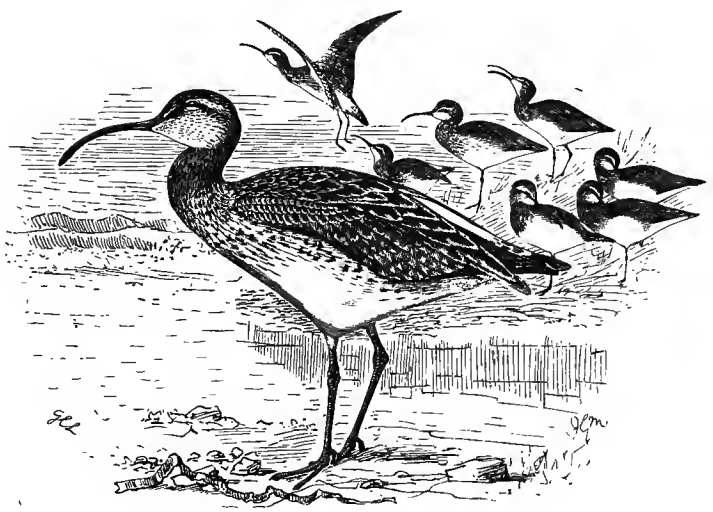
PLATES.—Daub. Pl. Enl. no. 842; Gould, Birds Gt. Brit. iv. pl. 49; Dresser, Birds of Europe, viii. pl. 576. Literature.

HABITS.—Seebohm, British Birds, iii. p. 100.

EGGS.—Seebohm, British Birds, pl. 33. figs. 4, 5.

The Common Whimbrel is not a Curlew, because its *crown is plain brown, with a pale mesial streak*. It and its eastern form, the Oriental Whimbrel, are the only Whimbrels in which the *lower back is much paler than the mantle*. Specific characters.

The adult Common Whimbrel has a pure white lower back, but in immature birds there are always dark streaks in the centre of many of the feathers. These dark centres are even more conspicuous in the adult of the Oriental Whimbrel, and most so in immature examples of the Eastern form [1].



Stejneger (Orn. Expl. Comm. Isl. and Kamtschatka, p. 135) remarks, "Were it not that the occurrence of numerous intermediate specimens have been recorded, I should consider the two forms good and distinct species."

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[1] It is very difficult to understand how Dresser ('Birds of Europe,' viii. p. 228) could arrive at the conclusion that the Eastern form of the Whimbrel "does not differ from our European bird." He had a fine series for examination, in which there were 10 examples of the Eastern form, and more than 20 of the Western. He correctly describes the adult of the European form as having a white rump, but does not seem to have noticed that the ten Eastern examples (nine of which are now in my collection) have the rump profusely streaked with brown. Another most unaccountable omission on his part is the absence of any description or even mention of the young in first plumage, or the bird of the year, which have streaked rumps, in both forms.

The Whimbrel is a bird of very powerful flight: it leaves our shores in its worn summer plumage, and moults its quills slowly in December in its winter-quarters; young birds are easy to detect in autumn by their shorter bills, and by the clearly defined buff spots on the upper parts, especially on the outer webs of the scapulars and tertials. The Whimbrel appears to be somewhat wild in its migrations, as amongst a large series of British examples a few Oriental Whimbrels occasionally occur, and in a large series of Indian and Burmese birds a few Common Whimbrels appear to be found.

Summer range.

The Western form of the Common Whimbrel has repeatedly been found in Greenland, and probably breeds there (Reinhardt, Ibis, 1861, p. 10). It is a common summer visitor to Iceland and the Faroes, and breeds in some numbers on the Shetlands and Orkneys. It may also breed in North-west Scotland, but the evidence that it does so is very unsatisfactory. Its breeding-range extends eastwards to Lapland and the fells of Norway and Sweden, above the limit of forest-growth. Henke (Ibis, 1882, p. 382) says that it is a rare summer visitor to Archangel; and Harvie Brown and I found it very rare in the valley of the Petchora, in lat. 66°; but Sabanaeff (Proc. Nat. Hist. Soc. Glasgow, 1877, p. 309) says that it is common on the steppes of the Ural.

Winter range.

On migration it is found on all the European coasts, and on most inland fly-lines, wintering on the Azores, the Canaries, and the other West-African islands. In the Mediterranean it is chiefly known in spring and autumn on migration, but it winters throughout the coasts of Tropical Africa, and visits many localities in the interior. I found it common in the Bay of Durban in March; Heuglin records it from the Blue Nile; Ayres obtained it in the Transvaal; and it is said to be found all the year round in Aden Bay (Major Yerbury, Ibis, 1886, p. 21). The fact that so many immature migratory birds remain in their winter-quarters, like the Whimbrels in the Red Sea, or stop short of their breeding-grounds, like the Whimbrels in North Scotland, is no doubt the cause of much error in describing the breeding-range of these and many other birds.

NUMENIUS PHÆOPUS VARIEGATUS.

ORIENTAL WHIMBREL.

Diagnosis. NUMENIUS PHÆOPUS dorso postico uropygioque valdè brunneo striatis.

Variations. THE Eastern and Western forms completely intergrade.

Synonymy.

Tantalus variegatus, *Scopoli, Del. Fl. Faun. Ins.* ii. p. 92 (1786, *ex Sonnerat*).
Scolopax luzoniensis, *Gmelin, Syst. Nat.* i. p. 656 (1788, *ex Sonnerat*).
Numenius luzoniensis (*Gmel.*), *Latham, Index Orn.* ii. p. 711 (1790).
Numenius atricapillus, *Vieillot, N. Dict. d'Hist. Nat.* viii. p. 303 (1817, *ex Sonnerat*).
Numenius uropygialis, *Gould, Proc. Zool. Soc.* 1840, p. 175.
Numenius variegatus (*Scop.*), *Salvadori, Ann. Mus. Civ. Gen.* xviii. p. 330 (1882).
Numenius phæopus variegatus (*Scop.*), *Seebohm, British Birds*, iii. p. 101 (1885).

Literature.

Plates.—Gould, Birds of Australia, vi. pl. 43.
Habits.—Legge, Birds of Ceylon, p. 910.
Eggs.—Unknown.

The difference between the European and Oriental Whimbrels has already been pointed out.

Geographical distribution.

The Oriental Whimbrel has not been recorded from the valley of the Obb, nor is it known to pass through Turkestan on migration; but as it is said to be common in winter at the mouth of the Indus, it has probably been overlooked in these localities [1]. It passes through Dauria on migration (Dybowski, Journ. Orn. 1868, p. 337), and Stejneger obtained it on Bering Island. It passes along the coasts of Japan and China on migration, and winters in India, Ceylon, Burma, the islands of the Malay Archipelago [2], and Australia.

NUMENIUS HUDSONICUS.

HUDSONIAN WHIMBREL.

Diagnosis.

Numenius axillaribus castaneis brunneo fasciatis: primariarum pogoniis internis brunneis albo fasciatis: abdomine albo.

Variations.

No local races of this species are known.

Synonymy.

Numenius hudsonicus, *Latham, Index Orn.* ii. p. 712 (1790).
Numenius rufiventris, *Vigors, Zool. Journ.* iv. p. 356 (1829).
Numenius brasiliensis, *Maximilian, Beitr. Naturg. Brasilien,* iv. p. 708 (1833).
Numenius intermedius, *Nuttall, Man. Orn. U.S. & Can.* ii. p. 100 (1834).

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[1] There are several examples in the great Hume Collection from Kurrachee and Bombay which belong unmistakably to the Eastern form.

[2] The statement (Meyer, Ibis, 1879, p. 143) that the Whimbrel breeds in Celebes, in trees, and only lays two eggs, must be intended to apply to some other species.

Literature.

PLATES.—Wilson, Am. Orn. pl. 56. fig. 1 ; Audubon, Birds Am. vi. pl. 356.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 315.
EGGS.—Newton, Proc. Zool. Soc. 1871, pl. iv. fig. 3.

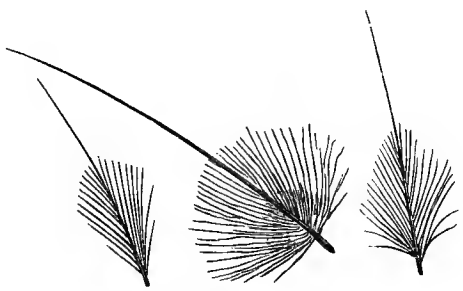
Specific characters.

The Hudsonian Whimbrel differs from the Curlews in having the *crown plain brown, with a pale mesial streak*; from the Common and Oriental Whimbrels in having the *lower back nearly the same colour as the mantle*; from the Eskimo and Least Whimbrels by the distinctness of the *pale bars on the inner webs of the primaries*; and from the Pacific-Island Whimbrel in having the *lower breast and belly white instead of buff*, and in having no long hairs on the thighs.

Geographical distribution.

It is confined to the Arctic Regions of the American continent during the breeding-season from Alaska to Greenland, and passes the Bermudas on migration (Reid, Zoologist, 1877, p. 478). In autumn it migrates southwards across the Line, where it has been seen in the Galapagos Archipelago (Dr. Habel, Trans. Zool. Soc. ix. p. 504) and in South America as far as Patagonia.

Its nearest ally is unquestionably the Pacific-Island Whimbrel (*Numenius tahitiensis*).



NUMENIUS TAHITIENSIS.

PACIFIC-ISLAND WHIMBREL.

Diagnosis.

NUMENIUS plumarum tibiæ rhachidibus valdè prolongatis.

Variations.

No local races of this species are known.

Synonymy.

Scolopax tahitiensis, *Gmelin, Syst. Nat.* i. p. 656 (1788).
Numenius femoralis, *Peale, Zool. U.S. Expl. Exp.* p. 283 (1848).
Numenius tahitiensis (*Gmel.*), *Ridgway, Proc. U.S. Nat. Mus.* iii. p. 201 (1880).
Numenius tibialis, *Peale fide Layard & Tristram, Ibis*, 1882, pp. 533, 534.

Literature.

Plates.—Peale, Zool. U. States Exploring Exp. 1838–42, Birds, pl. lxvi. fig. 1; Cassin, Zool. U. States Exploring Exp. 1838–42, Birds, ed. 2, pl. 37.
Habits.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 324.
Eggs.—Unknown.

Specific characters.

The Pacific-Island Whimbrel may be diagnosed by the *long hairs on the thighs which project far beyond the feathers.* A more complicated diagnosis is, crown plain brown with a pale mesial streak; lower back nearly the same colour as the mantle; pale bars on inner webs of primaries; and general colour of underparts buff.

Summer home.

The Pacific-Island Whimbrel has scarcely a right to its name, as it is only a winter visitor to the southern hemisphere. It breeds in Alaska (Nelson, 'Cruise of the Corwin,' p. 90), and has been recorded from Kamtschatka (Taczanowski, Bull. Soc. Zool. France, 1882, p. 397); but Stejneger regards this record as relating to *N. cyanopus* (Orn. Expl. Comm. Isl. and Kamtschatka, p. 317).

Winter home.

It was originally described from Tahiti, the largest of the Society Islands (Latham, General Synopsis of Birds, iii. p. 122); Peale redescribed it from the island of Vincennes, one of the Paumota Archipelago, to the east; and I have an example from the Samoa Islands to the west. Further north it has occurred on the Marquesas Islands (Tristram, Ibis, 1881, p. 251); Fanning Island (Tristram, Ibis, 1883, p. 47); Gilbert Islands (Finsch, Ibis, 1880, p. 432), where it is known only as a winter visitor; Marshall Islands (Finsch, Ibis, 1880, p. 220), where it was found moulting in September; and the Sandwich Islands, whence examples are in the museum of the Smithsonian Institution.

It appears to be nearest allied to the Hudsonian Whimbrel (*Numenius hudsonicus*).

NUMENIUS BOREALIS.

ESKIMO WHIMBREL.

Diagnosis.

Numenius primariis haud fasciatis: tarso postice reticulato.

Variations.

It is not known that examples from Alaska differ in any way from those from Greenland.

Synonymy.

Scolopax borcalis, *Forster, Phil. Trans.* lxii. pp. 411, 431 (1772).
Numenius borealis (*Forst.*), *Latham, Index Orn.* ii. p. 712 (1790).
Numenius brevirostris, *Lichtenstein, Verz. Doubl. Mus. Berlin*, p. 75 (1823).
Numenius microrhynchus, *Philippi & Landbeck, Wiegm. Arch.* 1866, pt. i. p. 129.

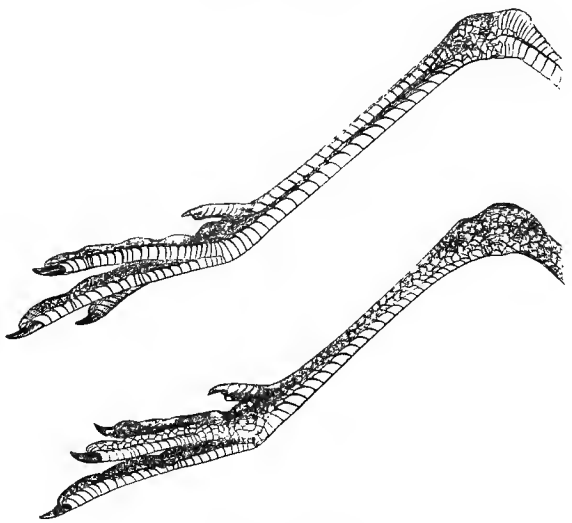
Literature.

Plates.—Temminck, Pl. Col. no. 381; Swainson & Richardson, Faun. Bor.-Amer. ii. pl. lxv.; Audubon, Birds Am. vi. pl. 357; Dresser, Birds of Europe, viii. pl. 575.
Habits.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 318.
Eggs.—Newton, Proc. Zool. Soc. 1871, pl. iv. fig. 1; Seebohm, British Birds, pl. 33. fig. 3.

Specific characters.

The Eskimo Whimbrel, often erroneously called the Eskimo Curlew, only requires two characters to diagnose it from all its congeners: *primaries with scarcely a trace of bars; back of the tarsus covered with hexagonal reticulations.*

Numenius minutus.



Numenius borealis.

Geographical distribution.

The Eskimo Whimbrel is an arctic species, breeding only on the tundras of North America, above the limit of forest-growth, from Behring Straits to Greenland. It is said to have occurred on the Siberian coast (Nelson, 'Cruise of the Corwin,' p. 90) and to be common on the shores of Norton Sound, though it was only observed on migration by the Point Barrow expedition (Seebohm, Trans. Norf. & Norw. Nat. Soc. iv. p. 307). It is recorded from Greenland (Reinhardt, Ibis, 1861, p. 10), and has occurred several times in Scotland and once in both England and Ireland. In the United States it occurs on migration both inland, on the Atlantic coast, and on the Bermuda Islands (Reid, Zoologist, 1877, p. 478). It appears to winter south of the Line; and though it has not been found on migration on the Pacific coast of North America, it has been recorded from the Galapagos (Salvin, Proc.

Zool. Soc. 1883, p. 429) and the coast of Chili (Sclater, Proc. Zool. Soc. 1867, p. 333). It has occurred once on the Falkland Islands (Abbott, Ibis, 1861, p. 156), passes through Central Patagonia on migration (Durnford, Ibis, 1878, p. 404), and was procured by Darwin, Captain Harrison, and others near Buenos Ayres. It is also found on migration in various parts of Brazil and Paraguay.

NUMENIUS MINUTUS.

LEAST WHIMBREL.

Diagnosis.

Numenius primariis haud fasciatis: tarso postice anticeque scutellato.

Variations.

No local races of this species are known.

Synonymy.

Numenius minutus, *Gould, Proc. Zool. Soc.* 1840, p. 176.
Numenius minor, *S. Müller, Verh. Land- en Volkenk.* p. 110 (1840, *nec Leach*, 1816).

Literature.

Plates.—Temm. & Schlegel, Fauna Japonica, Aves, pl. lxvii.; Gould, Birds of Australia, vi. pl. 44.
Habits.—Gould, Handb. Birds Austr. ii. p. 280.
Eggs.—Unknown.

Specific characters.

The Least Whimbrel differs from all the other species of the genus, except from the Eskimo Whimbrel, in having *scarcely any trace of pale bars on the inner webs of its primaries and secondaries*. From the latter it differs in what has always been regarded as a very important character: the *back of the tarsus* is *scutellated* as distinctly as the front, the scales being arranged in transverse plates instead of in hexagonal reticulations.

Geographical distribution.

Its precise breeding-grounds are unknown, but they are doubtless near the Arctic Circle in Eastern Siberia, as it has been obtained on migration in Dauria and in Japan. It passes along the Chinese coast, and through the Malay Archipelago, and winters in Australia.

Nearest allies.

In spite of the difference in the arrangement of the scales at the back of the tarsus, it is very closely related to the Eskimo Whimbrel, from which it principally differs in being slightly smaller, though with a rather longer tarsus; the underparts are somewhat paler and less conspicuously barred.

CHAPTER XXI.

Genus PHALAROPUS.

Diagnosis. TOTANINÆ digitis lobatis.

Generic characters. THE Phalaropes differ from all the other Charadriidæ in having *lateral lobes to the toes*, like the Grebes, which they also resemble in their laterally compressed tarsi; they also resemble the Grebes, the Auks, the Rails, and the Avocets in their fluffy compact plumage, but there is no reason to suppose that any of these characters denote affinity. In the position of their nostrils they are Scolopacine, not Charadriine; the toes are united by a web at the base, the tarsus is scutellated both in front and at the back, and the frontal feathers extend beyond the gape; so that they may be regarded as nearest related to the species comprised in the genus *Totanus*.

Synonymy of the Genus PHALAROPUS.

It is incredible that so well known and so clearly defined a genus, containing only three species, should have any synonymy; but such has been the perversity of ornithologists that the literature has been encumbered with no fewer than five generic names to puzzle and mislead the student.

	Type.
Phalaropus, *Brisson, Orn.* vi. p. 12 (1760)	P. fulicarius.
Crymophilus, *Vieillot, Anal. Nouv. Orn. Elém.* p. 62 (1816)	P. fulicarius.
Lobipes, *Cuvier, Règne An.* p. 495 (1817)	P. hyperboreus.
Steganopus, *Vieillot, N. Dict. d'Hist. Nat.* xxxii. p. 136 (1819)	P. wilsoni.
Holopodius, *Bonap. Compt. Rend.* xliii. p. 420 (1856)	P. wilsoni.

Determination of the type. Linneus placed the Phalaropes in his genus *Tringa* because they have four toes; but Brisson established a new genus for their reception on account of the peculiar webbing of

their feet. The Grey Phalarope (*Phalaropus fulicarius*), being the *Phalaropus phalaropus* of Brisson, is the type of the genus.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

PALÆARCTIC REGION.

North-west.
North-east.

P. FULICARIUS . . . . NEARCTIC REGION. . . . P. HYPERBOREUS.

North.
P. WILSONI . . . . . *Central.*

Climatic distribution.

The genus *Phalaropus*, though it only contains three species, is not exclusively Arctic. The distribution of each of the three species is somewhat peculiar; during the breeding-season it is as follows :—

Arctic Circumpolar	1	
Arctic America and East Asia	1	
Arctic species	—	2
Temperate North America	1	
Temperate species . . .	—	1
Species of *Phalaropus* . . .	—	3

Although the Phalaropes are more aquatic in their habits than any other birds belonging to this family, they can scarcely be regarded as shore birds. As might be inferred from the structure of their feet and the character of their plumage, they swim with the greatest ease, but they prefer small lakes and pools to the sea.

There is every reason to suppose that *P. wilsoni* represents the descendants of the Phalaropes which escaped from the Arctic ice down the great chain of lakes which lie between Hudson's Bay and the Rocky Mountains. The routes taken by the ancestors of *P. hyperboreus* and *P. fulicarius* are not so easy to determine, as both these species are now circumpolar. The rareness of the latter species in Europe suggests the idea that the ancestors of *P. hyperboreus* were isolated in the basin of the Mediterranean, and those of *P. fulicarius* in Southern Asia. It is, however, very possible that the latter species was isolated in the North Pacific Ocean, where it may have frequented the islands on both coasts, as it is much more maritime in its habits than either of its congeners.

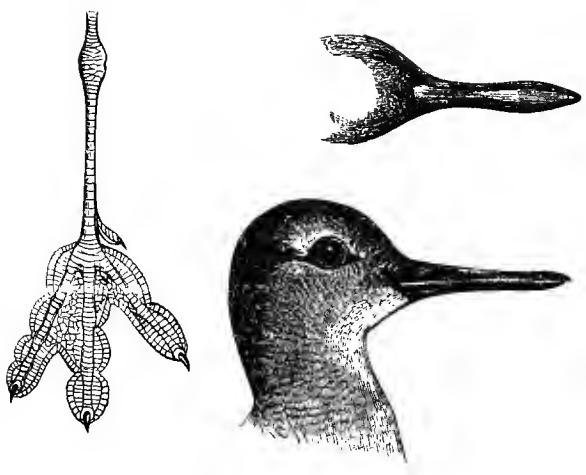
KEY TO THE SPECIES.

The Phalaropes are confined during the breeding-season to the northern portion of the Nearctic and Palæarctic Regions, retiring south to winter. Only three species are known, which may be distinguished as follows, in every stage of plumage:—

Bill and tarsus less than 1 inch.
- **wilsoni** . . . . . — Bill slender, gradually tapering to the point.
- **hyperboreus** . . . — Bill slender, gradually tapering to the point.
- **fulicarius.**

They may also be distinguished by the following characters:—

Lateral web of toes situated at each joint.
- **wilsoni** . . . . . — Outer tail-feathers not half an inch shorter than the longest.
- **hyperboreus** . . . — Outer tail-feathers not half an inch shorter than the longest.
- **fulicarius.**



PHALAROPUS FULICARIUS.

GREY PHALAROPE.

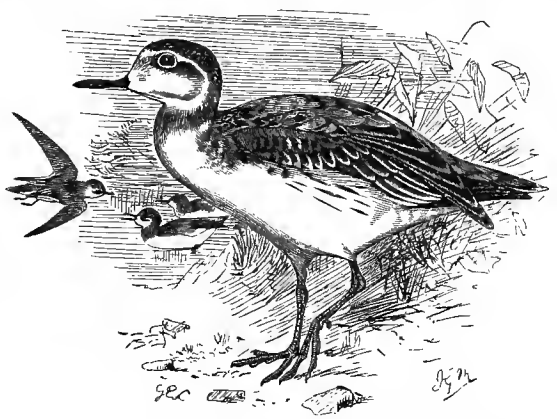
Diagnosis. PHALAROPUS rostro lato: caudâ valdè cuneatâ (rectricibus centralibus quam rectrices laterales 10 ad 16 millim. longioribus).

No local races of this species are known. Variations.

Tringa fulicaria, *Linneus, Syst. Nat.* i. p. 148 (1758); *Linn. Syst. Nat.* i. p. 249 (1766). Synonymy.
Phalaropus phalaropus, *Brisson, Orn.* vi. p. 12 (1760, winter plumage).
Phalaropus rufescens, *Brisson, Orn.* vi. p. 20 (1760, summer plumage).
Phalaropus lobatus (*Linn.*), *apud Tunstall, Orn. Brit.* p. 3 (1771).
Phalaropus rufus, *Bechstein, Naturg. Deutschl.* ed. 2, iv. p. 381 (1809).
Phalaropus platyrhynchus, *Temminck, Man. d'Orn.* p. 459 (1815).
Phalaropus griseus, *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 34 (1816).
Crymophilus rufus (*Bechst.*), *Vieillot, N. Dict. d'Hist. Nat.* viii. p. 521 (1817).
Phalaropus fulicarius (*Linn.*), *Bonap. Comp. List B. Eur. & N. Amer.* p. 54 (1838).
Phalaropus platyrostris, *Nordmann, Démidoff, Voy. Russ. Mérid.* iii. p. 250 (1840).
Phalaropus asiaticus, *Hume, Stray Feath.* i. p. 246 (1873).

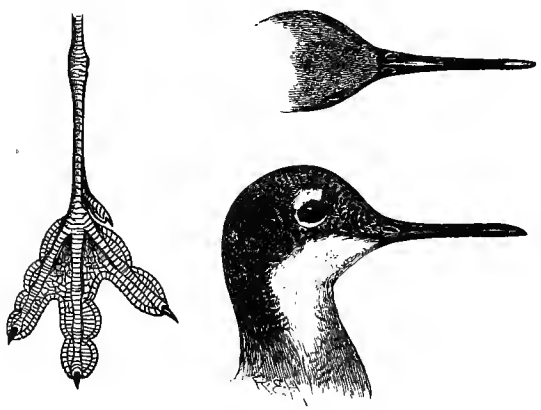
Plates.—Gould, Birds Gt. Brit. iv. pls. 81, 82; Dresser, Birds of Europe, vii. pl. 538. Literature.
Habits.—Seebohm, British Birds, iii. p. 85.
Eggs.—Seebohm, British Birds, pl. 27. figs. 7, 9.

The Grey Phalarope in breeding-dress differs entirely from its two allies, the whole of the underparts being chestnut like those of the Knot, Curlew Sandpiper, or Bar-tailed Godwit. At all seasons and ages it may be recognized by its *short wide bill*, or by its much graduated tail, the *central feathers* being generally *more than half an inch longer than the outermost.*



The Grey Phalarope may almost be regarded as a circumpolar species, though it is not known to breed on the continent of Europe. Middendorff found it very abundant on the Taimyr Peninsula; Dr. Bunge describes it as the commonest Sandpiper in the delta of the Lena. During the expedition to Alaska in 1881–83 it was found abundant at Point Barrow. It has been obtained on the Parry Islands, in Grinnell-Land, and in Greenland, Iceland, and Spitzbergen. It belongs to the class of gipsy migrants which never wander further from their breeding-grounds than they are compelled by stress of weather. It is a somewhat irregular winter visitor to Europe, and has occurred once in Tangiers. It is not known to pass through Turkestan or South Siberia on migration, but it winters on the Mekran coast and in Scinde. Severtzoff says that it is a rare visitor to the Pamir; a single example has been recorded from Calcutta, and it has even strayed as Geographical distribution.

far as New Zealand (Haast, Trans. New Zealand Institute, 1883, p. 279) and Chili (Salvin, Proc. Zool. Soc. 1883, p. 429). I have examples from Kamtschatka and the Kurile Islands. On the American continent it has occurred on both the Atlantic and the Pacific coasts at least as far south as lat. 40°, and Audubon records the occurrence of a flock, consisting of at least a hundred birds, on the banks of the Ohio, in lat. 38°.



PHALAROPUS HYPERBOREUS.

RED-NECKED PHALAROPE.

Diagnosis. PHALAROPUS rostro tenui, breviore (minus quam 25 millim.).

Variations. I CANNOT detect the slightest difference between examples from Europe, Asia, and America.

Synonymy.

Tringa lobata, *Linneus, Syst. Nat.* i. p. 148 (1758); *Linn. Syst. Nat.* i. p. 249 (1766, winter plumage).
Phalaropus cinereus, *Brisson, Orn.* vi. p. 15 (1760, summer plumage).
Phalaropus fuscus, *Brisson, Orn.* vi. p. 18 (1760, winter plumage).
Tringa hyperborea, *Linneus, Syst. Nat.* i. p. 249 (1766, summer plumage).
Phalaropus hyperboreus (*Linn.*), *Tunstall, Orn. Brit.* p. 3 (1771).
Tringa fusca (*Briss.*), *Gmelin, Syst. Nat.* i. p. 675 (1788).
Phalaropus vulgaris, *Bechstein, Orn. Taschenb.* ii. p. 317 (1803).

Phalaropus williamsii, *Simmonds, Trans. Linn. Soc.* viii. p. 264 (1807).
Phalaropus cinereus (*Briss.*), *Meyer, Taschenb.* ii. p. 417 (1810).
Lobipes hyperborea (*Linn.*), *Stephens, Shaw's Gen. Zool.* xii. pt. i. p. 169 (1824).
Phalaropus ruficollis, } *Pallas, Zoogr. Rosso-Asiat* ii. pp. 203, 204 (1826).
Phalaropus cinerascens, }
Phalaropus angustirostris, *Naumann, Vög. Deutschl.* viii. p. 240 (1836).
Phalaropus lobatus (*Linn.*), *Salvadori, Ucc. d'Ital.* ii. p. 210 (1871).
Lobipes tropicus, *Hume, Stray Feathers*, 1873, p. 247.
Lobipes lobatus (*Linn.*), *Baird, Brewer, & Ridgway, Water-Birds N. Amer.* i. p. 330 (1884).

Literature.

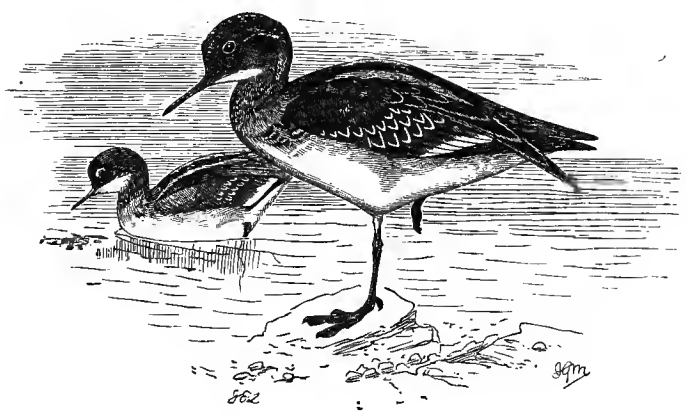
PLATES.—Daub. Pl. Enl. no. 766; Gould, Birds Gt. Brit. iv. pl. 83; Dresser, Birds of Europe, vii. pl. 537.
HABITS.—Seebohm, British Birds, iii. p. 89.
EGGS.—Seebohm, British Birds, pl. 27. figs. 4, 6.

Specific characters.

The Red-necked Phalarope may be recognized at all ages and seasons by its *short bill, less than an inch long, and gradually tapering to the point.*

In breeding-dress it differs principally from the Grey Phalarope in having a white breast and belly, and from Wilson's Phalarope in having a dark slate-grey hind neck.

The Red-necked Phalarope is a circumpolar bird, breeding principally on the tundras above the limit of forest-growth as far north as land extends in the eastern hemisphere, and in the western hemisphere up to lat. 73°. It rarely breeds south of the Arctic Circle,

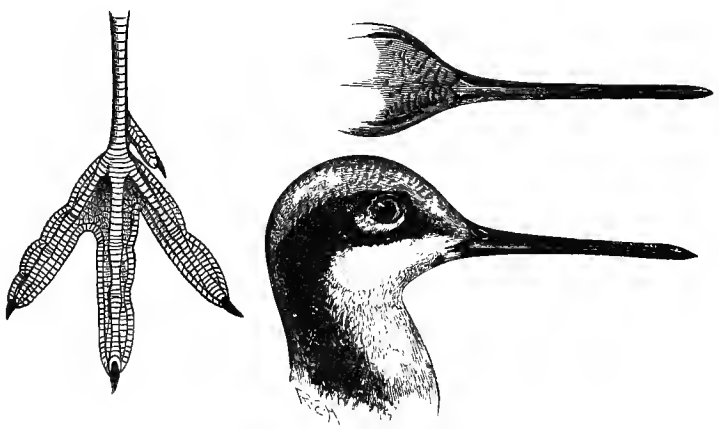


but above the pine-regions of the Dovrefjeld it breeds as far south as lat. 62°, and it is a summer visitor to the Shetland Islands and the Outer Hebrides.

Geographical distribution.

On the Pacific coast Middendorff found it breeding on the west shores of the Sea of Ochotsk as far south as lat. 55°; and it is a summer visitor to Greenland, Iceland, and the

Faroes. In winter it frequents the coasts of Europe, but is very rare in the basin of the Mediterranean, and has not occurred in North-east Africa, Palestine, or Asia Minor. It occurs during passage on most of the great internal lines of migration, and winters in Persia and occasionally in North India. It passes the coasts of Japan on migration, and winters in China and the islands of the Malay Archipelago as far south as New Guinea. In the western hemisphere it winters in the United States, Mexico, and Central America. It also occasionally visits the Bermudas (Reid, Zoologist, 1877, p. 475).



PHALAROPUS WILSONI.

WILSON'S PHALAROPE.

Diagnosis. PHALAROPUS rostro tenui, longo (plus quam 25 millim.).

Variations. No local races of this species are known.

Synonymy. Tringa glacialis, *Gmelin, Syst. Nat.* i. p. 675 (1788).
Steganopus tricolor, *Vieillot, N. Dict. d'Hist. Nat.* xxxii. p. 136 (1819).
Phalaropus wilsoni, *Sabine, Franklin's Narr. Journ. Polar Sea*, p. 691 (1823).
Lobipes incanus, *Jardine & Selby, Ill. Orn.* i. pl. 16 (1825).
Phalaropus fimbriatus, *Temminck, Pl. Col.* no. 370 (1825).

Phalaropus frenatus, *Vieillot, Gal. Ois.* ii. p. 178 (1826).
Lobipes frenatus (*Vieill.*), *Cuvier, Règne An.* i. p. 532 (1829).
Phalaropus stenodactylus, *Wagler, Isis,* 1831, p. 523.
Lobipes wilsoni (*Sabine*), *Audubon, Syn. Birds N. Amer.* p. 241 (1839).
Holopodius wilsoni (*Sabine*), *Bonap. Compt. Rend.* xliii. p. 420 (1856).
Steganopus wilsoni (*Sabine*), *Coues, Ibis,* 1865, p. 158.

Literature.

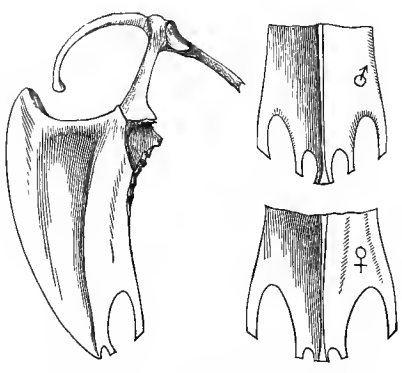
PLATES.—Temm. Pl. Col. no. 370; Jardine & Selby, Ill. Orn. i. pl. 16; Swainson & Rich. Faun. Bor.-Amer. ii. pl. 69; Audubon, Birds Am. v. pl. 341.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 335.
EGGS, described by Brewer on page 339 of the above-mentioned volume.

Specific characters.

Wilson's Phalarope may always be recognized by its long *slender bill, more than an inch long*; the long tarsus, about the same length as the bill, is also diagnostic. In breeding-plumage it resembles most the Red-necked Phalarope, but is easily distinguished by the white stripe down the back of the neck and the black stripes down the sides of the neck.

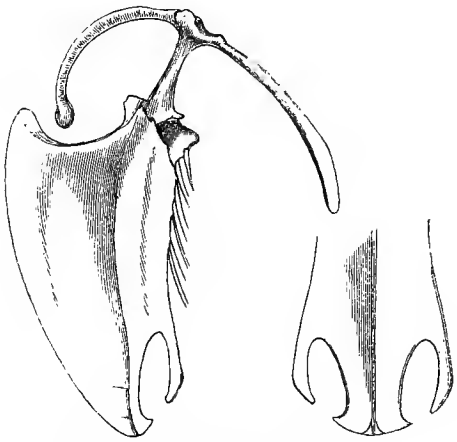
Geographical distribution.

It is entirely confined to the American continent, breeding near the lakes of the interior as far north as Lake Winnipeg, and as far south as the Great Salt Lake in the west, and Lake Michigan in the east. It is occasionally seen on the Atlantic coast on migration, and it winters in various parts of the Neotropical Region, Mexico, Guatemala, Chili (Bridges, Proc. Zool. Soc. 1843, p. 118), Patagonia (Durnford, Ibis, 1877, p. 42), &c.



Sternum of *Phalaropus fulicarius*.

CHAPTER XXII.



Sternum of *Totanus ochropus*.

Genus TOTANUS.

Diagnosis. TOTANINÆ frontis pennis ante fissuram extensis: rostro aut recto, aut paulo recurvato, aut perpaulum decurvato.

Generic characters. THE Sandpipers belonging to the genus *Totanus* might perhaps be called the *Hard-billed, partially web-footed Sandpipers* by those who object to the name of *Tatlers* adopted by Macgillivray and the American ornithologists.

They may be diagnosed as Totaninæ having the *frontal feathers extending in front of the gape*, and having the *bill either not decurved at all, or so slightly that a straight line from the gape to the tip will not pass below the lower outline of the under mandible.*

I have no doubt that there are many other characters besides the almost contemptible one last named to distinguish these birds from the Curlews, but I have not been able to discover them. An imperfect diagnosis (such as Sundevall sometimes gives) is perhaps preferable to one founded on such a trivial character as the bend of the bill. The following attempt would then meet the case: *Numenius* (with the exception of *N. minor*) has the back of the tarsus reticulated, whilst *Totanus* (with the exception of *T. incanus*) has the back of the tarsus scutellated like the front.

Difference between *Numenius* and *Totanus*.

If it be necessary to depend upon such apparently slight characters for the diagnosis of the genus *Totanus*, to what minute shades of difference must those ornithologists have descended who split it up into a dozen or more genera! In the synonymy of this genus there are not quite two generic names to each species, but very nearly so.

Synonymy of the Genus TOTANUS.

	Type.
Totanus, *Bechstein, Orn. Taschenb.* ii. p. 282 (1803)	T. calidris.
Glottis, *Koch, Syst. baier. Zool.* p. 305 (1816)	T. glottis.
Limicula, *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 32 (1816)	T. glottis.
Pavoncella, *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 29 (1816)	T. pugnax.
Machetes, *Cuvier, Règn. Anim.* i. p. 490 (1817)	T. pugnax.
Symphemia, *Rafinesque, Journ. Phys.* p. 420 (1819)	T. semipalmatus.
Actitis, *Boie, Isis*, 1822, p. 560	T. hypoleucus.
Catoptrophorus, *Bonap. Ann. Lyc. Nat. Hist. New York*, ii. p. 323 (1826)	T. semipalmatus.
Helodromas, *Kaup, Natürl. Syst.* p. 144 (1829)	T. ochropus.
Gambetta, *Kaup, Natürl. Syst.* p. 54 (1829, *nec Koch*, 1816)	T. calidris.
Erythroscelus, *Kaup, Natürl. Syst.* p. 54 (1829)	T. fuscus.
Xenus, *Kaup, Natürl. Syst.* p. 115 (1829)	T. terekius.
Rhyacophilus, *Kaup, Natürl. Syst.* p. 140 (1829)	T. glareola.
Iliornis, *Kaup, Natürl. Syst.* p. 156 (1829)	T. stagnatilis.
Ilodites, *Kaup, Natürl. Syst.* p. 155 (1829)	T. semipalmatus.
Bartramia, *Lesson, Traité d'Orn.* p. 553 (1831)	T. bartrami.
Tringoides, *Bonap. Sagg. dist. met. An. Vert.* p. 58 (1831)	T. hypoleucus.
Actidurus, *Bonap. Sagg. dist. met. An. Vert.* p. 143 (1831)	T. bartrami.
Euliga, *Nuttall, Man. Orn. U.S. & Can.* ii. p. 167 (1834)	T. bartrami.
Terekia, *Bonap. Comp. List B. Eur. & N. Amer.* p. 52 (1838)	T. terekius.
Actiturus, *Bonap. Comp. List B. Eur. & N. Amer.* p. 51 (1838)	T. bartrami.
Simorhynchus, *Keyserling & Blasius, Wirb. Eur.* p. 74 (1840)	T. terekius.
Guinetta, *Gray, List Gen. Birds*, p. 68 (1840)	T. hypoleucus.
Philomachus, *Gray, List Gen. & Subgen. of Birds*, p. 89 (1841)	T. pugnax.
Heteroscelus, *Baird, Birds N. Amer.* p. 734 (1858)	T. incanus.
Pseudototanus, *Hume, Stray Feathers*, vii. p. 488 (1878)	T. guttiferus.
Pseudoglottis, *Stejneger, Zeitschr. ges. Orn.* 1884, p. 223	T. guttiferus.
Heteractitis, *Stejneger, Auk*, 1884, p. 236	T. incanus.

Determination of the type.

Of the 17 species of *Totanus* now known to ornithologists only eight were known to Linneus. Of these he placed five in the genus *Tringa* on the ground that they had only one joint in the hind toe, and three in the genus *Scolopax* on the ground that they had more than one joint in the hind toe.

The Common Redshank (*Totanus calidris*), being the *Scolopax totanus* of Linneus, has every claim to be regarded as the type of the genus.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Totanoides.	PALÆARCTIC REGION.	*Tringoides.*
T. GLOTTIS, T. FUSCUS	*Arctic.*	
T. GUTTIFERUS, T. BREVIPES	*East Arctic.*	T. TEREKIUS.
	West Arctic and Subarctic.	T. PUGNAX.
	Arctic and Subarctic.	T. GLAREOLA, T. OCHROPUS, T. HYPOLEUCUS.
T. CALIDRIS	*Subarctic and Subtropical.*	
T. STAGNATILIS	*Subtropical.*	
	NEARCTIC REGION.	
	Arctic.	T. SOLITARIUS, T. MELANOLEUCUS, T. FLAVIPES.
T. INCANUS	*West Arctic.*	
	Arctic and Subarctic.	T. MACULARIUS, T. BARTRAMI.
T. SEMIPALMATUS	*East Subarctic and Subtropical.*	
T. SPECULIFERUS	*West Subarctic and Subtropical.*	

Climatic distribution.

The range of the genus *Totanus* is practically cosmopolitan, but during the breeding-season is probably confined to the Nearctic and Palæarctic Regions.

The genus *Totanus* is a decidedly Arctic one. Of 17 species only 2 are confined to the Temperate Region during the breeding-season. They are distributed as follows :—

Arctic Eurasia	5	
Arctic America	4	
Arctic species		— 9
Arctic and Temperate Eurasia	5	
Arctic and Temperate North America	2	
Arctic and Temperate species		— 7
Temperate Eurasia	1	
Temperate North America	2	
Temperate species		— 3
Species and subspecies of *Totanus*		— 19

Emigration.

The geographical distribution of the species included in the genus *Totanus* presents some difficulties, but on the whole it confirms the theory of a general dispersal of a circumpolar species by a Glacial Epoch. These birds are possessed of such powerful organs of flight that they have most of them extended their winter as well as their summer ranges from ocean to ocean.

Atlantic coast of Europe.

The five species which have white lower backs must be regarded as the typical group of the genus *Totanus*. They appear to represent the party which emigrated from the Polar Basin along the Atlantic coast of the Old World. None of them are found in the New World except as accidental visitors, and they are the only group represented in Iceland and the Faroes. We may assume that they were subgenerically differentiated during the period of their isolation, whilst the gradual increase of the Arctic ice drove them south, and that they rapidly spread eastwards along the shores of the Mediterranean to the southern coast of Asia, and that during the height of the Post-Pliocene Glacial Epoch they were differentiated into species in their present most favoured winter-quarters, whence they again spread over most of the Palæarctic Region during the warm period which followed. It is perhaps impossible accurately to determine the exact area of isolation of each species, but we are by no means without circumstantial evidence of the facts of the case.

To begin with the East, we may assign the Malay Peninsula to Erman's Sandpiper (*T. guttiferus*), as it appears to be still confined to that district in winter. India may lay claim to have been the native country of the Greenshank (*T. glottis*); and Ceylon to the small, and on that account probably island, form which we call the Marsh-Sandpiper (*T. stagnatilis*), and which Legge describes as "the most abundant of its genus" in that island. The Redshank (*T. calidris*) was most likely isolated in West Africa; whilst the Dusky Redshank (*T. fuscus*), the most Arctic species of the genus, appears to have remained furthest north on the shores of the sea which is now cut up into the Levant, the Black Sea, the Caspian, the Persian Gulf, and the Red Sea.

Across country in Eurasia.

The Ruff (*T. pugnax*) must also be regarded as having had a West Palæarctic origin, as it appears to be only an accidental visitor to the Pacific shores. It is perhaps less a shore-bird in its habits than the five species already discussed; it may fairly claim to have become subgenerically differentiated from them; and the remarkable extent to which sexual selection appears to have modified its nuptial plumage suggests the idea that it represents a body of Sandpipers which were isolated from their companions at an early date, and emigrated south across country. There seems reason to believe that at the height of the Glacial Period these birds found refuge in the valley of the Nile, where they are now extremely abundant in winter.

The nearest allies of these species are probably the two or three which have plain brown axillaries—*T. semipalmatus*, *T. incanus*, and *T. brevipes*. This little group ranges across East Siberia and North America. The specific distinctness of the two latter is doubtful, and for that very reason it gives us a clue as to which is the least-changed form. Birds of the year of the Siberian form (*T. brevipes*) have the under tail-coverts more or less

distinctly barred, so that we may fairly assume that *T. incanus*, the adults of which have the under tail-coverts very distinctly barred, is the older form—a conclusion supported by the fact that the scales at the back of the tarsus of the American form are constructed on a more archaic type than in the Siberian species. *T. incanus* and *T. semipalmatus* are so different that we may recognize their subgeneric distinction by supposing that *T. semipalmatus* emigrated along the Atlantic coast of America, and *T. incanus* along the Pacific coast of that continent. During the warm period which followed the Post-Pliocene Glacial Period the latter species appears to have sent a detachment across Behring Straits to East Siberia, the descendants of which have become partially differentiated, and are now known as *T. incanus brevipes*.

Atlantic and Pacific coasts of America.

Bartram's Sandpiper (*T. bartrami*), like the Ruff in the Old World, appears to have emigrated across country in the New World, and to have become almost entirely an inland species.

Across country in America.

The evidence that the ancestors of the remaining eight species emigrated along the Pacific coast of Asia is very strong. Four of them are Nearctic and four Palæarctic; of the latter, one is absent from Western Europe, and the other three are represented by such close allies in the New World that it is reasonable to suppose that the American species are the result of emigrations across Behring Straits during the Post-Glacial warm period. These eight species are :—

Pacific coast of Asia.

Old World.	*New World.*
T. terekius.	. . . . .
T. hypoleucus.	T. macularius.
T. ochropus.	T. solitarius.
T. glareola.	T. flavipes.
. . . . .	T. melanoleucus.

The remarkable fact that *T. melanoleucus* almost exactly resembles in almost every dimension *T. glottis* suggests the possibility that the former may be the American analogue of the latter (though it has lost its white lower back and rump) rather than a giant form of *T. flavipes*, which it almost exactly resembles in colour. The fact that the young in first plumage of *T. macularius* so closely resembles the adult of its Palæarctic analogue, is strong evidence that the latter is the older form.

T. ochropus being the commonest of the four in India, was probably differentiated in that country. The extraordinary abundance of *T. glareola* in Ceylon suggests that island as the birthplace of that species. *T. hypoleucus* being the most abundant of the four in *Burma* was probably isolated in that peninsula; whilst the range of *T. terekius* being the least westerly, the Malay Archipelago may have been the original home of that species.

KEY TO THE SPECIES.

Of the twenty-eight generic names already enumerated as having been applied to sections of this genus, six of them may perhaps be allowed to claim subgeneric rank, and the species may be ranged under them as follows :—

Totanus.—T. glottis, T. fuscus, T. calidris, T. guttiferus, T. stagnatilis.

Machetes.—T. pugnax.

Symphemia.—T. semipalmatus.

Tringoides.—T. melanoleucus, T. flavipes, T. glareola, T. ochropus, T. solitarius, T. terekius, T. hypoleucus, T. macularius.

Heteroscelus.—T. incanus, T. brevipes.

Bartramia.—T. bartrami.

In forming a key to the species it is scarcely necessary to recognize more than two groups. Subgenera are so very aggressive, that it is a pity to lose an opportunity of snubbing them.

The first group contains the typical *Totani*, which may always be distinguished by their *white lower backs*, and the *Heterosceli* and *Symphemia*, which may be most easily recognized by their *unbarred dark grey axillaries*.

Secondaries nearly uniform white.	**fuscus**	Secondaries white, barred with grey.
	calidris.	
	semipalmatus . .	Both sides of middle toe webbed at base.
	guttiferus . . .	
Wing less than $5\frac{1}{2}$ inches from carpal joint.	**glottis.**	
	stagnatilis.	
Nasal groove extending over only the basal half of bill.	**incanus**	Lower back, rump, and upper tail-coverts grey.
	brevipes	

All these characters are found in the young in first plumage as well as in adults, and are independent of season or sex.

The second group contains the species comprised in the subgenera *Machetes*, *Tringoides*, and *Bartramia*, none of which possess either of the characters which have been pointed out as possessed by the species contained in the first group.

	pugnax.	
	melanoleucus . .	Bill 2 inches or more in length.
	flavipes	Central upper tail-coverts white, with or without narrow bars.
	glareola	
	ochropus	Axillaries brown, narrowly barred with white.
	solitarius	
Wing under 6 inches .	**terekius**	Eighth and ninth secondaries mostly white.
	hypoleucus . . .	
	macularius . . .	Outer tail-feathers at least a sixth shorter than the longest.
	bartrami	

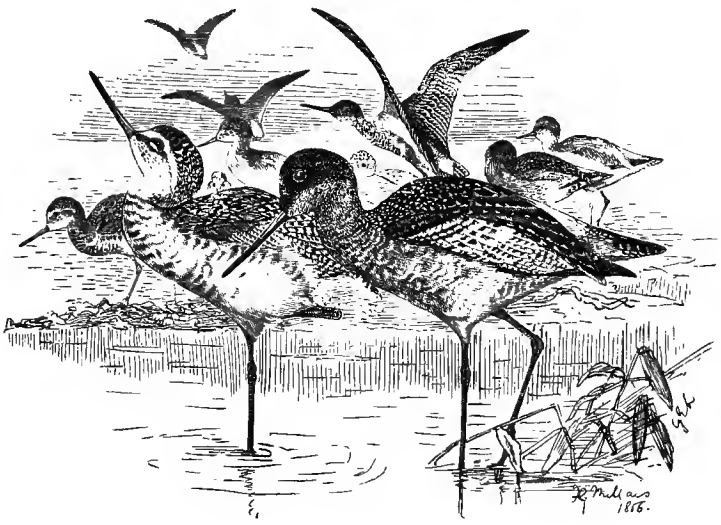
These characters are also all unaffected by age, sex, or season.

The two groups are very closely connected with each other. The almost white secondaries of *T. calidris* and *T. semipalmatus* partially appear in *T. terekius* and *T. hypoleucus*. The dark axillaries narrowly barred with white of *T. ochropus* and *T. solitarius* are intermediate between the dark unbarred axillaries of *T. semipalmatus*, *T. incanus* (and its subspecific form *T. brevipes*), and the broadly barred axillaries of *T. bartrami*, which lead on through the nearly white axillaries of *T. melanoleucus*, *T. flavipes*, and *T. glareola* to those of *T. glottis*, *T. guttiferus*, and *T. calidris*, which are sometimes quite white and sometimes more or less barred with brown, and those of *T. fuscus*, *T. stagnatilis*, *T. terekius*, *T. hypoleucus*, *T. macularius*, and *T. pugnax*, which are always white.

To split up such a homogeneous group of birds into half a dozen or more genera, founded on trivial and obviously adaptive characters, appears to me to be childish. To place *T. guttiferus* and *T. glottis* in different genera because the former has a slight web between the inner and middle toes, or to separate *T. glareola* from *T. flavipes* because there is a slight difference in the comparative lengths of the middle toe and the tarsus, appears

to me to be not only puerile, but a violation of principle. The so-called structural characters are so obviously adaptive, and the similarity of colour so close, that it is impossible to suppose that the former date as far back in the history of the species as the latter.

*** *Subgenus* TOTANOIDES : Totanus *aut dorso postico albo, aut axillaribus nigricantibus.*



TOTANUS FUSCUS.

DUSKY REDSHANK.

TOTANUS dorso postico albo : secundariis albis, fusco fasciatis. Diagnosis.

No local races of this bird are known ; examples from Japan do not differ from those found on our shores ; nevertheless Brehm split it into three species. Variations.

Synonymy.

Tringa totanus ruber, } *Brisson, Orn.* v. pp. 192, 277 (1760).
Limosa fusca, }
Scolopax fusca, *Linneus, Syst. Nat.* i. p. 243 (1766) [1].
Scolopax maculata, *Tunstall, Orn. Brit.* p. 3 (1771).
Scolopax atra, *Sander, Naturforsch.* xiii. p. 193 (1779).
Scolopax cantabrigiensis, *Latham, Gen. Syn. Suppl.* i. p. 292 (1787).

[1] The *Scolopax fusca* of the tenth edition of the ' Systema Naturæ ' is another bird and becomes the *Tantalus fuscus* of the twelfth edition.

Scolopax nigra,
Scolopax curonica,
Tringa atra (*Sand.*), } *Gmelin, Syst. Nat.* i. pp. 659, 669, 673 (1788).
Scolopax natans, *Otto, Uebers. Buff. Vög.* xxvi. p. 234 (1797).
Totanus maculatus (*Tunstall*),
Totanus fuscus (*Linn.*),
Totanus natans (*Otto*), } *Bechstein, Orn. Taschenb.* pp. 284, 286 (1803).
Tringa longipes, *Leisler, Nacht. Bechst. Naturg. Deutschl.* ii. p. 189 (1813).
Totanus raii, *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 31 (1816).
Erythroscelus fuscus (*Linn.*), *Kaup, Natürt. Syst.* p. 54 (1829).
Totanus ater (*Sand.*), *Stejneger, Orn. Expl. Kamtsch.* p. 129 (1885).

Literature.

PLATES.—Daub. Pl. Enl. no. 875; Gould, Birds of Great Brit. iv. pl. 55; Dresser, Birds of Europe, viii. pl. 568. figs. 2, 3, pl. 569. fig. 1.
HABITS.—Seebohm, British Birds, iii. p. 145.
EGGS.—Seebohm, British Birds, pl. 32. figs. 4, 5, 6.

Specific characters.

The Dusky Redshank, frequently called the Spotted Redshank, is easily distinguished in summer plumage by its slate-grey head, neck, mantle, and underparts. In winter plumage its close relationship to the Greenshank (*T. glottis*) and the Redshank (*T. calidris*), and to the other species of the genus, which, like it, have the *lower back white*, becomes apparent. From these near allies it is most easily distinguished by the colour of its *secondaries*, which are *white, barred with grey* on both webs.

The Dusky Redshank further resembles the Greenshank and the Marsh-Sandpiper (*T. stagnatilis*) in having the rudiments of bars on its primaries.

Geographical distribution.

The Dusky Redshank is not known with certainty to breed anywhere south of the Arctic Circle, but on the tundras above the limit of forest-growth it breeds from Lapland to Behring Straits, though nowhere very abundantly. It has not been recorded from Greenland, Iceland, or the Faroes. On migration it passes in spring and autumn, not only along the Atlantic and Pacific coasts (including those of Great Britain and Japan), but also across country by most, if not all, of the well-known routes of migration. It winters in the basin of the Mediterranean, and in various parts of Africa north of the Equator, and in India, Burma, and China. It has also been said to have strayed during winter as far as Ceylon, but the only record of its occurrence in the southern hemisphere is that of a single example obtained by Layard in the Cape Colony.

Except during the two seasons of migration it can scarcely be regarded as a shore-bird. Both at its breeding-grounds and in its winter-quarters it frequents marshes, swamps, and the banks of rivers and lakes.

Colour of legs.

One of the most interesting facts connected with this species is the seasonal change which takes place in the colour of its legs and feet; in summer they are dark purple-red, but in winter they change to dull orange-yellow.

TOTANUS CALIDRIS.

COMMON REDSHANK.

Diagnosis.

Totanus dorso postico albo : secundariis ferè omninò albis.

Variations.

No difference can be found between Atlantic and Pacific examples of this species.

Synonymy.

Scolopax totanus, *Linneus, Syst. Nat.* i. p. 145 (1758).
Tringa totanus,
Tringa totanus striatus,
Tringa totanus nævius, } *Brisson, Orn.* v. pp. 188, 196, 200 (1760).
Scolopax calidris,
Tringa gambetta,
Tringa striata, } *Linneus, Syst. Nat.* i. pp. 245, 248 (1766).
Totanus calidris (*Linn.*), *Bechstein, Orn. Taschenb.* ii. p. 284 (1803).
Gambetta calidris (*Linn.*), *Kaup, Natürl. Syst.* p. 54 (1829).

Literature.

Plates.—Daub. Pl. Enl. nos. 827, 845 ; Gould, Birds of Gt. Brit. iv. pl. 54 ; Dresser, Birds of Europe, viii. pl. 568. fig. 1, pl. 569. fig. 2.
Habits.—Seebohm, British Birds, iii. p. 140.
Eggs.—Seebohm, British Birds, pl. 32. figs. 1, 2, 3.

Specific characters.

The Redshank is the only *Totanus* which combines the two characters of *lower back white* and *secondaries nearly white*.

The Redshank is one of the commonest and best known of all the Waders found in the British Islands. It is a resident, frequenting almost all parts of the coasts in autumn and winter, and retiring more or less inland in summer, at which season it is generally distributed, though somewhat local. It breeds in all suitable districts in England, especially in the low-lying eastern counties; and in Scotland it is even more numerous, extending to the Hebrides, the Orkneys, and Shetland. In the latter islands it is, however, only sparingly met with in the breeding-season. It is a common bird in Ireland, frequenting the mud-flats on the coast at low tide, but retiring inland to breed.

Geographical distribution.

The geographical distribution of the Redshank is somewhat peculiar. It breeds in all suitable localities throughout the whole of Europe as far west as Iceland and the Faroes, but east of the White Sea its range gradually drops down to lat. 58° on the Ural Mountains. In the basin of the Mediterranean it appears to be a resident both in South Europe and in North Africa; but to the rest of Africa it is a winter visitor to the Canary Islands and the entire south coast of the continent. In Siberia its breeding-range only extends as far north as lat. 55°, and appears to be confined to the mountains of Southern Siberia and Turkestan. It breeds on the Caucasus, and probably on some of the Persian highlands. It passes through Mongolia on migration; and winters in India, Ceylon, Burma, China, and the islands of the Malay Archipelago, and has recently been recorded from Japan.

TOTANUS GUTTIFERUS.

ERMAN'S SANDPIPER.

Diagnosis.

Totanus dorso postico axillaribusque albis: digito medio basi utrinque palmatis.

Variations.

Only half a dozen examples of this very rare bird are known.

Synonymy.

Totanus guttifer, *Nordmann, Erman's Reise um die Erde*, p. 17 (1835).
Xenus guttifer (*Nordm.*), *Lichtenstein, Nom. Av. Mus. Berol.* p. 91 (1854).
Terekia guttifera (*Nordm.*), *Bonap. Compt. Rend.* xliii. p. 597 (1856).
Totanus haughtoni, *Armstrong, Stray Feathers*, iv. p. 344 (1876).
Pseudototanus haughtoni (*Armstr.*), *Hume, Stray Feathers*, vi. p. 488 (1878).

Symphemia haughtoni (*Armstr.*), *Harting, Ibis*, 1883, p. 134.
Pseudototanus guttifer (*Nordm.*), } *Stejneger, Zeitschr. ges. Orn.* 1884, p. 223.
Pseudoglottis guttifer (*Nordm.*), }

Literature.

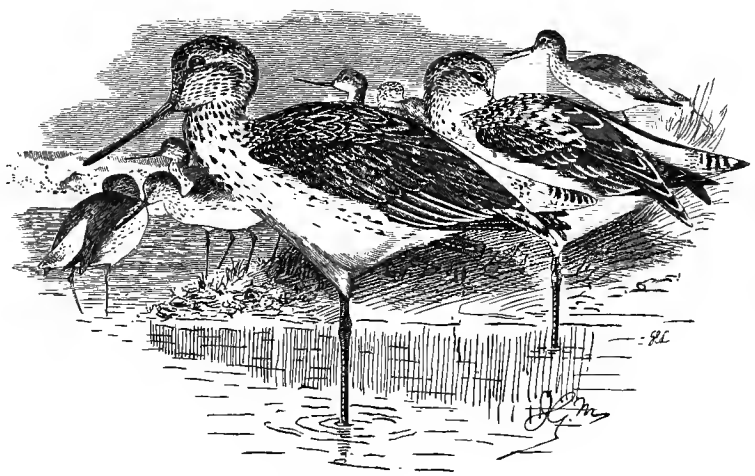
Plates.—Hume and Marshall, Game Birds of India, iii. p. 403; Harting, Ibis, 1883, pl. iv.; Stejneger, Zeitschrift gesammte Orn. 1884, pl. x.
Habits.—Armstrong in Hume and Marshall's Game Birds of India, iii. p. 403.
Eggs.—Unknown.

Specific characters.

Erman's Sandpiper may always be distinguished from every other *Totanus* except the Willet (*T. semipalmatus*) by having the *middle toe united at the base with both the other toes by a well-developed web*[1]. Its *white lower back* and *white axillaries* prevent its being confused with the Willet, and prove its much closer relationship to the Greenshank.

Geographical distribution.

Erman's Sandpiper has been obtained in summer on the north-west shores of the Sea of Okhotsk, on the east coast of Kamtschatka, and on Behring Island. In winter it is only known from Burma.



TOTANUS GLOTTIS.

GREENSHANK.

Diagnosis.

Totanus dorso postico albo: secundariis canis, non fasciatis: alis longis (circa 180 millim.): palamâ inter digitum medium et digitum internum carente.

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[1] Harting has given a woodcut of the foot of Erman's Sandpiper in the 'Ibis' for 1883, page 135.

Variations. Brehm splits the Greenshank into three species, but modern ornithologists are ignorant of even a local race of this bird.

Synonymy.

Scolopax glottis, *Linneus, Syst. Nat.* i. p. 146 (1758); *Linn. Syst. Nat.* i. p. 245 (1766).
Limosa grisea, *Brisson, Orn.* v. p. 267 (1760).
Scolopax nebularius, *Gunner, Leem. Lapp. Beschr.* p. 251 (1767).
Scolopax cineracea, *Latham, Gen. Syn. Suppl.* i. p. 292 (1787).
Scolopax canescens, *Gmelin, Syst. Nat.* i. p. 688 (1788).
Totanus glottis (*Linn.*), *Bechstein, Orn. Taschenb.* ii. p. 287 (1803).
Totanus fistulans, Totanus griseus (*Briss.*), *Bechstein, Natury. Deutschl.* iv. pp. 241, 249 (1809).
Totanus chloropus, *Meyer, Taschenb.* ii. p. 371 (1810).
Glottis natans, *Koch, Syst. baier. Zool.* p. 305 (1816, *nec Otto,* 1797).
Limicula glottis (*Linn.*), *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 32 (1816).
Glottis chloropus (*Meyer*), *Nilsson, Orn. Suecica,* ii. p. 57 (1821).
Limosa totanus (*Linn.*), *apud Pallas, Zoogr. Rosso-Asiat.* ii. p. 183 (1826).
Glottis nivigula, *Hodgson, Gray's Zool. Miscell.* ii. p. 36 (1831).
Totanus glottoides, *Vigors, Proc. Zool. Soc.* 1831, p. 173.
Limosa glottoides (*Vigors*), Totanus horsfieldii, *Sykes, Proc. Zool. Soc.* 1832, p. 163.
Glottis floridanus, *Bonap. Comp. List B. Eur. and N. Amer.* p. 51 (1838).
Glottis canescens (*Gmel.*), Glottis vigorsii, Glottis horsfieldii (*Sykes*), *Gray, List Birds Brit. Mus.* iii. p. 99 (1844).
Glottis glottis (*Linn.*), *Lichtenstein, Nom. Av. Mus. Berol.* p. 91 (1854).
Totanus canescens (*Gmel.*), *Adams, Proc. Zool. Soc.* 1859, p. 169.
Totanus nebularius (*Gunn.*), *Stejneger, Proc. U. States Nat. Mus.* 1882, p. 37.

Literature.

Plates.—Gould, Birds of Gt. Brit. iv. pl. 53; Dresser, Birds of Europe, viii. pl. 570.
Habits.—Seebohm, British Birds, iii. p. 149.
Eggs.—Seebohm, British Birds, pl. 29. figs. 1, 3, 4.

Specific characters.

The Greenshank has a *white lower back* and *nearly uniform grey secondaries.* Two other species of the genus possess both these characters, the Marsh-Sandpiper (*T. stagnatilis*) and Erman's Sandpiper (*T. guttiferus*). The former is most easily distinguished by its small size, having a wing about 5½ inches long, whilst the Greenshank has a *wing about seven inches long.* The latter has shorter *tarsi,* under instead of *over two inches,* but is most readily distinguished by the great development of the webs at the base of both sides of the middle toe. In the Greenshank the *web* is *obsolete between the middle and inner toes.* It is difficult to say to which of these two species the Greenshank is most closely allied.

The Greenshank has not been recorded from Greenland, Iceland, or the Faroes; but it is a regular summer visitor to the Highlands of Scotland and the fells of Norway,

Sweden, and Lapland. In the valleys of the Petchora and the Obb it appears to breed from lat. 60° to lat. 66°, which is probably its summer range throughout Siberia, as it only passes through Lake Baikal and the valley of the Amoor on migration, and Middendorff did not find it on the tundras, but only on the Stanovoi mountains. It passes along the coasts of Europe and Eastern Asia, including those of Great Britain and Japan, on migration, as well as along the recognized inland routes, and winters in the basin of the Mediterranean and throughout Africa. I found it very common on the lagoons near the coast of Natal; and Böhm obtained it in Central Africa, near Lake Tanganyika (Journ. Orn. 1885, p. 66). It also winters in India, Ceylon, Burma, China, the Malay Archipelago, and Australia. The winter range of this species is very extended, stragglers having occurred on Mauritius, Norfolk Island, in Chili, at Buenos Ayres, and in Florida. Geographical distribution.

The Greenshank frequents the sandy banks of rivers and lakes, and is especially fond of feeding on the mud-flats at the estuaries of rivers during low tide.

TOTANUS STAGNATILIS.

MARSH-SANDPIPER.

Diagnosis.

Totanus dorso postico albo: secundariis canis, non fasciatis: magnitudine parvâ (alæ circa 140 millim.).

Variations.

Even Brehm was unable to find any local races of this species.

Synonymy.

Totanus stagnatilis, *Bechstein, Orn. Taschenb.* ii. p. 292 (1803).
Glottis stagnatilis (*Bechst.*), *Koch, Syst. baier. Zool.* p. 306 (1816).
Totanus tenuirostris, *Horsfield, Trans. Linn. Soc.* xiii. p. 192 (1822).
Trynga guinetta, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 195 (1826).
Iliornis stagnatilis (*Bechst.*), *Kaup, Natürl. Syst.* p. 156 (1829).
Limosa horsfieldii, *Sykes, Proc. Zool. Soc.* 1832, p. 163.
Totanus lathami, *Gray & Hardwicke, Ill. Ind. Zool.* pl. 51 (1834).
Glottis horsfieldii (*Sykes*), *Gray, List Birds Brit. Mus.* iii. p. 99 (1844).
Totanus stagnalis (*Bechst.*), Totanus horsfieldii (*Sykes*), *Gray, Genera of Birds*, iii. p. 573 (1846).

Literature.

Plates.—Gould, Birds of Australia, vi. pl. 37; Gray and Hardwicke, Ill. Ind. Orn. pl. 51. fig. 3; Dresser, Birds of Europe, viii. pl. 566.
Habits.—Dresser, Birds of Europe, viii. p. 151.
Eggs.—Thienemann, Abbild. Vogeleiern, pl. lxiv. figs. 1 *a*, 1 *b*, 1 *c*, 1 *d*. They may be described as miniature eggs of the Greenshank or Redshank.

Specific characters.

The Marsh-Sandpiper has a *white lower back*, rump, and central upper tail-coverts, and *nearly uniform grey secondaries*, two characters which are only found combined in two other species in the genus, the Greenshank (*T. glottis*) and Erman's Sandpiper (*T. guttiferus*). From these two species it is most easily distinguished by its much smaller size, the *wing* from the carpal joint only measuring *about* $5\frac{1}{2}$ *inches* instead of 7 or 8 inches.

Jerdon very appropriately calls it the Little Greenshank, and it may fairly be regarded as a subarctic representative of its more arctic ally.

Geographical distribution.

The breeding-range of the Marsh-Sandpiper extends from the delta of the Rhone and the valley of the Danube, through South Russia, North Persia, and Turkestan to Southern Siberia. Further north it only occurs as an accidental straggler. An example has been obtained on Heligoland, but it is not known to have visited the British Islands. It passes on migration a still more extended range of country, from the coast of West Africa to the coast of China, and winters throughout Africa, both on the coast and inland. Böhm obtained it in Central Africa near Lake Tanganyika (Matschie, Journ. Orn. 1887, p. 138). It also winters in India, Ceylon, Burma, the Malay Archipelago, and Australia. It is said to be a resident on the southern shores of the Caspian.

It frequents the banks of rivers and lakes, especially tidal flats.

TOTANUS SEMIPALMATUS.

WILLET.

Diagnosis.

TOTANUS primariis pro majore parte albis.

Variations.

THE Western form of the Willet is on an average a larger bird than the typical or Eastern form, and may fairly be regarded as subspecifically distinct.

Synonymy.

Scolopax semipalmata, *Gmelin, Syst. Nat.* i. p. 659 (1788).
Totanus crassirostris, *Vieillot, N. Dict. d'Hist. Nat.* vi. p. 406 (1816).
Symphemia atlantica, *Rafinesque, Journ. Phys.* lxxxviii. p. 417 (1819).
Glottis semipalmata (*Gmel.*), *Nilsson, Orn. Suecica,* ii. p. 55 (1821).
Totanus (Catoptrophorus) semipalmatus (*Gmel.*), *Bonap. Ann. Lyc. Nat. Hist. New York,* ii. p. 323 (1826).
Hodites semipalmatus (*Gmel.*), *Kaup, Natürl. Syst.* p. 155 (1829).
Symphemia semipalmata (*Gmel.*), *Hartlaub, Rev. Zool.* 1845, p. 342.
Catoptrophorus semipalmatus (*Gmel.*),
Catoptrophorus crassirostris (*Vieillot*), } *Bonap. Compt. Rend.* xliii. p. 596 (1856).

Literature.

Plates.—Wilson, Am. Orn. pl. 56. fig. 3; Audubon, Birds Am. v. pl. 347.
Habits.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 285.
Eggs.—Thienemann, Abbild. Vogeleiern, pl. lxiv. fig. 1. In their earthy-brown shade of colour they somewhat resemble the eggs of the Ruff.

Specific characters.

The Willet may most easily be diagnosed by the colour of its *primaries*, which are *pure white for about the basal two-thirds*. Its dark brown axillaries also distingnish it from all its congeners except from *T. incanus* and *T. brevipes*, which are only half its weight. The fact that both its outer and inner toes are united to the middle toe by a web at the base also distinguishes it from all its allies except from *T. guttiferus*, which has white axillaries.

Geographical distribution.

The Willet has a very extensive range on the American continent, breeding as far north as lat. 56° in the North-West Territory, and as far south as Texas. To Canada and the Northern States it is only a summer visitor; but it is said to be a resident in the Southern States, and a few are said to remain to breed in the West-Indian islands. It passes along the coasts of Mexico, Central America, and Trinidad on migration, and possibly crosses the tropics to winter on the Pampas [1], but the evidence of this alleged fact is not very clear. It has once occurred on the Bermudas (Reid, Zoologist, 1877, p. 477); and has been included in the list of European birds on the faith of a skin in the Stockholm Museum said to have been killed in Upland, but the authenticity of which is very doubtful (Nilsson, Skandinavisk Fauna, Foglarna, 1858 ed., ii. p. 211).

TOTANUS SEMIPALMATUS SPECULIFERUS.

WESTERN WILLET.

Diagnosis.

Totanus semipalmatus magnitudine majore.

Variations.

The Eastern and Western forms of the Willet completely intergrade.

Synonymy.

Totanus speculiferus, *Cuvier, Règne An.* i. p. 531 (1829).
Symphemia speculifera (*Cuvier*), *Sclater, Ibis,* 1862, p. 199.
Symphemia semipalmata inornata, *Brewster, Auk,* 1887, p. 145.

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[1] Brewer's statement (Baird, Brewer, and Ridgway, Water-Birds N. Amer. i. p. 286) that the Willet "occurs throughout Central and South America, as far south as the Pampas, where it breeds in large numbers," is very interesting and remarkable if true, but it has possibly crept in by mistake, and probably refers to some other species.

Literature.

PLATES.—Swainson & Richardson, Faun. Bor.-Amer., Birds, pl. 67.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 285.
EGGS.—American ornithologists do not appear to have discriminated between the eggs of the two forms of Willet.

Geographical distribution.

To Mr. George Cavendish Taylor belongs the credit of having discovered that there are two forms of the Willet. He observed them both in considerable numbers on the east coast of Florida, and remarked that they never intermixed. It is supposed that the larger form breeds in the Pacific States from the source of the Saskatchewan to California, and winters in the Gulf of Mexico and the neighbouring coasts. It is on an average a larger bird than the Eastern form, as the following dimensions prove:—

Subspecific characters.

	T. semipalmatus.	*T. speculiferus.*
Length of wing from carpal joint . . .	7·0 to 8·1	7·9 to 8·6
Length of tarsus	2·0 to 2·6	2·2 to 2·9
Length of bill from frontal feathers . .	2·0 to 2·5	2·3 to 2·7

Brewster says that the plumage also differs slightly in colour; but in the examples which I have examined I can see no difference that is not attributable to age or season.

TOTANUS INCANUS.

AMERICAN WANDERING TATTLER.

Diagnosis.

TOTANUS axillaribus nigricantibus: remigibus haud albo notatis.

Variations.

ASIATIC examples of this species may fairly be regarded as subspecifically distinct. Ornithologists who set an extravagant value on so-called structural characters would doubtless place them in a different genus.

Synonymy.

Scolopax incana, *Gmelin, Syst. Nat.* i. p. 658 (1788).
Totanus pedestris, *Lesson, Traité d'Orn.* p. 552 (1831, partim).
Totanus fuliginosus, *Gould, Zool. Voy. 'Beagle,' Birds,* p. 130 (1841).
Scolopax undulata, } *Lichtenstein, Forster's Descr. Anim. It. Mar. Austr.* p. 173 (1844).
Scolopax pacifica, }

Totanus oceanicus, *Lesson, Compl. Œuvr. Buffon*, p. 244 (1847).
Totanus polynesiæ, *Peale, Zool. U. States Exploring Exp.* 1838–42, *Birds*, p. 237 (1848).
Gambetta fuliginosa (*Gould*), } *Bonap. Compt. Rend.* xliii. p. 597 (1856).
Gambetta oceania (*Lesson*), }
Totanus undulatus (*Licht.*), *Verreaux, Rev. Mag. Zool.* 1860, p. 457.
Heteractitis incanus (*Gmel.*), *Stejneger, Orn. Expl. Kamtsch.* p. 132 (1885).

Literature.

Plates.—Baird, Cassin, & Lawrence, Birds N. Amer. pl. lxxxviii.
Habits.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 290.
Eggs—Unknown.

Specific characters.

The Wandering Tattlers differ from all their congeners, except from the Willet (*T. semipalmatus*), in having *dark grey axillaries* without any bars across them. The *total absence of white on the quills* easily distinguishes them from their larger ally. From each other they are not always easy to distinguish, though some of the differences are what are called structural.

Geographical distribution.

The American Wandering Tattler breeds in Alaska and the Aleutian Islands, and passes along the coast of California and the Galapagos Islands (Dr. Habel, Trans. Zool. Soc. ix. p. 503) to winter in the Polynesian Islands. According to Stejneger both forms occur on Behring Island.

I have examples from the Fiji, the Samoa, and the Society Islands, and have also examined three examples brought by Mr. Young from the latter; but as the two forms have been confused by the majority of ornithologists it is impossible, in most cases, to tell to which the records apply.

I have not seen young in first plumage of the American form of this species; but in winter the breast, flanks, and axillaries are greyish brown, a little paler than the upper parts, and the rest of the underparts are white.

TOTANUS INCANUS BREVIPES.

ASIATIC WANDERING TATTLER.

Diagnosis.

Totanus incanus tarso postico scutellato: narium sulcis non nisi rostri dimidio extendentibus.

Variations.

The two forms of this species appear to me completely to intergrade.

Synonymy.

Totanus brevipes, *Vieillot, N. Dict. d'Hist. Nat.* vi. p. 410 (1817).
Totanus pedestris, *Lesson, Traité d'Orn.* p. 552 (1831, partim).
Totanus pulverulentus, *Müller, Nat. Verh.* p. 152 (1844).
Totanus griseopygius, *Gould, Proc. Zool. Soc.* 1848, p. 39.
Gambetta pulverulenta (*Müll.*),
Gambetta griseopyga (*Gould*),
Gambetta brevipes (*Vieillot*), } *Bonap. Compt. Rend.* xliii. p. 597 (1856).
Heteroscelus brevipes (*Vieill.*), *Baird, Cassin, & Lawrence, Birds N. Amer.* p. 734 (1858, partim).
Actitis pulverulentus (*Müll.*), *Dybowski, Parrex, Journ. Orn.* 1868, p. 337.
Heteractitis brevipes (*Vieill.*), *Stejneger, Orn. Expl. Kamtsch.* p. 137 (1885).

Literature.

Plates.—Temm. & Schlegel, Fauna Japon., Aves, pl. 65 ; Gould, Birds of Australia, vi. pl. 38.
Habits.—Stejn. Orn. Explor. Kamtsch. p. 137 ; Gould, Handb. Birds Austr. ii. p. 268.
Eggs.—Unknown.

The differences between the Asiatic Wandering Tattler and its American ally are as follows:—

Subspecific characters.

T. brevipes.	*T. incanus.*
Tarsus scutellated at the back.	Tarsus reticulated at the back.
Nasal groove extending over only half the bill.	Nasal groove extending along two thirds of bill.
Belly and under tail-coverts pure white both in summer and winter.	In summer plumage the bars on the breast and flanks extending also to the belly and under tail-coverts.
Length of wing from carpal joint 6·1 to 6·6 inch.	Length of wing from carpal joint 6·4 to 7·1 inch.

Young in first plumage have white marginal spots emphasized by dark submarginal spots on all the wing-coverts and tertials, and on the scapulars, upper tail-coverts, and tail-feathers ; and obscure bars on the throat, breast, and flanks.

Geographical distribution.

The Asiatic Wandering Tattler breeds in Eastern Siberia from Lake Baikal to Kamtschatka, and passes along the coasts of Japan, China, Formosa, and the Philippine Islands, to winter in the islands of the Malay Archipelago and Australia.

I have examples collected by Finsch on Duke of York Island, one of the islands of the Bismark Archipelago, between New Ireland and New Britain.

*** *Subgenus* TRINGOIDES: Totanus *dorso postico et interscapulio concoloribus; axillaribus aut omninò albis aut albis brunneo notatis.*

TOTANUS MELANOLEUCUS.

GREATER YELLOWSHANK.

Diagnosis.

TOTANUS dorso postico et interscapulio ferè concoloribus: supracaudalibus pro majore parte albis: magnitudine mediâ (alæ 185 ad 200 millim.).

Variations.

IT is not known that Eastern and Western examples of this species differ in any respect.

Synonymy.

Scolopax melanoleuca, *Gmelin, Syst. Nat.* i. p. 659 (1788).
Scolopax vociferus, *Wilson, Am. Orn.* vii. p. 57 (1813).
Totanus melanoleucus (*Gmel.*),
Totanus vociferus (*Wilson*),
Totanus sasashew,
} *Vieill. N. Dict. d'Hist. Nat.* vi. pp. 398, 401, 412 (1816).
Gambetta melanoleuca (*Gmel.*), *Bonap. Compt. Rend.* xliii. p. 597 (1856).
Totanus chilensis, *Philippi, Wiegm. Archiv,* 1857, pt. i. p. 264.

Literature.

PLATES.—Wilson, Am. Orn. pl. 58. fig. 5; Audubon, Birds Am. v. pl. 345.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 269.
EGGS.—Unknown.

Specific characters.

The Greater Yellowshank has the *lower back nearly the same colour as the mantle,* but the *predominant colour of the upper tail-coverts* is *white. Wing more than 7 inches* from carpal joint is a sufficient character to distinguish it from the allied species which also possess the other characters.

Geographical distribution.

The Greater Yellowshank undoubtedly breeds from the south of Alaska to Labrador, but we have no authentic account of the discovery of its eggs. It passes through the United States, the Bermudas (Reid, Zoologist, 1877, p. 477), and the West Indies on migration, a few remaining to winter in the Southern States, but the greater number passing further south to winter on the South-American coasts, where it has occurred in Venezuela (Berlepsch, Ibis, 1884, p. 441), Trinidad and Colombia (Salmon, Proc. Zool. Soc. 1879, p. 547), north of the equator. From the west I have an example obtained by

Buckley in Ecuador, and several collected by Whitely in Central Peru. Mr. Berkeley James procured it on the confines of Peru and Chili (Sclater, Proc. Zool. Soc. 1886, p. 404), and I have several examples collected by Read at Santiago. On the east coast it occurs as far south as Buenos Ayres; I have an example from Colonia procured by Capt. Harrison, who states that it was very abundant.

TOTANUS FLAVIPES.

YELLOW-LEGGED SANDPIPER.

Diagnosis. TOTANUS dorso postico et interscapulio ferè concoloribus: supracaudalibus pro majore parte albis: axillaribus albis parcè brunneo notatis: magnitudine mediâ (alæ 150 ad 175 millim.).

Variations. EASTERN and Western examples appear to be identical.

Synonymy.

Scolopax flavipes, *Gmelin, Syst. Nat.* i. p. 659 (1788).
Totanus natator,
Totanus fuscocapillus,
Totanus flavipes (*Gmel.*), } *Vieillot, N. Dict. d'Hist. Nat.* vi. pp. 400, 409, 410 (1816).
Gambetta flavipes (*Gmel.*), *Bonap. Compt. Rend.* xliii. p. 597 (1856).
Totanus leucopyga, *Illiger, fide Giebel, Thes. Orn.* iii. p. 645 (1877).

Literature.

PLATES.—Wilson, Am. Orn. pl. 58. fig. 4; Audubon, Birds Am. v. pl. 344.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 273.
EGGS.—Seebohm, British Birds, pl. 32. fig. 8.

Specific characters.

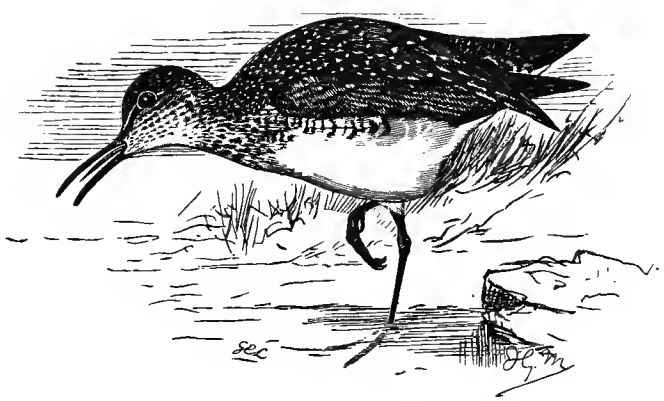
The Yellow-legged Sandpiper or Yellowshank is one of four species of *Totanus* which have the *lower back nearly the same colour as the mantle, but the predominant colour of the upper tail-coverts is white.* From *T. ochropus* it is easily distinguished by the colour of its *axillaries and under wing-coverts,* which are *white, sparingly marked with brown* instead of brown narrowly barred with white. From its two nearest allies it scarcely differs except in size.

	Wing.	Culmen.	Tarsus.
T. melanoleucus	7·4 to 8·0	2·0 to 2·4	2·3 to 2·7
T. flavipes	6·1 to 6·7	1·3 to 1·6	2·0 to 2·2
T. glareola	4·5 to 5·1	1·0 to 1·2	1·3 to 1·6

The geographical distribution of the Yellowshank is almost exactly the same as that of its larger ally; but its breeding-range extends somewhat further north, from the valley of the Yukon, in Alaska, to Greenland, and its winter range somewhat further south, to North Patagonia. Geographical distribution.

On migration it passes the Bermudas in large flocks (Reid, Zoologist, 1877, p. 478) and has occurred on the British Islands.

It passes through the West Indies and the island of Trinidad on migration. Salmon obtained it in Colombia (Sclater & Salvin, Proc. Zool. Soc. 1879, p. 547); Fraser obtained it in Ecuador (Sclater, Proc. Zool. Soc. 1860, p. 290); and I have examples collected by Whitely in Peru, and by Reed near Valparaiso in Chili. I have an example procured by Goering in Venezuela; Wallace obtained it at the mouth of the Amazon (Sclater & Salvin, Proc. Zool. Soc. 1867, p. 592); and it is common on the shores of the La Plata, near Buenos Ayres (Durnford, Ibis, 1876, p. 165), and in the Chupat valley in North Patagonia, which is probably the southern limit of its winter range (Durnford, Ibis, 1877, p. 43).



TOTANUS GLAREOLA.

WOOD-SANDPIPER.

Diagnosis.

Totanus dorso postico et interscapulio ferè concoloribus, supracaudalibus axillaribusque pro majore parte albis: magnitudine parvâ (alæ 115 ad 130 millim.).

Variations.

Examples from Holland appear to be identical with those from Japan.

Synonymy.

Tringa glareola, *Linneus, Syst. Nat.* i. p. 149 (1758) ; *Gmelin, Syst. Nat.* i. p. 677 (1788).
Tringa ochropus, *β.* glareola, *Linneus, Syst. Nat.* i. p. 250 (1766).
Tringa grallatoris, *Montagu, Orn. Dict. Suppl.* App. S (1813).
Totanus glareola (*Linn.*), *Temminck, Man. d'Orn.* p. 421 (1815).
Totanus affinis, *Horsfield, Trans. Linn. Soc.* xiii. p. 191 (1822).
Totanus grallatoris (*Mont.*), *Stephens, Shaw's Gen. Zool.* xii. pt. i. p. 148 (1824).
Rhyacophilus glareola (*Linn.*), *Kaup, Natürl. Syst.* p. 140 (1829).
Actitis glareola (*Linn.*), *Blyth, Cat. Birds Mus. As. Soc.* p. 267 (1849).
Totanus glareoloides, *Hodgson, fide Jerdon, B. India,* iii. p. 697 (1864).

Literature.

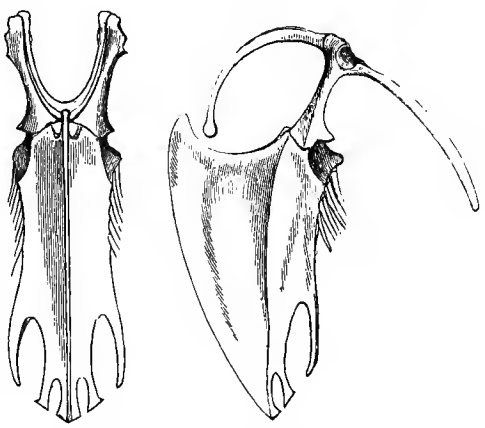
Plates.—Gould, Birds Gt. Brit. iv. pl. 57 ; Dresser, Birds of Europe, viii. pl. 565.
Habits.—Seebohm, British Birds, iii. p. 132.
Eggs.—Seebohm, British Birds, pl. 30. figs. 4, 5, 6.

Specific characters.

The Wood-Sandpiper has the *lower back nearly the same colour as the mantle*, and the *predominant colour of the upper tail-coverts, axillaries, and under wing-coverts* is *white*. This diagnosis is sufficient to distinguish it from all its congeners except from its two nearest allies, both of which are larger birds, as may be seen in the table of dimensions already given.

Geographical distribution.

The Wood-Sandpiper has a very extensive breeding-range. It has occurred in the Faroes, and may be regarded as a somewhat irregular visitor on spring and autumn migration to the British Islands, on very rare occasions remaining to breed. It is a summer visitor to the whole of Europe north of the valley of the Danube, and to Siberia, Turkestan, Mongolia, and the extreme north of China. It probably breeds as far north as land extends, as Middendorff found its nest in lat. 70° on the Taimyr peninsula. It winters in the basin of the Mediterranean, and in suitable localities throughout Africa. In Asia it winters in Persia, Beloochistan, India, Ceylon, the Burma peninsula, and the islands of the Malay Archipelago, but only passes through Japan and South China on migration.



Nearest ally.

On the American continent it is represented by a close ally, *Totanus flavipes*.

TOTANUS SOLITARIUS.

SOLITARY SANDPIPER.

Diagnosis.

Totanus axillaribus invicem albo brunneoque fasciatis: supracaudalibus centralibus brunneis: primariis haud fasciatis.

Variations.

Eastern and Western examples of this species appear to be identical.

Synonymy.

Tringa solitaria, *Wilson, Am. Orn.* vii. p. 53 (1813).
Totanus chloropygius, } *Vieillot, N. Dict. d'Hist. Nat.* vi. pp. 401, 411 (1816).
Totanus punctatus, }
Totanus caligatus, *Lichtenstein, Verz. Doubl.* p. 74 (1823).
Tringa macroptera, *Spix, Av. Bras.* ii. p. 76 (1825).
Rhyacophilus chloropygius (*Vieill.*), *Bonap. Compt. Rend.* xliii. p. 597 (1856).
Rhyacophilus solitarius (*Wilson*), *Baird, Cassin, & Lawrence, B. N. Amer.* p. 733 (1860).

Literature.

Plates.—Wilson, Am. Orn. pl. 58. fig. 3; Audubon, Birds Am. v. pl. 343.
Habits.—Seebohm, British Birds, iii. p. 130.
Eggs.—Unknown. (The egg described from Vermont (Brewer, Bull. Nutt. Orn. Club, 1878, p. 197) is so small that it is probably that of a Spotted Sandpiper.)

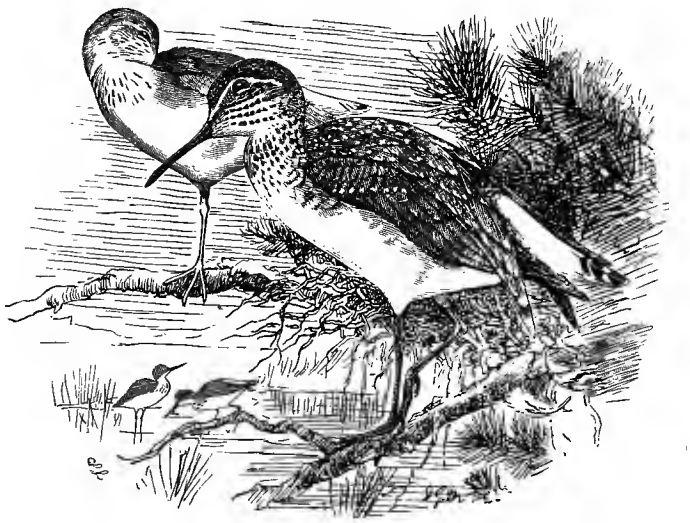
Specific characters.

The Solitary Sandpiper has *axillaries alternately barred with white and brown*; the *central upper tail-coverts are brown like the rump and back*, but there are *no traces of bars on the primaries*. No other *Totanus* fulfils all these conditions. It is unquestionably the American representative of the Green Sandpiper (*T. ochropus*).

Geographical distribution.

The Solitary Sandpiper is found during the breeding-season on the American continent as far south as lat. 44°, and northwards up to the limit of forest-growth, which in the west extends beyond the Arctic Circle, but in the east not nearly so far north. On migration it passes through most of the United States, though many cross the ocean by way of the Bermudas (Reid, Zoologist, 1877, p. 478), whence it may easily be carried to our coasts by storms or contrary winds. In Mexico, Central America, Trinidad, and the West Indies it probably only occurs on migration, but it winters in South America. I have an example collected by Goering in Venezuela; Wallace found it at the mouth of the Amazon (Sclater & Salvin, Proc. Zool. Soc. 1867, p. 592); Rohde obtained it in Paraguay (Berlepsch,

Journ. Orn. 1887, p. 37); and I have an example collected by Capt. Harrison at Colonia, near Buenos Ayres. I have several examples collected by Bartlett on the Peruvian Amazons (Sclater & Salvin, Proc. Zool. Soc. 1873, p. 309), but I can find no record of its occurrence in Chili.



TOTANUS OCHROPUS.

GREEN SANDPIPER.

Diagnosis. TOTANUS supracaudalibus albis: axillaribus brunneis, angustè albo fasciatis.

Variations. EXAMPLES from Pomerania do not appear to differ from those from Japan.

Synonymy.
Tringa ocrophus, *Linneus, Syst. Nat.* i. p. 149 (1758); *Linn. Syst. Nat.* i. p. 250 (1766).
Tringa tringa, *Brisson, Orn.* v. p. 177, pl. xvi. fig. 1 (1760).
Totanus ochropus (*Linn.*), *Temminck, Man. d'Orn.* p. 420 (1815).
Helodromas ochropus (*Linn.*), *Kaup, Natürl. Syst.* p. 144 (1829).
Actitis ochropus (*Linn.*), *Blyth, Cat. Birds Mus. As. Soc.* p. 267 (1849).
Rhyacophilus ochropus (*Linn.*), *Ridgway, Proc. United States Nat. Mus.* iii. p. 200 (1880).

Literature.

Plates.—Daub. Pl. Enl. no. 843; Gould, Birds Gt. Brit. iv. pl. 56; Dresser, Birds of Europe, viii. pl. 564.

Habits.—Seebohm, British Birds, iii. p. 126.

Eggs.—Seebohm, British Birds, pl. 30. figs. 1, 2, 3.

Specific characters.

The Green Sandpiper has *white upper tail-coverts* and *brown axillaries narrowly barred with white*. No other *Totanus* combines both these characters. On the American continent it is represented by *T. solitarius*, which scarcely differs from it except that the central upper tail-coverts are dark like the rump.

Geographical distribution.

The breeding-range of the Green Sandpiper reaches from the Atlantic to the Pacific, in the west extending somewhat north of the Arctic Circle, but in the east scarcely reaching that latitude. It is not known that this bird is more than a spring and autumn visitor to the British Islands, the north of France, Holland, Belgium, or Western Germany; but it has been recorded as breeding in the Pyrenees, the Alps, the Carpathians, and the Caucasus. Further east the southern limit of its breeding-range appears to be Turkestan and the mountains of Southern Siberia. It has been said to breed in Japan and North China; but the evidence of this is very unsatisfactory, although it certainly winters in both those countries, as well as in Cochin China, Burma, India, Ceylon, and westwards, in suitable localities, throughout Persia, South Europe, and the whole of Africa.

Its alleged occurrence in Nova Scotia (Baird, Brewer, and Ridgway, Water-Birds N. Amer. i. p. 282) is supported by entirely untrustworthy evidence.

Pseudogenera.

The Green Sandpiper has been removed from the genus *Totanus* and placed in a genus of its own on the ground that it has only one posterior emargination on each side of the keel of the sternum. It is very unfortunate that this heresy should have received the sanction of the 'Ibis List.' It is impossible to suppose that this character can be of any generic value in this group. As Messrs. A. and E. Newton very justly observe (Phil. Trans. Royal Soc. 1869, p. 337), "In the Limicolæ . . . a very great diversity of conformation of the posterior margin of the sternum exists, even among forms which are, both in general habits and outward structure, very closely allied."

TOTANUS TEREKIUS.

TEREK SANDPIPER.

Diagnosis.

Totanus primariis uropygioque haud albo notatis: secundariis pro majore parte albis: axillaribus omninò albis.

Variations.

No local races of this species are known.

Synonymy.

Scolopax cinerea, *Güldenstadt, Nov. Comm. Petrop.* xix. p. 473 (1774).
Scolopax terek, *Latham, Index Orn.* ii. p. 724 (1790).
Totanus javanicus, *Horsfield, Trans. Linn. Soc.* xiii. p. 193 (1820).
Scolopax sumatrana, *Raffles, Trans. Linn. Soc.* xiii. p. 327 (1822).
Numenius cinereus (*Güld.*), *Vieillot, Encycl. Méth., Orn.* p. 1157 (1823).
Limosa terek (*Lath.*), *Temminck fide Horsfield, Zool. Researches in Java, Gen. Cat.* p. 7 (1824).
Fedoa terekensis, *Stephens, Shaw's Gen. Zool.* xii. p. 83 (1824).
Limicola terek (*Lath.*), *Vieillot, Faun. Franç.* p. 306 (1825).
Limosa recurvirostra, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 181 (1826).
Xenus cinereus (*Güld.*), *Kaup, Natürl. Syst.* p. 115 (1829).
Limosa indiana,
Limosa cinerea (*Güld.*), } *Lesson, Traité d'Orn.* p. 554 (1831).
Terekia javanica (*Horsfield*), *Bonap. Comp. List B. Eur. & N. Amer.* p. 52 (1838).
Simorhynchus cinerea (*Güld.*), *Keyserling u. Blasius, Wirb. Eur.* p. lxxiv (1840).
Terekia javanica (*Horsfield*), *Gray, List Gen. Birds,* p. 68 (1840).
Terekia cinerea (*Güld.*), *Gray, List Gen. & Subgen. Birds,* p. 83 (1841).
Xenus terek (*Lath.*), *Lichtenstein, Nomencl. Av. Mus. Berol.* p. 91 (1854).
Totanus cinereus (*Güld.*), *Schlegel, Mus. Pays-Bas, Scolop.* p. 77 (1864).
Totanus terek (*Lath.*), *Schlegel & Pollen, Faune Madag.* ii. p. 172 (1868).

Literature.

Plates.—Gould, Birds of Australia, vi. pl. 34; Dresser, Birds of Europe, viii. pl. 572.
Habits.—Dresser, Birds of Europe, viii. p. 195.
Eggs, described by Dresser on p. 200 of the above-mentioned volume.

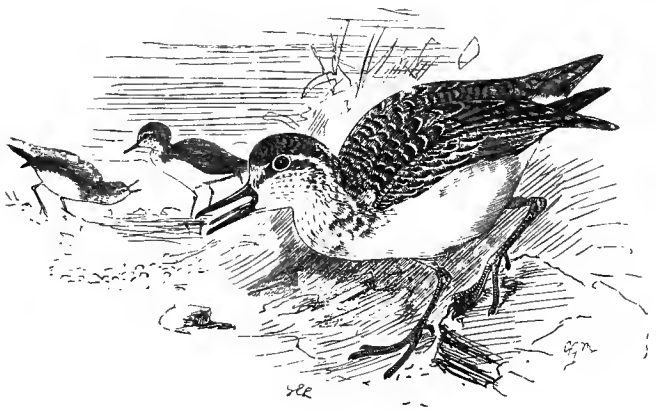
Specific characters.

The Terek Sandpiper may be diagnosed by three characters: *no white on the primaries or rump, a great deal of white on the secondaries,* and *nothing but white on the axillaries.*

It appears to be an Arctic form of the Common Sandpiper (*T. hypoleucus*), though its recurved bill resembles that of the Greenshank.

Geographical distribution.

The Terek Sandpiper is an Arctic species, breeding in the north of Europe and Asia from lat. 66° to lat. 70°. It is not known to breed west of Archangel, but its breeding-range probably extends to the Pacific, as it has been obtained on Behring Island. To Western Europe it is only an accidental visitor on migration, but it is occasionally found in winter in Africa, where it has occurred in Damara-Land, Natal, and the shores of the Red Sea. The main line of migration in autumn in the west is up the valleys of the Dwina and the Petchora to the Volga, whence it follows the Caspian to the south coast of Asia. In the east it occurs on migration on the coasts of Japan and China, and winters on all the southern coasts of Asia, frequently visiting the islands of the Malay Archipelago, and occasionally Australia.



TOTANUS HYPOLEUCUS.

COMMON SANDPIPER.

Diagnosis.

Totanus axillaribus albis: secundariarum octavâ nonâque pro majore parte albis: primariarum plurimis albo notatis: supracaudalibus uropygioque haud albo notatis.

Variations.

No local races of this species are known.

Synonymy.

Tringa hypoleucos, *Linneus, Syst. Nat.* i. p. 149 (1758); *Linn. Syst. Nat.* i. p. 250 (1766).
Tringa guinetta, *Brisson, Orn.* v. p. 183 (1760).
Actitis hypoleucos (*Linn.*), *Illiger, Prodromus,* p. 262 (1811).
Totanus hypoleucos (*Linn.*), *Temminck, Man. d'Orn.* p. 424 (1815).
Totanus guinetta (*Briss.*), *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 30 (1816).
Trynga leucoptera, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 196 (1826).
Tringoides hypoleucus (*Linn.*), *Bonap. Sagg. Distrib. Metod.* p. 58 (1831).
Guinetta hypoleuca (*Linn.*), *Gray, List Gen. B.* p. 68 (1840).
Actitis empusa, *Gould, Proc. Zool. Soc.* 1847, p. 222.
Actitis schlegeli, *Bonap. Compt. Rend.* xliii. p. 597 (1856).
Tringoides empusa (*Gould*), *Sclater, Journ. Proc. Linn. Soc.* ii. p. 170 (1858).
Totanus empusa (*Gould*), *Gray, Cat. Birds N. Guinea,* p. 52 (1859).

Literature.

Plates.—Daub. Pl. Enl. no. 850; Gould, Birds Gt. Brit. iv. pl. 58; Dresser, Birds of Europe, viii. pl. 563.
Habits.—Seebohm, British Birds, iii. p. 117.
Eggs.—Seebohm, British Birds, pl. 30. figs. 7, 8, 9.

Specific characters.

The Common Sandpiper and its American ally combine the characters of ***white axillaries, large patches of white on most of the primaries and secondaries,*** but ***no white on the rump or upper tail-coverts.*** In breeding-plumage the American bird has the underparts conspicuously spotted, but young in first plumage, and possibly both young and adult in winter plumage, resemble the European form in having no spots on the underparts. To distinguish the two species at all ages and seasons it is necessary to examine the secondaries.

T. hypoleucus.	*T. macularius.*
Eighth and ninth secondaries nearly white.	Eighth and ninth secondaries with a broad brown band across both webs.

Geographical distribution.

The Common Sandpiper is an extremely numerous species, and has a very extensive range, reaching from the Atlantic to the Pacific. It breeds throughout Scandinavia, but in North Russia and Siberia it is not found north of the Arctic Circle. It breeds in suitable localities throughout Europe, including the British Islands; and in Asia as far south as Turkestan (and possibly Persia), Cashmere, China, and Japan. A few remain all the year round in the basin of the Mediterranean, but its principal winter-quarters are throughout Africa in suitable localities: I found it common on rivers of Natal, both at Colenso about 500 feet above the sea, and on the shores of the lagoons at the mouth of the Umgeni river, as well as amongst the mangroves in Durban Bay. It also winters in India, Ceylon, Burma, the islands of the Malay Archipelago, the coasts of New Guinea and Australia, and is said to be generally distributed in the Solomon Islands (Sclater, Proc. Zool. Soc. 1869, p. 124). It has been found during the breeding-season in Teneriffe and North-east Africa, but in neither of these localities have its eggs been obtained.

TOTANUS MACULARIUS.

SPOTTED SANDPIPER.

Diagnosis.

Totanus axillaribus albis: secundariarum octavæ nonæque pogoniis ambobus strigâ brunneâ latâ notatis: supracaudalibus uropygioque haud albo notatis.

Variations.

No local races of this species are known.

Synonymy.

Tringa turdus aquaticus, *Brisson, Orn.* v. p. 255 (1760).
Tringa macularia, *Linneus, Syst. Nat.* i. p. 249 (1766).
Totanus macularius (*Linn.*), *Temminck, Man. d'Orn.* p. 422 (1815).
Actitis macularius (*Linn.*), *Boie, Isis*, 1826, p. 979.
Tringoides macularia (*Linn.*), *Gray, Genera of Birds*, iii. p. 574 (1846).
Tringites macularius (*Linn.*), *Sclater & Salvin, Proc. Zool. Soc.* 1873, p. 309.
Tringoides hypoleucos, *var.* macularius (*Linn.*), *Ridgway, Ann. Lyc. New York*, x. 1874, p. 384.

Literature.

Plates.—Wilson, Am. Orn. pl. 59. fig. 1; Audubon, Birds Am. v. pl. 342.
Habits.—Seebohm, British Birds, iii. p. 122.
Eggs.—Seebohm, British Birds, pl. 30. figs. 10, 11, 12.

The Spotted Sandpiper differs from its very close ally the Common Sandpiper (*T. hypoleucus*) in the particulars already pointed out.

Geographical distribution.

The Spotted Sandpiper has a very similar range in America to that of the Common Sandpiper in the Old World. In the north it does not quite reach the Arctic Circle, but it breeds throughout the United States of America, migrating southwards in autumn to winter in Mexico, the West Indies, Central America, and the northern portion of the South-American continent. It visits the Bermudas in considerable numbers, some of which remain during the winter (Reid, Zoologist, 1877, p. 478), so that its accidental occurrence in our islands might reasonably be expected. It has been said to have occurred on the continent of Europe; but the evidence in support of this statement is not very satisfactory, though there cannot be much doubt that it occasionally visits the British Islands.

TOTANUS PUGNAX.

RUFF.

Diagnosis.

Totanus axillaribus albis: primariis, secundariis et supracaudalibus centralibus haud albo notatis.

Variations.

No bird is subject to such extraordinary variations of colour as the Ruff, but none of them appear to have any geographical significance. The parts which vary in colour are first the ruff, second the breast and flanks, and third the ground-colour of the upper parts. The colours which these parts assume may be white, chestnut, or bronzy black. Each of these

three parts may be either of the colours named, except that the breast and flanks are never white, but the ruff when black may be barred with either white or chestnut.

The Ruff is the only polygamous bird amongst the Charadriidæ, and the females are said greatly to outnumber the males. Under these circumstances it is possible that the wonderful variation of colour may be due to Sexual Selection, but why similar variations are not produced in other polygamous species it is not easy to explain.

The remarkable variation of colour may possibly have been caused by interbreeding. It is reasonable to imagine that the Ruff became isolated in half a dozen localities at some period of its life, where it became partially differentiated into half a dozen species, which subsequently met and by interbreeding with each other produced the variety of plumage we now find. It is possible that the Ruff may be an instance of the swamping effect on unimportant variations of interbreeding, in the process of being accomplished, not as it usually takes place, by nipping them in the bud as they arise, but, having been prevented by isolation from so doing, coming in at the last moment and crushing them before the differentiation had become complete and rendered them permanent.

But unfortunately for this theory the aberrant character of the Ruff consists much in the variety of its colours, but more in the development of the feathers of the neck into a ruff and the production of tubercles on the sides of the head. The fact that both these peculiarities are only found during the breeding-season and are confined to the male, coupled with the polygamous habits of the bird, seems to confirm the other theory that the eccentricities of the Ruff are due to sexual selection.

Synonymy.

Tringa pugnax, *Linneus, Syst. Nat.* i. p. 148 (1758); *Brisson, Orn.* v. p. 240 (1760); *Linn. Syst. Nat.* i. p. 251 (1766).
Tringa totanus cinereus, *Brisson, Orn.* v. p. 203 (1760, winter plumage).
Tringa littorea, *Linneus, Syst. Nat.* i. p. 251 (1766, winter plumage).
Tringa grenovicensis, *Latham, Gen. Syn. Suppl.* i. p. 293 (1787).
Pavoncella pugnax (*Linn.*), *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 29 (1816).
Totanus pugnax (*Linn.*), *Nilsson, Orn. Suec.* ii. p. 71 (1817).
Machetes pugnax (*Linn.*), *Cuvier, Règn. An.* i. p. 490 (1817).
Totanus indica, Limosa hardwickii, *Gray, Ill. Ind. Zool.* ii. pl. 52. figs. 1, 2 (1834).
Philomachus pugnax (*Linn.*), *Gray, List Gen. B.* p. 89 (1841).
Machetes optatus, *Hodyson, Gray's Zool. Miscell.* p. 86 (1844).

Literature.

Plates.—Daub. Pl. Enl. nos. 300, 305, 306; Gould, Birds of Gt. Brit. iv. pl. 61.
Habits.—Seebohm, British Birds, iii. p. 113.
Eggs.—Seebohm, British Birds, pl. 29. figs. 6, 7, 9.

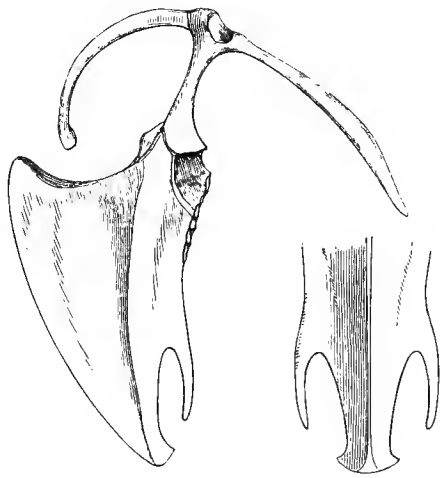
Specific characters.

The Ruff is a very remarkable bird, having a fringe of long feathers round the neck during the breeding-season. Immature birds and both sexes in either summer or winter plumage may be diagnosed as having *white axillaries, but no white on the primaries, secondaries, or central upper tail-coverts.*

The Ruff is a rare summer migrant to the British Islands, a few pairs still occasionally breeding in the Norfolk broads; but it is more abundant on spring and autumn migration. Formerly it bred in great numbers in most of the marshy districts of England, from Northumberland southwards. In Scotland and Ireland it occurs regularly on migration, and it is occasionally seen on the Orkneys and on Shetland.

Geographical distribution.

The Ruff is a west Palæarctic species, breeding as far north as land extends, as far south as the valley of the Danube and the Kirghiz Steppes, and as far east as the Taimyr



Peninsula and West Dauria, where it reaches to and probably breeds in the upper valley of the Amoor. It passes through the basins of the Mediterranean, Black, Caspian, and Aral Seas on migration, and winters in suitable localities in every part of Africa, Northern India, and Burma. Like many other Waders, it occasionally straggles far and wide during winter. A single example has occurred in Ceylon, and another on the north island of Japan, whilst others have been obtained in the United States of America (Maine, Massachusetts, New York, and Ohio), and in Spanish Guiana. Pallas stated that it was not rare in Kamtschatka; but subsequent travellers have failed to meet with it, though two examples have recently been obtained on Behring Island (Stejneger, Orn. Expl. Comm. Isl. and Kamtschatka, p. 317).

Pseudogenera.

The Ruff is undoubtedly a very aberrant species of the genus *Totanus*, but there is no reason to suppose that its eccentricities date further back than the peculiarities of its allies. The coincidence that it has only two instead of four notches on the posterior margin of its sternum is probably the reason why the genus *Machetes* still survives in quarters where the new-born zeal to recognize anatomical characters is not yet tempered with discretion.

Excess of females.

There can be no doubt that the number of females greatly exceeds that of the males. Naumann, who was by far the most accurate observer of birds who has recorded the results of his observations, estimated (Naturg. Vögel Deutschlands, vii. p. 544) that there were three females to one male during the breeding-season; and Andersson, who met with the Ruff in its winter-quarters in South Africa, remarks (Birds of Damara-Land, p. 305) that the flocks generally consisted of from three to a dozen birds, all females, with perhaps now and then a male. It is very remarkable that so acute an observer as Darwin should have arrived (Descent of Man, i. p. 306) at the opposite conclusion, because more male than female Ruffs are sent to market. In Montagu's excellent account of the habits of the Ruff (Orn. Dict. 2nd ed. p. 444) the facts are stated accurately. In spring the nets are spread on the places where the male Ruffs assemble to fight, and consequently very few Reeves are caught. In autumn, when the birds are caught on migration, it is expressly stated that "few old males are taken." The Ruff is so much larger, at least a third, than the Reeve that even after the autumn moult they are easily distinguished. It is possible that the number of Ruffs born may equal that of the Reeves, and that the former may be lessened by the constant fights occurring between them, but I know of no evidence that such is the case.

Variation in plumage.

The extraordinary variation in the plumage of the Ruff might be quoted as an instance of the worthlessness of colour as a generic or subgeneric character, were it not for the fact that even in the Ruff, which varies more in colour than any other bird, there are some parts which scarcely vary at all with age, sex, or season. These are the quills, lesser wing-coverts, primary-coverts, lower back, rump, under wing-coverts, axillaries, the centre of the belly, the under tail-coverts, and the four outer tail-feathers on each side. On the whole, therefore, we may claim that the evidence of the Ruff is in favour of the value of colour as a subgeneric character, and of the highest importance in pointing out the parts to which attention must be directed.

TOTANUS BARTRAMI.

BARTRAM'S SANDPIPER.

Diagnosis. TOTANUS primariarum pogoniis internis valdè fasciatis.

Variations. No local races of this species are known.

Synonymy.

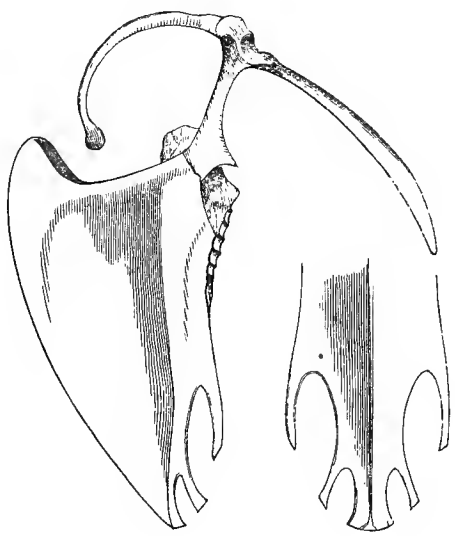
Tringa longicauda, *Bechstein, Kurze Uebersicht*, p. 453 (1811).
Tringa bartrami, *Wilson, Am. Orn.* vii. p. 63 (1813).
Totanus variegatus, Totanus melanopygius, } *Vieillot, N. Dict. d'Hist. Nat.* vi. pp. 397, 401 (1816).
Totanus bartramia (*Wils.*), *Temminck, Man. d'Orn.* ii. p. 650 (1820).
Bartramia laticauda, *Lesson, Traité d'Orn.* p. 553 (1831).
Actitis bartrami (*Wils.*), *Naumann, Vög. Deutschl.* viii. p. 43 (1836).
Actiturus bartramius (*Wils.*), *Bonap. Comp. List B. Eur. & N. Amer.* p. 51 (1838).
Tringoides bartramius (*Wils.*), *Gray, Genera of B.* iii. p. 574 (1846).
Bartramius longicaudus (*Bechst.*), *Bonap. Rev. et Mag. Zool.* 2nd series, ix. p. 59 (1857).
Actiturus longicaudus (*Bechst.*), *Newton, List B. Eur. Blasius*, p. 18 (1862).

Literature.

Plates.—Wilson, Am. Orn. pl. 59. fig. 2; Audubon, Birds Am. v. pl. 327.
Habits.—Seebohm, British Birds, iii. p. 110.
Eggs.—Seebohm, British Birds, pl. 32. figs. 7, 9.

Specific characters.

Bartram's Sandpiper may always be recognized by the *conspicuous bars on the inner webs of its primaries*, no other *Totanus* having more than indications of them. Its wedge-shaped tail is shared by the Common Sandpiper (*T. hypoleucus*) and by its American representative the Spotted Sandpiper (*T. macularius*), both of which also resemble it in the colour of their eggs.



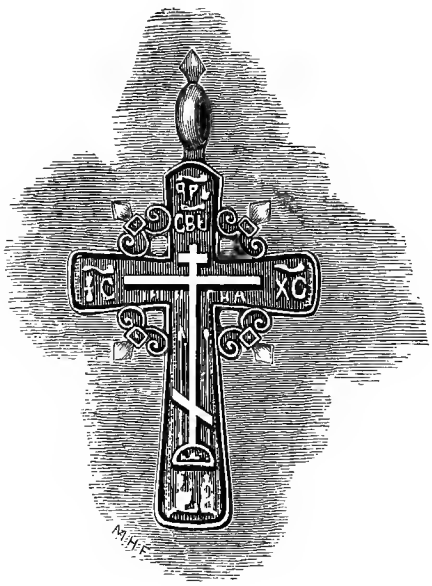
Bartram's Sandpiper breeds in the southern provinces of British North America and in the northern portion of the United States. It migrates southwards on the approach of winter in great numbers, both on the Atlantic coast and along the inland "fly-lines,"

wintering in the Southern States, Mexico, the West Indies, Central America, and South America.

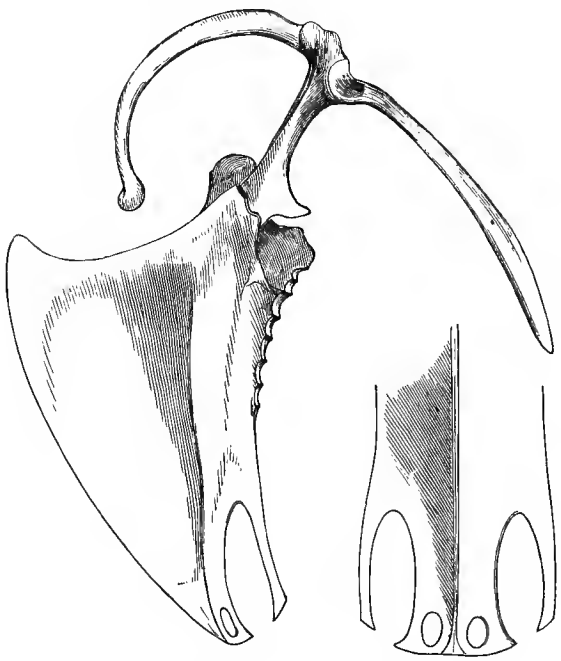
Geographical distribution.

It is possible that its breeding-range may extend much further north, as it has been obtained nearly as far north as the Arctic Circle in Alaska. It appears occasionally to wander very far from its ordinary winter-quarters during migration. There is no record of its occurrence on the Pacific coast of North America, but it has been obtained on the Bermuda Islands (Reid, Zoologist, 1877, p. 478), in Australia, and in Italy (Giglioli, Ibis, 1881, p. 184), Malta (Wright, Ibis, 1869, p. 247), Holland, Germany, and the British Islands. Salmon obtained it in Colombia (Sclater and Salvin, Proc. Zool. Soc. 1879, p. 547). It appears to be common in Eastern Peru, as it was obtained by Bartlett, Hauxwell, and Jelski; but it is not recorded from Chili. Goering obtained it in Venezuela (Sclater and Salvin, Proc. Zool. Soc. 1868, p. 169); and it is very common from December to the beginning of April in the Argentine Republic; Burmeister found it south of Mendoza, and it is one of the commonest Sandpipers near Bucnos Ayres (Durnford, Ibis, 1877, p. 199).

The sternum of Bartram's Sandpiper is that of a typical *Totanus*, and very closely resembles that of the Greenshank.



CHAPTER XXIII.



Sternum of *Limosa melanura*.

Genus LIMOSA.

Diagnosis of genus.

Totaninæ tarsis totis scutellatis : pedibus non lobatis : frontis pennis non ultra fissuram extensis : rostri apice duro, vix dilatato.

Generic characters.

The Godwits may be diagnosed as Totaninæ having the tarsus scutellated in front, having no lobes on the sides of the toes, having the frontal feathers not extending beyond the gape, and having the tip of the bill hard, smooth, and very slightly expanded.

Generic affinities.

The Godwits form a connecting link between the hard-billed and soft-billed Sandpipers with partially webbed feet. They agree with the former (*Totanus*) in having the

tip of the bill only slightly expanded, hard, and smooth; and with the latter (*Ereunetes*) in not having the frontal feathers extending beyond the angle of the gape.

The external characters which distinguish them from *Totanus* are so slight that the genus could scarcely claim recognition, except on the score of convenience, were it not that the profile of the keel of the sternum appears to vary in the two genera. In *Totanus* the apex rises up to meet the furculum, as it does in *Scolopax*, whereas in *Limosa* it seems to get away from it as far as it can, as it does in *Pterocles*.

Pectinated claws.

It is a curious fact that the Black-tailed Godwits of the Old World have the claw of the middle toe pectinated, as in most of the species of the genera *Glareola* and *Cursorius*.

Synonymy of the Genus Limosa.

	Type.
Limosa, *Brisson, Orn.* v. p. 261 (1760)	L. melanura.
Actitis, *Illiger, Prodromus,* p. 262 (1811)	L. melanura.
Limicula, *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 245 (1816)	L. melanura.
Fedoa, *Stephens, Shaw's Gen. Zool.* xii. pt. i. p. 70 (1824)	L. fedoa.

Determination of the type.

The synonymy of the genus *Limosa* is voluminous enough when we consider that it only contains four good species, and is doubtfully distinct from *Totanus*. Linneus placed the Godwits in his genus *Scolopax*, because they have a hind toe more developed than usual; but Brisson removed the Godwits with the Greenshank and the Dusky Redshank to a new genus, which he called *Limosa*. As the Black-tailed Godwit [1] (*Limosa melanura*) is both the *Scolopax limosa* of Linneus and the *Limosa limosa* of Brisson, it has a double claim to be regarded as the type of the genus.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Black-tailed.	Palæarctic Region.	*Bar-tailed.*
L. melanura	*North-west.*	L. rufa.
L. melanuroides	*North-east.*	L. uropygialis.
	Nearctic Region.	
L. hudsonica	*North.*	L. fedoa.

[1] The following ornithologists have called the Black-tailed Godwit *Limosa ægocephala* (Linn.):—Fleming, Degland and Gerbe, Gray, Blyth, Schlegel, Bonaparte, Middendorff, Shelley, Sharpe, Dresser, Hume, Heuglin, Blanford, Macgillivray, Newton, Harting, Saunders, Oates, Wardlaw-Ramsay, Legge, Baird, Brewer and Ridgway, and Irby. On what grounds they have done so it is impossible to imagine. Linneus was acquainted with both the European Godwits, naming the Black-tailed Godwit *Scolopax limosa* and the Bar-tailed Godwit *Scolopax lapponica*. His *Scolopax ægocephala* is based upon the descriptions of Willughby and

The genus *Limosa* contains only half a dozen species or subspecies, three of which are Arctic and three Temperate. Their distribution during the breeding-season is as follows:—

Climatic distribution.

Arctic Eurasia	2	
Arctic America	1	
Arctic species	—	3
Temperate Eurasia	2	
Temperate North America	1	
Temperate species	—	3
Species and subspecies of *Limosa*	—	6

Although the genus *Limosa* is a very small one, and is confined during the breeding-season to the northern half of the Nearctic and Palæarctic Regions, the Godwits are almost

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Albin, from which his diagnosis is evidently translated, as would naturally be the case in an attempt to diagnose a bird which he was not aware that he had ever seen. The following comparison of the descriptions leaves no doubt as to the species intended to be described:—

1628. *Will. Orn.* p. 292.	1738. *Albin, Nat. Hist. Birds*, ii. p. 64.	1766. *Linneus, Syst. Nat.* i. pp. 246, 247.
The outer toe is joined to the middle one . . . by a pretty thick membrane of a dusky or dark green colour. . . . Head . . . with some tincture of red. The neck and throat are reddish. The great feathers of the wings are black with white shafts.	The outer toe is joined to the middle one . . . by a pretty thick membrane of a dusky or dark green colour. . . . Head . . . of a reddish colour. The neck and throat are reddish . . . The great feathers of the wings are black with white shafts. A broad bar of white across the middle of the first, second, and third feathers.	Pedibus virescentibus. capite colloque rufescentibus. remiges primores scapo albo. remigibus tribus nigris basi albis.
The whole rump almost is white powdered with blackish specks.	The rump is white powdered with blackish specks.	Uropygium album maculis nigricantibus.
The tail-feathers . . . all crossed alternately with black and white lines.	The tail-feathers . . . all crossed alternately with black and white lines.	Rectrices nigricantes albo striatæ.
The bill is white at the base, black towards the point.	The bill is of a pale dilute reddish colour at the base, black at the point.	Rostrum basi rubescens.

There can be no doubt that Linneus borrowed from Albin, who in his turn borrowed of Willughby; and when we find the Bar-tailed Godwit of Pennant and the Bar-tailed Godwit of Brisson quoted as synonyms, it is impossible to understand how any ornithologist could have imagined that the *Scolopax ægocephala* of Linneus could be the Black-tailed Gedwit. Probably Degland and Gerbe were the bell wethers who led this large flock of innocent ornithological sheep astray.

cosmopolitan in their range. Their migrations are very extensive, and at some period of the year they visit every part of the World, with the remarkable exception of the Ethiopian Region south of the Equator.

Goneral facts of distribution.

The Godwits are shore birds, though they often breed far inland where suitable marshes or meadows are to be found. In winter they chiefly frequent the sea-shore, and like many other birds of similar habits they acquire a mud-coloured dress in autumn to enable them to do so with comparative impunity. On migration they follow the coast-lines for the most part; and we may reasonably infer that when they were inhabitants of the Polar Basin they were accustomed to make short trips along the coasts towards the south during the annual three months' night. When the Glacial ice increased sufficiently to drive them altogether out of the Polar Basin, there can be little doubt that they followed these four coast-lines, with which they must already have been familiar.

The isolation thus caused indirectly produced the differentiation of the Pre-Glacial species into four good and well-defined species. We may take one more step in the chain of reasoning with tolerable certainty, and assume that of the two groups into which the genus may be divided, Bar-tailed Godwits and Black-tailed Godwits (of each of which both hemispheres possess an example), one group are the descendants of the birds which left by way of the Atlantic, and the other represents the Pacific shore emigrants. The present distribution of the two groups of Godwits ought to throw some light upon their former migrations, inasmuch as birds appear to be very slow in finding new "fly-lines" and very quick in rediscovering old ones. Fortunately for our hypothesis the evidence upon this point is neither meagre nor conflicting. In the North Atlantic the Bar-tailed Godwits are unrecorded from Greenland, Iceland, or the Faroes, whilst the Black-tailed Godwit is recorded from each of the three localities. On the other hand, the Black-tailed American Godwit is said to be very rare in Alaska; whilst the eastern form of our Bar-tailed Godwit was the only species obtained by Stejneger on the Commander Islands, and was found by Dall to breed abundantly at the mouth of the Yukon River in Alaska. Surely these facts have some significance and are not the result of mere accident!

Parallelism between Godwits and Oystercatchers.

There is a remarkable parallelism between the distribution of the Godwits (*Limosa*) and that of the Oystercatchers (*Hæmatopus*).

The Godwits are divisible into four groups, founded upon two characters.	The Oystercatchers are divisible into four groups, founded upon two characters.
Predominant colour of the axillaries and under wing-coverts (*a*) white or (*b*) chestnut or brown.	Colour of the legs and feet (*a*) red or (*b*) flesh-colour.
Colour of the tail-feathers (*c*) black with white bases or (*d*) barred with brown and white.	Colour of the general plumage (*c*) pied or (*d*) black.

All the Old-World species possess character *a* and not *b*.	All the Old-World species possess character *a* and not *b*.
All the New-World species possess character *b* and not *a*.	All the New-World species possess character *b* and not *a*.
The only species recorded from Greenland, Iceland, and the Faroes, and breeding in Western Europe, possesses character *c* and not *d*.	The only species recorded from Greenland, Iceland, and the Faroes, and breeding in Western Europe, possesses character *c* and not *d*.
Although both of the American species occur on the Atlantic coast of North America, the commonest of the two possess character *c* and not *d*.	The only species breeding on the Atlantic coast of North America possesses character *c* and not *d*.
On the Pacific coast of North America the commoner of the two species possesses character *d* and not *a*.	On the Pacific coast of North America the only species found north of the tropics possesses character *d* and not *a*.
On the Pacific coast of the Old World both species (*a* and *d*) occur.	On the Pacific coast of the Old World both species (*a* and *d*) occur.

Ancient routes of emigration.

It is difficult to avoid the conclusion that the same causes have produced similar effects in the two genera. If this hypothesis be true, the Bar-tailed Godwits emigrated through Behring Straits, the ancestors of *L. fedoa* following the American coast, and those of *L. uropygialis* the Asiatic coast. The descendants of the latter gradually extended their range westwards, until in post-glacial times the European examples were more or less isolated and differentiated from their Asiatic *confrères* and became *L. rufa*. The Black-tailed Godwits represent the party which chose the Atlantic route, the ancestors of *L. hudsonica* having followed the Atlantic coast of America, and those of *L. melanura* the Atlantic coast of Europe. The latter gradually extended their range into Asia, and in post-glacial times the eastern examples were more or less isolated and differentiated from their fellows, and have now become *L. melanuroides*.

The present distribution of the species comprising the genera *Totanus* and *Limosa* is so satisfactorily accounted for, on the assumption that the ancestors of each genus were differentiated from each other before the Post-Pliocene Glacial Epoch, and appears to be so inexplicable, if the differentiation of the combined group be regarded as post-glacial, that I am convinced that I was wrong in uniting the two genera in my 'History of British Birds.' The difference already alluded to in the profile of the keel of the sternum of the species belonging to the two genera is an additional reason for regarding them as distinct, as is also the difference in the extent of the frontal feathers beyond the gape, though the latter character is probably an unimportant one.

KEY TO THE SPECIES.

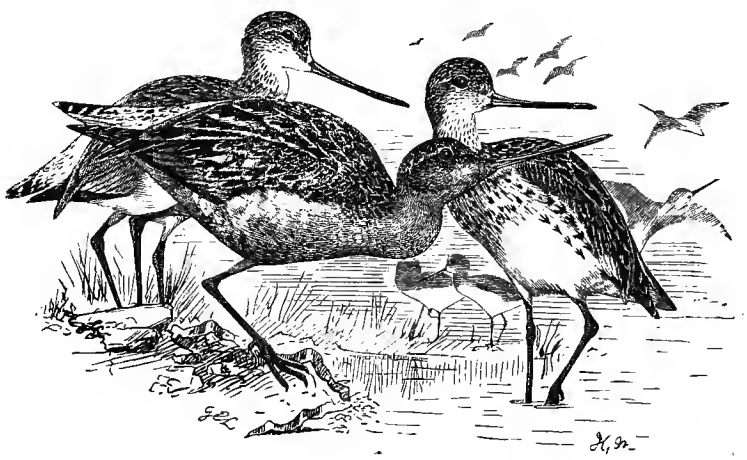
The following is a key to the species and subspecies of the genus *Limosa*.

Tarsus less than $2\frac{3}{4}$ inches.

- **melanura** . . . . — Tail-feathers black with concealed white bases.
- **melanuroides** . . — Tail-feathers black with concealed white bases.
- **hudsonica** . . . . — Tail-feathers black with concealed white bases. Axillaries dark grey.
- **rufa** . . . . . — Prevailing colour of rump and lower back white.
- **uropygialis.** — Prevailing colour of rump and lower back white.
- **fedoa** . . . . . — Axillaries chestnut.

All these characters apply to young in first plumage as well as to adult birds.

*** *Subgeneric group with barred tails.*



LIMOSA RUFA.

BAR-TAILED GODWIT.

Diagnosis. Limosa dorso postico, uropygio, axillaribus, subalaribusque albis brunneo notatis.

Variations.

The eastern form of the Bar-tailed Godwit is so much darker on the lower back and rump that it is entitled to be regarded as subspecifically distinct.

Synonymy.

Scolopax lapponica, *Linneus, Syst. Nat.* i. p. 147 (1758); *Linn. Syst. Nat.* i. p. 246 (1766).
Scolopax ægocephala, *Linneus, Syst. Nat.* i. p. 147 (1758); *Linn. Syst. Nat.* i. p. 246 (1766).
Limosa grisea major,
Limosa rufa,
Limosa rufa major, } *Brisson, Orn.* v. pp. 272, 281, 284 (1760).
Scolopax leucophæa, *Latham, Index Orn.* ii. p. 719 (1790).
Totanus ægocephalus (*Linn.*),
Totanus leucophæus (*Lath.*), } *Bechstein, Orn. Taschenb.* ii. pp. 288, 289 (1803).
Totanus ferrugineus, *Meyer, Taschenb.* ii. p. 374 (1810).
Limosa meyeri, *Leisler, Nachtr. Bechst. Naturg.* ii. p. 172 (1813).
Limicula meyeri (*Leisl.*),
Limicula lapponica (*Linn.*), } *Vieillot, N. Dict. d'Hist. Nat.* iii. pp. 249, 250 (1816).
Limosa jadreca,
Limosa noveboracensis,
Limosa ægocephala (*Linn.*), } *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 32 (1816).
Fedoa meyeri (*Leisl.*),
Fedoa rufa (*Briss.*),
Fedoa pectoralis, } *Stephens, Shaw's Gen. Zool.* xii. pt. i. pp. 75, 77, 79 (1824).
Limosa ferruginea (*Meyer*), *Pallas, Zoogr. Rosso-Asiat.* ii. p. 180 (1826).
Totanus rufus (*Briss.*), *Seebohm, Brit. Birds,* iii. p. 156 (1885).

Literature.

Plates.—Daub. Pl. Enl. no. 900; Gould, Birds of Gt. Brit. iv. pl. 51; Dresser, Birds of Europe, viii. pls. 573, 574.
Habits.—Seebohm, British Birds, iii. p. 156.
Eggs.—Seebohm, British Birds, pl. 29. fig. 8.

Specific characters.

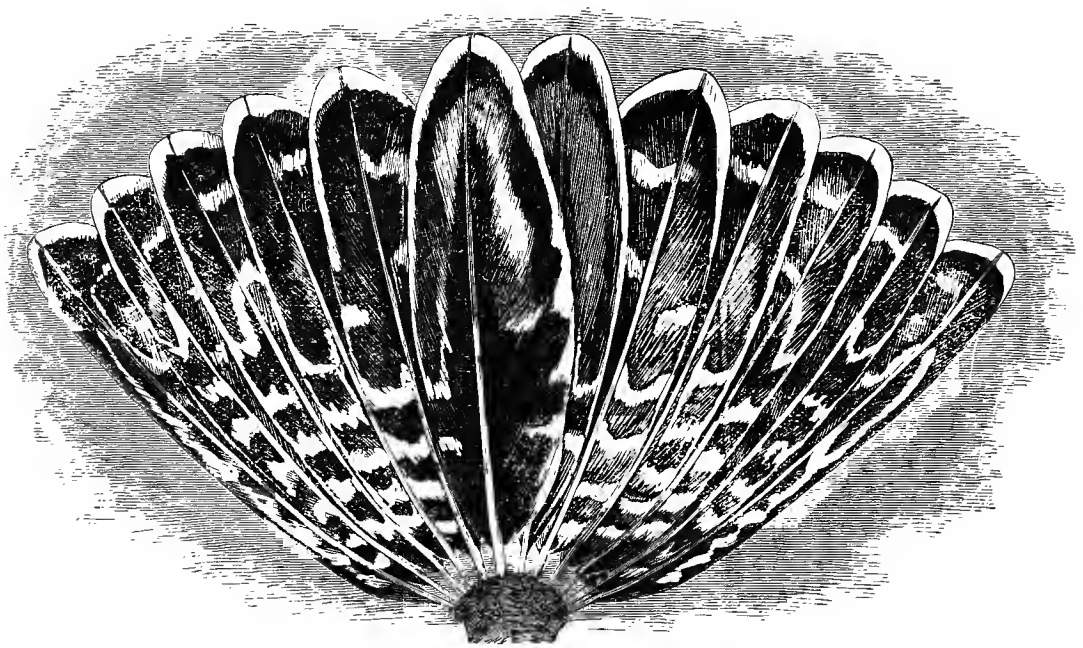
The Bar-tailed Godwit may be distinguished from all its allies, as well as from its eastern race, by the fact that the *lower back, rump, under wing-coverts, and axillaries are white obscurely marked with brown.* In the eastern form of this species the lower back and rump are brown, each feather obscurely edged with white, whilst in the American species of Bar-tailed Godwit these white edges are replaced by dark buff, which is also the colour of the under wing-coverts and axillaries.

The Bar-tailed Godwit has never been known to breed in any part of the British Islands, although it has been suspected to do so on some of the wild and lonely Hebrides. It is principally known as a visitor on migration, appearing in spring and autumn, most numerous at the former season on the low-lying coasts south of Spurn Point. It visits in

more or less abundance all the coasts of the British Islands, being most frequent on those that are low and sandy, and commoner in the east than in the west of Great Britain. It visits the Orkneys and Shetlands on migration, as well as the Channel Islands. A few stragglers occasionally remain during winter; and it sometimes wanders out of its usual course when on migration, and visits the inland counties. In the same manner a few often remain on our coasts all summer, unquestionably non-breeding birds. In Ireland it is said to be more abundant than in Scotland.

Geographical distribution.

The Bar-tailed Godwit is entirely confined, during the breeding-season, to the Siberian tundras above the limit of forest-growth from Lapland in the west across Behring's Straits into Alaska in the east. It has not been recorded from Greenland, Iceland, or the Faroes. The migrations of the Bar-tailed Godwit are somewhat peculiar. The mountains and deserts of Central Asia appear to present to it an impassable barrier. It appears to



Tail of young in first plumage.

be only an accidental visitor to the Indian peninsula east of the Indus, and it has never been recorded from Burma. The Bar-tailed Godwits breeding in the lower valleys of the Obb and the Petchora migrate down the valley of the Tobol into that of the Ural, or down the valley of the Kama into that of the Volga, to the Caspian, whence they cross to the Mekran coast, some possibly reaching Eastern Africa. Those breeding in North-west Russia and Lapland follow the coasts of Europe, and winter in the basin of the Mediterranean, principally in North Africa; they occasionally stray as far as the Canary Islands, but on neither coast of Africa do they appear to cross the equator.

The term Bar-tailed Godwit is an unfortunate one, as the tails of fully adult birds in winter plumage show scarcely any traces of bars. In the young in first plumage the bars are very irregular.

LIMOSA RUFA UROPYGIALIS.

SIBERIAN BAR-TAILED GODWIT.

Diagnosis.

Limosa rufa dorso postico vix albo notato.

Variations.

The eastern and western forms of the Bar-tailed Godwit completely intergrade.

Synonymy.

Limosa baueri, *Naumann, Vög. Deutschl.* viii. p. 429 (1836, descript. null.).
Limosa brevipes,
Limosa australasiana, } *Gray, List Birds Brit. Mus.* iii. pp. 95, 96 (1844, descript. null.).
Limosa lapponica, *var.* novæ zealandiæ, *Gray*[1], *Voy. Ereb. and Terror, Birds*, p. 13 (1846).
Limosa uropygialis, *Gould, Proc. Zool. Soc.* 1848, p. 38.
Limosa foxii, *Peale, U.S. Expl. Exp.* p. 231, pl. 65 (1848).
Gallinago punctata, *Ellman, Zool.* 1861, p. 7470.

Literature.

Plates.—Finsch & Hartlaub, Fauna Centr.-Polynes. pl. 13; Gould, Birds of Australia, vi. pl. 29.
Habits.—Gould, Handb. Birds of Australia, ii. p. 252; Middendorff, Sibir. Reise, Vög. p. 217.
Eggs.—Midd. Sibir. Reise, Vög. pl. xix. fig. 5.

Subspecific characters.

The eastern form of the Bar-tailed Godwit of the Old World differs from the western form of that species in the colour of the lower back and rump. In the eastern form the prevailing colour of each feather is brown, the white margins being somewhat obscure;

[1] It seems very strange that Gray should have given three names to the eastern form of the Bar-tailed Godwit—so strange that Swinhoe, and others after him, concluded that the name of *Limosa brevipes* had been applied by Gray to the eastern form of the Black-tailed Godwit, which is remarkable for the shortness of its tarsi. The type is, however, still in the British Museum, and is a Bar-tailed Godwit; but Gray himself discovered the inappropriateness of the name, and altered it two years later into *Limosa novæ-zealandiæ*, a name founded upon the same skin. The type of *Limosa australasiana* is in the mounted collection, and is an adult in winter plumage with only rudiments of bars on the tail-feathers.

whilst in the western form the prevailing colour of each feather of these parts is white, the brown centres being more or less obscure.

Geographical distribution.

It is impossible to say where these two forms meet, but most probably on the Taimyr Peninsula. An example which I obtained in the valley of the Yenesay is unquestionably the western form. Probably the Godwits found by Middendorff on the Taimyr Peninsula are somewhat intermediate, as he failed to notice any difference between them and examples obtained at Okhotsk. The eastern colony of Bar-tailed Godwits pass the coasts of Japan, Mantchuria, and China on migration, and winter in the islands of the Malay Archipelago, Australia, the New Hebrides, Norfolk Island, and New Zealand.

LIMOSA FEDOA.

AMERICAN BAR-TAILED GODWIT.

Diagnosis. LIMOSA axillaribus subalaribusque castaneis.

Variations. No local races of this species are known.

Synonymy.

Scolopax fedoa, *Linneus, Syst. Nat.* i. p. 146 (1758); *Linn. Syst. Nat.* i. p. 244 (1766).
Limosa americana rufa, *Brisson, Orn.* v. p. 287 (1760).
Scolopax marmorata, *Latham, Index Orn.* ii. p. 720 (1790).
Limicula fedoa (*Linneus*), Limicula marmorata (*Lath.*), } *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 248 (1816).
Limosa fedoa (*Linn.*), *Sabine, Franklin's Polar Sea,* p. 689 (1823).
Fedoa americana, Fedoa marmorata (*Lath.*), } *Stephens, Shaw's Gen. Zool., Birds,* xii. pt. i. pp. 71, 82 (1824).
Limosa adspersa, *Naumann, Vög Deutschl.* viii. p. 429 (1836).
Totanus fedoa (*Linn.*), *Seebohm, British Birds,* iii. p. 158 (1885).

Literature.

PLATES.—Edwards, Nat. Hist. Birds, iii. pl. 137; Wilson, Am. Orn. pl. 56. fig. 4; Audubon, Birds of America, v. pl. 348.
HABITS.—Baird, Brewer, and Ridgway, Water-Birds N. Amer. i. p. 255.
EGGS, described in the above-mentioned volume, p. 258, indistinguishable from large examples of *L. melanura*.

Specific characters.

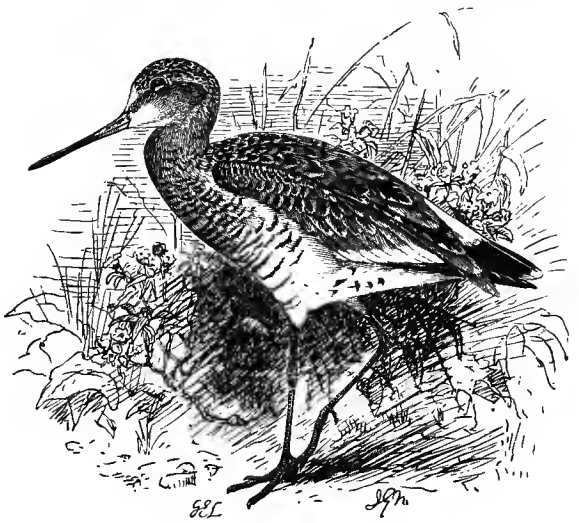
The American Bar-tailed Godwit, sometimes called the Marbled Godwit, may always be recognized by its *chestnut axillaries and under wing-coverts.*

It neither breeds so far north nor winters so far south as its Black-tailed ally. It is not known to breed north of the basin of Lake Winnipeg, or to winter further south than the coast of Peru. It may possibly be a resident in the central portion of its range. Geographical distribution.

On the Pacific coast it has not been recorded north of Vancouver Island; it is said to be common nearly all the year round on the southern half of the Californian coast; it winters on the Pacific coast of Guatemala (Salvin, Ibis, 1865, p. 190); it has occurred on the eastern slope of the Andes in Ecuador (Steere, Proc. Zool. Soc. 1878, p. 141), and on the coast of Western Peru (Taczanowski, Proc. Zool. Soc. 1877, p. 748).

It is probably confined during the breeding-season to the inland lakes, and is much rarer on the Atlantic coast than the Black-tailed species. It is not known to visit Labrador, but it is found on migration on the coasts of the Northern States and in winter on those of the Southern States, as well as on the West Indies. It has not been recorded from the Atlantic coast of South America, but it is common in the Bay of Honduras (Leyland, Proc. Zool. Soc. 1859, p. 64).

*** *Subgeneric group with no white on the rump.*



LIMOSA MELANURA.

BLACK-TAILED GODWIT.

Limosa rectricibus nigris, ad basin albis: axillaribus albis brunneo notatis. Diagnosis.

Variations. EASTERN examples average so much smaller in size than western ones that they may be regarded as subspecifically distinct.

Synonymy.

Scolopax limosa, *Linneus, Syst. Nat.* i. p. 147 (1758); *Linn. Syst. Nat.* i. p. 245 (1766).
Limosa limosa (*Linn.*), *Brisson, Orn.* v. p. 262 (1760).
Scolopax belgica, *Gmelin, Syst. Nat.* i. p. 663 (1788).
Totanus limosa (*Briss.*), *Bechstein, Orn. Taschenb.* ii. p. 287 (1803).
Actitis limosa (*Briss.*), *Illiger, Prodr.* p. 262 (1811).
Limosa melanura, *Leisler, Nachtr. Bechst. Naturg.* ii. p. 153 (1813).
Limicula melanura (*Leisl.*), *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 250 (1816).
Fedoa melanura (*Leisl.*), *Stephens, Shaw's Gen. Zool.* xii. pt. i. p. 73 (1824).
Totanus melanurus (*Leisl.*), *Seebohm, Brit. Birds,* iii. p. 162 (1885).

Literature.

PLATES.—Daub. Pl. Enl. nos. 874, 916; Gould, Birds Gt. Brit. iv. pl. 50; Dresser, Birds of Europe, viii. pls. 573, 574.
HABITS.—Seebohm, British Birds, iii. p. 162.
EGGS.—Seebohm, British Birds, pl. 29.

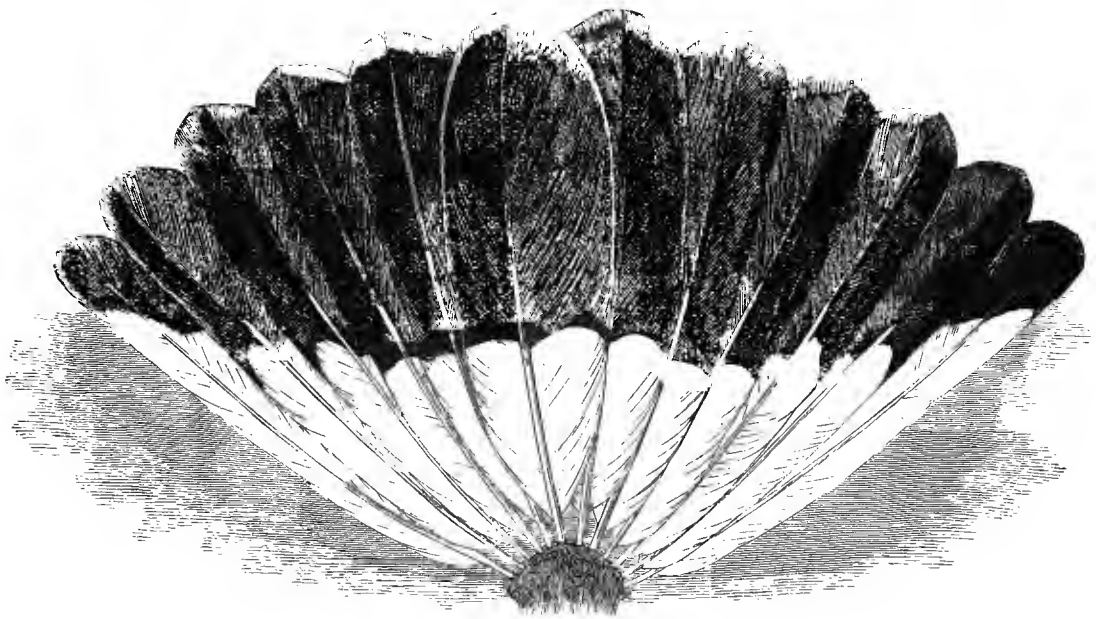
Specific characters. The Godwits of the Old World may always be distinguished from those of the New World by the colour of their under wing-coverts and axillaries. In the former the ground-colour of these parts is always white, and in the latter chestnut or brown. The two Godwits of the Old World may be distinguished from each other in various ways; but perhaps the simplest diagnosis of *L. melanura* is *tail-feathers black with concealed white bases; axillaries white, more or less obscurely barred with brown.*

Geographical distribution. Like the Bar-tailed Godwit the Black-tailed Godwit may be subdivided into an eastern and a western race. The latter is a regular summer visitor to the south of Iceland and the Faroes, and has been recorded from Greenland, though the evidence is most unsatisfactory. In the British Islands it is now only known on migration; but it still breeds in Holland, North Germany, Denmark, Scandinavia (occasionally as far north as the Arctic Circle), and in Central and Southern Russia. In South Siberia, west of the main valley of the Obb, it breeds as far north as lat. 60°. The European birds winter on the coasts of Spain and on the shores of the basin of the Mediterranean, occasionally straggling along the west coast as far as the Canaries and Madeira, and down the Red Sea as far as Abyssinia. The West-Siberian birds, and probably most of the East-Russian ones, winter on the shores of the Caspian Sea and the Persian Gulf, and the coasts and inland waters of India and Ceylon; they pass through Western Turkestan and the Himalayas on migration, and are much commoner in the north than in the south, and on the coast than on the inland lakes and rivers.

There is no difference in colour between the eastern and western forms of the

Palæarctic Black-tailed Godwit. The former is merely a small race of the latter, which completely intergrades with its larger ally, as may be seen from the following table :— Subspecific characters.

	L. melanura.	*L. melanuroides.*
Length of wing	9 to 8 in.	8 to 7 in.
Length of tarsus	$3\frac{3}{4}$ to 3 in.	3 to $2\frac{1}{4}$ in.



Tail of Black-tailed Godwit.

LIMOSA MELANURA MELANUROIDES.

SIBERIAN BLACK-TAILED GODWIT.

Diagnosis.

Limosa melanura magnitudine minore.

Variations.

The eastern and western forms of the Black-tailed Godwit completely intergrade.

Synonymy.

Limosa melanuroides, *Gould, Proc. Zool. Soc.* 1846, p. 84.
Totanus melanurus melanuroides (*Gould*), *Seebohm, British Birds,* iii. p. 163 (1885).

Literature. PLATES.—Gould, Birds of Australia, vi. pl. 28.
HABITS.—Gould, Handb. Birds Austr. ii. p. 51; Radde, Reis. Süd-Ost. Sibir. ii. p. 331.
EGGS.—Taczan. Journ. Orn. 1873, p. 104.

It is not known that the Siberian Black-tailed Godwit differs from its European ally, except in size, as has already been pointed out.

Geographical distribution. No Black-tailed Godwit has been recorded from the main valley of the Obb or from that of the Yenesay. The western tributaries of the former river appear to be the eastern limit of the range of the European Black-tailed Godwit; whilst the eastern tributaries of the latter river appear to be the western limit of the Siberian Black-tailed Godwit. The latter race breeds in the Altai Mountains, the basin of Lake Baikal, and throughout the valley of the Amoor; it passes through Mongolia and Japan on migration, and winters in China, Burma [1], the islands of the Malay Archipelago, and North Australia.

LIMOSA HUDSONICA.

AMERICAN BLACK-TAILED GODWIT.

Diagnosis. LIMOSA axillaribus subalaribusque nigricantibus.

Variations. No local races of this species are known.

Synonymy. Scolopax hæmastica, *Linneus, Syst. Nat.* i. p. 147 (1758).
Scolopax hudsonica, *Latham, Index Orn.* ii. p. 720 (1790).
Limicula hudsonica (*Lath.*), *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 250 (1816).

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[1] Three examples collected by Oates in Burma, and now in the National Collection, vary in length of wing from 7·4 to 7·0 inch, and in length of tarsus from 2·6 to 2·5; a third, also collected by Oates in Burma, is larger (wing 8·2, tarsus 3·1 inch). The three first mentioned are unquestionably the eastern form, and contrast strikingly with the Indian examples in the Hume Collection, which are as unquestionably the western form. There must be some mistake in the measurements given by Oates in his 'Birds of British Burma,' ii. p. 409 (a book, by the way, which ought to be in the hands of every ornithological student). His average is probably the mean between the largest and smallest examples, instead of the actual mean of the whole series.

Limosa hudsonica (*Lath.*), *Swainson & Richardson, Faun. Bor.-Amer.* ii. p. 396 (1831).
Limosa australis, *Gray, List Birds Brit. Mus.* iii. p. 95 (1844).
Limosa hæmastica (*Linn.*), *Coues, Bull. Nutt. Orn. Club*, 1880, p. 100.
Totanus hudsonicus (*Lath.*), *Seebohm, British Birds*, iii. p. 163 (1885).

Literature.

PLATES.—Edwards, Nat. Hist. Birds, iii. pl. 138; Audubon, Birds of America, v. pl. 349.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 260.
EGGS, described in the above-mentioned volume, p. 263, indistinguishable from small examples of *L. melanura*.

Specific characters.

The American Black-tailed Godwit, or Hudsonian Godwit as it is called by the American ornithologists, may always be recognized by its *dark brown axillaries and under wing-coverts*.

Geographical distribution.

It breeds on the tundras of North America, above the limit of forest-growth, from Alaska to Baffin's Bay, but it is said to be very rare at the western extremity of its range. In autumn it migrates southwards and crosses the tropics to winter in the temperate parts of South America, where it has been obtained as far south as the Falkland Islands.

It has been recorded twice from Alaska, once from the mouth of the Yukon River (Dall & Bannister, Trans. Chic. Ac. Sc. i p. 293), and once from the island of Michalaski (Adams, Ibis, 1878, p. 439); but it is probably very rare, as it was not met with by the naturalists of the 'Corwin' expedition, nor by the Point Barrow explorers, nor has it been recorded from any other part of the Pacific coast of North America. It has only once been recorded from the Pacific coast of South America (Bridges, Proc. Zool. Soc. 1843, p. 118), where it is said to occur in Chili.

It is a common though somewhat irregular migrant along the Atlantic coast of North America, and has once occurred on the Bermudas (Reid, Zoologist, 1877, p. 477). It has been recorded from Venezuela (Goering, Proc. Zool. Soc. 1869, p. 252), Buenos Ayres (White, Proc. Zool. Soc. 1883, p. 42), the lagoons of the Chupat River in Patagonia (Durnford, Ibis, 1877, p. 43), and the Falkland Islands (Darwin, Proc. Zool. Soc. 1860, p. 387).

CHAPTER XXIV.

Genus EREUNETES.

Diagnosis of genus.

Totaninæ rostro omninò ut in *Scolopace* formato.

The Snipe-billed Sandpipers are a small group of birds, not by any means specially related to the Snipes, the similarity in the formation of the bill being unquestionably a mark of analogy rather than of affinity. On the other hand, whilst they have the bill of *Tringa* and *Scolopax*, their feet resemble those of *Limosa* and *Totanus*, in all probability a second mark of analogy rather than of affinity.

The genus *Ereunetes* may be diagnosed as follows:—

Generic characters.

Charadriidæ having the *outer and middle toes connected at the base by a well-developed web*, and having *snipe-like bills*, narrowest near the middle when seen from above, and expanded towards the tip, which is covered with a soft membrane that appears to be pitted or corrugated in the dried skin.

As in the genus *Numenius*, the females of the species belonging to the genus *Ereunetes* have longer bills than the males.

Synonymy of the Genus Ereunetes.

	Type.
Ereunetes, *Illiger, Prodromus*, p. 262 (1811)	E. pusillus.
Macrorhamphus, *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 31 (1816) . .	E. griseus.
Hemipalama, *Bonap. Journ. Ac. Nat. Sc. Philad.* v. p. 187 (1825)	E. pusillus.
Heteropoda, *Nuttall, Man. Orn. U. S. & Canada*, ii. p. 135 (1834)	E. pusillus.
Limnodromus, *Lembeye, Av. Isla Cuba*, p. 91 (1850)	E. griseus.
Micropalama, *Baird, Birds N. Amer.* p. 726 (1858)	E. himantopus.
Pseudoscolopax, *Blyth, Journ. As. Soc. Beng.* xxviii. p. 280 (1859). . . .	E. taczanowskii.

For some inscrutable reason most ornithologists have shut their eyes to the obvious relationship between the four species which are comprised in this genus. Each of the four species has been made the type of a genus; one of them has appeared in that capacity three times, and another twice, so that no fewer than seven genera have been provided for four species.

The Canadian Semipalmated Stint (*Ereunetes pusillus*), being the only species included in the genus by its founder, is consequently the type. Determination of the type.

KEY TO THE SPECIES.

The species and subspecies belonging to this genus may be distinguished at all ages and seasons as follows:—

Ground-colour of lower back white.	**griseus.**	
	scolopaceus . . .	Bill over 2·5 in.
	taczanowskii . .	
Middle toe united to inner as well as to outer toe by a web at the base.	**himantopus.**	
	occidentalis . . .	Bill 1·2 to ·9 in.
	pusillus	Bill under ·9 in.

Judging from similarity of colour, which seems to be a character dating very far back in the genealogy of this group of birds, the genus *Ereunetes* appears to be nearest related to *Tringa* and *Limosa*.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

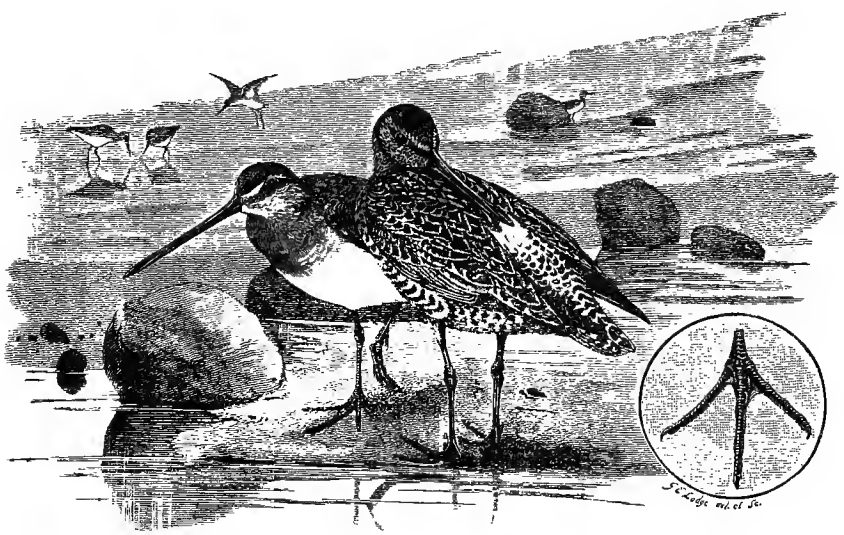
Ereunetes.	PALÆARCTIC REGION.	*Macrorhamphus*.
	North-east Siberia.	TACZANOWSKII.
	NEARCTIC REGION.	
OCCIDENTALIS	*Alaska*.	SCOLOPACEUS.
PUSILLUS, HIMANTOPUS	*Hudson's Bay Terr*.	GRISEUS.

The genus *Ereunetes* is purely Arctic. Its distribution during the breeding-season is as follows:— Climatic distribution.

Arctic America	5
Arctic Asia	1
Species and subspecies of *Ereunetes* .	— 6

Ancient routes of emigration.

If we regard the ancestors of the genus *Ereunetes* as residents on the shores of the Polar Basin before the Post-Pliocene Glacial Epoch, and as having been driven south by the Arctic cold into isolated regions, where they became differentiated into four species, there cannot be much doubt that the ancestors of *E. taczanowskii* followed the Pacific coast of Asia. *E. scolopaceus*, being its nearest relation, doubtless took the Pacific coast of America, and, after its return to the Polar Basin, was in post-glacial times again partially isolated and partially differentiated east and west of the Rocky Mountains, the eastern colony becoming *E. griseus*. *E. pusillus* and *E. himantopus* appear both to have originated east of the Rocky Mountains. As the former has extended its range, probably in post-glacial times, to Alaska (where it has become partially differentiated as *E. occidentalis*), we may perhaps assume that it followed the inland chain of lakes, whilst the latter may have selected the Atlantic coast of the American continent. This hypothesis is supported by the fact that the larger species appears to be more exclusively a coast bird on its autumn migrations.



E. scolopaceus (winter plumage). *E. griseus* (summer plumage).

EREUNETES GRISEUS.

CANADIAN SNIPE-BILLED SANDPIPER.

Diagnosis. EREUNETES dorso postico quam dorsum superius valdè pallidiore : palamâ nullâ inter digitum medium et digitum interiorem.

Variations.

The Western form of the Snipe-billed Sandpiper has a longer bill than the Eastern form and may fairly be regarded as subspecifically distinct.

Synonymy.

Scolopax grisea, Scolopax cayennensis, } *Gmelin, Syst. Nat.* i. pp. 658, 661 (1788, winter plumage).
Scolopax noveboracensis, *Gmelin, Syst. Nat.* i. p. 658 (1788, summer plumage).
Scolopax leucophæa, *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 358 (1816, *nec Lath.*).
Totanus ferrugineicollis, *Vieillot, N. Dict. d'Hist. Nat.* vi. p. 401 (1816).
Macrorhamphus griseus (*Gmel.*), *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 31 (1816).
Scolopax paykullii, *Nilsson, Orn. Suec.* ii. p. 106 (1817).
Totanus noveboracensis (*Gmel.*), *Sabine, Frankl. Journ.* p. 687 (1828).
Macrorhamphus punctatus, *Lesson, Traité d'Orn.* p. 556 (1831).
Limnodromus griseus (*Gmel.*), *Lembeye, Av. Isla Cuba,* p. 91 (1850).
Limosa grisea (*Gmel.*), *Schlegel, Mus. Pays-Bas, Scolop.* p. 26 (1864).
Ereunetes griseus (*Gmel.*), *Seebohm, British Birds,* iii. p. 168 (1885).

Literature.

Plates.—Wilson, Am. Orn. pl. 58. fig. 1; Audubon, Birds Am. vi. pl. 351.
Habits.—Seebohm, British Birds, iii. p. 168.
Eggs.—Seebohm, British Birds, pl. 68. fig. 2.

Specific characters.

The Canadian Snipe-billed Sandpiper, otherwise called the Red-breasted Snipe, the Brown Snipe, the Grey Snipe, or Lesser Longbeak, may be distinguished from all its congeners (except from the Alaskan Snipe-billed Sandpiper, to which it appears to be connected by intermediate forms) by its feet. It has *no web between the middle and inner toes.* It is intermediate in size between *E. taczanowskii* and *E. himantopus*, and agrees with the former in having *the lower back very much whiter than the mantle.* It scarcely differs in colour or markings at any age or season from its Western form, but it is on an average a slightly smaller bird, with a proportionately shorter bill and tarsi, as the following measurements prove:—

Subspecific characters.

	E. griseus.	*E. scolopaceus.*
Length of wing	5·4 to 5·8	5·6 to 6·0
Length of bill	2·0 to 2·6	2·4 to 3·0
Length of tarsus	1·2 to 1·5	1·4 to 1·7

Geographical distribution.

The Canadian Snipe-billed Sandpiper breeds in the arctic regions of the American continent from the Rocky Mountains to Baffin's Bay, and has occurred in Greenland. On migration it follows the inland fly-lines as well as the Atlantic coast, and occasionally occurs on the Bermudas (Reid, Zoologist, 1877, p. 476). In winter it has been found in

the West Indies, on the southern shores of the Gulf of Mexico, and on the Brazilian coast as far south as Bahia. It has repeatedly wandered as far east as the British Islands and the continent of Europe.

EREUNETES GRISEUS SCOLOPACEUS.

ALASKAN SNIPE-BILLED SANDPIPER.

Diagnosis. EREUNETES GRISEUS magnitudine majore.

Variations. THE Eastern and Western forms of this species appear completely to intergrade.

Synonymy.
Limosa scolopacea, *Say, Long's Exped.* ii. p. 170 (1833).
Scolopax longirostris, *Bell, Ann. Lyc. New York,* v. p. 4 (1852).
Macrorhamphus scolopaceus (*Say*), *Lawrence, Ann. Lyc. New York,* v. p. 4 (1852).
Macrorhampus griseus, *var.* scolopaceus, *Coues, Check-list,* no. 415 *a* (1873).

Literature.
PLATES.—Lawrence, Ann. Lyc. New York, v. pl. 1; Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 197 (coloured woodcut of head).
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 196.
EGGS.—Described on page 200 of the above-mentioned work.

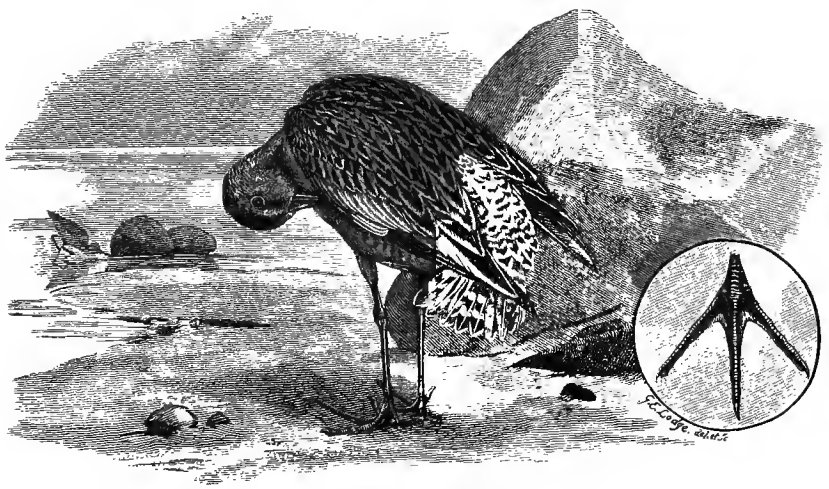
Subspecific characters. The Alaskan Snipe-billed Sandpiper, sometimes called the Red-bellied Snipe or Greater Longbeak, is the Western form of *E. griseus*. Attempts have been made to point out a difference of colour between it and its Eastern representative. It is perhaps on an average rather less spotted on the underparts in summer plumage, and on the lower back at all seasons; but these characters are very unreliable, and under no circumstances can it be regarded as more than subspecifically distinct from its Eastern ally.

The differences in the measurements of the two forms have been already pointed out.

Geographical distribution. The Alaskan Snipe-billed Sandpiper is common during the breeding-season in Alaska (Dall & Bannister, Trans. Chicago Ac. Sc. i. p. 291), and is extremely abundant on the American coast of Behring Sea and on the opposite coast of Siberia (Nelson, Cruise of the

'Corwin,' p. 85). It has been recorded inland in Siberia north of Yakutsk (Taczanowski, Journ. Orn. 1873, p. 112), and from both the north and central islands of Japan (Seebohm, Ibis, 1884, p. 33). How far east its breeding-range extends it is difficult to determine, but it probably breeds on Banks-Land, as it passes Point Barrow in considerable numbers on its autumn migration (Seebohm, Trans. Norf. and Norw. Nat. Soc. iv. p. 307). It also occurs abundantly on migration on the Pacific coast of the American continent (Coues, Ibis, 1866, p. 271), and inland in the valley of the Saskatchewan (where a few probably remain to breed), and occasionally on the Atlantic coast.

It appears to winter on the Pacific coast of Guatemala (Salvin, Ibis, 1865, p. 191) and in other parts of Central America.



Summer plumage.

EREUNETES TACZANOWSKII.

SIBERIAN SNIPE-BILLED SANDPIPER.

Diagnosis. EREUNETES dorso postico quam dorsum superius valdè pallidiore: digito medio basi utrinque palmatis.

Variations. No local races of this species are known.

Synonymy. Macrorhamphus semipalmatus, *Jerdon, fide Blyth, Journ. As. Soc. Beng.* xvii. p. 252 (1848, *nec Wilson*).

Pseudoscolopax semipalmatus (*Jerdon*), *Blyth, Journ. As. Soc. Beng.* xxviii. p. 280 (1859).
Micropalama tacksanowskia, *Verreaux, Rev. Mag. Zool* 1860, p. 206.
Ereunetes semipalmatus (*Jerdon*), *Seebohm, British Birds*, iii. p. 169.

Literature.

PLATES.—Verreaux, Rev. Mag. Zool. 1860, pl. xiv.; David & Oust. Ois. Chine, pl. 121; Hume & Marshall, Game Birds of India &c. iii. pl. 47.
HABITS.—Oates, Birds of British Burma, ii. p. 408.
EGGS.—Unknown.

Specific characters.

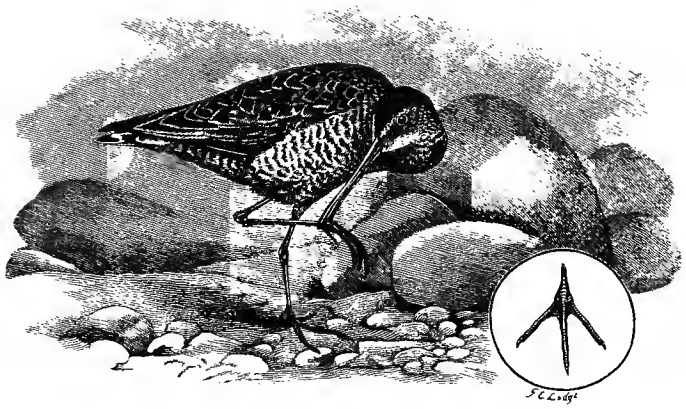
The Siberian Snipe-billed Sandpiper may be distinguished from its allies by its possession of two characters: the *lower back is much paler than the mantle*, and the *inner as well as the outer toe is united to the middle one by a web at the base.*

In the colour of its plumage and in its seasonal changes it so closely resembles the Bar-tailed Godwit (*Limosa rufa*) that it is often mistaken for it.

Geographical distribution.

The breeding-grounds of the Siberian Snipe-billed Sandpiper are unknown, but as it passes through Dauria on migration, and has not been met with by any traveller near the coast, they are presumably near Yakutsk. It is a rare winter visitor to India, Pegu, China, and Borneo.

It appears to be most nearly allied to the Alaskan Snipe-billed Sandpiper (*Ereunetes griseus scolopaceus*).



Summer plumage.

EREUNETES HIMANTOPUS.

STILT-SANDPIPER.

Diagnosis.

EREUNETES dorso postico et interscapulio ferè concoloribus: tarso longiore (33 ad 46 millim.).

No local races of this species are known. Variations.

Synonymy.

Tringa himantopus, *Bonap. Ann. Lyc. New York*, ii. p. 157 (1826).
Tringa (Hemipalama) himantopus (*Bonap.*), *Bonap. Comp. Orn. Roma e Filad.* p. 61 (1827).
Tringa douglasii, *Swainson & Richardson, Faun. Bor.-Amer.* ii. p. 379 (1831).
Hemipalma douglasii, Hemipalma auduboni, *Nuttall, Man. Orn. U. S. & Canada*, ii. pp. 140, 141 (1834).
Hemipalama himantopus (*Bonap.*), *Bonap. Comp. List B. Eur. and N. Amer.* p. 49 (1838).
Hemipalama multistriata, *Lichtenstein, fide* Hemipalama auduboni (*Nuttall*), *Gray, Genera of Birds*, iii. p. 578 (1845).
Totanus himantopus (*Bonap.*), *Lembeye, Av. Isla Cuba*, p. 95 (1850).
Micropalama himantopus (*Bonap.*), *Baird, Cassin, & Lawrence, Birds N. Amer.* p. 726 (1858).

Literature.

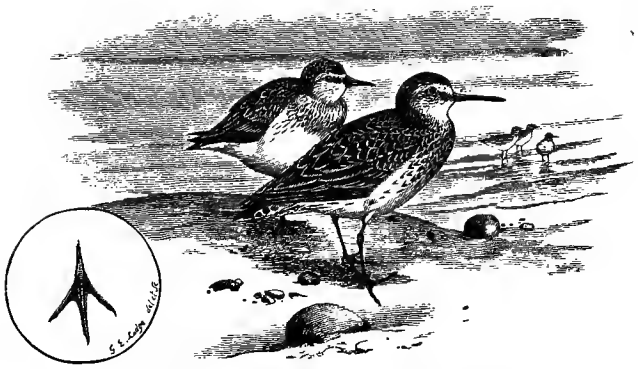
Plates.—Swainson & Richardson, Faun. Bor.-Amer. ii. pl. 66; Audubon, Birds Am. v. pl. 334.
Habits.—Baird, Brewer, & Ridgw. Water-Birds N. Amer. i. p. 201.
Eggs.—Described by Brewer (*tom. cit.* p. 204) from examples collected by Macfarlane.

Specific characters.

The Stilt-Sandpiper is considerably larger than the Semipalmated Sandpiper, but not quite so large as the Canadian Snipe-billed Sandpiper. From its larger congeners it is most easily distinguished by the character *lower back almost the same colour as the upper back*, whilst from the smaller species it differs considerably in the relative length of its legs. In the Stilt-Sandpiper, as its name implies, the legs are long, the *tarsus* being 1·4 *to* 1·8 *in. long*, nearly a third of the length of the wing from the carpal joint. In the Semipalmated Stint the tarsus is less than a fourth of the wing. The two species resemble each other very closely in winter plumage, except that the Stilt-Sandpiper has white upper tail-coverts. In summer plumage the bars across the upper tail-coverts and the whole of the underparts make it look very different from its small ally.

Geographical distribution.

The Stilt-Sandpiper breeds in the arctic regions of America from the Rocky Mountains to Baffin's Bay, but it is not known to have occurred in Alaska or Greenland. On migration it is found along the Atlantic coast as well as inland, and occasionally occurs on the Bermudas (Reid, Zoologist, 1877, p. 476). In winter its range extends from Central America and the West Indies to Brazil and Peru. I have an example in my collection obtained by Capt. Harrison near Buenos Ayres, which is probably the southern limit of its migrations. Fraser procured it on the Pacific side of the Andes in Ecuador (Sclater, Proc. Zool. Soc. 1860, p. 290), and Bartlett found it on the Atlantic slopes of the Andes in Peru (Sclater and Salvin, Proc. Zool. Soc. 1866, p. 199).



E. pusillus. *E. occidentalis.*

Summer plumage.

EREUNETES PUSILLUS.

CANADIAN SEMIPALMATED STINT.

Diagnosis. EREUNETES dorso postico et interscapulio ferè concoloribus: tarso breviore (minus quam 26 millim.).

Variations. THE Western form of this species has a longer bill, and may fairly be regarded as subspecifically distinct.

Synonymy.

Tringa cinclus dominicensis minor, *Brisson, Orn.* v. p. 222 (1760).
Tringa pusilla, *Linneus, Syst. Nat.* i. p. 252 (1766).
Ereunetes petrificatus, *Illiger, Prodromus*, p. 262 (1811).
Tringa semipalmata, *Wilson, Am. Orn.* vii. p. 131 (1813).
Tringa brevirostris, *Spix, Av. Bras.* ii. p. 76 (1825).
Hemipalama semipalmata (*Wilson*), *Bonap. Journ. Ac. Nat. Sc. Philad.* v. p. 88 (1825).
Pelidna brissoni, *Lesson, Man. d'Orn.* ii. p. 277 (1828).
Heteropoda semipalmata (*Wilson*), *Nuttall, Man. Orn. U. S. & Canada*, ii. p. 135 (1834).
Hemipalama minor, *Lembeye, Av. Isla Cuba*, p. 97 (1850).
Ereunetes pusillus (*Linn.*), *Cassin, Proc. Ac. Nat. Sc. Philad.* 1861, p. 177.

Literature.

PLATES.—Wilson, Am. Orn. pl. 63. fig. 3; Audubon, Birds Am. v. pl. 336.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 205.
EGGS.—Described by Brewer on p. 210 of the above-mentioned volume.

Specific characters.

The Canadian Semipalmated Stint, Little Sandpiper, or Semipalmated Sandpiper, as it has been variously called, so closely resembles the small *Tringas* in the colour of its

plumage, that a careful examination of the bill and feet is necessary to distinguish it from them. It is much smaller than any of its congeners, and may be distinguished by its short *tarsi*, which are *less than one inch in length*.

Subspecific characters.

It is very closely related to its Western ally, from which it scarcely differs, except in the length of its bill, which varies from ·68 to ·92 inch, whilst that of the Western form varies from ·85 to 1·15 inch. The two forms do not differ from each other in colour, except that in summer plumage the Western form is more chestnut on the upper parts.

Geographical distribution.

The Canadian Semipalmated Stint breeds in the arctic regions of the American continent from the Rocky Mountains to Baffin's Bay, but has not occurred in Greenland. On migration it follows the river-courses, as well as the shores of the Atlantic, and is a regular visitor to the Bermudas (Reid, Zoologist, 1877, p. 476). It winters on the coast of the South-American continent. I have several examples from Cayenne and Bahia, and one collected by Capt. Harrison in Unevo Gulf (about lat. 43° south) on the coast of Patagonia, which appears to be the southern limit of its range on the east coast. On the west coast it has been recorded as far south as Paracas Bay in Peru (Salvin, Proc. Zool. Soc. 1883, p. 429), but it is probable that the record refers to the Alaskan form of this species.

EREUNETES PUSILLUS OCCIDENTALIS.

ALASKAN SEMIPALMATED STINT.

Diagnosis.

Ereunetes pusillus magnitudine majore: habitu nuptiali partibus superioribus valdè castanco ornatis.

Variations.

The Alaskan Semipalmated Stint completely intergrades with the Canadian Semipalmated Stint.

Synonymy.

Heteropoda mauri, *Bonap. Comp. List B. Eur. & N. Amer.* p. 49 (1838).
Ereunetes mauri (*Bonap.*), *Gundlach, Journ. Orn.* 1856, p. 419.
Tringa cabanisii, *Lichtenstein, fide Cabanis, Journ. Orn.* 1856, p. 420.
Ereunetes occidentalis, *Lawrence, Proc. Ac. Nat. Sc. Philad.* 1864, p. 107.
Ereunetes pusillus, *var.* occidentalis (*Lawr.*), *Coues, Check-list N. Amer. Birds*, p. 83 (1873).
Ereunetes pusillus occidentalis (*Lawr.*), *Ridgway, Nom. N. Amer. Birds*, p. 45 (1881).

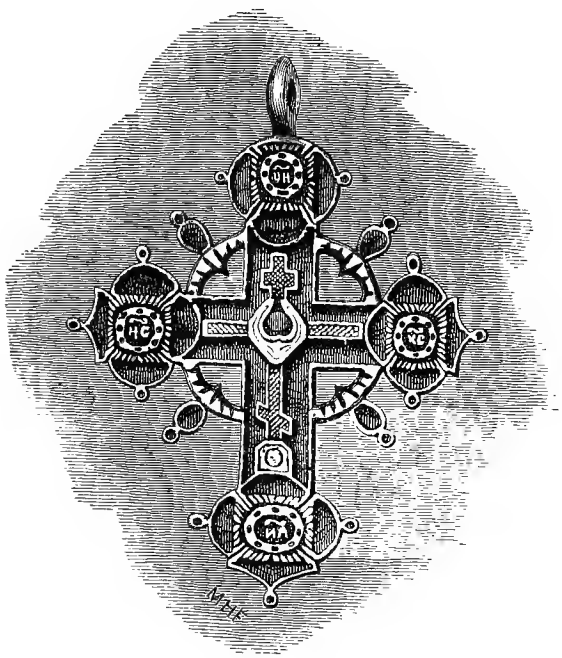
Literature.

PLATES.—Head figured by Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 207.
HABITS.—Described by Brewer on p. 209 of the above-mentioned volume.
EGGS.—Not known to differ from those of the Eastern form.

The Alaskan Semipalmated Stint is only a Western form of the Canadian Semipalmated Stint, from which it scarcely differs except in having a slightly longer bill, as has been already pointed out.

Geographical distribution.

It breeds in Alaska, passes on migration along the American shores of the Pacific, visits many of the inland waters west of the Rocky Mountains, and winters on the coast of Central America.



CHAPTER XXV.

Subfamily **SCOLOPACINÆ.**

CHARADRIIDÆ digitis omnibus ad basin liberis. Diagnosis of subfamily.

THE diagnosis of the Scolopacinæ is extremely simple :— Characters of sub-family.

Charadriidæ having all the toes cleft to the base.

About sixty birds possess this character which are probably more nearly related to each other than they are to the rest of the family, though *Tringa minutilla* resembles *Ereunetes pusillus* very closely, and *Strepsilas* possesses characters which closely resemble those of *Charadrius* and *Vanellus*.

Only five genera appear to possess characters of sufficient importance to entitle them to recognition. Genera.

KEY TO THE GENERA.

a. Tarsus much more than half the length of the bill.
  a^1. Difference in length between the shortest and longest primary much more than the length of the bill.
    a^2. First primary much longer than the fourth.
      a^3. Nasal aperture extending beyond the basal fourth of bill . STREPSILAS.
      b^3. Nasal aperture situated within the basal fourth of bill . . TRINGA.
    b^2. First primary not longer than the fourth . . . . . PHEGORNIS.
  b^1. Difference in length between the shortest and longest primary much less than the length of the bill . . . . . RHYNCHÆA.
b. Bill twice the length of the tarsus . . . . . SCOLOPAX.

Distribution of species.

It is difficult to say whether the Scolopacinæ are more Arctic than Temperate in their distribution. Of the 56 species and subspecies which it contains

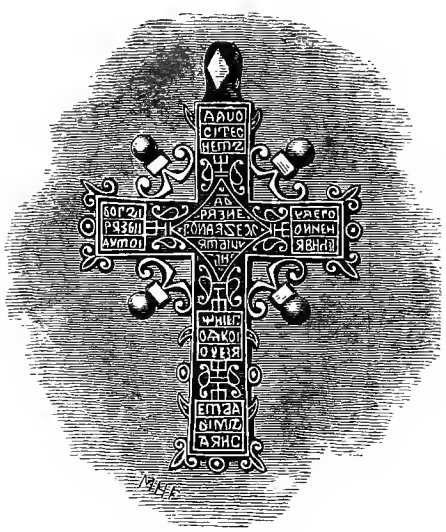
22 are exclusively Arctic.
6 are Arctic and Temperate.
16 are exclusively Temperate.
3 are Temperate and Tropical.
9 are exclusively Tropical.

56

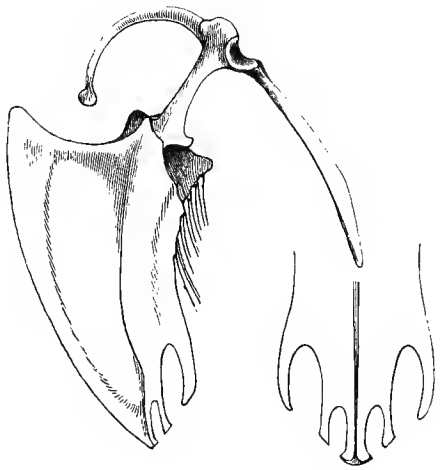
24 are New World.
5 are New and Old World.
27 are Old World.

56

Of five genera all are represented in both the New and Old Worlds.



CHAPTER XXVI.



Sternum of *Strepsilas interpres*.

Genus STREPSILAS.

Diagnosis of genus.

CHARADRIIDÆ digitis omnibus ad basin liberis: narium aperturâ ultra partem quartam rostri a basi extensâ.

Generic characters.

THE Turnstones are so nearly allied to the Plovers that it is doubtful whether they ought to be generically separated from them. They appear to form a connecting-link between the genera *Vanellus* and *Tringa*. They agree with the former in having the *nasal aperture extending beyond the basal fourth of the bill*, and with the latter in having the *toes cleft to the base*. These two characters are sufficient to diagnose the genus. In the distribution of the colours on the rump, upper tail-coverts, and tail, as well as in the position of the nostrils, they resemble *Vanellus*, but in the character of their feet as well as in the glossy appearance of their eggs they resemble *Tringa*.

Synonymy of the Genus STREPSILAS.

Although the genus *Strepsilas* contains only three species, its synonymy positively includes five names!

	Type.
Arenaria, *Brisson, Orn.* v. p. 132 (1760)	S. interpres.
Morinella, *Meyer, Taschenb.* ii. p. 383 (1810)	S. interpres.
Strepsilas, *Illiger, Prodromus*, p. 263 (1811)	S. interpres.
Aphriza, *Audubon, Syn. Birds N. Amer.* p. 225 (1839)	S. virgatus.
Cinclus, *Gray, List Gen. and Subgen. Birds*, p. 85 (1841)	S. interpres.

Objections to the use of *Arenaria.*

According to the modern interpretation of the Stricklandian Code of Nomenclature, which only admits Brissonian genera if they are additional to those of Linneus, the name of *Arenaria* cannot be applied to a genus of birds, having been appropriated by Linneus to a genus of plants. My first modification of the Stricklandian code (Seebohm, British Birds, i. p. xix) rejects *Arenaria* of Brisson as dating for purposes of nomenclature only from 1788, and therefore superseded by *Arenaria* of Linneus, which dates from 1767.

Objections to the use of *Morinella.*

My fourth modification provides for the rejection of *Morinella,* on the ground that if it be used as a generic term, the type of that genus must be the Dotterel, the *Charadrius morinellus* of Linneus. It may, however, be objected that there is also a *Tringa morinella* of Linneus, which refers to the Turnstone. The Dotterel and the Turnstone were well known to the great Swedish naturalist, and appear not only in the 'Fauna Suecica' but also in the 10th edition of the 'Systema Naturæ' as *Charadrius morinellus* and *Tringa interpres* respectively. The *Tringa morinella* of Linneus does not appear until the 12th edition, and was founded upon the *Morinellus marinus* of Catesby and the *Arenaria cinerea* of Brisson, which Linneus, following Brisson, imagined to be a second species of Turnstone, though there cannot be any doubt that the bird described by Brisson under that name was a young Turnstone in first plumage with no chestnut on the back; whereas the *Arenaria arenaria* of Brisson and the *Tringa interpres* of Linneus were founded on examples in full breeding-dress, of which Brisson says that Edwards's plate No. 141 is "une figure assez exacte." Baird, Brewer, and Ridgway (Water-Birds N. Amer. i. p. 119) appear to say that these plumages are reversed in Alaska! If there be not some extraordinary blunder in their descriptions the Alaska birds must be a distinct species, but probably they have mistaken young in first plumage for adults.

Strepsilas, a name which has been used for the genus which contains the Turnstones by an overwhelming majority of authors, thus remains master of the field—a conclusion devoutly to be desired by all ornithologists who wish to avoid useless change, producing endless confusion.

The Common Turnstone (*Strepsilas interpres*), being the only species known to Linneus, Brisson, or Illiger, becomes of necessity the type.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Strepsilas.	ARCTIC REGION.	*Aphriza.*
INTERPRES	*Circumpolar.*	
MELANOCEPHALUS	*Alaskan Coast.*	VIRGATUS.

Climatic distribution.

The genus *Strepsilas* must be regarded as Arctic, though one of the three species which it contains occasionally breeds in the Temperate Region. The distribution of these birds is as follows:—

Arctic America	2
Arctic America and Arctic and Temperate Eurasia . .	1
Species of *Strepsilas*	— 3

Emigrations.

The fact that *S. interpres* is still found in Greenland, Iceland, and Spitzbergen is suggestive of the isolation of its ancestors in the Atlantic. The Californian coast being the winter-quarters of *S. melanocephalus,* is a reason for supposing that its ancestors escaped from the Polar Basin through Behring Straits, and were isolated on the American shores of the North Pacific; whilst *S. virgatus,* wintering on the west coast of South America, is probably the descendant of the Turnstones which were isolated during the Post-Pliocene Glacial Period on the American shores of the South Pacific. It has the long narrow wings of *S. interpres,* which might be expected of a species which crossed the tropics on migration.

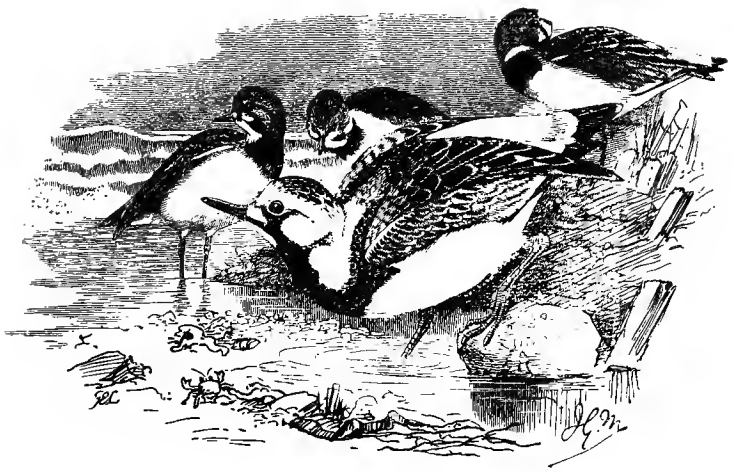
The Turnstones breed on the coasts in the arctic and semi-arctic regions, both in the Old and New Worlds. In winter they are found on the coasts of every other part of the globe.

KEY TO THE SPECIES.

Only three species are known, which may be diagnosed as follows:—

Chin and centre of upper throat brown or streaked with brown; not pure white.

- **interpres** . . . . — Lower back pure white.
- **melanocephalus** . — Lower back pure white.
- **virgatus** . . . . — Bill vaulted at the tip like that of a Plover.



STREPSILAS INTERPRES.

COMMON TURNSTONE.

Diagnosis. STREPSILAS mento et medio gulæ albo immaculato.

Variations. ALTHOUGH the Turnstone is perhaps the most cosmopolitan of all birds, and varies very much with age, sex, and season, it is not known to be subject to any local variation.

Synonymy.

Tringa interpres, *Linneus, Syst. Nat.* i. p. 148 (1758); *Linn. Syst. Nat.* i. p. 248 (1766).
Arenaria arenaria, } *Brisson, Orn.* v. pp. 132, 137 (1760).
Arenaria cinerea, }
Tringa morinella, *Linneus, Syst. Nat.* i. p. 249 (1766).
Tringa hudsonica, *Müller, Natursyst. Suppl.* p. 114 (1776).
Morinella collaris, *Meyer, Taschenb.* ii. p. 383 (1810).
Strepsilas interpres (*Linn.*), *Illiger, Prodr.* p. 263 (1811).
Strepsilas collaris (*Meyer*), *Temminck, Man. d'Orn.* p. 349 (1815).
Arenaria interpres (*Linn.*), *Vieillot, N. Dict. d'Hist. Nat.* xxxiv. p. 345 (1819).
Tringa oahuensis, *Bloxham, Byron's Voyage of the 'Blonde,' App.* p. 251 (1826).
Charadrius cinclus, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 148 (1826).
Cinclus morinellus (*Linn.*), *Gray, List Gen. and Subgen. B.* p. 85 (1841).
Cinclus interpres (*Linn.*), *Gray, Genera of Birds,* iii. p. 549 (1846).
Charadrius interpres (*Linn.*), *Seebohm, British Birds,* iii. p. 12 (1885).

Literature.

PLATES.—Daub. Pl. Enl. nos. 856, 857; Gould, Birds Gt. Brit. iv. pl. 50; Dresser, Birds of Europe, vii. pl. 532.

HABITS.—Seebohm, British Birds, iii. p. 12.

EGGS.—Seebohm, British Birds, pl. 24. figs. 1, 3.

Specific characters.

The Common Turnstone may be recognized at all ages and seasons by its *pure white chin and throat*. From the Surf-bird its white lower back is the best distinction. In breeding-dress the amount of white on the head and the chestnut on the back prevent it from being confounded with *S. melanocephalus*. In winter plumage the brown chin and throat of the latter species prevents confusion, but in immature dress the two species resemble each other very closely. The Black-headed Turnstone in immature plumage has the wing-coverts and innermost secondaries narrowly margined with white instead of broadly margined with buff, and the chin and throat are never pure white.

Geographical distribution.

The Turnstone is almost exclusively a shore-bird, but on migration it is habitually seen on many of the inland routes or fly-lines. It is a circumpolar species, breeding on the shores of the Arctic Ocean in Europe and Asia, as well as in America. There is no doubt that on the Scandinavian coast it breeds as far south as the Danish islands in the Baltic; and it is said to breed on the Azores, the Canaries, the islands of the Red Sea, the Balearic Islands, Robben Island on the coast of South Africa, the coast of South-west Texas, Lord Howe's Island between Australia and New Zealand, on the island of Jamaica, and in many other localities; but in none of these alleged instances is the evidence conclusive. It is a winter visitor to almost every coast of the islands or continents south of the Tropic of Cancer. A few winter on the Bermudas (Reid, Zoologist, 1877, p. 475); some on the Galapagos Archipelago (Dr. Habel, Trans. Zool. Soc. ix. p. 502); the 'Challenger' Expedition obtained it on the Admiralty Islands; and it has been recorded from every important group of the Pacific Islands, New Zealand, Australia, New Guinea, most of the islands of the Malay Archipelago, and almost from every part of the coasts of Europe, Asia, Africa, Madagascar, and North and South America. It is not exclusively a shore-bird, but has also occurred in Central Africa and Central Asia. Probably no other bird is so completely cosmopolitan in its range.

STREPSILAS MELANOCEPHALUS.

BLACK TURNSTONE.

Diagnosis.

STREPSILAS mento gulâque aut nigris (æst.), aut albis fusco striatis (hiem.): dorso postico albo.

Variations. No local races of this species are known.

Synonymy. Strepsilas melanocephalus, *Vigors, Zool. Journ.* iv. p. 356 (1829).
Strepsilas interpres melanocephalus (*Vigors*), *Coues, Check-list,* 2nd ed. p. 98 (1882).
Charadrius melanocephalus (*Vigors*), *Seebohm, British Birds,* iii. p. 12 (1885).
Arenaria melanocephala (*Vigors*), *Stejneger, Orn. Expl. Comm. Isl. & Kamtschatka,* p. 102 (1885).

Literature. PLATES.—Baird, Cassin, & Lawrence, Birds N. Amer. pl. vii.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 124.
EGGS.—Described by Brewer on page 126 of the above-mentioned volume.

Specific characters. The Black Turnstone or Black-headed Turnstone is perfectly distinct from the Common Turnstone, and might be placed in a different genus from that bird by those ornithologists who regard the discovery of a so-called structural difference as an excuse for cumbering the literature with useless synonyms. The Black-headed Turnstone has a broader wing than its ally, the distance from the carpal joint to the tip of the first secondary being about equal to that from the tip of the first secondary to the tip of the first primary, whilst in the Common Turnstone the latter measurement is half an inch or more shorter than the former. It may, however, be best diagnosed as *lower back white, chin and throat never pure white.*

Geographical distribution. The Black-headed Turnstone is exclusively confined to the Pacific coast of North America, breeding on the coast of Alaska and the adjacent islands, and wintering on the coast of California. The correlation of so limited a range of migration with so limited a development of the primaries as compared with that of the secondaries cannot be regarded as accidental.

STREPSILAS VIRGATUS.

PLOVER-BILLED TURNSTONE.

Diagnosis. STREPSILAS dorso postico brunneo.

Variations. No local races of this species are known.

Synonymy.

Tringa virgata, } *Gmelin, Syst. Nat.* i. p. 674 (1788).
Tringa borealis, }
Aphriza townsendi, *Audubon, Syn. Birds N. Amer.* p. 226 (1839).
Charadrius winterfeldti, *Tschudi, Wiegm. Arch. f. Naturg.* 1843, p. 388.
Aphriza virgata (*Gmel.*), *Gray, Genera of Birds*, iii. p. 548 (1846).
Strepsilas borealis (*Gmel.*), *Gay, Hist. Chile, Zool.* i. p. 408 (1847).
Aphriza borealis (*Gmel.*), *Bonap. Compt. Rend.* xliii. p. 420 (1856).
Strepsilas virgata (*Gmel.*), *Schlegel, Mus. Pays-Bas, Cursores*, p. 45 (1865).

Literature.

Plates.—Gray, Genera of Birds, iii. pl. cxlvii.; Audubon, Birds Am. v. pl. 322.
Habits.—Nelson, Cruise of the 'Corwin,' p. 83.
Eggs.—Unknown.

Specific characters.

The Surf-bird or Plover-billed Turnstone may be recognized either by its *brown lower back*, or by its *bill with a terminal vault*, like that of a Plover.

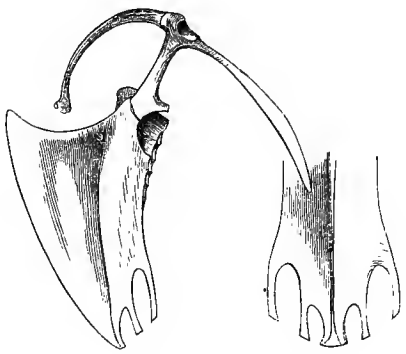
Geographical distribution.

It is not known where the Plover-billed Turnstone breeds, but it has occurred in various localities on the Pacific coast of America:—Norton Sound (lat. 63°) and Sitka (lat. 57°), in Alaska; Vancouver Island and the coast of British Columbia; California; Peru, Bolivia, and Chili. It may almost be taken for granted that it breeds in the two first-named localities, and winters in the three last named.

Alleged occurrence on the Sandwich Islands.

The alleged occurrence of the Surf-bird "on the Sandwich Islands, and others of the Pacific Ocean" (Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 127), is probably a myth. Latham originally described the species from "Sandwich Sound" and "King George's Sound" (Lath. Gen. Syn. Birds, iii. pt. i. pp. 180, 181) under the names of "Streaked Sandpiper" (summer plumage) and "Boreal Sandpiper" (winter plumage). The next bird but one described in Latham's 'General Synopsis' is also said to inhabit King George's Sound, and is called the "Variegated Sandpiper." Three years later, in 1788, Gmelin named these birds respectively *Tringa virgata*, *T. borealis*, and *T. variegata*. These names were adopted by our English ornithologist in 1790 (Latham, Index Orn. ii. p. 735), but the locality of the latter is altered from "Inhabits King George's Sound" to "Habitat in sinu Nootka." It is therefore not unreasonable to infer that Sandwich Sound and King George's Sound are parts of Nootka Sound, which separates the island of Nootka from Vancouver Island, where the Surf-bird was found by John Keast Lord ('The Naturalist in Vancouver Island and British Columbia,' ii. p. 298), and by Robert Brown (Ibis, 1868, p. 424), as well as by Capt. Prevost (Sclater, Proc. Zool. Soc. 1859, p. 236) and other travellers. The fact that Latham called the bird from King George's Sound the "Boreal Sandpiper" is corroborative evidence in favour of a northern locality.

CHAPTER XXVII.



Sternum of *Tringa subarquata*.

Genus TRINGA.

Diagnosis of genus.

CHARADRIINÆ primariarum primâ quam quarta valdè longiore: longitudinis differentiâ inter primariam longissimam et primariam brevissimam quam rostri longitudo valdè maximâ, narium aperturâ ultra partem quartam rostri a basi haud extensâ.

Generic characters.

THE cleft-toed Sandpipers are very easily diagnosed. The characters of *toes cleft to the base* and *difference in length between the shortest and longest primary much more than the length of the bill*, exclude every other genus in the family except *Strepsilas* and *Phegornis*. From the former they may be diagnosed by the character *nasal aperture situated within the basal fourth of the bill*, and from the latter by the fact that the *first primary is much longer than the fourth*.

Synonymy of the Genus TRINGA.

	Type.
Tringa, *Linneus, Syst. Nat.* i. p. 148 (1758); *Linn. Syst. Nat.* i. p. 247 (1766) .	No type.
Arenaria, *Bechstein, Orn. Taschenb.* ii. p. 462 *a* (1803, *nec Brisson*)	T. arenaria.
Calidris, *Illiger, Prodromus*, p. 249 (1811)	T. arenaria.
Erolia, *Vieillot, Analyse d'une Nouv. Orn.* p. 55 (1816)	T. subarquata.
Pelidna, *Cuvier, Règne Anim.* i. p. 490 (1817)	T. alpina.

	Type.
Eurhynorhynchus, *Nilsson, Orn. Suec.* ii. p. 29 (1821)	T. pygmæa.
Falcinellus, *Cuvier, Règne Anim.* i. p. 527 (1829)	T. subarquata.
Leimonites, *Kaup, Natürl. Syst.* p. 37 (1829)	T. temmincki.
Ancylocheilus, *Kaup, Natürl. Syst.* p. 50 (1829)	T. subarquata.
Actodromas, *Kaup, Natürl. Syst.* p. 55 (1829)	T. minuta.
Canutus, *Brehm, Vög. Deutschl.* p. 653 (1831)	T. canutus.
Schœniclus, *Gray, List Birds Brit. Mus.* iii. p. 104 (1844)	T. alpina.
Tringites, *Cabanis, Journ. Orn.* 1856, p. 418	T. rufescens.
Arquatella, *Baird, B. N. Amer.* p. 717 (1858)	T. maritima.
Delopygia, *Coues, Proc. Ac. Nat. Sc. Philad.* 1861, p. 190	T. bonaparti.
Heteropygia, *Coues, Proc. Ac. Nat. Sc. Philad.* 1861, p. 191	T. bonaparti.
Limnocinclus, *Gould, Handb. B. Austr.* ii. p. 254 (1865)	T. acuminata.

Rostral system unnatural.

The genus *Tringa* has been split up most unmercifully by modern ornithologists into pseudogenera, founded, for the most part, on slight differences in the shape of the bill. It would be waste of time to point out the characters which are supposed to distinguish these artificial little genera. There can scarcely be any doubt that the rostral system when carried out "regardless of consequences" is an unnatural one, and misrepresents in many cases the genetic relationship of birds. The following attempt to arrange the genus *Tringa* in convenient groups which shall at the same time be natural is based principally upon colour, those parts being chosen which do not vary with age, sex, or season, and which are presumably characters which date far back.

Natural subgenera.

A. Upper tail-coverts white, or white barred or streaked with black.
B. Last secondaries (next to the tertials) white or nearly so.
C. Inner web of primaries mottled with black.
D. Upper tail-coverts the same colour or darker than the rump; all the secondaries grey with a more or less distinct white margin.

Determination of the type.

The type of the genus *Tringa* is one of those puzzles which give ornithologists opportunities of differing in opinion. Linneus, who knew nothing about types in the sense in which that much-abused word is used by modern genus-makers, placed the Ruff at the head of his genus *Tringa*; but as that species is not a *Tringa* at all but a *Totanus*, it is impossible to accept it as the type. The type of Brisson's genus *Tringa* is also a *Totanus*, the *Tringa tringa* of Brisson being a synonym of *Totanus ochropus*, the Green Sandpiper. The next ornithologist who subdivided the genus *Tringa* was Bechstein, who removed the Sanderling to a genus by itself, adopted Brisson's genus *Limosa* for the Godwits and some of the white-rumped Sandpipers, and changed the name of the genus to *Totanus*; but Bechstein still left the Ruff at the head of his restricted genus *Tringa*. Thirteen years later Vieillot made a genus for the Curlew-Sandpiper, and made the Maubèche or Knot (*Tringa canutus*) the type of the genus *Tringa*.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).

Tringa.	ARCTIC REGION.	*Actodromas.*
ALPINA CANUTUS ARENARIA	*Circumpolar.*	
MARITIMA	*Eurasia and East America.*	
	Eurasian.	PLATYRHYNCHA.
	European and West Asiatic.	MINUTA.
SUBARQUATA CRASSIROSTRIS	*Siberian.*	
	East Siberian.	TEMMINCKI. RUFICOLLIS. SUBMINUTA. ACUMINATA.
PTILOCNEMIS	*Islands in Behring Sea.*	
	Islands north of Behring Straits.	PYGMÆA.
COUESI	*Alaska.*	
	Alaska and Lake Region.	BAIRDI.
RUFESCENS	*Alaska to Labrador.*	MINUTILLA.
	Alaska to Greenland.	PECTORALIS.
BONAPARTI	*Hudson's Bay Terr. and Greenland.*	

Climatic distribution.

The genus *Tringa* is Arctic and Circumpolar. The distribution during the breeding-season of the 20 species and subspecies of which it consists is as follows :—

Arctic America	8
Arctic America and Eurasia	4
Arctic Eurasia	8
Species and subspecies of *Tringa*	— 20

The geographical distribution of the *Tringæ* is cosmopolitan, but during the breeding-season they are for the most part Arctic birds. One or two species breed as far north as land is known to extend; all the species are found breeding within the Arctic Circle; the breeding-range of very few extends to the sub-arctic regions, and no species breeds in the tropics.

Many of the species must be regarded as post-glacial, that is to say, that during the warm period which followed the Post-Pliocene Glacial Period they became circumpolar; and some are partially, others wholly, differentiated in consequence of the partial or complete isolation produced by the comparatively recent accumulation of ice at the North Pole.

Our first step must therefore be to ascertain these post-glacial species.

Palæarctic Species.	*Nearctic Analogue.*
T. subarquata.	T. bonaparti.
T. maritima.	T. couesi. / T. ptilocnemis.
T. acuminata.	T. pectoralis.
T. platyrhyncha.	T. bairdi.
T. subminuta.	T. minutilla.

Post-glacial species.

Our subgeneric group A contains four species, which probably represent the descendants of the party of Tringas which emigrated from the Polar Basin down Baffin's Bay, and were during the Post-Pliocene Glacial Epoch isolated and differentiated on the American continent into the Knot (*T. canutus*) and Bonaparte's Sandpiper (*T. bonaparti*). Each of these species appears to have extended its range across Behring Straits during the succeeding warm period, the western emigrants of the Knot afterwards becoming *T. crassirostris*, which breeds in East Siberia, and those of Bonaparte's Sandpiper afterwards becoming *T. subarquata*, which breeds somewhere north of the Lena.

Emigrants along Atlantic coast of America.

To the three species which form group B may unhesitatingly be assigned the Atlantic coast of Europe as the route which their ancestors took when they escaped from the Polar ice. Not only do they all breed in Iceland, but they are the only species of the genus *Tringa* which do. Judging from their present winter-quarters, we may assume that *T. arenaria* was differentiated in South Africa, *T. alpina* in the basin of the Mediterranean (which probably accounts for the remarkable fact that it has been known to breed in Spain), whilst *T. maritima* probably never left the outskirts of the glaciers. In post-glacial times all three species became circumpolar. *T. arenaria* appears to have maintained its homogeneous characters; *T. alpina* shows some signs of differentiation; whilst *T. maritima* has become more differentiated, into *T. ptilocnemis* in the Behring Sea, and into *T. couesi* in Alaska.

Atlantic coast of Europe.

Subgeneric group C, consisting of only one species, is easily disposed of. The fact that *T. rufescens* is very abundant in Alaska, but "its presence on the Atlantic coast is regarded as an infrequent event," suggests at once the Pacific coast of America as the route of the emigrations of its ancestors.

Pacific coast of America.

Subgeneric group D contains by far the greatest number of species, and consequently requires for their differentiation the widest space and the greatest number of opportunities of isolation. The conformation of the land in Southern Asia is precisely what is required, and we may consequently accept the Pacific coast of Asia as the route of the emigrations of their ancestors. Again, assuming the locality where they are most abundant in winter as the most probable area of their isolation and differentiation, we arrive at the following

Pacific coast of Asia.

conclusion:—*T. acuminata* was differentiated in Australia and in post-glacial times despatched a colony across Behring Straits, which in process of time became *T. pectoralis*, which is "one of the commonest of the waders" at Point Barrow (Seebohm, Trans. Norf. & Norw. Nat. Soc. iv. p 307). *T. pygmæa* was isolated somewhere on the outskirts of the ice, possibly in the south island of Japan. *T. ruficollis* was isolated on the islands of the Malay Archipelago, and *T. subminuta* in Burma or Ceylon, a colony of the latter species crossing Behring Straits after the return north and becoming *T. minutilla*. *T. minuta* was doubtless isolated in India, and *T. platyrhyncha* in the Persian Gulf, a colony of the latter species subsequently crossing Behring Straits and becoming *T. bairdi*. Finally, *T. temmincki* was isolated in the valley of the Nile.

KEY TO THE SPECIES.

The species composing this genus are so nearly allied that it almost amounts to hair-splitting to divide them even subgenerically. It is, however, convenient to divide them into two groups to simplify the key to the species, and it seems possible that this sub-division may have some historical significance.

The first group consists of those species which have as much or more white than brown or grey on either the upper tail-coverts or the last half-dozen secondaries (true secondaries, not tertials):—

Wing 7 inches or more . .	**crassirostris** . . .	Bill 1 inch or more from frontal feathers. More white than brown on upper tail-coverts.
Wing 6·2 to 6·8 inch . .	**canutus**	
	subarquata . . .	
	bonaparti	Bill ·9 inch or less from frontal feathers. More white than brown on upper tail-coverts.
	alpina.	
	maritima	Rump and upper tail-coverts nearly black.
	arenaria . . .	Hind toe absent.

The second group consists of those species which have very little white, either on the upper tail-coverts or secondaries:—

- Wing more than 4 inches from carpal joint.
  - **rufescens** . . . . — Inner web of primaries mottled with black.
  - **acuminata.**
  - Feet and legs black . . .
    - **bairdi.**
    - **platyrhyncha** . . — Bill much longer than the tarsus.
    - **pygmæa** . . . . — Bill twice as broad near the end as at the base.
    - **minuta.**
    - **subminuta.**
- Outer tail-feathers pure white. — **temmincki.**

All the characters enumerated in both groups are believed to apply to male and female, old and young, in summer and winter plumage.

TRINGA SUBARQUATA.

CURLEW SANDPIPER.

Diagnosis.

Tringa supracaudalibus albis (hiem.), aut albis nigricante fasciatis, sæpe castaneo notatis (æstiv.): rostro valdè decurvato.

Variations.

No local races of this species are known.

Synonymy.

Scolopax subarquata, *Güldenstädt, Nov. Comm. Petrop.* xix. p. 471 (1775).
Numenius pygmæus, *Latham, Gen. Syn. Suppl.* i. p. 291 (1787).
Scolopax africana, Scolopax pygmæa (*Lath.*), *Gmelin, Syst. Nat.* i. p. 655 (1788).
Numenius africanus (*Gmel.*), *Latham, Index Orn.* ii. p. 712 (1790).
Scolopax dethardingii, *Siemssen, Handb. Mecklenb. Land- u. Wasservögel,* p. 169 (1794).
Numenius subarquata (*Güld.*), *Bechstein, Orn. Taschenb.* ii. p. 276 (1803).
Numenius ferrugineus, *Meyer, Taschenb.* ii. p. 356 (1810).

Tringa subarquata (*Güld.*), *Temminck, Man. d'Orn.* p. 393 (1815).
Tringa pygmæa (*Lath.*), *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 30 (1816).
Erolia variegata, *Vieillot, Analyse,* p. 69 (1816).
Falcinellus pygmæus (*Lath.*), *Cuvier, Règn. An.* i. p. 486 (1817).
Trynga falcinella, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 188 (1826).
Ancylocheilus subarquatus (*Güld.*), *Kaup, Natürl. Syst.* p. 50 (1829).
Falcinellus cursorius, *Temminck, Pl. Col.* no. 510 (1830).
Pelidna subarquata (*Güld.*), *Brehm, Vög. Deutschl.* p. 657 (1831).
Tringa (Pelidna) chinensis, *Gray, Zool. Miscell.* p. 2 (1831).
Ærolia varia, *Vieillot, Gal. des Ois.* ii. p. 89 (1834).
Falcinellus cuvieri, *Bonap. Comp. List B. Eur. & N. Amer.* p. 50 (1838).
Schœniclus subarquatus (*Güld.*), *Gray, List Birds Brit. Mus.* iii. p. 105 (1844).
Tringa ferruginea, *Brünnich, fide Coues & Co. Check-list N. Amer. Birds,* p. 152 (1886).

Literature.

PLATES.—Daub. Pl. Enl. no. 851; Temminck, Pl. Col. no. 510; Gould, Birds Gt. Brit. iv. pl. 68; Dresser, Birds of Europe, viii. pl. 553.
HABITS.—Seebohm, British Birds, iii. p. 180.
EGGS.—Unknown.

Specific characters.

The Curlew Sandpiper is the only *Tringa* with *white on the upper tail-coverts* which has *a decurved bill.*

Its seasonal changes of plumage precisely resemble those of the Knot, to which it is obviously very closely allied.

Breeding-grounds.

The breeding-grounds of the Curlew Sandpiper are as yet undiscovered. The few stray examples which have been obtained on the shores of the Arctic Ocean during summer are probably very old birds which have ceased to breed, or very young birds which have not begun to breed. It probably breeds on the Liakov Islands, as Dr. Bunge observed small flocks passing through the delta of the Lena on migration during the middle of June (Seebohm, Trans. Norf. & Norw. Nat. Soc. iv. p. 303). The alleged breeding of the Curlew Sandpiper on the Yalmal Peninsula and in Greenland (Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 248) are both admitted to be myths, as is unquestionably the story of its nest and eggs having been discovered in Scotland (Gray, Birds of the West of Scotland, p. 318); and the statement of Sabanaeff that it may breed in the Ural Mountains must be referred to the same category (Harvie Brown, Proc. Nat. Hist. Soc. Glasgow, 1877, p. 308).

Geographical distribution.

The Curlew Sandpiper is not an uncommon bird on the coasts of the British Islands during the period of its autumn migration and is occasionally seen in spring. It is doubtfully recorded from Iceland and Greenland, but inasmuch as it occurs as an accidental straggler on the Atlantic coast of North America, it is most probable that these records are true. Both Henke and Harvie Brown obtained it in summer at Archangel; I found it both in the valleys of the Petchora and the Yenesay. Middendorff obtained it on the

Taimyr Peninsula, and it was observed by the Vega Expedition near Behring Straits. It passes along the European coasts, the great inland lines of migration, and along the coasts of China, but it has not been recorded from Kamtschatka or Japan. A few remain to winter in the basin of the Mediterranean, but the majority pass on to Africa, throughout which continent they are found in suitable localities, both on the coast and inland. Böhm obtained it in Central Africa, west of Lake Tanganyika (Journ. Orn. 1885, p. 64). It also winters on the Mekran coast, in India, Ceylon, the Andaman Islands, Burma, the islands of the Malay Archipelago, and in Australia. In the arctic regions of the American continent it is represented by Bonaparte's Sandpiper, a perfectly distinct, though nearly allied, species.

TRINGA CRASSIROSTRIS.

JAPANESE KNOT.

Diagnosis.

TRINGA supracaudalibus aut albis (hiem.), aut albis nigrescente notatis (æstiv.) : rostro recto, longo (40 ad 46 millim.).

Variations.

No local races of this species are known.

Synonymy.

Tringa crassirostris, *Temminck & Schlegel, Fauna Japon., Aves,* p. 107 (1847).
Schœniclus magnus, *Gould, Proc. Zool. Soc.* 1848, p. 39.
Tringa magna (*Gould*), *Bonap. Compt. Rend.* xliii. p. 596 (1856).
Tringa tenuirostris (*Horsfield*), *apud Swinhoe, Gould, &c.*

Literature.

PLATES.—Temm. & Schlegel, Fauna Japon., Aves, pl. 64; Gould, Birds of Australia, vi. pl. 33; Harting, Proc. Zool. Soc. 1874, pl. lxi.
HABITS.—Hume, Stray Feathers, 1873, p. 240.
EGGS.—Unknown.

Specific characters.

The Japanese Knot is the only *Tringa* with *white on the upper tail-coverts* which has *a straight bill more than an inch and a half long.*

In summer plumage it has no chestnut on the underparts, and the chestnut on the upper parts is principally confined to the scapulars. In winter plumage the two Knots scarcely differ except in size.

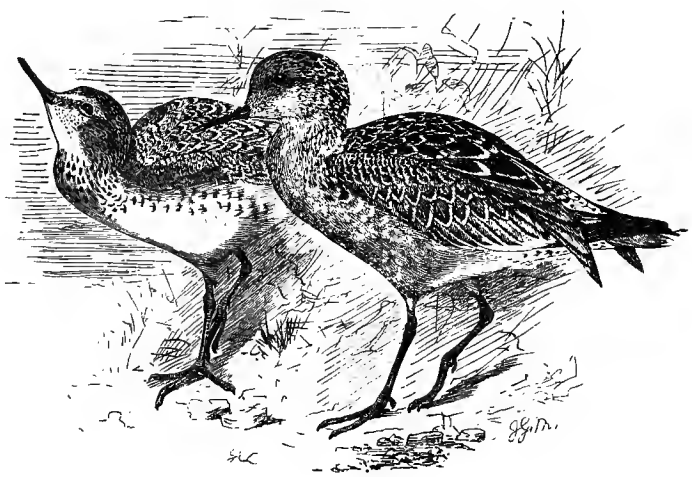
	Wing.	Bill.
Japanese Knot	7·6 to 7·0	1·8 to 1·6
Common Knot	6·8 to 6·2	1·5 to 1·1

The measurements are inches and decimals—the wing from the carpal joint, the bill from the frontal feathers.

Geographical distribution.

The breeding-grounds of the Japanese Knot are unknown, but Middendorff observed it during the whole summer on the southern shores of the Sea of Okhotsk, though he obtained no evidence of its nesting there. It has occurred on migration in the valley of the Ussuri, on the coasts of Japan and China, and on most of the islands of the Malay Archipelago. It winters on the coasts of Australia, has occurred on the Andaman Islands, and in considerable numbers on the coast of Scinde.

It is very closely allied to the Common Knot.



TRINGA CANUTUS.

KNOT.

Diagnosis. TRINGA supracaudalibus albis nigrescente fasciatis sæpe (in ptil. æstiv.) castaneo notatis: rostro recto, quam 40 millim. breviore.

Variations. No local races of this species are known.

Synonymy.

Tringa canutus, *Linneus, Syst. Nat.* i. p. 149 (1758); *Brisson, Orn.* v. p. 258 (1760); *Linn. Syst. Nat.* i. p. 251 (1766).

Tringa calidris,
Tringa calidris nævia,
Tringa calidris grisea,
} *Brisson, Orn.* v. pp. 226, 230, 233 (1760).

Tringa calidris, *Linneus, Syst. Nat.* i. p. 252 (1766, immature plumage).

Tringa islandica, *Linneus, Syst. Nat.* i. pt. ii. *Addenda* (1767, summer plumage).

Tringa australis,
Tringa nævia,
Tringa grisea,
} *Gmelin, Syst. Nat.* i. pp. 679, 681 (1788).

Tringa ferruginea, *Meyer, Taschenb.* ii. p. 395 (1810).
Tringa rufa, *Wilson, Amer. Orn.* vii. p. 43 (1813).
Calidris canutus (*Briss.*), *Cuvier, Règne An.* i. p. 489 (1817).
Calidris islandica (*Linn.*), *Ross, Voy. of Discovery*, ed. 2, ii. App. iv. p. 167 (1819).
Canutus islandicus (*Linn.*), *Brehm, Vög. Deutschl.* p. 654 (1831).
Calidris canutus (*Linn.*), *Gould, B. Eur.* iv. pl. 324 (1837).
Tringa lomatina, *Lichtenstein, Nomencl. Av.* p. 92 (1854).
Tringa cooperi, *Baird, Cassin, & Lawrence, B. N. Amer.* p. 716 (1858).
Heteropygia cooperi (*Baird*), *Coues, Proc. Ac. Nat. Sc. Philad.* 1861, p. 191.
Actodromas cooperi (*Baird*), *Ridgway, Nom. N. Amer. B.* p. 44 (1881).

Literature.

Plates.—Dresser, Birds of Europe, viii. pls. 555, 556; Gould, Birds of Gt. Brit. iv. pl. 65.
Habits.—Seebohm, Brit. Birds, iii. p. 174.
Eggs.—Unknown.

Specific characters.

The Knot has three allies which, like it, have the *ground colour of the upper tail-coverts white*. Two of these, *T. subarquata* and *T. bonaparti*, are much smaller birds, with wings less than $5\frac{1}{2}$ inches from the carpal joint. The distinction between *T. canutus* and *T. crassirostris* has already been pointed out.

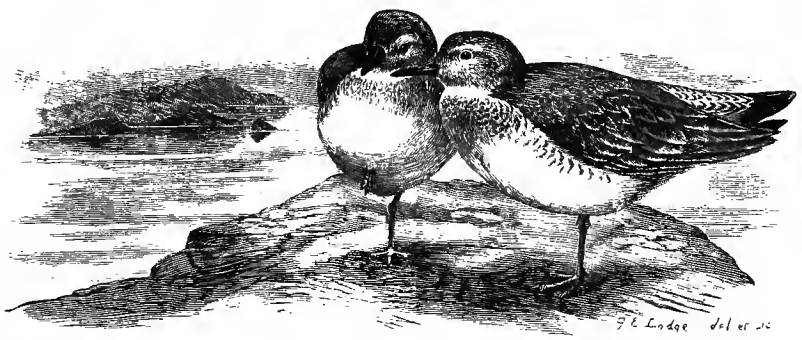
In full breeding-plumage the whole of the underparts are chestnut, and the ground-colour of most of the upper parts, sometimes even of a few of the upper tail-coverts, is also chestnut, but all trace of red disappears in winter.

Geographical distribution.

Scarcely anything is known of the breeding-places of the Knot, and authenticated eggs are entirely unknown in collections. In 1820 Sabine found it breeding in great abundance on Melville Island, about lat. 80°; in 1823 it was observed breeding on Melville Peninsula, about lat. 67°; Richardson (Faun. Bor.-Amer. ii. p. 387) says that it also breeds in Hudson's Bay, as far south as lat. 55°; and on the 9th of July, 1853, a female example was obtained at Cambridge Bay, in lat. 69°, by the surgeon of the 'Enterprise;' but it is not known that eggs obtained on these expeditions are in any collection. In 1876 Capt. Feilden, the naturalist on board the 'Alert,' obtained young in down, as well as their parents, on Grinnell-Land, in lat. $82\frac{1}{2}$°; and Mr. Hart, the naturalist of the 'Discovery,' on the same coast, in lat. $81\frac{3}{4}$°, also secured young in down; but neither of these naturalists procured any eggs. It has also been obtained in Alaska and Greenland. It passes through Iceland on migration, but is not known to breed there. In the arctic regions of the Old World our information is still more meagre. Henke observed it in the delta of the Dwina in summer, but failed to obtain eggs. It has been observed on migration in the valleys of the Kama and the Obb; but Harvie Brown and I saw nothing of it in the delta of the Petchora. It is not recorded from either Spitzbergen or Nova Zembla; Finsch failed to observe it on the Yalmal Peninsula; nor was I any more fortunate in the delta of the Yenesay. Middendorff saw nothing of it on the Taimyr Peninsula, except that he picked up a dead bird in autumn, and shot two birds on the 27th of May. Dybowski only obtained one example, near Lake Baikal, which had been

shot on the 24th of August. Middendorff saw flocks of this bird on the 7th of July at the mouth of the Uda, in the Sea of Okhotsk (about lat. 55°); and Schrenck obtained two examples on the 29th of August at the mouth of the Amoor, a few miles to the east of the latter locality.

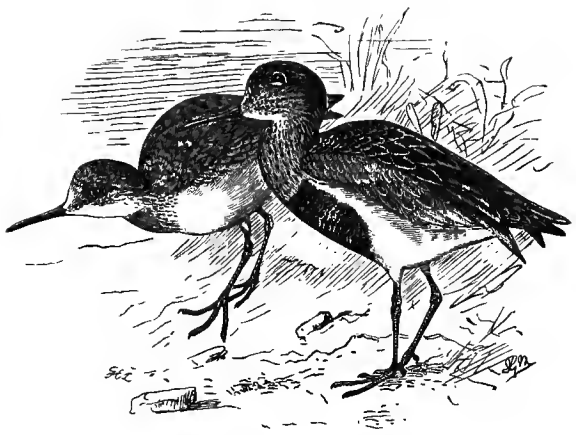
The alleged egg of the Knot obtained by Greely near Fort Conger (Auk, 1885, p. 313) cannot be accepted as authentic. It exactly resembles in size and colour eggs of *Ereunetes pusillus*. It was most likely an egg of that species, though it is not impossible that it may have been the egg of the Curlew Sandpiper or of the Grey Phalarope, either of which birds might, in breeding-plumage, be mistaken by an inexperienced observer for the Knot. I have an egg in my collection which I believe to be that of a Knot. It was sent in 1875 with the bird to Copenhagen by Coloniforsteher Bolbroe from Disco, in Greenland. It is unfortunately indistinguishable from a very handsome Snipe's egg, more boldly blotched and paler in ground-colour than usual. The Snipe has never been known to breed so far north as lat. 71°, and it is quite possible that the eggs of the Knot may be indistinguishable from those of the Snipe, but it does not seem possible that they are indistinguishable from those of the Semipalmated Stint.



The Knot is very rare in the Mediterranean during winter, but in spring and autumn it passes in considerable numbers to and from its winter-quarters on the west coast of Africa, where it occurs as far south as Damara-Land. North of the French coast the stream of migration divides, one route taking the west coast of England and Scotland through the Faroes to Iceland and Greenland; but the main route following the Dutch and German coasts through Heligoland or the east coast of Great Britain, through the Orkneys and the Shetlands, to the North Cape. It has only occurred once or twice in India, and not at all in Ceylon or Burma; but on the west coast of the Pacific it passes Japan and China on migration, to winter in Australia and New Zealand. It does not appear to be recorded from the Pacific coast of America; but it passes in considerable numbers on migration on the Atlantic coast of that continent, as well as along some of the well-known inland fly-lines, and has been obtained in winter as far south as Brazil.

Nearest allies.

The Knot is a very close ally of the Japanese Knot, and must be a very near connection of the Curlew Sandpiper.



TRINGA ALPINA.

DUNLIN.

Diagnosis. TRINGA secundariis internis (septimâ, octavâ nonâque) pro majore parte albis: supracaudalibus centralibus vix albo notatis: halluce parvo: pedibus nigris.

Variations. EXAMPLES from Eastern Asia and America are on an average slightly larger than those from Europe and Western Asia, and may be regarded as subspecifically distinct.

Synonymy.

Tringa alpina, *Linneus, Syst. Nat.* i. p. 149 (1758); *Linn. Syst. Nat.* i. p. 249 (1766).
Tringa cinclus,
Tringa cinclus torquatus,
Scolopax gallinago anglicana,
} *Brisson, Orn.* v. pp. 211, 216, 309 (1760).
Tringa cinclus, *Linneus, Syst. Nat.* i. p. 251 (1766, winter plumage).
Scolopax pusilla, *Gmelin, Syst. Nat.* i. p. 663 (1788).
Numenius variabilis, *Bechstein, Naturg. Deutschl.* iii. p. 141 (1809).
Tringa variabilis (*Bechst.*), *Meyer, Taschenb.* ii. p. 397 (1810).
Pelidna cinclus (*Briss.*), *Cuvier, Règne An.* i. p. 490 (1817).
Tringa schinzii, *Brehm, Beitr. Vogelk.* iii. p. 355 (1822).
Pelidna variabilis (*Bechst.*), *Stephens, Shaw's Gen. Zool.* xii. pt. i. p. 98 (1824).
Scolopax alpina (*Linn.*), *Pallas, Zoogr. Rosso-Asiat.* ii. p. 176 (1826).
Schœniclus cinclus (*Briss.*), *Gray, List Birds Brit. Mus.* iii. p. 104 (1844).
Tringa cinclus minor, *Schlegel, Rev. Crit.* p. 89 (1844).

Literature.

PLATES.—Daub. Pl. Enl. nos. 851, 852; Gould, Birds Gt. Brit. iv. pls. 69, 70; Dresser, Birds of Europe, viii. pl. 548.

HABITS.—Seebohm, British Birds, iii. p. 184.

EGGS.—Seebohm, British Birds, pl. 31. figs. 1, 2.

Specific characters.

The Dunlin belongs to the section of the genus *Tringa* which has *a great deal of white on the seventh, eighth, and ninth secondaries* (next the tertials), but *little or none on the central upper tail-coverts.* The only other species in the section are *T. arenaria* and *T. maritima* (the latter including its two subspecific allies). From the former it may easily be distinguished by its *hind toe*, and from the latter by its *black legs.*

Geographical distribution.

The Dunlin is probably the only species of *Tringa* which breeds in the British Islands. It is a regular summer visitor to the Orkney and Shetland Islands, to the Outer Hebrides, and to the West of Scotland; but in England and Ireland it is principally known as a winter visitor, though a few pairs are said still to breed on the Northumberland moors, the mountains of the Lake district, the Cheshire marshes, the Welsh mountains, the Cornish moors, and the Irish bogs.

The Dunlin is a circumpolar bird, breeding throughout the arctic regions of both continents—in Asia up to lat. 74°, but in America probably not so far north. It breeds in Greenland, on Iceland, and the Faroes, and in suitable localities throughout Scandinavia, Denmark, Finland, and the Baltic Provinces. An isolated instance is on record of its having bred in Spain; and I have an egg in my collection out of a clutch of four from which the bird was shot by Mr. Abel Chapman in the marshes of the Guadalquivir. It winters in the basin of the Mediterranean, in Spain and Portugal, and in North Africa; on the west coast it has not been found further south than the Canaries, but on the east coast it is said to cross the line to Zanzibar. On migration it passes along the valleys of the Kama and the Volga, and through Turkestan, to winter on the southern shores of the Caspian and the Mekran coast. I did not meet with it in the valley of the Yenesay until lat. 69°; Dybowski did not obtain it near Lake Baikal, neither has it occurred in the valley of the Amoor except near the coast. It passes on migration along the east coast of Siberia, visiting Japan and North China, and winters in South China, Formosa, Borneo, and Java. It has not occurred in Burma, and is only a rare visitor to the coasts of North India. On the American continent it migrates along both coasts, and winters in the Southern States and in the West Indies.

It is somewhat remarkable that a bird which breeds so far north should seldom if ever winter in the southern hemisphere; but it must be remembered that the breeding-range of no other *Tringa* extends so far south.

Nearest allies.

It is the only *Tringa* which has a black belly, but this peculiarity is confined to the breeding-plumage. It is probably nearest allied to *Tringa maritima ptilocnemis*, which has somewhat obscurely developed dark patches on the breast in breeding-plumage.

TRINGA ALPINA PACIFICA.

PACIFIC DUNLIN.

TRINGA ALPINA magnitudine paulò majore. Diagnosis.

THE Pacific Dunlin completely intergrades with its European ally. Variations.

Tringa alpina, *var.* americana, *Baird, Cassin, & Lawrence, Birds N. Amer.* p. 719 (1858). Synonymy.
Pelidna pacifica, *Coues, Proc. Ac. Nat. Sc. Philad.* 1861, p. 189.
Pelidna alpina americana (*Cassin*), *Ridgway, Proc. U. States Nat. Mus.* 1881, p. 200.
Tringa alpina pacifica (*Coues*), *Coues & Co. Check-list N. Amer. Birds,* p. 152 (1886).

PLATES.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 242 (head only). Literature.
HABITS. EGGS. } Described by Brewer (*loc. cit.*) as exactly similar to those of the common form.

This race of the Dunlin appears to have some claim to recognition on the ground that in Europe and Western Asia examples are found in which the wing, measured from the carpal joint, is less than 4·4 inch in length, and the culmen, measured from the skull, less than 1·4 inch (or measured from the frontal feathers less than 1·25); whilst in Asia east of the Yenesay and in America examples are found in which the wing is more than 4·8 and the culmen more than 1·7 inch (or from frontal feathers 1·5). The intergradation is, however, so nearly complete that it is doubtful whether a large enough series would not make the difference disappear. The comparative measurements are as follows:— Subspecific characters.

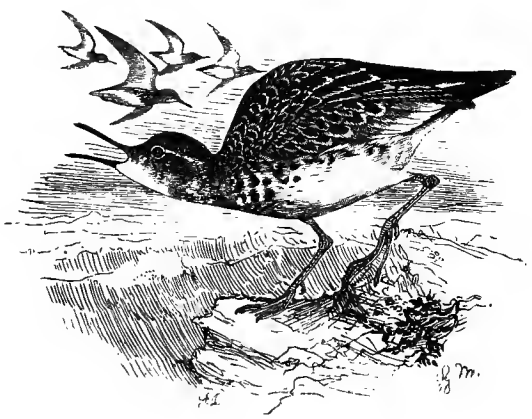
	Europe and Western Asia.		Eastern Asia and America.	
	in.	in.	in.	in.
Length of wing from carpal joint . .	4·1	to 4·8	4·4	to 4·9
Length of bill from skull	1·2	to 1·7	1·4	to 1·8
Length of bill from frontal feathers .	1·0	to 1·5	1·2	to 1·6

It is impossible to say to which form the Yenesay birds belong, as all the examples which I obtained fall within the measurements common to both.

American ornithologists imagine that the Dunlins on their continent are not only larger birds than ours, but have more red and less black on the upper parts, and much fewer dark streaks on the breast in summer plumage. To a limited extent this is true if Alleged difference in colour.

examples from the shores of the Atlantic arc compared with those from the shores of the Pacific. Out of a series of a hundred skins from all parts of its range an example shot in the valley of the Petchora on the 22nd of June shows the most chestnut-red on the back and scapulars. A bird shot in autumn on Formosa, in the process of moulting its primaries, shows the most black on the back and scapulars, and has the longest bill; it is of course in very abraded plumage. As the summer progresses not only do the chestnut margins of the feathers wear off, but the black centres of each feather enlarge in size and intensify in colour. The same change takes place on the feathers of the underparts. The new feathers appear in April—on the throat and upper breast white with narrow central dark streaks, on the lower breast and belly black with narrow white margins. In the course of the summer the white margins of the feathers disappear from the belly and become narrower on the throat, the dark central streaks at the same time enlarging until they become very conspicuous. Two skins from Formosa, one of them the long-billed example already mentioned, have the dark breast-streaks most developed; and two skins from the Kurile Islands, dated the 3rd of May, have them least developed, but not less so than African skins dated the 23rd of March and the 8th of April. The latter, however, are only beginning to acquire their black bellies.

The geographical range of this race of Dunlin has already been given.



TRINGA MARITIMA.

PURPLE SANDPIPER.

Diagnosis. TRINGA secundariis septimâ, octavâ nonâque pro majore parte albis: pedibus pallidis.

In the arctic regions of America this species is subject to considerable variation. Variations.

Tringa maritima, *Brünnich, Orn. Bor.* p. 54 (1764) ; *Gmelin, Syst. Nat.* i. p. 678 (1788). Synonymy.
Tringa nigricans, *Montagu, Trans. Linn. Soc.* iv. p. 40 (1798).
Tringa canadensis, *Latham, Index Orn.* ii. *Suppl.* p. lxv (1801).
Totanus maritimus (*Gmel.*), *Stephens, Shaw's Gen. Zool.* xii. pt. i. p. 146 (1824).
Trynga arquatella, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 190 (1826).
Calidris maritima (*Brünn.*), *Cuvier, Règne An.* i. p. 525 (1829).
Arquatella maritima (*Gmel.*), *Coues, Proc. Ac. Nat. Sci. Philad.* 1861, p. 183.

Plates.—Gould, Birds Gt. Brit. iv. pl. 75 ; Dresser, Birds of Europe, viii. pl. 554. Literature.
Habits.—Seebohm, British Birds, iii. p. 192.
Eggs.—Seebohm, British Birds, pl. 31. figs. 1, 2.

The Purple Sandpiper may be diagnosed by two characters from all its congeners, except the two which are doubtfully distinct from it. These two characters are *rump and upper tail-coverts nearly black, seventh to ninth secondaries nearly all white.* Specific characters.

From the two forms which are probably not more than subspecifically distinct from it this bird differs in the following particulars :— Subspecific characters.

T. maritima.	*T. couesi.*	*T. ptilocnemis.*
Feathers of upper parts in adult summer dress mostly margined with white, a few with chestnut and a few with pale slate-grey.	Feathers of upper parts in adult summer dress mostly margined with chestnut, a few with white and a few with pale slate-grey.	Feathers of upper parts in adult summer dress mostly margined with pale chestnut, a few with white and a few with pale slate-grey.
Breast-feathers in summer slate-grey with white margins.	Margins of breast-feathers in summer more or less buff.	
White margins to all the feathers of the breast.		White margins of feathers absent on sides of breast, thus forming two dark patches.
Outer web of primaries slate-grey, more or less narrowly margined with white on the basal half of the four or five innermost.		Basal half of outer web of the four or five innermost primaries white.
Length of wing 5·4 to 4·8 inch.	Length of wing 5·2 to 4·5 inch.	Length of wing 5·4 to 5·0 inch.

The Purple Sandpiper might almost be regarded as a resident in the Circumpolar Region. It is a summer visitor to North Greenland, Spitzbergen, Nova Zembla, and the Taimyr Peninsula ; but in South Greenland, Iceland, the Faroes, and on the Norwegian Geographical distribution.

coasts it is a resident. It winters in some numbers on the coasts of the British Islands, on the southern shores of the North Sea, and sparingly on the northern shores of the Mediterranean. It probably breeds on both coasts of Behring Straits and across Arctic America; but more or less isolation with its attendant differentiation appears to have taken place in the Behring Sea, so that the birds from this district are regarded as at least subspecifically distinct. It has not been recorded from Japan, but I have a skin in my collection in winter plumage (which has the basal half of the innermost web of the innermost primaries white) obtained by Wosnessenski in the Kurile Islands. It winters on the shores of the Great Lakes and on the coasts of New Brunswick, occasionally occurring on the Bermudas and the Azores. A solitary individual is said to have wandered as far as South Africa (Finsch, Abhandl. nat. Ver. Bremen, iii. p. 65), but the statement requires confirmation.

Like its near relation the Dunlin, the Purple Sandpiper breeds far south and winters far north.

TRINGA MARITIMA COUESI.

ALEUTIAN PURPLE SANDPIPER.

Diagnosis. TRINGA MARITIMA magnitudine minore, in ptil. æst. dorso valdè castaneo ornato, pectore fulvo suffuso: in ptil. hiem. vix distinguenda.

Synonymy. Arquatella couesi, *Ridgway, Bull. Nutt. Orn. Club*, 1880, p. 160.
Tringa couesi (*Ridgw.*), *Hartlaub, Journ. Orn.* 1883, p. 280.

Literature. PLATES.—None.
HABITS.—Stejneger, Orn. Exp. Kamtschatka, p. 112.
EGGS.—Stejn. Orn. Exp. Kamtsch. p. 114.

The differences between the Aleutian Purple Sandpiper and the typical form have already been pointed out. The former appears to replace the latter in the North Pacific, but the two forms are very closely allied.

TRINGA MARITIMA PTILOCNEMIS.

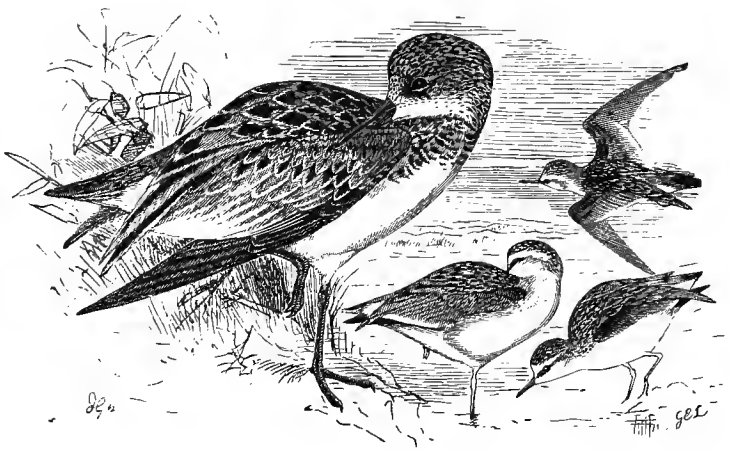
PRYBILOF PURPLE SANDPIPER.

TRINGA MARITIMA COUESI primariarum interiorum pogoniis externis ad basin albis ad rhachidem. Diagnosis.

Tringa ptilocnemis, *Coues, Birds North-West,* p. 491 (1874). Synonymy.
Tringa gracilis, *Harting, Proc. Zool. Soc.* 1874, p. 242.
Arquatella ptilocnemis (*Coues*), *Ridgway, Bull Nutt. Orn. Club,* 1880, p. 163.

PLATES.—None. Literature.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 222.
EGGS.—Described by Brewer on page 224 of the above-mentioned volume as averaging slightly larger than those of the typical form.

The differences between the Prybilof Purple Sandpiper and the typical form have already been pointed out. It is difficult to believe even in the subspecific distinctness of a Purple Sandpiper said to be isolated during the breeding-season on the Prybilof Islands, almost in the middle of the Behring Sea, and to wander in flocks during the rest of the year as far as the Kurile Islands on the one side and the coast of Alaska on the other. Such a geographical anomaly can only be accepted provisionally pending further information.



TRINGA ARENARIA.

SANDERLING.

TRINGA halluce nullo. Diagnosis.

Variations. ALTHOUGH the Sanderling is circumpolar in its range, it is not known to vary locally in any way. The variations due to season and age are fully described (Seebohm, British Birds, iii. p. 224). Newton's opinion (Ibis, 1859, p. 256) that American examples are larger than ours must have been arrived at after the examination of too small a series. The length of wing varies from 4·7 to 5·0 inch in both.

Synonymy.

Tringa calidris grisea minor, *Brisson, Orn.* v. p. 236 (1760).
Tringa arenaria, Charadrius calidris, } *Linneus, Syst. Nat.* i. pp. 251, 255 (1766).
Charadrius rubidus, *Gmelin, Syst. Nat.* i. p. 688 (1788).
Arenaria vulgaris, *Bechstein, Orn. Taschenb.* p. 462 *a* (1803).
Arenaria grisea, *Bechstein, Naturg. Deutschl.* iii. p. 368 (1809).
Arenaria calidris (*Linn.*), *Meyer, Taschenb.* ii. p. 326 (1810).
Calidris arenaria (*Linn.*), *Illiger, Prodr.* p. 249 (1811).
Calidris rubidus (*Gmel.*), *Vieillot, N. Dict. d'Hist. Nat.* xxx. p. 127 (1819).
Calidris tringoides, *Vieillot, Gal. des Ois.* iii. p. 95 (1825).
Trynga tridactyla, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 198 (1826).

Literature.

PLATES.—Gould, Birds Gt. Brit. iv. pl. 66; Dresser, Birds of Europe, viii. pls. 559, 560.
HABITS.—Seebohm, British Birds, iii. p. 221.
EGGS.—Feilden, Nares' Voy. Pol. Sea, ii. pl. i.; Seebohm, British Birds, pl. 27. fig. 8.

The Sanderling is most easily diagnosed by the *absence of a hind toe.*

Geographical distribution.

The Sanderling is a circumpolar bird, and doubtless breeds on all the coasts of the Arctic Ocean, though its eggs have only been taken on the Anderson River (lat. 68°), in Grinnell-Land (lat. 82½°), Greenland, Sabine Island (lat. 74½°), and in Iceland (lat. 65°). On the Asiatic coast I have shot it myself in July in lat. 65°, Middendorff observed it on the Taimyr Peninsula in lat. 74°, and it is a common bird in summer in Alaska. Its lines of migration are not only along the coasts of Europe, Asia, and America, but also across country, as it occurs in some numbers in spring and autumn on the Volga, the Kama, and Lake Baikal. Its winter range is very extensive, a few remaining in the basin of the Mediterranean and on the islands of West Africa, but the greater number reaching South Africa, where I found it a common bird both in Table Bay and near Durban. It is particularly common on the Mekran coast, but very rare in India, Ceylon, and Burma. It is a winter visitor to China, Japan, and the islands of the Malay Archipelago, the whole of the coasts of South America, the West Indies, and the Bermudas (Reid, Zoologist, 1879, p. 477), and the Galapagos Archipelago (Dr. Habel, Trans. Zool. Soc. ix. p. 503).

TRINGA PLATYRHYNCHA.

BROAD-BILLED SANDPIPER.

Diagnosis.

Tringa supracaudalibus centralibus et secundariis interioribus vix albo notatis : rostro quam tarsus vel quam alæ pars quarta longiore.

Variations.

It is not known that Eastern birds differ in any way from Western examples.

Synonymy.

Tringa platyrincha, *Temminck, Man. d'Orn.* p. 398 (1815).
Tringa eloroides, *Vieillot, N. Dict. d'Hist. Nat.* xxxiv. p. 463 (1819).
Pelidna platyrhincha (*Temm.*), *Bonap. Comp. List B. Eur. & N. Amer.* p. 50 (1838).
Limicola platyrhincha (*Temm.*), *Gray, List Birds Brit. Mus.* iii. p. 107 (1844).
Limicola hartlaubi, *Verreaux, Vinson's Voy. Madag., Ann. B,* p. 5 (1865).
Limicola sibirica, *Dresser, Proc. Zool. Soc.* 1876, p. 674.
Limicola pygmæa (*Lath.*), *apud Bechstein, Koch, Naumann, Keyserling & Blasius, Savi, Schlegel, &c.*

Literature.

Plates.—Gould, Birds Gt. Brit. iv. pl. 75 ; Dresser, Birds of Europe, viii. pl. 545.
Habits.—Seebohm, British Birds, iii. p. 197.
Eggs.—Seebohm, British Birds, pl. 27. figs. 10, 11, 12.

Specific characters.

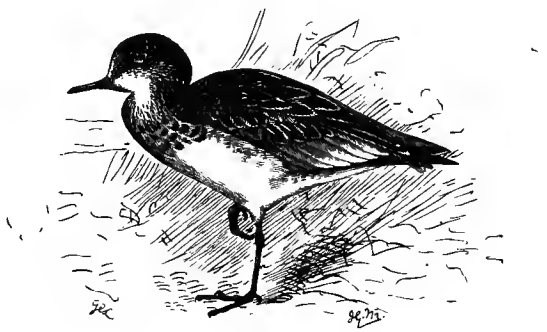
The Broad-billed Sandpiper may always be recognized by its long, flat, and curiously shaped *bill*, which is *more than a fourth of the length of the wing*, and is slightly widened towards the middle [1]. To make the diagnosis complete it is only necessary to add *little or no white on the secondaries and upper tail-coverts*.

Geographical distribution.

The Broad-billed Sandpiper is a very local bird during the breeding-season, but its range extends from the Atlantic to the Pacific. Wolley found it breeding near Muonioniska in lat. 68° ; and on the Scandinavian mountains it breeds in considerable abundance as far south as lat. 60°. There appears to be no foundation for the statement that it has occurred at Archangel. Harvie Brown and I did not meet with it in the Petchora, but Bogdanow records it from the Volga ; Sabanaeff does not record it from the Ural ; neither did Finsch meet with it in the valley of the Obb. It has not been recorded by any Siberian traveller from the Yenesay ; neither did Middendorff meet with it on the Taimyr Peninsula. Dybowski obtained a single example near Lake Baikal ; and Middendorff only met with it

[1] The alleged bare chin of this species (Lunel, Bull. Soc. Orn. Suisse, 1865, p. 31) is a myth.

on the southern shores of the Sea of Okhotsk. Neither Prjevalsky nor Severtzow met with this species; but it occasionally occurs on migration on the coasts of Europe and Japan. It winters in the basin of the Mediterranean and North Africa, on the Mekran coast, and the coasts of North India, occasionally straying as far south as Madagascar, Ceylon, and the Andaman Islands. It has also occurred during the cold season in Burma, the Malay Peninsula, Java, the Philippine Islands, Formosa, and China.



TRINGA TEMMINCKI.

TEMMINCK'S STINT.

Diagnosis. TRINGA rectricibus lateralibus albis.

Variations. No local races of this species are known.

Synonymy. Tringa temminckii, *Leisler, Nachtr. Bechst. Naturg. Deutschl.* ii. p. 78 (1812).
Pelidna temminckii (*Leisl.*), *Boie, Isis*, 1826, p. 979.
Leimonites temminckii (*Leisl.*), *Kaup, Natürl. Syst.* p. 37 (1829).
Calidris temminckii (*Leisl.*), *Cuvier, Règne An.* i. p. 526 (1829).
Schœniclus temminckii (*Leisl.*), *Gray, List Birds Brit. Mus.* iii. p. 106 (1844).
Actodromas temmincki (*Leisl.*), *Bonap. Compt. Rend.* xliii. p. 596 (1856).

Literature.

Plates.—Temminck, Pl. Col. no. 41; Gould, Birds Gt. Brit. iv. pl. 73; Dresser, Birds of Europe, viii. pl. 549. fig. 1, pl. 551. fig. 2.

Habits.—Seebohm, British Birds, iii. p. 217.

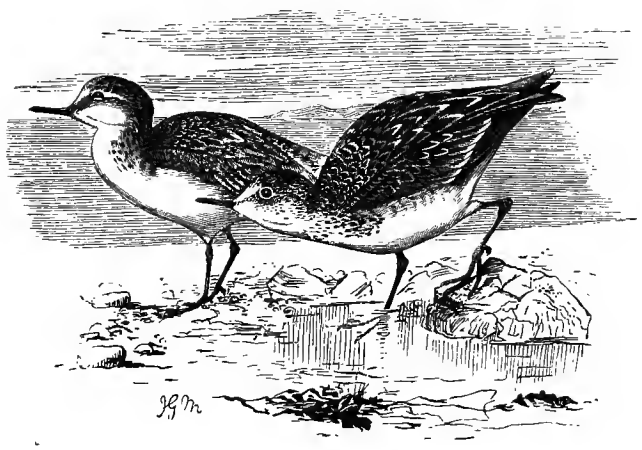
Eggs.—Seebohm, British Birds, pl. 31. figs. 7, 8.

Specific characters.

Temminck's Stint is the only *Tringa* having *pure white outer tail-feathers.*

Geographical distribution.

It is essentially an Arctic bird, breeding in the Old World portion of the Circumpolar Region on the tundras above the limit of forest-growth, and in similar localities on the banks of the great rivers as far south as lat. 65°, on the shores of the White Sea and the Gulf of Bothnia, and as far south as lat. 55° on the shores of the Sea of Okhotsk. It is also recorded as breeding above the limit of forest-growth on the Pamir and the mountains of Dauria; but the evidence in support of these statements is very unsatisfactory. It has not been recorded from Kamtschatka, nor has it ever been observed in Japan; but it was obtained by the 'Vega' expedition in Tchuski-Land. On migration it passes not only along the coasts of Europe and China, but also along most of the inland lines of migration, to its winter-quarters in the basin of the Mediterranean and North Africa, India and Ceylon, Burma, South China, Borneo, and probably other islands of the Malay Archipelago.



TRINGA MINUTA.

LITTLE STINT.

Diagnosis.

Tringa magnitudine parvâ (alæ quam 100 millim. breviores): rostro ad basin latissimo: pedibus nigris.

Variations. The Little Stints east of the Taimyr Peninsula have so much more red on the breast in summer plumage that they may fairly be regarded as subspecifically distinct.

Synonymy.

Tringa cinclus minor, *Brisson, Orn.* v. p. 215 (1760).
Tringa pusilla, *Linn. apud Latham, Gen. Syn. Suppl.* i. p. 292 (1787).
Tringa minuta, *Leisler, Nachtr. Bechst. Naturg. Deutschl.* i. p. 74 (1812).
Pelidna minuta (*Linn.*), *Boie, Isis*, 1826, p. 979.
Actodromas minuta (*Linn.*), *Kaup, Natürl. Syst.* p. 55 (1829).
Calidris minuta (*Leisl.*), *Cuvier, Règne An.* i. p. 526 (1829).
Schœniclus minuta (*Linn.*), *Gray, List Birds Brit. Mus.* iii. p. 106 (1844).

Literature.

Plates.—Gould, Birds Gt. Brit. iv. pl. 72; Dresser, Birds of Europe, viii. pl. 549. fig. 2, pl. 551. fig. 1.
Habits.—Seebohm, British Birds, iii. p. 204.
Eggs.—Seebohm & Harvie Brown, Ibis, 1876, pl. vii.; Seebohm, British Birds, pl. 31. figs. 10, 11, 12.

Specific characters.

The Little Stint may be diagnosed from all its congeners (except from the Red-throated Stint, which is merely the Eastern form of the Little Stint) by the following characters: *wing less than four inches* (measured from the carpal joint); *bill* narrow, *broadest at the base; legs and toes black.*

It is not known that *T. minuta* and *T. minuta ruficollis* differ in any respect from each other in winter plumage, but in breeding-dress they are generally distinct enough. The Western form has a white chin and throat, but the breast is streaked with chestnut; whilst the Eastern form has the chin, throat, and upper breast uniform chestnut.

Geographical distribution.

The Little Stint breeds in great numbers, though very locally, on the Siberian tundras above the limit of forest-growth from the North Cape to the Taimyr Peninsula. It has also been seen in summer on Waigatz Island and on Nova Zembla, and doubtless breeds in both these localities. It passes along the European coasts, the valleys of the Kama and the Volga, and through West Siberia and Turkestan on migration, to winter in suitable localities throughout Africa, including the valley of the Nile and Central Africa, where Böhm obtained it near Lake Tanganyika (Matschie, Journ. Orn. 1887, p. 138). It also winters in Persia, India, Ceylon, and Burma.

It belongs to a small group of dwarf Sandpipers or Stints of which eight forms are known, having wings less than four inches in length. Two of these have distinct webs at the bases of the toes, and are therefore placed in another genus. Six belong to the genus

Tringa, but of these three have pale legs and feet, and one has a shovel-shaped bill. The remaining two are the Eastern and Western forms of the Little Stint.

TRINGA MINUTA RUFICOLLIS.

RED-THROATED STINT. (Plate XV.)

Diagnosis.

Tringa minuta in ptil. æstiv. gutture castaneo: in ptil. hiem. haud a *Tringa minuta typica* distinguenda.

Variations.

It is believed that the Red-throated and Little Stints completely intergrade in summer plumage. They are indistinguishable in winter plumage.

Synonymy.

? Tringa albescens[1], *Temminck, Pl. Col.* no. 41 (1823).
Trynga ruficollis, *Pallas, Reise Russ. Reichs,* iii. p. 700 (1776).

[1] *Tringa albescens* of Temminck appears to be a composite species: "les deux pennes latérales de la queue sont blanches" can only apply to *T. temminckii*, but "toutes les parties inférieures sont d'un roussâtre-clair" cannot possibly apply to that species, and is a gross exaggeration when applied to *T. minuta ruficollis.*

Tringa salina, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 199 (1826).
Calidris albescens (*Temm.*), *Cuvier, Règne An.* i. p. 526 (1829).
Tringa australis, *Lesson, Traité d'Orn.* p. 558 (1831).
Schœniclus albescens (*Temm.*), *Gould, Birds Australia,* vi. pl. 31 (1848).
Actodromas albescens (*Temm.*), Actodromas australis (*Less.*), } *Bonap. Compt. Rend.* xliii. p. 596 (1856).
Tringa minuta ruficollis (*Temm.*), *Seebohm, British Birds,* iii. p. 205.

Literature.

PLATES.—Previously unfigured.
HABITS.—Unrecorded.
EGGS.—Undescribed.

The differences between the Little Stint and the Red-throated Stint or Eastern form of the Little Stint have already been pointed out.

Geographical distribution.

The Red-throated Stint breeds in Eastern Siberia. It was originally described by Pallas from Dauria, and was probably the species found breeding on the islands of the delta of the Lena by Dr. Bunge (Seebohm, Trans. Norf. & Norw. Nat. Soc. iv. p. 303). It was observed by Stejneger passing Behring Island late in May, and Middendorff found it during the first half of July on the southern shores of the Sea of Okhotsk. It passes Lake Baikal, Japan, and China on migration, and winters in the Malay Archipelago and Australia.

TRINGA SUBMINUTA.

MIDDENDORFF'S STINT.

Diagnosis.

TRINGA magnitudine parvâ (alæ quam 100 millim. breviores): pedibus pallidis: rectricibus lateralibus fuscis.

Variations.

THE American form of this species has on an average a smaller foot than the Siberian form and may be regarded as subspecifically distinct.

Synonymy.

? Totanus damacensis, *Horsfield, Trans. Linn. Soc.* xiii. p. 192 (1821).
Tringa subminuta, *Middendorff, Reise in Nord. und Ost. Sibir.* ii. p. 222 (1853).
Actodromas subminuta (*Midd.*), *Bonap. Compt. Rend.* xliii. p. 596 (1856).
Tringa damacensis (*Horsf.*), *Swinhoe, Ibis,* 1863, p. 413.

Literature.

PLATES.—Middendorff, Reise in Nord. u. Ost. Sibir. ii. pl. xix. fig. 6.
HABITS.—Legge, Birds of Ceylon, p. 889.
EGGS.—Unknown.

Specific characters.

Middendorff's Stint may be diagnosed from all its congeners (except from the American Stint, which appears to be only subspecifically distinct from it) by the following characters: *wing less than four inches* (measured from the carpal joint); *legs and toes pale brown, outer tail-feathers grey.*

Subspecific characters.

Middendorff's Stint has a slightly larger foot than the American Stint, but is not known to differ from it in any other respect.

	T. subminuta.		*T. minutilla.*	
	in.	in.	in.	in.
Tarsus	·9	to ·8	·9	to ·75
Middle toe and claw .	·95	to ·85	·85	to ·8
Wing	3·7	to 3·35	3·9	to 3·35

Geographical distribution.

Middendorff's Stint breeds on Behring Island and on the shores of the Sea of Okhotsk, but as it passes through the basin of Lake Baikal on migration it probably also breeds in the valley of the Lena below the Arctic Circle. It has also been recorded from the valley of the Amoor, and the coasts of Japan and China on migration, and examples have been obtained in winter from the islands of the Malay Archipelago, India, Burma, and Ceylon.

TRINGA SUBMINUTA MINUTILLA.

AMERICAN STINT.

Diagnosis.

TRINGA SUBMINUTA pedibus parvis (digitus medius cum ungue 20½ ad 21½ millim.).

Variations.

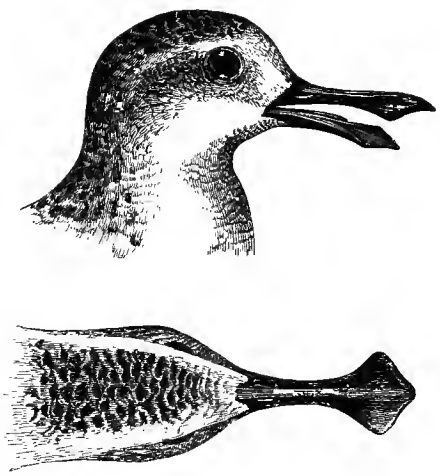
MIDDENDORFF's Stint and the American Stint appear completely to intergrade.

Synonymy.

Tringa minutilla, *Vieillot, N. Dict. d'Hist. Nat.* xxxiv. p. 452 (1819).
Tringa wilsoni, *Nuttall, Man. Orn.* ii. p. 121 (1834).
Pelidna nana, *Lichtenstein, Nomencl. Av.* p. 92 (1854).
Actodromas minutilla (*Vieill.*), } *Bonap. Compt. Rend.* xliii. p. 596 (1856).
Actodromas wilsoni (*Nutt.*), }
Tringa pusilla, *Linn., apud Wilson, Audubon, Bonaparte, Swainson & Richardson, Gray, &c.*

Literature. PLATES.—Wilson, Am. Orn. pl. 37. fig. 4; Dresser, Birds of Europe, viii. pl. 552. figs. 2, 3.
HABITS.—Seebohm, British Birds, iii. p. 213.
EGGS.—Seebohm, British Birds, pl. 31. fig. 5.

Geographical distribution. The differences between the American Stint and Middendorff's Stint have already been pointed out. The former breeds in the arctic regions of the western hemisphere from Alaska to Labrador. It passes through the United States and the Bermudas (Reid, Zoologist, 1877, p. 476) on migration, a few remaining to winter in the Southern States, but the greater number passing southwards to winter in Mexico, the West Indies, Central America, the Galapagos Archipelago (Dr. Habel, Trans. Zool. Soc. ix. p. 504), and the northern portions of South America.



TRINGA PYGMÆA.

SPOON-BILLED SANDPIPER.

Diagnosis. TRINGA rostro prope apicem quam ad basin valdè latiore.

Variations. IT is a somewhat remarkable fact that no intermediate form between this species and any of its allies has been discovered.

Synonymy. Platalea pygmæa, *Linneus, Syst. Nat.* i. p. 140 (1758); *Linn. Syst. Nat.* i. p. 231 (1766).
Eurinorhynchus griseus, *Nilsson, Orn. Suec.* ii. p. 29 (1821).
Eurinorhynchus pygmæus (*Linn.*), *Boie, Isis*, 1826, p. 979.
Eurhynorhynchus orientalis, *Blyth, Ann. & Mag. Nat. Hist.* xiii. p. 178 (1844).
Tringa pygmæa (*Linn.*), *Schlegel, Mus. Pays-Bas, Scolopaces*, p. 27 (1864).

Literature.

Plates.—Gray, Genera of Birds, iii. pl. clii.; Harting, Ibis, 1869, pl. xii.; Nelson, Cruise of the 'Corwin,' p. 87.

Habits.—Undescribed.

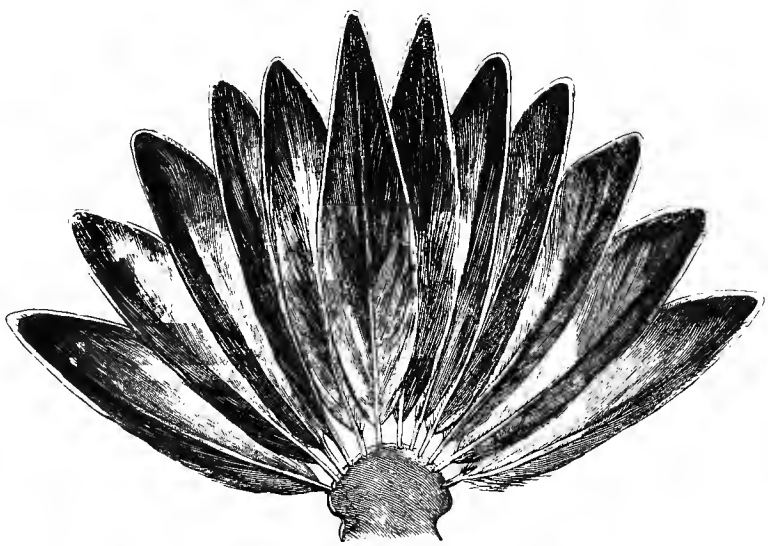
Eggs.—Unknown.

Specific characters.

The Spoon-billed Sandpiper may always be recognized by its spatulate *bill*, which is *three times as wide near the tip as it is at the base*. In every other respect—size, colour, and seasonal variations of plumage—it is not known to differ from the Eastern form of the Little Stint (*T. minuta ruficollis*).

Geographical distribution.

It breeds in some unknown country north of Behring Straits. Nelson obtained an example in Alaska, and Nordenskiöld observed it on migration on the northern shores of Tchuski-Land. I have examples in my collection from the Sea of Okhotsk, Hakodadi, Yokohama, Shanghai, and Amoy, all obtained on migration. It has also been obtained in India and Burma, which are presumably its winter-quarters.



TRINGA ACUMINATA.

SIBERIAN PECTORAL SANDPIPER.

Diagnosis.

Tringa supracaudalibus centralibus et secundariis interioribus vix albo notatis: pedibus pallidis: magnitudine majore (alæ plus quam 120 millim.): rectricibus centralibus vix (circa 3 millim.) quam contigui longioribus.

Variations. Siberian and American forms appear generally to be distinguishable.

Synonymy. Tringa aurita, *Latham, Index Orn. Suppl.* p. lxvi (1801).
Totanus acuminatus, *Horsfield, Trans. Linn. Soc.* xiii. p. 192 (1820).
Tringa australis, *Jardine & Selby, Ill. Orn.* ii. pl. 91 (1829, *nec Gmel.*).
Schœniclus australis (*Jard. & Selby*), *Gray, List Birds Brit. Mus.* iii. p. 105 (1844, *nec Gmel.*).
Tringa acuminata (*Horsfield*), *Swinhoe, Proc. Zool. Soc.* 1863, p. 316.
Limnocinclus acuminatus (*Horsfield*), *Gould, Handb. Birds of Australia*, ii. p. 254 (1865).

Literature. Plates.—Jardine & Selby, Ill. Orn. ii. pl. 91; Gould, Birds of Australia, vi. pl. 30.
Habits.—Gould, Handbook Birds Austr. ii. p. 254.
Eggs.—Unknown.

Specific characters. The Siberian Pectoral Sandpiper and its American ally belong to the central group of the genus, which have *dark central upper tail-coverts*, and *little or no white on the secondaries* except a narrow margin. They may be diagnosed from the other species of the group by the characters *legs and feet pale, wing from carpal joint more than* $4\frac{3}{4}$ *inches*. From each other they are much more difficult to diagnose, so much so indeed that it is scarcely doubtful that they are only subspecifically distinct.

Subspecific characters.

T. pectoralis.

	in.		in.
Wing . . .	5·0	to	5·7
Bill	1·0	to	1·1
Tarsus . . .	1·15	to	1·2

Central feathers of the tail ·25 longer than next, and ·35 longer than outermost.

Flanks very sparingly streaked. Belly and under tail-coverts pure white in adult in summer.

T. acuminata.

	in.		in.
Wing . . .	4·8	to	5·5
Bill	·85	to	1·0
Tarsus . . .	1·1	to	1·25

Central feathers of the tail ·1 longer than next, and ·35 longer than outermost.

All the underparts spotted or streaked in adult in summer.

The Siberian Pectoral Sandpiper has the lateral tail-feathers somewhat more pointed than its ally, but this appears to be an uncertain character. Intermediate forms also occur in which the relative length of the tail-feathers is halfway between the two extremes quoted above.

The Siberian Pectoral Sandpiper probably breeds in Dauria, as Dybowski obtained

examples in the middle of June in the valley of the Argun River, and Stejneger observed it on Behring Island during the autumn migration. It passes along the coasts of Japan and China, and has been frequently obtained on many of the islands of the Malay Archipelago from Java to New Guinea. It winters in Australia and New Zealand. Geographical distribution.

TRINGA ACUMINATA PECTORALIS.

AMERICAN PECTORAL SANDPIPER.

Tringa acuminata rectricibus centralibus quam contigui paulò (circa 6 millim.) longioribus. Diagnosis.

The Siberian and American forms of this species appear completely to intergrade. Variations.

Synonymy.

Tringa cinclus dominicensis, *Brisson, Orn.* v. p. 219 (1760).
Tringa maculata, *Vieillot, N. Dict. d'Hist. Nat.* xxxiv. p. 465 (1819).
Pelidna pectoralis, *Say, Long's Exp.* i. p. 171 (1823).
Schœnicola pectoralis (*Say*), *Gray, List Birds Brit. Mus.* iii. p. 104 (1844).
Tringa dominicensis, *Degland, Orn. Eur.* ii. p. 232 (1849).
Pelidna maculata (*Vieill.*), *Bonap. Compt. Rend.* xliii. p. 596 (1856).
Actodromas maculata, *Coues, Proc. Ac. Nat. Sc. Philad.* 1861, p. 197.
Limnocinclus pectoralis (*Say*), *Gould, Handb. Birds of Australia*, ii. p. 254 (1865).

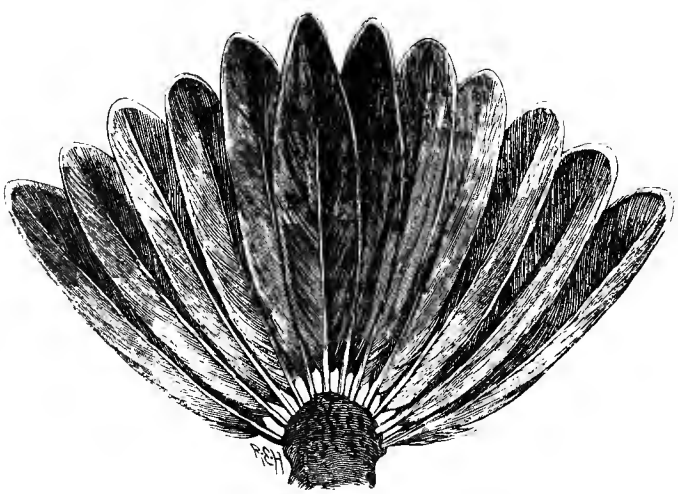
Literature.

PLATES.—Audubon, Birds Am. v. pl. 329.
HABITS.—Seebohm, British Birds, iii. p. 201; Murdoch, Exp. Point Barrow, p. 111.
EGGS.—Seebohm, British Birds, pl. 68. fig. 1.

The differences between this Pectoral Sandpiper and its close ally the Siberian Pectoral Sandpiper have been already pointed out.

Geographical distribution.

The American form of the Pectoral Sandpiper is probably confined to Arctic America during the breeding-season. It breeds abundantly near Point Barrow in Alaska, and has occurred as far east as Greenland. It passes through the United States on migration, and regularly visits the Bermuda Islands, sometimes in enormous flocks (Reid, Zoologist, 1877, p. 477). It winters in Mexico, the West Indies, Central America, and probably throughout South America. Buckley obtained it in Bolivia (Sclater & Salvin, Proc. Zool. Soc. 1879, p. 641), Reed in Chili (Sclater & Salvin, Proc. Zool. Soc. 1873, p. 455), and Durnford in Northern Patagonia (Ibis, 1877, p. 43). I have examples collected by Bartlett in Eastern Peru, and it has occurred in various localities in Brazil.



TRINGA BAIRDI.

BAIRD'S SANDPIPER.

Diagnosis.

TRINGA supraeaudalibus centralibus et secundariis interioribus vix albo notatis: pedibus nigris: magnitudine majore (alæ 115 ad 130 millim.).

Variations.

No local races of this distinct species are known.

Synonymy.

Tringa melanota, *Vieillot, N. Dict. d'Hist. Nat.* xxxiv. p. 462 (1819).
Pelidna dorsalis, *Lichtenstein, Nom. Av.* p. 92 (1854).
Actodromas bairdii, *Coues, Proc. Ac. Nat. Sc. Philad.* 1861, p. 194.
Tringa bairdi (*Coues*), *Sclater, Proc. Zool. Soc.* 1867, p. 332.

Literature.

Plates.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 230 (head only).
Habits.—Murdoch, Exped. to Point Barrow, p. 112.
Eggs.—Described by Brewer on page 232 of the above-mentioned volume on Water-Birds.

Specific characters.

Baird's Sandpiper belongs to the group which have *dark upper tail-coverts* and *dark secondaries*. It may be diagnosed from the other species belonging to the same group by its *black legs and feet* and *wing from carpal joint* $4\frac{1}{2}$ *to* 5 *inches*.

Large examples are often confused with small examples of *T. pectoralis*; but in addition to the much darker legs and feet, *T. bairdi* may always be recognized by its tail, the central feathers of which are not longer than the outer, though the intermediate ones on each side are rather shorter.

Geographical distribution.

It breeds in Alaska and in the valley of the Mackenzie River above the limit of forest-growth. It passes through the Western States on migration, and winters in South America. Salmon obtained it in Colombia (Sclater & Salvin, Proc. Zool. Soc. 1879, p. 547), Fraser in Ecuador, Whitely in Western Peru, Bartlett in Eastern Peru (Sclater & Salvin, Proc. Zool. Soc. 1873, p. 455), and I have several examples collected by Reed in Chili. I have also a skin sent by Andersson from Walfish Bay in South Africa.

TRINGA BONAPARTI.

BONAPARTE'S SANDPIPER.

Diagnosis.

Tringa supracaudalibus albis sæpe brunneo striatis: rostro quam 26 millim. breviore.

Variations.

No local races of this species are known.

Synonymy.

Tringa fuscicollis, *Vieillot, N. Dict. d'Hist. Nat.* xxxiv. p. 461 (1819).
Tringa campestris, *Lichtenstein, Verz. Doubl.* p. 74 (1823).
Tringa schinzii, *Bonap. Ann. Lyc. Nat. Hist. New York*, ii. p. 317 (1826, *nec Brehm*).
Pelidna schinzi, *Bonap. Comp. List B. Eur. & N. Amer.* p. 50 (1838, *nec Brehm*).
Tringa bonaparti, *Schlegel, Rev. Crit.* p. 89 (1844).
Schœniclus schinzii (*Bonap.*), *Gray, List Birds Brit. Mus.* iii. p. 105 (1844, *nec Brehm*).

Pelidna dorsalis, *Lichtenstein, Nomencl. Av.* p. 92 (1854).
Octodromas fuscicollis (*Vieill.*), *Bonap. Comp. Rend.* xliii. p. 596 (1856).
Heteropygia bonapartei (*Schleg.*), *Coues, Proc. Ac. Nat. Sc. Philad.* 1861, p. 191.

Literature.

PLATES.—Bonap. Am. Orn. iv. pl. 24. fig. 2; Audubon, Birds Am. v. pl. 335; Gould, Birds of Europe, iv. pl. 330; Dresser, Birds of Europe, viii. pl. 547.
HABITS.—Seebohm, British Birds, iii. p. 189.
EGGS.—Seebohm, British Birds, pl. 31. fig. 4.

Specific characters.

Bonaparte's Sandpiper, like its two nearest allies the Curlew Sandpiper and the Japanese Knot, has the *upper tail-coverts white, more or less streaked with brown*. The two central upper tail-coverts are, however, often only tipped with white. From both these species, as well as from the Knot, it may easily be distinguished by its short *bill*, which *rarely measures more than* ·9 *inch* from the frontal feathers.

In its seasonal changes of plumage it closely resembles the Japanese Knot, but the summer chestnut of the upper parts is less brilliant though more generally diffused.

Geographical distribution.

Bonaparte's Sandpiper breeds in the arctic regions of the American continent, from Greenland to the Mackenzie River. At Point Barrow it only occurred as an accidental straggler. It passes through the United States and the Bermudas (Reid, Zoologist, 1877, p. 477) on migration, and winters in the West Indies, Central America, and the whole of South America. It was originally described by Azara from Paraguay, where it has recently been obtained by Rohde (Berlepsch, Journ. Orn. 1887, p. 36). It is an occasional straggler to Europe, and has been said to be a resident in Central Patagonia (Durnford, Ibis, 1878, p. 404), and to breed in the Falkland Islands (Abbott, Ibis, 1861, p. 157); but these statements require confirmation.

It appears to be the American representative of the Curlew Sandpiper, and to bear the same relation to that species that the Japanese Knot does to the Common Knot.

TRINGA RUFESCENS.

BUFF-BREASTED SANDPIPER.

Diagnosis.

TRINGA primariarum pogoniis internis nigro maculatis.

Variations.

No local races of this species are known.

Synonymy.

Tringa subruficollis, } *Vieillot, N. Dict. d'Hist. Nat.* xxxiv. pp. 465, 470 (1819).
Tringa rufescens, }
Actitis rufescens (*Vieill.*), *Schlegel, Rev. Crit.* p. 92 (1844).
Actiturus rufescens (*Vieill.*), *Bonap. Rev. Crit.* p. 186 (1850).
Tringoides rufescens (*Vieill.*), *Gray, Cat. Brit. B.* p. 161 (1850).
Limicola brevirostris, *Lichtenstein, Nomencl. Av.* p. 92 (1854).
Actidurus nævius, *Heermann, Proc. Ac. Nat. Sc. Philad.* vii. p. 178 (1854).
Tryngites rufescens (*Vieill.*), *Cabanis, Journ. Orn.* 1856, p. 418.

Literature.

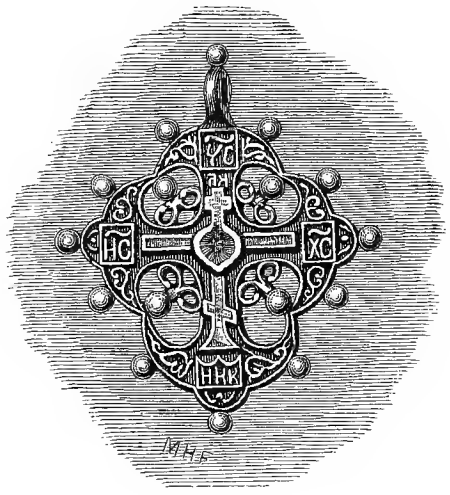
Plates.—Gould, Birds Gt. Brit. iv. pl. 64; Dresser, Birds of Europe, viii. pl. 561.
Habits.—Seebohm, British Birds, iii. p. 226.
Eggs.—Seebohm, British Birds, pl. 31. fig. 3.

Specific characters.

The Buff-breasted Sandpiper differs from all other species of the genus in having the *inner webs of the primaries and secondaries mottled with black.*

Geographical distribution.

It may be regarded as a summer visitor to the arctic regions of America, although it has not been recorded from Greenland. From Alaska its range extends to the Siberian coasts of Behring's Straits; and Middendorff obtained a single example on the southern shores of the Sea of Okhotsk. It passes through the United States on migration, to winter in the West Indies, Mexico, and the northern portions of South America; and has occurred on the Bermudas and on Heligoland.



CHAPTER XXVIII.

Genus PHEGORNIS.

Diagnosis of genus.

Scolopacinæ primariarum quatuor exterioribus subæqualibus: longitudine inter primariarum exteriorum et interiorum apices quam rostri longitudo majore.

The Short-winged Sandpipers are a very small group of birds, consisting of only three species, which have not hitherto been associated together; but they possess so many characters in common that there seems to be no reason why they should be placed in different genera. They are the only Sandpipers which do not breed in the Arctic Region, and the only Sandpipers which are not migratory. Both in their structure and habits (so far as is known of them) they form a connecting link between *Scolopax* and *Rhynchæa* on the one hand, and *Tringa* and *Strepsilas* on the other.

The Short-winged Sandpipers have many characters in common. They have short broad wings, as in *Rhynchæa*; more or less defined bars across the tail-feathers, as in *Scolopax*, *Rhynchæa*, *Totanus*, &c.; the toes are all cleft to the base, as in *Scolopax*, *Rhynchæa*, and *Tringa*; their bills are slender, very slightly expanded towards the tip, which is hard and smooth, and the nostrils are placed very near the frontal feathers, as in *Totanus*, and the conspicuous white streak behind the eye, which they all three possess, is one of the prominent characters of *Rhynchæa*. Finally, the area of distribution of the genus, so constituted, may be regarded as practically continuous.

The genus *Phegornis* may therefore be diagnosed as follows:—

Generic characters.

Charadriidæ having *all the toes cleft to the base*, having the *first four primaries not differing much in length*, but having *the distance between the tips of the first and last primaries more than the length of the bill*.

Synonymy of the Genus Phegornis.

	Type.
Leptopus, *Fraser, Proc. Zool. Soc.* 1844, p. 157 (*nec* Leptopus, *Raf.* 1815) . .	P. mitchelli.
Leptodactylus, *Fraser, Proc. Zool. Soc.* 1844, p. 157 (*nec* Leptodactylus, *Fitz.* 1826)	P. mitchelli.

	Type.
Leptoscelis, *Des Murs, Icon. Orn.* pl. 41 (1840) (*nec* Leptoscelis, *Haliday*, 1833)	P. mitchelli.
Phegornis, *Gray, Genera of Birds*, iii. p. 545 (1847)	P. mitchelli.
Prosobonia, *Bonap. Compt. Rend.* xxxi. p. 562 (1850)	P. leucoptera.
Æchmorhynchus, *Coues, Birds of the North-West*, p. 506 (1874)	P. cancellatus.

The genus *Phegornis* has been particularly unfortunate in its synonymy; each of the three species has been made the type of a genus, and one of them has been provided with as many as four genera before one could be found which had not been previously used for some other genus in Zoology. The result is that no fewer than six genera have been created for the reception of three birds!

Determination of the type.

The Chilian Sandpiper (*Phegornis mitchelli*), being the only species placed in the genus by Fraser, must be regarded as the type.

GEOGRAPHICAL DISTRIBUTION.

Australian Region.	
Christmas Island. *Paumota Archipelago.*	P. CANCELLATUS.
Society Islands.	P. LEUCOPTERUS.
Neotropical Region.	
Chilian Subregion.	P. MITCHELLI.

The area of distribution of the genus *Phegornis* is very limited, but it may be regarded as, to all intents and purposes, continuous. Very little is known of the habits of the three species which it contains, but the first two are probably shore-birds, whilst the third is said to frequent the borders of lakes. None of the three species are migratory.

Climatic distribution.

The genus *Phegornis* may be regarded as Tropical, though one of the three species which it contains is a resident in Temperate Regions. Their distribution is as follows:—

Tropical Pacific Islands	2
Temperate South America	1
Species of *Phegornis*	— 3

Emigrations.

When the ancestors of the Charadriidæ were dispersed by the Præ-Pliocene Glacial Epoch, which drove them out of the Arctic Region, and caused them to adopt migratory habits, or to extend the range of their migrations, some of them must have wintered south of the Line. Many species which now breed within the Arctic Circle still winter in the tropics, but a few of their near allies gave up the habit of migration to become residents of the southern hemisphere. If this change of habits occurred in some birds after the

Post-Pliocene Glacial Epoch, it is reasonable to suppose that it also occurred in others after the Præ-Pliocene Glacial Epoch. We must therefore be prepared to find in the southern hemisphere a few isolated species whose differentiation from their allies dates back to a period before the Pliocene Age, and which may therefore claim to be generically distinct from the other species in the family. One of these is the Chilian Sandpiper (or Mitchell's Slenderfoot of Fraser); the ancestors of this species had probably become residents of Peru and Chili before the Pliocene Age. A second species is Forster's Sandpiper (the White-winged Sandpiper of Latham), which found a permanent home on the Society Islands; and a third is Peale's Sandpiper (the Barred Phalarope of Latham) which is a resident of the Paumota Archipelago.

KEY TO THE SPECIES.

The three species may be distinguished as follows:—

Underparts barred { **mitchelli.**
cancellatus . . . } A hind toe.
leucopterus . . . }

PHEGORNIS MITCHELLI.

CHILIAN SANDPIPER. (PLATE XVI.)

Diagnosis. PHEGORNIS corpore subtùs fasciato: halluce nullo.

Variations. No local races of this species are known.

Synonymy.
Leptopus mitchellii, *Fraser, Proc. Zool. Soc.* 1844, p. 157.
Leptodactylus mitchellii (*Fraser*), *Fraser, Proc. Zool. Soc.* 1844, p. 157.
Leptoscelis mitchellii (*Fraser*), *Des Murs, Icon. Orn.* pl. xli. (1846).
Phegornis mitchellii (*Fraser*), *Gray, Genera of Birds*, iii. p. 545 (1847).

Literature.
PLATES.—Fraser, Zool. Typ. pl. 63; Des Murs, Icon. Orn. pl. xli.
HABITS.—Fraser, Zool. Typ. letterpress to pl. 63.
EGGS.—Unknown.

The Chilian Sandpiper, or Mitchell's Slenderfoot as it was fantastically called by its discoverer, may easily be distinguished from the other two Short-winged Sandpipers by its *not possessing a hind toe.* Specific characters.

It is described as a marsh bird inhabiting the Andes of Peru (Taczanowski, Proc. Zool. Soc. 1874, p. 561), Bolivia (Philippi, Reise Wüste Atacama, p. 163), and Chili, whence it was originally described by Fraser, and where it has since been obtained by Mr. Berkeley James (Sclater, Proc. Zool. Soc. 1886, p. 403). Des Murs received it in a collection of birds from California, but the locality is probably erroneous. Geographical distribution.

In consequence of its not having a hind toe it has been associated by some ornithologists with the Plovers; but the shape of the bill, the position of the nostrils, the white stripe behind the eye, the chestnut nape, the dark throat, the white band across the breast, the bars on some of the tail-feathers, the metallic gloss on the upper parts, the cleft toes, the short tarsus, and the short blunt wings, all suggest a much nearer relationship to the Painted Snipes. Nearest relations.

The young in first plumage, of which an example was obtained by Mr. Berkeley James in Chili, are remarkably like Peale's Sandpiper, the feathers of the upper parts, including the wing-coverts and tertials, having dark subterminal bars and chestnut margins, which more or less take the form of spots on the tertials. The peculiar coloration of the head of the adult is also absent. Young in first plumage.

PHEGORNIS CANCELLATUS.

PEALE'S SANDPIPER. (Plate XVII.)

Phegornis corpore subtùs fasciato: halluce parvo. Diagnosis.

Only three or four examples of this species are known. Variations.

Tringa cancellata, *Gmelin, Syst. Nat.* i. p. 675 (1788). Synonymy.
Phalaropus cancellatus (*Gmel.*), *Latham, Index Orn.* ii. p. 777 (1790).
Tringa parvirostris, *Peale, U.S. Explor. Exped.* 1838–1842, viii. p. 235 (1848).
Actiturus rufescens, var. *β*, *Bonap. Compt. Rend.* xliii. p. 597 (1856).
Totanus cancellatus (*Gmel.*), *Gray, Cat. Birds Pacific Ocean*, p. 61 (1859).
Æchmorhynchus parvirostris (*Peale*), *Coues, Birds of the North-West*, p. 506 (1874).

Literature.

PLATES.—Peale, U. States Exploring Exp. 1838–42, viii. Birds, pl. lxvi. fig. 2.

HABITS. } Peale, U. States Exploring Exp. 1838–42, viii. p. 235.
EGGS. }

Specific characters.

Peale's Short-winged Sandpiper may be distinguished from its two allies by its combination of the two characters, *underparts barred* and *a well-developed hind toe.*

Only examples known to exist.

It was originally described by Latham from an example in the collection of Sir Joseph Banks, said to have come from Christmas Island [1] (Ellis's unpublished drawings in the British Museum of birds obtained on the third voyage of Capt. Cook, no. 64). It was rediscovered by Peale, during the Wilkes United States Exploring Expedition, on Dog Island and Raraka Island, both belonging to the Paumota Archipelago. There are no later records of its occurrence, and the only examples known to exist are those in the Smithsonian Institution in Washington.

Peale's Sandpiper is probably one of the least changed descendants of the ancestors of the Sandpipers. It presents many characters which are peculiar to young birds, but there can be no question as to the age of the examples in the Smithsonian Institution. One of them is moulting its primaries; the first is an old ragged rusty feather, the second is half-grown, whilst the rest are new. So far as is known, no species of Charadriidæ moults its quills until it has assumed the plumage of the adult bird; and it is not at all uncommon to find birds which have moulted all their feathers from the immature plumage, except their quills, which still retain the pale tips of the first feathers.

PHEGORNIS LEUCOPTERUS.

FORSTER'S SANDPIPER. (PLATE XVIII.)

Diagnosis.

PHEGORNIS corpore subtùs haud fasciato.

Variations.

THE two varieties mentioned by Latham are probably older or younger birds than the one first described.

Synonymy.

Tringa leucoptera, *Gmelin, Syst. Nat.* i. p. 678 (1788).
Totanus leucopterus (*Gmel.*), *Vieillot, N. Dict. d'Hist. Nat.* vi. p. 396 (1817).

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[1] The island in the Pacific Ocean rather more than a thousand miles due south of the Sandwich Islands, not the island of the same name in the Indian Ocean about two hundred miles south of Java.

Calidris leucopterus (*Gmel.*), *Cuvier, Règne An.* i. p. 526 (1829).
Tringa pyrrhetræa, *Lichtenstein, Forster's Descr. Anim. It. Mar. Austr.* p. 174 (1844).
Prosobonia leucoptera (*Gmel.*), *Bonap. Compt. Rend.* xxxi. p. 562 (1850).

Literature.

PLATES.—Lath. Gen. Hist. Birds, ix. pl. cliii.
HABITS.—Undescribed.
EGGS.—Unknown.

Specific characters.

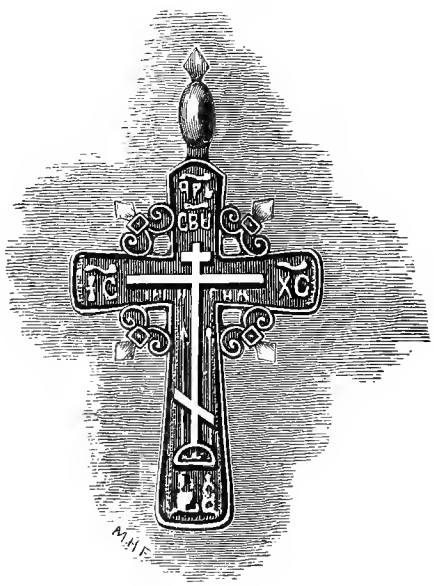
Forster's Short-winged Sandpiper, the White-winged Sandpiper of Latham, may be distinguished from its two short-winged allies by its *unbarred underparts*.

Geographical distribution.

Forster's Sandpiper is only known from the Society Islands, where it was obtained on one of Capt. Cook's Voyages (Forster's unpublished drawings in the British Museum, no. 120; Ellis's ditto, no. 65). It was found on the islands of Otaheite and Eimeo. It has not been recorded by any recent traveller, and the only example known to exist is that in the Leyden Museum.

Resembles a Rail.

It has been suggested by some ornithologists that this bird belongs to the Rallidæ rather than to the Scolopacinæ. It does unquestionably bear a superficial resemblance to some of the Crakes, but it differs from them in all essential particulars. Its tarsus is long and slender, so is its bill; the nostrils are placed close to the base of the bill; all the tail-feathers except the two centre ones are barred; and it has at least ten secondaries (in the Rallidæ eight appears to be the full number, exclusive of the tertials, which are coloured like the wing-coverts).



CHAPTER XXIX.

Genus RHYNCHÆA.

Diagnosis of genus.

CHARADRIIDÆ digitis omnibus ad basin liberis: rostri, digiti medii (cum ungue) et tarsi longitudine ferè æquali: differentiâ inter longitudinem primariæ longissimæ et longitudinem primariæ brevissimæ quam rostri longitudo valdè minore.

Generic characters.

THE Painted Snipes have rather long bills, very rounded wings, short legs, and long toes. They may be diagnosed as follows :—

CHARADRIIDÆ having *all the toes cleft to the base*; having the *bill* (from the frontal feathers), the *middle toe* (including the claw), and the *tarsus of nearly equal length*; and having the *difference in length between the shortest and longest primary much less than the length of the bill.*

Synonymy of the Genus RHYNCHÆA.

	Type.
Rostratula, *Vieillot, Analyse d'une Nouv. Orn.* p. 56 (1816)	R. capensis.
Rhynchæa, *Cuvier, Règne An.* p. 487 (1817)	R. capensis.

The Painted Snipes are to be congratulated upon their short synonymy. It is true that it might be easily increased by the addition of *Rynchæa* of Horsfield, *Rynchea* of Boie, *Rhinchæa* of Bonaparte, *Rynchœa* of Swainson, *Rhynchina* of Fleming, or *Rhynchœna* of Gloger, but the ornithologist cannot waste his time in cataloguing the orthographical vagaries of his predecessors.

Violation of the rules necessary.

To retain the name of *Rhynchæa* for the Painted Snipes is of course a violation of the Rules of Nomenclature. All that can be said is, "so much the worse for the rules." Most ornithologists violate the rules and say nothing about it. Like the ostrich, they bury their heads in the sand and fondly imagine that their errors are undiscovered. To adopt the name of *Rostratula* is entirely out of the question; rather than commit such a sacrilege the Rules should be torn up and thrown into the wastepaper-basket. There are two ways out of the difficulty: the name of *Rhynchæa* may be admitted by special exception, or the

name of *Rostratula* may be rejected on the ground that its author himself rejected it and adopted the name of Cuvier, not improbably because Vieillot knew that Cuvier's name was the older one, and subsequent researches may prove that it had been published in some earlier work than the first edition of the 'Règne Animal.' Special pleading to excuse it.

The Common Painted Snipe (*Rhynchæa capensis*), being the "Bécassine de Madagascar" of Buffon, which was designated by Vieillot as the type of his new genus, must be regarded as such. Determination of the type.

GEOGRAPHICAL DISTRIBUTION.

Ethiopian Region. } Oriental Region. }	. . . . . R. capensis.
Australian Region.	
Continental Australia.	. . . . . R. australis.
Neotropical Region.	
Southern half.	. . . . . R. semicollaris.

The genus *Rhynchæa* can scarcely be regarded as Tropical, inasmuch as none of the three species which it contains is exclusively tropical during the breeding-season. They are distributed as follows:— Climatic distribution.

Temperate South America	1
Temperate and Tropical Africa and Tropical Asia	1
Temperate and Tropical Australia . . .	1
Species of *Rhynchæa* . . —	3

The Painted Snipes appear to be the descendants of a party of Waders which abandoned their migratory habits before the Post-Pliocene Glacial Epoch, and settled in India, where they probably resided until that Peninsula became overcrowded by birds driven south by the freezing up of the breeding-grounds by the continually increasing Arctic ice. In consequence of the severity of the struggle for existence caused by the suddenly increased pressure of population, one party of emigrants appear to have crossed the tropics to Australia, whilst a second party joined the great band of emigrants which succeeded in crossing the Pacific to South America. During the warm period which followed the last of the series of invasions by arctic cold the great pressure was removed by the return of most of the glacial emigrants to their old homes; and the Painted Snipe appears to have increased and multiplied in its old Indian home to such a degree that it

gradually extended its range westwards until it overrun the whole of tropical Africa. The African Painted Snipes are now, to a large extent, isolated from their Indian brethren; but as they do not appear to have become in any way differentiated from them, we may reasonably infer that they are the descendants of post-glacial emigrants who have not yet been subjected to the abnormal pressure of population, which must intensify the struggle for existence, and enormously increase the rapidity of the action of the law of Evolution.

KEY TO THE SPECIES.

Only three species are known, which may be distinguished as follows:—

Only two buff patches on outer web of the 8th primary.
- **capensis** . . . . — Length of wing about 5 inches. Tail nearly even.
- **australis** . . . . — Length of wing about 5 inches. Tail nearly even.

semicollaris.

There can scarcely be any doubt that the affinities of *Rhynchæa* are with *Scolopax*. The pale mesial line on the crown and the two pale stripes on the back can scarcely have been independently acquired, and were doubtless inherited from a common ancestor, showing how important certain arrangements of colour sometimes are as generic characters, in many cases dating far earlier than the so-called structural characters.

RHYNCHÆA CAPENSIS.

PAINTED SNIPE.

Diagnosis. RHYNCHÆA magnitudine magnâ (alæ circa 125 millim.): caudâ ferè integrâ: primariæ octavæ pogonio externo quatuor maculis fulvis ornato.

Variations. I HAVE been unable to detect the slightest difference between examples from South Africa, India, and China.

Synonymy.

Rallus benghalensis, *Linneus, Syst. Nat.* i. p. 153 (1758); *Linn. Syst. Nat.* i. p. 263 (1766).
Tringa totanus bengalensis,
Scolopax gallinago maderaspatana,
Scolopax gallinago capitis bonæ spei, } *Brisson, Orn.* v. pp. 209 & 308, vi. Suppl. p. 141 (1760).
Scolopax capensis, *Linneus, Syst. Nat.* i. p. 246 (1766).
Scolopax chinensis, *Boddaert, Tabl. Pl. Enl.* p. 53 (1783).
Scolopax maderaspatana (*Briss.*), *Gmelin, Syst. Nat.* i. p. 667 (1788).
Scolopax sinensis, *Latham, Index Orn.* ii. p. 717 (1790).
Rhynchæa capensis (*Linn.*), *Cuvier, Règne An.* i. p. 488 (1816).
Rostratula capensis (*Linn.*),
Rostratula sinensis (*Lath.*),
Rostratula indica,
Rostratula viridis, } *Vieillot, N. Dict. d'Hist. Nat.* vii. pp. 1, 2 (1817).
Rhynchæa variegata, *Vieillot & Oudart, Gal. Ois.* ii. p. 109 (1825).
Rynchæa orientalis, *Horsfield, Trans. Linn. Soc.* xiii. p. 193 (1820).
Rhynchæa sinensis (*Vieill.*), *Vieillot, Tabl. Enc. Méth., Orn.* iii. p. 1164 (1823).
Rhynchæa africana,
Rhynchæa bengalensis (*Linn.*),
Rhynchæa madagascariensis, } *Lesson, Man. d'Orn,* ii. p. 270 (1828).
Scolopax mauritiana, *Desjardins, Proc. Zool. Soc.* 1831, p. 45.
Rhynchæa picta, *Gray, Zool. Miscell.* i. p. 18 (1831).
Rhynchæa indica, *Hodgson, Gray's Zool. Miscell.* 1844, p. 86.

Literature.

Plates.—Milne-Edwards & Grandidier, Hist. Madag., Ois., Atlas, iii. pl. 261; Daub. Pl. Enl. nos. 270, 922; Shelley, Birds of Egypt, pl. xi.
Habits.—Hume & Marshall, Game Birds India &c. iii. p. 381.
Eggs.—Jardine, Contr. Orn. 1852, pl. 89.

Specific characters.

The Painted Snipe may be diagnosed from its South-American congener by its size, *wing from carpal joint about five inches,* and from its Australian one by the *greater number of buff spots on its quills.* The Indian species has four buff spots on the outer web of the 8th primary, whilst the Australian species has only two.

Geographical distribution.

The Painted Snipe has a very wide range, extending over the whole of the Ethiopian Region, including Madagascar, and in Eastern Africa reaching down the valley of the Nile into Egypt, whence it stretches eastwards across Arabia and Southern Afghanistan into India, Ceylon, Burma, Sumatra, Java, Borneo, the Philippine Islands, Formosa, China, South-eastern Thibet, and the southern islands of Japan.

Like the true Snipes it is a marsh bird, but, as may be inferred from the length of its secondaries and the shortness of its primaries, its migrations are on a very limited scale.

The changes of plumage in this species produced by age, sex, and season are somewhat complicated, and have given rise to much confusion.

Seasonal and other changes of plumage.

As in the Phalaropes the adult female is more richly coloured than the adult male, but, unlike those birds, the adult winter plumage does not differ from the adult summer plumage.

The female is slightly the larger bird (wing 5·3 to 5·0 inch), and may at all ages be recognized by its wing-coverts, which are olive-green, each feather crossed by nearly a dozen narrow dark bars.

The male is somewhat smaller (wing 5·0 to 4·8 inch), and the wing-coverts expose only two dark bars on each feather, with a buff patch between them.

Fully adult birds of both sexes may always be recognized by their primaries; the inner web especially of the first primary showing little or no trace of bars, but being pale brown uniformly vermiculated with dark brown.

The adult female has the neck deep chestnut all round, shading into black on the breast. Young females in first plumage have buff bars across the inner webs of the primaries, a narrow buff bar across the ends of the wing-coverts, grey instead of chestnut round the neck, and the dark feathers across the breast have pale margins. They get adult wing-coverts and primaries at their first moult, and partially adult necks and breasts; but the fully adult plumage is not assumed until the second moult, and even then traces of immaturity are frequently found on the hind neck and on the primaries.

The adult male resembles the young female in first plumage, except that the wing-coverts are coloured as has already been described as peculiar to male birds, and the primaries as has been described as peculiar to adult birds. Young males in first plumage have buff bars across the inner webs of the primaries (as in the same plumage of the female), and the buff patches on the wing-coverts (peculiar to males) appear also on the scapulars and tertials; they get adult scapulars and tertials at their first moult, but the buff bars across the inner webs of the primaries do not appear to be lost until the second moult, and even then pale traces of them are often visible.

RHYNCHÆA AUSTRALIS.

AUSTRALIAN PAINTED SNIPE.

Diagnosis. RHYNCHÆA magnitudine magnâ (alæ circa 125 millim.) : caudâ ferè integrâ : primariæ octavæ pogonio externo non nisi duabus maculis fulvis ornato.

Variations. No local races of this species are known.

Rhynchæa australis, *Gould, Proc. Zool. Soc.* 1837, p. 155. Synonymy.

Plates.—Gould, Birds of Australia, vi. pl. 41. Literature.
Habits.—Gould, Handb. Birds Austr. ii. p. 274.
Eggs.—Proc. Linn. Soc. N. S. Wales, 1886, p. 1060.

The Australian Painted Snipe differs externally from its Asiatic and African ally in very slight details. It is on an average a larger bird, but its tarsus and middle toe are not quite so long. The only difference in colour that I have been able to discover is that in the continental species there are more buff spots on the outer webs of the primaries than is the case with the island species. For example, on the outer web of the eighth primary:—

R. capensis has two buff patches in the black base, and two in grey above it. Specific characters.

R. australis has only one buff patch in the black base, and only one in the grey above it.

The Australian Painted Snipe is generally distributed throughout the continent whose name it bears, though nowhere very abundantly. It appears to be absent from the extreme north, but has occurred at Rockingham Bay. It has not been recorded from Tasmania. To what extent it is a migratory bird has not been ascertained, but Gould regarded it as only a summer visitor to New South Wales. Geographical distribution.

The most remarkable fact connected with the history of the Painted Snipes is the structural difference between the female of the Indian Painted Snipe and that of the Australian species. In the latter the trachea is elongated and convoluted in a remarkable manner (Wood-Mason, Proc. Zool. Soc. 1878, p. 747). Convolution of the trachea.

RHYNCHÆA SEMICOLLARIS.

SOUTH-AMERICAN PAINTED SNIPE. (Plate XIX.)

Rhynchæa magnitudine parvâ (alæ circa 100 millim.): caudâ valdè cuneatâ. Diagnosis.

No local races of this species are known. Variations.

Synonymy.

Totanus semicollaris, *Vieillot, N. Dict. d'Hist. Nat.* vi. p. 402 (1816).
Tringa atricapilla, *Vieillot, Encycl. Méth.* iii. p. 1090 (1823).
Rhynchæa hilairii, *Valenciennes, fide Cuvier, Règne An.* i. p. 524 (1829).
Rhynchæa occidentalis, *King, Zool. Journ.* iv. p. 94 (1829).
Rhynchæa semicollaris (*Vieill.*), *Bridges, Proc. Zool. Soc.* 1843, p. 118.
Rhynchæa curvirostris, *Lichtenstein, fide Taczanowski, Orn. du Pérou,* iii. p. 378 (1886).

Literature.

Plates.—Lesson, Ill. Zool. pl. 18.
Habits. } Durnford, Ibis, 1876, p. 164.
Eggs. }

Specific characters.

The South-American Painted Snipe may always be recognized by its small size, the *wing from the carpal joint only measuring about four instead of about five inches.* In adult plumage the large round white spots on the black wing-coverts are very conspicuous.

Geographical distribution.

It inhabits the Chilian subregion of the Neotropical Region. To the Straits of Magellan it is probably only a summer migrant, which occasionally wanders in winter as far north as Peru and Brazil. Capt. Markham obtained it at Coquimbo in Chili (about lat. 30° south), and it is recorded from Peru (Tschudi, Fauna Peruan. p. 300). I have examples collected by Capt. Harrison near Buenos Ayres, and it has been recorded from the province of San Paulo in Brazil.

CHAPTER XXX.

Genus SCOLOPAX.

CHARADRIIDÆ digitis omnibus ad basin liberis: rostro longissimo (quam tarsus duplo longiore). Diagnosis of genus.

THE Snipes are very easily and very distinctly characterized from their allies. Most of the Charadriidæ are partially web-footed; they have a distinct web at the base of the toes, sometimes much more developed between the outer and middle toe: but the Snipes, some of the Sandpipers, and the Turnstones are exceptions to this rule; they have no rudimentary web between any of the toes, which are all cleft to the base. Again, most of the Charadriidæ have comparatively long legs and short bills; the Snipes, on the contrary, have short legs and long bills. The only birds in this family, except the Snipes, in which the bill is as long as, or longer than, twice the length of the tarsus are the females of one or two species of Curlew, and one or two species of Sandpiper, none of which have all the toes cleft to the base. The genus *Scolopax* may therefore be diagnosed as follows:— Generic characters.

CHARADRIIDÆ having the bill twice as long as the tarsus, and having all the toes cleft to the base.

The Snipes are the only birds in the family which combine both characters; the diagnosis is therefore perfect, including all the species which belong to the genus *Scolopax*, and excluding every other bird.

It is quite possible to construct other diagnoses of this genus which, if more complicated, are nevertheless founded upon characters of equal importance; but enough has been said to show what a good genus *Scolopax* is. To split up such a sharply defined well-characterized genus into four or five ill-defined badly-characterized genera is surely both unnecessary and unwise. Like every other genus it may easily be divided into subgeneric groups, because the gaps between the species are not of exactly the same width. A coincidence so remarkable seldom or never occurs. Folly of splitting the genus.

Most ornithologists recognize the two groups of Snipe and Woodcock as generically distinct, but they probably do so because they are unacquainted with the intermediate

Differences between Snipe and Woodcock.

forms which connect them. The Common Snipe has many characters which distinguish it from the Common Woodcock.

1st. In the Snipe the tibia is bare of feathers for a considerable distance, whilst in the Woodcock it is feathered to the joint.

2nd. In the Snipe the number of tail-feathers is fourteen, whilst the Woodcock has only twelve.

3rd. The Snipe has long primaries and short secondaries, the tip of the outermost secondary and that of the longest primary-covert being about equidistant from the carpal joint. The Woodcock has short primaries and long secondaries, the tip of the outermost secondary extending an inch beyond the longest primary-covert.

So much for what are called structural characters; but by bringing in characters founded upon colour to the rescue, we find other differences obviously, as we shall see in the sequel, of greater generic value.

4th. The bold black markings on the head of the Snipe begin at the base of the bill and are longitudinal, whereas in the Woodcock they are confined to the hind head and are transverse.

5th. The tail-feathers of the Woodcock have curious silvery-white tips on the under surface, of which no trace is to be found in the Snipe.

6th. The primaries of the Snipe are uniform in colour, whilst those of the Woodcock are barred.

7th. The eggs of the Snipe differ widely from those of the Woodcock, the latter being much paler in ground-colour.

Other minor points might be mentioned, but enough has been said to show that Nature has drawn many lines between the Snipe and the Woodcock, but unfortunately she has not drawn them in the same place. If the Snipes were separated from the Woodcocks on any of the seven characters enumerated, the only lines which would be coincident would be those formed by the 4th and 5th, both of which are founded upon colour and not structure. Two conclusions may be arrived at from the foregoing facts. One of these is that the characters of the Woodcocks and the Snipes are so closely interlaced that no ornithologist attempting classification on scientific principles would be likely to advise the subdivision of such a natural group as the genus *Scolopax*. The other conclusion requires consideration at greater length.

Structural characters more recent than pattern of colour.

Some ornithologists, whom it can scarcely be regarded as discourteous to style the pedantic school, not only separate the Woodcocks generically from the Snipes, but further subdivide each of these groups. These writers have adopted a theory that what they call structural characters are of generic value, whilst they regard difference of colour as only of specific value. In accordance with this notion, which I venture to call ante-Darwinian and ante-Huxleyan, they have placed the American Woodcock and the Jack Snipe in distinct genera, because in the former some of the primaries are remarkably attenuated, and in the latter the bill and the sternum are slightly exceptional, regardless of the facts

that the American Woodcock is apparently more nearly related to the European Woodcock than either of them are to the Moluccan Woodcock, and that the Jack Snipe and the Common Snipe are obviously nearer related to each other than either of them are to the Imperial Snipe of Colombia. All generic distinctions must be genetic distinctions, otherwise they are of no value. The theory that structural characters only are of generic value is either based upon the presumption that they date further back than characters founded upon difference in colour and pattern of colour, or it is an antiquated, unscientific, and absurd hypothesis.

In dividing the Snipes from the Woodcocks there cannot be much doubt that the natural line is that laid down by our fourth character and confirmed by the fifth, both characters being founded on differences of pattern of colour. It can scarcely be denied that in the Snipes, at all events, differences in the pattern of colour are of older genetic date, and therefore of higher generic value, than so-called structural differences, and that those ornithologists who maintain the contrary are advocating a hypothesis inconsistent with the theory of the evolution of species.

Semi-Woodcocks.

The Snipes which are nearest allied to the four Woodcocks are presumably five species, one of which has the inner webs of the primaries barred as in two of the typical Woodcocks, and the other four have the tibia feathered almost to the joint of the tarsus, but have only fourteen tail-feathers, a character which fortunately excludes one or two species in which there is much individual variation in the feathering of the tibia. They further resemble the Woodcocks in having, so far as is known, pale-coloured eggs. It is necessary to coin a name for this group, and I propose to call them Semi-Woodcocks.

Typical Snipes.

We have left the important group of typical Snipes, the *crème de la crème* of the genus, possibly the most highly developed, because showing the least trace of Woodcock blood and the closest relationship amongst themselves. One of them, which might almost be regarded as subgenerically distinct, is the Jack Snipe, which differs in many ways from its congeners. It has two instead of only one notch on each side of the posterior margin of the sternum. Like the Woodcocks it has only twelve tail-feathers, which resemble those of the Auckland Snipe in colour. Its tail is also more wedge-shaped than that of any other Snipe.

Synonymy of the Genus Scolopax.

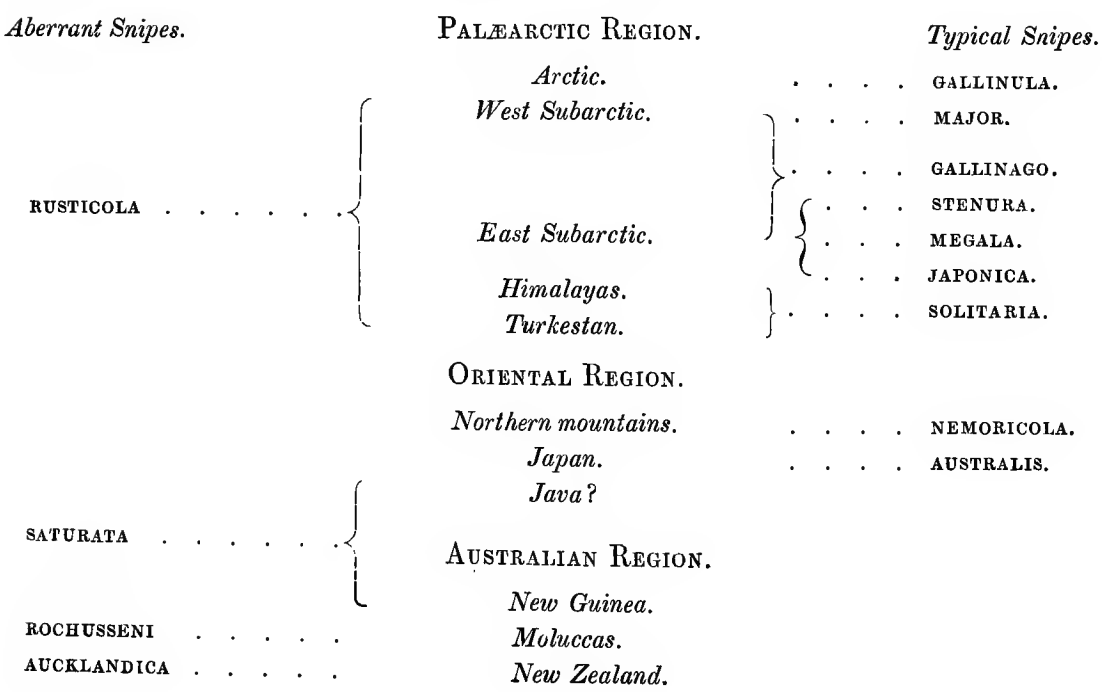
	Type.
Scolopax, *Linneus, Syst. Nat.* i. p. 145 (1758); *Linn. Syst. Nat.* i. p. 242 (1766)	No type.
Gallinago, *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 30 (1816)	S. major.
Rusticola, *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 348 (1816)	S. rusticola.
Telmatias, *Boie, Isis,* 1826, p. 980.	S. gallinago.

	Type.
Lymnocryptes, *Kaup, Nat. Syst.* p. 118 (1829)	S. gallinula.
Pelorhynchus, *Kaup, Nat. Syst.* p. 119 (1829)	S. gallinago.
Philolimnos, *Brehm, Vög. Deutschl.* p. 623 (1831)	S. gallinula.
Microptera, *Nuttall, Man. Orn.* ii. p. 192 (1834)	S. minor.
Nemoricola, *Hodgson, Journ. As. Soc. Beng.* vi. p. 491 (1837)	S. nemoricola.
Ascalopax, *Keyserling & Blasius, Wirb. Eur.* p. 216 (1840)	S. gallinula.
Homoptilura, *Gray, List Gen. Birds,* p. 70 (1840)	S. undulata.
Philohela, *Gray, List Gen. and Subgen. Birds,* p. 90 (1841)	S. minor.
Xylocota, *Bonap. Compt. Rend.* xli. p. 660 (1855)	S. jamesoni.
Cœnocorypha, *Gray, Cat. Gen. and Subgen. Birds,* p. 119 (1855)	S. aucklandica.
Spilura, *Bonap. Compt. Rend.* xliii. p. 579 (1856)	S. solitaria.
Neoscolopax, *Salvadori, Ann. Mus. Civ. Genov.* xviii. p. 331 (1882)	S. rochusseni.

The synonymy of the genus *Scolopax* is a melancholy record of the folly of ornithologists. The genus, as defined by Linneus, contained a somewhat heterogeneous collection of birds, including Whimbrels, Godwits, Snipes, and Sandpipers. Brisson turned out the Whimbrels, Godwits, and Sandpipers, and restricted the genus to the Woodcocks, Snipes, Painted Snipes, and the Dunlin. The European Woodcock (*Scolopax rusticola*), being the *Scolopax scolopax* of Brisson, must be regarded as the type.

GEOGRAPHICAL DISTRIBUTION

(during the breeding-season).



Aberrant Snipes.		*Typical Snipes.*
	ETHIOPIAN REGION.	
	Tropical Africa.	ÆQUATORIALIS.
	Madagascar.	MACRODACTYLA.
	NEARCTIC REGION.	
	Subarctic.	WILSONI.
MINOR	*East Subtropical.*	
	NEOTROPICAL REGION.	
UNDULATA	*Guiana.*	FRENATA.
GIGANTEA	*Brazil.*	
IMPERIALIS	*Columbian Andes.*	NOBILIS.
JAMESONI	*Peruvian Andes.*	ANDINA.
STRICKLANDI	*Chilian Andes.*	CHILENSIS.
	Falkland Islands.	MAGELLANICA.

Climatic distribution.

The genus *Scolopax* belongs for the most part to the Temperate Regions, but it may be regarded as cosmopolitan. The distribution of the 27 species and subspecies which it contains is as follows during the breeding-season :—

Arctic Eurasia	1	
Arctic species	—	1
Arctic and Temperate Eurasia	4	
Arctic and Temperate America	1	
Arctic and Temperate species	—	5
Temperate Eurasia	5	
Temperate N. America	1	
Temperate New Zealand	1	
Temperate S. America	7	
Temperate species	—	14
Temperate and Tropical Africa	1	
Temperate and Tropical species.	—	1
Tropical America	3	
Tropical Asia	2	
Tropical Africa	1	
Tropical species	—	6
Species and subspecies of *Scolopax*	—	27

Geographical distribution.

The geographical distribution of the Snipes is remarkable. Few genera of birds so nearly approach being absolutely cosmopolitan as the genus *Scolopax*. In the Arctic Regions both of the Old and of the New World Snipes breed beyond the Arctic Circle, in Norway, under the influence of the Gulf-stream, as far north as latitude 70°. No true Snipe is known to breed in Australia (the eggs attributed to the Australian Snipe are undoubtedly those of the Australian Painted Snipe); nor is any Snipe known to breed in any of the Pacific islands, with the exception of Auckland Island and the Chatham Islands, south of New Zealand. No true Snipe breeds in the Oriental Region, except at high elevations in the Himalayas and other mountain-ranges; but after the breeding-season both India, the Malay Peninsula, and Australia are visited by enormous numbers of Snipe. Otherwise the Snipes are cosmopolitan, breeding in Europe, Asia, Africa, and both North and South America.

Local distribution.

The Snipes are not shore-birds; had they been, they would doubtless have had a summer plumage different to that of winter. They live in forest-swamps and open marshes where there is plenty of cover, and where they are as much concealed in winter as in summer. Neither can they be called Arctic birds; they range up to, but scarcely beyond, the Arctic Circle, and breed in many subtropical countries. This partiality of the Snipes for cover is probably an important factor in the history of the evolution of the genus *Scolopax*. There can be little doubt that the ancestral species of the genus, wherever it came from, gradually extended its range until it became circumpolar, but the distance between Greenland and Scandinavia probably prevented any but shore-birds from having the area of their distribution continuous in both directions. Hence we may assume that as the Snipes are not shore-birds differentiation commenced at a very early period with them. The influence of the Gulf-stream and the mountainous character of Scandinavia probably brought the forests down to the coast in Lapland, so that the Snipes of that district became forest-birds and developed into Woodcocks; whilst the Rocky Mountains proved almost as favourable to forest-growth, but in the absence of the warmth produced by the Gulf-stream, the forests were separated by a tundra from the shore, where the Snipes appear to have developed into Semi-Woodcocks, so that when the Post-Pliocene Glacial Period drove them south, they were already partially differentiated into two species, one frequenting the marshes, and the other the forests.

Differentiation commenced early.

Origin of Woodcocks.

Semi-Woodcocks.

Emigrations of Woodcocks.

During the Pliocene Age the Woodcocks appear to have gradually extended their range eastwards throughout the forest-districts of the Palæarctic Region; and during the Post-Pliocene Glacial Epoch some of them (the ancestors of *S. minor*) appear to have emigrated across the Atlantic by way of the Azores to the Eastern States, whilst others found isolated homes in Java (the ancestors of *S. saturata*) and in the Moluccas (those of *S. rochusseni*).

The Semi-Woodcocks of the Rocky Mountains were driven south by the Post-Pliocene Glacial Epoch, and appear to have become isolated and differentiated in the northern

Andes (*S. jamesoni* and *S. imperialis*), the Southern Andes (*S. stricklandi*), and the Pampas of South America (*S. undulata*), whilst the most enterprising party found a home on the Auckland Islands (*S. aucklandica*).

Original home of the Jack Snipe.

It is difficult to assign an exact locality as the place where the Jack Snipe (*S. gallinula*) was isolated and differentiated during the Post-Pliocene Glacial Epoch; but the extent to which differentiation has taken place points to complete isolation, and the small size of the bird is an argument in favour of isolation on an island. The fact that its present range of distribution extends from the Atlantic to the Pacific suggests an island midway between the two; and none of its present winter-quarters fulfil all these conditions so well as the island of Ceylon.

Emigrations of Typical Snipes.

The Typical Snipes seem to have been the most adventurous, possibly because their original home having been, as it now is, the swamps caused them to multiply with great rapidity. During the Pliocene Age they became differentiated into Typical Snipes, the *crème de la crème* of the genus, to all intents and purposes a circumpolar species. The Post-Pliocene Glacial Period drove them south. *S. wilsoni* retained the original area of distribution in the New World, and is the least variable species, though its migratory habits have obliged it to lengthen its wings and shorten its bill. *S. frenata* is the result of the surplus population which crossed the line to South America, where, not being obliged to migrate, it retained its rounded wings and longer bill. In a vast continent like South America it is not to be wondered at that more or less distinct local races have since developed themselves.

The different distribution of land in the Old World caused more isolation, and consequently more differentiation. The present winter-quarters of the various species probably represent the localities where their respective isolation and differentiation took place. *S. nemoricola* became a forest-bird, and was isolated on the outskirts of the Himalayas; *S. solitaria* was probably developed in China; *S. æquatorialis* crossed the Line and was isolated in South Africa; *S. gallinago* was isolated in the basin of the Mediterranean, and, being subjected to precisely the same influences as its Nearctic ally (the necessity to become a migrant), slightly changed in a similar direction. *S. major* was isolated in East Africa, *S. stenura* in India, *S. megala* in the Malay Archipelago, and *S. australis* became a migratory bird, breeding in Japan and wintering in Australia.

The latter species, commonly known as Latham's Snipe, seems to have early become more or less modified by its isolation in Japan, where it probably developed a very long bill. This inference is based on the fact that its nearest allies are *S. macrodactyla* in Madagascar and *S. nobilis* in Colombia, two species doubtfully distinct from each other.

Remarkable similarity between distant species.

The explanation of the apparently extraordinary fact that two such very closely allied birds inhabit such widely distant localities appears to me to be as follows:—Their nearest relation is unquestionably Latham's Snipe, which occupies a locality midway between them. This Snipe is a migratory bird, breeding in Japan and wintering in Australia. There

cannot be much doubt that it was once a resident in Japan, nor can there be any doubt that a change in the habits of a bird from being a resident to being a migrant, whose range of migration covers a distance of five thousand miles, soon produced a corresponding change of structure. Its rounded wings and exceptionally long and heavy bill must seriously have impeded its progress, and we may confidently assume that Nature soon lengthened the one to aid its powers of flight, and shortened the other so that it might have less weight to carry. What I wish to infer from this argument is the strong probability that Latham's Snipe, before it became a migratory bird, differed scarcely, if at all, from the present condition of its allies in Madagascar and Colombia. The cold of the Glacial Epoch not only forced it to winter in Australia, but so reduced the area of its breeding-grounds, that large bodies were compelled to emigrate in search of fresh ones, as Pallas's Sand-Grouse did in 1863. It is difficult to say why they did not stop in Australia and breed there; but there must be something either in the climate or food of that continent which does not suit the true Snipes during the breeding-season, as none of them are known to breed in Australia. But, be that as it may, one party of emigrants seem to have flown almost due west to find a suitable home in Madagascar, whilst another must have flown almost due east to secure excellent quarters in Colombia. The birds which founded these two colonies, having discovered situations suitable for both summer and winter residence, probably neither changed their habits nor their structure. Their descendants are probably almost identical in form and colour with the common ancestors of the three forms when they were residents in Japan, and that is probably the explanation of their remarkable similarity at the present day. They have never passed through the ordeal of annual migration or been subjected to the sifting process involved in the non-survival of the least fit to endure the perils of such journeys. The alternative hypothesis that the Japan bird has retained its characters, and that the Madagascan and Colombian species have changed, is open to the objection that it seems impossible that two colonies so remotely situated could have independently varied in the same direction to a similar extent.

Absence of Snipes in Australia.

There is one very remarkable fact connected with the Snipes, and that is that the number of tail-feathers appears to vary in distinct connection with geographical distribution, as if it was a climatic rather than a genetic variation. Those inhabiting Europe, Africa, and America have fourteen to sixteen tail-feathers, whilst those peculiar to East Siberia have from eighteen to twenty-six. This extraordinary development of additional tail-feathers in East Siberia is very remarkable, and is not confined to the Snipes. Two species of Ground-Thrushes, *Geocichla varia* from East Siberia, and *G. horsfieldi* from Java (the latter obviously the result of a comparatively recent emigration from the former), are distinguished from all other Thrushes by having fourteen instead of twelve tail-feathers; and the Sea-Eagle of Kamtschatka also stands alone amongst his *confrères* as the possessor of fourteen tail-feathers. It is perhaps impossible to discover any rational explanation of these curious facts. Modern evolutionists have

Extraordinary development of tail-feathers in East Siberia.

invented the hypothesis of Sexual Selection to explain those facts which appear to be incapable of explanation by the theory of Natural Selection. It seems impossible to imagine any benefit that could accrue to a species by increasing the number of its tail-feathers; and philosophers will probably explain this curious series of facts by attributing it to the influence of Sexual Selection, on the same grounds that many a man, not a philosopher, explains an action of which he is unable to give a rational defence, by saying that it was *a whim of his wife!*

Sexual selection.

The geographical distribution of the Snipes is almost an exact parallel to that of the Thrushes, a group of birds quite as cosmopolitan. The Common Snipe and the Song-Thrush and their respective allies inhabit the Nearctic and Palæarctic Regions. The Snipes of the Ethiopian Region and the *Planestici* (*Turdus olivaceus* and its allies) of the same Region find the closest possible allies in the Neotropical Region. The Semi-Woodcocks and Ouzels (*Merula*) are represented by near allies in the Himalayas and in Tropical America, though the former have not left traces of their emigration in the Pacific Islands as the latter have done. The coincidence can scarcely be regarded as accidental, but appears to be an instance of the same causes producing the same effect.

Parallel distribution of Thrushes.

The geographical distribution of the Snipe appears to be somewhat anomalous from either the Passerine or the Batrachian point of view. The Painted Snipes are confined to the Equatorial Southern Zone, and are found in each of its four Regions—the Indian, the African, the Tropical American, and the Australian Regions. The Woodcocks are also found in the Northern Zone; but those inhabiting the Europo-Asiatic Region and the eastern half of the North-American Region appear to form one group, whilst the other is found only in the south-east of the Indian and the north-west of the Australian Region. The range of the Semi-Woodcocks, being confined to the islands near New Zealand and the Andes, would be most complicated if expressed in terms of either system of Regions. The typical Snipes are only absent during the breeding-season from the Oriental and Australian Regions; but it is worthy of note that the only species found in the Nearctic Region finds its nearest ally in the Palæarctic Region, whilst some of the Snipes of the Ethiopian Region are doubtfully distinct from some of those of the Neotropical Region.

Distribution of Snipes.

KEY TO THE SPECIES.

For convenience of diagnosis the Snipes may be divided into three groups. The first group contains the Typical Snipes which have fewer than 17 tail-feathers; the second comprises those Typical Snipes which have more than 17 tail-feathers, and which may therefore be styled Aberrant Snipes; and the third includes both the Woodcocks and the Semi-Woodcocks, which are classed together so that the student may see how many characters they have in common.

A. Typical Snipes. Markings on the head longitudinal. Tibia bare of feathers for some distance above the joint. Number of tail-feathers not exceeding 16. No bars on the inner webs of the primaries.

Ground-colour of outer tail-feathers pure white.
Width of outer tail-feathers less than $\frac{1}{4}$ in.

- **major** . . . . . — 16 tail-feathers.
- **æquatorialis** . . . — 16 tail-feathers.
- **frenata** . . . . . — 16 tail-feathers.
- **nobilis** . . . . . — 16 tail-feathers. Bill more than $3\frac{1}{4}$ inches long.

Tarsus, middle toe, and claw 3·4 to 3·6 in.

- **macrodactyla** . . — 16 tail-feathers. Bill more than $3\frac{1}{4}$ inches long.
- **wilsoni** . . . . — 16 tail-feathers.
- **gallinago** . . . . — 14 tail-feathers.
- **gallinula** . . . . — 12 tail-feathers.

Of these, *S. nobilis*, *S. macrodactyla*, and *S. æquatorialis* are resident species, in which the shortest secondaries project far beyond the longest primary-coverts ; but, unfortunately for the importance of the character, some of the local races of *S. frenata* are resident and others migratory, so that both forms of wing occur within the limits of that species.

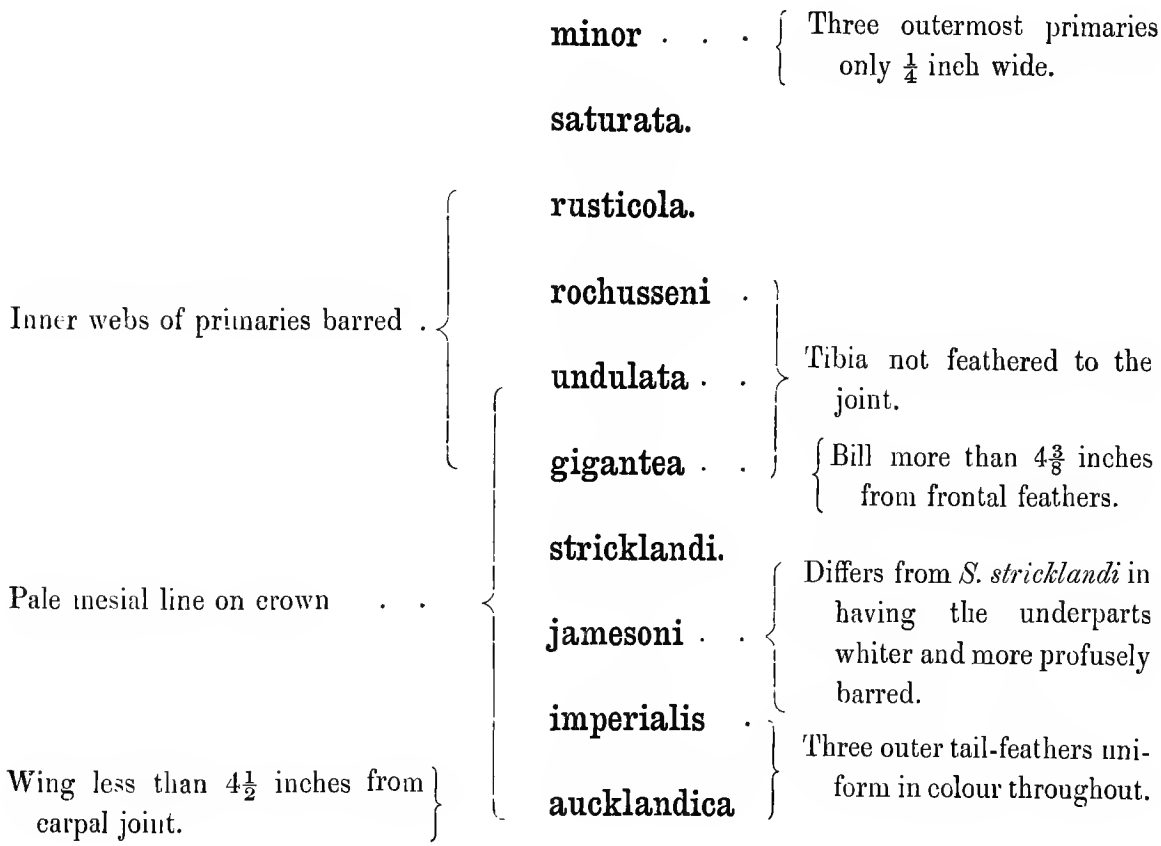
B. Aberrant Snipes. Markings on the head longitudinal. Tibia sometimes, but very seldom, feathered to the joint. Number of tail-feathers exceeding 16. Bars on the inner webs of the primaries absent or confined to the terminal half.

- **stenura** . . . . — 26 tail-feathers, of which 16 are less than ·2 in. wide.
- **megala** . . . . — 20 tail-feathers, of which 12 are less than ·3 in. wide.
- **solitaria** . . . . — Some feathers of the upper parts margined with white.
- **nemoricola** . . . — Secondaries extending ·6 in. beyond primary-coverts.
- **australis** . . . . — 18 tail-feathers, of which only 4 are less than ·3 in. wide.

Of these species *S. solitaria* and *S. nemoricola* often have the tibia feathered nearly to

the joint; they are also said to vary in the number of their tail-feathers, but I have never found more than 18.

C. Woodcocks and Semi-Woodcocks. This group contains 10 species and subspecies, in which the characters dovetail into each other in a remarkable manner: the first four have the markings on the head transverse; the first three and the last four have the tibia feathered almost or quite to the joint; none of them have more than 16 tail-feathers; and the second to the sixth have bars on the outer webs of the primaries.



The first four species are not only distinguished by having the markings on the crown transverse, but also by having the tail-feathers tipped with silvery white on the under surface. In all of them the outermost secondary extends an inch or more beyond the longest primary-coverts—a somewhat remarkable fact, as *S. minor* and *S. rusticola* are migratory birds. In the two previous groups the broad wing is always correlated with non-migratory habits, and appears to be purely an adaptive character, denoting analogy rather than affinity; whilst in this group the broad wing seems to be inherited from a

common ancestor, found alike in migratory and in resident species, whether they live in forests or on open swamps.

*** *New-Zealand Semi-Woodcock.*

SCOLOPAX AUCKLANDICA.

AUCKLAND SNIPE.

Diagnosis. SCOLOPAX tibiis ferè omninò vestitis : magnitudine parvâ (alæ circ. 100 millim.) : abdomine fulvo.

Variations. THE alleged variations of this species do not appear to have any geographical significance, but apply only to age.

Synonymy.
Gallinago aucklandica, *Gray, Voy. Ereb. and Terr., Birds,* p. 13 (1846).
Scolopax holmesi, *Peale, U. S. Expl. Exp.* 1838–1842, viii. p. 229 (1848).
Cœnocorypha aucklandica (*Gray*), *Gray, Cat. Gen. and Subgen. Birds,* p. 119 (1855).
Scolopax aucklandica (*Gray*), *Cassin, Zool. U. States Exploring Exp.* 1838–42, *Birds,* p. 311 (1858).
Gallinago pusilla, *Buller, Ibis,* 1869, p. 41.

Literature.
PLATES.—Gray, Voy. Ereb. and Terr., Birds, pl. 13.
HABITS.—Travers, Trans. New Zealand Inst. v. p. 217.
EGGS.—Unknown.

Specific characters. The Auckland Snipe, with a *length of wing of about* $4\frac{1}{4}$ *inches*, is distinguished by its small size from all the other species except from *S. gallinula* and *S. andina*. As both these species have white bellies, the character of *underparts buff* with darker markings on the breast and flanks completes the diagnosis.

Geographical distribution. The Auckland Snipe has occurred on the Snares Islands, about 150 miles south of New Zealand (Hügel, Ibis, 1875, p. 391), on Auckland Island, 150 miles further south (Gray, Zool. Erebus and Terror, Birds, p. 13), and on the Chatham Islands, about 300 miles to the east (Travers, Trans. New Zealand Inst. v. p. 217; Hutton, Ibis, 1872, p. 247). Buller says that Capt. Hutton and Mr. Kirk have recorded its occurrence in the

Gulf of Hauraki near Auckland, but I have not been able to find the record. It is probably a mere coincidence that its island life has dwarfed it exactly to the size of a Jack Snipe. In every other respect it is a Semi-Woodcock, and is probably nearest allied to *S. stricklandi*, though the absence of bars on most of the outer tail-feathers is a character which it shares with *S. imperialis*.

*** *Asiatic Snipes.*

SCOLOPAX AUSTRALIS.

LATHAM'S SNIPE.

Diagnosis.

Scolopax rectricibus duodeviginti, quarum non nisi quatuor angustæ sunt (minus quam 8 millim.).

Variations.

No local races of this species are known.

Synonymy.

Scolopax australis, *Latham, Index Orn. Suppl.* p. lxv (1801).
Scolopax hardwickii, *Gray, Zool. Misc.* i. p. 16 (1831).
Gallinago australis (*Lath.*), *Gray, List Birds Coll. Brit. Mus.* iii. p. 111 (1844).

Literature.

Plates.—Gould, Birds of Australia, vi. pl. 40.
Habits.—Gould, Handbook Birds Austr. ii. p. 271.
Eggs.—Unknown.

Specific characters.

Latham's Snipe has 18 *tail-feathers, of which only two on each side are less than* ·3 *in. in width.* No other Snipe agrees with this diagnosis, but as some of the tail-feathers are occasionally missing in birds injured by shot, or procured during the moulting-season, it is advisable to add some further characters. It is a large species, the wing measuring 6·5 to 6·0 inch from the carpal joint. As might be expected in a bird of such an extensive range of migration, its primaries have been lengthened, apparently at the expense of its secondaries, the longest primary-coverts extending considerably beyond the outermost secondaries. The scapulars are broadly margined with buff, and the tibia is bare for some distance above the joint.

Geographical distribution. It breeds in both islands of Japan, and passes the Philippine Islands and the coasts of China on migration to winter in Australia and Tasmania.

SCOLOPAX NEMORICOLA.

WOOD-SNIPE.

Diagnosis. Scolopax secundariis valdè (circa 16 millim.) ultra primariarum tectrices extensis : rectricibus duodeviginti.

Variations. In this species the tibia is sometimes feathered to the joint, and sometimes bare for a quarter of an inch or more, but the latter is probably caused by abrasion.

Synonymy. Gallinago nemoricola, *Hodgson, Proc. Zool. Soc.* 1836, p. 8.
Nemoricola nipalensis, *Hodgson, Journ. As. Soc. Beng.* vi. p. 491 (1837).
Scolopax nemoricola (*Hodgson*), *Jerdon, Ill. Ind. Orn.* pl. ix. (1847).

Literature. Plates.—Jerdon, Ill. Ind. Orn. pl. ix.; Hume & Marshall, Game Birds India &c. iii. p. 325.
Habits. } Hume & Marshall, Game Birds India &c. iii. p. 325.
Eggs. }

Specific characters. The Wood-Snipe may be diagnosed from all its congeners by its combination of two characters : *tail composed of more than* 16 *feathers, shortest secondaries projecting more than half an inch beyond the longest primary-coverts.* The latter character indicates comparatively limited powers of flight, and is consistent with its recorded habits, which closely resemble those of the Woodcock.

The six central tail-feathers are black, broadly tipped with chestnut, but of the six outer feathers on each side (which are grey, irregularly barred with dark brown) only four on each side are very narrow (varying from ·1 to ·3 in.).

Geographical distribution. The Wood-Snipe appears to be entirely confined to India and Burma, breeding at high elevations in the Himalayas from Nepal to Assam, migrating in autumn to winter in hilly districts further south in those countries. The nearest allies of this species appear to be the other Snipes which, like it, have more than fourteen tail-feathers; but, strange to say, it bears a superficial resemblance to *S. jamesoni* and *S. imperialis* from the northern Andes. The three species have the whole of the underparts profusely barred, and the

outer web of the first primary plain brown like the inner web. The Asiatic species is distinguishable at a glance by the broad buff dorsal stripes, which are almost obsolete in its South-American allies, as well as by its smaller size (wing under $5\frac{3}{4}$ inches instead of over 6 inches), and, if the tail be perfect, by having eighteen rectrices.

SCOLOPAX SOLITARIA.

HIMALAYAN SOLITARY SNIPE.

Diagnosis.

Scolopax scapularibus albo non fulvo striatis : rectricibus duodeviginti.

Variations.

Examples from Japan differ so much from extreme forms from Turkestan that they may fairly be regarded as subspecifically distinct.

Synonymy.

Gallinago solitaria, *Hodgson, Proc. Zool. Soc.* 1836, p. 8.
Scolopax hyemalis, *Eversmann, Bull. Soc. Mosc.* xviii. pt. i. p. 257 (1845).
Spilura solitaria (*Hodgson*), *Bonap. Compt. Rend.* xliii. p. 579 (1856).
Scolopax solitaria (*Hodgson*), *Swinhoe, Ibis,* 1863, p. 444.

Literature.

Plates.—Eversmann, Bull. Soc. Mosc. 1845, pl. vi. ; Hume & Marshall, Game Birds India &c. iii. p. 333.

Habits. } Hume & Marshall, *loc. cit.*
Eggs. }

Specific characters.

The Solitary Snipe is the only species with *more than* 16 *tail-feathers* in which the upper parts, especially *the outer margins of the scapulars, are streaked with white* instead of buff. In addition to the eight central tail-feathers, which are broad and suffused with chestnut towards the tip, there are usually five narrower feathers on each side (varying in width from ·15 to ·3 inch) which are dark brown, barred with white for at least the terminal two-thirds of their length. I have never found more than 18 tail-feathers, but Jerdon says that there are 20, and Hume makes the number vary from 16 to 24 !

Examples from Turkestan and the Himalayas differ slightly from those found in East

Siberia and Japan. They may perhaps be regarded as subspecifically distinct, and may generally be distinguished as follows:—

Subspecific characters.

Scolopax solitaria.	*Scolopax japonica.*
Lower breast white with no bars.	Lower breast white, barred with brown.
Pale dorsal stripes very broad.	Pale dorsal stripes very narrow.
Primaries marbled towards the tip.	Primaries plain throughout.

Japanese examples appear to be constant, as are all the Turkestan examples that I have seen; but in India slightly intermediate forms are found. Japanese birds are also, on an average, slightly smaller, varying in length of wing from 6·0 to 6·4 inch, whilst examples from Turkestan and India vary in length of wing from 6·4 to 6·8 inch.

Geographical distribution.

The Himalayan Solitary Snipe breeds at an elevation of from 10,000 to 15,000 feet from Turkestan, north-east as far as the Altai range, and south-east in the Himalayas as far as Assam, descending in autumn to winter in the lower valleys. Its nearest ally is scarcely more than subspecifically distinct from it, and probably interbreeds with it somewhere in South-east Siberia.

SCOLOPAX SOLITARIA JAPONICA.

JAPANESE SOLITARY SNIPE.

Diagnosis. SCOLOPAX SOLITARIA dorsi strigis pallidis angustioribus.

Variations. THE Japanese form of this species appears completely to intergrade with the Himalayan form.

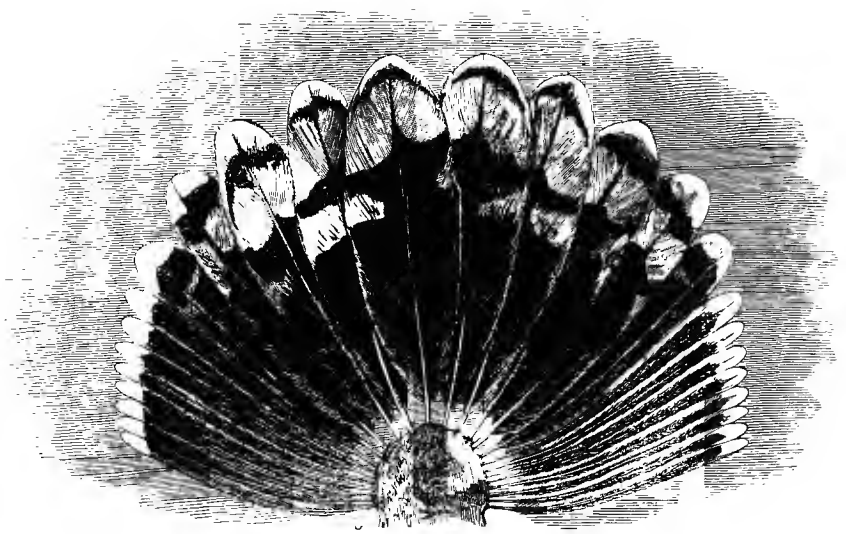
Synonymy. Gallinago japonica, *Swinhoe, Ibis*, 1873, p. 364.
Scolopax solitaria japonica (*Swinhoe*), *Seebohm, Ibis*, 1886, p. 129.

Literature. PLATES.—David & Oustalet, Ois. Chine, pl. 122.
HABITS.—Swinhoe, Proc. Zool. Soc. 1863, p. 313; Swinhoe, Ibis, 1873, p. 364.
EGGS.—Unknown.

The slight differences between the Japanese and Himalayan forms of the Solitary Snipe have been already pointed out, and may perhaps be regarded as sufficiently important to justify the subspecific separation of these very closely allied races.

Geographical distribution.

The Japanese Solitary Snipe breeds in Northern Japan, and probably in South-eastern Siberia as far east as Lake Baikal. It winters in China, though a few remain all the year round in Yezzo. It has hitherto been generally confounded with the preceding species, the synonymy of the two forms being still more confused. The *Scolopax hyemalis* of Eversmann (Bull. Soc. Mosc. 1845, p. 257, pl. vi.), from the Altai Mountains, is unquestionably the Himalayan bird. The *Gallinago japonica* of Bonaparte (Compt. Rend. 1856, p. 715) is apparently a *nomen nudum* without description of any kind, and may be any of the half-dozen Snipes of Japan; it therefore must be allowed to drop altogether out of the synonymy, leaving the coast perfectly clear for the adoption of Swinhoe's *Gallinago japonica* (Ibis, 1873, p. 364), of which the type is now in my collection.



SCOLOPAX STENURA.

PINTAIL SNIPE.

Diagnosis.

Scolopax rectricibus viginti-sex, quarum sedecim angustissimæ sunt (2 ad 4 millim.).

Variations.

No local races of this species are known, though of course it varies with age and season.

Synonymy.

Telmatias stenoptera, *Kuhl, fide Boie, Isis*, 1826, p. 979.
Scolopax stenura [1], *Kuhl, fide Bonap. Ann. Stor. Nat. Bologna*, iv. fasc. xiv. p. 335 (1830).
Scolopax horsfieldii, *Gray, Zool. Miscell.* 1831, p. 2.
Gallinago heterura, *Hodgson, Proc. Zool. Soc.* 1836, p. 8.
Gallinago biclavus, *Hodgson, Journ. As. Soc. Beng.* vi. p. 491 (1837).
Scolopax heterura (*Hodgson*), *Eyton, Proc. Zool. Soc.* 1839, p. 107.
Gallinago horsfieldii (*Gray*), *Gray, Cat. Mamm. &c. Brit. Mus.* iii. p. 110 (1844).
Gallinago stenura (*Kuhl*), *Gray, Genera of Birds*, iii. p. 583 (1846).
Scolopax pectinicauda, *Peale, U. S. Expl. Exp.* 1838–42, viii. p. 227 (1848).
Spilura horsfieldi (*Gray*), *Bonap. Compt. Rend.* xliii. p. 579 (1856).

Literature.

Plates.—Radde, Reis. im Süd. v. Ost-Sibir. ii. pl. xiii.; Hume & Marshall, Game Birds India &c. iii. p. 339.
Habits.—Hume & Marshall, Game Birds of India, Burma, and Ceylon, iii. p. 339.
Eggs.—Unknown.

Specific characters.

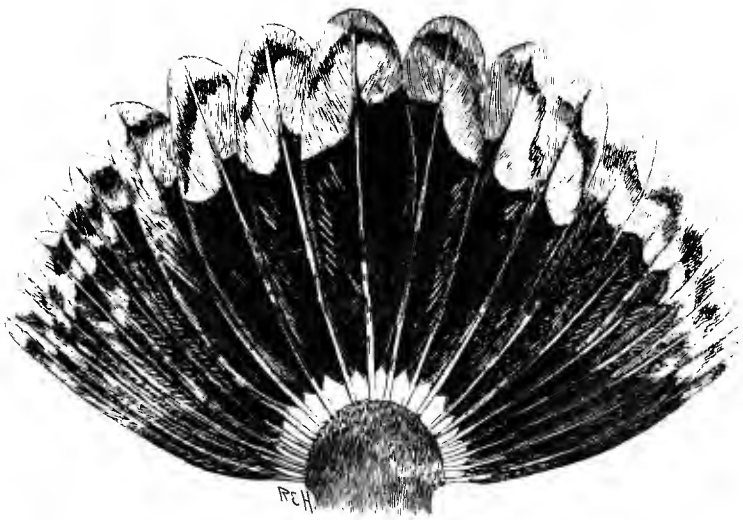
The Pintail Snipe may always be recognized by its *tail*. The *first* or outer *feather on each side is only* ·05 *inch across*; each succeeding feather increases in width, but so slightly that *the eighth is only* ·1 *inch across*, the ninth is ·25 inch across, leaving eight still broader central feathers, making 26 *in all*. It frequently happens, however, that some of the pin-feathers are missing.

Geographical distribution.

Of the three East-Siberian allies of the Common Snipe the Pintail Snipe is the smallest (wing 4·9 to 5·3 inch), with the greatest number of tail-feathers (26), and with the outer half-dozen or so on each side the most attenuated (under ·1 inch in width). It breeds as far north as the Arctic Circle, from the valley of the Yenesay to the Pacific. It is doubtful if it breeds as far south as the valley of the Amoor; but it winters in India, Ceylon, the Nicobars, the Andamans, the Burma Peninsula, China, and the islands of the Malay Archipelago.

Notwithstanding the extraordinary structural difference between the tail of the Pintail Snipe and that of the North-American form of the Common Snipe (*S. gallinago wilsoni*), these two species scarcely differ in any respect in colour or pattern of colour, though the latter is very complicated. The resemblance between them is so close, that it is doubtful whether it would be possible to distinguish one from the other if the tail of each were removed. Hume states that melanoid varieties of the Pintail Snipe also occur, which must resemble very closely the melanoid variety of the common species known as Sabine's Snipe. There can scarcely be any doubt that in this genus the pattern of the colour is a much more important character, dating much further back in its origin than the structure of the wings or tail.

[1] Hume calls this species *S. sthenura*, on the ground that it was so named by Bonaparte. This is a mistake; the introduction of the *h* appears to be a misprint, which first occurs in a translation (Isis, 1833, p. 1077).



SCOLOPAX MEGALA.

SWINHOE'S SNIPE.

Diagnosis.

Scolopax rectricibus viginti : quarum duodecim angustæ sunt (4 ad 8 millim.).

Variations.

No local races of this species are known.

Synonymy.

Gallinago megala, *Swinhoe, Ibis*, 1861, p. 343.
Gallinago heteroeaca, *Cabanis, Journ. Orn.* 1872, p. 317.
Scolopax megala (*Swinhoe*), *Rosenb. Malay Archip.* p. 278 (1878).

Literature.

Plates.—Unfigured.
Habits.—Swinhoe, Ibis, 1860, p. 66.
Eggs.—Dybowski, Journ. Orn. 1873, p. 104.

Specific characters.

Swinhoe's Snipe may be most easily recognized by its tail. It has 12 feathers (6 on each side) which vary from ·15 to ·3 inch in width, in addition to the eight central feathers (making 20 altogether). It is a slightly larger bird than the Pintail Snipe, but is not so large as Latham's Snipe, the *length of wing varying from* 5·4 *to* 5·6 *inch*. So far as I know there is no difference of any kind in the colour or pattern of colour between this species and several of its allies. They only differ in dimensions and in the number and shape of the outer tail-feathers.

Geographical distribution.

It breeds in South-east Siberia from Lake Baikal to the north island of Japan, and, passing through China on migration, winters in the islands of the Malay Archipelago.

*** *Asiatic and European Snipes.*

SCOLOPAX GALLINULA.

JACK SNIPE.

Diagnosis. Scolopax dorso purpureo: scapularibus viridi-iridescente ornatis.

Variations. Examples from England and Japan appear to be precisely similar.

Synonymy.

Scolopax gallinago minor, *Brisson, Orn.* v. p. 304 (1760).
Scolopax gallinula, *Linneus*[1], *Syst. Nat.* i. p. 244 (1766).
Gallinago minima, *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 31 (1816).
Lymnocryptes gallinula (*Linn.*), *Kaup, Natürl. Syst.* p. 118 (1829).
Philolimnos gallinula (*Linn.*), *Brehm, Vög. Deutschl.* p. 623 (1831).
Gallinago gallinula (*Linn.*), *Bonap. Comp. List B. Eur. & N. Amer.* p. 52 (1838).
Ascalopax gallinula (*Linn.*), *Keyserling u. Blasius, Wirb. Eur.* p. lxvii (1840).
Telmatias gallinula (*Linn.*), *Droste, Vog. Bork.* p. 234 (1869).

Literature.

Plates.—Daub. Pl. Enl. no. 884; Gould, Birds Gt. Brit. iv. pl. 81; Dresser, Birds of Europe, vii. pl. 544.
Habits.—Seebohm, British Birds, iii. p. 247.
Eggs.—Seebohm, British Birds, pl. 28. figs. 7, 9.

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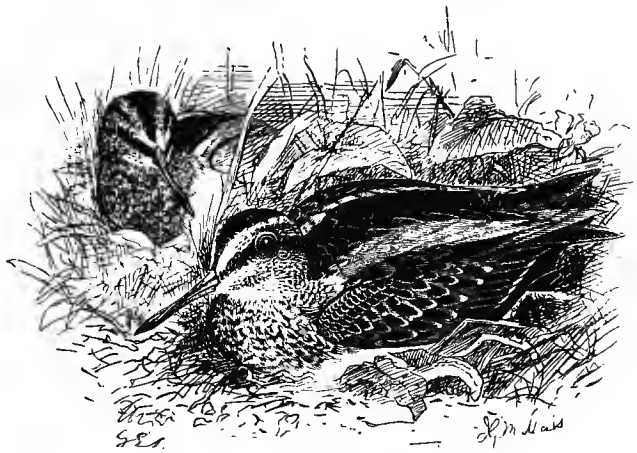
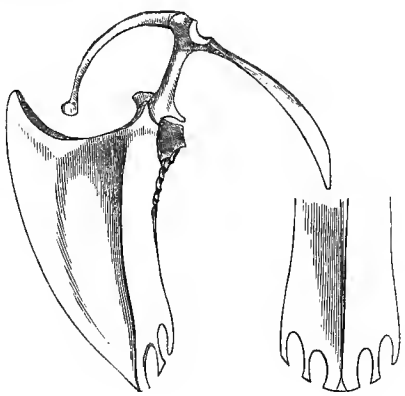
[1] It is a remarkable fact that the Jack Snipe was not known to Linneus when he wrote his tenth edition of the 'Systema Naturæ.'

The Jack Snipe and the Auckland Snipe are the two smallest species in the genus, but the former may perhaps be most easily diagnosed from all its congeners by the *purple gloss on its mantle* and the *metallic green on the inside webs of its scapulars*. Specific characters.

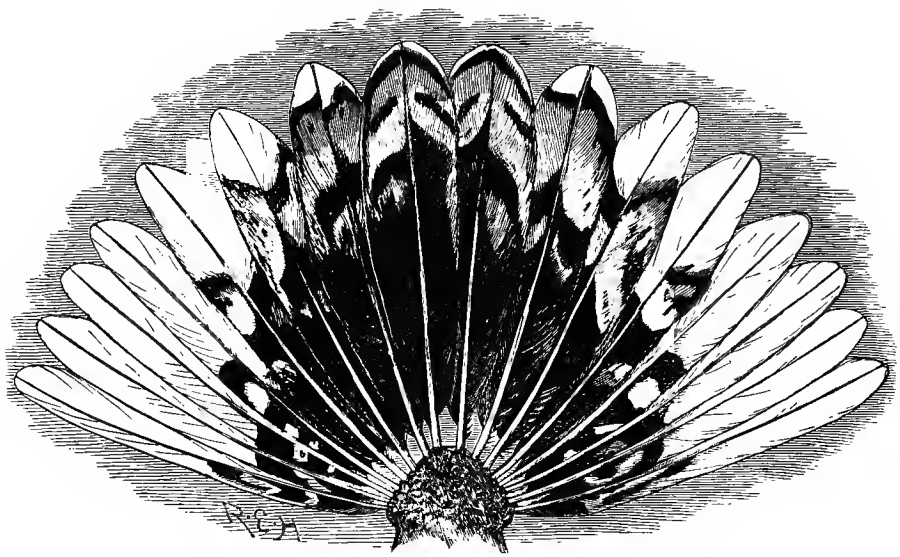


It is irregularly distributed, during the breeding-season, in the Arctic Regions from the Atlantic to the Pacific. It breeds on the Dovrefjeld above the limit of forest-growth, and throughout the tundras of Lapland. Henke says that it is only seen on migration at Archangel; Hoffmann records it from the source of the Petchora; and Middendorff met with it on the Boganida River, east of the Yenesay, in lat. 70°. It doubtless breeds in North-east Siberia, since it has occurred repeatedly in Japan and once in Formosa. Dybowski did not meet with it near Lake Baikal, but Finsch records it on migration from South-west Siberia. Severtzow says that it passes through Turkestan; and Bogdanow records it in spring and autumn in the valley of the Volga. It winters throughout the basin of the Mediterranean and inland in Africa north of the Great Desert, as well as in Persia, Afghanistan, India, Ceylon, and Burma. Geographical distribution.



The sternum of the Jack Snipe differs from that of its congeners in having two notches on each side of the posterior margin. This circumstance and the fact that it has Sternum.

only twelve rectrices are probably the reasons why it has been allowed to retain the genus created for its reception in the præ-Darwinian dark ages.



SCOLOPAX MAJOR.

GREAT SNIPE.

Diagnosis. Scolopax rectricibus sedecim, quarum quatuor laterales pro majore parte albæ sunt; tectricibus mediis latè albo terminatis.

Variations. No local races of this species are known.

Synonymy.

Gallinago media, *Gerini, Orn. Meth. Dig.* iv. p. 59, pl. cdxlvi. (1773).
Scolopax media (*Gerini*), *Latham, Gen. Syn. Suppl.* i. p. 292 (1787).
Scolopax major, *Gmelin, Syst. Nat.* i. p. 661 (1788).
Gallinago major (*Gmel.*), *Leach, Syst. Cat. Mamm. &c. Brit. Mus.* p. 31 (1816).
Scolopax palustris, *Pallas, Zoogr. Rosso-Asiat.* ii. p. 173 (1826).
Telmatias major (*Gmel.*), *Brehm, Vög. Deutschl.* p. 615 (1831).
Scolopax leucurus, *Swainson, Faun. Bor.-Amer.* ii. p. 501 (1831).
Gallinago montagui, *Bonap. Comp. List B. Eur. & N. Amer.* p. 52 (1838).
Ascalopax major (*Gmel.*), *Keyserling u. Blasius, Wirb. Eur.* p. lxxviii (1840).
Scolopax solitaria, *Macgillivray, Man. Brit. B.* ii. p. 102 (1842, *nec Hodgson*).
Gallinago media (*Gerini*), *Lichtenstein, Nomencl. Av.* p. 93 (1854).

Literature.

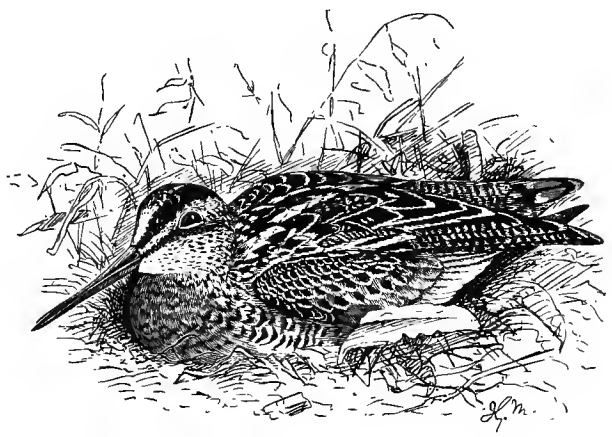
PLATES.—Gould, Birds of Gt. Brit. iv. pl. 78; Dresser, Birds of Europe, vii. pl. 541.
HABITS.—Seebohm, British Birds, iii. p. 237.
EGGS.—Seebohm, British Birds, pl. 28. figs. 1, 3.

Specific characters.

The Great Snipe is the only species of the genus which combines the two characters of *predominant colour of four outer tail-feathers on each side pure white*, and *median wing-coverts broadly tipped with pure white*.

Geographical distribution.

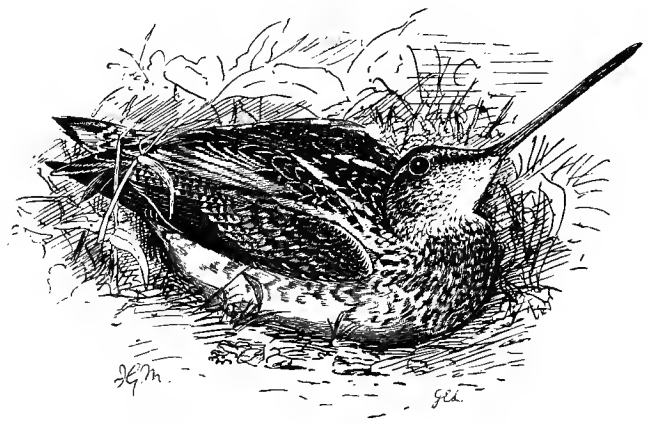
The geographical distribution of the Great Snipe is a very remarkable one, extending in summer from Scandinavia to the valley of the Yenesay, but in winter confined to the basin of the Mediterranean and the continent of Africa. The Great Snipe is not even known to pass through Turkestan on migration. It breeds in suitable localities throughout the basin of the Baltic, and in Scandinavia as far north as lat. 70°. To the British Islands it is only an accidental wanderer on migration, and has occurred in most parts of the country, including the Orkneys and Shetlands, but it is not known to have visited Iceland or the Faroes. In the valleys of the Petchora and the Obb it ranges up to lat. 67½°; but



in the valley of the Yenesay it does not go further north than lat. 66½°. There is no satisfactory evidence that it has ever occurred near Lake Baikal or in the valley of the Amoor. It passes through the Caucasus and North Persia on migration, and winters in suitable localities throughout South Africa, a few remaining in the basin of the Mediterranean. It crosses the Straits of Gibraltar, though not in great numbers, in spring and autumn; but in Malta it is said only to occur on the spring migration.

This geographical distribution is specially interesting as affording one of many other examples of migratory birds which have extended their breeding-range to a considerable distance, but, in consequence of their having continued to follow their ancient "fly-lines,"

have caused the line of migration to and from their more recently annexed breeding-grounds to be remarkably circuitous.



SCOLOPAX GALLINAGO.

COMMON SNIPE.

Diagnosis. Scolopax rectricibus quatuordecim aut sedecim, quarum externæ vix atteuuatæ (lat. 8 ad 10 millim.) et vix albo notatæ sunt: rostro medio (long. 60 ad 75 millim.): tibiarum parte extremâ (circ. 10 millim.) denudatâ.

Variations. The Common Snipe is a very variable species, as will hereafter appear, when it is compared with the North-American Snipe, which may fairly be regarded as only subspecifically distinct from it.

In addition to these variations, the Common Snipe is also subject to other variations of a more abnormal character. As is probably the case with nearly every species of bird, white or cream-coloured varieties are occasionally met with. Sabine's Snipe appears to be a partial melanism; and Brehm's Snipe has the outer tail-feathers elongated, so as to be as long or even longer than the central ones. These peculiarities are generally regarded as monstrosities, and are not known to be distinctive of the Snipes of any special locality; but there can be little doubt that, like many other diseases, they are more or less hereditary.

Synonymy. Scolopax gallinago, *Linneus, Syst. Nat.* i. p. 147 (1758); *Brisson, Orn.* v. p. 298 (1760); *Linn. Syst. Nat.* i. p. 244 (1766).

Scolopax cœlestis, *Frenzel, Beschr. Vög. u. Eier Wittenb.* p. 58 (1801).

Scolopax sakhalina, *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 359 (1817).

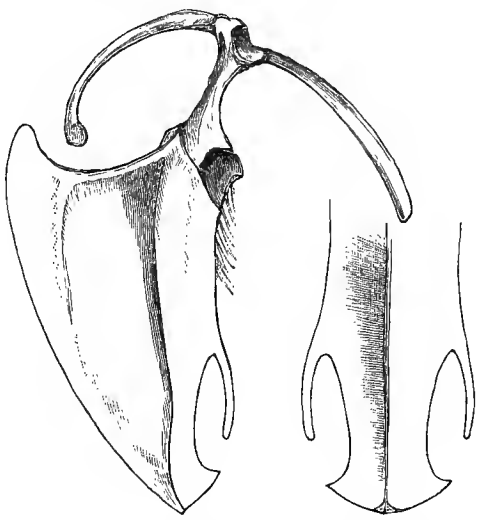
Scolopax brehmii, *Kaup, Isis,* 1823, p. 1147.
Scolopax sabini, *Vigors, Trans. Linn. Soc.* xiv. p. 557 (1825).
Telmatias gallinago (*Linn.*), *Boie, Isis,* 1826, p. 979.
Pelorychus brehmii (*Kaup*), Enalius sabini (*Vigors*), } *Kaup, Natürl. Syst.* pp. 119, 121 (1829).
Gallinago uniclavus, *Hodgson, Journ. As. Soc. Beng.* vi. p. 492 (1837).
Gallinago scolopacinus, *Bonap. Comp. List B. Eur. & N. Amer.* p. 52 (1838).
Scolopax peregrina (*Brehm*), *Temminck, Man. d'Orn.* iv. p. 435 (1840).
Ascalopax sabini (*Vigors*), Ascalopax gallinago (*Linn.*), } *Keyserling u. Blasius, Wirb. Eur.* pp. lxxvii, 216 (1840).
Gallinago gallinago (*Linn.*), *Lichtenstein, Nomencl. Av.* p. 93 (1854).
Gallinago vulgaris, *Dubois, Planches Col. Ois. Belg.* pl. 182 (1858).
Gallinago russata, *Gould, Birds Gt. Brit., Intr.* p. cxviii (1873).
Gallinago cœlestis (*Frenz.*), *Dresser, Birds of Eur.* vii. p. 641 (1880).

Literature.

PLATES.—Daub. Pl. Enl. no. 883; Gould, Birds of Gt. Brit. iv. pl. 79; Dresser, Birds of Europe, vii. pls. 542, 543.
HABITS.—Seebohm, British Birds, iii. p. 241.
EGGS.—Seebohm, British Birds, pl. 28. figs. 4, 6, 8.

Specific characters.

The Common Snipe may be most easily recognized by its *tail,* which consists of 14 *feathers* (*the four outermost of which vary from* ·4 to ·5 *inch*) in the European form, and of 16 *feathers* (*the four outermost of which vary from* ·3 to ·4 *inch*) in the American form. The only other species of Snipe with tails somewhat similar to that of the American form



are *S. major* and *S. macrodactyla.* The long bill of the latter (more than $3\frac{1}{2}$ inches) and the white outer tail-feathers of the former are sufficient distinction.

Geographical distribution.

The Common Snipe breeds throughout the whole of North Europe and Siberia, but is very rare north of lat. 70°, and in the southern portion of its breeding-range is chiefly confined to mountain-chains. Its range extends west to Iceland and the Faroes, and possibly to South Greenland, and it is said that in both the former localities a few remain to winter. It has been said to breed in Algeria, and is known to do so on the southern slopes of the Alps and in South Russia. Both Severtzow and Scully found it breeding in Turkestan, and Prjevalsky says that a few remain to breed in South-east Mongolia. It is a winter visitor to the basin of the Mediterranean and to North Africa, as far south in the west as the Azores, Madeira, the Canaries, and the valley of the Gambia, and in the east as far as the southern shores of the Gulf of Aden. In Asia it winters in Persia, India, Ceylon, the Andaman Islands, and Burma. It has once occurred on the Malay Peninsula, but passes regularly along the coasts of Japan on migration, to winter in China, Formosa, and the Philippine Islands.

*** *North-American Snipe.*

SCOLOPAX GALLINAGO WILSONI.

NORTH-AMERICAN SNIPE.

Diagnosis. SCOLOPAX GALLINAGO rectricibus sedecim, quarum externæ paulò attenuatæ (circ. 7 millim. lat.) sunt.

Variations. THE North-American Snipe appears completely to intergrade with the Common Snipe.

Synonymy.

Scolopax delicata, *Ord, Suppl. Wilson's Am. Orn.* p. 218 (1825).
Scolopax wilsonii, *Temminck, text to Pl. Enl.* no. 403 (1826).
Scolopax drummondii, } *Swainson & Richardson, Faun. Bor.-Amer.* ii. pp. 400, 501 (1831).
Scolopax douglasii, }
Gallinago wilsoni (*Temm.*), *Bonap. Comp. List B. Eur. and N. Amer.* p. 52 (1838).
Gallinago media wilsoni (*Temm.*), *Ridgway, Nom. N. Amer. Birds,* p. 44 (1881).
Scolopax gallinago wilsoni (*Temm.*), *Seebohm, British Birds,* iii. p. 241 (1885).
Gallinago delicata (*Ord*), *Coues & Co. Check-list N. Amer. Birds,* p. 148 (1886).

Literature.

PLATES.—Wilson, Am. Orn. pl. 47. fig. 1; Audubon, Birds Am. v. pl. 350.
HABITS.—Baird, Brewer, & Ridgway, Water-Birds N. Amer. i. p. 188.
EGGS.—Described by Brewer on p. 192 of the above-mentioned volume.

Subspecific characters.

A comparison of a large series of skins of the North-American Snipe with a still larger series of examples of the Common Snipe presents some curious anomalies. The extreme forms of the two species may be contrasted as follows:—

Scolopax gallinago.	*Scolopax wilsoni.*
Tail-feathers *fourteen* in number.	Tail-feathers *sixteen* in number.
Axillaries *white.*	Axillaries *transversely barred with broad dark bands.*
Breast with obscure dark *longitudinal streaks.*	Breast with obscure dark *transverse bars.*
Bill varying from 3·0 *to* 2·5 *inch* in length.	Bill varying from 2·7 *to* 2·3 *inch* in length.
Outer tail-feather crossed by *three* dark bars, diam. ·4 in.	Outer tail-feather crossed by *five* dark bars, diam. ·3 in.

So far as I know the American birds are always constant to their characters; but, unfortunately for the validity of the two species, there is not one of these characters (except perhaps the very short bill, which is not always characteristic of the American form) which does not frequently occur in examples from the Old World. Hume says that in India Fan-tailed Snipes with sixteen tail-feathers are common enough. Snipes with barred axillaries are perhaps the rule rather than the exception, even in England. Snipes with transversely-barred breasts are occasionally found in the Old World, and the number of bars across the outer tail-feathers of British-killed examples varies from three to five. Nevertheless, I have never seen an Old-World example of a Snipe possessing *all* the characters of the American species.

Geographical distribution.

The North-American Snipe is a summer visitor to the whole of the continent from the Atlantic to the Pacific as far north as the Arctic Circle and as far south as the latitude of New York. It winters in Mexico, Central America, the West Indies, and the extreme northern portion of South America. A few remain to breed as far south as Maryland, and a few remain to winter as far north as Texas.

The constancy of the characters of the North-American Snipe has induced many ornithologists of the New World to regard it as specifically distinct from our Common Snipe. The inconstancy of the characters of the latter form is, however, so great that this conclusion can scarcely be maintained. The Common Snipes of the Palæarctic Region

vary so much and so constantly in the direction of the Nearctic Snipe, that they must be regarded as little better than a race of mongrels.

*** *South-American Snipes and Semi-Woodcocks.*

SCOLOPAX STRICKLANDI.

STRICKLAND'S SNIPE.

Diagnosis. SCOLOPAX pileo in longitudinem striato: rectricibus quatuordecim omnibus fasciatis: tibiis ferè omninò vestitis: pectore et abdomine fulvis vix brunneo notatis.

Variations. No local races of this species are known.

Synonymy. Gallinago stricklandii, *Gray, List Birds Brit. Mus.* iii. p. 112 (1844).
Scolopax meridionalis, *Peale, U. S. Expl. Exp.* 1838-42, viii. p. 229 (1848).
Scolopax spectabilis, *Hartlaub, Naum.* 1853, p. 216.
Scolopax stricklandi (*Gray*), *Sharpe, Zool. Voy. Erebus and Terror, Birds, App.* p. 38 (1875).

Literature. PLATES.—Gray, Zool. Voy. Erebus and Terror, pl. 23; Cassin, U. States Exploring Exp. ed. 2, viii. pl. 35. fig. 1.
HABITS.—Peale, U. States Exploring Exp. 1838–42, viii. p. 229.
EGGS.—Obtained by Mr. Berkeley James in Chili.

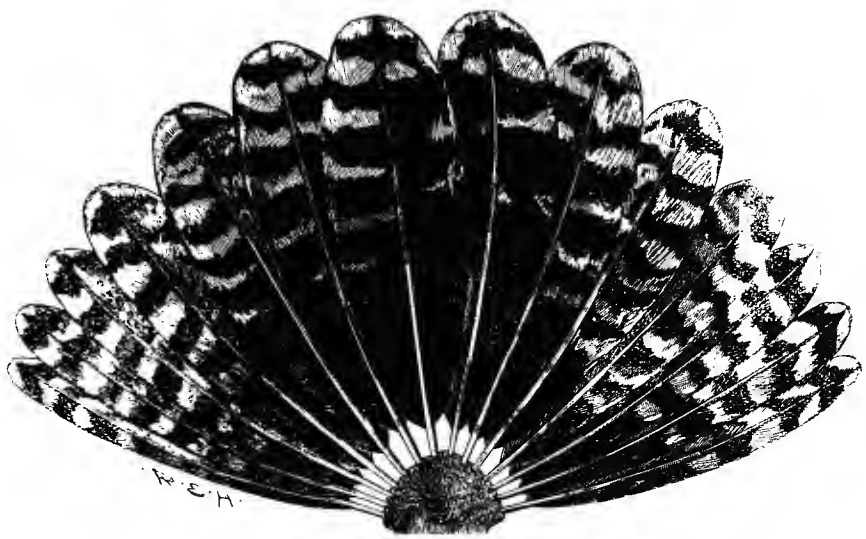
Specific characters. Strickland's Snipe is easily distinguished from the typical Woodcocks by the *longitudinal markings of the crown*. The two additional characters of *tibia feathered almost to the joint*, and *tail consisting of only* 14 *feathers*, distinguish it from both the typical and aberrant Snipes, and from one of the Semi-Woodcocks (*S. undulata*). From two other Semi-Woodcocks the *bars on the outer tail-feathers* is a sufficient distinction; but from Jameson's Snipe it can only be distinguished by the buff colour of all the pale parts, and by the almost entire absence of dark markings on the breast and belly.

The superficial resemblance between Strickland's Snipe and the Solitary Snipe is somewhat remarkable, but they have very different tails. Strickland's Snipe appears to have *only* 14 *tail-feathers*. The four outer ones on each side vary in width from ·22 to ·45 inch, and are black narrowly barred with buff. The six central feathers are broader, and the buff more nearly approaches chestnut, but the black scarcely becomes confluent on the outer webs, and leaves traces of buff-chestnut bars on the margin of the inner web. The Solitary Snipe, on the other hand, has 18 tail-feathers. The four outer ones on each side vary in width from ·1 to ·25 inch, and are brown, narrowly barred with white.

Strickland's Snipe is only known from Chili and Patagonia. It has been found as far south as Cape Horn; in Valdivia, in south lat. 40°; and Mr. Berkeley James observed it in the market at Valparaiso, which is the most northerly limit of its known range. Geographical distribution.

Strickland's Snipe is very rare in collections. The type is in the British Museum, and other examples are in the collection of Salvin and Godman, in my own collection, and in the Lynn Museum. On the continent it may be seen in the museums at Bremen and Leyden. Examples very rare.

In its habits it is a Woodcock and not a Snipe. It is described as frequenting damp thick forests or moist bushy lands, and as never seen on open marshy ground. Its egg is also like that of a Woodcock, having a pale stone-coloured ground, very different from the olive-brown ground-colour of the eggs of the Snipes.



SCOLOPAX JAMESONI.

JAMESON'S SNIPE.

Diagnosis.

Scolopax tibiis ferè omninò vestitis : rectricum quatuordecim lateralibus attenuatis (circ. 5 millim.), omnibus fasciatis : primariæ primæ pogonio externo haud fasciato : pectore et abdomine albescentis valdè brunneo fasciatis.

Variations.

No local races of this species are known.

Synonymy.

Xylocota jamesoni, *Bonap. Compt. Rend.* xli. p. 660 (1855).
Gallinago jamesoni (*Bonap.*), *Sclater & Salvin, Exotic Orn.* p. 196 (1869).
Scolopax jamesoni (*Bonap.*), *Seebohm, Ibis*, 1886, p. 130.

Literature.

PLATES.—Unfigured.

HABITS.—Described by Simons, who met with this species at an elevation of 11,000 feet on the Sierra Nevadas, in Colombia, as a very rare and shy bird, dodging amongst the tufts of grass in swampy places.

EGGS.—Unknown.

Specific characters.

Jameson's Snipe has many characters in common with the Typical Woodcocks, but *the markings on the crown are longitudinal*, and there are no traces of the silvery white tips on the under surface of the tail-feathers so conspicuous in that little group. It has a long thick bill and a short thick tarsus; the claw of the hind toe is very small, and *the tibia is feathered almost, if not quite, to the joint*, the latter character being sufficient to exclude it from the Typical Snipes. It has short primaries and long secondaries, and in other respects bears a superficial resemblance to the Wood-Snipe (*S. nemoricola*), but the restricted number of its tail-feathers excludes it from the group of Aberrant Snipes.

Nearest ally.

The tail of *S. jamesoni* differs so much from that of *S. nemoricola*, and resembles so much that of *S. stricklandi*, that there can be little doubt that the true affinities of the two South-American species are with each other rather than with the species which seem, in other respects, to be their East-Asian representatives. The variation in width of the four outer tail-feathers of Jameson's Snipe is from ·2 to ·5 inch, and their colour is very grey and the bars somewhat obscure. The six central feathers scarcely differ from those of Strickland's Snipe. Both species have *only* 14 *tail-feathers, all of which are barred.*

Of the group of Semi-Woodcocks to which it consequently belongs, the last-mentioned character excludes two, *S. imperialis* and *S. aucklandica*, both of which have three or more tail-feathers on each side plain brown without any bars. Two others, *S. undulata* and *S. gigantea*, are excluded by the first-mentioned character (having the tibia bare of feathers for some distance above the joint), and are further excluded by the distinct traces of bars on the inner webs of their primaries. The only other Semi-Woodcock is *S. stricklandi*, which is the nearest ally of Jameson's Snipe, and may possibly prove to be only subspecifically distinct from it; but in Strickland's Snipe the breast and belly are uniform buff without any bars, whilst in Jameson's Snipe they are dull white barred with brown.

Geographical distribution.

Jameson's Snipe is a resident in the mountain plateaux of the northern Andes, where it breeds at a high elevation. It was originally described by Bonaparte[1] from examples obtained by Jameson near Quito in Ecuador. It has since been obtained by Fraser on the

[1] Of the types one is in the collection of Canon Tristram, and the other in mine. They are labelled "Quitian Andes, W. Jameson," and were bought for a few pence at the sale of Sir William Jardine's birds when that magnificent collection was recklessly thrown away for a mere trifle. The old story, "somebody blundered."

southern slope of Chimborazo, about 14,000 feet above the sea (Sclater, Proc. Zool. Soc. 1860, p. 82), and by Buckley on the eastern slope of the main chain of the Andes in Bolivia (Sclater & Salvin, Proc. Zool. Soc. 1879, p. 641), and again recently by Stolzmann near the original locality (Taczanowski, Proc. Zool. Soc. 1885, p. 112). There can be little doubt that it occurs in Peru; it has not actually been procured in that country, but Jelski recognized its note (Tacz. Orn. Pérou, iii. p. 376).

SCOLOPAX IMPERIALIS.

IMPERIAL SNIPE.

Diagnosis.

Scolopax tibiis ferè omninò vestitis : rectricum tribus externis non fasciatis : magnitudine magnâ (alæ circa 150 millim.).

Variations.

Only one example of this species is known.

Synonymy.

Gallinago imperialis, *Sclater & Salvin, Proc. Zool. Soc.* 1869, p. 419.
Scolopax imperialis (*Scl. & Salv.*), *Seebohm, Ibis*, 1886, p. 130.

Literature.

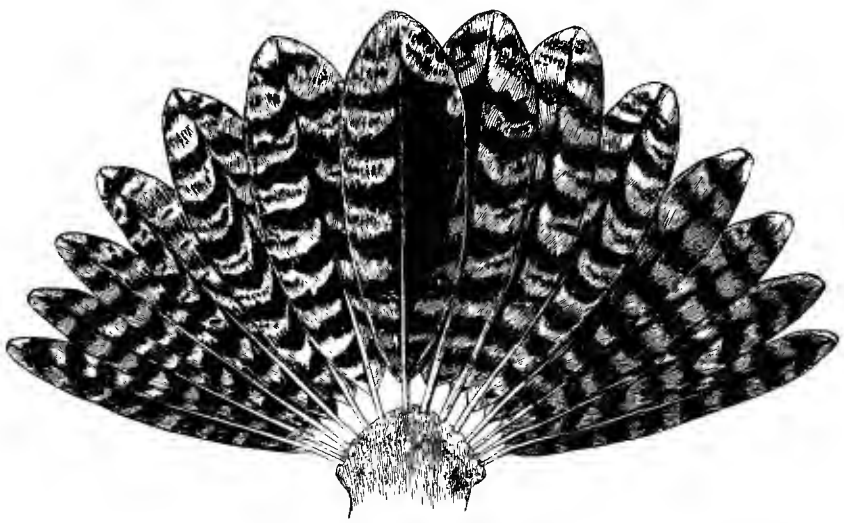
Plates.—Sclater & Salvin, Exotic Orn. pl. xcvii.
Habits.—Undescribed.
Eggs.—Unknown.

Geographical distribution.

Specific characters.

The Imperial Snipe is only known from a single skin, said to have been obtained in the interior of New Granada, which looks like a rufous phase of the last-mentioned species, adjoining the limits of whose range it was found. The fact that the *tarsus measures only* 1·4 instead of 1·5 inch, and that the *three outer tail-feathers* (which are all that are left on the unique example in the collection of Messrs. Salvin and Godman) are *plain brown without any bars*, apparently indicate that it is a good species. It may be diagnosed from its near ally, as well as from all other species of the genus, by the ground-colour of its upper parts, which is rich chestnut. It may also be diagnosed from all other known species of *Scolopax* by the great breadth of its wings. The outermost secondary extends about two inches beyond the longest primary-covert, nearly twice as much as in any other species of the group.

It is unquestionably very nearly allied to Jameson's Snipe, but will probably be found to be specifically distinct from that bird.



SCOLOPAX UNDULATA.

CAYENNE GIANT SNIPE.

Diagnosis. SCOLOPAX pileo in longitudinem striato: primariarum pogoniis internis fasciatis.

Variations. SOUTHERN examples are, on an average, so much larger that they may fairly be regarded as subspecifically distinct.

Synonymy.
Scolopax undulata, *Boddaert, Table Pl. Enl.* p. 54 (1783).
Scolopax paludosa, *Gmelin, Syst. Nat.* i. p. 661 (1788).
Homoptilura undulata (*Bodd.*), *Gray, List Gen. Birds,* p. 70 (1840).
Gallinago undulata (*Bodd.*), *Gray, Genera of Birds,* iii. p. 553 (1846).
Xylocota paludosa (*Gmel.*), *Bonap. Compt. Rend.* xli. p. 660 (1855).
Gallinago paludosa (*Gmel.*), *Schlegel, Mus. Pays-Bas, Scol.* p. 8 (1864).

Literature.
PLATES.—Daub. Pl. Enl. no. 895.
HABITS.—Buffon, Hist. Nat. des Ois. vii. p. 481.
EGGS.—Unknown.

Specific characters.

The Giant Snipe may be diagnosed from all the species of the genus which have, like it, the *bars on the head longitudinal* and not transverse, by its *barred primaries*. There are two forms of Giant Snipe which appear to be exactly alike in colour, but differ slightly in size. Their respective distribution has not been very accurately determined, nor has it been absolutely proved that they completely intergrade, but the following measurements of six examples leave little room for doubt on the subject:—

	S. undulata.	*S. gigantea.*
	inch.	inch.
Length of wing	6 to $6\frac{1}{2}$	$6\frac{3}{4}$ to 7
Length of bill	4 to $4\frac{1}{4}$	$4\frac{1}{2}$ to 5
Length of tarsus	$1\frac{1}{2}$ to $1\frac{7}{8}$	$2\frac{1}{4}$
Length of middle toe	$2\frac{1}{2}$	$2\frac{5}{8}$

Geographical distribution.

The Cayenne Giant Snipe is only known with certainty from the mountains of Guiana.

Buffon says that the Cayenne Giant Snipe is nocturnal in its habits, but differs from the Woodcock in being a bird of the swamps, avoiding the forests.

SCOLOPAX UNDULATA GIGANTEA.

BRAZILIAN GIANT SNIPE.

Diagnosis.

Scolopax undulata magnitudine majore (alæ plus quam 160 millim.).

Variations.

There cannot be much doubt that this bird completely intergrades with the preceding, from which it only differs in size.

Synonymy.

Scolopax gigantea, *Natterer, fide Temm. Pl. Col.* no. 403 (1826).
Gallinago gigantea (*Natt.*), *Gray, Genera of Birds*, iii. p. 583 (1846).
Gallinago lacunosa, *Lichtenstein, Nom. Av.* p. 93 (1854).
Xylocota gigantea (*Licht.*), *Bonaparte, Compt. Rend.* xliii. p. 579 (1856).
Scolopax undulata gigantea (*Temm.*), *Seebohm, Ibis*, 1886, p. 131.

Literature.

Plates.—Temminck, Pl. Col. no. 403.

Habits.—Undescribed.

Eggs.—I have eggs of this species procured near Buenos Ayres with the bird by Mons. L. Hardy du Dréssent, which exactly resemble those of the Woodcock in colour, but are twice the size.

Geographical distribution.

The difference between the Brazilian and Cayenne Giant Snipes has been already pointed out. The former has been obtained near the source of the Parana and near Buenos Ayres. Its reported occurrence in Peru and Cayenne may possibly be correct, but the evidence is scarcely conclusive.

SCOLOPAX FRENATA.

BRAZILIAN SNIPE.

Diagnosis.

Scolopax rectricibus sedecim, quarum laterales angustæ (minus quam 5 millim.), et valdè brunneo fasciatæ sunt: rostro breviore (minus quam 75 millim.).

Variations.

This species varies so much that I have been obliged to recognize three races as subspecifically distinct from the typical form.

Synonymy.

Scolopax frenata [1], *Illiger, fide Lichtenstein, Verz. Doubl.* p. 75 (1823, *descript. null.*).
Scolopax braziliensis, *Swainson & Richardson, Faun. Bor.-Amer.* ii. p. 400 (1831).
Gallinago frenata (*Illig.*), *Bonap. Compt. Rend.* xliii. p. 579 (1856).
Scolopax frenata brasiliensis (*Sw. & Rich.*), *Seebohm, Ibis,* 1886, p. 138.

Literature.

Plates.—Unfigured.
Habits.—Durnford, Ibis, 1877, p. 198.
Eggs, obtained by Capt. Harrison near Buenos Ayres, resemble dark varieties of those of the Common Snipe in colour, and measure 1·55 by 1·15 inch.

Specific characters.

Azara's Snipe may be diagnosed as having *sixteen tail-feathers*, of which the *outermost* are very narrow, *less than* ·2 *inch wide*, and *crossed by five or six brown bands*. As a further distinction from *S. nobilis*, in which the outer tail-feathers are ·25 inch wide, it is safest to add, *bill less than three inches long*.

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[1] I cannot agree with Messrs. Sclater and Salvin (Proc. Zool. Soc. 1868, p. 144) that Lichtenstein based his name upon Azara's "Becasina prima." He based it upon a skin of a Snipe from Brazil, still in the Berlin Museum, labelled "*Scolopax frenata*" by Illiger. He erroneously gave as a synonym no. 387 instead of 388 of Azara, a bird which is not known to have occurred in Brazil.

The typical form of this species is a small race which appears to be a resident in tropical South America east of the Andes. It scarcely differs from its Peruvian ally in length of wing, but in the length of its bill (which, measured from the frontal feathers, varies from 2·4 to 2·9 inch) it differs from that race, in which the bill rarely exceeds 2 inches in length. On the other hand, it scarcely differs from its two allies, which breed, the one in the Falkland Islands and the other in Chili, in the length of its bill; but in the length of its wing (which, measured from the carpal joint, varies from $4\frac{1}{2}$ to 5 inches) it differs from those races, in which the wing is very rarely as short as 5 inches and sometimes as long as $5\frac{3}{4}$ inches.

Azara's Snipe, the Neotropical representative of the Common Snipe, appears to have become more or less differentiated into four races, two small and two large ones; the two former being tropical, and the two latter temperate in their range.

Close relationship to the North-American Snipe.

I have been unable to discover any character by which some of the forms of Azara's Snipe can be distinguished from the North-American form of the Common Snipe except the width of the outer tail-feathers. In every other respect they appear to be absolutely similar, and to have precisely the same habit of "drumming."

Geographical distribution.

The Brazilian form of Azara's Snipe, or the Brazilian Snipe as it may conveniently be called, appears to be a common bird in tropical South America east of the Andes, and probably breeds in suitable localities throughout its range. It has occurred in the west of Venezuela (Goering, Proc. Zool. Soc. 1870, p. 788); I have examples collected by Whitely in the neighbourhood of Mount Roraima, on the confines of British Guiana; it breeds in the marshy districts of Pernambuco (Forbes, Ibis, 1881, p. 359); I have seen examples from the provinces of Bahia and Minas Geraes; it was originally described by Azara from Paraguay; Burmeister obtained it in the province of Mendoza in the Argentine Republic; and I have eggs of this species from Buenos Ayres.

Hans von Berlepsch expresses the opinion (Journ. Orn. 1887, p. 36) that the small Snipes found in Paraguay are the young of the larger Snipes from that country. The fact that the length of the bill of the smaller birds is the same as that of the larger ones appears to me to be conclusive evidence that this is not the case. I know of no species of Snipe in which the bill of the young is proportionately longer than that of the adult. So far as I know, the contrary is always the case. There is, however, a much more important difference between the two races, a structural difference which many ornithologists would regard as almost generic. The small Snipes are residents in tropical America, and hence we find that they have short primaries and long secondaries: *the shortest secondaries extend beyond the longest primary-coverts* often as much as half an inch. The large Snipes breed in Patagonia or the Falkland Islands, and are only winter visitors to Paraguay, and consequently the shortest secondaries do not extend beyond the longest primary-coverts. Unfortunately the Chilian race is intermediate in this respect, otherwise the two forms which are found in Paraguay must be regarded as specifically distinct.

SCOLOPAX FRENATA MAGELLANICA.

FALKLAND-ISLAND SNIPE.

Diagnosis. SCOLOPAX FRENATA magnitudine majore: colore pallidiore: secundariis brevioribus.

Variations. THE Falkland Island Snipe appears completely to intergrade through the Chilian Snipe with the Brazilian Snipe.

Synonymy. Scolopax paraguayæ, *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 131 (1816).
Scolopax magellanicus, *King, Zool. Journ.* iv. p. 93 (1833).
Gallinago magellanicus (*King*), *Gray, List Birds Brit. Mus.* iii. p. 111 (1844).
Gallinago paraguayæ (*Vieillot*), *Gray, List Birds Brit. Mus.* iii. p. 111 (1844, *partim*).
Scolopax frenata magellanica (*King*), *Seebohm, Ibis*, 1886, p. 138.

Literature. PLATES.—Unfigured.
HABITS.—Abbott, Ibis, 1861, p. 156.
EGGS, obtained by the 'Challenger' expedition, measure 1·7 × 1·22 inch.

Subspecific characters. The Falkland-Island Snipe is merely a pale form of the Chilian Snipe, with slightly shorter secondaries, the outermost not extending beyond the longest primary-covert. It breeds on the Falkland Islands and possibly near the Straits of Magellan, migrating

Geographical distribution. northwards in autumn along the east coast of South America as far north as Paraguay, whence it was originally described by Azara. I have examples collected by Capt. Harrison at Maldonado and Bahia Blanca.

SCOLOPAX FRENATA CHILENSIS.

CHILIAN SNIPE.

Diagnosis. SCOLOPAX FRENATA alis longioribus (130 ad 145 millim.).

Variations. THE Chilian Snipe appears to be an intermediate form between the Falkland-Island Snipe and the Brazilian Snipe, with both of which it intergrades.

Gallinago paraguayæ (*Vieillot*), *apud auctores omnes*. Synonymy.

PLATES.—Unfigured. Literature.

HABITS.—Bridges, Proc. Zool. Soc. 1843, p. 118.

EGGS.—Described (Yarrell, Proc. Zool. Soc. 1847, p. 54), from examples sent from Chili by Bridges, as measuring $1\frac{3}{4}$ by $1\frac{1}{4}$ inch.

The Chilian form of Azara's Snipe, or the Chilian Snipe, appears to be confined to the Pacific slopes of Bolivia and Chili. I have been unable to find any evidence of its occurrence east of the Andes; consequently the name of *S. paraguayæ*, by which it is generally known, must be abandoned as sure to be always misleading, and as originally applied to a nearly allied local race which breeds in the Falkland Islands and winters in Paraguay. Under these circumstances I have been obliged most reluctantly to give it a new name, *Scolopax chilensis*, or, if we adopt a trinomial nomenclature, *S. frenata chilensis*. Geographical distribution.

It differs from the Brazilian Snipe only in dimensions. In both forms the length of the bill from the frontal feathers varies from 2·4 to 2·9 inch, but whilst in the Brazilian Snipe the length of the wing from the carpal joint varies from $4\frac{1}{2}$ to 5 inches, that of the Chilian Snipe varies from $5\frac{1}{4}$ to $5\frac{3}{4}$ inches. In none of these dimensions does it differ materially from the Falkland-Island Snipe, which has all the appearance of being a desert form of its Chilian ally. In the Chilian Snipe the pale parts are very white and the dark parts very dark, a rich velvety dark brown. It varies in the comparative length of the primaries and secondaries, intergrading with the Falkland-Island race on the one hand, and with the Brazilian form on the other. Subspecific characters.

Examples from Chili are common in collections, and Messrs. Salvin and Godman have one from Bolivia.

SCOLOPAX FRENATA ANDINA.

PERUVIAN SNIPE.

SCOLOPAX FRENATA rostro breviore. Diagnosis.

THE Peruvian Snipe is only a small race of the Brazilian Snipe, with which it intergrades. Variations.

Gallinago andina, *Taczanowski, Proc. Zool. Soc.* 1874, p. 561.
Scolopax frenata andina (*Tacz.*), *Seebohm, Ibis,* 1886, p. 138. Synonymy.

Literature. PLATES.—Unfigured.
HABITS.—Taczanowski, Orn. Pérou, iii. p. 375.
EGGS.—Unknown.

Subspecific characters. The Peruvian form of Azara's Snipe is a miniature of the Brazilian form, which it resembles in colour. The average dimensions of the two races are as follows :—

	S. frenata.	*S. andina.*
	inch.	inch.
Bill	2·9 to 2·4	2·1 to 2·0
Wing	4·9 to 4·5	4 6 to 4·5
Tarsus	1·3 to 1·2	1·1 to 1·0

Geographical distribution. It is only known from the Peruvian Andes, where it was first obtained by Whitely (Sclater & Salvin, Proc. Zool. Soc. 1869, p. 151), about 10,000 feet above the level of the sea, near Cuzco ; and afterwards by Jelski, who obtained the type described by Taczanowski near Lake Junin, about 300 miles to the north-west in the same chain. More recently it has been found by Stolzmann (Taczanowski, Proc. Zool. Soc. 1880, p. 213) about 9000 feet above the level of the sea at Cutervo, about 400 miles further still to the north-west.

SCOLOPAX NOBILIS.

NOBLE SNIPE.

Diagnosis. SCOLOPAX pileo in longitudinem striato : rostro longo (80 ad 115 millim.) : primariis non fasciatis : rectricibus sedecim, quarum externæ angustæ (circ. 5 millim.) et fulvescentes pogoniis ambobus brunneo fasciatæ sunt.

Variations. LARGE examples of the Noble Snipe are scarcely distinguishable from small specimens of the Madagascar Snipe.

Synonymy. Gallinago nobilis, *Sclater, Proc. Zool. Soc.* 1856, p. 31.
Gallinago granadensis, *Bonap. Compt. Rend.* xliii. p. 579 (1856).
Scolopax nobilis (*Sclater*), *Seebohm, Ibis,* 1886, p. 133.

Literature. PLATES.—Sclater & Salvin, Exotic Orn. pl. xcviii.
HABITS.—Undescribed.
EGGS.—Salmon, Proc. Zool. Soc. 1879, p. 547.

The Noble Snipe and its very close ally the Madagascar Snipe are the only two true Snipes (*i. e.* with *longitudinal markings on the crown*, and no silvery tips to the tail-feathers) which have *bills more than* $3\frac{1}{4}$ *inches long* (measured from the frontal feathers) and *no* traces of *bars on the primaries*. They have 16 *tail-feathers*, and the *outer ones on each side are not more than* $\frac{1}{4}$ *inch wide, are barred on both webs, and are far removed from white in colour*. The difference between the two forms is pointed out in the next article. They differ principally from Latham's Snipe in having a shorter, because more rounded wing (first primary only exceeding the fourth in length by $\frac{1}{4}$ instead of $\frac{3}{4}$ inch), by having a longer bill ($3\frac{1}{4}$ to $4\frac{1}{2}$ inches instead of $2\frac{7}{8}$ to $2\frac{1}{2}$ inches), and by having two tail-feathers less. Specific characters.

The Noble Snipe is only known from the plateaux of the Andes of Ecuador and Colombia. Geographical distribution.

*** *African Snipes.*

SCOLOPAX NOBILIS MACRODACTYLA[1].

MADAGASCAR SNIPE.

Scolopax nobilis macrodactyla (tarsus et digitus medius cum ungue 86 ad 92 millim.). Diagnosis.

There is every reason to suppose that the Madagascar Snipe completely intergrades with its South-American ally. Variations.

Gallinago macrodactyla, *Bonap. Icon. Fauna Ital.*, text to pl. 43, p. 3 (1832). Synonymy.
Gallinago bernieri, *Pucheran, Rev. Zool.* 1845, p. 279.
Gallinago longirostris, *Lichtenstein, Nom. Av. Mus. Zool. Berol.* p. 93 (1854).
Scolopax nobilis macrodactyla (*Bonap.*), *Seebohm, Ibis,* 1886, p. 133.

Plates.—Milne-Edw. & Grand. Hist. Madag., Ois. iv. pl. 260. Literature.
Habits.—Roch & Newton, Ibis, 1863, p. 172.
Eggs.—Harting, Proc. Zool. Soc. 1882, p. 356.

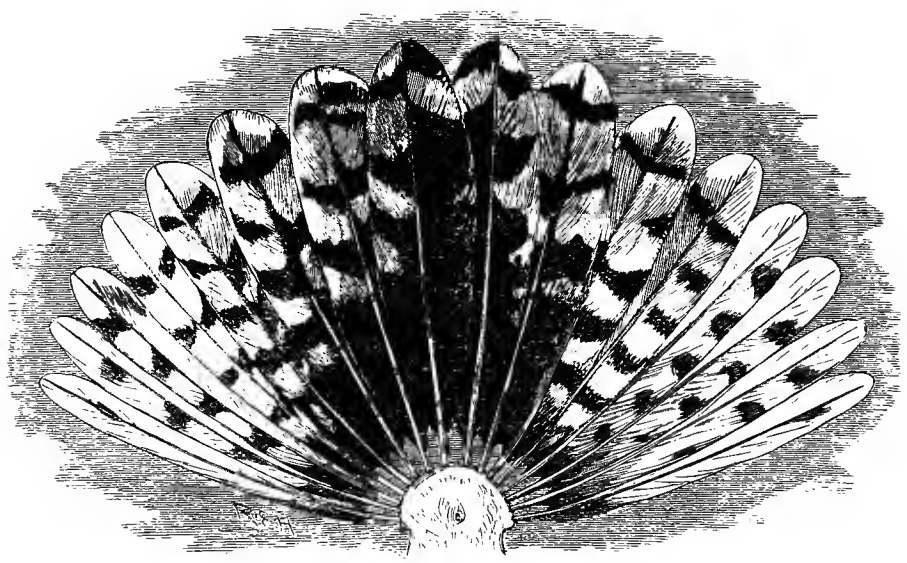
The Madagascar Snipe has sixteen tail-feathers like its Colombian ally. It is not known that it differs from it in colour, except perhaps that the outer tail-feathers are more Subspecific characters.

[1] It is unusual to give the later name precedence over the earlier one, but in the present case common sense demands that the rule be violated. *S. macrodactyla nobilis* would imply a large variety of the Madagascar Snipe, which would be erroneous; *S. nobilis macrodactyla* means a variety of the Noble Snipe with a larger foot than usual, which is precisely the state of the case.

suffused with chestnut than in the Colombian form. It also differs from its Colombian ally in having on an average a larger foot; but it is doubtful whether the latter character would hold good in a large series. As it is, the difference is so small that, in order to make it as perceptible as possible, it is necessary to measure the foot in the longest possible way, that is, from the joint of the tibia and tarsus to the end of the claw of the middle toe. These dimensions vary in *S. nobilis* from 3·0 to 3·3 inch, and in *S. macrodactyla* from 3·4 to 3·6 inch.

Geographical distribution.

So far as is known, the Madagascar Snipe is the only Snipe found on that island, and does not occur on the mainland.



SCOLOPAX ÆQUATORIALIS[1].

ETHIOPIAN SNIPE.

Diagnosis. Scolopax rectricibus quatuor externis pro majore parte albis; tectricibus mediis angustè fulvo terminatis.

[1] This species is often called *Scolopax nigripennis*, a name given by Bonaparte to a Snipe said to have come from the Cape. He describes the outer web of the first primary as black, whence the name *nigripennis*. As, however, the Ethiopian Snipe happens to be distinguished from the other species which breeds in the Ethiopian Region and from the species which only winters there by the fact that the outer webs of its first primaries are white, there can be little doubt that the name is a misprint for *albipennis*; but the adoption of either name is, of course, out of the question.

Variations.

This species varies considerably in the length of the bill, but apparently irrespective of geographical distribution.

Synonymy.

Gallinago nigripennis, *Bonap. Icon. Fauna Ital., Ucc.* text to pl. 43, p. 4 (1832).
Scolopax elegans, *Desjardin, Proc. Zool. Soc.* 1835, p. 201.
Gallinago æquatorialis, *Rüppell, Syst. Uebers. Vög. Nord-Ost-Africa's*, p. 123 (1845).
Gallinago atripennis, *Bonap. fide Hartlaub, Orn. Westafrica's*, p. 239 (1857).
Gallinago angolensis, *Bocage, Jorn. Sc. math., phys. e nat. Lisb.* ii. p. 49 (1868).
Telmatias æquatorialis (*Rüpp.*), *Heuglin, Peterm. Geogr. Mitth.* 1869, p. 417.
Scolopax æquatorialis (*Rüpp.*), *Seebohm, Ibis*, 1886, p. 136.

Literature.

Plates.—Unfigured.
Habits.—Sharpe, Layard's Birds of South Africa, p. 676.
Eggs, in my collection, obtained by Ayres in the Transvaal, resemble exceptionally large eggs of the Common Snipe.

Specific characters.

The Ethiopian Snipe may fairly claim to be regarded as the handsomest species of the genus, on the ground of the clear definition of its markings, and the velvety gloss of the black on its upper parts. The *pure white ground-colour of the four outer tail-feathers* on each side distinguishes it from all the other species of the genus except from the Great Snipe (*S. major*). From that species it is most easily distinguished by its *median wing-coverts*, which are *narrowly tipped with buff*, instead of broadly tipped with white. Both have sixteen tail-feathers, the outer tail-feather measures ·2 inch across, each succeeding feather increasing in width until the fourth measures ·3 inch. The European species has a shorter bill and longer primaries than the African :—

S. major. Bill 2·3 to 2·8 inch. First primary ·5 inch longer than the fourth.

S. æquatorialis. Bill 2·8 to 3·2 inch. First primary ·3 inch longer than the fourth.

Geographical distribution.

The Ethiopian Snipe inhabits Africa south of the Sahara from Abyssinia to the Cape, and is recorded from Damara Land, Benguela, Angola, and Senegambia. It is found in the Cape Colony, Natal, and the Transvaal.

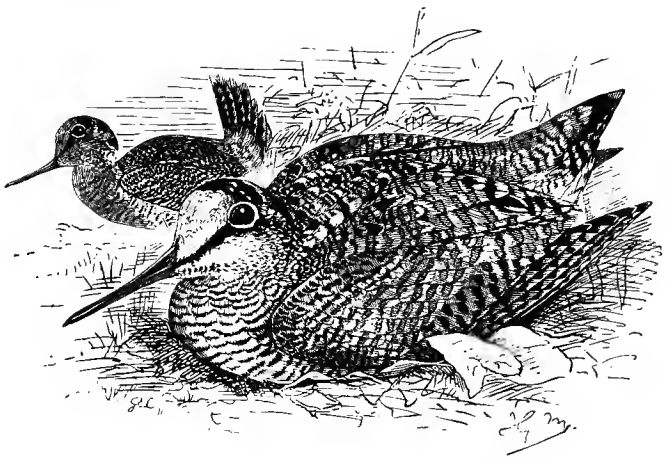
Nearest allies.

It is difficult to determine the relative importance of the slight characters upon which the various species of Snipe are founded. The Ethiopian Snipe (*S. æquatorialis*) resembles the Great Snipe (*S. major*) in the white tips of its secondaries and in the great amount of white on its outer tail-feathers. It resembles the Common Snipe (*S. gallinago*) in the white outer web of its first primary and in the frequent predominance of white on its axillaries. It appears to be very closely related to the Chilian Snipe (*S. chilensis*), with which it agrees in size and colour. Its wing is much more rounded than that of the Common Snipe, and slightly more so than that of the Chilian Snipe.

It seems probable that the Snipes enjoy a remarkable immunity from persecution in consequence of their semi-nocturnal habits, which have saved them to a large extent from

the sifting process of protective selection. The result of this is shown in the small range of variation in colour between the species. *S. æquatorialis* and *S. chilensis* are probably the least changed descendants of the common ancestors of *S. gallinago* and *S. major* in the Old World, and of *S. wilsoni* in the New World, which were probably residents on the tundras near the Polar Basin before the Post-Pliocene Glacial Epoch drove them south.

*** *Typical Woodcocks.*



SCOLOPAX RUSTICOLA.

WOODCOCK.

Diagnosis. Scolopax rectricum apicibus subtùs colore argenteo: primariarum pogoniis internis fasciatis: pectoris pennis omnibus fasciatis.

Variations. It is said that examples from the Azores are smaller than usual, but I have not seen a sufficient number from those islands to form an opinion.

Synonymy. Scolopax rusticola, *Linneus, Syst. Nat.* i. p. 146 (1758); *Linn. Syst. Nat.* i. p. 243 (1766).
Scolopax scolopax, *Brisson, Orn.* v. p. 292 (1760).
Rusticola vulgaris, *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 348 (1816).

Rusticola europæa, *Lesson, Traité d'Orn.* p. 555 (1831).
Scolopax indicus, *Hodgson, Journ. As. Soc. Beng.* ii. pt. 1, p. 490 (1837).
Scolopax communis, *Selby, Cat. Gen. & Subgen. Aves*, p. 43 (1840).
Rusticola sylvestris, *Macgillivray, Man. Brit. B.* ii. p. 105 (1842).
Scolopax scoparia, *Bonap. Compt. Rend.* xliii. p. 579 (1856).

Literature.

PLATES.—Daub. Pl. Enl. no. 885; Gould, Birds Gt. Brit. iv. pl. 77; Dresser, Birds of Europe, vii. pl. 540.
HABITS.—Seebohm, British Birds, iii. p. 231.
EGGS.—Seebohm, British Birds, pl. 28. figs. 2, 5.

Specific characters.

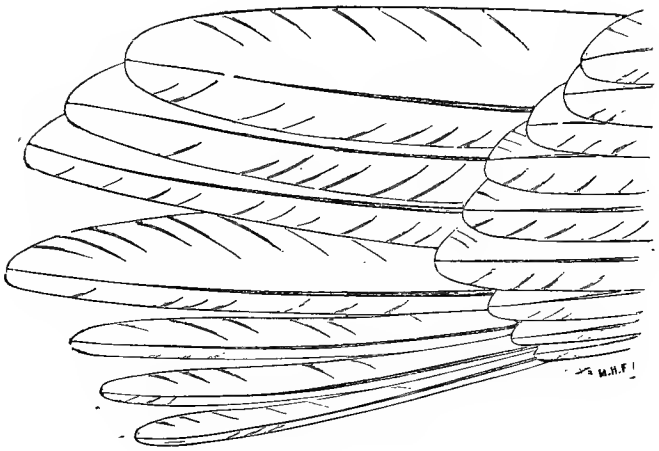
The Woodcock may be distinguished from all the Snipes by the *silvery white tips of the under surface of its tail-feathers*; and from the three other Woodcocks by the combination of the two characters, *all the feathers of the breast barred, primaries with rudimentary bars on the margins of both webs.* The former character distinguishes it from *S. minor* and *S. rochusseni*, and the latter from *S. saturata* as well as from *S. minor.*

Geographical distribution.

The Woodcock breeds somewhat sparingly and locally throughout the British Islands, including Shetland and some of the inner islands, and may constantly be met with during winter; but its numbers are largely increased in autumn and spring by birds passing through on migration. At these seasons it is common on the Orkneys and the Outer Hebrides, though, owing to the absence of suitable cover, it does not breed in any of these islands.

It is a semi-arctic bird, ranging from the Atlantic to the Pacific. In Scandinavia it breeds up to lat. 67°, in West Russia to 65°, but in East Russia and Siberia not much beyond 60°. Its southern breeding-range extends to the Azores, the Canaries and Madeira, to the Alps, the Carpathians and the Caucasus, to the Himalayas (where it breeds at an elevation of ten thousand feet), and to Mongolia and the mountains of Japan. It winters in the basin of the Mediterranean, in Persia, India, Burma, and China, occasionally wandering as far south as Ceylon. It has not occurred in Iceland or Greenland, and only once on the Faroes; but accidental stragglers, no doubt driven westward by storms, principally from the Azores, have been met with on the American continent in Newfoundland, New Jersey, and Virginia.

It is very distinct from its four nearest allies, and it is quite impossible to guess to which of them it bears the closest relationship. It is essentially a forest-bird, and is to a great extent nocturnal in its habits.



SCOLOPAX MINOR.

AMERICAN WOODCOCK.

Diagnosis. SCOLOPAX primariarum primis tribus valdè attenuatis.

Variations. No local races of this species are known.

Synonymy. Scolopax minor, *Gmelin, Syst. Nat.* i. p. 661 (1788).
Rusticola minor (*Gmel.*), *Vieillot, N. Dict. d'Hist. Nat.* iii. p. 351 (1816).
Microptera minor (*Gmel.*), *Nuttall, Man. Orn.* ii. p. 192 (1834).
Microptera americana, *Audubon, Syn. Birds N. Amer.* p. 250 (1839).
Philohela minor (*Gmel.*), *Gray, List Gen. and Subgen. Birds,* p. 90 (1841).

Literature. PLATES.—Wilson, Am. Orn. pl. 48. fig. 2; Audubon, Orn. Biogr. pl. 265.
HABITS.—Baird, Brewer, and Ridgway, Water-Birds N. Amer. i. p. 183.
EGGS.—Described by Brewer in the above-mentioned work, p. 187.

Specific characters. The American Woodcock may be recognized at once by the extraordinary *attenuation of its first three primaries.* The pattern of the colour of the upper parts is very similar to that of our bird, to which it is evidently very closely allied, but it has no trace of bars on the primaries, and scarcely any on the underparts. Its range extends northwards to lat. 50°, and southwards into Texas, but its longitudinal range extends from the Atlantic

only halfway across the continent. To the northern half of its range it is only a summer visitor, but in the southern half it is a resident, whose numbers are largely increased during winter. There can be little doubt that it is the result of an ancient western emigration from the Old World or from the Azores. Geographical distribution.

It is for the most part a forest-bird, and almost exclusively nocturnal in its habits.

SCOLOPAX ROCHUSSENI.

MOLUCCAN WOODCOCK. (Plate XX.)

Scolopax rectricum apicibus subtùs colore argenteo: primariarum pogoniis internis fasciatis: pectore non fasciato. Diagnosis.

It is not known that examples from one island of the Moluccas differ in any way from those of another. Variations.

Scolopax rochussenii, *Schlegel, Nederl. Tijdschr. Dierk.* 1866, p. 254.
Neoscolopax rochusseni (*Schlegel*), *Salvadori, Ann. Mus. Genov.* xviii. p. 331 (1882). Synonymy.

Plates.—Hitherto unfigured.
Habits.—Undescribed.
Eggs.—Unknown. Literature.

The Moluccan Woodcock, like all the four true Woodcocks, possesses both the transverse markings on the head and the *silvery tips to the under surface of the tail-feathers.* The *absence of bars on the breast* and the presence of *rudimentary bars on the margin of both webs of the primaries* serve to distinguish it from the other Woodcocks. Its unbarred breast shows its relationship to *S. minor*, and its barred primaries to *S. rusticola.* Specific characters.

It is only known from the small group of islands from which its vernacular name is derived, and where it is doubtless a resident. Geographical distribution.

It is very different from our Woodcock, but is probably the result of an emigration of a party of that species from Japan.

Although its habits are undescribed we may fairly assume it to be a forest-bird, as the islands which it inhabits are said to be covered with wood to the sea-shore. It is very rare in collections. The type in the Leyden Museum came from the island of Obi, and I have an example in my collection which was sent to Mr. G. A. Frank, of Amsterdam, with a collection of birds from Ternate.

SCOLOPAX SATURATA.

HORSFIELD'S WOODCOCK. (PLATE XXI.)

Diagnosis. SCOLOPAX rectricum apicibus subtùs colore argenteo : primariarum pogoniis internis non fasciatis, primariis non attenuatis.

Variations. EXAMPLES from Java appear to be exactly similar to those from New Guinea.

Synonymy. Scolopax saturata, *Horsfield, Trans. Linn. Soc.* xiii. p. 191 (1821).
Rusticola javanica, *Lesson, Traité d'Orn.* p. 555 (1831).
Scolopax rosenbergi, *Schlegel, Nederl. Tijdschr. Dierk.* 1869, p. 54.

Literature. PLATES.—Schlegel, Handl. Dierk., Aves, pl. vi. fig. 71.
HABITS.—Horsfield, Trans. Linn. Soc. xiii. p. 191.
EGGS.—Unknown.

Specific characters. Horsfield's Woodcock may be distinguished from the Snipes by the *transverse markings on its head,* and the *silvery tips on the under surface of the tail-feathers.* It is much smaller than our Woodcock, but not quite so small as the American species. In the pattern of its *primaries* it is intermediate between them. In our bird both webs are more or less *barred,* in Horsfield's Woodcock the *outer web only,* and in the American bird neither web. The shape of the wing is also intermediate; the first three primaries are nearly equal in length, the second slightly the longest.

Geographical distribution. Horsfield's Woodcock was originally described from the island of Java, where it was found at an elevation of 7000 feet, and the type, which was formerly in the India Museum, still exists, though moth-eaten and devoid of feathers, in the British Museum. The Leyden Museum possesses two examples collected by Boie on the same island, and a third example, the type of *S. rosenbergi* [1], from the north-western peninsula of New Guinea. A second example from the same peninsula, collected by Bruijn, is in the collection of Count Turati in Milan (Salvadori, Orn. Papuasia e delle Molucche, iii. p. 235), and a third, obtained by the same collector, is recorded (Guillemard, Proc. Zool. Soc. 1885, p. 665). It is not known that any other examples of this rare Woodcock exist. It is impossible to say whether it be a resident in Java and Western New Guinea, and if so probably in the intervening islands, or whether it be only a winter visitor to the Malay Archipelago, breeding northwards in Eastern Thibet or Yunnan.

Breeding-range doubtful.

[1] When Schlegel described it he unfortunately compared it with an example of *S. saturata* from Java which was moulting its primaries, and had run the gauntlet of nearly forty years' exposure to dust and sunshine on the shelves of the Leyden Museum. The two birds seem to be specifically identical. Both have the richly barred underparts, black and chestnut, except across the middle of the breast, where in both birds the black bars are on a white ground.

INDEX.

NOTE.—The names which I have adopted (of which the specific names are those *auctorum plurimorum*) appear without any affix. Where the name of the author is affixed it is placed in brackets if the genus be not that originally employed.

[1] Kaup's name is *Pelorychus*; Degland and Gerbe (Orn. Eur. ii. p. 181) altered it to *Pelorynchus*, and Gray (Hand-list, iii. p. 52) further altered it to *Pelorhynchus*, which name I have erroneously adopted in my synonymy of the genus *Scolopax* (p. 464).

[1] Since going to press I find that I have erroneously included the name *Totanus horsfieldii* of Sykes in the synonymy of the Greenshank, *Totanus glottis*—a double blunder, inasmuch as the name ought to be *Limosa horsfieldii*, and belongs to the Marsh-Sandpiper, *Totanus stagnatilis*, where I have placed it. The *Glottis horsfieldii* (Sykes) of Gray is consequently also out of place in the synonymy of the Greenshank. In that of the Marsh-Sandpiper it is correct; but *Totanus horsfieldii* (Sykes) in the synonymy of that bird should not date from *Gray, Genera of Birds* (1846), but from *Blyth, Ann. Mag. Nat. Hist.* xii. p. 169 (1843). The description of *Limosa horsfieldii* by Colonel Sykes leaves little doubt that the Marsh-Sandpiper is the bird referred to, and now that the type, which was formerly in the India Museum, is accessible at South Kensington, no doubt whatever remains.

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