

(*Casuariidae*),<sup>1</sup> the richness and specialization of the Kingfishers (*Alcedinidae*), Parrots (*Psittaci*), and Pigeons (*Columbidae*), its Birds-of-Paradise (*Paradisidae*), Honeysuckers (*Meliphagidae*), and some remarkable Flycatchers (*Muscicapidae*). It has several marked deficiencies compared with Australia, among which are the Warblers (*Sylviidae*), Babblerz (*Timeliidae*), Finches or Weaver-birds (*Fringillidae* or *Ploceidae*)—according as we are disposed to treat those groups—certain Parrots (*Platycercinae*), and Diurnal Birds-of-Prey (*Falconidae*), and, above all, the Emeus (*Dromæidae*). About 9 genera are especially Malayan, and nearly as many more have apparently the same origin, but, curiously enough, are not found in the intervening Moluccan province. Thus it will be seen that the avifauna of New Guinea is pre-eminently that of the Australian Region, and that it has many peculiar developments of Australian types; but that there has also been an infusion of Malayan forms, of which one group is spread pretty uniformly over the whole Archipelago, if not beyond it; while another group presents a rare instance of discontinuous distribution—not appearing in an intervening space of 1000 miles across, though that space is full of islands to all appearance habitable by such forms. The birds of Papua are, as a whole, remarkable for their brilliancy of plumage, one-half of the species occurring there being so distinguished, and no less than 12 genera are decorated by the metallic colouring of their feathers. The Birds-of-Paradise, the Racquet-tailed Kingfishers, the largest and smallest of the Parrot tribe, namely, *Calyptrorhynchus* and *Nasiterna*, and the great Crowned Pigeons (*Goura*) are very characteristic among its productions.

The chief dependencies of New Guinea require some little notice. These are the Aru Islands in the west, and New Britain and New Ireland in the east, with the Solomon Islands as still more distant outliers in the same direction, and the Louisiade group in the south. The first, separated by 150 miles of sea from Papua, has over 100 species of Land-birds, of which, however, about four-fifths have been found also on the mainland; but among those which are peculiar are two of the finest *Paradisidae*—one of them belonging to a distinct genus (*Cicinnurus*)—and there is the very suggestive fact, as asserted, of two species of *Casuaris* occurring in the group. Of the ornithological features of New Britain and New Ireland not much is known, save that the former is inhabited by a species of Cassowary, and that both are intimately connected with New Guinea. The avifauna of the Solomon Islands is in some degree better understood, and 30<sup>2</sup> well-authenticated

<sup>1</sup> The importance which must be attached to the distribution of Ratite as compared with Carinate birds, to say nothing of the interesting fact that the known number of species of *Casuaris* has been raised from one to nine in the course of a very few years, makes it advisable here to give a list of the 9 species, with the localities (so far as they have been ascertained) they inhabit, as announced to the Zoological Society of London, 16th February 1875, by Mr Sclater, to whose courtesy the author owes the sight of a proof sheet of the communication:—

*C. galeatus*, Ceram.  
*C. papuanus*, Northern New Guinea.  
*C. westermanni*, Jobie Island.  
*C. uniauriculatus*, New Guinea.

*C. picticollis*, Southern New Guinea.  
*C. beccarii*, Wokan, Aru Islands.  
*C. bicarunculatus*, Aru Islands.  
*C. australis*, North Australia.  
*C. bennetti*, New Britain.

A species of Cassowary has been said to occur in the Solomon Islands, and if so, one would think it likely to be distinct, but the only example alleged to have come from that group which has been examined proved to be *C. bennetti*.

It would seem not at all unreasonable that in dividing the Papuan Subregion into provinces we should be guided by the distribution of this remarkable genus. In that case, not only would Ceram be annexed to the Papuan province, but the Cape-York district severed from the Australian and added to the Papuan Subregion.

<sup>2</sup> As stated in the preceding note, a *Casuaris* is said to be found in the Solomon Islands, and, however contrary to expectation, would seem to be of the same species as that which inhabits New Britain.

species of Land-birds, with 1 peculiar *Rallus*, have been found there. Of those 30, 16, or more than half, are known to be peculiar, while 3 more probably are so: 5 species occur in New Ireland as well; 1 is common also to New Caledonia and the New Hebrides, 1 to the Louisiade Archipelago, and the remaining 4 have a wider distribution in the Papuan Subregion, to which unquestionably the group belongs.

The Moluccan province, completing this Subregion and consisting of many rather widely detached islands, which lie for the most part between those forming the provinces already described, extends probably from Timor-lead in the south to the Sanguir group in the north, and includes the considerable islands of Ceram, Bouru, Gilolo, and Morty. About 200 species of Land-birds are now known from this province, and they may be assigned to over 80 genera. Of the species about 15 are common to the Indian region, but more than twice as many to the Papuan province, and some 140 are peculiar, of which the most significant are the *Casuaris* of Ceram.<sup>3</sup> Of the genera of Land-birds 2 only—*Semioptera*, a remarkable Bird-of-Paradise, and *Lycocorax*, an aberrant Crow—are peculiar; but there is also in Gilolo a brevipennate genus of Rails (*Habroptila*) to which the same epithet will apply. One genus is common to Ceram and Celebes, and another is found in Australia, whence possibly it is a migrant, while 30 genera are characteristic of the Papuan Subregion, and nearly 40 more, of more or less wide range, are found in and probably derived from New Guinea. Finally, there are some 12 genera which do not occur in New Guinea, and belong wholly or mainly to the Indian Region, but there are only 3 characteristically Indian types met with in the Moluccas, and all of them are there represented by distinct and well-marked species. The avifauna of the Moluccan province is therefore thoroughly that of the Papuan Subregion, and is no less clearly derivative from that of New Guinea, but not fewer than 11 forms of Birds-of-Paradise (*Paradisidae*), with more than 12 other characteristically Papuan genera, are wanting, and therefore, in Mr Wallace's opinion, it would seem as though the province is not a fragment of any old Papuan territory, a supposition supported by the fact that most Moluccan birds are very distinct from their representatives in New Guinea. Amongst the most characteristic forms are the scarlet Brush-tongued Parrots (*Lorius* and *Eos*), found, it is believed, in every island of the group, but not in the Celebesian or Timorese provinces. One species of *Eos* from Siau and Sanguir intimates that those islands belong to the province. *Eclactus*, another scarlet Parrot, but belonging to a different family, also is equally characteristic with the Parrots just mentioned. As a rule, the birds of the Moluccan province are larger and more conspicuous than the allied species from neighbouring parts.

On the whole, the avifauna of the Papuan Subregion presents some very remarkable features, but most of them must be here briefly treated by way of summary. Unquestionably its most distinctive characteristic is to be found in the presence of the Birds-of-Paradise (*Paradisidae*), which are almost peculiar to it; for, granting that the Bower-birds (*Chlamydera* and others) of Australia should be classed in this family, it must be admitted that they are very abnormal, or perhaps, to take firmer ground, that they are far less highly specialized than the beautiful and extraordinary forms which are found, and found only within very restricted limits, in the various islands of the Subregion. It would be easy, if space allowed, to dwell at length on the many points of interest with respect to those wonderful birds, though in truth we know but little of them.

<sup>3</sup> See preceding footnotes.

(2.) *The Australian Subregion* is limited to the great insulated continent which bears that name, with its appendage Tasmania or Van Diemen's Land, and possesses, on the whole, a very homogeneous fauna—so much so, indeed, that at present it would be almost impossible to subdivide it into provinces. Influenced in the north by its proximity to the rich and varied Papuan Subregion,<sup>1</sup> its *ornis* rapidly becomes modified towards the south. Out of some 630 species or more, nearly 490 are Land-birds, and not more than one-twentieth of them are found elsewhere, so that its peculiar species bear a greater proportion to the rest than is the case in the Papuan Subregion. Though the western, and especially the north-western, parts of the country, which have been as yet but imperfectly investigated, will no doubt yield more results on further examination, it is already evident that the greatest animal wealth of Australia lies towards the east. The western portion seems to have but 2 peculiar genera (one of questionable value)—a nocturnal Parrakeet (*Geopsittacus*), and a Weaver-bird (*Emblema*), which is apparently not very far removed from others of the same group. In the north, as already stated, there is a considerable admixture of genera from the Papuan Subregion, which do not proceed beyond the tropic, and of these *Casuaris* is a striking example. The genus *Xerophila*, of uncertain affinity, is confined to South Australia; and the extreme limits of the Subregion, that is Tasmania, possess in addition only 1 genus, *Eudypetes*, belonging to the marine family of the Penguins (*Spheniscidae*), which inhabit generally the sub-antarctic seas; but the Land-birds, which are few in number, are specifically identical with those of Australia proper. This is even the case with the Emeu (*Dromæus*), and the import of this fact is as significant<sup>2</sup> as would be a corresponding example drawn from the class *Mammalia*, since, in regard to means of locomotion, birds incapable of flight are on a par with terrestrial mammals. As a whole, Australia is rich in Parrots (*Psittaci*), having several very peculiar forms; but Picarions (*Picariæ*) of all sorts—certain Kingfishers (*Alcedinidae*), perhaps, excepted—are few in number, and the Pigeons (*Columbidae*) are also comparatively scarce. Australia, however, possesses two extraordinary families of abnormal *Passeres*—the Lyre-birds (*Menuridae*) and the Scrub-birds (*Atrichidae*)—which, so far as is at present known, stand by themselves, though it is possible that the latter have a somewhat distant ally in the genus *Orthonyx*, or even in the South-American family *Pteroptochida*. The number of peculiar or characteristic genera of *Passeres* is, however, too great to be here enumerated; and there are many singular forms of *Columbidae*. Among the more curious forms of Land-birds other than those may be especially remarked *Lipoa* among the Gallinæ (*Megapodiidae*), and *Tribonyx* among the *Grallæ* (*Rallidae*), while *Pedionomus* is a form referred by some systematists to the first and by others to the second of those Orders. The presence of a Bustard (*Eupodotis*) presents a curious example of interrupted distribution, since none of that family (*Otididae*) are found nearer than India.

Polynesian Subregion.

(3.) *The Polynesian Subregion*, though so vast, extending as it does from one tropic to the other throughout ninety degrees of longitude (from long. 140° E. to long. 130° W.), at that part of the earth's surface where degrees of longitude are broadest, possesses generally a very uniform avifauna. It may possibly be partitioned into four or five provinces; but if so, the products of the first of them,

containing the Palau<sup>3</sup> (commonly called Pelew), the Caroline, and most likely the Ladrone Islands, are at present too imperfectly known for any useful results to be drawn from them. Then we have the New Hebrides and New Caledonia forming another province; after which comes the third, or Central-Polynesian province, comprising the Fijian, Tongan, and Samoan groups; next the numerous clusters from Cook's Islands to the Marquesas, including the Society Islands and the whole of the Low Archipelago, which may perhaps form a fourth province; and lastly, the Sandwich or Hawaiian Islands. The first of these provinces (so to call them) possesses in the Palau Islands a Reed-Warbler, which seems to form a peculiar genus (*Psamathia*), while another kindred form belongs to the widely-spread genus (*Acrocephalus*) that our own English bird does, and occurs there, and there alone, so far as we know, throughout the whole Subregion.<sup>4</sup> The like may be said of a Goatsucker (*Caprimulgus*). 1 other typically Polynesian genus is found; 1 is common to the Papuan, and 1 to the Malayan (Indian) Subregion. The second province shows some transition from the Papuan to the Australian Subregion. Out of 30 genera of Land-birds, 18 are typically Australian, 13 are also Polynesian: about 5 go no further to the eastward. 3 species of *Aplonis*, a genus of uncertain affinity, but generally classed with the Starlings (*Sturnidae*), seem to link this province to the Central-Polynesian, and a very remarkable and apparently very generalized form of *Grallæ*—the Kagu (*Rhinocetus*), which seems to have half-a-dozen scattered alliances—is peculiar to New Caledonia. From the third province only some 50 genera and some 150 species of Land-birds are known. A species of Cuckoo (*Eudynamis taitensis*) ranges over the whole of this as well as the next district so far as the Marquesas, as also does perhaps an abnormal Warbler (*Tatara*). On the other hand, the Samoan group has in the Manu-mea or Tooth-billed Pigeon (*Didunculus*) a form which alone makes a distinct family of *Columbae*; and another island of the same group, Savai, produces a most peculiar brevipennate Water-hen (*Pareudiastes*), which is deemed worthy of generic separation from *Gallinulæ*. The fourth province, which (if it may be recognized as such) may be called the Eastern-Polynesian, comprehends, as above stated, the countless islands which surround the Low Archipelago. Respecting these we have little precise information—two meagre lists of birds from Huahine, one of the Society group, and a catalogue obviously not complete of those of the Marquesas, appearing to furnish nearly all our available material. The latter group possesses a rather remarkable Pigeon, said to be peculiar to it, but perhaps also found in the former; and though closely allied to *Carpophaga*, it has been elevated to generic rank under the name of *Serresius*. The last province is that of the Sandwich Islands, which, notwithstanding that their ornithology has never been thoroughly worked out, seem to present some conspicuous differences from any other; and it is almost a matter of opinion whether, small as is the known avifauna of the group, it should not be regarded as constituting a separate Subregion rather than as a province of Polynesia. The ascertained Land-birds are but 18 in number. Of these 3 are Birds-of-prey, and 1 of them, the *Pandion* (?) *solitarius* of Cassin, is only known in collections by a unique specimen. The other 2 are widely-distributed

<sup>1</sup> The Peninsula of Cape York possesses a *Casuaris*, as already noticed, and other grounds are not wanting for the supposition that has been entertained that zoologically it belongs to the Papuan Subregion.

<sup>2</sup> Its significance is increased by the fact that the Emeu of West Australia is distinct from that of the east. The Emeu is extinct in Tasmania.

<sup>3</sup> Dr Finsch is understood to be especially engaged on the birds of this group of islands, to our knowledge of which he and Dr Hartlaub have already contributed much.

<sup>4</sup> It is, however, found in Australia, and even in the south of that country.

<sup>5</sup> It is possible, however, that *Otidiphaps*, which is supposed to come from New Guinea, may also belong to the *Didunculidae*.

species of Owls (*Strigidae*). There are no *Psittaci* or *Picariæ*. The *Passeres* consist of 15 well-established species, all peculiar to the group, and belong to 10 generic forms, only 1 of which, the cosmopolitan *Corvus*, is known to occur elsewhere. The remainder are restricted to the Hawaiian Islands, and may be referred to 2 families—one the almost universally distributed Flycatchers (*Muscicapidae*), and the other the Honey-suckers (*Meliphagidae*), which, as has been said before, are preeminently characteristic of the whole Australian Region; but it is to be observed that the most of the species are remarkable for the extraordinary form of their bill, so that they may ultimately be found to constitute a special section of the family, if they be not considered to form a distinct one (*Drepanidae*). There are also two peculiar species of Water-birds—a Coot (*Fulica alai*), and the well-known Sandwich-Island Goose (*Bernicla sandwicensis*), which has been very commonly domesticated in Europe. The Hawaiian Archipelago has thus a larger proportion of peculiar genera and species than any other group in the Subregion, from which fact Mr Wallace infers, and no one can doubt the truth of the observation, the great antiquity of its isolation.

(4.) *The New-Zealand Subregion*, however, is, and to all appearance long has been, more isolated still, probably, indeed, longer isolated than any other portion of the globe. Beside the three larger islands, known in the aggregate as New Zealand, numerous satellites belong to the Subregion, as Lord Howe's, Norfolk, and Kermadoc Islands, with the Chatham, Auckland, and Macquarrie groups. At the highest estimate the Subregion contains about 150 existing species of birds, of which more than 60 are Land-birds, belonging to about 34 genera, 16 of the latter being peculiar, and there may be some 5 genera of Water-birds, making 21 in all. Of the others 4 are widely spread, but the rest (9 in number) are characteristically those of the Region. Most of the genera occurring elsewhere are here represented by peculiar species, but then 5 are common to Australia. Some 7 or 8 are also allied to Australian species, and there are 4 Australian and 1 Polynesian species. Therefore every degree of similarity to Australia is to be found. Of peculiar genera it will suffice to say that 2 (*Myiomoira* and *Miro*) belong to the Warblers (*Sylviidae*), 1 genus (*Turnagra*) perhaps comes under the Babblers (*Timeliidae*), and 2 genera (*Xenicus* and *Acanthositta*) may be referred to the Creepers (*Certhiidae*). The *Paridae* have 1 genus (*Certhiiparus*), and the *Meliphagidae* 3 genera (*Prothemadura*, *Pogonornis*, and *Anthornis*). The Starlings (*Sturnidae*) are represented by *Callwa*, *Creadion*, and the very abnormal—or perhaps it would be better to say generalized—*Heterolocha*. An entire and very distinct family (*Strigopidae*) of Parrots is certainly peculiar, and it may probably be justifiable to regard the genus *Nestor* as constituting a second. There is also an Owl, which has been usually considered the type of a genus (*Sceloglaux*); and the *Rallidae* present two very remarkable forms—the Wood-hens (*Ocydromus*) and the Takahē (*Notornis*), the last almost, if not quite, extinct. The widely-spread family of Plovers (*Charadriidae*) have two not less singular generic developments—*Thinornis* and the extraordinary Wrybill, *Anarhynchus*. Among the Ducks (*Anatidae*), *Hymenolævus* is a very curious form; and, finally, among the *Ratitæ* we have the whole family of weird-looking Kiwis (*Apterygidae*), represented by three or four species, which are totally unlike any other existing birds. In all, there is a wonderful amount of specialization, though perhaps in a very straight line from generalized forms; but the affinity to Australian or Polynesian types is in many cases clearly traceable, and it cannot be supposed but that these last are of cognate origin with those of New Zealand. A very long period of isolation must have been required to produce

the differences so manifestly to be observed, but a few forms seem at rare intervals to have immigrated, and this immigration would appear to be kept up to our own day, as shewn by the instance of *Zosterops lateralis*, which is said to have lately made its first appearance, and to have established itself in the country, as well as by the fact of two Cuckoos, the widely-ranging *Eudynamis taitensis* and *Chrysococcyx lucidus*, which are annual visitors.

The most extraordinary ornithic feature of New Zealand, however, is unquestionably the former existence of the gigantic birds of the families *Dinornithidae* and *Palapterygidae*, with a few other contemporary forms. These, however, having been already mentioned there is no need to dwell further upon them. As a whole, the avifauna of New Zealand must be regarded as one of the most interesting and instructive in the world, and the inevitable doom which is awaiting its surviving members cannot but excite a lively regret in the minds of all ornithologists. This regret is quite apart from any question of sentiment; if it were otherwise, it could not be defended against that sentiment which prompts our colonial fellow-subjects indiscriminately to stock their fields and forests, not only with the species of their mother-country, but with all the fowls of heaven, whencesoever they can be procured. The regret we express arises from the thought that just as we lament our ignorance of the species which in various lands have been extirpated by our forefathers, so our posterity will want to know much more of the present ornithic of New Zealand than we can possibly record; for no one nowadays can pretend to predict the scope of investigation which will be required, and required in vain, by naturalists in that future when New Zealand may be one of the great nations of the earth.

II. THE NEOTROPICAL REGION, though presenting certain affinities to the Australian, and the only one which can be said to be zoologically allied to it, is yet almost as distinct in its character therefrom as it is geographically distant. Excepting towards its northern limits, where it meets and inoculates with the Nearctic Region, the boundary of the Neotropical Region is simple enough to trace, comprehending as it does the whole of South America from Cape Horn to the Isthmus of Panama and all Central America, and reaching in North America to somewhere about the twenty-second parallel of north latitude; besides including the Falkland Islands to the south-east,<sup>1</sup> and the Galapagos under the equator to the west, as well as the whole of the Antilles or West-India Islands up to the Florida Channel, which separates them from the peninsula of that name. Though over none but the remotest corners of this sufficiently large area is the supreme Class of animals formed (as we have found it to be the case throughout by far the greater portion of the Australian Region) by the Birds, yet they here play a part of very great importance, owing to the comparatively scanty number of Mammalian types. Among these last, however, there are two remarkable groups—the *Pedimana*, containing the only members of the Subclass *Didelphia* which occur at the present day

<sup>1</sup> It may even be questionable whether Tristan da Cunha, though lying nearer to the African coast, should not be referred to the Neotropical rather than to the Ethiopian Region. On this lone spot but four species of Land-birds are known to occur, all of which are peculiar—two of them even generically. One is a Finch (*Crithagra insularis*), belonging, it is true, to a genus very well represented in Africa; but the second (*Nesospiza acunha*) is the type and sole member of a genus which, whether it be considered a Finch or a Bunting, is said by Dr Cabanis, its describer, to have unquestionable similarity to some South American forms (*Journ. für Orn.* 1873, p. 154). The third bird is a Thrush (*Nesocichla eremita*), like the last, peculiar both in species and genus to the island, and apparently having no relation to anything Ethiopian; while the fourth is a peculiar species of brevipennate Water-hen (*Gallinula nesiotis*), which may have been derived from either continent.

out of the Australian Region, and the *Edentata*, an Order which, though found also in Africa and India, attains in South America the summit of its development in variety and number of forms; and we cannot adduce any examples of Orders or Suborders from the Class *Aves*, the circumstances of which will exactly match those of these three groups of *Mammalia*. The nearest approach, perhaps, is made in one way by the South-American Ratite birds, of which one entire group, consisting of at most three species (*Rheidae*), is peculiar to the region, and thus to some extent parallels the case of the *Pedimana*; but while these last also invade the Nearctic Region, the former are not even spread over the whole of continental South America, being limited to its colder portion. Moreover, so far as Orders have been generally understood and accepted by ornithologists among Carinate Birds, there is no one of wide range which can compare with the overwhelming development of the Edentates in the Neotropical Region. On the other hand, it must be observed that the Region claims all the Tinamou (*Tinamidae*)—the *Dromæognathæ* of Professor Huxley—which, if we were to follow his arrangement established on palatal characters, it would seem necessary to regard as the equivalent of an Order; and also a single very remarkable form (*Opisthocornus*), which he has satisfactorily shown to be so unlike every other that it can only be conveniently classed by itself.<sup>1</sup> Of these forms the *Tinamidae* certainly, and *Opisthocornus* probably, are of comparatively low developmental rank, in that respect resembling certain characteristic Australian groups; but the similarity between the avifaunas of the two Regions seems to be further borne out by the same fact being observable of other South-American families, forming what may be called the lower Suborders<sup>2</sup> of *Passeres*, to which the names of *Oligomyoda* and *Tracheophona* have been attached, and these, if not altogether originating in the Neotropical Region, are without doubt therein most abundantly produced. The significance of this fact is enhanced when we remember that, as has been said before, to consider rightly the problem of the distribution of birds, we must in the main rely on the *Passeres*, as affording on the whole the surest ground for our investigations. Now, taking the latest, nay, the only, complete list of Neotropical birds—that published by Messrs Sclater and Salvin<sup>3</sup> in 1873, we shall see that there are 8 Passerine families peculiar to the Region, of which 3 belong to the *Tracheophona*, 4 to the *Oligomyoda*, and 1 only to the *Polymyoda* or *Oscines*. Or, if we look to the entire number of species given in that work as inhabiting the Region, we find it to be 3565. Of these, 1997, or a good deal more than half, belong to the Order *Passeres*—a large proportion truly, but one that (from other causes not germane to our present investigation, and therefore to be just now disregarded) need not especially excite our wonder. But the characteristic nature of the avifauna of the Region is more clearly brought out when

<sup>1</sup> To recognize these Orders, *Crypturi* and *Opisthocorni*, however, it becomes logically necessary to recognize many other groups in like manner, and thus to raise the number of Orders in the whole Class to at least two dozen, or nearly four times as many as most ornithologists have been usually willing to admit, a proceeding which naturally lowers the differential standard, and renders a comparison between "Orders" of *Aves* and "Orders" of *Mammalia* or *Reptilia* almost impossible.

<sup>2</sup> The term "Suborder" should very possibly not be used here, at least in a technical sense. The *Passeres* seem to be properly divisible into two great groups—one containing the genus *Menura*, the other all the rest, except most likely *Atrichia*, which there is some reason to suppose may be found to form a third group. Whenever these groups shall receive names, they ought to be regarded as Suborders, but in the meantime, with this explanation, perhaps no harm will follow from calling the sections *Polymyoda* (the *Oscines* of some writers), *Oligomyoda*, and *Tracheophona* "Suborders."

<sup>3</sup> *Nomenclator Avium Neotropicalium*, &c., Auctorum P. L. Sclater & O. Salvin. London: 1873.

we learn that of the 1997 species just mentioned, 1070 only belong to the higher Suborder (*Polymyoda*), leaving 927 to the two lower Suborders (*Oligomyoda* and *Tracheophona*); or to speak in round numbers, out of 2000 species of the highest Order of birds, a little more than one-half belong to its highest section, while nearly one-half belong to its two lower sections. This is a state of things which exists nowhere else on the globe; for, except in Australia, where a few but uncertain number of purely indigenous and peculiar non-polymyodous *Passeres* are found, and in the Nearctic Region whither one family of *Oligomyoda* has evidently been led by the geographical continuity of its soil with that of the Neotropical Region, such forms do not occur elsewhere. Accordingly their disproportionately prevalence in South America and its neighbouring lands points unerringly to the lower rank of the ornithic of the region as a whole, and therefore to the propriety of taking it next in order to that of the Australian Region, the general fauna of which is admittedly the lowest in the world. It is believed that much the same result would follow from a similar examination of other Orders, especially the *Picariæ*; and Professor Huxley has urged with his wonted perspicuity the alliance of the two Regions just named, basing his opinion in great measure on the evidence afforded by the two sections into which the true *Gallinae* are divisible, the *Peristeropodes* and the *Alectoropodes*, the former composed of the families *Megapodiidae*, almost wholly Australian, and the *Cracidae*, entirely Neotropical, but citing also other weighty evidence in favour of his conclusion.<sup>4</sup>

Leaving, however, this matter as in some degree hypothetical, though its probability can hardly be denied, we have as genera, families, or perhaps even larger groups a great many very remarkable forms which are characteristic of or peculiar to the Neotropical Region in part, if not as a whole. Of families we find 23, or maybe more, absolutely restricted thereto, besides at least 8 which, being peculiar to the New World, extend their range into the Nearctic Region, but are there so feebly developed that their origin may be safely ascribed to the southern portion of America. First in point of importance comes the extraordinarily beautiful family of Humming-birds (*Trochilidae*), with nearly 120 genera (of which only 5 occur in the Nearctic Region), and more than 400 species. Then the Tyrants (*Tyrannidae*), with more than 70 genera (8 of which range into the northern Region), and over 300 species. To these follow the Tanagers (*Tanagridæ*), with upwards of 40 genera (only 1 of which crosses the border), and about 300 species; the Piculules (*Dendrocolaptidae*), with as many genera, and over 200 species; the Ant-Thrushes (*Formicariidae*), with more than 30 genera, and nearly 200 species; together with other groups which, if not so large as those just named, are yet just as well defined, and possibly more significant, namely, the Tapaculos (*Pteroplochidae*), the Toucans (*Rhamphastidae*), the Jacamars (*Galbulidae*), the Motmots (*Momotidae*), the Todies (*Todidae*), the Trumpeters (*Psophiidae*), and the Screamers (*Palmamedidae*); besides such isolated forms as the Seriema (*Cariama*) and the Sun-Bittern (*Eurypyga*).

Having thus briefly indicated some of the chief characteristic and for the most part generally distributed forms of the Neotropical avifauna, we have next to consider the separation of the Region into Subregions and provinces. Herein we find far greater difficulty than we had to encounter in treating of the preceding (the Australian) Region, the geographical peculiarities of which marvellously lend themselves to its comparatively easy partition, while the isolation of its several portions contributes in an extraor-

Ornithic development comparatively low.

Characteristic families.

Division into Subregions.

<sup>4</sup> *Proceedings of the Zoological Society*, 1868, pp. 294-319.

dinary degree to the process. But compared with the remaining Regions of the globe, the Neotropical, as it will be essayed to show in the sequel, presents, perhaps, no greater difficulty in this respect than others do. The Subregions (one excepted), however, cannot be said to be well defined, for no natural boundaries are to be found for them, and we must trust solely to the presence or absence of certain forms of Bird-life in marking out their limits. This is, of course, the most proper zoological method of proceeding, but in some cases it tends to make the divisions rather more than less arbitrary, and in all cases dependent upon the amount of investigation which has been bestowed on the several districts. The physical features of the continent of South America are very varied, and cannot be said to assist us much or at all in our task. The proximity of its southern extremity to an ocean wherein at one season of the year floating ice abounds, gives that portion a rigorous climate, and the presence of the grand chain of the Andes, the highest save one in the world, prolongs beyond the equator those characteristics of a mountainous or even an alpine tract, which override any that are commonly associated with degrees of latitude. This range, the great Cordillera, has also a remarkable effect first on the climatological properties of the whole country, and then on its vegetation, which, of course, acts directly on its animal inhabitants. Running as the Andes do pretty nearly longitudinally, and lying near the western coast of the continent, the warm, moist winds from the Atlantic sweep across its eastern and wider portion, unimpeded in their course by any considerable high land, till they are attracted by the summits of the giant range, and precipitating their fertilizing showers on its lofty slopes, supply the brimming floods of some of the largest rivers of the world. Westward of the chain is in great part a desert, at least down to lat. 10° S., though much of this was, prior to the conquest of Peru by the Spaniards, carefully irrigated and highly luxuriant. A few other arid tracts are found, but compared with most other continents the proportion of desert-land is small, and the valleys of the majestic rivers which roll their course to the Atlantic are clothed with the most extensive virgin forests in the world. To these varied physical conditions seem due the chief differences which are observable in the avifauna of the component parts of the South-American continent, which, rich as it is beyond that of all other countries in genera and species, displays yet a considerable uniformity in its larger groups of Birds.

The Subregions into which that portion of the earth at present under consideration can be most conveniently separated seem to be six in number—four of them included within the continent of South America, and two lying beyond its limits.<sup>1</sup> But the confines of these continental Subregions, as has been above hinted, are of the vaguest. It is doubtful whether any amount of local knowledge will ever justify the zoogeographer in drawing an absolute line of demarcation between any two of them. At present our information certainly does not permit us to do more than indicate the general direction of such boundaries; not that we believe that their existence may not be legitimately assumed. Beginning with the apex of the continent, we have a Subregion, extending from Cape Horn to somewhere north of Bahia Blanca on its eastern coast, whence its boundary runs in a north-westerly direction, passing to the eastward of Mendoza, and then northward along the eastern and higher slopes of the Andes until it crosses the equator,

<sup>1</sup> In arriving at this conclusion the author wishes to acknowledge the kind assistance he has received from his old friend Mr Salvin, F.R.S., whose long-continued study of American, and especially Neotropical, forms of birds has placed him in the front rank of authorities on the ornithology of the New World.

and, after trifurcating on either side of the valleys of the Magdalena and its affluent the Cauca, returns along the western slopes of the lofty Cordillera, until it trends seaward and reaches the Pacific coast of South America somewhere about Truxillo, in lat. 7° S. This Subregion, for a reason presently to be given, may be called the Patagonian, though its northern extremity lies so far removed from its eponymic territory. Next we have what may be called the Brazilian Subregion, marching with the foregoing until somewhere near Potosi in Bolivia, whence it turns to the north-east, and, avoiding the watershed of the Amazons, strikes, perhaps, the Paranahyba, through or along which it makes its way to the Atlantic. Then comes the enormous basin of the Amazons—the Mediterranean of South America, as the dwellers on its banks fondly call it—which, though forming an important part of the Brazilian Empire, seems undoubtedly to be a distinct Subregion from that to which this last name has been applied, and may justly be denominated the Amazonian. Yet, be it remembered, that, its peculiarities not being observable on the higher tributaries of the mighty river, its upper waters must be regarded as draining land which belongs to the fourth Subregion—of which more immediately. Continuous to the southward with the Brazilian boundary the western frontier of the Amazonian Subregion seems to turn off before the eastern confines of the Patagonian Subregion are reached, and, leaving a space intervening, it pursues a generally northward course, at a lower level, on the western bank of the Huallaga, and crossing the great stream whence it derives its name, in somewhere about long. 77° W. and lat. 5° S., it pursues its way towards the mouth of the Orinoco. The fourth and last Subregion of South America includes all that is left of the continent, and perhaps may be most fitly named the Subandean.<sup>2</sup> This begins in the south with the narrow slip of land before mentioned as intervening between the comparatively low-lying Amazonian Subregion and that portion of the Patagonian which runs along the lofty Peruvian Andes, and is believed to extend from the frontiers of Bolivia to the table-land of Ecuador, rounding, on the one hand, the forked extremity of the Patagonian Subregion to the westward until it meets the Pacific at Truxillo, stretching over 500 miles of sea to the Galapagos Islands, under the equator, and, on the other hand, following the Amazonian boundary to the Atlantic, while it comprehends the islands of Trinidad and Tobago, as well as those which lie on the northern coast of South America. Besides portions of the states already named, it includes Nueva Granada and Venezuela till it reaches the Central-American Subregion in the Isthmus of Panama. This fifth Subregion stretches on the west northward about as far as Guaymas on the east coast of the Gulf of California, and on the east to the Rio Grande, which forms the boundary of Mexico and Texas, but the Nearctic Region dips down along the central table-land till near Queretaro, a little to the northward of the city of Mexico, and thence southward along the higher ridges to an almost indefinite extent. The sixth Subregion is composed of the Antilles, with the important exception of Trinidad and Tobago, and its limits being capable of easy geographical circumscription, further consideration of them may be for the present deferred.

The difficulty of distinguishing these several Subregions is indeed very great; and it is not only possible, but highly probable that even in a few years further exploration will enjoy a large amount of rectification of their frontiers. It

<sup>2</sup> In some respects it corresponds with what has been commonly called the "Columbian" Subregion; but that name, having been used in a special and more restricted sense, might give rise to some misunderstanding. As will be seen, it comprehends far more than the former United States of Columbia.

must be remembered too that where, in the preceding paragraphs, "lines" of demarcation have been spoken of, such lines are in truth tracts of country often from one to two hundred miles in breadth, and in most cases there is no hope that the boundaries will ever attain any great degree of precision. Some advance of knowledge in this direction will no doubt accrue as the elevation and contour of hills and table-lands become more accurately laid down; but at first the effect of this increase to our information will certainly be to complicate matters, by shewing the existence within one Subregion of spurs, isolated spots, or enclosed areas belonging to another, and as yet unsuspected. Still the amount of light thrown on the Neotropical Region by the persevering labours of the eminent ornithologists before named, seems to deserve being brought to a focus; and accordingly the following summary is now offered in the hope that some of the characteristics of the avifauna of the Region may thereby be more readily comprehended.

Of the families of Birds peculiar to the Neotropical Region—twenty-four in number, according to Messrs Sclater and Salvin—the distribution may be tabulated as follows:—

Subregion.	Peculiar to 1 Sub-region.	Common to 2 Sub-regions.	Common to 3 Sub-regions.	Common to 4 Sub-regions.	Common to 5 Sub-regions.	Common to all Sub-regions.
Patagonian .....	1 <sup>1</sup>	3	1	1	3	0
Brazilian .....	0	4	1	8	5	0
Amazonian .....	1	0	1	8	5	0
Subandean .....	1	1	2	8	5	0
Central-American .....	0	1	1	7	5	0
Antillean .....	1	0	0	0	2	0

This table will serve to shew the close alliance of the four middle Subregions to one another in their most remarkable forms, and, at the same time, the singularity displayed by the Patagonian and Antillean Subregions; while it will also make evident that no family peculiar to the Region is found in all its Subregions.

(1.) *The Patagonian Subregion*, lying chiefly at the southern extremity of the continent, seems to present the greatest affinity to that in which the Australian avifauna reaches its climax. This is shewn not only by the prevalence in it, alone of all the Neotropical Subregions, of the *Ratitæ*, which wander over its solitudes, and the Penguins (*Spheniscidae*), which haunt its shores; but by the low, generalized, and peculiar forms like *Thinocorus* and *Attagis* among the widely-varying *Limicolæ*, and the *Pteroptochidae* (though some few species of this family occur elsewhere in South America) among the *Passeres*. The family of Plantcutters (*Phytotomidae*) is almost peculiar, only just intruding upon Southern Brazil. Of the more characteristic families of Birds of the New World, some 3 only (*Dendrocolaptidae*, *Formicariidae*, and *Trochilidae*) shew themselves in any great abundance, while but 2 others, which are feebly represented, occur within the ill-defined limits of its southern province, Patagonia,—the rest of its terrestrial, and still more of its littoral or maritime, avifauna consisting of families, or groups of families, which are nearly cosmopolitan. On the pampas of La Plata we find the number of characteristic Neotropical forms much increased, but still the poverty of the Argentine ornithology is of the most marked kind when compared with the wealth of the more fertile tracts which lie on its northern and eastern frontiers. In La Plata we have but 2 other families (*Tyrannidae* and *Lalamedeidae*) coming under this category that are at all well developed. *Mniotiltidae*, *Vireonidae*, and *Certhiidae* do not appear at all, and *Tanagridæ* but in small numbers. As has been said already, the Subregion extends northward along the chain of the Andes, and with this extension it

<sup>1</sup> The *Thinocoridae* may be questioned as having a real existence. The writer would be inclined to include it in the cosmopolitan family of *Charadriidae*.

seems proper to take in their arid and barren western slopes as well as a portion of the tract lying between that range and the sea, so as to include Chile and a considerable slice of Peru. But even by so doing we gain but little. No more of the characteristically Neotropical forms mount these lofty ascents in any multitude, nor are we able to add any forms of very wide distribution. However, throughout the whole Subregion many genera, and species without number, which are absolutely peculiar, occur, and thus aid in stamping the quality of the tract. Indeed, the very presence of the Struthious family *Rheidae*, with its two or three species, would serve alone to do this; and as its headquarters are in Patagonia, that country becomes of sufficient importance to give its name to the Subregion of which it forms at most but a moiety.

Entering more into details, we find the Patagonian Subregion possessing about 46 genera of birds not found elsewhere in South America. Of these 30 are strictly Land-birds—3 belonging to the family *Emberizidae*, 1 to *Icteridae*, 5 to *Tyrannidae*, 8 to *Dendrocolaptidae*, 4 to *Pteroptochidae*, 3 to *Trochilidae*, 1 to *Psittacidae*, 1 to *Falconidae*, 1 to *Columbidae*, 2 to *Tinamidae*, and 1 to *Rheidae*. Of the rest there are 3 genera of *Charadriidae* (as restricted), 1 of which (*Eudromias*) is doubtfully identical with a genus of the Old World; 2 genera of the peculiar family *Thinocoridae*; *Chionis*, an antarctic form; 2 genera of *Scolopacidae*, one peculiar, the other (*Rhynchœa*) rather widely spread over Australia, India, and Africa; 2 genera of *Anatidae*, both peculiar; 2 genera of *Laridae*, one peculiar, the other belonging to subpolar seas; 1 genus of the cosmopolitan *Podicipedidae*; and 3 genera of *Spheniscidae*, a family limited to the Antarctic or Subantarctic Ocean. But further into particulars want of space forbids our going, save to remark on a very peculiar and instructive case offered by *Buteo*, a genus of *Trochilidae*. Of this section of Humming-birds there are three known species—one, *E. galeritus*, found in Chile, evidently its mother country, but also occurring from 400 to 600 miles from the mainland on both of the chief islets of the little Juan Fernandez group—Masatierra and Masafuera; but each of these limited spots has besides its own peculiar species of the genus—the former *E. fernandensis* and the latter *E. leyboldi*. This alone would present nothing at all unparalleled elsewhere; but it is curious that while both sexes of the more widely-ranging *E. galeritus* have a green plumage, the males of the other two have a brilliant red colour, and generally resemble each other, though the females of each differ more decidedly. Supposing, as we may justly do, that all these species have descended from a common ancestor, Mr Sclater has shewn<sup>2</sup> the probability that *E. galeritus* represents the appearance of the parental stock that in bygone times colonized the Juan-Fernandez cluster, of which *E. fernandensis*, now peculiar to Masatierra, and the most aberrant from the original form, is the progeny of the earliest settlers, and *E. leyboldi*, confined to Masafuera, is the descendant of a later immigration, while, still more recently, *E. galeritus* has found its way to both islets, and in each yet possesses its normal characters.

Passing over, as not affording anything especially remarkable, the chain of islands, from Chiloe to Cape Horn, in which the range of the Andes plunges into the Southern Ocean, though alongside of it lie Tierra del Fuego and its satellites, which form an important adjunct to the South-American continent, our attention is turned to the Falklands, an interesting and considerable group of islands situated over 200 miles to the north-east of the historic Strait of Lemaire. Here we find 18 species of Land-birds—7 belonging to the order *Accipitres* and 11 to *Passeres*. Of

<sup>2</sup> *Ibis*, 1871, pp. 180-183.