

these some 5 species are peculiar—2 belonging to *Phrygilus* (*Emberizidae*), 1 to *Cinclodes* (*Dendrocolaptidae*), 1 to *Muscisaxicola* (*Tyrannidae*), and 1 to *Milvago* (*Falconidae*). Of Water-birds there is a peculiar species of *Chloephaga* (*Anatidae*), and there are, or until recently were, about half-a-dozen species of Penguins (*Spheniscidae*), some of which, though not resorting exclusively to these islands, may be fairly regarded as finding there their chief breeding-quarters. Of the ornithology of South Georgia, a group of islands lying some 1300 miles east of Staten Island, and nearly in the same latitude, and doubtless belonging to the Patagonian Subregion, as well as of the South Shetlands, no particulars are available.

(2.) *The Brazilian Subregion* has only recently had removed from it the valley of the Amazons and its tributaries. The boundaries, so far as they can be traced, have been already given. This Subregion is not characterized by the presence of any family of Birds peculiar to it alone, but among those families which are found in only two Subregions of the Neotropical Region it possesses 3 in common with the Patagonian,—*Phytotomidae*, *Cariamidae*, and *Rheidae*,—the first and last only in its southern districts, and 1 in common with the Central-American—*Oxyrhamphidae*. Of the peculiarly Neotropical families occurring in three Subregions only, it has but 1, *Pteroptochidae*, the range of which is shared by the Patagonian and the Subandean. When we come to families of four Subregions, we find the Brazilian invaded by the almost cosmopolitan *Sylviidae*, which also inhabit the Subandean, Central-American, and Antillean, and possessing in common with the Amazonian, Subandean, and Central-American not fewer than 8—*Pipridae*, *Momotidae*, *Galbulidae*, *Buconidae*, *Rhamphastidae*, *Cracidae*, *Heliornithidae*, and *Parridae*—the last of which is, however, widely distributed in other regions, besides, *Palmamedidae*, which occurs also in the Patagonian, Amazonian, and Subandean Subregions. The chief justification for considering the Brazilian Subregion apart from the Amazonian is perhaps to be sought in the presence within the limits of the former of 5 families, *Sylviidae*, *Oxyrhamphidae*, *Phytotomidae*, *Pteroptochidae*, and *Cariamidae*, which are not found in the latter, while on the other hand, 5 families, *Capitonidae*, *Opisthocomidae*, *Euryptygidae*, *Psophiidae*, and *Edionemidae*, inhabit the latter without occurring in the former; add to which the fact, that of the families found in only two of the Neotropical Subregions not one is common to the Brazilian and Amazonian.

In this Subregion we have 42 peculiar genera, 1 belonging to *Sylviidae*, 4 to *Tanagridae*, 2 to *Emberizidae*, 3 to *Tyrannidae*, 2 to *Pipridae*, 5 to *Cotingidae*, 6 to *Dendrocolaptidae*, 3 to *Formicariidae*, 2 to *Pteroptochidae*, 7 to *Trochilidae*, 2 to *Caprimulgidae*, and 1 to each of the families *Picidae*, *Momotidae*, *Galbulidae*, *Psittacidae*, and *Tinamidae*. The number of peculiar species is, however, far too great to be here enumerated. There are no islands of any importance belonging to this part of South America.

(3.) *The Amazonian Subregion*, comprehending the valley of the Amazons and its affluents (except their elevated sources among the Andes) as well as the right bank of the Orinoco and, of course, the intervening country, has been but lately separated from the preceding, and the reasons for here considering it distinct have just been briefly stated. They are not, indeed, those which first prompted the division, which was established mainly, if not entirely, on account of the peculiarity of most of the species of Birds² found within its ill-defined borders as before given; but on whichever ground we proceed we may be pretty sure that its separation is justifiable. We have here 2

¹ The propriety of considering the Stone-Curlews to form a family distinct from the other Plovers (*Charadriidae*) is very questionable. Cf. Selater and Salvin, *Proceed. Zool. Soc.* 1867, pp. 593-596.

families peculiar—*Opisthocomidae*—already mentioned as forming almost a distinct Order, but composed of a single species, the Hoactzin, and the *Psophiidae* or Trumpeters, now-a-days regarded as distant allies of the Cranes (*Gruidae*), but presenting many remarkable and unique features. This family also contains but one single genus, including some half-dozen species, the respective range of each appearing, singularly enough, to be separated by rivers. Amazonia possesses no family in common with but one other Neotropical Subregion, but it shares 3 with the Central-American and Subandean. These are *Capitonidae*, *Euryptygidae*, and *Edionemidae*, of which the second only is peculiar to the Region, the first and last being widely distributed. The families which it shares with three other Subregions have been already enumerated, as well as those which by their presence or absence distinguish it from the Brazilian Subregion. The peculiar genera remain to be pointed out. These are but 27 in number: 2 belong to *Icteridae*, 3 to *Pipridae* and *Cotingidae* respectively, 2 to *Dendrocolaptidae*, 7 to *Formicariidae*, 2 to each of *Trochilidae* and *Galbulidae*, 1 to *Ardeidae* and *Palmamedidae*, 2 to *Cracidae* and the genera *Opisthocomus* and *Psophia* before mentioned. There is another genus also which is worthy of remark, *Chenalopez*, belonging to the *Anatidae*, not found elsewhere in the New World, but common to the Ethiopian Region. Space will not admit of our entering further upon the consideration of the ornithic peculiarities of Amazonia, but perhaps it may be said to form the most self-contained Subregion of the whole continental area of which we are now treating, and we may expect that with the progress of zoological exploration its boundaries may be laid down with tolerable precision. There are no islands which can be attached to Amazonia.

(4.) *The Subandean Subregion*, from what has been previously indicated of its extent, will be readily seen to offer the most varied conditions of existence of any part of the Neotropical Region, and we shall not therefore be surprised to find its ornithic at once rich and remarkable. It might perhaps now, and some day probably will, be broken up into two or more provinces, not to say separated into distinct Subregions, but the means for such partition are at present wanting. Yet there is only one family of Birds peculiar to it, the *Steatornithidae*, composed of a single species, the Guacharo or Oil-bird (*Steatornis caripensis*), confined to a very few localities in its eastern portion. In common with Central America, but not elsewhere met with in the Region, it has of Neotropical families *Cinclididae* and *Alaudidae*, though the latter of these two widely-ranging families is but poorly represented by a single species (*Otocorys chrysolæma*), apparently the survivor of an old population (all, or nearly all, of which has perished), stranded, as it were, on the high lands of Columbia. Those families which it possesses that are common to but two other Neotropical Subregions have already been named, and it will be enough to repeat that 1 of them extends to the Patagonian and Brazilian, and the remaining 3 to the Amazonian and Central-American. In like manner have been enumerated the families which are also found in but three other Subregions—1 it has in common with the Amazonian, Brazilian, and Patagonian; 8 with the Central-American, Amazonian, and Brazilian; while 1 of these (*Parridae*) is also found in very distant parts of the world, and 1, also a family of extremely wide range, with the Brazilian, Central American, and Antillean Subregions.

The genera peculiar to the Subandean Subregion are exceedingly numerous, amounting to no fewer than 72. These may be apportioned as follows: 1 to *Troglodytidae*, 4 to *Carebidae*, 10 to *Tanagridae*, 5 to *Emberizidae*, 1 to *Icteridae*, 2 to *Tyrannidae* and *Pipridae* respectively, 3 to *Cotingidae*, 1 to each of *Dendrocolaptidae* and *Formicariidae*,

38 (1) to *Trochilidae*, 1 to the peculiar family *Steatornithidae*, and 1 to *Picidae*, *Strigidae*, and *Cracidae* respectively. The enormous differential development of the peculiarly New-World family *Trochilidae* calls for some remark, and is only approached (as will presently be seen) by that which has occurred in Central America. The habitat of some of these forms of Humming-birds, whether genera or species—and the latter are wonderfully numerous—is extremely restricted. That of *Loddigesia mirabilis*, long since described from a still unique specimen in the Loddiges collection, is Chachapoyas in northern Peru, and though possibly more pains has been taken to discover it and compass the capture of other examples than has been the case with any other Bird, it has not been again met with. Its haunts may, therefore, be safely presumed to be especially confined. Two species of *Oreotrochilus* (*O. chimborazo* and *O. pichinchae*) have their abode almost limited to the slopes of the lofty mountains whence they take their name, and nearly as much may be said of others. The Tanagers (*Tanagridae*)—birds of varied form, and generally of exquisite plumage—also frequent this Subregion in great force, and among them there is here found, perhaps, the greatest amount of differentiation, both generic and specific.

Of the hundreds of other curious ornithological characteristics of the Subregion which might easily be cited, no more can here be given, but a brief notice of the avifauna of its extreme points seems to be required. It has now been for some time fully admitted by all competent authorities that the islands of Trinidad and Tobago, which the geographer might be inclined to class with the Antillean chain, must be regarded as being truly portions of the South-American continent, detached in comparatively recent times, and even now only separated from Venezuela by a comparatively shallow sea. Neither of these islands has a single peculiar species,¹ and except, perhaps, some stragglers from the north, not one which is not also found on the nearest mainland, though, of course, many inhabitants of the neighbouring continent do not pass either the Dragon's or the Serpent's Mouth, as the two narrow channels which cut off Trinidad from South America are called. We may presume that the various islands, Margarita, Curacao, and Oruba, which lie off the northern coast of Venezuela, also belong to this Subregion, though scarcely anything is known of their animal products.

Very different from this state of things is that which obtains at the opposite extremity of the Subregion. The interesting group of volcanic islands known as the Galapagos present not merely a large number of peculiar species, but 4 peculiar genera of Land-birds; 1 of these, *Certhidea*, belongs to the *Carebidae*, and the other 3, *Geospiza*, *Camarhynchus*, and *Cactornis*, seem to come into the family *Emberizidae*.² It was Mr Darwin who first drew attention

¹ Trinidad has about 350 species—one of them (*Psittacula cingulata*) was thought to be peculiar, but Mr Salvin informs the writer that it has lately been procured in Guiana. The nearest approach, perhaps, to peculiarity is in a Thrush, which was originally described as being specifically distinct, under the name of *Turdus xanthoscelus*, but its claims to that consideration are now disallowed.

² A very considerable amount of uncertainty, which at present cannot be removed, though it produces some confusion, appertains to the right position of many of the New-World forms of so-called Buntings (*Emberizidae*) and Finches (*Fringillidae*). The writer is fully inclined to believe that the distinctness of these two families, which among forms of the Old World has long been recognized, and that almost without difficulty, can be fairly established, since it seems to rest on good osteological characters; but the American genera have not yet been sufficiently examined to allow of many of them being allotted without much doubt. This uncertainty will most likely in time be removed, unless—and such a probability cannot be denied—some of the New-World forms turn out to be so much generalized as to fill up the gap which now presents itself between the two groups as observed in the Old World. Meanwhile, the consequent inconvenience is unavoidable.

to the remarkable ornithic of this archipelago, and here it was, as he has told us, that there dawned upon him from its consideration that theory of "Natural Selection" which has transformed the whole aspect of biology, and, whether wholly or partially accepted, has placed the science upon a new and higher pedestal. Later researches, indeed, have shown the nonexistence of some of the peculiarities which this eminent observer believed, on what was then good evidence, he had determined; but these refer to the restricted distribution of several of the species among the different islands, and are not of any such importance as to affect his general results, while doubtless, had his visit to this "little world within itself," as he appropriately calls it, been of longer duration, he would have become aware of these minor facts. The strictly-speaking Land-birds of the Galapagos seem to be some 30 in number, of which about 26 are *Passeres*. Among these, 1 only, *Dolichonyx oryzivorus* (belonging to the family *Icteridae*), and obviously a straggler, is identical with a species of the mainland, while 2, a *Dendroica* (*Mniotiltidae*), and a *Progne* (*Hirundinidae*), have been by some considered to be distinct species, by others but local races,—which means, of course, that from one cause or another isolation has not yet modified them so as to depart greatly from their congeneric continental forms,—but the remaining 23 (1) are peculiar, and, what is especially worthy of notice, no fewer than 18 (1), or nearly three-fourths of the whole number, belong to the four peculiar genera. There is also a peculiar species of Buzzard, agreeing closely in every habit and even in tone of voice with the carrion-eating *Polyborus*, and originally described as the type of a distinct genus under the name of *Cracirex galapagoensis*. Apparently, too, there is a distinct and peculiar Barn-Owl (*Aluco punctatissimus*), but alongside of it we have the widely-spread Short-eared Owl (*Asio accipitrinus*), though examples of this last are said to present in these islands sufficient difference to justify the bestowal upon them of a distinct specific name. Among Water-birds, the *Rallidae* and *Ardeidae* furnish, the former one and the latter two, species not known elsewhere. A remarkable fact, also, is the asserted existence of a peculiar species of Flamingo (*Phoenicopterus glyphorhynchus*), seeing that most of the birds of this genus have a very extended distribution. A Penguin also (*Spheniscus mendiculus*) is at present only known from the Galapagos; but considering the range of other forms of this family (*Spheniscidae*), we should, perhaps, be premature in as yet pronouncing it a peculiar species, though the existence of a Penguin at all under the equator raises a presumption that such may be the case. There is, however, one feature in the avifauna of these islands which should not be overlooked. Notwithstanding that the Galapagos are here placed as forming an outlying portion of the Subandean Subregion, the fact must not be concealed that their ornithic seems to have no very special or intimate relation thereto. All that can be averred of it is that it is American. In the subregion just named, as has been above shown, the *Trochilidae* attain their maximum of development, yet no Humming-birds are found in this archipelago. So also with the *Tanagridae*, of which there are abundant Subandean representatives, the *Dendrocolaptidae*, *Formicariidae*, and other characteristic Neotropical families. In the Galapagos none of them are found. It is true that the presence of a species of the South-American genus *Pyrocephalus*, and of a genus of the Neotropical family *Carebidae*, may be a set off on the other side; but on the whole, it seems quite likely that the relations of this isolated, equatorial province (for so it is entitled to be deemed) are as near to the north as to the south, if not nearer, and it is quite possible that, having its ornithological characters only in view, future zoogeographers may think fit to ally it to the former rather

than the latter. But the affinities of its Reptilian fauna point to a connection, however remote in point of time, with South America, and accordingly the Galapagos are here left in that Region to which they have been commonly assigned.

(5.) *The Central-American Subregion* is the next to be considered, and in treating of it we become aware of a disturbing force which renders impossible the laying down for it of anything like a definite frontier. This disturbing force is the entrance, as before intimated, of a Nearctic fauna which runs along the backbone, so to speak, of the Subregion to an unknown but variable extent; for part of this Nearctic fauna ebbs and flows according to the season of the year, in winter possibly creeping down the mountainsides, and being strongly reinforced by immigrants from the north, but in summer retiring northward and perhaps upward, so as to occupy only the most lofty ridges. Yet that two Subregions here unite and inosculate is certain; but in considering the Central-American avifauna, we have to guard ourselves against this periodic stream of northern immigrants, and cannot deal with it precisely in the same way as we have done those Subregions further removed from the influence which is here so strongly manifested. In Central America, though its ornithology is of the richest, we find not a single peculiar family of Birds, and those which it, to a more or less limited extent, shows with the other Subregions of the Neotropical Region have been already named, except the *Ampelidae*, a small but widely-ranging family of the northern hemisphere, which it has in common with the Antillean Subregion. 5 other families, however, *Paridae*, *Sittidae*, *Certhiidae*, *Laniidae*, and *Meleagridae*, belonging also to the Nearctic Region, occur here. Of genera which are not found elsewhere in the Region, it seems to have 93, but 47, or just more than half, of them are also found in the Nearctic Region; and therefore to obtain anything like a true notion of the Central-American ornithology, it will be necessary to keep the two categories apart. Taking first those which are absolutely peculiar, we have 2 belonging to *Turdidae*, 1 to *Troglodytidae*, 2 to *Mniotiltidae*, 1 to each of *Vireonidae*, *Ampelidae*, and *Tanagridae*, 3 to *Emberizidae*, 1 to *Icteridae*, 2 to *Corvidae* and *Tyrannidae* respectively, 1 to *Cotingidae*, 2 to *Formicariidae*, 19 to *Trochilidae*, 2 to *Momotidae*, 1 to each of *Trogonidae*, *Cuculidae*, and *Psittacidae*, 2 to *Cracidae*, and 1 to *Tetraonidae*. Then, taking those not found elsewhere in the Neotropical Region, but inhabiting the Nearctic, we have, as occurring in Central America, 1 belonging to *Turdidae*, 2 to *Sylviidae*, 3 to *Paridae*, 1 to each of *Sittidae* and *Certhiidae*, 2 to *Troglodytidae* and *Mniotiltidae* respectively, 1 to *Laniidae*, 2 to *Ampelidae*, 14 to *Emberizidae*, 3 to *Fringillidae*, 2 to *Icteridae*, 1 to each of *Tyrannidae*, *Trochilidae*, *Picidae*, and *Cuculidae*, 2 to *Strigidae* and *Anatidae* respectively, 1 to each of *Columbidae* and *Meleagridae*, 2 to *Tetraonidae*, and 1 to *Charadriidae*.

Nicely balanced as these numbers are, they show a result which might well have been expected from the physical and geographical configuration of the country, while the numbers of other families peculiar to the Neotropical Region, though shared by some of its Subregions, as already given, prove incontestably the propriety of including Central America with that Region; and this would come out even more plainly did our limits permit of the investigation being extended to species, though so many northern forms here find their winter-quarters. It remains to remark that almost the only island of any importance belonging to the Subregion is Socorro, the largest of a small group lying to the westward of Mexico in lat. 18° 30' N., and long. 111° W. Here out of 9 species of Land-birds, 4 have been described as peculiar, 2 others are

¹ See preceding footnote.

elsewhere known as occurring only on the Tres Marias, a little group some 250 miles nearer the mainland, and 1 is regarded as a local race of a continental species, leaving but 2 (both Birds-of-prey) which cannot be deemed autochthonous. The still more remote Cocos Island, lying in lat. 5° 33' N., and long. 87° W., from which one peculiar species of *Coccyzus* (*Cuculidae*) is known, may belong just as likely to the Subandean as to the Central-American Subregion.

(6.) *The Antillean* is the only one of the Neotropical Subregions the precise boundaries of which can be definitely laid down; and it is in many respects one of the most suggestive and interesting, comparatively small though it be. Extending from Cape San Antonio de Cuba in the west to Barbadoes in the east, its greatest length is only about 1700 miles, and from Abaco, one of the Bahamas, in the north to Grenada in the south, it does not cover 15 degrees of latitude, while within these limits the proportion of land to water, being less than 98,000 square miles, is very inconsiderable. The unbroken chain of islands which are commonly known as the "West Indies"—though that term rightly includes not only all of the "Spanish Main," but an indefinite extent of coast lying both north and south of the ancient dominions of the Catholic King in the New World—forms, geographically, a second line of connection between the two halves of the American continent, separated from the great western isthmus by the deep waters of the Caribbean Sea and the Gulf of Mexico, and at once suggests a former communication by land with Yucatan at the one extremity and with Venezuela at the other, to say nothing of a possible junction with Florida. Yet, as will presently be shewn from a consideration of the peculiar forms of Bird-life which have grown up along the chain, any such communication, if it ever existed, must have been exceedingly remote in point of time; for narrow as are the channels between Cuba and the opposite coast of Central America, between the Bahamas and the south-western peninsula of North America, and between Grenada and Tobago (the last belonging zoologically, as has been already demonstrated, to South America), the fauna of the Antillean chain, instead of being a mixture of that of the almost contiguous countries, differs much from all, and exhibits in some groups a degree of speciality which may be not unfitly compared with that of oceanic islands. Except such as are of coral formation, the Antilles are hilly, not to say mountainous, their summits rising in places to an elevation of 8000 feet, and nearly all, prior to their occupation by Europeans, were covered with luxuriant forest, which, assisting in the collection and condensation of the clouds brought by the trade winds, ensured its own vitality by precipitating frequent and long-continued rains upon the fertile soil. Under such conditions we might expect to find an extremely plentiful animal population, one as rich as that which inhabits the same latitudes in Central America, not many degrees further to the west; but no instance perhaps can be cited which shows more strikingly the difference between a continental and an insular fauna, since, making every allowance for the ravages of cultivation by civilized man, the contrary is the case, and possibly no area of land so highly favoured by nature is so poorly furnished with the higher forms of animal life. Here, as over so large a portion of the Australian Region, we find Birds constituting the supreme class—the scarcity of Mammals being accounted for in some measure as a normal effect of insularity.

Glancing at the entire chain, we may first set aside the Bahamas, a succession of emerged coral-reefs founded on, and to the south and east surrounded by, shoals or banks, broken only here and there by deeper channels; and then by drawing a line to the south of the islands of St Croix

and St Bartholomew, we find that this line divides the chain into two groups of distinct character—that lying to the southward and eastward, almost identical with the "Windward Islands" of some geographers,¹ which, excepting Antigua and Barbadoes, are almost entirely volcanic, while no direct trace of recent volcanic action is known in the group lying to the northward and westward. These three divisions, however natural in appearance, can hardly be affirmed to form as many zoological provinces, owing to the absolute dearth of information respecting many of them, and the insufficient amount which has been received of the remainder. Taking the whole of the Antillean Subregion, the Bahamas, Cuba, Jamaica, St Croix, St Thomas, Sombrero, St Bartholomew, Guadeloupe, Dominica, Martinique, and St Lucia are the only islands of the ornithology of which we have anything more than what may be called a casual account; and hence, though valuable observations respecting some of the rest have been placed on record by travelling naturalists, any attempt to separate the Subregion into proper provinces would necessarily be of the crudest kind, and here cannot be made, though doubtless such provinces will eventually be defined with precision.

Character-
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Still enough is known of the Birds of this Subregion to enable us to draw some conclusions, though certain of them seem especially likely to be overset by further investigation. It is inhabited by some 41 families, 1 of which (*Todidae*) is not found elsewhere, 2 more (*Cerebidae* and *Cotingidae*) are confined to the Neotropical Region, 8 (*Mniotiltidae*, *Vireonidae*, *Tanagridae*, *Icteridae*, *Tyrannidae*, *Trochilidae*, *Cathartidae*, and *Aramidae*) are common to that and the Nearctic Region, but are peculiar to the New World, and 30 are of much more general distribution, but 2 of these (*Trogonidae* and *Fregatidae*) are not found in the Nearctic Region, and, as the above numbers show, there is no family common to that Region and the Antillean Subregion without also occurring in other parts of the Neotropical Region. On the whole, therefore, the affinity of the Subregion to the Neotropical rather than to the Nearctic Region is fully made out. About 140 genera are found in the Antilles, of which 30 are peculiar to it, being a considerably larger proportion than is elsewhere found in the Neotropical Region. Of these 30 genera, which are all Land-birds, 4 belong to *Turdidae*, 1 to each of *Mniotiltidae*, *Vireonidae*, *Ampelidae*, and *Cerebidae*, 2 to *Tanagridae* and *Emberizidae* respectively, 1 to each of *Icteridae* and *Tyrannidae*, 5 to *Trochilidae*, 1 to *Caprimulgidae*, 2 to *Picidae*, 1 to *Todidae*, 2 to *Trogonidae*, *Cuculidae*, and *Strigidae* respectively, and 1 to *Columbidae*.² Besides these, 21 more, which it is perhaps unnecessary to particularize, do not exceed the limits of the Neotropical region, while 5 others, belonging respectively to the families *Cypselidae*, *Fregatidae*, *Anatidae*, *Columbidae*, and *Rallidae*, occur both here and elsewhere in that Region without reaching the Nearctic except as stragglers. *Perisoreglossa*, belonging to the family *Mniotiltidae*, is the only genus common to the Nearctic Region and the Antillean Subregion without occurring elsewhere in the Neotropical Region, all the remaining Antillean genera inhabiting both North and South America. The distribution of some of

¹ In the language of others, the "Windward Islands" begin with Martinique and so continue to Trinidad, while the remainder of the Lesser Antilles, lying eastward of Porto Rico, are called the "Leeward Islands." Other authorities name all the smaller islands so far as St Thomas "Windward Islands," and those further westward the "Leeward." Creoles appear to apply these terms relatively to their own habitation, just as the dweller on the bank of a river speaks of "up stream" and "down stream" with sole reference to the position he occupies on the margin; and it might be wished, though that were vain, that the use of terms so little definite should be abandoned.

² This genus (*Starnanias*) has been said, however, to occur in the Florida Cays, but the statement seems doubtful.

the peculiar genera merits a little attention, for 19 out of the 30 are confined to a single island, or nearly-connected group of islands. Thus, Cuba has 6 believed to be restricted to its soil; Jamaica, 7; Hispaniola, 2; and the so-called "Windward Islands," probably 4; while none are known to be absolutely limited to the Bahamas, to Porto Rico, or the Virgin Islands. It is possible, indeed, that Hispaniola and Porto Rico, if as well explored as Cuba and Jamaica have been, might tell a very different story.

Pursuing the subject further, and entering, so far as space will allow, upon a consideration of details, we find that there are of Land-birds about 200 resident species, and nearly 90 which are not resident, but migratory. These last belong to about 55 genera, of which some 40 have no resident insular representatives, while those migrants pertaining to genera which possess permanent residents are nearly all as much Neotropical as Nearctic in character. Most of these, so far as is known, visit Cuba only, where over 80 are recorded as occurring, while but 30 reach Jamaica. The number, however, in the island last named, and in others, would most likely be not inconsiderably increased did competent observers but exist, though the fact that a well-known species like the Humming-bird of eastern North America (*Trochilus colubris*) does not seek its winter-abode in any of the islands except the Bahamas and Cuba, tends to lessen the force of such a supposition, and points to our actual knowledge being not very far wrong. Among the more interesting of peculiar forms is one genus of *Turdidae* (*Mimocichla*), which is represented by 4 distinct species, found in the Bahamas, Cuba, Jamaica, and Hispaniola respectively. Another genus of the same family (*Margarops*) has a species ranging from Hispaniola to the Virgin Islands, and a second species inhabiting Martinique and St Lucia only, these two islands possessing at the same time a third and peculiar genus (*Rhamphocinclus*), containing but a single species, common to both, while they also have another genus (*Cincoerthia*), a distinct species of which inhabits either island, though a third species of the same is found in Guadeloupe and Nevis. The genus *Certhiola*, belonging to the *Cerebidae*, is remarkable in that it occurs in nearly every island except Cuba; but what seems to be still more extraordinary is that the species found in the Bahamas (*C. bahamensis*), and there alone in the whole Subregion, also occurs in Cozumel, an island off the coast of Yucatan, though Cuba intervenes. The distribution of *Spindalis*, one of the *Tanagridae*, resembles that of *Mimocichla*, above noticed, only that here Porto Rico also has its distinct representative species. Of the peculiar genera of Humming-birds, *Eulampis* has 2 species—one ranging from St Lucia to Nevis, but the second extending northward to St Thomas. *Aithurus*, a very remarkable form, is restricted to Jamaica, while *Mellisuga* is common to that island and Hispaniola—each of these genera consisting of but one species only, and the last is the smallest known bird. *Orthorhynchus* seems to have 3 species, one extending from St Thomas to Dominica, a second (perhaps barely separable) common to Martinique and St Lucia, and a third to St Vincent and Barbadoes; and, finally, *Sporadinus* has one species in Cuba and at least one of the Bahamas, a second species in Hispaniola, and a third in Porto Rico. Of genera of Humming-birds, which are not confined to the Antilles, *Lampornis*, a widely-ranging genus, has two species peculiar to Jamaica and Porto Rico respectively; while a third extends from Hispaniola to St Thomas. *Calypte*, which has two species in Mexico, has a third peculiar to Cuba, while *Doricha* is represented in two of the Bahamas (New Providence and Inagua) by as many distinct species; the other three described species of the form inhabiting Central America, and none, so far as known, occurring in

Cuba; and thus we have afforded us another case of interrupted generic distribution somewhat like though not quite so extraordinary as that of *Certhiola* already noticed. In all, about 17 species of *Trochilidae* are found in the Antilles, of which only one, and that of exceptionally developed migratory habits, occurs elsewhere. The peculiar family *Todidae* has been already mentioned; and it is only necessary here to remark that the single genus *Todus* which it contains seems to have 5 species, one limited to each of the large islands, Cuba, Jamaica, Hispaniola, and Porto Rico, the fifth being from an unknown locality.¹ Much the same has to be said of *Saurothera*, a genus of *Cuculidae*, which is represented by a distinct species in each of these four islands, while another genus of the same family, *Hyetornis*, with one species, is peculiar to Jamaica. The *Trogonidae* have two genera, *Prionoteles* and *Tennotrogon*, each with a single species, the former peculiar to Cuba, and the latter, which exhibits a remarkable affinity to the African genus *Hapaloderma*, to Hispaniola. *Pseudoscops*, a genus of *Strigidae*, is peculiar to Jamaica, but *Gymnoglaux*, belonging to the same family, has one species limited to Cuba, while a second extends from Porto Rico to some of the Virgin Islands. Cuba also, besides a widely-ranging species of Kestrel (*Tinnunculus*), has a second species which is peculiar to the island. Jamaica, on the other hand, seems to have no Kestrel at all.

Any speculations as to the former history of the Antilles derived from our imperfect knowledge of their existing ornis would be vain. It is enough to perceive, as the preceding facts will show, that there must have been no ordinary amount of upheaval and subsidence, of turning land into water and water into land, to account for the present distribution of their avifauna. More wonderful than any evidence given by the Birds, is that which is afforded by other Classes. It is asserted that *Solenodon*, an Antillean genus of Insectivorous Mammals, has its nearest ally in a Malagasy form; and a splendid Butterfly, found only in Jamaica (*Urania sloanis*), belongs to a genus of which while two other species are known from Central and South America respectively, the only other genus resembling it is one that inhabits Madagascar.

III. THE NEARCTIC REGION comprises all that is left of the American continent, after the Neotropical Region has been taken off, and certain outlying groups of islands, such as the Aleutian chain, with its immediate dependencies, and the Bermudas—none of them, however, being of any great importance,—as well as the circumpolar lands lying westward of long. 60° W., and Greenland. The confines of these two Regions, as before stated (page 748), are as yet but vaguely traced. All that is known for certain is that the more northern runs considerably southward along the highlands of Central America, and that its influence, as determined by the presence of resident genera of northern extraction, is perceptibly felt on the summits or slopes of the mountains, at least so far southward as lat. 20° N. In the lowlands the boundary lies much further towards the north, and, perhaps, in general terms, may be placed somewhere about lat. 25° N., while both in lowlands and highlands, as above explained, the northern influence varies with the seasons of the year, being greatest in winter, when the migratory birds, which breed in the Nearctic Region, have turned their flight southward, and least in summer, when they have retired to their northern homes. If the avifauna of the Neotropical Region could, in a wide sense, be truly termed homogeneous, much more is this the state of the case with the Nearctic. Of the 63 families² of Birds, which is the highest number

¹ A bird of this group was one of those asserted by Ledru to have formerly occurred in St. Thomas (page 734.)

² Three of these (*Hematopodidae*, *Recurvirostridae* and *Phalaro-*

it seems possible to count for this region, only 1, *Chamaeidae*, is peculiar, and the validity of the grounds on which this has been established as such may be open to question; 44 of them are also Palearctic; and the remaining 18 are common to the Neotropical Region, of which last number at least 4 (*Trogonidae*, *Plotidae*, *Fregatidae*, and *Phaetontidae*) have a much more extended range. Thus there are 14 peculiarly American families left. These are *Mniotiltidae*, *Cœrebidæ*, *Tanagridæ*, *Vireonidae*, *Icteridae*, *Tyrannidae*, *Trochilidae*, *Momotidae*, *Aridæ*, *Cathartidae*, *Cracidae*, *Meleagridæ*, *Tantalidae*, and *Aramidae*. But the propriety of here admitting *Trogonidae* (mentioned above) and *Momotidae* is very doubtful; for, though included by Dr Coues, they are omitted by Professor Baird from his *North American Birds*, the most recent work on the subject. The claim of *Cœrebidæ* to be considered Nearctic is also slender, resting on the fact that a small colony of the Sugar-bird which inhabits the Bahamas (*Certhiola bahamensis*) has established itself on one of the Florida Cays. The *Aridæ* are represented in the Region by a single species only—the long-known Carolina Parakeet (*Conurus carolinensis*); and the *Tanagridæ*, a family containing upwards of forty genera, have but one genus (*Pyrranga*), exemplified by four or five species, out of about a dozen, which occur within its limits.

On the other hand, the peculiarly American families best represented in the Nearctic Region seem to be four in number,—*Mniotiltidae*, by 13 genera and about 50 species, *Vireonidae* by 1 genus and 14 species, *Icteridae* by 8 genera and 21 species, and *Tyrannidae* by 8 genera and 26 species. The first of these, however, can alone be regarded as eminently characteristic of the Region, since that affords a home to all but 3 of the genera, but at the same time, only about one-half of the described species occur there. None of the rest can compare with it in this respect, *Vireonidae* having 5 genera and 50 species, *Icteridae* 24 genera and 105 species, and *Tyrannidae* 71 genera and 324 species in the Neotropical Region.

Coming now to the genera of Nearctic birds, we may put the number perhaps at 330, of which 24 seem to be peculiar to the Region; 2 of them belong to *Turdidae*, 1 to *Chamaeidae*, *Paridae*, *Troglodytidae*, and *Motacillidae* respectively, 5 to *Emberizidae*, 2 to *Corvidæ*, 1 to each of *Picidae*, *Falconidae*, and *Columbidae*, 5 to *Tetraonidae*, and 1 to *Scolopacidae*, *Anatidae*, and *Laridae* respectively. But it is perhaps worth remarking that the families *Emberizidae* and *Tetraonidae*, here most abundantly represented by genera, are still more abundantly represented in like manner elsewhere. In the Neotropical Region we have some 30 and in the Old World some 15 genera of the former, which are not found in the Nearctic Region; and the Old World has some 30 genera of the latter which are not found in the New. On the other hand it must be admitted that if we subdivide the American *Tetraonidae* into sections or sub-families, we find that while one of those sections, the *Odonophorinae*, is peculiar to America, the balance as regards the other, *Tetravinæ*, is clearly in favour of its greater development in North America, where we have 3 genera absolutely peculiar, as well as 3 others which are also found in the Palearctic Region. With this Region, indeed, the Nearctic has about 128 genera in common, having 178 which are also Neotropical. Returning to these last presently, it may be advisable here to give some particulars of those which are common to both sides of the North Atlantic. I belong to each of the families *Turdidae* and *Cinclidæ*; 3 to *Sylviidae*, 2 to *Paridae*, 1 to *Sittidae*, *Certhiidae*, *Troglodytidae*, and *Alaudidae* respectively, 2 to each of *Mota-*

podidae are not regarded as good families by the writer. They are common also to the Palearctic Region.

alidae and *Hirundinidae*, 1 to *Ampelidae* and *Laniidae* respectively, 7 to *Fringillidae*, 2 to *Emberizidae*, 3 to *Corvidæ*, 1 to each of *Cypselidae* and *Alcedinidae*, 3 to *Picidae*, 9 to *Strigidae*, 10 to *Falconidae*, 1 to *Columbidae*, 3 to *Tetraonidae* and *Charadriidae* respectively, 2 to each of *Hematopodidae*, *Recurvirostridae*, and *Phalaropodidae*, 7 to *Scolopacidae*, 1 to *Ibididae* and *Plataleidae* respectively, 4 to *Ardeidae*, 1 to *Gruidae*, 5 to *Rallidae*, 1 to *Phœnicopteridae*, 18 to *Anatidae*, 1 to each of *Sulidae*, *Pelecanidae*, and *Phalacrocoracidae*, 6 to *Laridae*, 3 to *Procellariidae*, 1 to each of *Colymbidae* and *Podicipedidae*, and 10 to *Alcidae*.¹ Thus it will be seen that no less than 57, or more than one-sixth of the whole 330 genera, are purely Land-birds,—a very large proportion.

The genera which occur both in the Nearctic and Neotropical Regions, without appearing in the Palearctic, must be divided into two categories in order to arrive at a just estimate of the relations of the avifaunas of the first two. These categories consist of those genera which, being only winter visitants to the southern Region, do not breed there, and those which may fairly be called common to both. The latter need perhaps no further attention, after what has been previously said of the Central-American Subregion (p. 748), but the former require some notice. Of those in this category 1 genus belongs to each of the families *Sylviidae* and *Troglodytidae*, 8 to *Mniotiltidae*, 6 to *Emberizidae*, 1 to *Icteridae*, *Trochilidae*, *Picidae*, and *Columbidae* respectively, 6 to *Scolopacidae*, and 1 to *Phalaropodidae*—27 in all. These must, of course, be considered characteristic of the Nearctic Region, and might, indeed, be not inappropriately added to the 24 genera which are, as already said, peculiar thereto; but even if this be done, we find the number of peculiar and characteristic genera (taken together) of the Nearctic Region to be only 51—a smaller number than that of the genera of Land-birds alone (57) which are common to the Palearctic, and considerably less than half the number of all genera which are found on both sides of the Atlantic (128), while the remaining genera which are strictly common to the Neotropical (151) is much larger again. Thus, regarded simply from an ornithologist's point of view, what we call the Nearctic "Region" seems to have no right to be considered one of the primary Regions of the earth's surface, and to be of less importance than some of the Subregions of the Neotropical Region, as may be shewn more plainly by the following table:—

	Whole No. of Genera of Birds.	Peculiar Genera of Birds.
Patagonian Subregion.....	290	46
Brazilian ".....	396	43
Amazonian ".....	373	27
Subandean ".....	469	72
Central-American ".....	464	46
Antillean ".....	140	30
Nearctic Region.....	330	24

It is not, however, intended here to question the validity of the Nearctic Region in a zoogeographical sense. If that position could be successfully disputed, it must be done on more than ornithological grounds, and a consideration of them would be out of place in this article. It is enough to mention that though the Mammals would possibly lead to much the same conclusion as the Birds do, yet the lower Classes of Vertebrates—Reptiles, Amphibians, and Fishes—would most likely have a contrary tendency, while the present writer is quite unable to guess at the result which would be afforded by the Invertebrates. Now, as in map-

¹ Of many American Birds, especially Water-birds, which from time to time occur as stragglers in Europe, no account has here been taken, and, of course, they will not be reckoned in our computation of Palearctic genera.

ping out the world into zoological Regions all animals have to be regarded, he has no wish to disturb the scheme which has been so generally approved, but contents himself with pointing out that the case for its adoption is not in this particular instance strengthened by the evidence given by the Class *Aves*.

A great majority of the Nearctic families and genera of Birds appear to be generally distributed throughout all the "Subregions," or perhaps it would be better to call them "provinces," into which ingenuity can separate the Region. And on this account, as well as from what has been urged in the preceding paragraph, it seems unnecessary to treat of each "Subregion" or "province" so fully as has hitherto been done in the present article. Indeed such districts are not easily defined, and their definition rests rather on differences of species than of higher groups, as we have found to be the case in discussing the several component parts of the other Regions we have considered. Professor Baird, in a masterly treatise on this and another subject,² would first divide that portion of North America which constitutes the Nearctic Region into two principal sections, the Eastern extending from the Atlantic sea-board westward across the Alleghany Mountains and over the valley of the Mississippi and its fertile prairies to about long. 100° W., where the sterile plains begin. The western boundary of this division, however, is not sharply defined, nor does it coincide with any meridian line, but lies somewhat obliquely and interdigitates with the eastern confines of the next division by extending westward along the river-bottoms. Marching with this irregular frontier we have the second, or Western, great division reaching thence to the shores of the Pacific, and though the character of its avifauna is much the same through and beyond the Rocky Mountains to the eastern slope of the Sierra Nevada and Cascade Mountains of California and Oregon, it changes somewhat on their western slope and thence to the sea, exhibiting modifications which may warrant further separation into a truly Western and a Central subdivision—thus making in all three provinces for the whole of the more southern part of the Nearctic Region, while each of them shews, as might be expected, indications of additional change, subject in great measure to the degree of latitude under which any particular locality in them may lie.

Having thus pointed out the three provinces into which this portion of the Region can be separated, it may be well to cull from Professor Baird's investigations of the subject some further details. The boundary of the Eastern province, which, taking up an old name, we may perhaps term the "Alleghanian"—from the principal mountain range within its limits,—starts from the Gulf of Mexico, near the eastern border of Texas, perhaps between the rivers Brazos and Sabine, and following the course of the former to the great American Desert, in about long. 100° W., runs northward, forced sometimes more or less westward, especially along the Platte, and sometimes eastward. It crosses the Platte between Forts Kearney and Laramie, and apparently intersects the Missouri about Fort Lookout. Reaching the southern frontier of the Dominion of Canada, it rapidly inclines to the westward, and including the valleys of the Saskatchewan and the Athabasca, it crosses the Rocky Mountains, and, cutting the river Yukon below the junction of the Pelly and the Porcupine, loses itself in the wilds which border the Arctic Ocean. Since the Middle province—on which as yet no more precise name has been bestowed—lies for the most part between the Alleghanian and the Western or "Californian," as it has been entitled, the boundaries of this last had best, so far

² "The Distribution and Migrations of North American Birds," *American Journal of Science and Arts*, ser. 2, vol. xii. pp. 78-90, 184-192, 337-347 (January, March, and May, 1866).