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## BARBETS, AND THEIR DISTRIBUTION.

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(With a Coloured Plate.)

IN my notice of the Bell-bird and its allies,\* I spoke of the difficulties hitherto experienced in the introduction of living representatives of the great fruit-eating families of birds of the tropics into this country, which, however, we had recently succeeded in overcoming in several instances. A case in point is that of the Barbets—a tolerably numerous and well-defined group of zygodactyle birds inhabiting the tropics of both hemispheres, of which, as far as I am aware, no living example had ever been imported into Europe prior to the arrival of the specimen figured in the accompanying illustration. This bird, although not by any means one of the largest or finest of the “Bucconidæ,” as the family to which it belongs is termed, is of interest as representing a form hitherto unknown in our aviaries, and as being endowed with special modifications of structure to adapt it to a peculiar mode of life. First, therefore, I will state what is known of the life history of the present species, and its immediate allies. Then I will endeavour to point out some of the principles which are exemplified by the geographical distribution of the group to which it belongs.

The Blue-cheeked Barbet was first described by the veteran ornithologist Latham in the latter end of the last century, and provided with the not very specially appropriate name *Asiatica*. Latham regarded it as a kind of Trogon, and, as Trogons were in those days supposed to belong to America exclusively, called it the “Asiatic Trogon, *Trogon Asiaticus*.” This specific name, however, being the first given, we are compelled, in compliance with the general usage of natural-

\* INTELL. OBS., vol. x, p. 401.

ists, to adopt for the bird, referring it at the same time to the correct genus *Megalœma*. Subsequently to Latham's description this Barbet was figured by the French naturalist Le Vaillant in the second volume of his large illustrated work "On Paradise Birds and Rollers." It has likewise been provided with other names by different writers on ornithology, with an account of which we need not trouble our readers.

The native country of the Blue-throated Barbet is the eastern portion of British India. It is found throughout Lower Bengal, and extends northwards along the sub-Himalayan region, as far as the Dehra Doon and Kumaon. Eastwards it occurs in Assam and Sylhet, but is stated to be rare in Arracan and Tenasserim.

Within this area the present bird would appear to be rather an abundant species, and to have attracted the notice of many of the Indian field-naturalists, who have furnished us with some interesting observations on its habits. Professor Sundevall, whose notes on the birds met with in the vicinity of Calcutta have been translated by the late Mr. Strickland, tells us that this Barbet is common near that city in the months from February to May, and feeds on berries, which were always found broken in its stomach. It is a solitary bird, and like others of the same genus, remarkable for its loud note, which "may be expressed by *rokurog! rokurog!* the middle syllable being uttered in a higher key than the other two. Both sexes cry in the same manner, sitting still, with outstretched neck; at intervals they were seen to spring aside, or transversely across the branch, with considerable activity."

Major Pearson remarks that this species is common in Bengal, but less so in Orissa, and that he did not observe it at Juanpore. "It has a peculiar habit, when perched, of bowing the head, accompanying each motion with a single note resembling the word *hoo*. It has two broods—one in the month of May, the other in November."

Mr. F. Buchanan Hamilton, in his MS. notes quoted by Mr. F. Moore, states that the Bengalee name of this bird is "*Bassunt bari*," or "Old Woman of the Spring," probably from the noise that it makes at this season of the year. He gives its food, as "wild figs, plantains, and other fruit."

Lieutenant-Colonel Tickell, a well-known Indian field-naturalist, has described the nest of this bird as hemispherical, composed of dry grass, and placed externally upon a tree. But there can be no doubt that he has been misled on this point, for all the Barbets nest in holes of trees, and, like other birds that lay their eggs in similar situations, produce white eggs, and it is hardly possible that this species should prove an exception. Indeed, we are told by another equally

trustworthy observer,\* that the Blue-cheeked Barbet “excavates holes in trees for its nest.”

Besides the Blue-throated Barbet, some eight or nine species of the same genus are found in India. About fifteen others are known, all of which inhabit different portions of the “Indian Region,” that is South-eastern Asia and the large adjacent islands of Sumatra, Borneo, Java, and the Philippines. There are also found within the same area two other nearly allied forms of slightly different structure, namely, *Psilopogon*, with one species peculiar to Sumatra, and *Megalorhynchus*, with two species found in Malacca, Sumatra, and Borneo. We have thus altogether about twenty-six known Indian species of this family, which in their habits and mode of life do not materially differ from *Megalæma Asiatica*.

In the forests of Africa we again meet with numerous representatives of the same family, belonging, however, according to the best authorities, to genera different from those of Asia. These are the Barbets of the genera *Barbatula*, *Gymnobucco*, *Læmodon*, and *Trachyphonus*, which are distributed over the wooded districts of Abyssinia, and the adjacent portions of East Africa, are found throughout the tropical forests of Western Africa, and extend southwards nearly to the vicinity of Cape Town. The well-known African traveller and naturalist, Theodor von Heuglin, has written an excellent article upon the Barbets of Eastern Africa, in the “Ibis” for 1861,† and M. Jules Verreaux, of the Jardin des Plantes, has given a complete list of the known African species of the family, in the Zoological Society’s “Proceedings” for 1859.‡ From these authorities it would appear that there are at present known about twenty-five African Barbets belonging to the genera above mentioned. We have no such accurate account of the habits and manners of these birds as of the Indian Barbets; but from the following general remarks of Heuglin there would appear to be little deviation on these points. Of the Barbets of Eastern Africa, Heuglin says: “With the exception of the *Trachyphoni*, the *Capitonidæ* are not shy birds, though quiet and solitary, and always keeping to the high trees and bushes. The *Trachyphoni* are frequently seen in the plains, and although also shy, are of a much more lively and wandering nature than the *Pogonorynchi* and *Barbatulæ*. The note of the *Trachyphoni* is loud and very melodious; they run (though in a different way from Woodpeckers) up and down the trunks of trees, feeding upon insects, berries, and fruits, as they hop

\* Buchanan Hamilton.

† See his article on new or little-known birds of Eastern Africa, “Ibis,” 1861, p. 121.

‡ P. Z. S., 1859, p. 393.

from branch to branch. Their flight is short, but rapid; their course consisting of a series of numerous undulations. I never saw any of the species of this group on the ground. I am not acquainted with the mode of propagation of these birds, except that *Trachyphonus margaritatus* builds in holes of trees, and lays white eggs, usually from four to six in number. In the months of October and November, I have often seen half-fledged young ones of this species clustering together, in the peculiar way that may be observed in some of the European genera (*Parus*, for instance), and sitting on the smooth side of the small branches, chirping as they await their parents. With raw flesh and hard and soft-boiled eggs, I have kept some of them a long time in confinement."

"The *Capitonidæ* of North-eastern Africa are not exactly migratory, though they appear at the time when the Sycamores (*Ficus sycamorus*) are ripe in countries where they are not generally met with."

On crossing over the Atlantic to tropical America we again meet with Barbets of organization and habits nearly similar to those of the Old World, but neither so widely distributed nor so abundant in species as their brethren of Africa and Asia. Only two forms of American Barbets are yet known to science, namely the genera *Capito* and *Tetragonops*, the former with fourteen and the latter with two species.\* The latter is the most aberrant form of the whole family—that is, that which departs farthest from the general character of the group—and shows many points of resemblance to the Hill-toucans (*Andigence*). There can be no question, indeed, that the Barbets are closely allied to the Toucans (*Ehamphastidæ*), and should be placed next to them in the natural series; and to those who hold the doctrine of the derivative origin of species, it is interesting to note that the most Toucan-like Barbets inhabit the same region as the most Barbet-like Toucans.

It appears, therefore, that in the case of the Barbets, we have an instance of members of the same natural family of birds being met with in the tropics of both the Old and the New World. And this is a very noteworthy fact, for it must be recollected that, as a general rule, the avi-faunas of these two regions—that is, the general series of the birds which inhabit them respectively—are perfectly distinct from one another. Not only are the species—if we except some few wandering forms of nearly universal distribution—invariably distinct from one another, but in nearly every case these species are referable to different genera, and, as a general rule, it may even be stated that the most characteristic birds of these two regions

\* See the Author's articles on the American Barbets, in the "Ibis," 1861, p. 182; 1862, p. 1; and 1864, p. 370.

belong to different families. For example, humming-birds (*Trochilidæ*) are very numerous all over the Neotropical Region—under which name are comprised Central and Southern America—but are quite unknown in Asia and Africa. In the same category we may place the toucans (*Rhamphastidæ*), Jacamars (*Galbulidæ*), motmots (*Momotidæ*), puff-birds (*Bucconidæ*), curassows (*Cracidæ*), tinamous (*Tinamidæ*), and numerous other families which are more or less generally distributed throughout Central and Southern America, but are not found in the tropics of either Africa or Asia. In the same way, the bee-eaters (*Meropidæ*), hornbills (*Bucerotidæ*), rollers (*Coraciidæ*), sugar-birds (*Nectariniidæ*), honey-guides (*Indicatoridæ*), orioles (*Oriolidæ*), and other families, are characteristic groups of the ornithology of the Old-World tropics, but are not known to exist in the New World. The cases where members of the same natural family of birds are met with in the tropics of both hemispheres are mostly those in which the families are of extended geographical distribution. For example, the falcons (*Falconidæ*), owls (*Strigidæ*), swifts (*Cypselidæ*), swallows (*Hirundinidæ*), and thrushes (*Turdidæ*), are widely diffused families, which are represented in every part of the earth's surface, and are abundant in the tropics of both the Old and the New World. In the same category may be placed most of the families of waders and water-birds, which are usually of very wide range—in some few cases even the same species occurring in every part of the world. But it is quite an exceptional case for a family of birds confined to the tropics to be found in both hemispheres, and besides the Barbets, the only well-defined families presenting the same phenomenon of distribution are the parrots (*Psittacidæ*) and the trogons (*Trogonidæ*). Members of both of these groups, as in the case of the Barbets, are found in the tropics of Africa and Asia as well as in those of America.

Now, assuming the derivative origin of species—that is, the descent of the various members of natural groups (whether we call them genera or families) from a common ancestor at a more or less distant epoch, let us see what deductions may be derived from these facts of geographical distribution.

In the first place, looking to the general diversity of the avi-faunas of the tropics of the two hemispheres, it is evident that the lands which constitute their seats must have remained, as they now are, for a long period of ages, separated by an extensive barrier of ocean. Upon no other hypothesis than this can the number of extensive groups peculiar to each of them, and the general dissimilarity of the two avi-faunas, be explained.

But on the other hand there must have been a time when

these two regions, now so widely separated, were linked together by an intervening band of tropical land. In no other way can we account for the presence of Barbets and trogons in the tropics of each hemisphere. It is hardly possible to imagine that the common ancestors of these two families, which from their whole organization are essentially denizens of the tropics, were themselves extra-tropical. In the case of the parrots, however, we have probably to deal with a very ancient and long-enduring stock, which may have been formerly cosmopolitan,\* and members of which are even now found in the temperate regions of the southern hemisphere.

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## ON THE STRUCTURE AND MANNER OF GROWTH OF THE SCALES OF FISHES.

BY JONATHAN COUCH, F.L.S., C.M.Z.S., ETC.

OF the vast number of the known species of fish, amounting to several thousands, a large proportion have the body covered, and in numerous instances the head also, with scales; which, for the most part, are so arranged, as to form an armour of defence, as well as an adornment of beauty, that grows with their growth without an increase of number, and by its permanency differs in essential properties from those scales—not very unlike in appearance, and even in some of their uses—which clothe the bodies of reptiles; but which latter, when once formed, are incapable of growth. To enable them to be accommodated to the increase of bulk of the animal, these latter must be thrown off, together with the skin that bears them, to be succeeded by another crop, which is altogether new—a circumstance that does not take place in any species of fish with which we are acquainted. There is, therefore, a much closer relationship between the scales of fishes, of which we have now to treat, and the spines and plates, however otherwise unlike, which we find scattered over or covering the bodies of some other families of fishes, especially as regards their mode of increase in size—a fact to which, on another occasion, our attention will be directed, as showing an example in which an apparently different result is obtained by a simple

\* Groups of general distribution over the whole world's surface, such as the falcons (*Falconidæ*), and the ducks (*Anatidæ*), are called "cosmopolitan." Groups confined to the tropics, such as the barbets, trogons, and parrots, may be called "tropicopolitan." Another class of natural groups is confined to the northern portion of each hemisphere, and may be termed "arctopolitan." Such are the awks (*Alcidæ*) and the grouse (*Tetraonidæ*).