

mandible, which has besides a dark line down the margin. The eyelids and cere (or what answers to the latter) are flesh-colour; the iris of a rich dark brown, the centre of the eye being black. The legs and feet are of a deep flesh-colour, the claws almost white; and the tarsi have a few scales in front, the rest being bare, with a smooth skin.

The bird is quite a young specimen, and still has a patch of light-brown feathers on the side of the head and throat, through which can be discerned a few feathers of the new plumage*.

VII.—*Remarks on the Habits, Distribution, and Affinities of the Genus Pitta.* By ALFRED R. WALLACE.

THE beautiful birds which are now generally included in the single genus *Pitta* have lately been monographed by Mr. Elliot, and have also been the subject of an article by Prof. Schlegel in the 'Muséum d'Histoire Naturelle des Pays-Bas,' as well as of a monograph forming the first part of a work entitled 'Les Oiseaux des Indes Néerlandaises,' while the first volume of Mr. Jerdon's 'Birds of India' gives an accurate account of the species inhabiting that country. The time therefore seems appropriate for generalizing the information contained in these works as to the geographical range of the several species, and for giving a few observations on the habits of those which I myself met with in the Malay Archipelago.

The Pittas, or Ground-Thrushes, are a group of insectivorous birds which inhabit the forests of the Eastern tropics, and are generally adorned with brilliant and strongly contrasted colours. The rich blues and crimsons, the delicate greens, yellows, and purples, the velvety black and pure white (three of which tints at least generally adorn each species) remind one of the Tanagers of South America; and, in fact, these two groups are almost the only ones which have no one characteristic tint or style of dress,

* Dr. Bennett's latest letters to the Secretary of the Zoological Society (read at the Meeting on the 10th November last) announce the arrival in Sydney of a second living specimen of the *Didunculus*; and that, with his usual liberality, he had purchased the pair for the Society, and was intending to send them to England by the first convenient opportunity.—ED.

but whose different species seem free to adorn themselves with the brightest hues from Nature's laboratory. There is, however, this difference, that whereas the Tanagers are a dominant group, abounding in genera, species, and individuals, over a very wide area, and presenting to our view much variety of form and almost every possible combination of colours, the Pittas are a small and probably decreasing genus, with but slight modifications of form, and alike poor in species and in individuals. They inhabit a district which has been recently broken up into many fragments, and which seems to have been, during long epochs of the past, in an unstable and ever-changing condition. The effects of such changes of surface are to be traced in the constitution of this lovely genus, which, though so small, yet presents us with at least ten distinct styles of coloration, each of which, under more favourable circumstances, might have been the nucleus of a group of variously modified species.

In form the Pittas are characterized by a short rounded body, densely clothed with plumage, by very long legs, short wings and tail, and by a long and strong bill, so much like that of a Jackdaw or Jay as sufficiently to explain why Linnæus named the only species known to him *Corvus brachyurus*. Their motions are very pleasing. They never seem to hurry, and yet get along at a great rate by hopping, generally on the ground, but occasionally perching on a stump or bush, and, when hard pushed, taking a long, straight, and silent flight. They are almost universally rare birds, and are only to be met with by assiduously searching for them in the station which each species is found to prefer. Sometimes they frequent deserted plantations and dense thickets near villages. I obtained the beautiful *Pitta elegans* in such places near Palembang, in Sumatra. Most of the species are, however, found only in the virgin forests, often preferring the densest and thorniest jungles, where it is almost impossible to catch sight of them, except when so near that they cannot be shot without spoiling the specimen. In the island of Bouru the *Pitta rubrinucha* was only found among the tangled coils of the prickly rattan-palms, where it is impossible for a man to pass without first laboriously hewing a pathway. My best hunter had seen this bird many times during our two

months' stay in the island, without ever being able to secure a specimen. Not liking to be beaten, he proposed to me to go and sleep in a deserted hut near the place where he had most frequently seen it; because just after sunrise they are busily feeding, and are more easily approached. His plan succeeded, and he shot two adult specimens; but he was so close to one of them that it was literally blown into several pieces; and his success cost me his services for a fortnight, owing to his having seriously torn and cut his feet in his too eager pursuit after the game in its prickly fastness. In the Aru Islands the beautiful species *P. novae-guineae* and *P. mackloti* quite baffled my Malay hunters; but the little Papuan boys, creeping stealthily through the thick jungle, shot them with blunt prong-headed arrows, and thus procured me many fine specimens. The noble *Pitta maxima*, one of the very finest birds of the Malay Islands, is found only in the rocky forests of the mountainous island of Gilolo, where it hops among the crags and stones with such activity that it is very difficult to follow it. The only place where I could do more than catch an occasional hasty glimpse of a *Pitta* was in the island of Lombock. The *Pitta concinna* was there rather plentiful in a level sandy tract densely overgrown with low trees and shrubs and intersected by numerous pathways. As there were very few insects in the neighbourhood to distract my attention, I devoted a good deal of time to shooting; and nothing gave me more pleasure than hearing the note of a *Pitta*, watching for it to appear, and getting a successful shot at it through some narrow opening in the jungle. The bird's presence would often be first made known by its little pattering tread among the dry leaves; a glimpse would then be obtained as it passed lightly under the thickest of the covert, and the least motion to obtain another glimpse would often be followed by a slight flutter and flash as it flew almost noiselessly away. A dead *Pitta*, as it lies when just shot, is exceedingly beautiful. You do not find it lying on its side, or all in a heap, like other birds, but invariably flat on its back, the feet up in the air, the plumage beautifully puffy, and the crimson patch on the belly displayed to the best advantage. This peculiarity of the dead bird is perhaps owing to the short tail and wings and the roundness and plumpness of the

body; but it produces an effect which I was never weary of admiring, and gave a crowning charm to the excitement and pleasure of *Pitta*-shooting.

The voice of all the smaller species that I met with was of a constant character, and could easily be distinguished from that of any other bird. It is a plaintive whistle of two notes, the second lengthened out and quickly succeeding the first. When the birds are undisturbed, this cry is repeated at intervals of a minute or two. The large *P. maxima* and the *P. elegans* have each three notes of a similar character, according to the testimony of my Malay hunter; and Mr. Jerdon gives three notes also to the *P. bengalensis*.

The food of the *Pittas* consists of various kinds of insects, especially Coleoptera and small Orthoptera, and also of worms. Their powerful bill enables them to dig for these latter, as is proved by its often being incrustated with earth. They do not seem to like ants, as I never found these insects in their stomachs, nor do they frequent places where ants most abound. Another consideration would also lead us to the conclusion that to feed on ants is not the part which the *Pittas* have to play in the economy of nature; for these insects are everywhere abundant in the tropical forests; many of the species swarm in countless myriads of individuals, and it is therefore natural to suppose that the birds which could find in them a congenial food would be abundant also, and would be as ubiquitous as the ants themselves. The true Ant-Thrushes (*Formicariinæ*) of South America do answer this description, which the *Pittas* do not; and the comparative scarcity and irregularity of their most congenial food may be one reason why these lovely birds are so invariably scarce and local.

In the majority of the species the sexes certainly do not differ; in some, however, the fact is doubtful. In the large *P. nipalensis*, the female, according to Hodgson, is duller coloured and more rufous on the back. Mr. Elliot describes sexual differences in several of the species, especially in *P. cyanura*, *P. elegans*, and *P. cærulea*, but does not state on what authority he has determined the differently coloured specimens to be adult and fully plumaged females. Prof. Schlegel, who has obtained these species with the original notes of the naturalists who procured them, seems to

consider that the females, when fully adult, in every case resemble the males; and in this I am inclined to agree with him. If the adult female of *P. cærulea* is the brown bird so generally supposed to be that sex, it would almost seem a good ground for establishing a genus for this in many respects peculiar species.

The nidification of only four species has been observed—*Pitta strepitans* in Australia, *P. cyanura* in Java, *P. cucullata* in North India, and *P. venusta* in Sumatra. All these build their nests near the ground, rather rudely formed of sticks or reeds, roots, dead leaves, and moss. *P. strepitans* lays four eggs, which are creamy white, blotched and spotted with brown; those of *P. cyanura* are described as being similar in colour and markings, but five eggs were found in a nest, while the only nest of *P. venusta* ever found had two eggs of a pure white colour. The nest of *P. cucullata* is described by Jerdon as being formed principally of roots and fibrous materials, and as having three eggs, of a faint greenish white, with a few reddish and brown spots.

On looking through the works of Messrs. Elliot and Schlegel already alluded to, I have been surprised to see the large proportion of the species about which no information whatever has been obtained, and of which even the colours of the bill, feet, and iris had to be put in by guess. The specimens collected by Müller and the other Dutch naturalists in the Archipelago appear to have been all obtained through native collectors; and no care seems to have been taken to teach these men to make the necessary observations while skinning the birds. Having myself shot or skinned more species of *Pitta* than any other person, and wishing to make this communication as complete and useful as possible, I will here give the colours of the soft parts of all the species collected by myself, or of which I have obtained accurate information from the person who shot them.

- P. crassirostris* . Bill black, base of lower mandible horny, feet pale horn- or flesh-colour, iris dark.
P. vigorsi . . . Bill black, feet pale yellowish horn-colour, iris dark.
P. concinna . . . Bill black, feet pale yellowish horn-colour, iris dark.
P. muelleri . . . Bill black, feet blackish, iris dark.

- P. novæ-guinææ* . Bill black, feet dusky, iris olive-brown.
P. celebensis . . Bill blackish horny, feet dusky lead-colour,
 iris pale olive.
P. rubrinucha . Bill blackish horny, feet light bluish lead,
 iris light olive-brown.
P. rufiventris . Bill dark horny, base of lower mandible red-
 dish beneath, feet pale lead-colour, iris olive.
P. cyanonota . . Bill blackish horny, feet dusky olive, iris olive.
P. mackloti . . Bill black, feet dusky, iris olive.
P. elegans . . Bill black, feet olive-brown, iris dark.
P. granatina . . Bill black, feet black, iris purple-black.
P. maxima . . Bill black, feet pale yellowish horn-colour, iris
 dark.

The genus *Pitta* has been subdivided into three named genera, which are tolerably well characterized; but several others would seem equally worthy of being separated, owing to there being numerous slight modifications of form in the most nearly allied species; and the whole group is so compact and natural, that I prefer following those naturalists who keep it entire. There are, however, four distinct groups of species, each characterized by a peculiar style of colouring, and several other smaller groups and isolated species which it is impossible to combine naturally with any of these. And whereas the genus, treated as a whole, seems irregularly and, as it were, fortuitously scattered over a wide area, yet when we consider the separate groups of species above alluded to, we find them in many cases to have each a well-defined and restricted geographical range. I shall therefore divide the genus into sections, which agree generally with those of Bonaparte, and consider the distribution of each separately.

Sect. 1. The green-backed species, buff beneath, with dark head, blue shoulders, and red belly. These may be arranged geographically as follows:—

1. *angolensis* . . West Africa.
2. *bengalensis* . . India proper, from Himalayas to Ceylon.
3. *nympha* . . . China.
4. *cyanoptera* . . Malay Peninsula, Sumatra, and Borneo.
5. *megarhyncha* . Banca Island.

6. *crassirostris* . . . Sula Islands.
7. *vigorsi* Banda Island.
8. *irena* Timor and "Ternate," Schleg. (query *crassirostris*).
9. *concinna* Lombock, Sumbawa, and Flores.
10. *strepitans* . . . Australia.

This form therefore extends over the whole area of the genus, from West Africa to Eastern Australia. It is absent, however, from the Philippine Islands, Celebes, Java, and New Guinea, where species of other sections take its place. Having such a wide range, and being of comparatively simply-coloured plumage, this group may be looked upon as typical of the genus, as being that portion of it which probably retains most of the primitive type, and from which the other more brilliantly coloured and more isolated forms may be supposed to have been derived.

Sect. 2. Species in which the buff of the under parts in the last group is replaced by green. All are of comparatively small size :—

11. *cucullata* . . . Nepal, Burmah, and the Malay Peninsula.
12. *muelleri* . . . Sumatra and Borneo.
13. *bangkana* . . . Banca Island.
14. *atricapilla* . . . Philippine Islands.
15. *forsteni* . . . Celebes.
16. *novæ-guinææ* . . New Guinea and the Papuan Islands.

This group has also a rather wide range, extending from the Himalaya to New Guinea. A remarkable feature of its distribution is the gap between Celebes and New Guinea (including all the Molucca Islands), in which no species of this section seems to exist.

Sect. 3. Species with ashy-blue breast and red belly, and which want the silvery-blue patches on the rump and shoulder of the preceding groups :—

17. *erythrogastra* . . Philippine Islands.
18. *celebensis* . . . Celebes.
19. *rubrinucha* . . . Bouru.
20. *rufiventris* . . . Gilolo and Batchian.
21. *cyanonota* . . . Ternate.
22. *mackloti* . . . New Guinea and the Papuan Islands.

This compact little group of closely allied species is confined to the Austro-Malayan province, with the exception of one species from the Philippines. These islands, however, though placed in the Indo-Malayan province, show a decided affinity in many of their productions to those of the island of Celebes, with which they were probably at some former period more closely connected than at present. We may therefore consider this to be a very well-defined geographical group.

Sect. 4. Species with finely banded breast, brown back, yellow coronet, and elongated tail:—

- 23. *elegans* . . . Malay Peninsula and Sumatra.
- 24. *schwaneri* . . . Borneo.
- 25. *cyanura* . . . Java.

This distinct group of most elegant birds, to which the name of *Pitta* has been by some authors restricted, has a very definite geographical range, being confined to the three great Malayan islands and the peninsula, which so closely resemble each other in every department of nature. The very close connexion of Sumatra with the Asiatic continent is here, as in so many other cases, indicated by an identity of species, while Java and Borneo possess each very distinct forms.

Sect. 5. Species entirely purple and red, with blue wing-coverts and neck-stripe:—

- 26. *granatina* . . . Malay Peninsula and Borneo.
- 27. *venusta* . . . Sumatra (Borneo?).

A small but very distinct and beautiful group, which cannot be naturally combined with any other species of the genus. It differs from Sect. 3, with which Bonaparte placed it, in its shorter wings and its smaller hind toe and claw, as well as in its quite distinct style of coloration.

Sect. 6. Species with red back, blue crown, and white throat and wing-band:—

- 28. *baudi* . . . Borneo.

This exquisite bird is so distinct in the arrangement of its colours, that it cannot be placed with any of the other groups. It seems to have relations to the species of the last two sections, with which it also consorts geographically.

Sect. 7. Black, with green back, blue shoulder-patch, and reddish belly:—

29. *iris* . . . North Australia.

This species, though much isolated, has evident relations with the birds of Sect. 2; and as it is only found in the extreme north of Australia, I have little doubt that the same or an allied species exists in the southern parts of New Guinea. This species, in fact, approaches so much to *Pitta novæ-guinææ*, that it ought perhaps to have been placed in the same section.

Sect. 8. A large species, black, with white breast, red belly, and blue shoulder-patches:—

30. *maxima* . . Gilolo.

This magnificent bird, perhaps the finest of the genus, is much isolated; the form of its wings, the pale-coloured legs, black head, crimson belly, white wing-bar, and blue shoulder-patch show its nearest affinities to be with Sect. 1.

Sect. 9. A large light-blue bird, spotted beneath.

31. *cyanea* . . . Arracan, Tenasserim.

This is another remarkable and very distinct bird, which by its somewhat elongate tail approaches Sect. 4, while its colouring and size would more approximate it to the next. It is interesting to remark that its geographical position is also intermediate between that of these two groups.

Sect. 10. Large birds of dull colours and somewhat coarse plumage:—

32. *nepalensis* . . . Nepal to Arracan.

33. *cærulea* . . . Peninsula of Malacca, Sumatra.

These species depart most from the typical characters of the genus, and have been separated under the name of *Heleornis*. It seems preferable, however, not to break up the genus, but to retain these as an aberrant section.

Let us now carefully examine the preceding list of species, and cull the various interesting facts of distribution with which it furnishes us. The first thing to notice is that two of the largest groups (Sections 1 and 2), comprising sixteen species, are widely distributed over nearly the whole area of the genus, and are

nearly equally divided between the Indian and Australian zoological regions. Of the remaining groups, five sections, comprising nine species, are Indian, while three sections and seven species are Australian. The great majority of the species, however, inhabit the Malayan Islands, as distinguished from the continent of Asia on the one hand and Australia on the other. Thus we find in

Africa and Asia . . .	6	species	of	3	groups,
Australia	2	„		2	„
Malay Islands . . .	25	„		8	„

proving that the genus is preeminently Malayan, and is one of the very few which characterize the Archipelago as a whole, and not, as is much more frequently the case, the eastern or western portion of it only.

The island which contains the greatest number of species is Borneo, which would thus seem to be the metropolis of the group. It possesses five or perhaps six species; Sumatra and the Malay Peninsula each have five; the Philippines possess two; and Java only one. These islands combined, constituting what I term the Indo-Malayan province, have thus fourteen species of *Pitta*. Further east, no one island possesses more than two species, due partly to the much smaller size of the islands, and also because in the great island of New Guinea we reach the eastern limit of the genus. On combining these islands to form the Austro-Malayan province, only ten species of *Pitta* are found to inhabit it. The variety of form also, as expressed by the number of sections into which the species fall, is greater in the Indian than in the Australian division of the Archipelago. Thus,

Austro-Malayan province . .	10	species	of	4	groups.
Indo-Malayan province . . .	14	„		6	„

It is interesting to remark that two species of the same group scarcely ever inhabit one island: where two or more species are found in an island, they almost invariably belong to as many distinct sections of the genus. This illustrates Mr. Darwin's theory of the extermination of closely allied forms by the more dominant race, and also of the effects of intercrossing in keeping up the uniformity of a species over a wide area. It thus

happens that it is on the continent that the species have the widest range, though the varieties of physical condition in India, from the Himalayas to Ceylon, must certainly be greater than from island to island in the Archipelago. But those slight modifications which tend to bring a species into more exact harmony with surrounding conditions can be accumulated and rendered constant by "natural selection" in an island where intercrossing with the forms of other districts is impossible; while on a continent the same mode of action will be very often neutralized by the intermingling of the various forms which must occasionally come in contact with each other, except where the habits of the animal are much opposed to locomotion. It is an interesting confirmation of this theory that the only species of *Pitta* which presents any well-marked varieties is that which has the widest range. Two or three forms of *P. bengalensis* have been described as distinct species; but it is found that these forms are unstable and graduate into each other. We have here an evident tendency to produce distinct forms, which intercrossing continually prevents; but if continental India were broken up into three or four large islands (a change which the southern extremity of Asia has already undergone), we can hardly doubt but that a form specially adapted to the conditions, physical and organic, of each island would be developed by natural agencies from the variable material that we know already exists there. This segregation has already taken place to a remarkable extent in the Archipelago. Generally speaking, each island or little group of islands has its peculiar species distinct from those of the islands that surround it. Some of these cases of localized species are among the most extraordinary known. The little island of Banda, hardly more than a mile across, has a species peculiar to it. Ternate, a mere volcanic satellite of Gilolo, and not more than ten miles from it, has a *Pitta* all to itself, though closely allied to the distinct species which inhabits the large islands of Gilolo and Batchian. The small rugged metalliferous island of Banca, between Sumatra and Borneo (but so close to the former island as to seem only a detached fragment of it), has actually two species peculiar to itself; while, what is still more strange, the two allied species of which they seem to be modifications (*P. cya-*

noptera and *P. muelleri*) are both common to the great islands of Sumatra and Borneo. This is an arrangement totally opposed to our ideas of putting the right bird in the right place. It is exactly as if the Isle of Man possessed two peculiar species of Thrush, while the allied species were common to Britain and Ireland.

Those naturalists (and I fear they are many) who consider that the Darwinian school attempts to explain too much of the mystery of nature will perhaps think that I should give some idea of how this anomalous state of things came about, and, if I neglect to do so, will lay claim to it as a fact in opposition to my own doctrines. Now though I entirely object to judgment being passed on a theory of nature by its power to explain *all* mysteries—seeing that the most important data for solving such problems as this are almost always wanting—yet in the present case it is by no means difficult to give a fair conjectural explanation. Modification of form is admitted to be a matter of time. The amount of diversity in the organic remains of two beds or strata is a measure of the time between the deposition of those strata. So the amount of diversity in the species of two adjacent islands is the measure of the time those islands have been separated. In the present case, therefore, as the island of Banca, close to Sumatra, presents in this genus a greater diversity from it than does Borneo, it would follow that Banca was separated and became an island at a time when Sumatra and Borneo were still united. Looking at the position of these islands on the map, this seems hard to believe; but it is in reality by no means improbable. The whole coast of Sumatra opposite Banca is barely raised above the level of the sea, and is a network of tidal channels through a soft alluvial soil. Evidently this part of Sumatra is newly formed land, the result of the action of tropical rains on the mountains and high lands more than a hundred and fifty miles back in the interior. The nearness of Banca to Sumatra is therefore recent and illusory. The south-west coast of Borneo is almost equally low, and has been increasing in a similar manner. The sea immediately between Sumatra and Borneo has thus been lately filled up by alluvial deposits: it was formerly deeper; and the connexion between those islands

was not in this direction, but through the intervention of the Malay Peninsula. The position of the Anamba and Natuna Islands, and a sea under fifty fathoms deep, show the probable line of connexion of Borneo with Malacca, while the narrow and island-choked strait west of Singapore indicates the point of junction with Sumatra. At this time Banca was already isolated; its rocky surface and mineral products show a great resemblance to the peninsula, from which it was probably separated at a still earlier period. There is therefore a *primâ facie* case for considering Banca to be an older island than Sumatra or Borneo. If so, the fact of its possessing these peculiar species is exactly what we might expect, instead of being the hopeless puzzle it seems to be if we only take into consideration the present position of the surrounding islands. I have dwelt somewhat fully on this case, because it is one of the most interesting with which I am acquainted; and though the explanation I have offered of it is in a great measure hypothetical, it shows in a most forcible manner how impossible it is to understand the curious problems presented to us by the geographical distribution of animals, without taking into consideration all the probable and possible changes which may have recently taken place in the distribution of land and water on the earth's surface.

The position which the genus *Pitta* should hold in a natural arrangement of birds, and its relations of affinity to the other genera and families of Perchers, are problems which cannot yet be said to be satisfactorily solved. By most recent authors *Pitta* has been considered to belong to the same family as the American Ant-Thrushes, along with a host of other genera of obscure affinities. Messrs. Horsfield and Moore include all these as a subfamily of the true Thrushes, while Cabanis and Dr. Sclater consider them to belong to distinct sections of Passeres. Bonaparte, in his family *Pittidæ*, included several other genera, such as *Brachypteryx*, *Pnoëpyga*, and *Myiophonus*, all inhabiting the same countries as the Pittas, and having considerable resemblance to them in form and habits, but differing totally in coloration. Mr. Elliot, in his 'Monograph of the *Pittidæ*,' gives only the species of *Pitta*, to which I presume he intends to restrict the family.

Judging from external characters alone, it would seem almost impossible to separate the *Pittas* from the *Formicariidæ*, or from the above-mentioned genera with which Bonaparte associates them. The first primary in all these groups is more or less developed—a character which at once distinguishes them from the *Turdidæ*, in which it is always rudimentary; and the structure of the bill and feet, as well as the general form and habits, present no constant differences of the slightest importance.

An examination of the sternum and its appendages in these birds does not throw much light on the matter, though it serves to confirm the isolation of *Pitta*, which is expressed in its peculiar colouring rather than in its external form or habits. In *Brachypteryx*, *Myiophonus*, *Zoothera*, and *Henicurus* the general form of the *sternum* is so much like that of the Thrushes, that it is hardly possible to seize on any character to separate them. In *Myiophonus* it has rather a lower keel, and the forked processes of the *episternum* are rather blunter and more divergent, while the coracoids are a little longer. *Brachypteryx* almost exactly resembles *Turdus fumidus* in the form of the sternum; but the branches of the *episternum* are more slender. In *Pitta* the differences are more apparent: the keel is high and arched, and rises more abruptly from the extreme posterior margin than in any of the above-mentioned species, and this margin is very much narrowed. The anterior extremity of the keel is much produced, and the anterior margin hollowed out in a deep curve above the large *episternum*. This is most remarkable on the under surface, where it forms a perfect Y with slender cylindrical arms, differing in this part of the sternum from any Passerine bird I possess. The coracoids are long and stout, as in *Myiophonus*, considerably exceeding in length the *sternum* itself from their insertion to the posterior margin. The only Formicariine sternum which I have been able to examine is that of a species of *Grallaria*. This so closely approaches the same part in *Brachypteryx* as to suggest a direct affinity; while the differences, where they exist (as in the lower and less arched keel), are such as to remove it rather further than that genus from the form of the sternum in *Pitta*.

It would seem therefore that, pending a more accurate exami-

nation of the details of structure in these and the allied genera from all parts of the world, we must consider the Pittas to form a group apart, closely allied to *Myiophonus*, *Brachypteryx*, and *Pnoëpyga*, and, through them, to the South American *Formicariidæ*. *Cinclus*, *Henicurus*, *Eupetes*, and *Zoothera* seem also to come in the same group; and it is a question whether the whole of the *Timaliidæ* must not follow them. These would form a large and very natural family of short-winged terrestrial or semi-terrestrial insectivorous birds, of which the *Pittinæ*, *Myiophoninæ*, *Cinclinæ*, and *Timaliinæ* would be the Old-World section, while the *Thamnophilinæ*, *Formicivorinæ*, and *Formicariinæ* would characterize the New World.

This arrangement is put forward with much diffidence as a mere suggestion which has arisen from the comparisons of these various groups while endeavouring to make out the affinities of the genus *Pitta*.

VIII.—*Note on the Caprimulgine Genus Cosmetornis.*

By P. L. SCLATER, M.A., Ph.D., F.R.S.

(Plate II.)

IN the second Number of his 'Icones Avium' Mr. Gould has figured a singular form of Goatsucker, with the inner primaries very much elongated, for which he has proposed the name *Semeiophorus vexillarius*. The term *Semiophorus*, having been previously employed in science, was subsequently altered by Mr. G. R. Gray into *Cosmetornis*. In the *Macrodipteryx longipennis* of Western Africa (a bird known since the days of Afzelius) the same remarkable peculiarity is exhibited by the male bird. But in *Macrodipteryx* the shaft of the elongated primary is denuded, and only terminated by a webbed extremity, whereas in *Cosmetornis* the elongated primary is webbed throughout its length. As, however, the general structure of these two forms closely agrees, they can only be considered as subgenerically different.

While *Macrodipteryx longipennis* is not an uncommon bird in cabinets of natural history, *Cosmetornis vexillarius* has hitherto but rarely made its appearance in European collections. There