

tains, where I found the nests of this species, among *débris* carried down by the melting of the snows, on Ischika, one of the highest points of that range. I have once or twice observed the Rock Thrush in the Island of Corfu, where it is highly prized as a singing bird.

75. COMMON WHEATEAR. (*Saxicola ænanthe*.)

Arrives in Epirus in March; common during the summer months.

76. RUSSET WHEATEAR. (*Saxicola stapazina*.)

More abundant than the preceding species in Epirus during the summer.

77. EARED WHEATEAR. (*Saxicola aurita*.)

This is the least common of the three species of Wheatear that I have observed in these parts. It arrives at the same time as the preceding.

78. WHINCHAT. (*Pratincola rubetra*.)

79. STONE-CHAT. (*Pratincola rubicola*.)

Both these species are common in summer, and I have occasionally observed the latter in winter, in Corfu and Epirus.

80. ALPINE ACCENTOR. (*Accentor alpinus*.)

Common in the Acroceraunian mountains in May 1857.

[To be continued.]

XVI.—*The Ornithology of Northern Celebes.*

By ALFRED RUSSEL WALLACE*.

I HAVE just returned from a three months' exploration of Menado and the surrounding district of Minahassa, forming the north-eastern extremity of Celebes. My collection of birds is not a very extensive one, but it comprises some very interesting species, and I have made some observations on habits and economy which I think will be interesting to your readers.

I first visited the most elevated district, taking up my residence in a village at an elevation of 3500 feet. The weather, however,

* Communicated in a letter from Mr. Wallace to the Editor.

was very unpropitious, and birds very scarce. The most interesting species was the beautiful *Enodes erythrophrys*, Temm., which, as far as I could ascertain, is confined to the interior mountain districts, and never abundant. The anomalous *Scissirostrum pagii*, Lafr., however, so scarce at Macassar, was here plentiful, occurring in flocks about the hill-plantations, often settling on dead trees, in the holes of which it builds, and keeping up a loud and almost continual chirping. It, in fact, takes the place of *Lamprotornis*, and is called by the same native name. The beautiful large Wood Swallow, *Artamus monachus*, Temm., was seen here; but I left the place without obtaining a specimen, and never met with it again, *A. leucorhynchus* being the common species of the country. A pretty *Zosterops* and two or three *Ralli* were almost the only other birds I obtained at this elevation.

I then removed to a forest district beyond the lake of Tondano, at an elevation of about 1500 feet, and, had the circumstances been favourable, I think I should have obtained a fine collection. But the weather was worse than before, the sun being often invisible for eight or ten days together, and both my hunters were sick and left me, so that it was almost impossible for me to do anything. Of the few species I obtained, however, several were new to me; viz. *Ptilonopus gularis*, Q. and G., the noble *Carpophaga forsteni*, Temm., a most lovely *Cinnyris* with scarlet breast and yellow-striped throat (I hope a new species), and a rather pretty little *Parus* (?). A second species of Racket-tailed Parrot also occurred here, I suppose the *Prioniturus discurus*, Vieill., very distinct in both sexes from the *P. platurus*, which was found at Macassar as well as here, though more sparingly than the former. It is a most interesting bird, but in a dozen or twenty specimens I found only one or two with the tail-feathers finely developed. These birds attack the Bananas near the villages, and fly with much screaming after dark, even as late as nine or ten o'clock.

Returning to Menado, I collected in that neighbourhood and on to the eastern extremity of the peninsula. The fine Goatsucker, *Lyncornis macropterus*, Temm., is abundant about the town of Menado, appearing soon after sunset, chasing insects with rapid evolutions. I now obtained some Kingfishers which

seem almost wanting in the mountain districts. *Halcyon melanorhyncha*, Temm., is found near the beech and on rivers; *H. monachus*, Forsten, in the forest, being in its insect food allied to the *Dacelones*. The beautiful *Dacelo cyanotis*, Temm., occurred only in the central virgin forests. *Pitta celebensis*, Forst., was scarce; and I was disappointed in not obtaining either of the other two species found by Forsten. Many other species also escaped me, especially the *Meropogon forsteni*, Temm., which I had set my heart upon obtaining, but of which I saw no trace. The beautiful Ground Pigeon, *Chalcophaps stephani*, Reich., though not rare, was very difficult to get; and of the fine *Phlegœnas tristigmata* I procured only a single specimen. The birds which possessed the highest interest for me were, however, the two *Megapodii*, about which I have some interesting facts to communicate.

One of these is a true *Megapodius*, of small size, and only remarkable for not making a mound of refuse, like most of the genus, but, instead of this, scratching out a hole in the rotten stump or root of a fallen tree, and there burying its eggs. The species is, I suppose, known, though you do not mention it among those noticed in your paper* on the Fauna of New Guinea. The other is the noble *Megacephalon maleo*, one of the finest of the *Megapodiidæ*, remarkable for the backward prolongation of the cranium into a cellular mass, the short, blunt claws, and the delicate rosy hue of the under side of the body.

This interesting bird is confined, so far as I am aware, to the northern peninsula of Celebes, and to the littoral portions of the island, never being found in the mountain ranges or in the elevated district of Tondano. It seems particularly to abound in the forests around the base of the Klabat mountain, feeding entirely on fallen fruits, which in the crop resemble the cotyledons of leguminous seeds. In the months of August and September, when there is little or no rain, they descend to the seabeach to deposit their eggs. They choose for this purpose certain bays remote from human habitations. One of these serves for an extensive tract of country, and to it the birds repair daily by scores and hundreds. I visited the most celebrated of these

* Journ. Proc. Linn. Soc. Zool. ii. p. 149.

beaches, but, it being late in the season, did not see so much of the birds as I might otherwise have done. I made, however, some interesting observations, and obtained a very fine series of specimens during my stay of six days.

The place is situated in the bay between the island of Limbe and Banca, and consists of a steep beach about a mile in length, of very deep, loose, and coarse black volcanic sand, or rather gravel, exceedingly fatiguing to walk over. It is bounded at each extremity by a small river with hilly ground beyond, while the forest behind the beach itself is somewhat flat and its growth stunted, so that it has quite the appearance of being formed from the *débris* of an ancient lava-stream from the Klabat volcano, especially as beyond the two rivers the beaches are of *white* sand. In the mass of loose sand thrown up above high-water mark are seen numbers of holes four or five feet in diameter. In and around these holes, at a depth of one or two feet, the eggs of the Maleos are found. There are sometimes only one or two, sometimes as many as seven or eight in one hole, but placed each at a distance of 6-8 inches from the others, and each egg laid by a separate bird. They come down to the beach, a distance often of ten or fifteen miles, in pairs, and, choosing either a fresh place or an old hole, scratch alternately, throwing up a complete fountain of sand during the operation, which I had the pleasure of observing several times. When a sufficient depth is reached, the female deposits an egg and covers it up with sand, after which the pair return to the forest. At the end of thirteen days (the natives assert) the same pair return, and another egg is deposited. This statement seems to have been handed down by tradition, having perhaps originated from the observation of some wounded or singularly marked bird. I am inclined to think it is near the truth, because in the females I killed before they had laid, the egg completely filled up the lower cavity of the body, squeezing the intestines so that it seemed impossible for anything to pass through them, while the ovary contained eight or ten eggs about the size of small peas, which must evidently have required somewhere about the time named for their successive development. The colour of the eggs is a pale brownish-red, and their dimensions are

4.3 inches long by 2.4 inches wide. When quite fresh they are delicious eating, as delicate as a fowl's egg, but much richer, and the natives come for more than fifty miles round to search for them. After the eggs are once deposited in the sand the parent birds pay no further attention to them. The young birds on breaking the shell work their way up through the sand and run off to the forest.

The appearance of the birds when walking on the beach is very handsome. The glossy black and rosy white of the plumage, the helmeted head and the elevated tail, roofed like that of the common hen, form a *tout ensemble* quite unique, which their stately and somewhat sedate walk renders still more remarkable. When approached they run pretty quickly, and, if suddenly disturbed, take flight to the lower branches of some adjacent tree. There is hardly any difference between the sexes, except that in the male the cranial protuberance and nasal tubercles are a little larger, and the rosy or salmon tinge of the breast and belly a little deeper; but these characters are not so constant and conspicuous as to make it always possible to distinguish the male from the female bird.

When we consider the great distances the birds come and the trouble they take to place the eggs in a proper situation, it does seem extraordinary that they should take no further care about them. It is, however, quite certain that they neither do nor can watch over them. The eggs deposited by a number of hens in succession in the same hole must render it impossible for each to distinguish its own, and the food of the parent birds can be obtained only by continual roaming, so that if the numbers which come down to this beach alone in the breeding season (according to the accounts, many hundreds or even thousands) were obliged to remain in the vicinity, the greater part would perish of hunger.

In the structure of the feet of the *Megacephalon* we may see a reason why it departs from the habits of its nearest allies, the *Megapodii* and *Talegalli*, which generally heap up mounds of earth and rubbish in which to bury their eggs. The feet of the *Maleos* are not nearly so strong in proportion as those of the former birds, while the claws are short and straight, instead of

being very long and greatly curved. The toes are, however, slightly webbed at the base, and thus the whole foot and rather long leg are well adapted to scratch away rapidly a loose sand, although they could not, without much labour, accumulate the heaps of miscellaneous materials which the large, grasping feet of the *Megapodii* bring together.

The very peculiar habits of the whole family of the *Megapodiidae* departing widely from those of all other birds, may also, I think, be shown to be almost the necessary results of certain peculiarities of organization. These peculiarities are two—the size and number of the eggs, and the nature of the food on which these birds subsist. Each egg being so large as to fill up the abdominal cavity and with difficulty pass the walls of the pelvis, a considerable interval must elapse before the succeeding ones can be matured. The number of eggs which a bird produces each season seems to be about eight, so that an interval of *three months* elapses between the laying of the first and last egg. Now, supposing the eggs to be hatched in the ordinary way, they must be laid on the ground (for the general structure of the bird renders the construction of an arboreal nest impossible) and must be incessantly watched by the parents during that long interval, or they would be surely destroyed by the large lizards which abound in the same district. It seems probable, however, that the eggs could not retain the vital principle for so long a time, so that the bird would have to sit on them from the commencement, and hatch them successively. But the period of incubation is a severe tax upon all birds even when it is comparatively short and food easily obtained. In this case complete incubation would be most likely impossible, because the particular species of fruits on which these birds subsist would be soon exhausted around any one locality, and both parents and offspring would perish of hunger. If this view is correct, the *Megapodiidae* must behave as they do. They must quit their eggs to obtain their own subsistence,—they must bury them to preserve them from wild animals,—and each species does this in the manner which slighter modifications of structure render most convenient.

It has been generally the custom of writers on natural history to take the habits and instincts of animals as the fixed point, and

to consider their structure and organization as specially adapted to be in accordance with them. But this seems quite an arbitrary assumption, and has the bad effect of stifling inquiry into those peculiarities which are generally classed as "instincts" and considered as incomprehensible, but which a little consideration of the *structure* of the species in question, and the peculiar physical *conditions* by which it is surrounded, would show to be the inevitable and logical result of such structure and conditions. I am decidedly of opinion that in very many instances we can trace such a necessary connexion, especially among birds, and often with more complete success than in the case which I have here attempted to explain. For a perfect solution of the problem we must, however, have recourse to Mr. Darwin's principle of "natural selection," and need not then despair of arriving at a complete and true "theory of instinct." This subject is, however, far too large to be discussed here; and with a few words on the general character of the Ornithological Fauna of Celebes I must conclude.

I am now acquainted with 140 birds of Celebes, and there are ten found by Forsten which I have not met with. This number of 150 species is very small, considering the extent of the island, yet I do not think that future researches will very materially increase it. Many of the chief families which swell the list of species of the western islands are here either altogether absent or very feebly represented. The vast group of the *Turdidæ* is almost absent, the *Bucconidæ*, *Trogonidæ*, and *Eurylemidæ* quite so. The *Picidæ* too have almost disappeared, while even the *Laniidæ* and *Muscicapidæ* furnish us with only two or three species. There are indeed a number of very peculiar genera and species, but no extensive groups to make up for the deficiencies which I have noticed. The characteristic groups of the Moluccas and New Guinea on the other side are also for the most part wanting. The fine group of true Lories is not found here, though these birds occur in the little island of Siao, a few miles to the north, from whence I obtained the lovely *Eos indicus*, Gm. Neither do the genera *Eclectus*, *Geoffroius*, *Rhipidura*, *Tanyptera*, or *Tropidorhynchus* ever occur.

A very large proportion of the species of Celebes are alto-

gether peculiar to it. Only eight land-birds are common to it and the Moluccas, viz. *Merops ornatus*, *Munia molucca*, *Eurystomus pacificus*, *Ptilonopus superbus*, *Turtur chinensis*, *Hirundo javanica*, *Todiramphus collaris*, and *Scythrops novæ hollandiæ*; and most of these are birds of a very wide range in the Archipelago, only one in fact, the *Ptilonopus*, being a strictly Moluccan bird, and that differs almost enough to be considered distinct. The birds of Java, Borneo, and Timor are, on the other hand, better represented, as might be expected, from those islands entirely surrounding the southern and western parts of Celebes; yet not more than twenty species of these occur, leaving about 100 land-species altogether peculiar to this island. Such a disproportion probably occurs nowhere else in the world, even in islands less favourably situated for receiving immigrants.

On the whole, therefore, though disappointed as to the number and variety of species, I cannot but consider the island of Celebes to be one of the most interesting in the world to the philosophical ornithologist, and well worth the time I have bestowed upon it. The Dutch naturalist Forsten having resided a year and a half at Menado with unlimited means and Government assistance, I cannot hope to have made many discoveries; I trust, however, that one or two of the smaller species may prove new.

Amboyna, Oct. 1859.

XVII.—On an undescribed Species of Hawk from New Granada.
By PHILIP LUTLEY SCLATER.

(Plate VI.)

ALTHOUGH the *Accipitres* generally are birds of wide distribution, instances of species being confined to narrow geographical limits are not wanting even in this group. The mountain-valleys of New Granada—so fertile in zoological novelties of every sort—have produced several birds of prey which are not known to occur elsewhere. The curious *Milvago carunculatus**, described from a single specimen, now, we believe, in the Museum of the Academy of Natural Sciences of Philadelphia,

* *Phalcobænus carunculatus*, Des Murs, Rev. Zool. 1853, p. 154.