

XL.—On the great Bird of Paradise, *Paradisea apoda*, Linn. ; ‘Burong mati’ (Dead bird) of the Malays ; ‘Fanéhan’ of the Natives of Aru. By ALFRED R. WALLACE.

HAVING enjoyed the rare privilege of a personal acquaintance with this remarkable bird in its native haunts, during my residence in the Aru Islands, I am enabled to give a more complete account of its habits, its local and geographical distribution, and some peculiarities of its structure and œconomy, than has yet been published, and to correct several errors and misstatements which occur in all the accounts I have seen. I have supplied the deficiencies of my own observations by carefully comparing the accounts of those natives who shoot the birds and prepare the skins for sale, and with whom I have resided for more than two months in the interior of the forests. My own Malay hunters, who have shot most of the fine specimens which I have obtained, have been another independent source of information.

A person cannot be long in the interior forests of Aru without hearing a loud, harsh, often-repeated cry, *wawk-wawk-wawk*, *wōk-wōk-wōk*. This is the *Paradisea*, and it is sure to be heard morning and evening, besides occasionally throughout the day. It is the most frequent and the loudest of all the cries in the forest, and can be heard at the greatest distance. One soon becomes convinced that the bird is most abundant ; and it is, in fact, over a very large part of Aru, one of the very commonest species. Much of the noise, however, is made by the young birds of various ages, and who seem to be ten times as numerous as the full-plumaged, adult males. We shot nearly a dozen of the former before we even saw one of the latter. The adults frequent the very loftiest trees, and are shy and wary, and so strong and tenacious of life, that I know no bird of its size so difficult to kill. It is in a state of constant activity, flying from tree to tree, scarcely resting still a moment on the same branch, and, at the slightest alarm, flying swiftly away among the tree-tops. It is a very early bird, commencing to feed before sunrise ; but it does not seem to gorge itself and then rest half-torpid, like many fruit-eating birds, as it may be seen and heard at all times of the day in a state of activity.

On examining a freshly killed bird, we see the great muscular strength of the legs and wings, and find the skin to be remarkably thick and tough, and the skull as well as all the bones very hard and strong. The whole neck is lined with a thick, muscular fat, exactly similar to that of the *Cephalopterus ornatus*, in the same position, and probably serving in both cases to nourish the highly developed plumage of the adjacent parts. This causes the throat externally to appear very wide, and as if

swollen, which displays to great advantage the dense, scaly, metallic plumage. The flesh, as might be expected, is dry, tasteless, and very tough—to be eaten only in necessity. By far the greater number of the birds I have opened have had their stomachs full of fruit, and this seems to be their usual and favourite food. At times, however, they seek after insects, principally Orthoptera; and I have found one of the largest of the Phasmidæ almost entire in the stomach of a full-plumaged bird.

It is only for two or three months of the year, during the height of the east monsoon, that the natives obtain them; and this circumstance has no doubt led to the statement that they are migratory in Aru, arriving from New Guinea at the end of the west, and returning there again at the end of the east monsoon—which is quite incorrect, as they are permanent residents in Aru, and the natives know nothing about their being found in New Guinea. About April, when the change from the west to the east monsoon occurs, the Paradiseas begin to show the ornamental side feathers, and in May and June they have mostly arrived at their full perfection. This is probably the season of pairing. They are in a state of excitement and incessant activity, and the males assemble together to exercise, dress and display their magnificent plumage. For this purpose they prefer certain lofty, large-leaved forest-trees (which at this time have no fruit), and on these, early in the morning, from ten to twenty full-plumaged birds assemble, as the natives express it, “to play and dance.” They open their wings, stretch out their necks, shake their bodies, and keep the long golden plumes opened and vibrating—constantly changing their positions, flying across and across each other from branch to branch, and appearing proud of their activity and beauty. The long, downy, golden feathers are, however, displayed in a manner which has, I believe, been hitherto quite unknown, but in which alone the bird can be seen to full advantage, and claim our admiration as the most beautiful of all the beautiful winged forms which adorn the earth. Instead of hanging down on each side of the bird, and being almost confounded with the tail (as I believe always hitherto represented, and as they are, in fact, carried during repose and flight), they are erected *vertically* over the back from under and behind the wing, and there opened and spread out in a fan-like mass, completely overshadowing the whole bird. The effect of this is inexpressibly beautiful. The large, ungainly legs are no longer a deformity—as the bird crouches upon them, the dark brown body and wings form but a central support to the splendour above, from which more brilliant colours would distract our attention,—while the pale yellow head, swelling throat of rich metallic green, and bright golden eye, give vivacity and life to

the whole figure. Above rise the intensely-shining, orange-coloured plumes, richly marked with a stripe of deep red, and opening out with the most perfect regularity into broad, waving feathers of airy down,—every filament which terminates them distinct, yet waving and curving and closing upon each other with the vibratory motion the bird gives them; while the two immensely long filaments of the tail hang in graceful curves below*.

In the freshly killed specimens it can be easily seen (even did not observation of the living bird prove it) that this is the natural position of the long plumes. They all spring from an oval fold of the skin, about an inch in length, situated just below the elbow or first joint of the wing. On this point they turn as on a hinge, and admit only of being laid down closed beneath the wing, or erected and expanded in the manner described, which position they take of their own accord, if the bird is held up by the legs, with the head inclining a little downwards, and the whole gently shaken. In this manner, by slightly altering the position of the body, all the forms which the plumage assumes during life can be correctly and beautifully imitated. If I am right in supposing this attitude to be now first made known in Europe, and our taxidermists succeed in properly representing it, the Bird of Paradise will, I am sure, excite afresh universal admiration, and be voted worthy of its illustrious name.

The curious habit of the males assembling to play and exercise their limbs and feathers, occurs in some other birds, as the Turkeys and Argus Pheasants, and particularly in the *Rupicola cayana*, which, though a true arboreal bird, has its ball-room on the ground, generally on a flat rock, on which a space of a few feet in diameter is worn clean and smooth by the feet of the dancers. On these spots the natives set snares, and catch these beautiful birds alive. The soaring of the Lark, and, in all song-birds, the exertion of singing, probably results from the same desire for action at the time when the moulting is completed, and the frame overflowing with health and vigour.

When the natives wish to procure 'Burong mati,' they search for one of the trees on which the birds assemble, and, choosing a time when they are absent, construct among its branches a little hut of boughs, so chosen as to afford them a good concealed station for shooting the birds. They say the greatest care is necessary to make the covering very close, and at the same time not too artificial; for if the birds once see anything move within, they will quit the tree, and never return to it. They ascend to this nest before daylight in the morning, with their bow and a good stock of arrows; a boy accompanying them, who

* A note on the mode in which the male Bird of Paradise displays his plumes, will be found in the Annals for February 1854, vol. xiii. p. 157.

remains crouched at the foot of the tree, to secure the birds as they fall, and recover the arrows. They sometimes use arrows with a large rounded piece of wood at the end, so as to make no wound; but they say the bird is so strong, that it is very hard to kill them with this, and they therefore prefer the usual long, pointed arrows, which transfix the body and certainly bring down the bird. The assembly commences soon after sunrise, and when a sufficient number are in full play, the archer begins his sport, and if skilful, will shoot nearly the whole of them in succession, as each bird seems so much intent on his own enjoyment as not to miss his companions. In skinning, they take out the bones of the head and legs, and apply ashes to the skin, a stick being pushed up to the base of the beak, on which the skin of the head and neck shrinks to about a tenth of its natural size. A little peg of wood is pushed through the nostrils, by which the skin is hung up to dry, and a string tied round the wings to keep them in their place. In damp weather the skin about the base of the beak often breaks, and is then mended with pitch! and the smoky atmosphere of the native houses, in which half-a-dozen families have their cooking-fire in daily action, soils and darkens the whole plumage, especially the pale yellow head and the delicate downy portion of the long plumes. When dry, they are preserved wrapped in palm-leaves, which, however, seldom cover the extreme ends of the feathers, which thus become still more rubbed and dirtied. Some years ago, two dollars each were paid for these skins, but they have gradually fallen in value, till now there is scarcely any trade in them. I purchased a few in Dobbo at 6*d.* each.

Of the geographical distribution of the Bird of Paradise many erroneous statements have been published. Its supposed migrations have by some been extended to Banda, by others to Ceram and all the eastern islands of the Molucca group. These statements are, however, totally without foundation, the species being strictly confined to New Guinea and the Aru Islands, and even to a limited portion of each of those countries. Aru consists of a very large central island, and some hundreds of smaller ones scattered around it at various distances, many being of large size and covered with dense and lofty forests; yet on not one of these is the *Paradisea* ever found (although many of them are much nearer New Guinea), being limited to the large island, and even to the central portions of that island, never appearing on the sea-coast, nor in the swampy forests which in many places reach some miles inland. With regard to its distribution in New Guinea, the Macassar traders assured me it was not found there at all; for, although they obtain quantities of 'Burong mati' from most of the places they visit on the west coast of

New Guinea, they are all of another kind, being the *Paradisea papuana*, a smaller and more delicate, but less brilliantly coloured species. On inquiry I found they did not trade to the eastward of Cape Buro (135° E.). Lesson*, I believe, found the larger species in the southern peninsula of New Guinea, and an intelligent Ceramese trader I met at Aru assured me that, in places he had visited more eastward than the range of the Macassar traders, the same kind was found as at Aru. It is therefore clear that the *Paradisea apoda* is confined to the southern peninsula of New Guinea and the Aru Islands, while the *Paradisea papuana* inhabits only the northern peninsula, with one or two of the islands (most probably) near its northern extremity. It is interesting to observe, that though the Ké Islands and Goram approach nearer to New Guinea than Aru, no species of the Paradise birds are found upon them,—pretty clearly showing that these birds have not *migrated* to the islands beyond New Guinea in which they are now found. I have, in fact, strong reasons for believing, from geographical, geological, and zoological evidence, that Aru is but an outlying portion of New Guinea, from which it has been separated at no very distant epoch.

In examining my series of specimens, I find four such well-marked states of the male bird, as to lead me to suppose that three moults are required before it arrives at perfection. In the first condition it is of a nearly uniform coffee-brown colour, darker on the head and paler on the belly, but entirely without markings or variety of colour. The two middle tail-feathers are exactly equal in length to the others, from which they only differ in having a narrower web. In the next series of specimens, the head has acquired the pale yellow colour, and the throat and

* Since writing this paper, I have, by the kindness of a German physician residing at Macassar, Dr. Bauer, obtained a perusal of the 'Zoology' of the voyage of the 'Coquille,' containing Lesson's observations on the Paradise Birds. There is, however, a great want of preciseness in his account, owing to his using French trivial names, and his not stating *where* and *how* he obtained each species. He visited, I find, only the north coast (Dorey Harbour) and the islands of Waigiou. His details of habits refer to, and the specimens shot by himself or companions are spoken of as, the "petit Émeraude," which must be the *P. papuana*, Bechst. (*P. minor*, Forst.). He states, however, that he procured from the natives at Dorey *the two species of 'Émeraude,'* the other being, no doubt, the true *P. apoda*, Linn., which I believe does not inhabit that district. They were probably obtained from the Ceramese traders, who had brought them from the south or from Aru, just as they offered me at Aru specimens of the *P. papuana* which they had brought from the north peninsula of New Guinea. He mentions the apparently large number of females, and concludes that the bird is polygamous! but I have no doubt that what he took for females were mostly young males. He says nothing about the vertical expansion of the plumes, which will form, I hope, an important addition to our knowledge of these remarkable birds.

forehead the rich metallic green of the old birds ; the two middle tail-feathers, however, are still webbed, but are now two or three inches longer than the rest. In the next state these two feathers have been replaced by the immensely long, bare rachides, quite equal to the greatest size they attain ; but there is yet no sign of the fine side-plumes which mark the fourth and perfect state of the species. I am inclined to believe, therefore, that this extraordinary mass of plumes is only obtained by the *Paradisea* in its fourth year, and after three complete changes of its feathers. This will account for the very large number of immature birds everywhere seen, while the full-plumaged males are comparatively scarce. It is singular that I have not been able to obtain a single adult female, my only specimen of that sex being, I think, also a young bird. It is exactly similar to the youngest males, of a coffee-brown all over ; but in Bonaparte's 'Conspectus' it is stated that the female is dusky yellow and brown, with the under parts *entirely white*. This, I cannot help thinking, must be a mistake, or altogether another bird ; for neither myself nor my hunters have ever seen one at all resembling it, out of many hundreds in various states of plumage. The natives who shoot the birds are also quite unacquainted with it, and always declared that the birds of a uniform brown colour were the females. I am sorry I could not positively determine the point, because I shall probably not again visit the districts in which the *Paradisea apoda* is found. I hope, however, to obtain the allied *P. papuana* on the north coast of New Guinea, and trust to be more successful in ascertaining the female of that species. It is also worthy of notice that the long cirrhi of the tail in the full-plumaged males vary very much in length, and the shortest is often the most worn, showing that it has reached its full development for the year. A specimen occurs occasionally with immense cirrhi ; one of mine has these feathers 34 inches long, while the general length seems to be from 24 to 28 inches. I think it probable, therefore, that these cirrhi increase in length each year, and that the very long ones mark very old birds. The other dimensions of the bird, and the length of the ornamental side-plumes, are in all cases almost exactly equal.

XLI.—*Observations on the Habits of the common Marten* (*Martes foina*). By Madame JEANNETTE POWER*.

EVERY one knows that the Marten is very wild, and that it inhabits the forests. As cunning as the Fox, it prowls like that animal round about isolated houses and farms, and enters these for the purpose of plunder ; its visits, which are not disinterested,

* Communicated by Prof. Owen.