

of this bird as differing from New-Guinea specimens in the markings of the wings and tail; but, judging from the series at the British Museum, I do not think that these are constant characters."

29. *CARPOPHAGA VAN-WYCKI*.

Of this and the other Pigeons of Duke-of-York Island, Mr. Brown writes as follows:—

"Of your new *Carpophaga melanothroa* I have only obtained one skin. *C. vanwycki* and *C. rubricera* are our commonest Pigeons, and can be got in any numbers. If you wish for any specimens I can easily get them, as we are shooting them every day. *Edirhinus insolitus* is also very abundant; I have tried several times to rear some for transmission to you, but have not yet succeeded in keeping them for more than a few months.

35. *AMAURORNIS MOLUCCANA* (Wallace).

Porzana moluccana, Wallace, P. Z. S. 1865, p. 480.

Gallinula ruficrissa, Gould, B. Aust. Suppl. pl. 79.

Amaurornis moluccana, Salvadori, R. Accad. Sci. di Torino, vol. xiv.

I have not been able to make a comparison; but I suppose that the Duke-of-York bird is referable to this southern form of *A. olivacea* (Meyen) of the Philippines.

3. Notes on the Anatomy of *Gelada rueppelli*.

By A. H. GARROD, F.R.S., Prosector to the Society.

[Received May 7, 1879.]

(Plate XXXVIII.)

Having had the opportunity of dissecting the adults of both the sexes of *Gelada rueppelli*, the female of which lived a short time in the Society's Gardens, where it died, I desire to record some points in the anatomy of the species which appear to be of interest.

The following are measurements from the skins, except when otherwise indicated:—

	♂ adult.	♀ adult.
	inches.	inches.
From margin of upper lip, over head and along back, to base of tail.....	28·75	29·2
Same measurements from body with skin removed...	24·5	25
Tail, without hairy tuft	24·75	25
Tuft of tail	8	3·5
From wrist to end of nail of middle digit of hand...	5	4·5
From heel to end of nail of middle digit of foot.....	7	6·25
From angle of axilla to end of nail of middle digit of hand	16·25	15·1
From mid-perineum to end of nail of middle digit of foot	9	11
Nail of middle digit of hand along convexity	1·1	1·15
Nail of middle digit of foot along convexity	1·01	1·01

With reference to the male, its general colour is a dark sooty chocolate-brown. The shoulder, forearm, back of hand, and instep, as well as most of the tail, with the exception of its end, are black. The palest brown is found on the abdomen, though this is very dark. A few white hairs mixed with the brown-black of the tail-tuft give that a lightish tint. The longest hair is that between the shoulders, where it reaches as much as eleven inches. This lengthy hair extends upwards over the occiput quite forward to the superciliary ridge, and downwards to the loins, below which it rapidly reduces before the base of the tail is reached. Laterally the long hair extends over the shoulders, and less considerably under the arms, towards the lateral margins and to the surface below the nude chest-space. The hair on the abdomen is about 2.75 inches long, that outside the thighs 4 inches, that on the tail an inch, except the end tuft, where it reaches 3.5 inches.

The characteristic nude chest-space is double in the male, being formed of two median triangular isosceles areas reversely directed, with their apices approximate, but separated by an interval, 1.5 inch in length, of hair-covered skin. The base of the very obtuse-angled upper triangle, which is margined by black hair, is five and a half inches from the middle of the lower lip, and is situated opposite the larynx, its length being 3.75 inches, and its depth not being more than an inch. The lower triangle is also very obtuse-angled, with its base, slightly concave downwards, six inches long.

Although the two nude triangles above described do not meet, they tend to form an hour-glass surface of florid skin, 7.75 inches along each lateral curve from horn to horn. The hair bordering it is an inch long or so and iron-grey in tint, from the almost equal admixture of black and white hairs. There is no carunculation of the skin in the nude spaces or at their borders. The pair of nipples are closely approximate, not being more than a quarter of an inch apart in the dried skin. They are situated in the nude area of the lower triangle, an inch above its base.

In the female the general tint is much the same as that of the male; the hair is very much shorter and less faded at the tips. The interscapular hair is the longest, reaching nearly four inches, whilst that of the loins is not so black as in the male.

The pectoral nude space is in the female carunculated all along its lateral and inferior borders. The two triangles which go to form it join apically by an isthmus 1.3 inch broad. The marginal hair is not mixed with white. The caruncles are numerous, and about a quarter of an inch in breadth, being ovate and flattened. The nipples are situated as in the male, and are an inch apart.

In both sexes the face is nude below the line of the frontal eminences, and laterally from points a little less than half an inch outside the outer canthus of each eye, the nude spaces running straight downwards in the direction of the angles of the mouth, just before reaching which they turn and include the chin.

The ischial callosities, which are subcircular, and a little less than two inches in diameter, are situated in a naked area which is carun-

culated in the female. This area extends forwards for three and a quarter inches, broad opposite the mons veneris, which is therefore nude, the anterior border being non-carunculated, and gradually lost in the sparse hair of the abdomen.

Osteological comparisons between *Gelada* and its allies are very attractive, but do not lead to very definite results. Those most important in my estimation will be here recorded.

The following are measurements of the larger bones in the male:—

	inches.
Length of humerus.....	7.1
„ radius.....	7.4
„ ulna.....	8.35
„ femur.....	7.45
„ tibia.....	7.6
„ fibula.....	7.0
„ scapula.....	5.25 (extreme)
From anterior margin of præmaxilla to occiput.....	6.5 (5.8 in ♀)
Extreme breadth at posterior parts of zygomata.....	4.1 (4.0 in ♀)
Extreme breadth of orbit.....	0.9 (same in ♀)
Interorbital interval.....	0.425 (0.35 in ♀).

There are 13 pairs of ribs, of which 5 are false. The sacrum consists of three vertebræ. The clavicles form a single curve; and the anterior margin of the manubrium sterni is *not* much thickened.

My opportunities for examining the skulls of adult specimens of Monkeys being but few, it is impossible to generalize to any extent with safety. *Cercopithecus* differs from *Macacus* and *Cynocephalus* in not possessing a fifth lobe to its mandibular third molar. In *Gelada* this extra lobe is large, as is the anterior talon on the maxillary molars, which are small in *Cynocephalus*, and much smaller still in the Macaques I have examined. In *Gelada* the upper incisors are at right angles to the alveolar margins of the premaxillary, which is the case in *Macacus*; in *Cynocephalus* and *Cercopithecus* they converge as they descend.

The profile view of the *Gelada*'s skull exhibits the great anterior development of the sharp median portion of the supraorbital ridge and the deep concavity of the nasal contour. In *Gelada*, *Cercopithecus*, and *Cynocephalus* the nasal bones are separate, elongate, and narrow, appearing superficially upon the skull as high as the supraorbital frontal ridge. In *Macacus* they fuse, and form a short broad triangle whose apex does not reach the frontal bone, the maxillaries meeting above it.

In *Gelada* there is no trace of any groove or foramen for the supraorbital vessels and nerve. This is also the case in *Cercopithecus*. In *Macacus* and *Cynocephalus*, however, the groove is very deep, almost forming a foramen. The malar foramen is also wanting in *Gelada*. Its presence in allied genera is uncertain. There is a foramen in the fronto-malar suture.

In *Macacus* and *Cynocephalus* the anterior palatine foramina open into an osseous depression, which is continued for some distance forwards, almost to the alveolar margin. In *Gelada* they open directly upon the surface of the palate.

In *Macacus* and in *Cercopithecus* a powerful transverse ridge of bone is seen to form the posterior boundary of the osseous palate. This is not seen in *Gelada* or in *Cynocephalus*.

In *Cynocephalus* the mastoid process of the temporal bone is fairly developed. In *Gelada*, *Cercopithecus*, and *Macacus* it is obsolete.

In *Cynocephalus* and *Macacus* the hamular process of the internal pterygoid plate of the sphenoid bone is much more superficial, and is placed more forward than in *Gelada*.

The left lung is two-lobed, the lower being slightly the larger. The upper is nearly divided transversely into two moieties, of which the lower is a little the smaller.

The right lung has four lobes, the (bifid) azygos being the smallest, the middle next in size, elongate and triangular. The obliquely cut upper lobe is smaller than the subquadrate largest lower lobe.

There are three circumvallate papillæ at the base of the tongue, arranged in the characteristic V.

The following are intestinal measurements :—

	Male. inches.	Female. inches.
Small intestine	90	129
Large intestine	58	51
Cæcum	3	3

The stomach much resembles that of man in shape, being a little more elongate. There is no appendix vermiformis to the sacculated cæcum, which does not differ from that of the lower Old-World Monkeys. The colon is sacculated throughout.

The spleen is three inches long, one and a half inch broad, being suboblong and slightly bifid at one extremity.

The kidneys are ovate, not reniform, and with but a single pyramid in each.

There is an os penis three quarters of an inch long. The vagina is very hirsute, with large broad transverse rugæ. The uterus is pyriform.

To understand the bearing of the details of the anatomy of the liver of the *Gelada*, it will be necessary to view the peculiarities of the organ in allied genera. This the inspection of a large number of species enables me to do.

In the genus *Macacus* the liver is comparatively uncomplicated. The right and left lateral fissures are well marked, the umbilical fissure being less considerable and less constant in depth. The abdominal surfaces of the right and left central lobes are frequently

connected by a bridge of hepatic tissue. The inferior margin of the right central lobe is straight, and at right angles to the axis of the gall-bladder, which latter organ is deeply imbedded in a cystic fossa, never deep enough to appear on the diaphragmatic surface. The fundus of the gall-bladder never reaches the inferior margin of the organ, though it approaches very near to it. There is no trace of a cystic fissure. The interval between the inner border of the cystic fossa and the umbilical fissure is always broad, a quadrate lobule intervening. The left central is generally the smallest of the four main lobes, it being vertically elongate. The left lateral lobe is shaped much like the sector of a quarter of a circle, with the apex directed to the portal fissure. This apex is often simple; but when not so a slight fissure runs for a short distance from the superior border of the lobe, not far from the apex, *parallel* to the left lateral fissure. The right lateral lobe is subquadrate in form; its surface presents no irregularities, as a rule; but when present they take the form of deep semilunar incisions on its abdominal surface. The abdominal margins of the umbilical fissure frequently present small lobelets of a bluntly conical form, with their apices directed downwards. These are most frequently situated on the left central lobe, but sometimes on the right, sometimes on both. The caudate lobe is elongatedly subfusiform, without any renal depression; its apex reaches *as far as* the extreme right margin of the right lateral lobe. The Spigelian lobe is well marked, being small and thin; its shape is that of the tip of the compressed finger of a glove; it is directed backwards.

The genus *Cercopithecus* differs from *Macacus* in the following respects:—The inferior margin of the right central lobe is rarely anything approaching a straight line at right angles to the axis of the gall-bladder; a slight notch often also indicates the rudiment of a cystic fissure. The imbedded fundus of the gall-bladder is likewise generally visible on the diaphragmatic surface of the right central lobe. The interval between the left margin of the cystic fossa and the umbilical fissure is narrow, and often not more than a sharp vertical ridge of hepatic tissue. The apex of the left lateral lobe (directed, as in *Macacus*, towards the portal fissure), when complicated, is rendered so by a short fissure running from the superior border of the lobe, *not* parallel to the left lateral fissure, but downwards and inwards, so as to produce a subtriangular lobelet, in which the free margin is directed horizontally upwards. When complicated the right lateral lobe develops lobules on its abdominal surface, not semilunar incisions. The caudate lobe runs to the extreme margin of the right lateral lobe, as in *Macacus*. The Spigelian lobe is frequently absent, and when present is irregular and much smaller than in *Macacus*.

In the genus *Cynocephalus* the peculiarities of *Cercopithecus* are observed, except that the caudate lobe is very short, only extending half across the right lateral lobe horizontally. The Spigelian lobe is also well developed, quite as much or even more so than in *Macacus*, it being thicker than in that genus.

In *Gelada* the right and left central lobes are proportionally larger than in the genera above described. Otherwise it most resembles *Cercopithecus*, differing from it in that the cystic fissure is shallow, at the same time that the fundus of the gall-bladder does not so nearly approach the inferior border of the right central lobe. It resembles *Cercopithecus* in that the Spigelian lobe is absent, at the same time that the caudate lobe is long, in both which respects it contrasts strongly with *Cynocephalus*. The only lobelet is one on the right border of the umbilical fissure, which is Macaque-like. It differs from *Macacus* in the obliquity of the inferior border of the right central lobe, and in the nearness of the gall-bladder to the umbilical fissure, as well as in the absence of a Spigelian lobe and the large size of the central lobes.

The brain of *Gelada rueppelli* is particularly instructive when compared with the beautiful series of figures in Gratiolet's 'Mémoire sur les Plis Cérébraux de l'Homme et des Primates.' Its different aspects are represented, natural size, on Plate XXXVIII. Its most marked feature is the relatively small size of the occipital lobe, which is about as large as in the *Semnopithecus*, smaller than in the *Cynocephalus*, and much smaller than in *Macacus* as well as *Cercopithecus*. In the two last-named genera this lobe is unconvoluted, or very slightly so. In *Gelada* there is a simple horizontal sulcus (*h, h*) a short distance above its lower border, running from the posterior surface some way forward, but not so far as to meet the posterior transverse sulcus (*c, c*). In *Cynocephalus* the occipital lobe is more elaborately convoluted.

An inferior horizontal occipital sulcus, parallel to that just described, runs so far forward as to join the major oblique temporo-parietal sulcus (*b, b*). This is a condition recorded by Gratiolet in *Semnopithecus maurus* only, the sulcus generally turning upwards to end independently.

The major oblique temporo-parietal sulcus (*b, b*) commences below, near the inferior rounded margin of the temporal lobe, and runs upwards as well as backwards to near the middle line of the brain. It is joined by the prolongation upwards of the Sylvian fissure (*a, a*), two thirds from its lower end, it being bent slightly forward at the point of junction.

Surrounding the upper end of this last sulcus, but not meeting it, is one whose posterior limb (*c, c*) forms the anterior boundary of the occipital lobe, the posterior transverse fissure, whilst its anterior limb (*g, g*) runs forwards, downwards, and outwards, to end independently as in allied Primates. Where these two limbs meet a small sulcus runs inwards to the middle line, becoming conspicuous on the median aspect of the hemisphere.

The prolongation upwards and backwards of the Sylvian fissure on the outer surface of the brain meets the major oblique temporo-parietal sulcus as above mentioned. Whether or not it should meet it is uncertain in allied species of the same genus according to Gratiolet. It is peculiar, however, in that from a little above and below its middle it sends forward small branches (*e, e* and *n, n*). In





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