

larger, the filaments very much less thickened at the summits, and the stigma, instead of being almost or quite as large as the ovary, is so small as scarcely to be distinguished from the short style. The difference in this respect is so great, that, were it not that Bentham mentions that this species is sexually dimorphous, and that I am assured by unquestionable authority that the two forms are identical, I should consider them distinct species.

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NOTE ON SOME POINTS IN THE ANATOMY OF THE PIGEONS  
REFERRED TO BY DR. HANS GADOW IN A RECENT PAPER ON  
THE ANATOMY OF PTEROCLES.

BY WILLIAM A. HASWELL, M.A., B.Sc. (EDIN.)

In part II. of the Proceedings of the Zoological Society of London for 1882, which has just come to hand, I find in a paper by Dr. Hans Gadow on the Anatomy of *Pterocles* some statements called forth by a paper of mine published in the Proceedings of this Society (Notes on the Anatomy of Birds, III.—The Myological Characters of the Columbidae, Vol. iv., pp. 306—310 [1880].)

I must first explain that the paper in question was in reality an abstract of a very much longer and more detailed account of the entire system of limb-muscles in the Pigeons, together with comparative studies of many other birds, which was presented to the Society at the time, and this may serve to account for the condensed form in which it appears. At the end of the short abstract I summarise the leading characteristics of the muscular system of the Pigeons in five statements. These I regard, taken all together, as enabling us to give a myological definition of the order. I do not state that all these points are peculiar to the Pigeons, I merely allege that they are characteristic of them as a group—a distinction which appears to me perfectly obvious, but which Dr. Gadow seems not to apprehend. These five



characteristics (with a modification to be noticed presently) I have merely to repeat, seem, taken together, to characterise the family, and if Mr. Forbes and Dr. Gadow will take the trouble to make a really careful dissection of the common Pigeon, they will find it necessary to modify some of their statements. The authors alluded to state that of the five points "one is totally incorrect and three others, viz. nos. 3, 4, and 5, are not characteristic of the Columbidae."

1. The absence of a posterior belly of the latissimus dorsi.

In a short note on *Turacæna* and *Ædirhinus* (Proc. Linn. Soc. N.S.W., Vol. vii., p. 115) I have pointed out that in the fruit-pigeons the arrangement of this muscle is normal. Dr. Gadow says "Mr. Forbes and I, on examining the following birds, which were at hand—*Carphophaga*, *Chalcophaps* and *Columba*—found this muscle consisting of two bellies, the posterior one being just as well developed in these Pigeons as in *Astur*, arising from the anterior margin of the ileum and from the last dorsal vertebræ, and inserted by means of a tendon below that of the anterior belly into the humerus. Throughout their whole length the two bellies were connected by a fascia." This is precisely the arrangement found in *Ædirhinus* and *Ptilopus*, as in birds generally; that it occurs also in *Chalcophaps*, as well as in the fruit-eating *Carphophaga* is a fact new to me—never having had a specimen of the former genus to dissect. But it surprises me greatly to be told that Mr. Forbes and Dr. Gadow found it occurring in *Columba*. The posterior belly is entirely absent in *Columba livia* and *C. ænas*, in *Macropygia* and *Turacæna*. I have carefully verified its absence in so many dozens of specimens, chiefly of the two first-named forms, that I cannot but entertain grave doubts of the correctness either of Dr. Gadow's and Mr. Forbes's observation, or of the determination of the specimen of *Columba* which they say they examined. I must confess to having made a too hasty inference in this particular in regarding as a characteristic of the Pigeons as a group what I afterwards found



to be not a universal modification ; but the correctness of my observations can be verified by anyone, and it is a point whose importance in the classification of the Columbæ will probably prove to be considerable.

3. The absence of the *glutæus externus* and the presence of the *adductores brevis et longus*, the *semitendinosus* and *semimembranosus*. With reference to this point Dr. Gadow states :— “ Now the *m. gluteus externus* (= *glut. anterior*) is generally very small, but plainly visible in many birds, such as Pigeons, Passerine birds, &c., and not absent as stated by Mr. Haswell,” (i.e. as I take it, “ though very small in many birds such as Pigeons, Passerine birds &c., is plainly visible,” etc.). That this muscle, though well developed in many families, is extremely small in others is a well-known fact ; but in the Pigeon it is entirely absent as a separate muscle, as was long ago pointed out by Garrod.\* In regard to the four muscles whose presence is specially noted, Dr. Gadow goes on to say—“ The four other muscles are well-developed in most birds as Prof. Garrod has stated over and over again, and as the dissection of any fowl will shew.” I may here quote my own words in the paper alluded to. “ The *adductor brevis*, *adductor longus*, *semimembranosus*, *semitendinosus* and *accessory semitendinosus* are all present. The significance of these muscles has been pointed out by Mr. A. H. Garrod (“ On certain muscles of the Thigh of Bird and their value in classification, P. Z.S., 1873 and 1874).” This surely is plain enough. Prof. Garrod found that the absence or presence of certain muscles of the thigh was characteristic of the various major groups of birds. Indicating each of these muscles by a letter he was able to give a myological formulæ for each, and these formulæ he found to be of some value in the determination of affinities. Surely then this formula is of sufficient importance to be quoted in an enumeration of the myological characters of the Pigeons. But Dr. Gadow not

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\* Vide his “ Collected Scientific Papers,” p. 240, or P.Z.S., 1874, p. 258.



only finds fault with this, but insinuates that I was not aware that these muscles "as Prof. Garrod has stated over and over again," are found in other birds. In place of adopting one of Prof. Garrod's views, it is made to appear that I have been altogether overlooking his observations!

4. The special relation of the tendon of the ambiens (when present) to the fibular head of the flexor perforatus secundus tertii digiti. On this Dr. Gadow remarks—"The distal end of the ambiens muscle, when typically developed, always forms the continuation of one of the heads of the m. perforatus dig. ii. et iii.." This is, so far as my observations extend, quite correct. How Dr. Gadow, if he has really read my paper and not merely the summary, persuades himself that it contradicts my statement, I am at a loss to understand.

As a rule the fibres of the distal tendon of the ambiens become broken up when they reach the upper portion of the leg, and become scattered through the fleshy substance of the muscles referred to. In the Pigeons the arrangement is peculiar in this, that the distal tendon maintains its consistency and joins the proximal tendon of the fibular head of the flexor perf. sec. tert. dig., so that the whole might be regarded as an ilio-phalangeal muscle with two bellies and the intermediate tendon united to the fibula by a tendinous band, which is sometimes very slight. It is perhaps a point on which too much weight might be laid, but the myology of the various orders of birds is on the whole so remarkably uniform that such a peculiarity is at least worthy of being noted.

5. The presence of lumbricales in the foot. Dr. Gadow's remark on this point is as follows:—"The muscle which Mr. Haswell takes to be the representative of the lumbricales muscles of mammals has not "hitherto escaped the notice of Anatomists," and it is not "peculiar to the Pigeons," since it is also present in many other birds, e. g. the *Ratitæ*, and has been described by



Meckel, although he gives no name to it, in his "System der vergleich. Anat." iii., p. 388, and in his Archiv für Anat. u. Physiol. pp. 278 and 279." Not having been able to consult the volumes referred to here, I am unable at present to check Dr. Gadow's identification of the muscle which I have ventured to name lumbricalis with a muscle mentioned by Meckel and occurring "in many other birds, e. g. the *Ratitæ*." No mention is made of such a muscle by Owen in his 'Memoir on the Apteryx,' in his article "Aves" in Tod's Cyclopædia, or in his 'Comparative Anatomy and Physiology of Vertebrates,' in all of which frequent reference is made to Meckel's 'Vergleichende Anatomie,' nor by Selenka in the 'Vögel' of Bronn's 'Thierreich' in which Meckel is also constantly quoted, nor by Alix in his 'Appareil locomoteur des Oiseaux;' nor does Garrod mention it in his paper on the Ostrich, in which the flexors of the toes are minutely described (Collected Papers, pp. 101-104).

The muscle referred to, which, if it be not an equivalent of two coalescent lumbricales, has no homologue in Mammals, arises from the under surface of the tendon of the flexor profundus just before it divides, and, becoming bifurcated, is inserted into the sheath containing the flexor tendons of the second and third toes. Against Dr. Gadow's statement that it occurs in many other birds and therefore is not characteristic of the Pigeons, I have to place the fact that it does not occur in any of the numerous birds—swimmers, waders, parrots, kingfishers, cuckoos and others—that I have examined for it, with the single exception of the rasorial birds in which it is well-developed. Thus though not, as I once regarded it, peculiar to the Pigeons, this muscle is a characteristic one and is probably of some taxonomic value. If it should prove to be common and peculiar to the Columbæ and the Rasores, it would prove an interesting minor link between these groups.

We may then define the *Columbidæ* myologically as birds with an expanded tensor accessorius, with the posterior belly of the



latissimus dorsi sometimes absent, with the gluteus externus undeveloped, with the adductores longus et brevis, semitendinosus and accessory semitendinosus all well-developed, with the ambiens sometimes absent, and when present exhibiting a characteristic arrangement, and with "musculi lumbricales" in the foot.

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NOTES AND EXHIBITS.

Note on some Seaweeds from Port Jackson and adjacent coast, by E. P. Ramsay, F.L.S.—In a recent letter from our esteemed correspondent, Baron Ferd. von Mueller, that distinguished Botanist has kindly given me the names of the following *Algæ*, which I had sent him for determination, requesting me to bring under the notice of the Society the fact that no fruiting specimens of *Claudia bennettiana* have yet been recorded. This beautiful and delicate *Alga* was dredged near Spectacle Island; where particular search should be made for this rare and interesting plant. And indeed the marine flora of Port Jackson and the adjacent coast is worthy of special attention and research, several new species and a new genus having been recently discovered on our shores. The following species from Bondi have been determined by Professor Agardh, of Lund, the greatest authority on *Algæ*: *Pterocladia lucida*, J. Agardh; *Splachnidium rugosum*, Greville; *Lederstedtia australis*, J. Agardh. (*nov. gen. et sp.*); *Gelidium corneum*, Greville; *Plocamium angustum*, J. Agardh. Specimens of a *Laurencia* and of a small *Martensia*, probably new, were obtained in deep water. I may also mention that a new species of *Sargassum* was dredged near the North Head.

Professor Stephens exhibited a collection of rocks and fossils illustrating the structure of the Western Coal-fields, as explained by Mr. Wilkinson in his map of Wallerawang (1877). The oldest stratified rocks, quartzites, conglomerates, and sandstones are Devonian, as shewn by characteristic fossils from Mt. Lambie



Haswell, W A. 1882. "Note on some points in the anatomy of the pigeons referred to by Dr. Hans Gadow in a recent paper on the anatomy of Pterocles." *Proceedings of the Linnean Society of New South Wales* 7, 397–402.  
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