

Seed and skin of apple
 Pulp of pear (?)
 Acorn
 Meat of an unknown nut
 A piece of rotten wood
 A piece of cork

Miscellaneous.

A rubber band
 Gravel

THE PTERYLOSIS OF THE WILD PIGEON.

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RECENTLY, Dr. Jonathan Dwight called my attention to the desirability of placing on record an account of the pterylosis of the Wild Pigeon (*Ectopistes migratorius*), since material suitable for the purpose is accessible to me. For the use of this material, I take pleasure in acknowledging my debt to Mr. Henshaw and Mr. Bangs, of the Museum of Comparative Zoölogy.

The Museum is so fortunate as to have the skin of a very young nestling (M. C. Z. no. 73216) from Wisconsin, which although covered with its nearly uniform coat of neossoptiles yet shows fairly well the main tracts of the pterylosis. This nestling measures about 90 mm. in length, with the bill about 15 mm. more. The skin is light brown, the neossoptiles are rather bright tawny yellow and the feather-buds of the coming contour feathers are nearly black. The wings and little stump of a tail are too badly dried up to make any study of the quills profitable, but perhaps the most striking feature of the pterylosis is the marked development of the "pelvic wing" so well described and figured by Beebe in the White-winged Dove (1915, *Zoologica*, vol. II, no. 2). In the young *Ectopistes* this consists of nineteen quills as against eighteen in *Melopelia*, but owing to the position of the tibia and the dryness of the skin, it is not possible to determine satisfactorily whether the arrangement of these quills is in reality as different from that

shown in *Melopelia* as it seems to be. Apparently twelve of the quills are on the tibia, crossing its entire width; six and possibly seven of these are main quills and six or perhaps only five are coverts; the outermost are smallest. The other seven feathers are four main quills and three coverts and they lie along the posterior margin of the femur. The two groups of feathers are divided by a break similar to that which separates primaries and secondaries in the wing, but this may be an artificial condition due to the way in which the skin was prepared and dried. It is notable that all the quills of the "pelvic wing" are much more advanced in development than are any of the quills of the wings or tail.

When the main pterylosis of this young *Ectopistes* is compared with Nitzsch's figure of the condition in *Columba livia*, we find some striking differences. Dorsally, the upper cervical tract with its limiting apterium on each side and its conspicuous fork between the shoulders is fairly well marked but the branches of the fork are narrower, and the fork itself is deeper. The humeral tracts are evident but narrower than in *Columba*. The dorsal tract however, instead of having an insignificant apterium, a mere line at its center, is made up of two parts, separated from the cervical fork by a space of 5 or 6 mm. and from each other by a dorsal apterium 3 or 4 mm. wide; the two halves of the tract run nearly parallel to a point about 12 mm. anterior to the oil-gland when they curve inward slightly and unite in a short terminal part about 5 mm. wide, ending at the oil-gland. Each half of the dorsal tract is about four feathers, or 3 mm. wide near its middle, but is much narrower anteriorly. There is no trace of a femoral tract save the inner half of the "pelvic wing." The lower cervical, sternal and ventral tracts in the young *Ectopistes* are continuous as in *Columba* but are much narrower. The most striking feature however, is the complete separation of the two sides. In *Columba*, the lower cervical is a single tract only slightly forked where it joins the sternals, but in *Ectopistes* (*juv.*), the fork is so deep, reaching clear to the chin, that the lower cervical tract apparently consists of two entirely separated longitudinal tracts. It is possible that this separation has been accentuated by the way in which the throat has been stuffed in this particular specimen, but I think there is no doubt that in the living bird at this stage, the two parts were

separate. At the posterior margin of the sternum, there is a distinct notch on the *inner* side of each ventral tract, which seems to indicate the end of the sternal tract, widest just above the notch. It is not certain that this notch is not an artefact but I believe it would be at least indicated in the living bird. The ventral tracts end at the anus but scarcely surround it. There is no connection between the lower cervical or sternal tracts and the anterior end of the humerals.

The pterylosis of the adult Wild Pigeon has been determined by the study of two excellent alcoholic specimens. Certain features not clearly shown by one are easily distinguished on the other. The striking feature of the pterylosis is the extent to which the tracts cover the bird; the increase in their width during growth from nestling to adult is really extraordinary. Looking at the dorsal surface of the plucked bird the first impression is that there are no apteria but a closer inspection reveals a few small areas free from contour feathers and brings out the fact that the contour feathers are thickly placed on the main tracts and more sparsely distributed on the intervening spaces. The whole upper surface and sides of head and neck are quite uniformly feathered, somewhat sparsely on the occiput but quite densely on the neck. The fork of the upper cervical tract can be distinguished by its thicker feathering but there is no apterium between its halves or between it and the dorsal tract. There are no apteria either between the dorsal tract and the humerals but the intervening skin is uniformly, though not thickly, covered by contour feathers. The humeral tracts are wide and thickly feathered; just outside them there is, on each wing, an apterium about 25 mm. long by 8 mm. wide, running nearly parallel with the humerus. The mid-dorsal apterium is about 60 mm. long, 4 mm. wide at middle and tapering to each end. It is therefore relatively larger than in Nitzsch's figure of *Columba*, but it is greatly reduced (relatively of course) from the condition shown in the young *Ectopistes*. At the upper end of each femur there is a small apterium about 10 mm. in vertical length by 7 mm. in width. At the side of the pygidium, at the base of the outer rectrices is a still smaller space not quite 6 mm. square. All the rest of the dorsal surface is covered by the contour feathers of the dorsal and femoral tracts. The outer posterior

series of the femoral tract are composed of relatively large closely placed feathers and there are two or three widely separated series of three or four feathers each on the tibia, but one would never suspect the existence at any time of a "pelvic" wing so conspicuous in the young bird. The oil-gland itself is well developed, has the surface free from feathers, and lacks entirely a terminal tuft of small feathers.

Ventrally the apteria are more marked than on the upper side, yet the covering of contour feathers is very extensive. The two halves of the lower cervical tract are still separated by an apterium 4 mm. wide, as in the young bird, but contour feathers are now present on the chin and upper throat, so that they are united at their upper ends. The pterylosis of the neck in *Ectopistes* is thus very different from that shown for *Columba*, in Nitzsch's figure, for there are no lateral cervical apteria in *Ectopistes* and there is no lower cervical apterium in *Columba*. The sternal tracts in the Wild Pigeon cover the sides of the breast clear to the wings, connecting with the humeral tract above and extending far out on the humerus below; there is a small apterium on the side of the breast just beneath the head of the humerus. Posteriorly the sternal tracts run into the femorals on the side and extend upward to merge into the dorsal tract. There is a little triangular apterium, with sides about 8 mm. long, just anterior to the middle of the femoral tract, but excepting this space and the one at the upper end of the femur, the sides of the bird are entirely clothed in contour feathers. The sternals pass without a break or even a notch into the broad but short ventral tracts. These do not reach the anus nor do they meet each other clearly in the midventral line. Posterior to them is a rather large and distinct area, lacking contour feathers, but the lower side of the pygidium is well feathered. The ventral apterium is only 5 or 6 mm. wide over the crop, but becomes 20 mm. wide at the middle of the sternum and is 10 mm. wide on the belly.

The wing shows four well-developed feathers in the alula, ten long primaries and fourteen visible secondaries, but the "fifth" secondary is conspicuous by its absence! The relative length of the primaries is 9, 10, 8, 7, 6, 5, 4, 3, 2, 1. There are twelve rectrices, their relative lengths being 1, 2, 3, 4, 5, 6; i. e. the middle

pair longest, the outer shortest. Rectrix 1 is inserted almost directly above 2 but the others lie in the same plane. There are six major upper coverts on each side, but 6 is quite small and lies close beside 5 above rectrix 5, while covert 1 though large is pushed outward by the position of rectrix 1 and so lies nearly over rectrix 2. There are six major lower coverts but they lie beneath rectrices 2-5; covert 1 is largest and covert 6 is smallest.

The feathering of the lower part of the legs is sparse but continues down on the front of the tarsus 10-12 mm. Posteriorly the feathers do not extend over the joint.

If the above account of the pterylosis of the Wild Pigeon be compared with the account and figures of the pterylosis of the Columbidae given by Nitzsch, it is evident that *Ectopistes* has a distinctive arrangement of its feather tracts, of which the most striking character is their tendency to merge with each other. Comparison of the pterylosis of the adult and young Wild Pigeon reveals the highly interesting and important fact that the nearly uniform feather coat of the adult is not a primitive but a secondary condition, just as is known to be the case with the nearly uniform feathering of the ostrich. Perhaps the usual opinion that a uniform coat of feathers was the original condition from which specialized pterylae have been derived, may prove to be a mistake.