NOTES ON THE OSTEOLOGY OF THE THRUSHES, MIMINÆ, AND WRENS.

BY FREDERIC A. LUCAS.

(With Plate XXXVII.)

The present paper was commenced more than a year ago, but many circumstances have combined to prevent its completion sooner. It was undertaken at the suggestion of Mr. Robert Ridgway, in the hope of throwing a little light on the relations of the *Miminæ*. This peculiarly American subfamily, formerly placed among the Thrushes, has of late found a resting-place with the Wrens, and in the A. O. U. Check List stands at the foot of the family *Troglodytidæ*, *Galeoscoptes* standing last of all. I must at the outset confess that it has been a somewhat difficult matter to select for comparative purposes characters that should be at once well marked and of undeniable taxonomic value. Judging from an examination of many specimens such characters would seem to be found in the shape of the maxillo-palatines, pars plana, costal process, and coracoid. Many bones which might be supposed to offer good points are found untrustworthy when put to the test.

Looking down upon two parallel series of Crania, one of Thrushes and one of Wrens, the first will be found to differ from the second in the much greater breadth of the lachrymal region due to the lateral expansion of the pars plana.

Viewed in the same way the skulls of the *Miminæ* are seen to be intermediate between the two, although the *Miminæ* vary somewhat among themselves; *Harporhynchus*, due allowance being made for its size, having as narrow a skull as the Wrens, while *Galeoscoptes* and *Melanoptila* approach, but do not equal, the Thrushes.

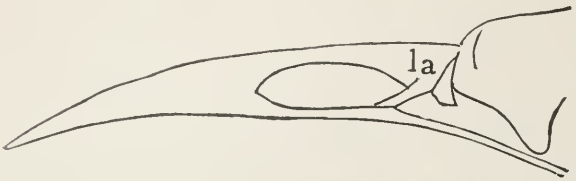
Another very obvious character for comparative purposes is found in the relative width of the external process of the nasal and the angle subtended by this bone and the pars plana. In all the Thrushes examined the external process of the nasal is broad, in all the Wrens and in the *Miminæ* it is narrow. In the Thrushes the angle formed by the nasal and pars plana is very acute, while in the Wrens and Mocking-Thrushes the corresponding angle is more or less open, most so in the Wrens. In these particulars *Galeoscoptes* comes nearer the Thrushes than do its associates.

Aside from the small taxonomic value of the lachrymal it is a most unsatisfactory bone to deal with, not only from its small size but from its delicate texture and the insensible manner in which it merges into the surrounding membrane. This causes the lachrymal to be frequently lost in the preparation of a skull, in spite of the most watchful care, and

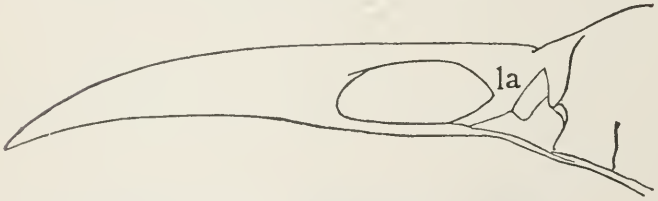
doubtless accounts for the absence of this bone in many of the skulls herein noted.

In *Merula aurantia* and *Turdus mustelinus* the lachrymal has the form and articulation shown in the accompanying figure:

Lachrymal region of *Merula aurantia*.



Lachrymal region of *Campylorhynchus affinis*.



Lachrymal region of *Harporhynchus currirostris*.

The lachrymal of *Harporhynchus* is also better described by the figure than it could possibly be in words. In *Mimus* this little bone is triangular in shape, as in some Wrens, but instead of being wedged in between the pars plana and the nasal, as in those birds, it is attached solely to the nasal. This is also the case with *Galeoscoptes*, and in this respect these two *Miminæ* resemble *Merula aurantia*.

Campylorhynchus affinis and *Salpinctes obsoletus* have a sharp-pointed lachrymal, driven well home between the pars plana and nasal. A most careful examination of *Thyromanes felix* has failed to discover any trace of the lachrymal whatever. Seen from below the greater size of the pars plana in the Thrushes than in the Wrens or *Miminæ* is very apparent. Among the *Miminæ*, *Galeoscoptes* and *Melanoptila* most nearly approach the Thrushes in the size of the pars plana, while between them and the Wrens come *Harporhynchus* and *Mimus*. The prepalatines are slightly wider in the Thrushes than in the *Miminæ* or Wrens, and the transpalatine process is usually blunter in the Thrushes than in the other birds under consideration.

This character can, however, be of but little value, since the process varies in shape even among species very nearly related. *Mimus bahamensis*, for example, differs from its near relations in having a blunt transpalatine very much like *Turdus mustelinus*.

The Wrens, however, agree among themselves in possessing a transpalatine process terminating in a sharp point of the pattern indicated in Plate XXXVII, fig. 1.

Passing to the maxillo-palatines we find these little processes to have the same shape in *Mimus*, *Mimodes*, *Harporhynchus*, *Melanoptila*, and *Oreoscoptes*. This last-named bird I have not examined, but Dr. Shufeldt's description agrees exactly with that of the corresponding process in the other species above mentioned.*

Galeoscoptes differs from the other *Mimina* in the shape of the maxillo-palatines, which conform very nearly in pattern to those of the Thrushes, who agree among themselves in having the maxillo-palatines of the shape shown in Plate XXXVII, Fig. 3.

The Wrens have a very characteristic, slender, and sharply-pointed maxillo-palatine, the shape of which can best be understood by a reference to Plate XXXVII, Fig. 1.

In spite of the fact that *Galeoscoptes* does not agree with the other *Mimina* in the shape of its maxillo-palatines I am inclined to place considerable taxonomic value on this process for the distinguishing of nearly related forms, especially when correlated with other characters.

This surmise should, however, be tested by the examination of a large series of specimens, but in addition to the species noted in this paper I have found that our six species of Swallows have each and all the same shaped maxillo-palatine, while *Micropus apus*, *M. melanoleucus*, *M. subfurcatus*, *Chætura pelasgia*, *Collocalia fuciphaga*, and *Dendrochelidon mystacea* also have their own characteristic maxillo-palatine.

The anterior extremity of the vomer is subject to great specific variation of form, and I have been unable to find that it has, if any, more than an extremely slight taxonomic value.

The shape of the tympanic fossa is even more variable, but the temporal fossa seems to present more tangible characters.

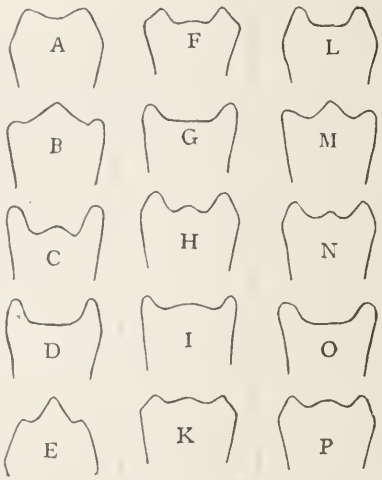
Thus in the Thrushes this fossa is so deep and produced so far backward as to make a very noticeable notch in the contour of the skull when viewed from behind. This notch was least marked in *Turdus musicus*, possibly from the fact that the specimen examined had been a cage bird. In the *Mimina*, and also in the Wrens, the temporal fossa is shallow and not produced backward, thus breaking in but little on the transverse outline of the cranium.

The form of the scapula is so extremely variable that it can furnish at the best specific characters only. As a rule it is more decurved and

* Since this was written Dr. Shufeldt has kindly sent me two specimens of *Oreoscoptes*, which show that the maxillo-palatines have the same shape as those of *Mimus*, etc.

expanded toward the tip in the Wrens than among the Thrushes, yet *Merula aurantia* is in this particular very Wren-like.

Harporhynchus, *Galeoscoptes* and *Melanoptila* have each a graceful scimetar-shaped scapula, *Mimodes* has a rather straight "blade-bone" while *Mimus* has a blunt-tipped scapula.



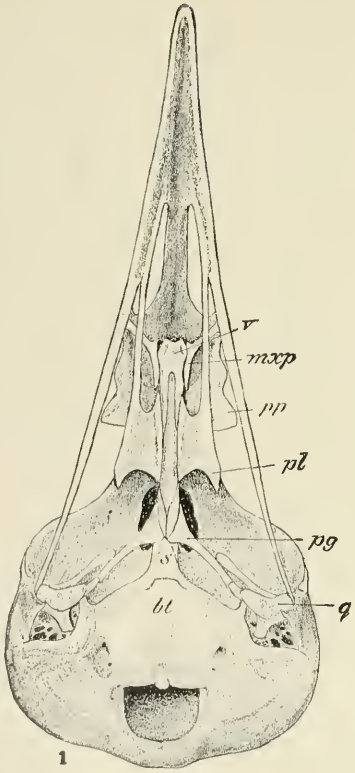
Figures of Vomers.

A.—*Campylorhynchus affinis.*
B.—*Salpinctes obsoletus.*
C.—*Thyromanes felix.*
D.—*Troglodytes ædon parkmani.*
E.—*Telmatodytes palustris.*
F.—*Mimus bahamensis.*
G.—*Galeoscoptes carolinensis.*
H.—*Harporhynchus curvirostris.*
I.—*Mimodes graysoni.*
K.—*Melanoptila glabrirostus.*
L.—*Turdus mustelinus.*
M.—*Turdus fuscescens.*
N—*Turdus swainsoni.*
O.—*Merula migratoria.*
P.—*Turdus musicus.*

The shaft of the coracoid has the same slender, gracefully curved form in all the birds examined, but the extent to which the epicoracoidal portion is developed varies, seemingly having a distinctive form in each of the groups under consideration.

In the Wrens a narrow buttress of bone is carried from the epicoracoid a short distance along the outer edge of the coracoid. In the *Mimine* the width of this buttress is increased, while in the Thrushes it widens into a broad but thin wall of bone running half way or more up the coracoid. *Galeoscoptes* is an exception to the other *Mimine* from the fact that it has the wide coracoidal buttress of a Thrush, while on the other hand *Melanoptila* has the narrow flange of a Wren.

The shape of the costal process of the sternum seems to be a fairly good character for comparative purposes, being one that shows little, if any, specific variation. Taken by itself the shape of the costal process would be of comparatively little value, but taken in connection with



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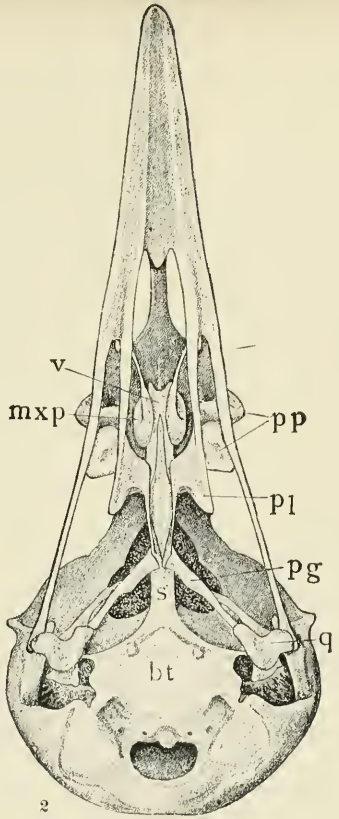

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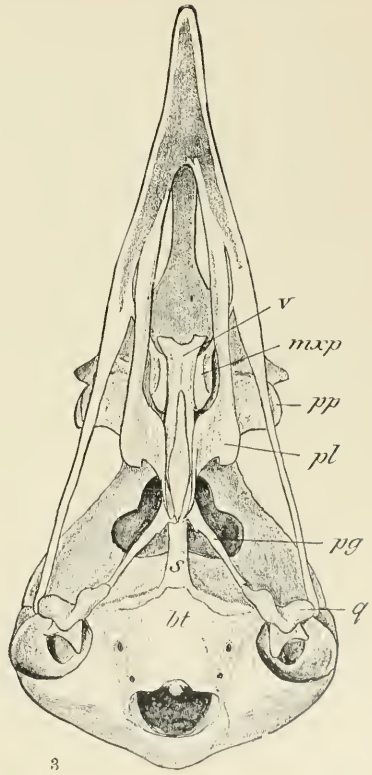

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OSTEOLOGY OF THRUSHES, MIMINÆ, AND WRENS. (Page 173.)

1. *Campylorhynchus affinis.* 2. *Harporhynchus curvirostris.* 3. *Merula migratoria.*

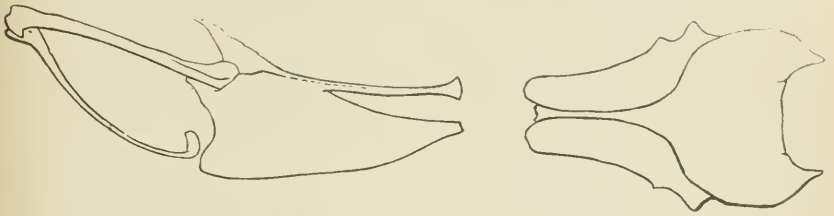
(*v*, vomer; *mxp*, maxillo palatine; *pp*, pars plana; *pl*, palatine; *pg*, pterygoid; *q*, quadrate; *s*, sphenoidal rostrum; *bt*, basi-temporal.)

other characters it becomes important, as it is by certain combinations of characters, rather than by the presence or absence of any one or two, that groups of birds must be divided one from another.

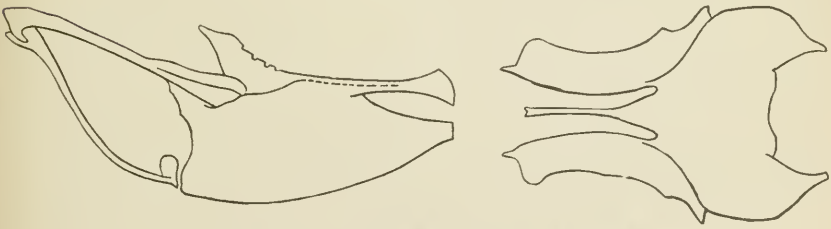
In the Wrens the costal process is slender and so acuminate as to be almost of needle-like sharpness, while in the Thrushes it is large, blunt, and roughly rhomboidal in shape, although varying slightly in different species.

Turdus mustelinus has the largest costal process among the Thrushes, not being equaled in this respect by *T. swainsoni* or *T. fuscescens*. The *Mimina* are intermediate as regards the shape and size of the costal process between the Thrushes and Wrens.

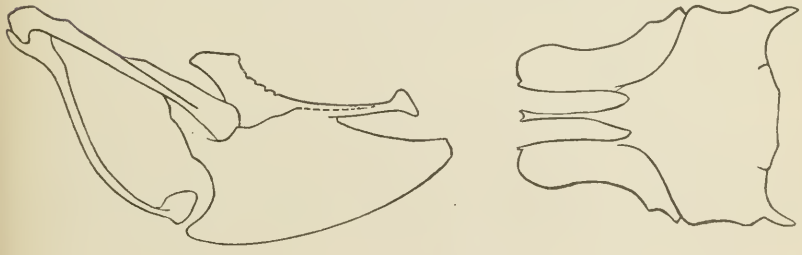
The Wrens have the manubrium a little less deeply cleft than the members of the two other groups under consideration, while the notches in the posterior margin of the sternum are deeper.



Sternum and pelvis of *Campylorhynchus affinis*.



Sternum and pelvis of *Harporhynchus curvirostris*.



Sternum and pelvis of *Merula migratoria*.

The sternum is viewed obliquely in order to better show the costal process.

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The pelvis is subject to considerable specific variation, although offering some fairly good points for comparative purposes. In general terms the pelvis in the Thrushes may be said to be short and wide, the width especially noticeable when the pelvis is viewed from behind.

The ilia are short, anteriorly wide, with their transverse axes but little inclined from the horizontal.

In the Wrens the pelvis has a slightly compressed appearance, this being due to the fact that the ilia are rather elongate and narrow, with their transverse axes inclined at a considerable angle from the horizontal. To use a familar simile the ilia of the Thrushes form a rather flat roof, the backbone representing the ridgepole, while the ilia of the Wrens form a roof having a great deal of pitch to it. In the shape of the ilia and general appearance of the pelvis the *Mimina* are thoroughly Wren-like. The posterior iliac border exhibits great variety of shape, and while *Merula migratoria*, *Harporhynchus curvirostris* and *Salpinctes obsoletus* have what may perhaps be called the typical patterns of their respective groups, yet no one pattern is quite constant.

The posterior iliac border of *Turdus musicus* and *T. mustelinus* bears more resemblance to that of *Harporhynchus* than to that of either *Merula migratoria* or *M. aurantia*. *Mimus* fits in very nicely between *Galeoscoptes* and *Turdus mustelinus*. *Thyromanes* is not very dissimilar to *T. mustelinus*, and *Melanoptila* is in this particular even more like *T. mustelinus*. The ilio-neural groove is open in all the birds under consideration with the exception of *Campylorhynchus* in which the ilia touch and become anchylosed with the spinous processes. This character, if it can be called one, is greatly affected by age, and its taxonomic value is even more than doubtful.

The last two pre-sacrals are shorter, and their transverse processes consequently nearer together in the Thrushes than in the *Mimina* or Wrens, this difference being very perceptible when the *Mimina* and Thrushes are compared with one another. In the Thrushes there is a very noticeable ridge or keel along the under side of those pre-sacrals which are fused with the "sacral mass," a feature that is either very slightly marked or altogether wanting in the *Mimina* and Wrens.

The distinctive characters of the groups thus briefly dwelt upon may be summed up as follows:

Wrens.—Ante-orbital region narrow. Descending process of nasal slender. Angle formed by this process and "pars plana" rather open. Maxillo-palatines acuminate posteriorly. Costal process of sternum small, acuminate. Coracoid with a short flange on the epicoracoidal portion. Pelvis anteriorly narrow, with the ilia much inclined from the horizontal.

Mimina.—Ante-orbital region narrow. Descending process of nasal narrow. Angle subtended by this process and "pars plana" rather acute. Maxillo-palatines claviform (except *Galeoscoptes*). Costal process moderate in size, somewhat acuminate. Coracoid with a moderate

flange on epicoracoidal portion; pelvis rather compressed, with ilia inclined from the horizontal.

Thrushes.—Ante-orbital region wide. Descending process of nasal wide. Angle formed by this process and "pars plana" acute. Maxillo-palatines of a modified claviform shape. (See Plate XXXVII, Fig. 3.) Costal process of sternum large, blunt, rhomboided in outline. Coracoid with a wide flange running half way up the shaft. Pelvis broad, flattened.

From these brief notes it will be seen that the *Mimina* hold a somewhat intermediate position between the Wrens and Thrushes, and if the characters described are of sufficient value to be considered *family* characters (which is extremely doubtful) each of the groups under consideration seems to have equal rights in that respect.

The Wrens, as represented by the species in hand, form a harmonious group, agreeing very closely with one another in their osteology, and presenting some well-marked distinctive characters.

The Thrushes also, when compared with the Wrens, present well-defined characters, and while differing among themselves more than do the Wrens, these differences are nevertheless very slight.

Aside from *Galeoscoptes* the *Mimina* are fairly well marked, having a very characteristic shape to the maxillo palatine process. This maxillo-palatine is so entirely different from that of the Wrens that from what little experience I have had I should hesitate to unite two groups so dissimilar in this respect. On the other hand, *Galeoscoptes* has such decided leanings toward the Thrushes, not only in its skull, but in other portions of the skeleton, that it would seem to connect them with the *Mimina*. Be this as it may, *Galeoscoptes* is certainly nearer to the Thrushes than any other member of its group, while *Harporhynchus* seems to be the farthest removed.

Since the foregoing pages were written I have, by the kindness of Dr. Edgar A. Mearns, U. S. Army, received specimens of *Oreoscoptes montanus* and the rare *Harporhynchus crissalis*.

Oreoscoptes follows naturally after *Galeoscoptes*, but has the Mimine maxillo-palatine unmodified. *Harporhynchus crissalis* is interesting from the fact that its pelvis very much resembles that of *Campylorhynchus*, being much contracted anteriorly. It is in this respect quite different from *H. curvirostris*. *H. crissalis* appears to be specially modified for a terrestrial mode of life. The wings and shoulder girdle are quite feeble, the wing being of the same length as that of *Oreoscoptes*, while the sternum is not so deeply keeled. The narrowness and rugosity of the pelvis, together with the robust character of the leg bones, indicates good running powers. The hypapophyses of the last cervicals and anterior three dorsals are unusually well developed.

It was intended that *Chamæa* should have been included in this paper, but at the time no specimen was available. While this paper has been

in the hands of the printer, however, there has been opportunity for the accumulation and study of more material, and among other species has been *Chamæa*. As Dr. Shufeldt has been collecting material with the view of making a special study of this form, I will simply say that Chamæa appears most decidedly to belong with the Wrens and not with the Titmice.

Certhia also, judged from its osteology, should be placed with the Wrens, while on the other hand it seems more and more clear that the *Mimina* should not be included in the very sharply-defined family *Troglodytidæ*.