

ANATOMICAL NOTES ON SOME GENERA OF PASSERINE
BIRDS.

BY HUBERT LYMAN CLARK.

THERE are many genera of Passerine birds, the relationships of which are still more or less uncertain, largely owing to our lack of knowledge of their anatomy. Thanks to the kindness of Mr. Outram Bangs, and his interest in having our knowledge along these lines extended, some alcoholic material has already been placed in my hands and more is promised, which will enable me to study the anatomy of some of these genera of doubtful affinity. Through the kindness of Dr. C. W. Richmond and the authorities of the United States National Museum, to whom I here express my hearty thanks, representatives of the three following genera have been sent me, and I venture to present here the results of my studies. Such studies can only be carried on with profit, where large collections of skins and alcoholic birds are accessible for comparison, and I am therefore indebted to Mr. Henshaw and Mr. Bangs for the freedom with which I have been permitted to use the collections in the Museum of Comparative Zoölogy.

SALTATOR.

An adult male specimen of *Saltator atriceps* Lesson, from Mexico, lacking wing and tail feathers, but otherwise in good condition, preserved in alcohol, has been carefully studied in comparison with *Pipilo* and *Piranga*. The characters of the bill and feet of *Saltator* are too well known to need any comment from me, while the tongue shows no distinctive character. It is so similar to that of *Pipilo* that the only difference is its slightly greater fleshiness.

Pterylosis. The general pterylosis of *Saltator* is like that of most oscinine birds and reveals no really distinctive feature. The upper cervical tract is long and narrow, only three feathers wide for most of its length, but the dorsal tract has the usual rhomboidal form. Other specimens show that the wing is pointed by the sixth primary, which is nearly equalled by the fifth and

seventh; the fourth is longer than the eighth which is about equal to the third; the second is longer than the ninth which may be either longer or shorter than the first. This arrangement of the primaries is quite different from that shown by *Piranga* but is almost exactly like that found in *Pipilo erythrophthalmus*. The tail is very much graduated and is made up of 12 soft, broad rectrices.

Alimentary Canal. No notable characters are shown by the intestine or stomach, which are not distinguishable from those of *Pipilo*. The intestine measures about 225 mm. in length, or rather less than the total length of the bird, but one and a half times the length of the bird, if the rectrices are not included. The stomach contained seeds and the pit of a small, cherry-like fruit, as well as much undetermined vegetable matter; no insects were noted.

Palatine Region. The palatine processes are long and conspicuous as in the finches and tanagers generally. There is a well-developed "secondary palatine process" on each side much as in *Habia*, although not so long or conspicuous as in that genus. They are rather better developed than in *Piranga*. The maxillo-palatines are not peculiar.

Sternum. There is no trace of an 'osseous bridge' from the anterior margin of the sternum to the manubrium, such as occurs in *Piranga* and *Rhodinocichla*. Back of the anterior margin which is vertically very much thickened there is a bony roof over the small space contained between the anterior margin and the sloping sides of the sternal floor. This bony roof is present in many finches and tanagers but shows great diversity in its extent and appearance. In *Saltator*, it is perforated by a conspicuous, circular, median foramen, posterior to which is a second much smaller opening. There are no openings in this bony roof in *Pipilo* but in *Habia*, there are two as in *Saltator* although they are very much smaller than in that species. In *Piranga*, there are, in the male, two very large foramina side by side and a smaller opening may be seen in the posterior face of the anterior margin; in the female, the large foramina seem to be wanting. Whether this bony roof and these foramina have any special significance I am not prepared to say, but their appearance in *Piranga* (male), *Habia* and *Saltator* is striking.

Conclusions. The resemblance of *Saltator* to *Pipilo* in its ana-

tomical features is striking, while in two details (secondary palatine process and foramen in osseous roof above sternum) in which it differs from that genus it resembles *Habia*. It lacks the 'osseous bridge' of the sternal manubrium so marked in *Piranga* and *Rhodinocichla*. It seems to me therefore that Ridgway is right in placing *Saltator* in the *Fringillidæ*.

CHLOROPHONIA.

An adult male of *Chlorophonia callophrys* (Cabanis) from Costa Rica has been at my disposal. It has been compared chiefly with *Piranga* and *Euphonia*. Unfortunately alcoholic specimens of other *Tanagridæ* have not been available, excepting *Rhodinocichla*. The characters of the bill and tongue need no comments from me but the tarsi show a certain character which does not seem to have been noted hitherto.

Tarsus. Examination of the alcoholic specimen revealed the interesting fact that the tarsi are distinctly booted. The three scales which usually cover the front of the tarsus in tanagers are fused together so that there is hardly a trace of the lines of division. On noting this fact, I examined a large number of skins of *Chlorophonia* (5 species), *Pyrrhuphonia*, and *Euphonia* (10 species) and several genera of more typical tanagers, with the result, which was surprising to me, that a booted tarsus, as perfect as that of a thrush, is by no means rare among these tanagrine birds. I find it occurs in *Pyrrhuphonia* constantly in both sexes and may well be considered one of the generic characters. It is also fairly constant in *Chlorophonia callophrys*, *longipennis*, *viridis*, *frontalis psittacina*, and *occipitalis* but is less frequent in typical *frontalis* and in *pretri*. In all these cases adult males generally have the tarsus booted, but in the females as a rule, and in the young the divisions between the scutes are still to be seen. In *Euphonia affinis*, both sexes are, as a rule, booted but in most species of the genus, the scutes on the front of the tarsus are quite distinct. Booted tarsi are also found, at least in adult males of *Calospiza*, *Pœcilothraupis*, *Hemithraupis*, *Chlorospingus* and *Mitrospingus*. Very probably they will be found in other genera and their occurrence throughout the *Tanagridæ* deserves detailed investigation.

Pterylosis. The general pterylosis of *Chlorophonia* deserves comment because of the noticeable width of the tracts and the density of their feathering. This is particularly true of the upper cervical tract. The dorsal tract ('saddle') is not as broadly rhombic as in most oscines but the outer angles are rounded. The posterior end of the 'saddle' is almost completely separated from the remainder of the dorsal tract, which is at first narrow and with few feathers but becomes broad and well-feathered at the oil-gland. The sternal tracts are abruptly contracted where they pass into the ventrals. There are nine primaries and nine secondaries in the wing; the sixth, seventh and eighth primaries are nearly equal, the seventh a trifle the longest perhaps; the ninth is next, with the fifth, fourth, third, second and first in regular succession. There are twelve rectrices of approximately equal length, though the outer ones are of course (since the tail is nearly square-cut) really the longest.

Alimentary Canal. The stomach is small but quite distinct. One can distinguish a proventriculus about six mm. long and a gizzard of about the same length. The latter has thin walls but the inner surface is hard and corrugated, so there is no reason for refusing to call it a gizzard. Forbes states (P. Z. S. London, 1880, p. 145) that in *Chlorophonia viridis* there is "the same non-development of a gizzard" as in *Euphonia*. It is curious that there should be a noticeable difference on this point within the limits of a single genus, but certainly in *Chlorophonia callophrys* the gizzard is far better developed than in *Euphonia*. The intestine in *Chlorophonia* is extraordinarily long; in the specimen before me it measures 340 mm. or more than $2\frac{1}{2}$ times the total length of the bird. Naturally in its arrangement within the body cavity we find two more folds than is usual among tanagers. The stomach contains seeds and indeterminate vegetable matter and remains of at least one insect.

Palatine Region. The bony palate is remarkable for the very short palatine processes. They are as short and blunt or rounded as in many Mniotiltidæ, so that the palate is not at all tanagrine in appearance. There is no secondary palatine process and the maxillo-palatine bones show no peculiarities. The vomer is noticeably broad and thick, with the anterior margin not deeply notched.

Sternum. There is no trace of the osseous bridge nor of foramina

in the bony roof of the space back of the anterior margin of the sternum. In all particulars, the sternum appears to be typically fringilline.

Conclusions. The details of anatomy here given throw very little light on the affinities of Chlorophonia but there is no special relationship to the tanagers shown. The palatine structure and the peculiarities of the alimentary canal both tend to separate it from that group.

EUPHONIA.

An adult male of *Euphonia minuta* from Costa Rica has been available for study and comparisons have been made chiefly with Chlorophonia. The bill and feet need no discussion here; the character of the tarsal covering in Euphonia has been described above under Chlorophonia.

Tongue. The tongue of Euphonia is strikingly different from that of Chlorophonia or any of the tanagrine birds I have examined and resembles that of some of the Cœrebidæ. It is almost tubular, the sides being rolled inward but not quite meeting. The tip is brushy.

Pterylosis. The general plan of the pterylosis is not peculiar. The dorsal saddle is more nearly rhombic than in Chlorophonia and the other tracts are not so broad nor so densely feathered as in that genus. The arrangement of the nine primaries is essentially the same, but the eighth is slightly the longest and the ninth is a trifle longer than the sixth. There are twelve nearly equal rectrices.

Alimentary Canal. The genus Euphonia has long been noted for the apparent absence of a stomach. The specimen at hand does not seem to differ essentially from the one figured by Forbes (l. c.). The intestine is very long, about 180 mm., or twice the total length of the bird, and is much convoluted, as in Chlorophonia.

Palatine Region. The palate of Euphonia has been figured by Parker (Trans. Zool. Soc. London, vol. 10, pl. 46, fig. 3) and the specimen before me agrees well with that figure except for the apparent absence of maxillo-palatines. Parker indicates these bones rather indefinitely and I have found nothing that seems to

me to correspond with them. The palatine processes are remarkably long and pointed, a very characteristic feature of the skull and strikingly different from the condition found in Chlorophonia. The vomer is deeply divided anteriorly as Parker has shown and thus is quite different from that of Chlorophonia.

Sternum. The sternum shows none of the tanagrine peculiarities of Piranga but is almost exactly similar to that of Chlorophonia.

Conclusions. The differences between Euphonia and Chlorophonia in the tongue and palate are so marked as to make one hesitate before asserting that the two genera are nearly allied. Differences in the alimentary canal and in the feet also, may not be ignored. In all of these features Euphonia approaches some of the Cerebidæ and the possibility of its relationship to some members of that family should not be ignored. It is however possible that *Euphonia minuta* is not representative of the genus and that some other species may show more tanagrine affinities.

GENERAL NOTES.

Holboëll's Grebe in Concord, Mass.— On December 15, 1912, Bateman's Pond froze over with black ice, but a thaw and rain resulted on the 17th in covering the ice with nearly an inch of water. During the moonlight night that followed a Holboëll's Grebe (*Colymbus holboëlli*) attempted to light in the pond and I believe settling on the ice and was unable again to take wing. On the following morning, it having turned cold during the night, the bird was found with its breast feathers frozen in the ice. The wrists of its wings were badly lacerated by beating against the ice to free itself, but in other respects the bird was uninjured. After much piteous squawking, its feathers were cut from the ice and the bird liberated. Its wings, however, were injured so badly that it was killed and is now preserved in this Museum.— R. HEBER HOWE, Jr., *Thoreau Museum, Concord, Mass.*

Additional Notes on the Harlequin Duck in Wyoming.— In 'The Auk' for January, 1913, pp. 106-107, I recorded two male specimens of the Harlequin Duck which I saw at Teton Lodge (Moran Post Office), in Jackson Hole last September, and which were supposed to have been