

of some forms of fulmars, from the northern Atlantic and Pacific oceans. . . . We have other examples of dichromatism in the same group, as the dark and white forms of *Ossifraga gigantea*; and Mr. Ridgway's suggestion that it will be found more [or less] extensively all through the superfamily of Tubinares or Procellaroideæ, is well worth consideration.'

As to other questions involved, their further discussion by me is unnecessary, and the valuable space which would thus be sacrificed can easily be filled much more acceptably to the readers of 'The Auk.'—ROBERT RIDGWAY.]

Dr. Shufeldt on the Osteology of the Trochilidæ, Caprimulgidæ, and Cypselidæ.*—In the present paper, Dr. Shufeldt treats of three of the most interesting families of birds, anatomically speaking. He gives very detailed descriptions of the bones of *Trochilus alexandri*, several *Chordeilæ*, and *Phalænoptilus nuttalli*, as well as *Panyptila saxatilis*, accompanied by finely executed plates, for which working anatomists who have no access to the forms mentioned, will be very thankful. It can not be our intention, in the present connection, to examine into the general correctness of the descriptions, which may be taken for granted until disproved, but we are obliged to say that Mr. Frederic A. Lucas, the osteologist of the National Museum, Washington (who is also the original source of the information contained in a note in 'Science,' 1886, p. 572), has called our attention to the fact that Dr. Shufeldt in describing and figuring the forelimbs of *Trochilus*, has transposed the humeri of the two sides, and described and figured the right humerus in place of the left one, which seems quite obvious from an inspection of pl. lxi, fig. 3½ as compared with the corresponding part of fig. 4. The great difference which Dr. Shufeldt found in the form of this bone in Micropodidæ (= Cypselidæ) and Trochilidæ is thus easily accounted for and reduced to very little indeed.

But more interesting to ornithologists in general are his 'Conclusions' which sum up the results of his comparisons of the three families. He first confirms the correctness of the view held by a great many ornithologists and anatomists (*ex. gr.*, W. K. Parker, Newton, Nitzsch, Garrod, Forbes, etc.), that the Caprimulgi are not very closely related to the Cypseli or Trochili, and should be removed from the 'order' Macrochires. It is very interesting to remark that Nitzsch, in establishing this term, only included therein *Cypselus* and *Trochilus*, while *Caprimulgus* and its allies were kept in a group by themselves. It is not probable that the separation of the Goatsuckers from the other two groups will be seriously challenged. Not so, however, Dr. Shufeldt's conclusion, that the relationship of Cypseli and Trochili is equally remote, and that "with the exception of a few minor points in their organization, the Swifts are essentially

* Contribution to the Comparative Osteology of the Trochilidæ, Caprimulgidæ, and Cypselidæ. By R. W. Shufeldt, M.D. < Pr. Zool. Soc. London, 1885, pp. 886-915 + pll. lviii-lxi.

modified Swallows, and, as the family Cypselidæ, they belong in the order Passeres, next to that group." Here we must enter a most decided protest, quoting, as we do, Prof. W. K. Parker, perhaps the most competent anatomist living. He says of the Swallow*: "In this remarkable group of tender-billed Passerines, there is not, as far as I am aware, a single aberrant character of importance. The skull, the skeleton generally, the digestive and the vocal organs, — all these might belong to species of the genus *Sylvia*. And yet, in minor adaptive modifications (I say *minor* in reference to what is of importance in morphology), these birds are full of modifications, and to the unscientific eye they appear to belong to the kind of the Swifts, and not to the kind of the ordinary Warblers. The Swifts, however, lie on the extreme margin of the Coracomorphæ, and form another group, which leads to the Goatsuckers; but the Swallows have retained (or gained) that perfect *syrix* which is the sign and the seal of their right to the title 'Oscines.'" And of the Swifts he says (op. cit., p. 295): "Although the border of the Swifts falls to them close on that 'topland' of the Passerines where the Swallows congregate, yet are these conterminous groups only 'second cousins,' and more alike in their habits and mode of dress than in their real nature. . . . Now a Swift, as to his skull and face, is merely an exaggerated Swallow, an *ultra-hirundine* bird, a caricature, as it were, of the true Passerine gaping birds. In the skeleton he comes close to the Humming-bird; in the huge disproportion in length of the *arm* to the *hand* even the Swallow begins to be very *Cypseline*; but the Swift and the Humming-bird are here as one. So also, are they in the sternum and shoulder-girdle; the Swift also has lost the 'cæca coli,' and has not developed any intrinsic muscles to the *syrix*."

Is it possible that Dr. Shufeldt has overlooked the *many* points in which Swallows and Swifts disagree outside of the skeleton? It may be well to enumerate some of the most salient features, and for that reason we introduce the following brief statement from the 'Standard Natural History,' IV (1885), p. 437: "Externally they may be easily distinguished; the Swifts by having ten primaries, not more than seven secondaries, and only ten tail-feathers; while the Swallows have but nine primaries, at least nine secondaries, and twelve tail-feathers. The Swifts have also the dorsal track bifurcate between the shoulders, while in the Swallows it is simple. Internally they differ in a great number of points, but we shall only mention that the Swifts have a sternum, while the Swallows have the manubrium bifurcate, and the posterior border deeply two-notched; the former have a myological formula $A \frac{1}{2}$, the latter $A X Y \frac{1}{2}$; the former are synpelmous, the latter are schizopelmous; the former have a peculiar arrangement of the tensor patagii brevis, the latter have the general arrangement of the Passeres; the former have a simple *syrix* without intrinsic muscles, the latter have a very specialized *syrix*; the former are without cæca, the Swallows possess them, etc., the total effect being that the Swifts are Picarians and the Swallows are Passeres."

* Trans. Zool. Soc. London, X, 1878, p. 293.

Dr. Shufeldt explains the similarities in the skeletons of Swifts and Hummers by saying that "such similarities are due to physiological adaptation of structure, referable in the present instance to the peculiar flight of these birds, and the consequent requirements of the muscles involved in it." But what differences are there in the Swifts' flight from that of the Swallows' that should have caused such a remarkable modification towards the Hummingbirds? And are not the Swallows' and the Swifts' flight more similar *inter se* than that of either one to the Hummers? How is it then that the wings of Swifts and Hummers are more alike, even in the shape of the humerus and its processes?

Finally we take the liberty to introduce a scheme of the Picarians which we prepared last year for the bird-volume of the 'Standard Natural History.' The order Picariæ is quite polymorphic, but, after all, we do not regard it as so extremely unnatural. Some few forms may have to be eliminated, but until it be shown that these have had an ancestry different from the common stock from which most of them have sprung we consider it as consisting of the following super-families:

Homalagonatus; desmopelmaus;		<i>Cuculoideæ</i>	} dorsal tract furcate between the shoulders.
		<i>Coracioideæ</i>	
Anomalogonatus.	X enters into the myological formula.	synpelmous	} feet pamprodactylous } dorsal tract simple between the shoulders.
		schizopelmous; antipelmous; heteropelmous; A alone constitutes the myological formula.	<i>Alcedinoideæ</i> ; dorsal tract furcate between the shoulders.
			<i>Upupoideæ</i> ; dorsal tract furcate between the shoulders.
			<i>Picoideæ</i> ; zygodactylous . . . } dorsal tract simple between the shoulders.
	<i>Trogonoideæ</i> ; heterodactylous } or } pamprodactylous } anisodactylous }		

We remark that the Goatsuckers are referred to the super-family *Coracioideæ*, consequently far from the Cypseli and Trochili, which we include in the super-family *Micropodoideæ*.

In the mean time, we are always thankful for the contributions of Dr. Shufeldt, and we learn with great satisfaction that it is his intention to take up the Trogons next. But we must warn against conclusions solely drawn from osteological characters, and in the present order, especially against such ones as are based chiefly in the features of the bony palate. A natural system cannot be based upon one single set of characters; all will have to be carefully considered, whether they are external or internal, before we can hope to understand the true relationship of the different groups.—L. S.

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