

is abundant, to preserve some at once by mounting in Canada balsam upon glass slides for microscopic study. Suggestions in this line have been made in a recent article in the 'American Monthly Microscopical Journal.'

Very respectfully,

HERBERT OSBORN.

Agricultural College, Ames, Iowa.

Notes on the Steganopodes, and on Fossil Birds' Eggs.

TO THE EDITORS OF 'THE AUK':—

Dear Sirs:—Through the courtesy of the United States National Museum I have been permitted to examine their entire series of skeletons representing all the North American representatives of the Steganopodes. This material I have also compared with osteological preparations of steganopodous birds in my own collection, and with those from other parts of the world. My comparative studies of this remarkably fine series convinces me that this group, in so far as their skeletology seems to indicate, may be arrayed as a fairly natural SUBORDER of birds, for which the name STEGANOPODES may be retained. Upon again dividing them they would appear to fall into at least three superfamilies, and an entire taxonomical scheme, to include so far as the genera only, would stand as follows:—

| SUBORDER. | SUPERFAMILIES. | FAMILIES. | GENERA. | |
|--------------|----------------|----------------|---|---|
| STEGANOPODES | { | Pelecanoidea | { Pelecanidæ. Phalacrocoracidæ. Anhingidæ. Sulidæ. | <i>Pelecanus.</i> <i>Phalacrocorax.</i> <i>Anhinga.</i> <i>Sula.</i> |
| | | Phaëthontoidea | Phaëthontidæ. | <i>Phaëthon.</i> |
| | | Fregatoidea. | Fregatidæ. | <i>Fregata.</i> |

In the 'Proceedings' of the Zoölogical Society of London for this year (1894, p. 160) I published a brief article 'On the Affinities of the Steganopodes,' wherein there was set forth a classificatory scheme for this group, but unfortunately it contained an error that made it appear that the genera *Pelecanus*, *Phalacrocorax*, *Anhinga*, and *Sula* all belonged to the family *Pelecanidæ*, which of course is a proposition that would not be entertained for a moment by any thinking avian taxonomer. There are no better defined families anywhere in ornithology than the Pelicans, the Comorants, the Anhingas, and the Gannets. Of the Pelecanoidea, the two most closely related families are the Phalacrocoracidæ and the Anhingidæ, while the next most evident fact is the less close affinity existing between the Comorants and the Sulidæ. *Pelecanus* is an aberrant genus having varying relations with all the other three remaining families of the Pelecanoidea. From this last-named superfamily we are led to the Phaëthontoidea through the Sulidæ, and especially through

the great similarity of a number of the skeletal characters as seen in *Sula brewsteri* as compared with the corresponding ones of the genus *Phaëthon*.

Again, in some osteological particulars *Phaëthon* links the Steganopodes with the Longipennes on the one hand, and with the Tubinares on the other. There are many suggestive "gull characters" in the skeleton of *Phaëthon flavirostris*, and even more that suggest to us the skeleton as seen in *Puffinus*.

Of the three superfamilies given in my scheme above, the most unique and best defined one is the Fregatoidea. The pelvis in *Fregata* is more like the pelvis in *Phaëthon* than it is like that bone in any of the other steganopodous types, but the strangest fact is the very close resemblance, both superficial and real, its skull has to the skull of a typical Albatross,—as for example that of *Diomedea albatrus*. In my P. Z. S. article I pointed out a number of these characters, but in another account not as yet published, I have written out a very full comparative description of the skeleton of *Fregata* which will appear in due course.

Passing now to another matter I would invite your attention to another paper recently published by the present writer, and I refer to my 'Comparative Oölogy of North American Birds' which appeared in the Report of the U. S. National Museum for 1892. On page 461 of that memoir I remark that I am "not aware of the discovery of the eggs of any of the now extinct forms of reptiles, either fossil or subfossil, and it is beyond all probability that we will ever know what the eggs of *Archæopteryx*, or any of the toothed birds of the Kansas Cretaceous Beds (*Hesperornis*, *Ichthyornis*, and others), or, indeed, any of the smaller extinct types of Aves, looked like." This opinion I believe to be quite general, or at least it is by no means a well-known fact that specimens of fossil eggs of both reptiles and birds have been found and now exist in certain collections. I was among the number standing in ignorance of that fact when I published my above-named memoir, but since then, through the kindness of Mr. F. A. Lucas of the U. S. National Museum, I have been shown in the palæontological collections of that institution, very perfect specimens of thoroughly fossilized eggs of a small turtle, probably an *Emys*, also fairly good specimens of fossilized birds' eggs (*Larus*, or of some allied type?).

All these specimens are from the Paris Basin, and were received from the distinguished French savant, M. Alphonse Milne-Edwards. The birds' eggs, which interest us here, consist of a subfossilized, more or less broken shell, of a dull gray color, which closely overlays the solid fossil infiltrated matter that fills up in each case the egg cavity. Those I examined show no evidence of markings of any kind on the surface of the shell, which is no more than what we would expect. With such specimens as these before me, I can now easily believe that it lays quite within the range of possibility for us some day to find in the Kansas Cretaceous Beds fossilized eggs of the extinct toothed birds above named.

Indeed, that cretaceous formation, it would seem to me, would afford the very best conditions for the preservation of such objects.

Captain Bendire has shown me a very beautiful specimen of a fossil egg of a turtle (*Emys*) that he personally collected. It is from the Cretaceous, and the fossilized remains of the turtle were found with it. He also showed me a fine fossil bird's egg, probably a *Sula*, found 42 ft. below the surface of a guano deposit on the Island of Lobos de Tierra, coast of Peru, and which has been estimated by the Peruvian scientists to be a thousand years old.

I reiterate my belief here that it is very likely that the eggs of all the early ancestral types of birds were plain white and without markings of any kind. When I say this I do not mean to include of course the more immediate ancestral types of modern birds, though it is probable that many of them laid pure white eggs, but rather those avian or reptilo-avian forms belonging to still earlier geologic periods, as for example such a horizon as the one in which *Hesperornis* and its contemporaries are found, or perhaps even still a little later, as those of the early part of the Tertiary age.

Very respectfully,

R. W. SHUFELDT.

Takoma, D. C.,
25 July, 1894.

NOTES AND NEWS.

THE TWELFTH CONGRESS of the American Ornithologists' Union will be held at the American Museum of Natural History in New York City, beginning Monday, Nov. 12, 1894, with the meeting of the Council and the business meeting for the election of officers and members and the transaction of the usual routine business. Tuesday and following days will be given to public sessions for the reading and discussion of scientific papers. Members intending to present papers are requested to forward the titles of their papers to the Secretary, Mr. John H. Sage, Portland, Conn., prior to Nov. 7, in order to facilitate the preparation of the program of papers to be read before the Congress.

MR. SAMUEL N. RHOADS of Haddonfield, New Jersey, has just published his 'Reprint of the North American Zoölogy, by George Ord,' announced some months since (see *Auk*, XI, p. 190) as in preparation. It forms an octavo volume of nearly 200 pages, relating about equally to mammals and birds. The work comes too late for formal review in the present number of 'The Auk.'