

THE AGE OF THE SUPPOSED CRETACEOUS  
BIRDS FROM NEW JERSEY.

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AMONG the fossil birds of the North American list considerable interest has attached to a number of species named by Marsh many years ago from specimens obtained in the marl pits of New Jersey from what have long been supposed to be deposits of Cretaceous age. A recent paper by C. Wythe Cooke and Lloyd W. Stephenson<sup>1</sup> shows that part of the New Jersey marl deposits formerly considered Upper Cretaceous, namely the Hornerstown Marl, the Vincentown Sand, and the Manasquan Marl, in reality belong in the Eocene. The Navesink marl remains in the Cretaceous. In view of this information it is of importance to determine the strata from which the birds named by Marsh were obtained since on this will rest decision as to whether they are to be considered of Upper Cretaceous or of Eocene Age. In this matter the writer has been assisted by Dr. Cooke and Dr. Stephenson, and by Dr. Henry B. Kummel, State Geologist of New Jersey, to whom thanks are due for information supplied that would not otherwise have been available. The species of birds concerned will now be considered in detail.

*Graculavus velox* Marsh<sup>2</sup> in the original description is said to have been "found by John G. Meirs, Esq., at Hornerstown, New Jersey, in the greensand of the upper Cretaceous." From information obtained from an account by Dr. G. R. Mansfield<sup>3</sup> it appears that the marl pits worked many years ago near Hornerstown were in the Hornerstown marl, indicating that the specimen on which Marsh based his *Graculavus velox* came from these beds. As these have been shown to be of Eocene age then this bird is to be listed from the Eocene instead of the Upper Cretaceous as formerly.

To continue with other species from this locality *Graculavus*

<sup>1</sup> The Eocene age of the supposed late Upper Cretaceous greensand marls of New Jersey, Journ. Geol., vol. 36, February-March, 1928, pp. 139-148, 2 tables.

<sup>2</sup> *Graculavus velox* Marsh, Amer. Journ. Sci., ser. 3, vol. 3, 1872, p. 363.

<sup>3</sup> Potash in the Greensands of New Jersey, U. S. Geol. Surv. Bull. 727, 1922, pp. 93-94, pl. 2.

*pumilus* Marsh<sup>1</sup> is said to come "from the same locality and geological horizon as the preceding [i. e. *Graculavus velox*], x x x also discovered by John G. Meirs, Esq."

The type of *Telmatornis priscus* Marsh<sup>2</sup> was "found in the Cretaceous greensand of the middle marl bed, in pits of the Cream Ridge Marl Company, near Hornerstown, New Jersey." Of *Telmatornis affinis* Marsh<sup>3</sup> it is said in the original description that "these remains, also, were found by John G. Meirs, Esq., near Hornerstown, New Jersey, and by him presented to Yale College, in behalf of the Cream Ridge Marl Company."

*Palaeotringa littoralis* Marsh<sup>4</sup> is "from the Cretaceous greensand of the middle marl bed. They were discovered by Nicholas Waln, Esq., in his marl pits, at Hornerstown, New Jersey."

*Palaeotringa vagans* Marsh<sup>5</sup> was "discovered at Hornerstown, New Jersey, about ten feet below the surface of the marl, and was presented to the Yale Museum by John G. Meirs, Esq."

It is obvious from what Marsh says about the type locality of the species mentioned above that the remarks made under *Graculavus velox* apply likewise to these other forms from Hornerstown, and they also must be considered of Eocene age. This supposition is strengthened by the statement of Dr. Stephenson who informs me that according to Weller the "middle marl bed" mentioned under *Telmatornis priscus* and *Palaeotringa littoralis* is the Hornerstown marl.

Another species, *Laornis edwardsianus* Marsh<sup>6</sup> was "found in the greensand of the upper, Cretaceous marl bed at Birmingham, New Jersey, in the pits of the Pemberton Marl Company and was presented to the Museum of Yale College by the Superintendent, J. C. Gaskill, Esq." Concerning this Dr. Henry B. Kümmel has kindly furnished the following information:

"The marl pit at Birmingham is located about a mile and a half west of the larger town of Pemberton, and is unquestionably the one of the Pemberton Marl Company of which Mr. J. C. Gaskill was Superintendent.

<sup>1</sup> *Graculavus pumilus* Marsh, Amer. Journ. Sci., ser. 3, vol. 3, 1872, p. 364.

<sup>2</sup> *Telmatornis priscus* Marsh, Amer. Journ. Sci., ser. 2, vol. 39, 1870, p. 210.

<sup>3</sup> *Telmatornis affinis* Marsh, Amer. Journ. Sci., ser. 2, vol. 39, 1870, p. 211.

<sup>4</sup> *Palaeotringa littoralis* Marsh, Amer. Journ. Sci., ser. 2, vol. 39, 1870, p. 208.

<sup>5</sup> *Palaeotringa vagans*, Marsh, Amer. Journ. Sci., ser. 3, vol. 3, 1872, p. 365.

<sup>6</sup> *Laornis edwardsianus* Marsh, Amer. Journ. Sci., ser. 2, vol. 39, 1870, p. 206.

"The basal portion of the marl bed at this point belongs to the Cretaceous (Navesink), as shown by the shell bed which borings have revealed. The workings, however, are not in the lower portion but in the upper part of the bed, and therefore I think the specimen should be referred to the Hornerstown. If we had exposed a complete section of the marl bed, we might be able to draw the line between the Cretaceous and the Eocene portions. I have not been able to do it on the basis of the one or two borings which have penetrated the entire thickness of the section at this point. Based on our present knowledge I believe we are correct in referring all fossils which have been obtained from the worked portion of this pit to the Eocene."

*Palaeotringa vetus* Marsh<sup>1</sup> was "found in the marl at Arneytown, New Jersey, which would imply that it was from the lowest Cretaceous marl bed." At Arneytown the geologic map shows a small area of Hornerstown marl capping a hill, overlying the Redbank sand, a Cretaceous formation. The Navesink marl is distant several miles so that here also it would seem that this species must be credited to the Hornerstown marl and therefore to the Eocene.

From what has been said above it is evident that all of the supposed Cretaceous birds of the New Jersey marl beds are in reality from Tertiary deposits since they appear to come from the Eocene. They will be so indicated in the list of fossil birds to be included in the fourth edition of the 'A. O. U. Check-List' now in course of preparation. With these forms allocated in the Eocene there is more logic in including them under families of birds with species existing today, procedure that to the writer has seemed dubious while they were considered of Cretaceous age since it is his present belief, based on what is known of the Hesperornithiformes and the Ichthyornithiformes, the only Cretaceous birds in which the skulls have been found, that all Cretaceous birds possessed teeth, and were for this and other reasons not so closely allied to living species as to permit their inclusion in living families.

*U. S. National Museum.*

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<sup>1</sup> *Palaeotringa vetus* Marsh, Amer. Journ. Sci., ser. 2, vol. 39, 1870, p. 209.