# PRESENT STATUS OF THE CHECK-LIST OF FOSSIL BIRDS FOR NORTH AMERICA.[1]

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THE first fragment of a fossil bird found in North America of which there is record, secured by S. W. Conrad in the marl beds near Arneytown, New Jersey, was mentioned by Dr. Morton in 1834 in his 'Synopsis of the Organic Remains of the Cretaceous in the United States,' but was not named until 1870 when it served as the type of *Palaeotringa vetus* of Marsh. The type of this species therefore, in date of discovery, is the earliest known of American fossil birds.

Ebenezer Emmons in 1857 named what is supposed to be a fossil bird from fragmentary bones from North Carolina, but definite study of the bird life in the fossil deposits of North America may not be said to begin until the year 1870, when there came announcement by Othniel Charles Marsh of five forms from the Cretaceous, and four from what were then called Tertiary formations. Other species were described by Edward D. Cope in the same year, while in 1872 Marsh gave to the world notice of the first of the famous toothed birds of the west. The labors of the two eminent paleontologists last mentioned continued to such effect that in 1884 the list of described fossil birds had increased to forty-six species, the number given in the fossil list in the first edition of the A. O. U. 'Check-List' published in 1886.

In years subsequent to this, miscellaneous bones of fossil birds continued to come from various sources, while exploration of Pleistocene beds in what are known as the Fossil Lake deposits in Oregon, led to the discovery of large numbers of bones of birds, from which R. W. Shufeldt in 1891 and 1892 identified approximately fifty species, to which later investigations added still others. These have included extinct Flamingos, Geese, Grebes, Gulls, Crows and a Blackbird, as well as bones of the Mallard, Baldpate, Hooded Merganser and many others among living forms. From this and other sources, the second edition of the A. O. U. 'Check-List' published in 1895, included sixty-four fossil species.

[1] Read at the meeting of the American Ornithologists' Union, at Ottawa, Canada, October 13 1926.

Though rich in avian material the Fossil Lake beds of Oregon have been eclipsed by discovery of the wonderful deposits in the Pleistocene asphalt lenses of Rancho La Brea, near Los Angeles, California, which constitute one of the most important finds on this continent in this branch of palaeontology since they have yielded approximately one hundred thousand bones of birds. These have passed under the capable hands of Loye Miller, who has found among them, extinct and modern species of Eagles and Condors, a great, heavy-beaked Vulture, (*Teratornis merriami*) a large gallinaceous bird named *Parapavo californicus* that is allied to the Ocellated Turkey of southern Mexico and Guatemala, Owls, Storks and many others. Study of these had barely begun with the issue of the third edition of the A. O. U. 'Check-List' in 1910, so that the fossil list in that volume includes only seventy-two species, an increase of only eight in the fifteen years that had elapsed since the second edition.

In addition to the deposits at Rancho La Brea numerous bones of Pleistocene birds from Potter Creek, Samwel and Hawver caves in northern California have added to our list of extinct birds, while more recently there has been found a second deposit of bones in asphalt near McKittrick, California, from which have come additional data.

Between the birds of the Cretaceous and those of the Pleistocene that have just been mentioned intervene many interesting forms. Among those recorded from the Eocene of North America one of the strangest is the huge *Diatryma steini*, named in 1917 by Matthew and Granger from a skeleton, nearly complete, found in the Badlands of Wyoming. This was a flightless running bird, standing more than six feet in height, with a heavy body and a strong bill. From the Eocene of Utah the writer has described a shore-bird ancestral to the Avocet, and two curious Auk-like forms that seem to have combined in a measure the longer legs of shore-birds with the form and habits of Auklets.

In many cases fossil birds from the Eocene have been somewhat uncertain as the bones are so crushed and distorted that it is difficult to build up a clear picture of their form. From the succeeding Miocene and Pliocene deposits have come much more perfect material that has proved far more satisfactory to study.

The Sheep Creek and Snake Creek beds in northwestern Nebraska under exploration by parties from the American Museum of Natural History, supplemented by material secured by Mr. Harold Cook, by Princeton University, and the Carnegie Museum have yielded an interesting avifauna from which the writer has described a number of new forms. In these remote ages there was apparently in this region a badlands area over whose cliffs soared Eagles of the genus *Geranoaëtus*, today confined to South America, Hawks on the order of our Red-tailed Hawks, another form related to the modern Mexican Black Hawk, and a Kite, while from wooded stream borders below came the harsh calls of Chachalacas and the screams of tiny Parrots related to, but much smaller than, the modern Carolina Paroquet.

From the diatomaceous beds of Miocene age near Lompoc, California, Loye Miller has named Shearwaters, Boobies, Auklets and Godwits all closely allied to living forms. And in deposits in southern Arizona recorded as late Pliocene age I have found a tiny Goose of the group that includes our Canada and Hutchins' Geese, but no larger than a Duck, a Tree-duck, some shore-birds, Pigeons and fragments of an Ocellated Turkey.

It will appear from what has just been said that there has been much recent activity in the study of avian fossils so that on assembling the material for the fossil list of the fourth edition of the A. O. U. 'Check-List' we find that it now includes 149 species, more than double the number given in 1910. Material now in press will increase the total to a still greater figure before this list is published. In addition to these there are now known 107 species of our living birds whose bones have been found in Pleistocene deposits which should be included in the fossil list if it is to present a true picture of knowledge of our ancient avifauna. The total thus is increased to more than 250 forms.

Our knowledge of our Pleistocene avifauna while considerable is still very incomplete and will be augmented materially by future investigations. It may be noted that search among cave deposits in this country has received as yet comparatively slight attention except in a few localities, and will when exploited unquestionably prove a fertile source of data regarding Pleistocene occurrence of modern birds and may reveal forms now extinct. Such has been the history of similar studies in western Europe.

The known fossil species in our present list may be divided under several headings aside from their systematic classification. Among the species of the Cretaceous period the toothed birds have naturally attracted the greatest attention because of the form of their jaws. One group of these, *Hesperornis* and its allies, includes diving birds, flightless species of Loon-like or Grebe-like habit some of which were of considerable size. In these the teeth were in grooves. A second group—*Ichthyornis*—with teeth in sockets included Gull-like or Tern-like species of moderate dimensions with excellent powers of flight.

Mention has been made of *Diatryma steini* and other birds of the Eocene period. The few known species of this age are peculiar, and in some cases are unique types. Some, however, are suggestive of modern families and seem ancestral to existing families or subfamilies.

Beginning in the Oligocene we find birds of decidedly modern type though differing considerably from existing relatives, and finally in the Miocene, two or more million years ago, appear birds so closely allied to our modern species that in many cases they may be assigned to living genera.

Coming to more modern times let us transport ourselves for a bird walk of a few hours to view the wonderfully rich avifauna of the Pleistocene. Before our eyes Strange Grebes, huge Swans, and curious Geese, some large and some tiny, swim in lakes and ponds in company with more familiar Mallards, Gadwall, Teal and Shovellers. Storks and Herons, some extinct and some of species still living, stalk about in marshes or stand silently watching for their prey. Gulls and Terns circle in flocks above groups of Snipe, Sandpipers and Killdeer, mainly of familiar form but with a few strangers in their ranks. Vultures abound, in number of species exceeding what we find in Africa today, and including at least one bird, the great *Teratornis*, with a wing spread eclipsing that of its companion Condors. Eagles and Hawks soar among the hills or over the plains, and Falcons dash through flocks of smaller birds in search of prey.

Flocks of Quail appear among the bushes, with Sharp-tailed Grouse and Prairie Chickens on the plains, and Ruffed Grouse and large Turkeys in the woodlands.

A few Red-shafted Flickers are noted, with Horned Larks, Crested Jays, Crows, Ravens, Meadowlarks, Red-winged and Yellow-headed Blackbirds, a Shrike and a form of Brewer's Blackbird. There are in addition Towhees, and a host of little Finches always (as yet) too dimly seen to be identified. The Burrowing Owl stands at the entrance of its tunnel, the Short-eared Owl flushes from marshy meadows, and Long-eared Owls rest hidden in dense thickets. At nightfall comes the call of the Barn Owl and the Great Horned and Screech Owls from the canyons. Our list for such a day on present information would compare favorably with one made under modern conditions. When the avifauna of the Ice Age and of the latter part of the Tertiary is better known we shall unquestionably find it much richer in species than is the case in present times since the greater part, if not all of our modern forms, were then in existence contemporaneously with many peculiar birds that have become extinct.

The zoogeographer attempts to explain the distribution and evolution of modern bird life on presumption based on present occurrence, but only from fossils may we hope for wholly certain information on this subject. Our knowledge of the bird-life of prehistoric periods is wholly imperfect but is growing steadily. From the mass of fragments that is being laboriously assembled we may hope to prepare eventually a mosaic that will picture at least the important phases of the evolution and the former distribution of our birds.

*U. S. National Museum.*