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## BIRD BONES IDENTIFIED FROM INDIAN SITES AT WESTERN END OF LAKE ERIE

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The earliest eyewitness accounts of the land and the birds at the western end of Lake Erie did not come until the region was already in transition from wilderness to farm and town. Although French and English traders had visited the area earlier, clearing of the forest and permanent settlement by white men did not begin here until the early 1800s and was not completed until late in the century. Clearing and agriculture developed here more slowly than in the rest of Ohio and southern Michigan. The obstacle was the exceeding wetness of the land and in particular the Black Swamp that lay like a moat across northwestern Ohio from Sandusky Bay on Lake Erie to Indiana (Mayfield 1962:36-37).

This first direct information on the birds of the region in prehistoric times comes from Indian sites recently excavated by Professor Earl J. Prah and his students of the Sociology and Anthropology Department of the University of Toledo.

### SITES

The four sites represented in this report are all within 10 mi. of the courthouse of Toledo, Ohio, although one of them is located in Michigan. Cultural and radiocarbon evidence places all the sites in the late Woodland Period and before contact with white men, roughly 700 to 1300 years ago.

The principal site, supplying 225 identified bird bones, is on land now occupied by the Indian Hills School of Rossford (NE $\frac{1}{4}$  NW $\frac{1}{4}$  sec. 23, T. 8 N., R. 11 E., Ross Township, Wood County, Ohio). Digging here took place in the summers of 1967 and 1968. Only a part of the area was dug exhaustively, but the amount of excavation was substantial. More than 45,000 ft<sup>2</sup> of surface were scraped and more than 2000 ft<sup>2</sup> were excavated to the level of sterile sand. Over 5000 manhours of work went into this project. Much of the effort was concentrated in 10-ft-square test pits. All material was sifted through  $\frac{1}{4}$ -inch screen. Post molds revealed the locations of a number of former dwellings and 800 ft of stockade, which was estimated to be about half the original length. The highest concentration of food remains, ceramics, and artifacts occurred within the house patterns.

The University of Michigan Radiocarbon Laboratory gave the following dates for three samples from this site: A.D. 710  $\pm$  120 (M-2043), A.D. 890  $\pm$  130 (M-2044), and A.D. 1110  $\pm$  100 (M-2042).

A smaller collection, 18 identified bird bones, came from the John Morin farm in Michigan, just north of Toledo. It was excavated in 1967. This site is on the north bank of Halfway Creek  $\frac{1}{4}$  mi. from its mouth (NW $\frac{1}{4}$  SE $\frac{1}{4}$  sec. 32, T. 8 S., R. 8 E., Erie Township, Monroe County, Michigan). A radiocarbon sample was dated A.D. 1070  $\pm$  110 (M-2087).

Two sets of two bones each were identified from the Williams site on the flood plain south of the Maumee River at the crossing of Interstate Highway 475 and from the Fort Meigs State Memorial site at the southwest edge of Perrysburg, Ohio. Pottery fragments and artifacts in these two sites pointed to the late Woodland Period.

### DISCUSSION

This region is a flat lake plain. Up to almost 1910, parts of it remained in its original water-soaked state. The land could not be farmed until drained, and the early settlers, coming from hilly country, were slow to master the art of tiling. Deciduous trees of great size and diversity covered most of the land, but the swamp forest was broken in many places by extensive grassy marshes, shallow ponds and meandering streams. Deeper water occurred where the Maumee River and larger creeks broadened into estuaries near their mouths.

In such wet land it is not surprising that the birds captured by the Indians were mainly waterfowl. Of 247 bird bones identified, 222 (90%) were of ducks, geese, swans, or grebes. This sample includes 34 species of birds, a few identified tentatively. The entire list appears in table 1.

I have made no attempt to estimate the numbers of individual birds. Since the digging pits were scattered in larger deposits and the identified bones came from many depths, I suspect most of the bones represent separate birds.

Bird bones made up about 4% by weight of one large sample analyzed from the Indian Hills site and judged fairly representative of all the excavations. This sample contained 17,000 g of nonhuman bones from three test pits. Fish bones made up 56% of the sample by weight; mammals, 40%; and turtle, less than 1%.

Among the mammals only the black bear (*Ursus americanus*), wolf (*Canis lupus*), porcupine (*Erethizon dorsatum*), and elk (*Cervus canadensis*) are now absent from the area.

Plant remains included wood of the shagbark hickory (*Carya ovata*) and nuts of the black walnut (*Juglans nigra*) and hazelnut (*Corylus americana*), all of which are still common here. Some of the sites contained maize.

Before commenting on the birds in detail, I would like to voice some cautions. The proportions of the species are only roughly indicative of the abundance of the species at the time of capture. The Indians probably were selective in their hunting, focusing on

TABLE 1. Bird bones identified from Indian sites at western end of Lake Erie.

Species	Indian Hills	Morin	Williams	Fort Meigs
Pied-billed Grebe, <i>Podilymbus podiceps</i>	8	—	—	—
Trumpeter Swan, <i>Olor buccinator</i>	15	—	—	—
Canada Goose, <i>Branta canadensis</i>	2	3	—	—
Snow Goose, <i>Chen caerulescens</i> (?)	1	—	—	—
Black Duck, <i>Anas rubripes</i> and Mallard, <i>Anas platyrhynchos</i>	30	1	—	—
Gadwall, <i>Anas strepera</i> (?)	1	—	—	—
Pintail, <i>Anas acuta</i>	4	—	—	—
Blue-winged Teal, <i>Anas discors</i> and Green-winged Teal, <i>Anas carolinensis</i>	55	6	—	—
American Widgeon, <i>Mareca americana</i> (?)	5	—	—	—
Shoveler, <i>Spatula clypeata</i>	3	—	—	—
Wood Duck, <i>Aix sponsa</i>	13	2	—	—
Redhead, <i>Aythya americana</i>	21	—	—	—
Ring-necked Duck, <i>Aythya collaris</i> (?)	3	—	—	—
Canvasback, <i>Aythya valisineria</i>	15	—	—	—
Lesser Scaup, <i>Aythya affinis</i>	16	1	—	—
Common Goldeneye, <i>Bucephala clangula</i> (?)	3	—	—	—
Bufflehead, <i>Bucephala albeola</i>	2	3	—	—
Oldsquaw, <i>Clangula hyemalis</i> (?)	1	—	—	—
Hooded Merganser, <i>Lophodytes cucullatus</i>	5	—	—	1
Common Merganser, <i>Mergus merganser</i> (?)	2	—	—	—
Goshawk, <i>Accipiter gentilis</i>	1	—	—	—
Red-tailed Hawk, <i>Buteo jamaicensis</i>	1	—	—	—
Red-shouldered Hawk, <i>Buteo lineatus</i>	1	—	—	—
Gr. Prairie Chicken, <i>Tympanuchus cupido</i>	1	—	—	—
Turkey, <i>Meleagris gallopavo</i>	8	2	1	1
Sandhill Crane, <i>Grus canadensis</i>	—	—	1	—
Willet, <i>Catoptrophorus semipalmatus</i>	2	—	—	—
Greater Yellowlegs, <i>Totanus melanoleucus</i>	2	—	—	—
Hudsonian Godwit, <i>Limosa haemastica</i>	1	—	—	—
Passenger Pigeon, <i>Ectopistes migratorius</i>	1	—	—	—
Robin, <i>Turdus migratorius</i>	1	—	—	—
Common Grackle, <i>Quiscalus quiscula</i>	1	—	—	—
Totals	225	18	2	2

the largest and most easily taken species, and perhaps on the most palatable.

Also there has been some selectivity in the process of identification. The bones were severely broken and splintered, and out of thousands of pieces only a small fraction were identifiable. Of these, the largest bones are easiest to identify. A mere fragment of a Turkey bone, for example, may be unmistakable, while a similar bit of a small bird may be impossible to determine.

And finally, different ducks of similar size are notoriously difficult to differentiate on the basis of a single bone or bone fragment. In several instances where the samples were very small or the species virtually indistinguishable, I have indicated the possibility of error in table 1 with a question mark. In making these judgments, I have also been guided in part by knowledge of the birds present in early historical times.

The Trumpeter Swan (*Olor buccinator*) appears to have been common at this locality hundreds of years ago. It was not included in the first check-lists

of Ohio (Kirtland 1838) nor of Michigan (Sager 1839), but it has been reported sparingly among the bones of Indian sites in southern Ohio (Coslin 1955: 359). The Trumpeter Swan is known to have bred formerly as far east as Indiana (A.O.U. 1957:59), and it may have nested in the marshes near Lake Erie. It was also abundant in prehistoric times in Illinois (Parmalee 1958:171). Now its range is reduced to remote scattered areas of the West, mainly from Wyoming to Alaska.

I suspect this large bird was able to withstand the bow and arrow but not the gun. The Indians got firearms in this region at least 50 years before the first permanent white settlers arrived. Also, hunting pressure was put on this swan in its main breeding grounds in Canada by the trade in swan skins that was already brisk in the 1700s. The Trumpeter Swan's habit of entering small bodies of water probably made it more vulnerable to hunters than the Whistling Swan (*Olor columbianus*), which has not been positively identified in this sample. Today, the Whistling Swan by the hundreds visits the shallows of western

Lake Erie in spring and fall migration but tends to stay warily out from shores that could conceal a hunter.

Two of five bones of Canada Geese (*Branta canadensis*) permitted exact size comparison, and these were larger than any comparative examples available to me, suggesting that a very large form of the species occurred here.

The most numerous of all birds in these Indian middens was the teal. Museum comparisons have led me to believe that most of these are Blue-winged Teal (*Anas discors*) although I do not doubt that Green-winged Teal (*A. carolinensis*) are included also. Today, Blue-winged Teal are common breeding ducks of the area, particularly at small marshes, grassy ponds, and marshy river banks in the interior. Many Green-winged Teal pass through the area in spring and fall migration, and would be expected in this set.

Next to the teal in numbers were the Black Duck/Mallard group. Although bones of these two species are virtually indistinguishable, and I suspect both occur in this set, my best specimens seemed to match more precisely the comparative material available to me for the Black Duck (*Anas rubripes*). This species nests commonly here today and makes up about 90% of the thousands of ducks that still winter on the unfrozen rapids of the Maumee River between Waterville and Grand Rapids, Ohio. In prehistoric times, the innumerable woodland pools in this region may have been particularly favorable to the Black Duck as distinct from the Mallard (*Anas platyrhynchos*). Conversely, the Mallard may have been favored in modern times as the forest was cleared and the country became more Western in aspect. Today, the Mallard is common in nesting season and migration.

Diving ducks of the genus *Aythya*, especially the Redhead (*A. americana*), were much more numerous in ancient times than at present, according to this sample. They were also abundant migrants in the last century, before their nesting grounds in the West had been disturbed. Potter (1870) considered the Redhead one of the most numerous ducks stopping in migration on Maumee Bay. Now that the breeding grounds in the Great Plains have been largely taken over for agriculture, both the Redhead and Canvasback (*A. valisineria*) visit this area in comparatively small numbers. Of this genus only the Lesser Scaup (*A. affinis*) is still an abundant migrant.

Waterfowl were taken more frequently than other kinds of birds by Indians of the Woodland Period in Illinois also. At various sites there, Parmalee (1958:169) found the Anatidae comprised over 70% of the avian remains. All of his sites were located on bodies of water as were those in this report, but the abundance of ducks reminds us that the tall-grass prairies were wet and dotted with ponds seasonally at least. In contrast with these areas, in the hilly, forested land of southern Ohio, the Indians captured few waterfowl and far more Turkeys (*Meleagris gallopavo*) and Passenger Pigeons (*Ectopistes migratorius*) (Parmalee and Shane 1970:197; Parmalee 1965:117; Goslin 1955:359, 361).

The Passenger Pigeon was unexpectedly rare in this sample. Yet, in the 1860s it was still seen in "clouds" here and in the 1870s was still regarded a menace to crops. The Greater Prairie Chicken (*Tympanuchus cupido*) was also abundant hereabouts in the mid-1800s and presumably thrived in the extensive wet

prairies of earlier times (Mayfield 1962:45-46). Both of these birds, represented by one bone each in this sample, were prominent in Indian remains of southern Ohio.

The abundance of ducks in this sample along with a sprinkling of shore birds in contrast to the scarcity of presumably abundant land birds prompts us to speculate that the Indians had an effective but unreported method of capturing birds in shallow waters and on mud flats. The bow and arrow may have been excellent against the Trumpeter Swan and Turkey but less than ideal against ducks and shorebirds. Modern bow-and-arrow hunters seldom pursue ducks. They find the drawing of a bow always gives a split second warning, and this is usually enough for the escape of an alert, swift, small target. A missed shot over water and mud often causes the loss of an arrow, and a duck is not worth many such losses.

An automatic walk-in trap would surely have been within reach of the Indians' ingenuity. They were adept at making fish nets, and it would seem a short step to a cage trap such as we would now make of chicken wire. I find no reference to such a device in anthropological literature, but believe it could have existed unnoticed by early travelers and by archaeologists, who would have assumed it was a fish net.

Rock-shelter remains elsewhere in Ohio show the Indians of the late Woodland Period made nets of great strength and delicacy. One example with 1-cm mesh was made from the stem fiber of the swamp milkweed (*Asclepias incarnata*), an abundant plant near Lake Erie. Many other vegetable fibers also were used to make cords and ropes (Shetrone 1928: 13, 16, 19, 20).

Apparently the aim of the Indians in pursuing birds was strictly utilitarian. All the species in this sample were suitable for food, and none apparently was sought primarily for its bright feathers. Many colorful birds such as the Blue Jay (*Cyanocitta cristata*) and Scarlet Tanager (*Piranga olivacea*) are abundant in this region today. If they were hunted regularly by Indians, they should turn up in remains. However, they do not appear in this sample or in other collections I have seen from Ohio. On the other hand, in the West, Miller (1963:181) believed the prehistoric Indians frequently took the Red-shafted Flicker (*Colaptes auratus*) for decorative purposes. The hawks in this sample may have served a ceremonial purpose.

Another interesting circumstance is the fragmentation of the bones. Nearly all are broken and splintered, and yet they are sharp and clean in outline and not at all scarred and abraded as would be expected from the chewing of dogs or wear under foot. Miller (1963:188), noting the same circumstance at many sites from North Dakota to California and doubting that moccasined feet would cause so much breakage, suggested that Indians may have broken the bones ritually.

Cold-weather species as well as warm-weather species in this sample suggest the Indians occupied these sites all or nearly all of the year.

At the Morin site, which was near a farmhouse, an unexpected find was three bones of immature chickens (*Gallus gallus*), but when collecting data revealed that these had been gathered on the surface and were unrelated to the dated material buried underneath, they were excluded from this sample.

## SUMMARY

Four Indian sites of the late Woodland Period in Ohio and Michigan at the western end of Lake Erie produced 247 identifiable bird bones of 34 species, mainly waterfowl. Radiocarbon dates range from about 700 A.D. to 1100 A.D. The only bird species not reported from this locality in historic times is the Trumpeter Swan (*Olor buccinator*) which may have been extirpated by the Indians soon after they got guns but before the first white settlers arrived.

## ACKNOWLEDGMENTS

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## NEOGENE FOSSIL JAYS FROM THE GREAT PLAINS

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Only two of the known paleospecies of Corvidae are jays, both described from the late Pleistocene of Florida. They are *Protocitta dixi* Brodkorb (1957), later also reported from the late Pleistocene of Texas (Weigel 1967), and *Henocitta brodkorbi* Holman (1959). These were large birds of genera unrepresented in the present day avifauna. Their closest living relatives appear to be the Mexican and Central American Magpie Jay (*Calocitta formosa*) and the Mexican Brown Jay (*Psilorhinus morio*).

In the present paper two additional fossil jays are described. A new genus from the late Miocene of Colorado extends the record of the jays in America back as far as that of the crows in Europe, where *Miocorvus larteti* (Milne-Edwards 1867-71) has hitherto been the oldest known member of the Corvidae. The other jay described here represents a second species of the extinct genus *Protocitta*, from the Pliocene-Pleistocene boundary of Texas and Kansas.

## A MIOCENE JAY FROM COLORADO

The bird described here is a medium-sized jay superficially resembling the Pinyon Jay (*Gymnorhinus cyanocephalus*), the Unicolored Jay (*Aphelocoma unicolor*), and Clark's Nutcracker (*Nucifraga columbiana*). It differs from both fossil and living genera of jays as described below.

**Miocitta**, new genus

*Type of Genus.* **Miocitta galbreathi**, new species. *Etymology.* From Greek *meiōn* (less, in reference to the Miocene epoch) and Greek *kitta* (feminine; a jay). The specific name is in honor of the collector, Dr. Edwin C. Galbreath, Department of Zoology, Southern Illinois University, Carbondale, Illinois (see Galbreath 1964).

**Miocitta galbreathi**, new species

*Holotype.* Distal portion of right humerus, Southern Illinois University no. P 198 (fig. 1). From about 20 mi WSW of Peetz, Logan County, Colorado, in SE  $\frac{1}{4}$ , sec. 26, T. 11 N., R. 55 W. In lower part of Pawnee Creek Formation, associated with Kennesaw local fauna, Upper Miocene (see Galbreath 1953).

*Family Reference.* The distal part of the humerus is superficially similar in the Corvidae and Icteridae, but the fossil is referable to the Corvidae on the basis of the following criteria: (1) Entepicondyle short (in Icteridae it is lengthened distally and often produced anconally). (2) Ectepicondylar process also short and rather closely adpressed to the shaft (in Icteridae the process is long and swings laterally to leave a wide space between its more medial spur and the shaft). (3) Brachial depression of moderate depth, with its medial border sunk only slightly below the level of the medial edge of the shaft (in Icteridae the brachial depression is quite deep, and the medial edge of the shaft often forms a steep wall bounding the medial edge of the depression).

*Generic and Specific Diagnosis.* (1) Olecranal fossa a furrow extending transversely from entepicondyle to area proximal to the intercondylar groove, deep throughout, but deepest proximal to the external portion of the internal condyle (in other genera