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FOSSIL BIRDS OF FLORIDA

Jonathan J. Becker



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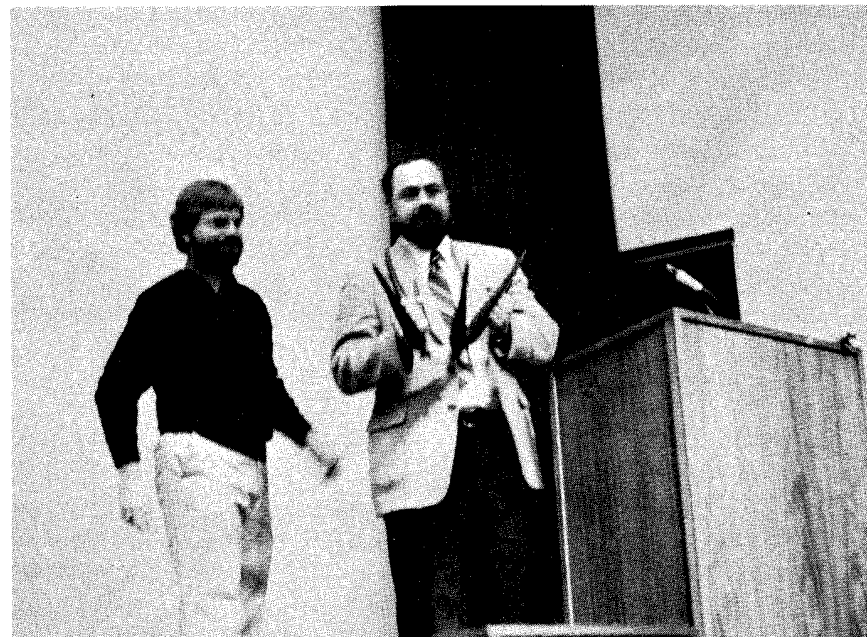
OFFICIAL BUSINESS

FLORIDA PALEONTOLOGICAL SOCIETY, INC.

Minutes of the Fifth Annual Business Meeting
6 November 1982

The meeting was called to order at 10:55 AM by
President MacFadden.

The minutes were accepted with unanimous approval as
printed in the March, 1982 issue of the Plaster Jacket.



Bruce MacFadden (left, 1982 President), passes the
Hexameryx skullcap to Cliff Jeremiah (right, 1983
President) at the end of the business meeting.

Howard Converse presented the Secretary/Treasurer's Report as follows:

RECEIPTS:

Membership dues	\$1,774.24
Spring Meeting fees	745.00
Patch Sales	305.00
Misc. Rec'pts (extra PJ's, etc.)	8.00
Book Fund	245.00
	<hr/>
	\$3,077.24

EXPENSES:

Reitz Union (Coffee-Donuts)	\$53.75
Secretary of State-Annual Report	10.00
FPS Patches	873.59
Jimbo's Bar BQ/Spring Meeting	693.00
Museum (Xerox, labels, etc.)	75.00
Operation loss (Thomas Farm Dig)	189.89
	<hr/>
	\$1,980.23

THOMAS FARM FIELD CAMP - JUNE 1982:

RECEIPTS:

16 persons @ \$200.00 each	#3,200.00
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EXPENSES:

Alachua Co. Sanitary Septic System	260.00
Stokely Van Camp, Inc. (Gatorade)	33.00
Hughes Supply, Inc. (pipes, tent stakes)	112.84
Cooking utensils	288.40
Student Assistants (2 persons)	400.00
Gen. operating expenses (gas, ice, etc.)	400.00
Zell's Hardware (pails, hoses, etc.)	191.07
Plywood (Dave Webb)	17.75
Bowman Trans. (shipping-cots & netting)	45.85
Fl. State Museum Assoc. fee (insurance)	205.00

Continued Expenses (Thomas Farm Field Camp-June 1982)

Certificate Printing	2.00
Food Supplies	930.30
Traveling expenses (Gicca & Herring)	253.68
Live Oak Gas Co. (stove)	250.00
	<hr/>
	#3,389.89

Net loss of - \$189.89

The report was approved as presented.

In the Editor's Report Dave Webb observed that the Society has been able to maintain three issues per year with numbers 39 through 41 printed in 1982. The average cost per issue, using the University of Florida Press, is \$175.00.

Dave also discussed the proposed fossil book using the Plaster Jacket issues as a framework, but with considerable updating. Several members urged that the old issues be bound in book form until the new updated book became available. Dave reported that the 41 issues cover most of the fossil topics; but some ten items have not been treated including an introduction; amphibians; birds; bats; marsupials; ruminants; lists of species; museum locations and an index. Few bibliographic citations have been included in the old Plaster Jacket issues. Illustrations will be the biggest job. The Society will be asked to hire an artist for good line drawings. A discussion followed.

The Fund Raising Committee Report was introduced by President Bruce MacFadden. The book fund needs money up front. Cliff Jeremiah gave a plea for publication funds. Bruce gave a description of the scholarship fund which will be derived from the interest earned from the fund. Ben Waller reported that seven companies have been approached for \$1000 each. These

funds should be available by the next meeting. Each Chairperson gave a plea for fund raising. It was announced that money should be sent to the Committee Chairpersons or the Secretary/Treasurer.

Bruce MacFadden gave the President's Report on developments during the past year. A letter was read from George Gaylord Simpson thanking the Society for the birthday certificate sent on his 80th birthday.

An offer was presented to the Society donating all rights to Margaret C. Thomas's book on fossils. A brief discussion followed. The decision would be left up to the Board of Directors.

A slide presentation on the Thomas Farm Dig was given by Bruce. A complete outline of last year's dig was presented and plans for the 1983 dig were discussed.

Under New Business the Officers for 1983 were installed. They are Clifford Jeremiah as President; Joe Larned as President-Elect; Frank Garcia as Vice-President; Howard H. Converse as Secretary/Treasurer and as new Directors Larry Lawson, Don Serbousek, Ed Brown, and Thomas Watson.

The applications for Chapter status of two groups were presented. They were from the Suncoast Archaeological & Paleontological Society, Inc. and the Bone Valley Fossil Society. Approval will be voted upon during the Board of Director's Meeting.

A request was made for a site for a Spring Meeting. This was left undecided with a couple of options open.

The meeting was adjourned at 12:02 PM.

Respectfully submitted,
Howard H. Converse, Jr.
Secretary/Treasurer

NUMBER 42

MARCH 1983

THE FOSSIL BIRDS OF FLORIDA

Jonathan J. Becker

This article provides a general overview of fossil birds in Florida. A selected bibliography (page 20) provides additional sources for consultation.

INTRODUCTION

More is known about living birds than about any other class of vertebrates. Large numbers of studies dealing with their behavior, ecology, and physiology appear every year. But comparatively little is known of their origin, phylogeny, and evolution. Feduccia (1980) and Brodkorb (1971) both have excellent discussions of the evolution of birds and their fossil record on a worldwide scale.

Avian fossils normally occur in fair numbers in adequately sampled fossil deposits of a moderate size. Several deposits in the United States have produced notable amounts of avian material. The largest collections are from the tar pits of Rancho La Brea, California. Over 85,000 avian fossils representing at least 133 species have been recovered. Other Pleistocene localities with large numbers of birds (over 50 species) occur in Oregon, other deposits in California, and of course, Florida. The Reddick locality in Florida has produced over 10,000 avian specimens, representing over 64 species.

Obviously fossil birds are not as rare as commonly believed. Much of this is due to careful collection techniques and screen washing large amounts of matrix. Avian paleontologists, on the other hand, are

much rarer than commonly believed. Four authors are responsible for one-third of the 900-odd paleospecies of birds; and 15 authors for 3/4 of the paleospecies.

Florida has been fortunate not only in having many fossil localities producing birds (Fig. 1), but also in having a large number of avian paleontologists actively working on Florida material. Notable among them is Pierce Brodkorb in the Department of Zoology at the University of Florida, who has concentrated much of his 30 years of research on fossil birds of Florida.

Fossil birds most commonly are described from post-cranial skeletal elements; bird skulls are extremely fragile, and of course, they lack teeth. The major limb elements (e.g. humerus, carpometacarpus, tibiotarsus, tarsometatarsus) in most birds are so distinctive that they are diagnostic to the level of species. It is therefore not uncommon to see a valid description of a new fossil species based on a partial humerus, or the distal half of a tarsometatarsus.

I would like to thank Pierce Brodkorb and Gary S. Morgan for critically reading this paper. Pierce Brodkorb also graciously allowed the use of his drawings and photos for Figures 2-6.

FLORIDA'S FOSSIL BIRDS

Florida's record of fossil birds begins late in the 150 million year history of the evolution of birds. Three local faunas, mid Miocene (Hemingfordian) in age, have produced the oldest fossil birds in the state--Gainesville, Tallahassee and Thomas Farm.

Two species were described by Brodkorb in 1963 from within the city limits of Gainesville, both originating from the lower Hawthorn Formation. Puffinus micraulax, an extinct shearwater slightly smaller than Audubon's Shearwater, was described on a distal humerus found by Mr. Kent Ainslie along Hogtown Creek. The other,

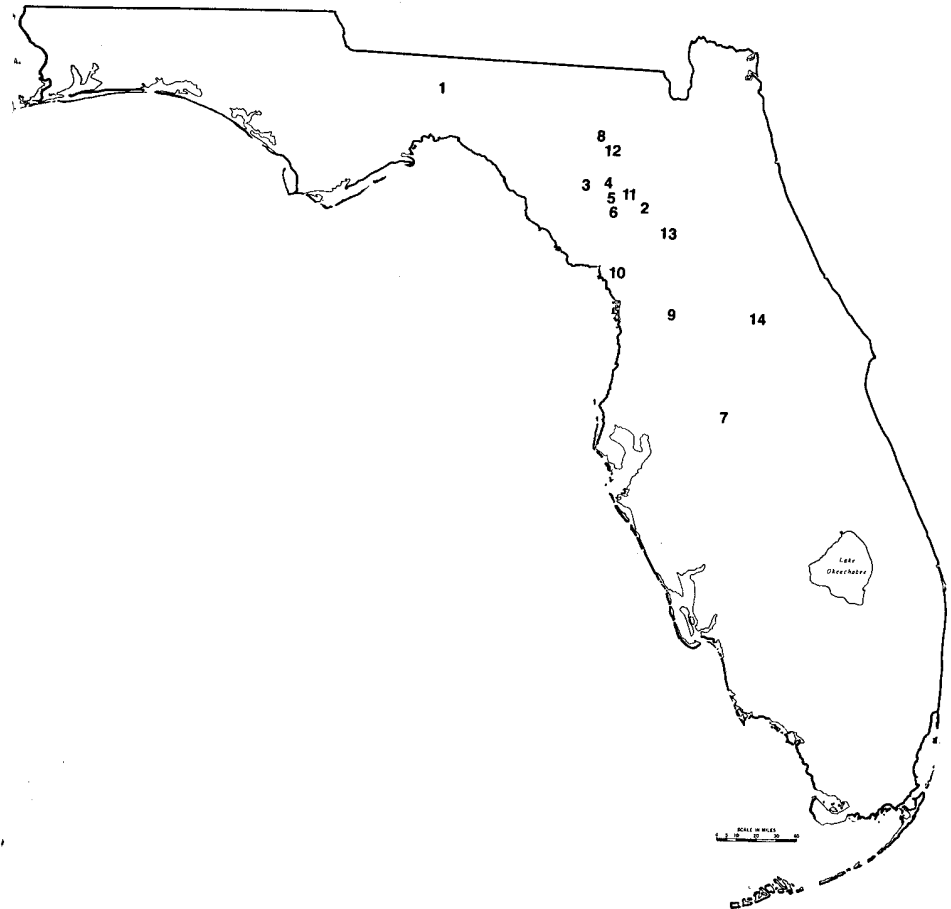


Fig. 1. Major avian fossil localities in Florida.
Hemingfordian: (1) Tallahassee, (2) Gainesville, (3) Thomas Farm. Clarendonian: (4) Love Bone Bed.
Hemphillian: (5) McGehee, (6) Haile VI, (7) Bone Valley. Blancan: (8) Santa Fe River, (9) Coleman II, (10) Inglis IA.
Rancholabrean: (11) Arredondo, (12) Itchtucknee River, (13) Reddick, (14) Rock Spring, (6) Haile XIB.

Sula universitatis, similar in size to the Brown Booby, is known from only a proximal carpometacarpus. It was found by Mr. Robert Strawn along a small creek near Fraternity Row on the University of Florida campus. The coastal ecology of both of these birds agrees well with the predominately marine nature of the Hawthorn Formation.

Two additional birds were described from Torreya Formation deposits in the switchyards of the Seaboard Airline Railroad Company in Tallahassee. Propelargus olseni, is a small extinct stork named after Stanley J. Olsen. Probalearica crataegensis, an extinct crane, similar to the Old World Crowned Crane, derives its name from the Greek krataigos, a hawthorn bush.

The third middle Miocene (Hemingfordian) locality producing fossil birds is Thomas Farm, near Bell in Gilchrist County. A cormorant (Phalacrocorax subvolans), three kites (Promilio floridanus, P. epileus, and P. brodkorbi), a chachalaca (Boreortalis laesslei), and a tiny turkey (Rhegminornis calobates) have been described from this deposit (Figures 2 and 3). Additional, undescribed material shows the presence of two small doves, a wood warbler, a barbet, and a roller-like bird.

The fossil record of birds in Florida next skips to the late Miocene (latest Clarendonian) at the Love Bone Bed. Although studies on this avifauna have not yet been completed, preliminary identifications show this avifauna to be the most diverse non-marine avifauna known in North America prior to the Pleistocene. The following birds have been identified: a grebe, cormorants, an anhinga, flamingoes, an ibis, herons, a stork, ducks and geese, a new world vulture, an osprey, a hawk, a turkey, rails, coots, cranes, a limpkin, shorebirds, and perching birds.

There are three latest Miocene (Hemphillian) local faunas from which fossil birds have been

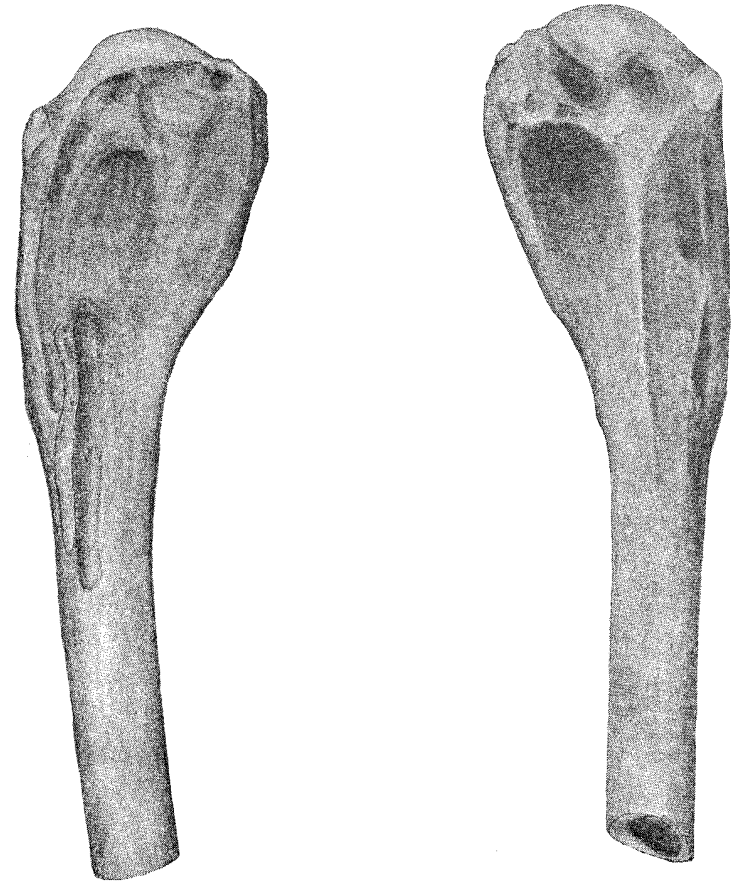


Fig. 2. Phalacrocorax subvolans, proximal humerus. Described from Thomas Farm, Gilchrist County. Middle Miocene Cormorant.

described--Haile VI, McGehee Farm, and the Bone Valley. Palaeostruthus eurius, an emberizid finch, about the size of a towhee, is the only described bird from Haile VI. It represents one of the few paleospecies of the order Passeriformes, the perching birds.

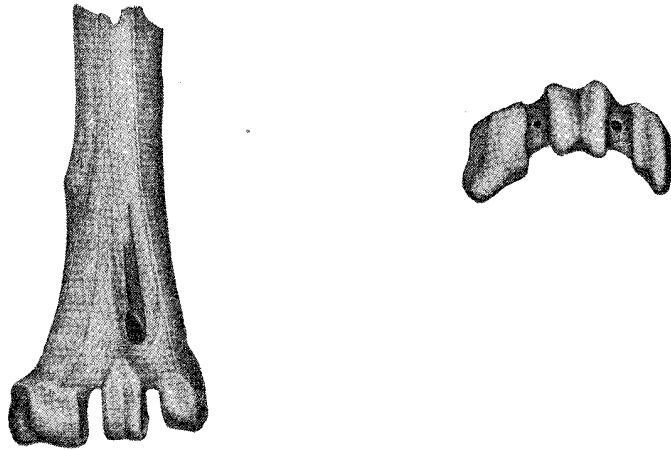


Fig. 3. Promilio floridanus, distal tarsometatarsus. Described from Thomas Farm, Gilchrist County. Middle Miocene kite.

McGehee Farm has produced four fossil birds. Phalacrocorax wetmorei, a small cormorant similar to the modern Double-crested Cormorant, was originally described from Bone Valley specimens. Nycticorax fidens, is an extinct night-heron similar to the modern Black-crowned Night-Heron. It is the first known fossil record of the genus. Ereunetes rayi, a small sandpiper between the Least Sandpiper and Baird's Sandpiper in size, is named after Clayton Ray. The fourth species is Jacana farrandi, an extinct species of lily-trotter. They are specialized members of the Order Charadriiformes which includes sandpipers and allies, gulls, and auks. Their outstanding physical feature is extraordinarily long toes and toenails (up to four inches) enabling them to walk over floating water plants.

The phosphate mines of the Bone Valley region in Polk, Hardee, and Hillsborough counties have produced a large number of fossil birds. All the specimens which have been studied are from the lowest part of the Bone Valley Formation, with an age of Clarendonian. Two loons are known. Gavia palaeodytes is a small species about the size of the modern Red-throated Loon. Gavia concinna is intermediate in size between the modern Red-throated Loon and the Common Loon. Other birds include Pliodytes languisti, the size of a large Pied-billed Grebe, and Diomedea anglica, an extinct albatross, described originally from Suffolk, England.

The family Sulidae, which includes the boobies and gannets, are all marine birds. The name booby, comes from the Spanish bobo, a dunce, alluding to the ease at which they are captured. Three members of this family are present in the Bone Valley collections. Morus peninsularis, a gannet, is smaller than the living species of gannets. Two boobies are present--Sula guano, about the size of the Red-footed Booby and Sula phosphata, the size of the Brown Booby.

The most abundant avian remains from the Bone Valley represent a cormorant, Phalacrocorax wetmorei, closely allied with the modern Double-crested Cormorant. Another cormorant is also present in the Bone Valley. It is much larger than any living species, and is referred to the extinct species, Phalacrocorax idahensis, on that basis.

A large heron, Ardea polkensis, similar to the modern Great Blue Heron is reported, as is an indeterminate species of Ibis (Eudocimus sp.). The genus Eudocimus includes both the modern White and Scarlet Ibis. The Bone Valley specimen represents the oldest occurrence of the genus.

Additionally, a duck, Bucephala ossivallis, similar to the Common Goldeneye, and an extinct flamingo, Phoenicopterus floridanus were described from the Bone Valley.

The remaining birds described from the Bone Valley are all in the Order Charadriiformes. Haematopus sulcatus is an oystercatcher, similar to the modern American or Black Oystercatcher in size. They feed mainly on oysters, clams and mussels which they pry open with chisel-shaped bills. Two sandpipers are found in the Bone Valley deposits--Calidris pacis similar to the modern Red Knot; the other, Erolia penepusilla, is slightly larger than the living Least Sandpiper. The remaining paleospecies in this family, Limosa ossivallis, is similar to the modern Marbled Godwit.

A gull, Larus elmorei, is known from a handful of specimens, and is closely related to the modern Ring-billed Gull (Figure 4). A large auk, Australca grandis, about the size of the modern Tufted Puffin, completes the list of the described birds from Bone Valley. At least 10 additional genera of birds have been tentatively identified from the Bone Valley, but material presently available does not allow the formal description of these species. Large rookeries of these fossil birds, especially the cormorants and the boobies, have been suggested to play a large role in concentrating phosphate in fossil guano deposits which now make up the largest mining reserves in the New World.

By the Pliocene (Blancan), the first modern species of birds appear in Florida's fossil record. From the Santa Fe River, 7 species of birds are known, 5 of which represent living species--the Double-crested Cormorant, two ducks--the Lesser Scaup and the Common Merganser, the Red-tailed Hawk, and the Wild Turkey. A paleospecies of grebe, Podilymbus magnus, related to the Pied-billed Grebe, is also present.

But the most remarkable member of this fauna is the extinct species Titanis walleri (Figure 5). This large predatory, flightless bird whose remains were first



Fig. 4. Larus elmorei, distal humerus. Described from Bone Valley, Polk County. Late Miocene gull.

found by Mr. Ben Waller, is larger than an African Ostrich (about 6 ft. tall) and is related to the flightless predatory cranes of South America.

Haile XV represents the late Blancan in Florida. Again neospecies predominate. Present are the Pied-billed Grebe, Common Egret, Green-winged Teal, Wild Turkey, and an indeterminate egret in the same genus as the Snowy Egret or Little Blue Heron. The

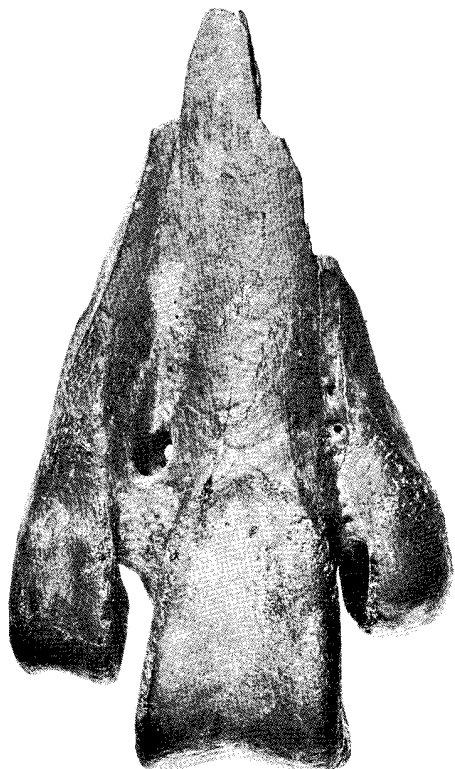


Fig. 5. Titanis walleri, distal tarsometatarsus. Described from the Santa Fe River, Gilchrist/Columbia Counties. Width equals 76 mm. Comparable measurement from a Sandhill Crane equals 22 mm. Pliocene predatory crane from South America.

quail present compares to the extinct Colinus cf. suilium. A new species of small heron was named from this locality, Butorides validipes, similar to the modern Green Heron.

The Early Pleistocene (Irvingtonian) is well represented by two large avifaunas--Coleman and Inglis. Some 47 species are known from Inglis. Described paleospecies from Inglis include an extinct grebe, Podiceps dixi, slightly larger than the Horned Grebe; an extinct Shelduck, Anabernicula gracilentia; and an extinct hawk, Buteogallus fragilis, resembling the living Great Black Hawk of the Neotropics. Neophrontops slaughteri, an extinct Old World Vulture; Colinus suilium, an extinct quail; and Meleagris anza, an extinct turkey are also present; as is Titanis walleri, the giant predatory crane. Two species of fossil owl have been reported, Speotyto megalopeza, similar to the Modern Burrowing Owl and Asio priscus, related to the modern Long-eared Owl. Also recorded is Campephilus dalquesti, an extinct woodpecker slightly smaller than the recently extinct Ivory-billed Woodpecker. An additional 6 genera are in the process of being described from Inglis--two herons, a hawk, an eagle, and two species of tiny owls. Also reported is the living California Condor.

The Coleman localities record 38 species of birds and share approximately 50% of all avian species with Inglis. Paleospecies which are shared are Colinus suilium and Meleagris anza. Other paleospecies present at Coleman and not at Inglis include Ciconia maltha, a large stork, Coragyps occidentalis, an extinct vulture related to the modern Black Vulture, and an extinct Jay referable to Procyta cf. P. ajax. A large species of Anhinga is also present at Coleman.

There are several dozen late Pleistocene (Rancholabrean) localities in Florida which have produced fossil birds. The major localities (with number of species of birds reported) are Arredondo (41), Bradenton (10), Haile XIB (67), Itchtucknee River (67), Melbourne (19), Reddick (64), Rock Springs (31), Sabertooth Cave (10), Seminole Field (47), and Vero 2 & 3 (15).

These and other localities have produced a combined record of around 150 species of birds; 20 are paleospecies and an additional 6 are modern species which have present distributions far removed from Florida. These extirpated species are Olor buccinator, the Trumpeter Swan, known today from Yellowstone Park, Wyoming and Alaska; Bonasa umbellus, the Ruffed Grouse, from wooded North America south to the mountains of Georgia; Tympanuchus cupido, the Greater Prairie-Chicken, and Numenius americanus, the Long-billed Curlew both from the prairie regions of North America; and Aramides cajanea, the Gray-necked Wood Rail from South America. Ectopistes migratorius, the recently extinct (1914) Passenger Pigeon, also occurs in Florida's Pleistocene record.

The Rancholabrean paleospecies of Florida are listed in Table 1, with the ecological counterpart or related species to help the reader visualize the extinct avifauna. Most are very closely related to modern species.

Two faunal patterns become apparent in the Pleistocene avifauna of Florida. The first is related to the presence of northern species which are present, such as Olor buccinator and Bonasa umbellus. The presence of these indicates that their range expanded southward during the glacial periods and contracted back northward during the non-glacial periods.

The other faunal pattern is related to the cyclic opening of the Gulf Coast Savanna corridor when sea levels dropped during ice ages (see Webb, S. D., 1974, Pleistocene mammals of Florida, for discussion). As is shown in the mammals, two different sets of avian species appear in the fossil record reflecting the opening of this corridor--arid western species and mesic tropical species.

The western species include Gymnogyps ampulus, closely related to the California Condor; Teratornis

Table 1. Florida's late Pleistocene (Rancholabrean) avian paleospecies and their modern ecological counterparts or closely related species.

Rancholabrean Fossil Birds	Modern Counterpart/ Related Species
<u>Podilymbus wetmorei</u>	Pied-billed Grebe
<u>Podiceps dixi</u>	Horned Grebe
<u>Ciconia maltha</u>	White Stork
<u>Anas itchtucknee</u>	Blue-winged Teal
<u>Gymnogyps amplus</u>	California Condor
<u>Teratornis merriami</u>	Condor-like
<u>Caracara prelutosa</u>	Crested Caracara
<u>Milvago readei</u>	Yellow-headed Caracara
<u>Neortyx peninsularis</u>	Bobwhite
<u>Porzana auffenbergi</u>	Sora Rail
<u>Laterallus guti</u>	Black Rail
<u>Gallinula brodkorbi</u>	Florida Gallinule
<u>Fulica shufeldti</u>	American Coot
<u>Dorypaltus prosphatus</u>	Lapwing
<u>Tachycineta speleodytes</u>	Tree Swallow
<u>Cistothorus brevis</u>	Wren
<u>Pandanaris floridanus</u>	Cowbird
<u>Cremaster tythtus</u>	Crested Oropendola
<u>Protocitta dixi</u>	Magpie Jay
<u>Henocitta brodkorbi</u>	Magpie Jay

merriami, a huge teratorn known from the Rancho la Brea, California; and Pandanaris floridanus, closely related to the fossil cowbird of Rancho la Brea. This pattern is also shown in the relictual distribution of two modern species. The Burrowing Owl, Athene cunicularia, and the Scrub Jay, Aphelocoma coerulescens, are both essentially western forms with small relict populations in Central Florida.

The neotropical species include, among others, Caracara prelutosa and Milvago readei (two species related to the Neotropical caracaras), Procyta dixi and Henocitta brodkorbi-related to the Magpie Jay of Mexico and South America, Cremaster tytthus (Figure 6), related to the Crested Oropendula, and the Gray-necked Wood Rail. Again this pattern is shown in the present distribution of three modern species. The Snail Kite (= Everglade Kite), Rostrhamus sociabilis, the Crested Caracara (= Audubon's Caracara), Polyborus plancus, and the Short-tailed Hawk, Buteo brachyurus, are all Neotropical species with relict populations in Florida.

The Recent avifauna of Florida is dealt with in any field guide or checklist of the state. About 400 species of birds have been observed in Florida; with around 160 actually breeding within the state.

I would like to end this summary of the fossil birds of Florida with an appeal to all fossil enthusiasts for any fossil bird bones you have or may find. The fossil record of birds is well known for only the Rancho la Brea, and even then only a few species are completely represented. The record in other "land mammal ages" is poorly known. Many of these species are known from only one or two skeletal elements--making it extremely difficult to gain an overall idea of fossil bird's form, adaptations, etc. This is especially true in the older deposits such as Bone Valley--only one or two of the commonest birds are fairly well known, but the rarer species are known from only one or two specimens.



Fig. 6. Cremaster tytthus, humerus. Described from Arredondo, Alachua County. Late Pleistocene Oropendula from South America.

Much work remains to be done in avian paleontology, both in Florida and worldwide. It is only with selfless cooperation that it can rapidly progress.

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Available in book stores or from the Audubon Society.)

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