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NOTES

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**DETERMINING THE ORIGIN OF NON-NATIVE BIRDS
SEEN IN THE WILD IN FLORIDA
—A CASE STUDY CASE: WOOLLY-NECKED STORK**

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The appearance in the wild of a bird native to a distant land is often dismissed as ornithologically insignificant, for its presence is usually assumed to be due to its escape from captivity. Robertson and Woolfenden (1992) cited 146 species of exotic birds reported in the wild in Florida, few of whose true origins ever were determined. Yet, investigation of the possible sources and the circumstances surrounding the presumed escape often disclose facts that, even when the escape is confirmed, may have wider application. In this paper we show that the current or recent presence of many species of exotic birds in captivity in Florida and elsewhere often can be established readily. We further show that unusual circumstances may obscure the trail of evidence that brings proof of captive origin of any particular exotic species. We also show that accidentally released, flight-worthy captives may not quickly disperse or not be widely encountered in the wild.

On 1 May 1994 we were driving north on U. S. 1 near Goulds, Dade Co., when a large unfamiliar bird flew low across the highway in front of us. We could readily place the bird in the Ciconiidae but did not recognize it as to species. We later concluded from Hancock et al. (1992) that we must have seen a Woolly-necked Stork (*Ciconia episcopus*) which has two subspecies, *C. e. episcopus* in India and Southeast Asia, and *C. e. microscelis* throughout much of sub-Saharan Africa. Because storks are physically adapted to fly long distances primarily using thermals and have a comparatively limited flapping/gliding flight range as would be required over the ocean (Pennycuik 1972, Elkins 1983), we supposed that this Woolly-necked Stork escaped from captivity.

Because of other research in progress, we had available to us the relevant portion of the International Species Inventory System (ISIS) Bird Abstract for 30 June 1993 (Appendix). We noted that only three participating institutions in the world claimed to hold captive Woolly-necked Storks as of mid-1993, one bird at the Gladys Porter Zoo in Brownsville, Texas, and several at the San Diego Wild Animal Park and the affiliated San Diego Zoo in California. The San Diego facilities' population had increased since June, 1993, due to an ongoing successful breeding program, but none of their birds had escaped or been sent elsewhere (J. Myers, pers. comm.). The one Woolly-necked Stork in Texas also was still present (P. Burchfield, pers. comm.). Our conversations did result in helpful suggestions for locating presently undocumented Woolly-necked Storks in Florida, and we quickly found the likely solution to the apparent mysterious origin of the Woolly-necked Stork we saw.

Prior to Hurricane *Andrew* in August 1992, Miami Metrozoo had two pairs of Asiatic Woolly-necked Storks in their huge outdoor walk-in display of free-flying birds *Wings of Asia*, which held nearly 300 individuals of about 85 species. The aviary itself was destroyed in the hurricane, unintentionally freeing the 95% of those birds that survived the storm. Most remained nearby, however, and about half were quickly recaptured and re-located to secure facilities. The four Woolly-necked Storks survived and remained but proved too wily for recapture. Within a few weeks, one pair has dispersed and was last seen by zoo personnel several km to the northwest, towards the Everglades. The other pair remained free-flying at the site, surviving on food placed out for other animals. Be-

cause it no longer controlled them, Miami Metrozoo ceased reporting its Woolly-necked Storks to ISIS in late 1992, even though two birds technically remained nearby. Later the female of the second pair also disappeared. The male continued to remain mainly on zoo property, although he was not noted there the day our observation (C. Burch, pers. comm.). Our sighting, 8 km south of the zoo, seems likely to have been him.

Many large birds in collections are surgically pinioned and permanently incapable of flight, while many others' flight feathers are clipped annually. Our investigation indicated that once-captive birds, even those having full flight capability, may not leave their customary food source quickly, and those that finally do, may not be seen widely in the wild afterwards. Florida's wading birds are subject not only to intense interest by birders and the general public, but also to periodic aerial surveys by biologists. Over a 20-month period following their release, we would expect more reports than ours of several unfamiliar, large, distinctive birds such as Woolly-necked Storks at large. The absence of other reports suggests that these storks, once leaving a dependable food source, may not have survived long in their new environment. Such may be the fate of many so-called 'escapees', although it certainly is not a universal phenomenon. A black-necked Stork (*Ephippiorhynchus asiaticus*), of unknown origin but native to Australasia, survived and was often seen in Shark Slough, Everglades NP, for several years beginning in 1974 (P. W. Sykes in Edscorn 1975, Toops and Dille 1986).

While a Woolly-necked Stork is an improbable vagrant to Florida, other species' origins may be more difficult to discern. We believe that a thorough investigation will reveal sufficient evidence to form a conclusive judgment on the probable origin of most non-native birds reported in the wild.

We thank Carl Burch of Miami Metrozoo; Pat Burchfield of the Gladys Porter Zoo; Judy Myers of the San Diego Wild Animal Park; Kim Hastings and Mike Kelly of ISIS; and our colleagues John Ogden and Bill Roberson, for providing information, literature, or comments on earlier drafts of this note. M. P. Kahl and an anonymous reviewer also provided helpful suggestions.

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APPENDIX

ISIS and its participants in Florida as of December 1993

ISIS is a non-profit organization located in Apple Valley, Minnesota and run by an international Board of Trustees elected by its subscribing institutions. It has over 450 members in more than 50 countries, mainly zoos, significant collections, and breeding facilities, 28 of which are in Florida (see below). ISIS' main goal is to encourage captive-breeding and exchanges between facilities, to reduce collecting pressures on animals in the wild. The ISIS Abstracts (Mammals, Birds, Reptiles and Amphibians), prepared twice annually in taxonomic order, list each institution's holdings and show among other data the number of males, females, unsexed individuals, and births for each (sub)species during the prior twelve months. Although these are not public documents, subscribing institutions often will share their data with serious researchers.

ISIS Code	Facility name and location*	Telephone
1. BUSCH TAM	Busch Gardens, Tampa	(813)-987-5250
2. CENTERHIL	Rare Feline Breeding Compound, Center Hill	(904)-793-2109
3. CYPRESS	Florida Cypress Gardens, Winter Haven	(813)-987-5545
4. DREHER PA	Dreher Park Zoo, West Palm Beach	(407)-533-0887
5. ENGRESSERS	Endangered Species Facility, Trenton	(904)-463-7292
6. FLAMINGO	Flamingo Gardens, Ft. Lauderdale	(305)-473-2955
7. GAINSVLLE	Santa Fe Teaching Zoo, Gainesville	(904)-395-5604
8. GULF BREZ	The Animal Park, Gulf Breeze	(904)-932-2229
9. JACKSONVL	Jacksonville Zoological Park, Jacksonville	(904)-757-4463
10. JNGLARY F	Jungle Larry's African Safari Land, Naples	(813)-262-5409
11. LAKEBUENA	(Disney) Discovery Island, Lake Buena Vista	(407)-824-3784
12. LAKESIDE	Lakeside Farm & Gardens, Tarpon Springs	(813)-Unlisted
13. LOWRY	Lowry Park Zoological Garden, Tampa	(813)-935-8552
14. LOXAHATCH	Rare Species Conservatory, Loxahatchee	(407)-790-5864
15. METROZOO	Miami Metrozoo, Miami	(305)-251-0401
16. MIAMI PJ	Parrot Jungle, Miami	(305)-666-7834
17. MONK JUNG	Monkey Jungle, Miami	(305)-235-1611
18. NOELLSARK	Noell's Ark Chimp Farm, Tarpon Springs	(813)-937-8683
19. ORLANDO	Sea World of Florida, Orlando	(407)-351-3600
20. PANAMACTY	Zooworld, Panama City	(904)-230-1423
21. SANFORD	Central Fla. Zoological Park, Lake Monroe	(407)-323-4450
22. SILVER SP	Silver Springs Attraction, Silver Springs	(904)-236-2121
23. ST AUG GA	St. Augustine Alligator Farm, St. Augustine	(904)-824-3337
24. TALLAHASE	Tallahassee Mus. Nat. Hist., Tallahassee	(904)-575-8685
25. UNIVMIAMI	U. Miami Anthropology Dept., Coral Gables	(305)-284-2380
26. W PALM BE	Lion Country Safari, West Palm Beach	(407)-793-1084
27. WOODHAVEN	Lubee Foundation, Gainesville	(904)-485-1250
28. YULEE	White Oak Plantation, Yulee	(904)-235-3340

*Not all facilities listed keep birds in their collections.