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THE HISTORY OF QUAIL MANAGEMENT WITH COMMENTS ON PEN-REARING

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Abstract: Quail were present in the Lower Oligocene about 40 million years ago. The remains of northern bobwhite (*Colinus virginianus*) have been found in Indian middens in the eastern United States, but these birds were not considered a preferred food. However, California quail (*Callipepla californica*) were a choice food of Native Americans. Bobwhite are the most prized species by sportsmen, with the California quail in second place. There is evidence that northern bobwhite reached unprecedented numbers over large geographical areas, especially along their northern range in the mid-1800's. California and Gambel's quail (*C. gambelii*) were abundant in the mid- to late-1800's. From a social standpoint, the importance of northern bobwhite in promoting sportsmanship afield has never been fully appreciated. The bobwhite created a gentleman's way of life in the South that is steeped in socially accepted tradition which has been fostered and respected by sportsmen through the years. By its very nature, bobwhite hunting brings out the best in men and dogs. The eternal pursuit of perfection by man has made quail the hunting sport of choice by Americans. With ever-decreasing quail habitat and a growing human population, there is a great need to establish more quail habitat throughout the bird's range, and to produce pen-reared bobwhite that consistently emulate the sporting challenge of their wild cousins.

Key words: history, pen-reared, private initiative, quail, social.

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When Dr. Church invited me to be a plenary speaker on the subject of "The Cultural and Historical Aspects of Quail Management," I accepted with the proviso that I could discuss the dire need for more assistance from the academic community in the production of quality, pen-reared bobwhite for hunting purposes. He agreed, which gave me a chance to review the literature on the history of quail, recall the sporting qualities of this great game bird and its influence on our social and cultural life, and conclude with a plea for more attention to the problems of producing quality, pen-reared quail.

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ORIGIN

Quail have been part of the world fauna at least since the Lower Oligocene (40,000,000 years ago; Johnsgard 1973). Modern forms are thought to have evolved from a long-tailed, arboreal, cracid-like ancestor in Central America or northern South America; the progenitor, similar to tree quails (*Dendrortyx* spp.), branched along 2 inde-

pendent lines. One line led to the forest-adapted, terrestrial taxa more specialized for digging bulbs, rootlets, and tubers than for seed-eating and includes the genus *Cyrtonyx*. The second line led to arid-adapted, terrestrial genera and includes *Colinus*, *Callipepla*, and *Oreortyx*.

Rosene (1984:9) reviewed the geologic history of quail in the contiguous 48 states. Remains of the earliest-known extinct quail (*Colinus hibbardii*) were discovered in Kansas, dating from the late Pliocene Epoch (>1,000,000 years ago). Another quail, *Colinus sulium*, lived about 15,000 years ago (Pleistocene Epoch), based on remains from Florida and Texas. *C. sulium* was smaller than the Kansas bird, but larger than the modern bobwhite.

During the Pleistocene Epoch, continental glaciers spread from the north over much of the hemisphere. Many plants and animals were forced south and failed to survive, whereas others evolved into new species and races. Evidently *C. sulium* became extinct during this period, and there was a transition to *C. virginianus*. Paleontologists recognize sufficient differences in quail fossils to classify the 2 extinct birds as separate species, and they infer that our present bobwhite could have evolved from *C. hibbardii* of 1,000,000 years ago.

Table 1. Common and scientific names of quail in the 48 contiguous states.

Genus <i>Callipepla</i>	
	Scaled quail (<i>C. squamata</i>)
	California quail (<i>C. californica</i>)
	Gambel's quail (<i>C. gambelii</i>)
Genus <i>Colinus</i>	
	Northern bobwhite (<i>C. virginianus</i>)
Genus <i>Oreortyx</i>	
	Mountain quail (<i>O. pictus</i>)
Genus <i>Cyrtonyx</i>	
	Montezuma quail (<i>C. montezumae</i>)

Today the contiguous states harbor 4 genera and 6 species of quail (Table 1). Known hybridization among *Callipepla* species and between *Callipepla* and *Colinus* demonstrates close phylogenetic relationships.

RECENT HISTORY

Available evidence from middens indicates that bobwhite were not commonly used by Indians, probably because of their small size and the difficulty of securing them in large numbers. The wild turkey (*Meleagris gallopavo*) was the upland bird most sought after by Indians (Goslin 1955, van der Schalie and Parmalee 1960, Woolfenden 1965); however, for many Native Americans, the California quail was an important part of the diet, supplementing large mammals, fish, roots, seeds, nuts, and other foods. The birds were so sought after in some areas, especially in the northern half of California, that special devices were developed solely for capturing quail. In the central area of the state there were professional quail hunters, which emphasizes the importance of the birds to Indians in the area (Nissen 1977:228).

In Wisconsin the bobwhite within a period of 10 years, 1845-54, became extraordinarily abundant (Schorger 1946:81-82). It then declined in numbers so rapidly that during the past 75 years the most that can be said for the species is that it has maintained its existence. Taking into consideration all of the known influential factors, Schorger (1946:94-98) concluded that a decade of favorable winter weather seems to have been most important in producing the peak in the population. Unless we assume that weather has continued to be the important factor, the question of why the quail refuses to undergo more than a sporadic increase remains unanswered.

The former periodic irruption or emigration of quail on an extensive scale was an interesting phenomenon (Schorger 1946:87-90). During the movement, which took place usually in September and October, quail behaved abnormally, especially in the north-central states. As late as 1891, Van Dyke (1891:11-13) wrote of the quail in Minnesota:

"In the early part of the fall,...quail generally have a crazy spell, during which they gather into large flocks, travel quite a distance and even go into town and butt their brains out against houses." Schorger (1946:89) stated, "There is little doubt that the habit of quail to emigrate or irrupt, when a certain density of population was attained, was a powerful factor in producing the huge numbers that existed in Wisconsin in the decade prior to 1854."

There is ample evidence that quail increased greatly simultaneous to a certain stage in the development of agriculture. After the Wisconsin peak quail populations, all stages of land improvement could be found in the southern portion of the state, yet quail never recovered.

Gambel's quail were historically much more abundant in Arizona than at present; extremely high populations were observed from early exploration of the territory until about 1900 (Brown 1988). The earliest explorers (1840's) observed "immense" numbers of quail. Brown (1988:9) quoted from the diary of G. O. Hand based on observations in 1862:

"All along this day's march the quail were astonishing; big flocks of them 200 yards long. I really think there were millions of them in each flock."

High numbers persisted into the late 1880's as "thousands of dozens" were captured and shipped to market. Indeed, Gambel's quail were so numerous as to be considered agricultural pests.

The great drought of 1888-1904 and associated grazing abuses marked the end of high quail abundance in Arizona (Brown 1988:9). Brown (1988:10) speculated, as did Leopold (1977:33-34), that the inherent productivity of the land might have been lowered by the whiteman's land-use practices and the alien plants which he introduced. He also observed that massive flocks of Gambel's quail often were associated with perennial watercourses, scoured each year by floods which deposited nutrient-rich sediment. Daming of the watercourses has thwarted a rejuvenating process of nature.

Leopold (1977:32-34) stated that California quail in the presettlement stage were probably not as abundant as they were during the subsequent market hunting era. This species peaked between 1860 and 1895. He envisioned a sequence of environmental stages, associated with settlement and agricultural development, that initially favored the increase and spread of quail but later led to habitat deterioration and a substantial regression in numbers. Leopold (1977:34) further stated that the fortuitous production of optimum vegetation for quail took place on soils brimming with stored fertility and organic matter of the ages. The same was true of the peak period of bobwhite production in the Midwest. It is unrealistic to believe these pioneer conditions could be fully restored today by proper land management. Overgrazing, overcropping, and surface erosion have stripped most lands of that accumulated richness that came with centuries of soil maturation under native vegetation. Perhaps only the deep alluvial valleys have retained the basic capacity to fully renew their original productivity, and those are the areas cultivated most intensively and mechanically. We must take the sensible view that the great quail peak of the mid- and late-1800's is a glamorous relic of the past, a relic we wish to fully understand but that we can only reproduce on a small scale.

SOCIAL AND CULTURAL ASPECTS OF QUAIL

If there is 1 upland bird that fits into the American scene to perfection, it is the northern bobwhite. Not a large bird, not as swift as some or as tricky, the bobwhite has nonetheless endeared itself to thousands of upland gunners as the only bird that is "fit to hunt" (Anderson 1977). In the South the northern bobwhite is referred to as "The Bird." More sportsmen hunt and more has been written about the bobwhite, as well as the hunting dogs used to hunt them, than all other quails.

The California quail has the doubtful honor of ranking second in popularity with sportsmen. Certainly the Montezuma quail (*Cyrtonyx montezumae*) is the least famous in providing sporty hunting, and between these 2 species must fall the other quail, the scaled (*Callipepla squamata*), Gambel's, and mountain (*Oreortyx pictus*).

Marks (1991) stated that hunting traditions reveal central values, symbols, and tensions in American life. Some hunting traditions have elite origins, which Marks contrasts with the

democratic ethos of the American frontier. In the antebellum period, wealthy planters affirmed aristocratic ideals through the hunt. The planter ventured forth in leisure, on horseback, with trained dogs and a retinue of trusted slaves and friends. The hunt was a coordinated vortex of action, surrounded by the roaring swirls of peers and subordinates, of horses and hounds, all focused on a common objective. Following the war between the states, white elites elaborated the hunt of quail. Quail hunting had to be approached on a gentleman-to-gentleman basis. He was worthy of respectful shooting. Marks further stated that landowners lay claim to a genealogy of status and control over the good stuff of life through their pursuit of the bobwhite.

Cultural symbols permit us to identify esteemed personal traits. Central to hunting is the value of fair play—wild animals should always be given a chance to escape. Sportsmanship includes keen observation, self-reliance, patience, and unselfishness. Hunting is an arena for demonstration of character and accomplishments, forming the basis for friendship and companionship, but also for competition.

There was great emphasis on sportsmanship afield in the first half of the 20th Century. Outdoor writers such as Nash Buckingham, Harold Sheldon, Ray Holland, Robert Ruark, and Warren Page preached and wrote about sportsmanship afield and, in my opinion, it was quail hunting that inspired them to do so. The lack of emphasis on sportsmanship afield in the latter half of the 20th Century made it mandatory to inject hunter responsibility into hunter education courses. Outdoor gadgets seized our attention, and the term "slob hunter" emerged to haunt us.

As Robert Ruark (1980:6) stated:

"The [bobwhite] quail has never been satisfactorily explained in terms of his relationship with man, his peculiar fascination *for* man, or the occasional nobility or fraud that he inspires *in* man. He seems to have been created especially for his catalytic approach to the genus *Homo*, and comes off heavily the best by comparison."

Neel (1972) documented the emergence in the postbellum period of many plantations for bobwhite hunting rather than agricultural crops. These properties stretched from Virginia to Texas and ranged in size from a few hundred to thousands of hectares of southern land.

The old cotton fields and farmsteads, abandoned after defeat of the South in the War Be-

tween the States, had gone through the early stages of succession and by 1920 offered new challenges to those responsible for the quail crop. Of course, by the late 1920's, quail managers had tried all of the "quick fixes" for quail abundance and were aware that simple answers, such as restrictions on bag limits and seasons, predator control, or restocking were not the solutions. Something more was needed.

The classic study by Herbert Stoddard (1931) in the 1920's was a direct result of the deterioration of hunting quality on existing plantations, and it was financed by unhappy plantation owners. One of the most important principles to emerge from Stoddard's research has to be the concept of a biological approach to management, including fire as a necessary and useful tool. Through private research, southern plantations have had considerable impact on wildlife management as a profession, and quail management in the South in particular. Stoddard's effort, along with Aldo Leopold's classic *Game Management* (1933), were the blueprints of the 1930's for an ecological approach to wildlife management.

WINDS OF CHANGE

We have little reason to be optimistic about the future of wild quail in North America. There are no simple and easy answers. Good quail hunting will become more expensive and require intensive management. Fred Guthery (Caesar Kleberg Wildlife Research Institute, Texas A&I University, pers. commun.) tells me populations of 5-7 bobwhite per ha are possible in Texas in normal years with intensive management. John Olin, with intensive quail management, approached 5 quail per ha on the best bobwhite habitat on his Georgia plantation. It can be done, but the economics are not for the average hunter.

Part of the "winds of change" is the growing use of pen-reared bobwhite for dog training and commercial hunting areas, such as hunting preserves. Unfortunately, we in the wildlife profession have abandoned game-bird propagation and left the effort in the hands of good folks in poultry husbandry, who mostly treat the subject as an unwanted stepchild and do not understand the importance of simulating the sporting aspects of wild birds with their pen-reared counterparts. Their training has been the efficient conversion of feed into pounds of flesh for the meat market. Have those of us in the wildlife management profession forgotten artificial propagation is a tool of wildlife management? Shouldn't we always strive to improve our management tools? When

we do initiate a project with pen-reared game birds, the effort seems to center on what is wrong with pen-reared game birds for hunting purposes instead of how we can improve their field performance. In the meantime pen-reared bobwhite are used to supplement wild populations in many areas and passed off as wild birds in ever increasing numbers (Kozicky 1987:65).

Northern bobwhite is called the king of game birds, but his pen-reared cousins have a serious flaw. They tend to domesticate in captivity rather quickly, and their field performance leaves much to be desired. Quail hunters either on a hunting preserve or commercial hunting area have a right to expect pen-reared game birds to approximate the field behavior of their wild brethren. The birds are expected to flush as a covey and exhibit strong flight characteristics, have the same color and conformation as wild birds, and be fully feathered and not grossly debeaked.

In the beginning of my effort to develop quality bobwhite hunting with pen-reared birds at Nilo, an experimental and demonstrational hunting preserve owned by the Winchester Group, Olin Corporation, I looked for simple answers. But, answers were not simple and required considerable attention to details.

We finally achieved success with the Burnette bobwhite (Kozicky and Madson 1966:138-162). Our greatest critic was John M. Olin, the guiding force behind our efforts at Nilo, and devoted quail hunter. Needless to say, we felt the glow of accomplishment when he stated that we were 90% successful in simulating wild quail hunting with pen-reared bobwhite. But, this brush with success only lasted about 2 years. My source of pen-reared birds from the Burnettes dried up, and we became involved in other projects. The important point is that pen-reared birds can provide quality hunting.

Wildness in any game bird is the sum of heredity and environment. Although the ring-necked pheasant (*Phasianus colchicus*) does not seem to be greatly influenced by environment, the bobwhite is (Kozicky 1987:35-40). The objective on a preserve is to provide consistent, quality hunting of any upland game bird within 30-60 minutes of being released for hunting. The key words are "consistent" and "quality." The 30- to 60-minute time limit is incidental if the loss of released birds can be minimized. As a rule, the longer the period between release of birds and hunting, the lower the return. Released birds are subject to predation and movement after being released.

Consistent means that one can expect the same field performance under the same weather conditions throughout the hunting season. Too often we hear that released birds performed well 1 day but not the next. What happened? In many instances we do not know. But it is a fair assumption that some detail(s) of management for quality quail hunting has (have) been overlooked.

The preserve operator, looking for a simple answer and a scapegoat, is prone to blame the breeder. But, if the birds were good flyers at the time of purchase, the answer lies either in shipping or management of the birds on the preserve.

The game-breeding industry has matured by leaps and bounds on some species of game birds in the last 40 years. Originally, game breeders selected for the domestic strain of game birds. Most game birds were produced for the table. Hence, they selected more docile birds, best egg layers, and largest birds—all traits of domesticity. But, the hunting preserve industry began demanding changes, and great strides have been made, especially with the ring-necked pheasant. Today, game breeders can provide you with a pheasant for the table or a bird as wild as you want. The same is not true for bobwhite.

In the last 40 years the preserve industry has learned the importance of heredity and isolation through trial and error in producing quality bobwhite (Kozicky 1987:36-37). However, there is little valid information on how frequent to back-cross to wild birds. There is no universal understanding of the word "isolation." Some breeders consider isolation of pen-reared bobwhite to be putting their holding pens behind the barn. To me isolation should mean absolutely no contact with dogs and not more than 1 human contact per day, and preferably by the same person wearing the same colored clothing. There are other factors still being evaluated, such as flight pens; rearing on ground or wire; overhead cover; not mixing bobwhite from different holding pens; darkened holding pens; food, water, and dusting; and shipping that influence the performance of pen-reared bobwhite in the field (Kozicky 1987:57-68). Currently, bobwhite breeders advertise that their birds are flight-conditioned. In most cases it is a sales gimmick or buzzword of questionable value. To date, we cannot judge the field performance of pen-reared bobwhite by the most common anatomical or physiological variables—rectal temperature, heart rate, body weight, wing measurements, or toe or leg length (Cain 1974). However, if the birds are docile when you approach

them in a holding pen, it is unlikely they will perform satisfactorily in the field.

We all like simple solutions to complicated problems, but they are seldom valid, which reminds me of a quick fix several years ago. At the Caesar Kleberg Wildlife Research Institute we tried to take average pen-reared bobwhite, inject them with adrenocorticotrophic hormone, and stimulate a docile domesticated bird into simulating a wild bird for at least a few hours. In short, it did not work. What was of interest is that individual birds reacted differently to the drug and external stimuli. This made us realize that bobwhite are also individuals, probably as much as humans. If so, it takes time to unite a group into a covey.

There is considerable tradition associated with bobwhite hunting. The hunter expects to find a covey of birds and have birds flush as a covey and then pursue some of the singles. One problem with pen-reared birds is that they have not had a chance to become a covey, especially when birds for a hunt originate from different holding pens. The birds have not had time to develop a peck order and determine a leader. One of the benefits of the Smith-O'Neal release system (Kozicky 1987:69-70) is that it gives pen-reared birds time to become a covey, and react accordingly when encountered in the field. With good quality pen-reared birds, such as Burnette bobwhite, the birds reacted as a covey unit upon release. But these birds were reared and held together as a unit both by the Burnettes and within the holding pens at Nilo. The normal number of birds in a covey released for hunting at Nilo was 6.

Then, there are folks who want to release pen-reared bobwhite with the thought that they will be accepted by wild coveys. Some have even broadcast pen-reared birds over their hunting areas. It usually is a 1-time affair. The return in harvested bobwhite quickly eliminates this technique. Occasionally a wild covey will accept a pen-reared bird or 2, but such acceptance is more the exception than the rule. Wild coveys have strong social bonds and are not prone to accept recruits.

Besides the rearing and holding of pen-reared bobwhite, there is a series of factors that will affect the field behavior of released pen-reared birds: number of birds in a release, method of release, length of time from release to hunting, type of cover into which the birds are released, weather, traits of the hunting dog(s), and time of day (Kozicky 1987:61-63,116).

Quality quail hunting with pen-reared birds sounds like an impossibility, but many of the problems listed are minor if the birds are of the proper wild stock. *In my opinion there is no substitute for the basic wildness of pen-reared stock, and the efforts made by the game breeder and the hunting preserve operator to retain the basic wildness of the birds.* Mature bobwhite can and have become pets.

As yet no one has developed an environmental influence that will reverse the tendency for bobwhite to domesticate in captivity. All management techniques, with the exception of backcrossing to wild birds, are environmental measures to delay domestication or to influence the field behavior of pen-reared bobwhite. The industry needs the help of universities to solve some of the mysteries of producing quality pen-reared bobwhite for hunting on a consistent basis at a reasonable cost. Personnel at some universities and state wildlife agencies believe that pen-reared bobwhite are a liability in the wild, and the fewer the better. This philosophy reminds me of an ostrich sticking its head in the sand, because thousands of pen-reared bobwhite are released every year for hunting purposes, and the number is growing. Private enterprise in game management has been with us since 1910.

As Aldo Leopold (1933:20) pointed out back in the early 1930's,

"The Crusaders for conservation wrote many volumes on why rather than how wildlife and civilizations could be adjusted to each other. There was 1 periodical, *The Game Breeder*, that pioneered the idea of game production through private initiative, but it leaned toward artificialized game-farming technique, and toward open markets to reinforce the private production incentive. These 2 corollaries, particularly the latter, beclouded the intrinsic merit of the central idea. Its program had the outstanding merit of realism and of constructive discontent with pious phrases."

The Game Breeder magazine eventually went out of business but has been replaced with *Wildlife Harvest*.

The academic challenge is to try and find the best way to produce quality bobwhite at a reasonable price and keep hunting as close to its traditional sporting challenge as possible, including the covey rise. It has been done on a small scale by a Missouri couple devoted to the production of quality birds, but it was more a labor of love than one for profit (Kozicky and Madson 1966). Then, the question remains: will the hunting

preserve client pay for the extra cost of quality bobwhite? We are all aware that the most sensitive nerve in the human body is the one that runs between the heartstrings and the billfold. There are hunters who are quite satisfied with the quality of current pen-reared birds on hunting preserves (Marks 1991:180-181). Also, strange as it may sound, there is a growing number of new hunters who have never experienced the challenge of wild quail hunting and may not know the difference.

SUMMARY

In closing, quail have been a fixture on the American scene for more years than man has recorded history. Their contribution to sport hunting, especially bobwhite and California quail, are legion, and have had a great influence on our social life. Quail have brought out the best in men and dogs, especially the bobwhite. Yet, we need to be concerned about the future of all species of quail.

The future of quail lies in part with the general public, the quail hunter, the economics of the sport, and the academic community. The quail hunter, best described by Charley Dickey (1974:25), "...is a simple and kindly man who asks no more of life than that the birds fly fast, the dogs hold tight, and everything has a sporting chance to live or die," will have to learn to devote more time and money to the future of his sport. The academic community must strive to find ways and means of assuring huntable supplies of bobwhite on an annual basis and help private enterprise produce better and wilder bobwhite in captivity at a reasonable price. The use of pen-reared bobwhite is a fact of life. The challenges are tremendous, but good men and women rise to such challenges, and I have a profound faith that solutions will be found and the sport of quail hunting will continue to epitomize sportsmanship afield.

LITERATURE CITED

- Anderson, L. A. 1977. Hunting the uplands with rifle and shotgun. Winchester Press, New York. 214pp.
- Brown, D. 1988. Were quail more abundant then than now? *Ariz. Wildl. News* 34(1):8-10.
- Cain, R. 1974. Proceedings of the game bird management short course. Ext. Serv., Penn. State Univ., University Park.

- Dickey, C. 1974. Charley Dickey's bobwhite quail hunting. Oxmoor House, Inc., Birmingham, AL. 189pp.
- Goslin, R. 1955. Animal remains from Ohio rock shelters. *Ohio J. Sci.* 55:258-362.
- Johnsgard, P. A. 1973. Grouse and quails of North America. Univ. Nebr. Press, Lincoln. 553pp.
- Kozicky, E. L. 1987. Hunting preserves for sport or profit. Caesar Kleberg Wildl. Res. Inst. Press, Texas A&I Univ., Kingsville. 210pp.
- _____ and J. B. Madson. 1966. Shooting preserve management--the Nilo System. Winchester Press, East Alton, IL. 311pp.
- Leopold, A. 1933. Game management. Charles Scribner's and Sons Publ., New York. 481pp.
- Leopold, A. S. 1977. The California quail. Univ. Calif. Press, Berkley. 281pp.
- Marks, S. A. 1991. Southern hunting in black and white. Princeton Univ. Press, New Jersey. 327pp.
- Neel, L. 1972. The traditional southern bobwhite quail plantation. Pages 4-6 in J. A. Morrison and J. C. Lewis, eds., *Proc. First Natl. Bobwhite Quail Symp.*, Okla. State Univ., Stillwater.
- Nissen, K. M. 1977. Quail in aboriginal California. Pages 227-228 in A. S. Leopold, author, *The California quail*. Univ. Calif. Press, Berkley. 281pp.
- Rosene, W. 1984. The bobwhite quail, its life and management. Sun Press, Hartwell, GA. 418pp.
- Ruark, R. C. 1980. The brave quail. Pages 3-13 in L. Underwood, ed., *The bobwhite quail book*. Amwell Press, Clinton, NJ.
- Schorger, A. W. 1946. The quail in early Wisconsin. *Trans. Wis. Acad. Sci., Arts, and Letters* 36:77-103.
- Stoddard, H. L. 1931. The bobwhite quail: its habits, preservation and increase. Charles Scribner's and Sons Publ., New York. 559pp.
- van der Schalie, H. and P. W. Parmalee. 1960. Animal remains from the Etowah Site, Mound C, Bartow County, Georgia. *Fla. Anthropologist* 13(2-3):37-54.
- Van Dyke, T. S. 1891. Bob-white in Minnesota. *Shooting and Fishing* 10(7):11-13.
- Woolfenden, G. E. 1965. Bird remains from a Kentucky Indian midden. *Quart. J. Fla. Acad. Sci.* 28:115-116.

