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A Review of Parental Carrying of Young by Waterfowl*

PAUL A. JOHNSGARD AND JANET KEAR

The occasional stories of female ducks carrying young while flying from elevated nest-sites, though ignored for the most part, still persist. Recently, the astonishing observations of Cade and Maclean (1967) on the sandgrouse *Pterocles namaqua* transporting water to its young in its feathers and the excellent photographs by Truslow (1967) of the Pileated Woodpecker (*Dryocopus pileatus*) carrying its eggs from a ruined nest, two behaviors previously regarded by ornithologists as improbable or highly unlikely, have led us to examine once again the reports of parental carrying in ducks.

Most authorities on waterfowl—for example, Phillips (1922:220; 1924:64) and Kortright (1942:227, 265)—have not taken these accounts seriously. And why should they? Photographic evidence convinces us that downy young of several species, including the Wood Duck (*Aix sponsa*), Common Goldeneye (*Bucephala clangula*), and Common Shelduck (*Tadorna tadorna*), normally jump from the nesting hole. In these species observers have repeatedly noted that when the female stands at the base of the nesting tree and calls, the young scramble up the sides of the nesting cavity and jump out in quick succession. Audubon himself subscribed to the idea that this method of egress was normal in Wood Ducks although he also believed that, if the nest was a great distance from water, the female carried the young in her bill.

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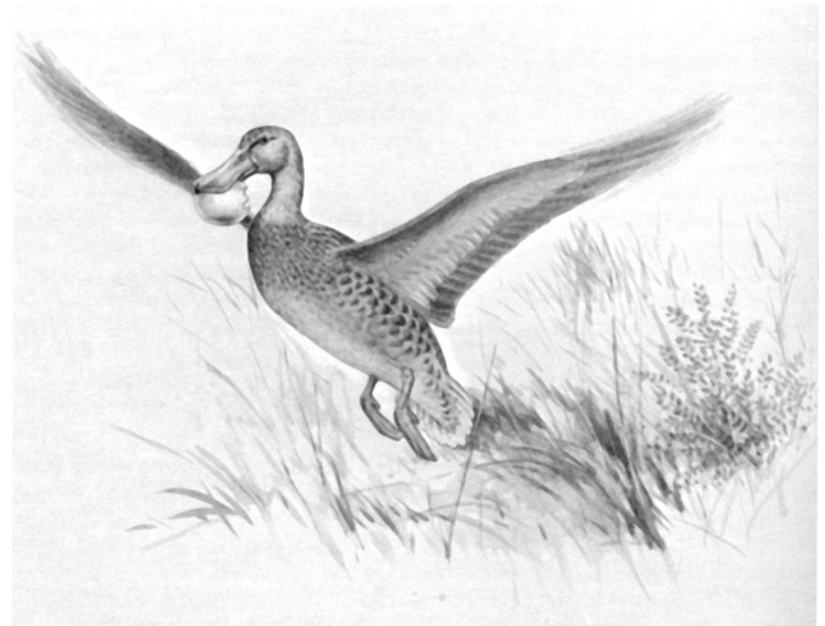


Figure 1. Female Shoveler removing eggshell from the nest. This drawing, by Robert Gillmor, is based on a published photograph by Lyie Sowls.

We have many other accounts of the young jumping from the nesting hole. A. S. Hawkins and F. C. Bellrose (*in* Kortright, 1942) provided one of young Wood Ducks and both Brewster (1900) and Macartney (1918) described the same behavior in the Common Goldeneye. Rittinghaus (1956) reported and photographed the aerial descent of downy Common Shelducks, and Robinson (1940) and Bjarvall (1967) described almost identical behavior in Mallards (*Anas platyrhynchos*), which do not regularly nest in trees. Likewise Yocom (1952) and Craighead and Stockstad (1958) told of newly hatched Canada Geese (*Branta canadensis*) jumping from aerial nests.

Thus this type of departure from elevated nests has been observed among species representing five tribes of Anatidae (Delacour, 1954-1964), including all those with typical tree-nesting forms. In her recent studies on the behavior of newly hatched nidifugous birds, Kear (1967) demonstrated that ducklings of the tree-nesting

species lack what is otherwise an almost universal characteristic—a tendency to avoid sharp drops. She suggested that this relatively dangerous behavior evolved because of the necessity of jumping to the ground soon after hatching.

In view of this evidence we must regard the accounts of female ducks carrying their young while flying either as hoaxes, inaccurate observations, or a representation of distinctly atypical behavior. To consider such young-carrying as pure fabrication is nullified by too many people of diverse backgrounds reporting on it in reputable journals. It seems, therefore, that another look at the accounts of parental carrying, or how young birds might otherwise leave nests in trees, is in order.

Parental Carrying in Birds Other than Waterfowl

It is at once apparent that, of all the tree-nesting avian groups, nearly every account of carrying young concerns only a few orders, most members of which are ground-nesting and leave the nest immediately after hatching. E. A. Armstrong (*in* Thomson, 1964) and Nice (1962) reported that three species of rails (*Rallus*) have been seen carrying young, and between them they indicated that similar behavior has been reported in a gallinule (*Gallinula*), a sandpiper (*Actitis*), both genera of woodcock (*Scolopax* and *Philohela*) and, curiously, a cuckoo (*Centropus*). Labitte (1960) mentioned several reports of parental carrying by various European birds, especially hawks and owls. E. W. Farmer (*in* Bent, 1932:349) observed parental carrying by a chachalaca (*Ortalis*). Cunningham-van Someren and Robinson (1962) reported parental carrying by the African Jacana (*Actophilornis africanus*) and this issue of *The Living Bird* has a paper on the same subject by John B. Hopcraft. Finally, Schafer (1959) provided an account of parental carrying by European Woodcock (*Scolopax rusticola*) and von Frisch (1966) has described and photographed parental carrying by a Montagues Harrier (*Circus pygargus*).

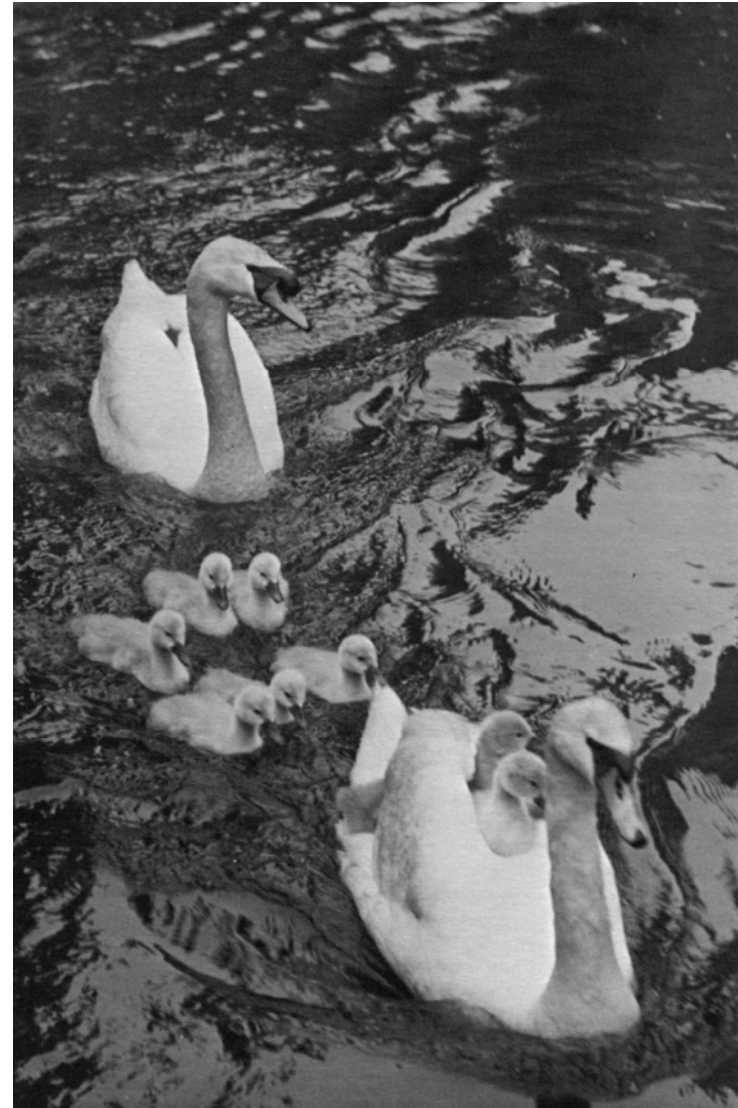


Figure 2. An unusually large family of Mute Swans. Notice how the wings of both adults (female in foreground) are slightly raised, providing a convenient "cockpit" for the young. Photograph from the files of the Wildfowl Trust; photographer unknown.



Figure 3. Female Mute Swan with two young aboard. Photograph courtesy of the *Reading* (England) *Evening Post*.

Parental Carrying in Waterfowl

It appears, therefore, that definite records substantiate the carrying of young for representatives of five or more orders exclusive of the Anatidae. However, one important difference between all of these birds and waterfowl is that waterfowl are almost totally unable to pick up anything and carry it about. According to Harrison (1967), waterfowl do not carry nesting material but pass it backwards over the shoulder. Our own observations indicate that they do not transport food in order to deal with it in a more secure or convenient place, do not normally remove eggshells from nests at hatching time, and do not bring food to their young. (We shall explain later that some species do carry eggs and eggshells.) In a few species where the adults help the young obtain food, the young come to the parent's side, either voluntarily or when called. The

parents never go to them. Even in the Red-crested Pochard (*Netta rufina*), in which the male performs courtship-feeding, the female approaches the male and takes the material from his bill. But, despite this well-established disinclination to carry objects, a surprising number of accounts of flying adults carrying young do appear in literature, and such accounts involve species that represent most of the recognized tribes.

Apparently the only report of parental carrying by whistling ducks is for *Dendrocygna javanica* (Hume and Marshall, 1879-1881). Hume recalled two instances in which he personally observed adults carrying young in their claws. Yocom (1952) cited a second-hand account of Canada Geese removing young one at a time in the bill from a high nest-site, and Pedersen (1934) told of seeing two Barnacle Geese (*Branta leucopsis*) flying down from a high cliff in Greenland, each carrying in its bill an object later identified as a downy young. Madsen (1925) reported that a Barnacle Goose, after being disturbed on its nest, flew 35 meters down a Greenland cliff with one young on its back. Johnson (1965) stated that a sheep rancher in Chile had observed Black-necked Swans (*Cygnus melancoryphus*) carrying young on their backs while in flight, and that the natives mentioned seeing Ashy-headed Sheldgeese (*Chloephaga poliocephala*) carrying goslings in the bill from tree nests. Ludlow (1950:44) quoted Colonel Stackley to the effect that Ruddy Shelducks (*Tadorna ferruginea*) carry their young to water by "tucking them in between the neck and the shoulder" and volplaning down to the shore. Several observers, quoted in Phillips' work (1922-1926), reported parental carrying by Common Shelducks. One of these, Lumsden (1898), saw a female Common Shelduck drop from its bill an object which proved to be a recently hatched duckling, and another, Payne-Gallwey (1882), reported seeing a Common Shelduck carrying ducklings on its back. Roberts (1957), as well as Clancey (1967), indicated that carrying of the young may occur among Egyptian Geese (*Alopochen aegyptiacus*) and Comb Ducks (*Sarkidiornis melanotos*).



Figure 4 Black-necked Swan at the Wildfowl Trust with one young cygnet visible on its back. The adult shown is probably a female. Photograph by Russ Kinne.

Forbush (1922, 1925), having contacted a number of observers who claimed knowledge of the means by which another perching duck, the Wood Duck, might bring its young from the nest, thoroughly discussed the matter. He stated (1925:229) that three persons saw young carried on the female's back. In all other cases, if the parents transported the young at all, they carried them in the bill. Phillips (1925) indicates that there were 13 cases of this. Kingsford (1917) also reported carrying in the bill. Forbush added that on several occasions when the young were evidently not held in the bill, more than one clung to the female simultaneously. On the other hand, Dr. Gilbert Gottlieb (pers. commun.) told us that he was unable to induce parental carrying experimentally among Wood Ducks by any means.

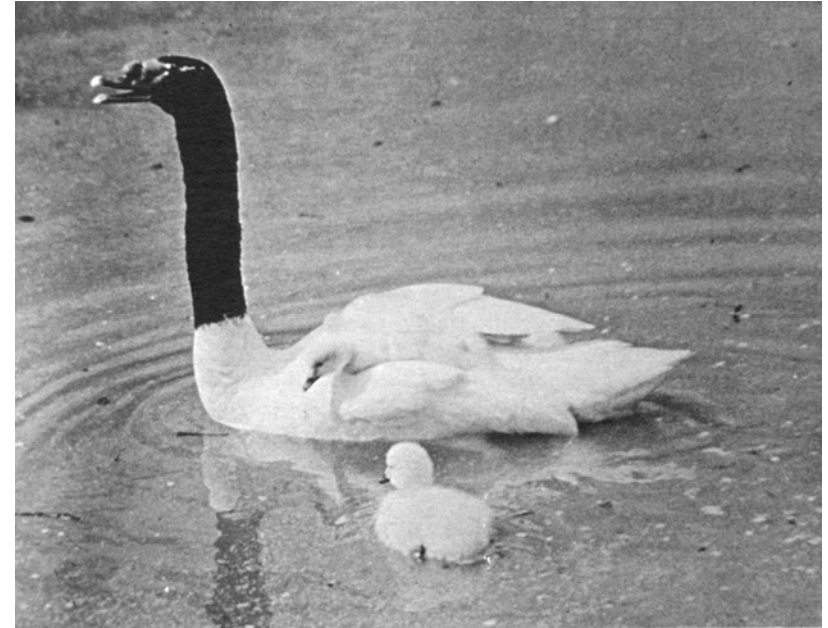


Figure 5 Male Black-necked Swan at the Wildfowl Trust with three young on its back. One is barely visible under the bird's right wing, a second is looking over the adult's left shoulder, and a third is behind the second, with its head hidden under the wing or scapular feathers of the adult. Photograph by Paul A. Johnsgard.

Recently, Mr. Douglas Wagstrom of rural Ottertail County, Minnesota, informed me (PAJ) that in 1966 he observed apparent parental carrying by a female Wood Duck that nested about 18 feet up in an elm tree, 40 feet from the bedroom window of his farmhouse. Early one morning the female repeatedly flew from the nest entrance straight to the edge of the closely mowed lawn some 80 feet away where she dropped suddenly to the ground and stopped. After the last flight he saw a brood of ducklings, all clustered together, follow her into the tall marsh grass adjacent to the lawn. The light was not strong enough for Mr. Wagstrom to determine how the young were carried but he was positive that they did not jump from the nest-hole and run across the lawn. In 1967, Wood Ducks occu-

pied the same nest-site, and, from 29 June, I made daily visits to the nest at sunrise in hopes of observing the departure. Although I missed the exodus by a few hours on the morning of 5 July, the Wagstroms saw it. The young definitely jumped out of the nest while the female stood at the base of the tree. If we assume that the same female Wood Duck nested there both years, this would suggest a surprising variability of behavior.

Regarding the dabbling ducks, most of which normally nest on the ground, we have only a few cases of possible parental carrying. In Australia the Black Duck (*Anas superciliosa*) often nests in elevated sites (Frith, 1967), and Miles (1950) provided a first-hand account of the female carrying the young to the ground on her back. However, Chapman (1951) gave an equally detailed description of the same species in New Zealand bringing the young from a treetop nest in her bill.

Several species of sea ducks typically nest in tree cavities or elevated sites. Various accounts of parental carrying can be found for both species of golden-eyes, such as Bailey's (1918) for the Common Goldeneye. Dr. Frank McKinney (pers. commun.) informed us that Alaskan fishermen told him of seeing Pacific Eiders (*Somateria mollissima v-nigra*) carrying young on their backs, and Bent (1923) cited some accounts of female Hooded Mergansers (*Mergus cucullatus*) and Common Mergansers (*M. merganser*) carrying young in the bill.

The only stiff-tailed duck for which we have any information concerning adults possibly flying with young is the Musk Duck (*Biziura lobata*). Mr. H. A. Robinson (pers. commun.) told me (PAJ) that Australian fishermen have reported seeing Musk Ducks taking flight with young on the back.

Possible Means of Carrying Young

Thus, observers have repeatedly described two diverse means of parents carrying young—on the back or in the bill.

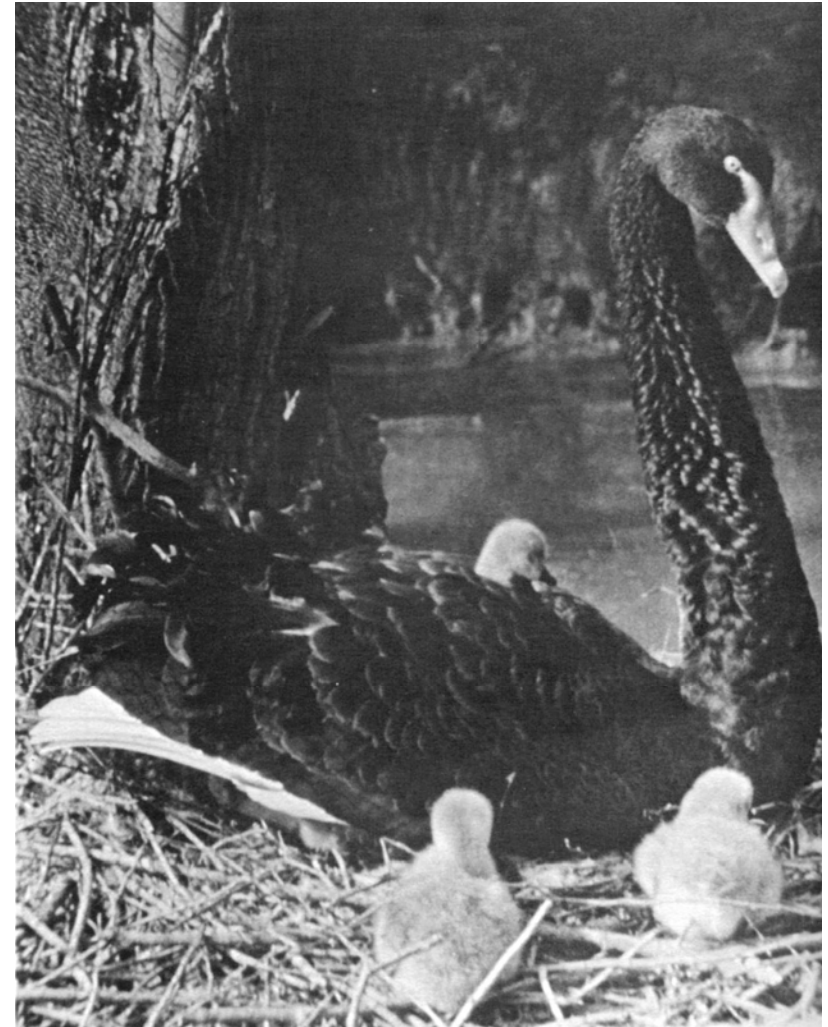


Figure 6. Male Black Swan at the Wildfowl Trust, brooding one newly hatched cygnet on its back while others stand beside it on the nest. Unlike other species, male Black Swans regularly assist in incubation. Photography by Paul A. Johnsgard.

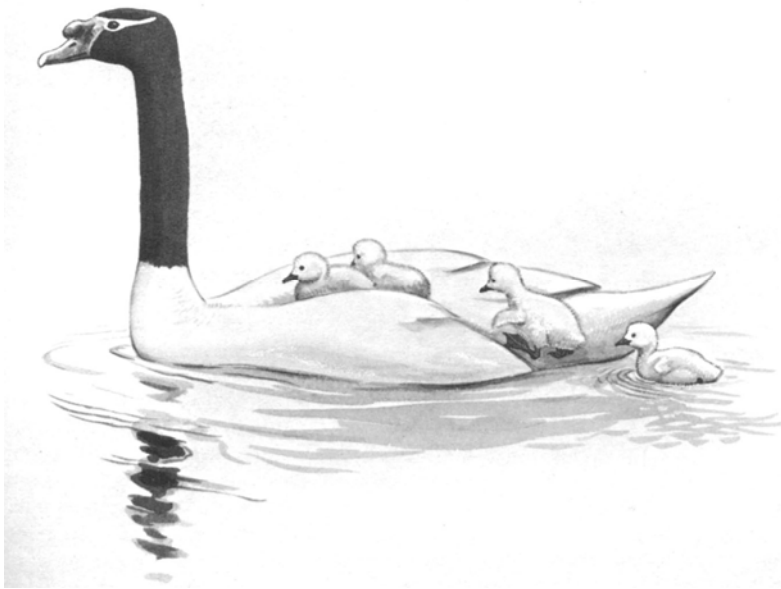


Figure 7 Black-necked Swan cygnets climbing onto an adult. This method of "boarding" is typical of all the swans that carry their young; the parent provides no assistance. Drawing by Robert Gillmor.

Although the second method seems especially improbable, the observations of Sowls (1955) and others on damaged eggs or eggshells being carried from the nest (see Figure 1) demonstrate a clear capacity for removing objects in the bill—regardless of the statements by Nethersole-Thompson (1942). Sowls reviewed earlier reports of Mallards and Mexican Ducks (*Anas diazi*) carrying whole eggs or cracked eggs; and, in addition, he induced eggshell carrying in incubating Shovelers (*Anas clypeata*) and Pintails (*Anas acuta*) by planting eggshells among the clutch. Hochbaum (1959:92) writes of a Shoveler carrying an egg in flight. McKinney's description (1967) of captive female Shovelers carrying eggs or eggshells on three occasions strengthens these observations. There are also older published accounts of removal of addled eggs by Muscovies (*Cairina moschata*) and Common Mergansers. Similarly, E. Merikallio (*in*

Hildén, 1964) reported that female Common Eiders (*Somateria mollissima*) may remove eggs broken during incubation, and D. J. Brand (*in* Siegfried, 1965) reported that female South African Shovelers (*Anas smithi*) may carry away the empty shells as the eggs hatch. Clancey (1967) indicated that similar eggshell removal may also occur in Yellow-billed Ducks (*A. undulata*) and Weller (1959) has seen the same behavior in Redheads (*Aythya americana*). The only observation of egg-carrying by birds at the Wildfowl Trust was made by Dr. G. V. T. Matthews (pers. commun.) in April 1968 when a full-winged female Wood Duck swam across the pond in front of his window, carrying in her bill an apparently addled egg. She traveled some 45 yards before dropping it. Thus we cannot entirely discount the carrying of young in the bill.

The other method of carrying young—of flying with them on the back—is also difficult to accept. Nonetheless, we know that swimming adults do sometimes carry the young on the back. This behavior is marked in the three temperate-breeding swans, the Mute Swan (*Cygnus olor*), Black Swan (*C. atratus*), and Black-necked Swan, all of which may carry their young on their backs while swimming during their first two weeks of life or even longer (see Figures 2, 3, 4, 5, and 6). This activity in the temperate-breeding swans partly replaces brooding which in the northern, mostly arctic-breeding species, *C. cygnus* (including *buccinator*) and *C. columbianus* (including *bewickii*), takes place entirely on land. Although brooding on land seems to be restricted to the females of all swans, both sexes of the three temperate-breeding species carry cygnets on their backs. The male Mute and Black Swans do so only occasionally, but the male Black-necked Swan often swims about with three or four cygnets on its back at one time.

In these species the cygnets initiate the carrying by climbing on at a point between the folded wing and the tail (Figure 7). The parents do not assist them except perhaps by remaining motionless until they are aboard; thus, the carrying depends mainly on the young themselves. Not only do the arctic-breeding swans never carry cygnets, but also, if we give the cygnets of arctic-breeding species to

temperate-breeding adults to rear, the temperate-breeders do not carry them (JK, unpublished data). We have not yet attempted the rearing of temperate-zone cygnets with adults of the arctic forms at the Wildfowl Trust. We note, however, that the arctic species, all of which are migratory, do have longer wings that fold closely over the back, presenting a smooth lateral outline that might make climbing difficult. And we also note behavioral differences in the cygnets of the two groups. The cygnets of the temperate-zone forms exhibit a strong climbing tendency that the arctic species do not possess, at least to the same extent. For example, a small hand-reared Mute Swan is restless when sitting in a human lap and must reach the shoulder before settling down (Figure 8); a small hand-reared Trumpeter Swan is not.

At least two ducks also regularly carry their young, the Musk Duck (Serventy and Whittell, 1948; Lowe, 1966) and Salvadori's Duck, *Anas waigiensis* (Delacour, 1954-1964). The Musk Duck is a large, short-winged Australian stiff-tail and in this case, since the male Musk Duck assumes no parental role after copulation, the female alone carries. The clutch size is small, two eggs being the commonest number (Frith, 1967), and the brood is often reduced to a single offspring (Lowe, 1966) which rides around on its mother's back, even apparently diving with her by holding on to her neck feathers with its bill (Serventy and Whittell, 1948). The behavior has not been investigated in detail in the Musk Duck, nor in the Salvadori's Duck where again it is apparently only the mother that carries. Observers have also noted carrying during swimming in the Common Goldeneye (Bailey, 1918), Black-bellied Tree Duck, *Dendrocygna autumnalis* (Bolen *et al.*, 1964), two sheldgeese, *Chloephaga poliocephala* and *C. melanoptera* (A. W. Johnson, pers. commun.), two mergansers, *Mergus serrator* (Cory, 1878) and *M. merganser* (Baird *et al.*, 1882-115), and the Wood Duck (Allen, 1961:192). At the Wildfowl Trust we have seen the young of nearly all these species sitting or standing on the backs of foster-parent hens (Figure 9).



Figure 8. A hand-reared Mute Swan cygnet climbing up to the shoulder of Dr. Kear. Photograph taken at the Wildfowl Trust by Jan Rietz.

Discussion

The advantages of adults carrying young while swimming seem so obvious that we wonder why most waterfowl species do not do so. Presumably the adult must be relatively large and the brood small enough for all to be accommodated, and the adult must not need to fly much. It seems significant that at least four of the species which carry their young while swimming have relatively short wings. As in the grebes (Podicipedidae), the ducks carrying young would spend a great deal of time afloat and, therefore, obtain much of their food on or below the water surface. The evolution of the trait of carrying the young while swimming was possibly influenced by predation and in this respect certain differences in the life histories of swans may be relevant: The arctic species, which do not carry their young, hatch when the summer night is short or even non-existent; the temperate-zone cygnets, on the other hand, daily experience some hours of darkness when they are particularly vulnerable and need protection from predators. Further, the arctic cygnets grow

very rapidly and perhaps they become too large too quickly for easy carrying.

From a consideration of parental carrying while swimming, two points emerge: First, in at least all the species which are well studied the young initiate the carrying; and second, in one species that dives the duckling reportedly clings so tightly to the neck and back feathers that even when the adult submerges, the young is able to remain attached. Dr. Kear, when handling newly hatched ducklings of about 100 species of waterfowl, has noticed how many of them, perching ducks in particular, cling to fingers and clothing. When startled they occasionally bite and hang on tightly for some seconds. Forbush (1922:15) reported somewhat similar behavior for newly hatched Wood Ducks which clung to the backs of foster-parent hens during their first few days of life. Thus, in certain species at least, the two behavioral prerequisites for taking flight with the young on the back are fulfilled, namely, the ability to climb onto and take a firm hold of the parent. The adult's behavior—swimming, diving, or taking flight—is relatively unimportant, but being able to fly with the young would surely have great survival value. For instance, it seems reasonable that for the highly aquatic Musk Duck such a method of transporting the young might be more feasible than walking with them when the breeding ponds dry up.

We feel that authorities on waterfowl have discounted too hastily the possibility of parents transporting young. Although jumping from the nest at the mother's signal is the normal procedure for hole-nesting waterfowl, the evidence suggests that parental carrying among the feathers might occur on rare occasions or in special circumstances and, where it occurs, depends mainly on the behavior of the young themselves. And, in the light of recent observations on waterfowl carrying eggshells from the nest, we cannot dismiss too casually the fact that some waterfowl may at times carry the young in the bill.



Figure 9. Downy Black-bellied Tree Duck standing on the back of a bantam hen at the Wildfowl Trust. Photograph by Philippa Scott.

Summary

A review of literature reveals that published accounts of parental carrying among waterfowl are numerous and of diverse origins. Parental carrying on the back while swimming has been reliably seen in three species of swans, two sheldgeese, and at least seven species of ducks. Parental carrying of young in flight has also been reported for at least 16 species representing seven of the generally recognized waterfowl tribes. The majority of such accounts have involved carrying the young in the bill, a possibility that is somewhat substantiated by reliable observations of egg or eggshell carrying by females of several species. In addition, at least those species that regularly carry the young on the back while swimming may be preadapted to similar carrying of them while in flight. It is suggested that occasional parental carrying by either or both techniques is sufficiently probable as to warrant additional consideration and attention.

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PARENTAL CARRYING OF YOUNG BY WATERFOWL

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