Sparrow males, while not maintaining large territories, do defend their nests vigorously against other male House Sparrows (p. 57). At no time was any sign of aggression shown by the male House Sparrows at this duplex nest.

Brudenell-Bruce (1975:67) noted that Common Ground-Doves in the Bahamas were very aggressive and belligerent toward other species, a trait that certainly was not manifested in this instance.

Concern has frequently been expressed for the potential negative impact of introduced House Sparrows on native cavity-nesting birds (e.g., Jackson and Tate, Wilson Bull. 86: 435–449, 1974). Our observations suggest that under some conditions they also may have a negative impact on noncavity-nesting species. This might be particularly true on an island such as Walker's Cay (total area ca 40 ha) where populations of all species are very small.

The paucity of information concerning the distribution and status of this species in the Bahamas is disconcerting. Available information suggests that the species has either been overlooked or is rapidly expanding its range. In view of the House Sparrow's impact in other parts of the world and its importance as a subject of evolutionary studies (e.g., Johnston and Selander, Am. Nat. 107:373–390), we feel that the status of Bahamian populations is worthy of further study.—JEROME A. JACKSON AND BETTE J. SCHARDIEN JACKSON, *Dept. Biological Sciences, Mississippi State Univ., Mississippi State, Mississippi 39762.* *Accepted 19 Jan. 1985.*

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Commentary and observations on the alleged transportation of eggs and young by caprimulgids.—Austin and Singer (Birds of the World, Hamlyn, London, England, 1961) state that "Nightjars are among the few birds that will move their eggs or young when disturbed or alarmed by the threat of discovery. This has been questioned ever since Audubon described a Chuck-will's-widow moving its eggs in its capacious mouth a century ago. But the phenomenon has been observed in this species often enough since to validate it."

Commentary.—Statements such as the one above persist in the ornithological literature despite the fact that there is no satisfactory evidence that anyone since Audubon (Ornithological Biography, I, Edinburgh, Scotland, 1831) has seen a Chuck-will's-widow (*Caprimulgus carolinensis*), or any other nightjar for that matter, carrying an egg in its mouth. Several ornithologists have deliberately tried to induce Chuck-will's-widows to perform this feat by handling the eggs and provoking the birds, yet none has succeeded (Ganier, Wilson Bull. 76:19–27, 1964). After a critical reading of Audubon's biographies, Ganier (1964) concluded ". . . it is my belief that Audubon had no such personal experience on which to base this story. It does not fit in with my own long experience with these birds, nor have I been able to find in the literature any ornithologist since Audubon's time who claims to have witnessed such an episode."

Extensive studies of Common Nighthawks (*Chordeiles minor*) by Weller (Auk 75:48–59, 1958), of Pauraques (*Nyctidromus albicollis*) by Skutch (Parent Birds and Their Young, Univ. Texas Press, Austin, Texas, 1976) and of Whip-poor-wills (*Caprimulgus vociferus*) by Raynor (Bird-Banding 12:98–104, 1941) also failed to produce evidence for oral egg-carrying in these species.

In Africa, the Mozambique Nightjar (*C. fossii*) is credited with transporting an entire clutch in its bill (Mackworth-Praed and Grant, Birds of Eastern and North Eastern Africa, Longmans, London, England, 1952). I have been unable to trace the authority for this

statement; Armstrong (Bird Display and Behaviour, Dover Publications, New York, New York, 1965) cites Jackson (The Birds of Kenya Colony and the Uganda Protectorate, Gurney and Jackson, London, England, 1938), but I could find no mention of it in Jackson under any of the species discussed. In over 20 years of studying the nightjars of southern Africa, I have found no evidence of any nightjar carrying any eggs in its mouth. The "capacious mouth" of a nightjar could certainly accommodate an egg, perhaps even two, just as it could probably accommodate the teat of a goat, but there appears to be no more evidence of it being an egg-carrier than there is of it being a goatsucker.

Caprimulgid eggs are sometimes moved short distances by wind (Parks, Bird-Banding 18: 170, 1947), flood (Morgan, Aust. Bird Watcher 1:117–118, 1960), or the normal movements of the incubating bird (Woods, Condor 26:1–6, 1924), the cumulative effect of the latter occasionally resulting in moves of several meters from the original nest site (Gross, pp. 206–234 *in* Bent, U.S. Natl. Mus. Bull. 176, 1940). This could be mistaken for deliberate translocation. When the eggs disappear it is sometimes assumed that the birds have moved them to a new site (Cameron, Auk 24:289–406, 1907; Merrill, U.S. Natl. Mus. Proc. 1:118–173, 1878), especially when another clutch is found in the vicinity (Warren, Report on the Birds of Pennsylvania, Meyers, Harrisburg, Pennsylvania, 1890; Ferguson, Wilson Bull. 79: 452–453, 1967). It would be more reasonable to assume that the first clutch was taken by a predator and that the second clutch was a replacement clutch or belonged to a different bird. Some apparent movements or disappearances of eggs or young are due to observer error in recalling the exact position of the nest. These difficulties can be overcome by marking the eggs and birds and by accurately locating the nest position in relation to fixed reference points (see below).

Nightjars in flight have been seen carrying eggs beneath the body, apparently held between the legs or in the claws (Rysgaard, Auk 61:138, 1944; Kilham, Wilson Bull. 69:113, 1957; pers. obs.). It is clear from the detailed accounts of these incidents that all are the result of accidental transportation.

Field observations.—I studied the breeding biology of the Fierynecked Nightjar (*C. pectoralis*) and some related species on Ranelia Farm (19°22′S, 32°37′E, 885 m above sea level) near Mutare, Zimbabwe, from 1972 to 1975 in partial fulfillment of the requirements for a Master's degree (Jackson, M.S. thesis, Univ. Natal, Pietermaritzburg, South Africa, 1983). One of the study objectives was to obtain positive data on the transportation of eggs or young.

Study area and methods.—My study area of 100 ha consisted of miombo woodland (mainly *Brachystegia* and *Julbernardia* spp.) on gently sloping sandveld, broken by outcropping sheets and domes of granite. I established a network of fixed, numbered concrete beacons to serve as reference points for my field work. A closed traverse of the beacons was carried out by theodolite to provide the survey data for mapping the network. The exact location of every nightjar nest found and of every nightjar captured or recaptured was determined by compass bearing and tape distance from the nearest beacon and was then plotted on the map.

I used the technique of nightlighting (spotlight and hand net) to find and trap the nightjars during night searches, and mist nets to trap the birds on the nest by day, although initially hand nets were also used by day (Jackson, Bokmakierie, 36:86–89, 1984). Most of the nests were found as a result of trapping sitting birds at night.

To ensure individual identification, I marked the eggs and young with pink nail varnish and banded the adults with numbered bands supplied by the South African Bird Ringing Unit; the young were also banded when they reached half the adult weight.

Blinds were set up at two of the Fierynecked nests in order to observe and photograph the behavior of the birds; a light intensifying telescope (Magniscope) was used at night. One

of the nests was surrounded by a fence of wire mesh, 15 cm high and one m distant, to prevent the two young from moving away unaided before they could fly.

The nightjars in the study area suffered a considerable amount of interference at the nest as a result of routine trapping, examination, marking, weighing and measuring, with eggs, young and adults being handled freely at least once a week and as often as once or twice a day. Interference was kept to a minimum consistent with the other objectives of the study, and no attempt was made to deliberately provoke adults into transporting eggs or young away from the nest.

Results.—During the study period, covering four breeding seasons, my assistants and I captured three European Nightjars (*C. europaeus*), 79 Fierynecked (including 24 juveniles), six Freckled (*C. tristigma*) (four juveniles), 11 Mozambique (two juveniles), and eight Pennantwinged (*Macrodipteryx vexillaria*) nightjars. Most of these birds were recaptured one or more times during the course of the study (Jackson, Safring News 13:43–50, 1984). We found 60 nightjar nests (44 Fierynecked, 6 Freckled, 7 Mozambique, and 3 Pennant-winged nightjars).

At 21 nests the eggs disappeared or were deserted intact prior to hatching. Ten desertions (3 Fierynecked, 2 Freckled, 2 Mozambique, and 3 Pennantwinged nightjars) appeared to be in response to our activities. Six desertions (5 Fierynecked and one Mozambique nightjar) occurred after the birds had been sitting for several days in excess of the normal incubation period on eggs that failed to hatch. At five nests (4 Fierynecked and one Freckled nightjar) the eggs simply disappeared, as would happen if the parents had transported them to a new nest. In two of these cases, the birds concerned did nest again shortly afterwards, but in neither case was any marked egg from the old nest found in the new nest. The other three pairs (including the Freckled Nightjar) were not found nesting again in the seasons concerned.

We flushed nightjars off eggs or young on at least 338 occasions (251 Fierynecked, 60 Freckled, 19 Mozambique, 8 Pennantwinged nightjars) during our study without seeing any sign of an airlift of an egg or a chick by any parent.

On eight occasions, while in a blind, I saw nightjars moving their young by calling the young to them, 4 times by the male and 4 times by the female, including 3 during daylight. The chicks, at ages ranging from 1 to 10 days, responded immediately to the low *woot-woot-woot*. . . call of the parent by moving directly towards it, clambering over leaves, twigs, stones, grass stems, and other obstacles, sometimes up steep slopes, for distances ranging from 10 cm to 10 m. On two occasions when a fence prevented them from reaching the adult, the adult eventually flew into the fenced enclosure to join the chicks. At no stage were the adults seen to make any effort to airlift the chicks out of the enclosure, and the chicks remained confined until they could fly out at age 14 days.

My only observation of egg carrying concerned a pair of Fierynecked Nightjars nesting in a eucalyptus plantation on Retreat Farm (17°55'S, 31°03'E), Harare, Zimbabwe. The nest was found on 28 September 1967 shortly after the first egg was laid and was visited regularly thereafter in an attempt to determine the incubation period. On 15 October at 17:50 when I flushed the female off the nest she appeared to be carrying an egg below her lower breast. It was easy to follow her flight with binoculars, as there was no undergrowth in the plantation. After flying about 30 m she perched on a branch 5 m above the ground, tugged at the egg with her bill, succeeded in pulling it off and then dropped it to the ground, where I recovered it. What I found was not a complete egg, but about half of the shell, which had obviously stuck to the breast feathers, as several had come away with the shell. The nest still contained one egg, and 40 cm away lay a newly-hatched chick, thrown there when the adult took off; it too seemed to have been stuck to the adult.

This incident offers a simple explanation for the behavior of the Whip-poor-will (*C. vociferus*) that Kilham (1957) observed, and a careful reading of his detailed account shows

that it is probably the correct one. That the transportation of the egg was accidental is confirmed by the fact that the bird was still carrying the same egg when Kilham again flushed it off the nest an hour later; it had not removed the egg to a place of safety. That the egg may have stuck to the ventral plumage with albumen is suggested by the fact that one of the eggs was already hatching when the bird was flushed for the first time. A similar occurrence involving a Chuck-will's-widow was observed by Rysgaard (1944), but on that occasion the egg seemed to be attached to the bird's foot rather than to the ventral plumage. When he again flushed the bird off the nest later in the day, he found a chick struggling free from the shell, again suggesting that albumen had glued the egg to the bird. Rysgaard (1944) offers another explanation: "In all probability the shell was extremely porous and fragile just prior to hatching, and the bird had accidentally imbedded its claws into the shell and was unable to release them." When van Rossem (Trans. San Diego Soc. Nat. Hist. 8:121–148, 1936) collected a Whip-poor-will off a nest containing one nearly fresh egg he noted that "stuck to the ventral plumage of the incubating female were several small pieces of shell, showing that another egg had been laid and somehow broken." When an egg hatches or breaks for some other reason there is always a danger that an egg or some shell fragments will stick to the sitting bird. Photographs by Sundin (Vår Fågelvärld 41:31, 1982) of a Little Auk (*Plautus alle*) flying and perching with an egg stuck to its belly show this very clearly.

Austin and Singer (1961) state that "Chuck-wills have also been reported to carry their young to a safer place between their thighs the way a Woodcock will." But this behavior is by no means common in the American Woodcock (*Scolopax minor*), if it occurs at all. Tuck (Can. Wildl. Serv. Monogr. Ser. 5, 1972) points out that none of the biologists who have observed and banded hundreds of American Woodcock broods has ever seen it, and adds that if it does occur in snipe or woodcock, it is probably accidental and quite unusual. Tordoff (Loon 56:81–82, 1984) discusses the evidence and concludes that American Woodcock do not intentionally transport their young; he is also skeptical of reports of egg carrying by European Woodcock (*S. rusticola*). The evidence for European Woodcock deliberately airlifting their young is much greater (Alexander, Ibis 88:12–22, 1946); however, many of the observations concerned can be explained as optical illusions created by the distraction flight of the adult bird (Lowe, Ibis 114:106–107, 1972; Glutz von Blotzheim et al., Handbuch der Vögel Mitteleuropas, Akademische Verlagsgesellschaft, Wiesbaden, W. Germany, 1977; Cramp and Simmons, eds., The Birds of the Western Palearctic, Oxford Univ. Press, Oxford, England, 1983).

Nightjars, which have short legs and a very short bill, would have great difficulty carrying young between their thighs, yet some species have been seen carrying young beneath their bodies, e.g., the Egyptian Nightjar (*C. aegyptius*) (Robin, Oiseau Revue fr. Ornithol. 39:1–7, 1969) and the Whip-poor-will (Bent, U.S. Natl. Mus. Bull. 176, 1940). As with the transportation of eggs, the simplest explanation is that the chick observed was stuck to the ventral feathers of the adult. There is no reason to suppose that the adult was deliberately carrying it to safety.

Caprimulgids moving chicks away from danger do so by first moving away themselves and then calling the chicks to them (Skutch, pp. 200–202 *in* Bent, 1940, for the Pauraque; Weller, 1958, for the Common Nighthawk; Ganier, 1964, for the Chuck-will's-widow; Raynor, 1941, for the Whip-poor-will; pers. obs. for the Fierynecked Nightjar). Several of these authors noted that the young were very mobile within a day of hatching and I can confirm this for Fierynecked, Freckled (*C. tristigma*) and Mozambique nightjars. One Fierynecked chick that I handled less than four hours after it hatched walked about strongly on the palm of my hand, climbing up a slope of about 30°. This early mobility of the chick can lead to the mistaken assumption, when it is found to have moved, that "the parent must have carried the chick" (Cunningham-van Someren, East Afr. Nat. Hist. Soc. Bull. April:63, 1971).

Conclusions.—Caprimulgids respond to undue provocation at the nest by deserting the eggs or by calling the young away. Chicks are mobile within hours of hatching and readily move unaided towards a calling adult. There is no satisfactory evidence of adults deliberately transporting eggs or young, either in the mouth or between the thighs, as is claimed in the literature. Accidental transportation occasionally occurs when an egg or chick gets stuck to the soft ventral plumage of the sitting bird, and this would seem to be the explanation for most of the documented records.

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Temperature fluctuations and nesting behavior of Rock Wrens in a high-altitude environment.—The energetics of nesting behavior in birds has been examined by many workers (Kale, Publ. Nuttall Ornithol. Club 5, 1965; Verner, Condor 67:125–139, 1965; Walsberg, Ecology 59:147–153, 1978; Vleck, Condor 83:229–237, 1981). This paper reports observations made at a nest of Rock Wrens (*Salpinctes obsoletus*) at 3800 m above sea level. The study was conducted on 19 and 20 July 1981 at the University of California White Mountain Research Station, Inyo County, California, about 350 m above timberline. The nest was situated beneath a rock of approximately 15 cm, and opened to the southwest. Summer temperatures average from 0 to 20°C, and summer precipitation averages about one cm; winds of approximately 8 km/h were frequent. During a continuous 24-h period we recorded feeding and other behavioral patterns, and simultaneously monitored nest and ambient temperatures. The nest contained a small nestling, which we estimated to have been 2–4 days old.

Methods.—Nest temperatures (Tn) were recorded with a copper-constant thermocouple taped to the roof of the rock cavity in which the nest was located (about 8 cm from the bottom of the nest depression). Ambient temperatures (Ta) were measured with a thermometer that rested at ground level in a shaded rock crevice. Both Ta and Tn were recorded every 5 min, to obtain average hourly temperature values. Daytime parental behavior (number and duration of visits to the nest, qualitative assessment of food delivered, etc.) was observed from 12:00 to 20:45 on the first day, and from 05:00 to 12:00 on the second day. We considered the two half-days of observation as a single day. Neither parent was banded and, because the species is sexually monomorphic, we can state only that one, both, or neither of the parents was at the nest at any particular time.

Results.—Tn averaged 21.8°C and Ta averaged 22.2°C for the active period of the day (05:00–20:00 h); Tn averaged 11.3°C during the inactive period (20:00–05:00 h). The combined number of parental visits for the entire day was 298; food was brought by the parents in 240 of these visits (15 visits/h). The rate of feeding in the morning followed an hourly pattern in which an hour of high feeding rates was followed by an hour of low ones (Fig. 1). This behavior may have been caused by response of the parents to satiation of the nestling (Kendeigh, Illinois Biol. Monogr. 22:1–356, 1952). The feeding rate, which declined in the afternoon, increased shortly before nightfall; this pattern is commonly observed in other species (Kluijver, Ardea 38:99–135, 1950; Kendeigh 1952; Morehouse and Brewer, Auk 85:44–54, 1958; Anderson and Anderson, Condor 62:351–369, 1960; Nolan, Ornithol. Monogr. 26, 1978).