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Food sharing by sibling Common Barn-Owls.—Interactions among nestling Common Barn-Owls (*Tyto alba*) range from cannibalism (Baudvin 1975, Colvin 1984, Lenton 1984, pers. obs.) to food sharing (Bunn and Warburton 1977, Epple 1979). In this paper I present the first documented case of food sharing among siblings in the North American race of the Common Barn-Owl (*T. a. pratincola*).

I observed food deliveries of adult barn-owls and food consumption behavior of their young in an abandoned agricultural silo in Davis County, Utah. Observations were made at a distance of less than 1 m. I watched through a one-way mirror in the back of a nest box lighted from within by a small battery-powered bulb. I made 27 h of observations on five nights over a 4-week period in April and May 1983.

Initial observations occurred during 4 h on 14 April when the four nestlings ranged from 7 to 14 days of age. The adult female remained in the box with the young on this night and spent most of her time brooding. When the male delivered prey, she tore it into pieces and fed it to the young. On the second night of observation, 26 April, the young were 19–26 days old. Both adults brought food to the young but neither entered the box. Nine prey items, all small rodents, were delivered during the 9.5-h activity period. The two oldest young obtained most of the prey items because of their greater size and agility. I did not see the youngest owlet eat on this night. Observation was limited to the first 2 h of activity on 30 April during which the same pattern was seen as on 26 April. On 3 May all four young still survived and were 24–31 days old. The adults delivered a total of 15 prey items over 9.5 h, mostly rodents and shrews. Each time an adult arrived at the nest, all of the young rushed to meet it. Once an owlet had control of a prey item, there was little, if any, attempt by the others to wrest it away. The largest owlet obtained and ate prey brought in delivery numbers 1, 2, 3, 5, 7, and 9. The next largest young obtained and ate prey from deliveries 6 and 8, and the third largest ate item 4. One of the smallest two young ate the prey delivered 12th. Despite having eaten six prey items and apparently being satiated, the largest young persisted in rushing to meet adults arriving with food. It also managed to obtain the prey brought in deliveries 10, 11, 13, 14, and 15, but made no attempt to eat

any of them. Instead, it offered them intact to its siblings. The first four of these shared prey were voles (*Microtus* spp.) which the oldest owlet carried to one or the other of the two smallest siblings. The posture and vocalizations of the largest owlet during this food sharing were much like those of the adults when they offered food to the young, i.e., prey was picked up and carried by the owlet in its beak. As it approached a younger sibling, it leaned forward and presented the prey. During all of this activity, the older owlet uttered the rapid twittering described as the food-offering call by Bunn et al. (1982), but no food begging by the younger siblings was noted. This behavior left little doubt that the food was being presented to the other owlets. The final prey item of the night, a juvenile pocket gopher (*Thomomys talpoides*), was offered to each of the younger owlets by the oldest but was not accepted by any of them. Finding no interest, the owlet dropped the gopher which was ignored by all of the nestlings for the remainder of the night. A final short period of observation on 7 May produced results similar to early evening events on prior days of observation. All four young in the brood fledged by 15 June.

My observations of food sharing closely match those seen in two European subspecies of the Common Barn-Owl (Bunn and Warburton 1977, Epple 1979). Thus, it is clear that, although the frequency of occurrence of this behavior is not known, food sharing occurs in at least three races of this widely distributed species.

The significance of food sharing, however, is not clear. Seemingly, juvenile barn-owls do not guard food for later use once they are satiated. Younger owlets would thus have access to a prey item even if it was not given to them by their older siblings. Food sharing in juvenile barn-owls could be altruistic behavior consistent with kin selection theory (Kurland 1980). On the other hand, by giving food to younger siblings, older owlets may be merely storing food in living containers as a hedge against future food shortages (Bruce Colvin pers. comm.). Either behavior could contribute to the fitness of individuals exhibiting it.

Food sharing by juvenile barn-owls certainly differs greatly from siblicide commonly practiced by juvenile eagles (Edwards and Collopy 1983). Although cannibalism has been widely reported in barn-owls, there is little or no evidence of siblicide in the species. Death and/or disappearance of the youngest owlets has occurred in about 30% of the 250 nesting attempts that I have observed in northern Utah. In some cases, dead owlets have been consumed by their nest mates and in others they have not. I have not found any indication (i.e., injuries), though, of aggression having led to these deaths; starvation was apparently their cause.

Food sharing could have a survival advantage for younger members of large broods if the adult female must leave them to help the male hunt. Eggs in barn-owl clutches hatch at 2–3 day intervals (Smith et al. 1974, Wilson et al. 1986). Large broods, common in this species (Baudvin 1975, Lenton 1984, pers. obs.), thus may consist of young more than 2 weeks apart in age. If females with such broods leave to hunt before the smallest young can feed themselves, sibling feeding could play an important role in survival of the youngest brood members. However, unless older siblings tear up food before offering it to owlets too small to do so for themselves, the duration that food sharing is effective for the survival of smaller young would be brief. Nevertheless, it might provide the difference between surviving or not for some of the brood.

Strong selection for delivering and presenting food to their young by barn-owls would be expected because it is obviously a key to reproductive success. Development of this behavior in immatures is consistent with the overall reproductive pattern of the species. Barn-owls rapidly mature; most breed in their first year and individuals have been known to breed successfully at six months of age (Trollope 1971). Early development of food presentation could be especially important to the fitness of males because they give food to females to begin pair formation and continue to do so through incubation and brooding. Thus, food

sharing by nestling barn owls may be simply an early manifestation of a behavior important to their fitness.

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Notes on the social behavior and mating system of the Casqued Oropendola.—Oropendolas (*Psarocolius* spp.) are of particular interest in studies of mating systems because they nest colonially and are among the most sexually dimorphic of all birds. Male oropendolas are 10–35% larger by wing length than females (Lowther 1975); in some species, males weigh more than twice as much as females (Robinson 1986c, unpubl. data). Extreme dimorphism is correlated highly with polygynous mating systems (Emlen and Oring 1977), and Robinson (1986c) suggested that some oropendolas may be harem polygynous. In this note we examine the mating system and social behavior of the Casqued Oropendola (*Psarocolius oseryi*), a previously unstudied species, in southeastern Peru and compare it with other closely related tropical Icterinae.

Study area and methods.—This study was conducted at the Cocha Cashu Biological Station in the Manu National Park (11°51′S, 71°19′W) in southeastern Peru. The study area consists of humid, undisturbed lowland forest (elevation 400 m) in the floodplain of the Manu River.