

The frequency of helpers in our study was 0.21 (3 of 14 nests). Because our observations were not continuous over long periods, it is possible that we did not detect other instances of helping and thus underestimated its frequency.

What would have been the eventual fate of the nests is not known because we took the young and hand-reared them for orientation experiments. The relationships, if any, of the individuals attending the nests is, of course, unknown.

Without knowing the relationship of the individuals involved, it is difficult to ascertain the advantage to the helpers. One explanation is that the individuals outside the breeding pair had recently suffered the loss of their nest and were still physiologically motivated to feed young. This would require the intrusion into an established territory by an outsider, but Wittenberger (pers. comm.) found that after the young hatch, territorial behavior and territory defense essentially cease. Wittenberger (pers. comm.) has also observed adults other than the parents visit a nest. Because these individuals never carried food to the nest, he interpreted the behavior as "information gathering" by the non-parents. All the birds we observed, except one male at the second nest, carried food to the nest. Although we were concealed about 10–15 m from the nest, we could not determine whether the adults actually gave the food to the young or ate it themselves while standing beside the nest.

This is one of very few records of a trans-equatorial migrant which has adult (and presumably sexually mature) helpers at the nest. For other migratory species with cooperative breeding, the helpers are usually young of the year. Because the Bobolinks are long lived (Martin, *Bird-Banding* 44:47–58, 1973) and return to their previous breeding locations regularly (Martin 1974; Wittenberger 1978 and *Ecology* 61:140–150, 1980), it is conceivable that the helpers were related to the birds being helped. This possibility is so intriguing from a theoretical aspect, based on kin selection theory (Hamilton, *J. Theoret. Biol.* 7:1–52, 1964), that we are reporting these observations with the hope that they will stimulate further studies with marked birds to investigate the relationship between the helpers and the individuals they help.

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Cooperative foraging and courtship feeding in the Laughing Gull.—Cooperative foraging (two or more individuals assisting each other in obtaining prey) has apparently not been previously reported in any gull species. I made the following observations of cooperative courtship feeding in Laughing Gulls (*Larus atricilla*) while conducting a study on shorebird foraging at Little Beach Island, Brigantine National Wildlife Refuge in Ocean County, New Jersey. During May and early June Laughing Gulls in New Jersey feed on horseshoe crab (*Limulus polythemus*) eggs, buried on sandy beaches (Wander and Dunne, *Records of New Jersey Birds* 7:59–64, 1981). They uncover the eggs by treading with both feet at the water's edge and then scooping up the eggs which float to the surface. The approach of a conspecific within 15–40 cm usually elicited aggressive acts such as long calls, jabbing with the gape exposed, and pecking with the bill closed.

On three occasions, 24 May 1981, 30 May 1981, and 25 May 1982, I observed two Laughing Gulls feeding on *L. polythemus* eggs, with their shoulders often touching and no apparent aggression. As none of these birds were individually marked, it is possible, but

not likely, that I observed the same individuals on the three occasions. I was able to distinguish between the two birds by continuously watching the pair and noting the location of one bird relative to the other. For these three observations the birds presumed to be males are identified as gull A and the birds presumed to be females are identified as gull B. On each of the three occasions one gull, A, was treading and the other gull, B, was scooping the eggs out of the water. I did not observe gull A eating any eggs. This continued for 3–4 min until the two gulls walked up on the beach side by side with gull B long calling and head tossing. On 25 May 1982, both gulls long called and head tossed as they walked up the beach; gull A subsequently chased gull B. During all three observations gull B begged and pecked at gull A's bill. On 30 May 1981 and 25 May 1982 gull A regurgitated *L. polythemus* eggs and both gulls ate the eggs. On each of the three occasions gull A mounted gull B, gull B moved its tail to one side, and gull A gave the "gackering call" while copulating.

Courtship feeding is a basic part of pair formation among gulls (Tinbergen, *The Herring Gull's World*, Collins, London, England, 1953; Moynihan, *Behaviour* 13:112–130, 1958). Regurgitation is the most common method of courtship feeding in Laughing Gulls, although males have also been observed presenting a whole fish to the female (Noble and Worm, *Ann. N.Y. Acad. Sci.* 45:179–220, 1943). These three cases of a male uncovering *L. polythemus* eggs and allowing a female to eat the eggs may be a form of courtship feeding. These episodes took place several minutes before the male mounted the female and on 24 May 1981 there was no regurgitation prior to copulation. At Brigantine most first eggs are laid by female Laughing Gulls on 25, 26, or 27 May, so these observations took place during the egg-laying period (Montevocchi et al., *Ibis* 121:337–344, 1979).

Cooperative foraging is a rare occurrence in birds; one example is White Pelicans (*Pelecanus erythrorhynchus*) cooperatively driving fish into shallow water (Welty, *The Life of Birds*, Saunders, Philadelphia, Pennsylvania, 1982). Foraging for *L. polythemus* eggs requires that an individual perform two activities: treading and then scooping up the eggs as they float to the surface. It is even more unusual for foraging activities to be uncoupled such that two individuals can forage cooperatively by each performing one activity. Another apparent example of such cooperative foraging is a report of team hunting and food sharing by two Parasitic Jaegers (*Stercorarius parasiticus*) feeding on a Pectoral Sandpiper (*Calidris melanotos*) (Pruett-Jones, *Wilson Bull.* 92:525–527, 1980).

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Pairing behavior and pair dissolution by Ring-billed Gulls during the post-breeding period.—The pairing behavior of gulls has most commonly been described in the pre-egg-laying period of the reproductive cycle (e.g., Moynihan, *Behaviour* 13:112–130, 1958). Pairing behaviors are much less frequent during incubation and are rare during chick-rearing (Fetterolf, unpubl.). Herein, I report observations of pairing behavior and pair dissolution by Ring-billed Gulls (*Larus delawarensis*) which occurred during the post-breeding period immediately after these birds had cared for young. I discuss the relationship among post-breeding pairing behavior, pair dissolution, and breeding success and examine hypotheses which may explain the occurrence of such behavior.