

COMPLEX INTERACTIONS BETWEEN CLAPPER RAILS AND LAUGHING GULLS

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WHEN two species nest in the same habitat it is of interest to study their interactions, since ecological competition, predator-prey relationships and simple propinquity may lead to interspecific aggression. Clapper Rails (*Rallus longirostris*) nest within a large colony of Laughing Gulls (*Larus atricilla*) in coastal *Spartina* marshes of the Brigantine National Wildlife Refuge north of Atlantic City, New Jersey. In some instances rails' nests occur within a few feet of the nests of gulls. During two summers of field work we have compiled notes on behavioral interactions between these two species; these notes reveal that the relationship between the species is quite complex.

FIGHTS AND DISPLAYS BETWEEN RAILS AND GULLS

During the breeding season of 1965 one of us (A.S.) noted aggressive encounters between the two species on three occasions involving different individuals. Observing from a hide she saw a gull and a rail fighting with bills locked together, beating their wings at one another, while the gull uttered calls that we believe to be associated with alarm. The initiations of these three fights were not seen; the fights ended in each case in departure of the rail. Two of the fights were in the neighborhood of gull nests but some distance from the nearest known rail nests; one took place next to the rail's nest.

On 20 June 1966 C.G.B. observed an encounter in which a rail on its nest was attacked by a Laughing Gull from the nearest gull nest. The gull approached the rail's nest on foot while gathering nest material, flew up within two feet of the nest and then repeatedly swooped and soared at the sitting rail from about eight feet above it. The gull swooped with lowered feet and, passing low over the rail, pecked down at it. Several times the gull appeared to strike the rail and following one of these strikes the rail responded by leaping up at the gull. After a few more swoops the gull flew to its own nest site about 20 feet away where it attempted to relieve its sitting mate.

In nesting areas where a rail nest was located within a cluster of gull nests, incubating gulls frequently, but not always, displayed an "intruder" response to a rail returning to its nest. This display consisted of ruffling the saddle feathers, bobbing the head rhythmically, holding the bill horizontally and open, and uttering an *uhr* call. This behavior pattern was also seen in incubating gulls when they were approached from the ground by a strange gull.

Strife between members of different avian species can usually be ac-

counted for as due to competition over a common source of food, competition for nesting sites or to some form of predator-prey relationship. The clashes that we have described between rails and gulls did not conform to the usual patterns of interspecific fighting over food, and since the birds were already nesting the issues would appear not to have been over nesting sites. Hence defense against predation seemed the most likely explanation of the fights between gulls and rails. We made a search of relevant literature but failed to find documented evidence of predation in either direction between the two species.

PREDATOR-PREY RELATIONS

Predation by Rails of Gull Nests.—On 31 May 1966 in the Brigantine gully J.P.H. flushed a Clapper Rail from among Laughing Gull nests in an area known to contain no rail nests. This rail had a white secondary feather; a rail so marked was nesting about one-quarter of a mile to the northeast. Inspection showed that the gull nest in the center of the group from which the rail flushed had its single egg freshly broken open, with a large hole in the top.

On 17 June 1966 from a blind in a different part of the gully, A.S. watched a Clapper Rail approach an unattended Laughing Gull nest which contained one gull egg and two experimental wooden egg-models. The rail passed by an adjacent nest with an incubating gull, and this gull made no response to the rail. The rail pecked into the unattended nest several times, and then after a few minutes crept away, passing by another unattended gull nest close to the blind without looking into it. Later inspection of the nest visited by the rail showed the gull's egg to have been broken in two, and its contents eaten; it is not known whether the rail struck the wooden egg-models.

Predation by Gulls at Rail Nests.—On 21 June 1966 C.G.B. made further observations of the rail's nest at which he had seen on the previous day the clash between gull and rail already described. The nest contained two freshly hatched rail chicks, the shells of three hatched eggs and three unhatched eggs. During the two hour watching session no adult rail was seen attending the nest.

As on the previous occasion the male gull of the pair owning the neighboring gull nest approached the rail nest on foot in the course of collecting nest material between attempts to effect nest relief. When three feet from the rail nest, the gull Long-called, dropped its nest material, and made the *kekek* "alarm call." It then walked onto the nest and began pecking down into it. One of the rail chicks made a high pitched squeal. The gull continued pecking vigorously. One of the chicks either leapt or was flung by the gull 18 inches or so out of the nest. The gull continued to peck it. Again the chick



FIG. 1. A nest containing the eggs of both Laughing Gulls and Clapper Rails found in the Brigantine gully, July, 1966. The fragments of broken shells are from a hatched rail egg. There was a dead rail chick within two feet of the nest. (photo by C.G.B.)

jumped or was flung into the air. The gull continued pecking for a few seconds and then walked off a few feet where it stood for a minute or so Long-calling and preening.

After several more unsuccessful attempts at nest relief, interspersed with collecting trips, the gull returned to the rail's nest and resumed pecking. It picked a chick up in its bill during which the chick squealed and flapped its wings. The gull dropped the chick, pecked hard at it, picked it up and dropped it several times and then began making swallowing movements. A few seconds later the gull was swooped at by another gull and immediately flew to its own nest where it attempted to relieve. A minute or so later the gull returned to the rail's nest and again it was swooped at and chased off by another gull.

Ten minutes later a flock of six gulls, including the bird we have been concerned with so far, was hovering over the rail's nest. One of the gulls descended on to the nest and flew off with a rail chick dangling from its bill

and the other gulls flying after it. Later inspection of the nest showed the remains of a partly eaten rail chick lying 18 inches from the nest, no sign of the other chick, and the three unhatched eggs still intact in the nest. It may be significant that there were newly hatched gull chicks in the nest of the predatory gull.

JOINT USE OF NESTS BY GULLS AND RAILS

Once in 1965 and once in 1966 we discovered nests containing eggs of both Laughing Gulls and Clapper Rails in widely separated parts of the colony. Unfortunately, it was not possible to determine which species was in attendance at these nests at the time we discovered them; nor was it possible to judge positively from the nest structure whether the nests had originated as rail nests or gull nests. In one of these nests, rail chicks were also present, but no gull chicks. Furthermore, in 1966 one of us (J.P.H.) found a rail nest of typical structure containing two gull eggs, but no rail eggs or chicks.

Our observations indicate that the average incubation period for the Laughing Gull is 21–23 days. Kozicky and Schmidt (1949) report that the average incubation period for the Clapper Rail is between 18–22 days. The presence of rail chicks in one of the nests suggests that the rail eggs were laid earlier; this might be interpreted as evidence for the nest initiating as a rail nest rather than as a gull nest. Pettingill (1938) reports an incident of a rail consistently retrieving its eggs from more than two feet from the nest rim. This performance was accomplished by carrying the eggs in its bill. It is thus possible that a rail might have retrieved gull eggs from nearby gull nests and placed them in its own nest. The further possibility that under certain conditions a gull egg might appear as a “supernormal” incubation stimulus to a rail, rather than as a food object, would be consistent with this explanation.

On the other hand it has been reported that California gulls (*L. californicus*) sometimes stock their nest with, and incubate, the eggs of other species and that these gulls may transport such eggs by swallowing and regurgitating them whole (Vermeer, 1967). No such behavior has been observed in Laughing Gulls but perhaps it should be kept in mind as yet another possible explanation of the gull-rail nests.

Whatever the truth of the matter, we might have here yet another basis for hostility between gulls and rails: competition for nests and eggs for incubation.

DISCUSSION

We thus have evidence that rails prey upon the eggs of gulls; that, at least on occasion, gulls prey on the chicks of rails; and that the two species are in

some sort of competition at nest sites. We have not observed gulls eating rail eggs, or rails eating gull chicks. C.G.B. has observed Laughing Gulls eating one another's eggs and has seen foreign gulls descend on and peck at the eggs of gulls that were tardy in returning to their nests after alarms. Such predatory gulls are viciously attacked by the nest owners, but if the egg-robber has succeeded in gashing an egg the owner will probably devour what remains. Laughing Gulls thus have a taste for eggs so that one might expect that they would prey on those of Clapper Rails if given the opportunity. However, in the attack on the rail nest that we have reported the unhatched eggs of the rail were ignored.

If gulls do take rail eggs the occurrences are probably rare, for the rails give little opportunity for predation of their eggs by gulls—far less opportunity than the gulls give the rails. Whereas a gull flies at alarm, removing its own conspicuous body from the nest and leaving the eggs to the protection of their camouflage, the cryptically colored rail sometimes stays covering its eggs until it is almost stepped on. Furthermore, the dispersion and inconspicuousness of the rail's nest are such that the ratio of return for effort for a gull seeking rails' eggs would be unfavorable, compared with what it is for other available sources of food. By L. Tinbergen's (1960) hypothesis, a "search image" for rails' eggs would probably not be retained by a gull for long. We think it likely, therefore, that gulls offer little if any egg predation pressure to rails.

On the other hand, the quantity and availability of gulls' eggs to a rail would seem to make it worth a rail's while to search out gulls' nests as a source of food. The cryptic coloration of the rail, and its habit of creeping stealthily, silently and with head down through the vegetation would seem to be suited to such predation. It is impossible at present to estimate the extent of Clapper Rail predation on Laughing Gulls' eggs. The rail apparently does not carry the gull eggs away whole from the nest to devour them elsewhere, as does the Fish Crow (*Corvus ossifragus*). Rather, the rail eats the eggs on the nest, leaving the shells behind. But such is also the practice of the Laughing Gulls themselves, so that one cannot, on the basis of what remains in the gulls' nests, work out how much of the destruction suffered by gulls' eggs is due to rails. Among the Rallidae predation of gulls' eggs is not peculiar to the Clapper Rail; according to Densley (1966) Coots (*Fulica atra*) take the eggs of Black-headed Gulls (*Larus ridibundus*).

Since both the rails and the gulls eat gulls' eggs there is a sense in which at least some of the clashes between gulls and rails could be construed as fighting over food. That is, the fighting is over objects that the members of both species eat, but which also happen to be the offspring of one of them.

The fact that the gull's behavior would, for most purposes, be described as defense of its brood rather than defense of a food source distinguishes these fights from typical instances of interspecific fighting over food. But the point is perhaps worth making that we have here an illustration of how the way in which one classifies a piece of behavior depends upon the point of view one takes.

Several interpretations of the attacks by the gull on the rail's nest are possible. Since both of the occasions when it was observed, the gull was engaged in a prolonged series of attempts to relieve its sitting mate, the gull's behavior might have been, at least in part, a consequence of frustration of these efforts. Relief ceremonies sometimes contain elements of overt hostility between the members of a gull pair, particularly at and beyond the time that their eggs hatch. The gull's attacks on the rail's nest, at least in their initial phases, could perhaps have been instances of redirected attack (Bastock et al., 1953). The behavior of the gull towards the rail chick was not unlike the behavior that adult gulls frequently show to gull chicks. Sometimes attacks by a gull on gull chicks follow immediately upon agonistic encounters between the gull and other adults and so occur in a sequence that makes the notion of redirection appropriate.

On several occasions C.G.B. observed adult Laughing Gulls pecking chicks of their own species to death. On one occasion a gull was seen to alight on the unattended nest of another gull and fly off with the rear portion of a newly-hatched chick dangling from its mouth. The calls and postures adopted by the gull attacking the rail chick were typical of gulls attacking gull chicks, and the swooping attacks that it drew upon itself were also typical of what happens when a gull chick is being pecked. Explanation of why adult gulls attack gull chicks still poses a problem. It is doubtful whether one explanation will cover all types of occurrence: at times the adults seem to be treating the chicks as food objects, at other times as trespassers over territorial boundaries, at others as the objects of redirected attack, but there are many occasions when there is no obvious basis for a gull's hostility to a chick. In any case the similarity between the gull's behavior towards the rail chick and the attacks by gulls on gull chicks suggests that explanations of the two phenomena may be similar.

In sum, the aggressive interactions between gulls and rails are unlikely to have as their basis a simple, unitary explanation. There are elements of mutual predation, nest-site competition, food competition and redirected aggression underlying the interspecific fighting. Only further study can clarify this complex nexus of behavior, and the questions that it raises.

SUMMARY

1. On four occasions, actual fights between Clapper Rails (*Rallus longirostris*) and Laughing Gulls (*Larus atricilla*) on the nesting grounds were observed in detail.
2. Twice, rails were observed preying on gull eggs, and once a single gull and later a group of gulls were seen preying on rail chicks at the nest.
3. One nest of unknown origin contained both rail and gull eggs; another contained rail eggs and chicks plus gull eggs. A typical rail nest was discovered with gull eggs, but no rail eggs or chicks.
4. These results, coupled with observations of gull-gull interactions, make it seem likely that interspecific aggression between gulls and rails has no simple, unitary explanation. The interactions contain elements of mutual predation, the nest-site competition, food competition and redirected aggression, thus demonstrating how complex may be the interactions between two species sharing the same habitat.

ACKNOWLEDGMENTS

The observations reported here were made in conjunction with a program of study of the behavior of the Laughing Gull, supported by Grant #12774 from the Public Health Service, and a PHS-NIMH Postdoctoral Fellowship to J.P.H. We thank Dr. Douglass Morse for comments on the manuscript. The article constitutes publication #4 from the Brigantine Field Station of the Institute of Animal Behavior.

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