

INTELLIGENT BEHAVIOR IN THE CLAPPER RAIL

BY OLIN SEWALL PETTINGILL, JR.

Plates 14-15

OF twenty nests of the Northern Clapper Rail (*Rallus longirostris crepitans*) found at Cobb Island, Virginia, June 24-26, 1933, one was selected for a study of the nesting birds. This particular nest was located at least twenty feet from a salt marsh in a thick growth of sedges bordering the island's broad sand beach. So thick and rank was the surrounding vegetation and so greatly did it slant in one direction over the nest that the nest was concealed from view even from a position directly above it. Within four feet of the nest I placed a burlap blind and cut away the sedges on one side of the nest to permit observation through a small opening in the side of the blind facing the nest.

On July 2, I entered my blind while the bird was absent from its nest. After a ten-minute wait I suddenly noticed a few sedges moving behind the nest, then the head of the rail peering through them. It was panting noticeably, and its lower mandible was lowered with each exhalation and closed with each inhalation. Slowly, cautiously, it stepped over the eggs, covering them and adjusting them for brooding. For fully five minutes the rail (sex undetermined) incubated, remaining quiet except for its heavy breathing. At the end of that time some slight movement on my part within the blind frightened the bird, and it departed hurriedly. In a few minutes it returned, became suspicious of my presence, and hastened away again. Several times within the next fifteen minutes it appeared and disappeared; finally it became used to sounds emanating from the blind and stayed calmly on the nest. But the bird was not accustomed to the sharp sound that my tripod caused when, sliding down the side of the blind against which it was precariously leaning, it struck the ground. The rail, startled, was out of sight in an instant. As it jumped from the nest it accidentally pushed out an egg with its foot. When it returned and began to incubate, it immediately saw this egg resting on the ground eight inches away from the edge of the nest. After gazing at the egg steadily for nearly three minutes, it slowly reached out with its bill and with the tips of the mandibles poked gently at the surface and turned it over a number of times. Then, quite unexpectedly, it grasped the egg crosswise at the widest part, lifted it up, and brought it back to the nest beside the other eggs.

Wishing to secure photographs of this impressive behavior, I flushed the rail from the nest, set up my camera in the blind with the lens projecting through the hole toward the nest, and placed the egg in the same position it had occupied when dislodged. The bird returned almost as soon as I was

prepared. It repeated the performance with little hesitation and with little poking at the egg's surface. In fact, the egg was put back into the nest so quickly that I secured but one photograph, that of the bird starting to lift the egg. Again I flushed the bird, removed the egg as before, and again I secured an exposure, that of the bird lifting the egg. Eight times more I flushed the bird and removed the egg, and each time the bird returned the egg!

My series of photographs of this egg-returning act was now complete (see Plates 14-15). I then experimented further with the rail, to the extent of placing the egg a foot away from the nest, a distance sufficient to make the bird leave the nest in order to bring it back, yet easily in line with the bird's vision. This time the rail, after returning, stepped from the nest, picked up the egg, turned around, put the egg beside the others, and settled on the nest.

The day following this experience with the Clapper Rail, Cobb Island was flooded by an almost unprecedented high tide. Although this particular nest was located on the edge of the dry beach, it was low enough to be washed away, as were all the other nests in the vicinity. This disaster, therefore, terminated further experiments with the nesting birds, but it was not without some reward. It brought me an experience with a brood of Clapper Rails that would otherwise never have happened.

During the high tide I stayed in Captain George W. Cobb's house. This was ideally located on the southern end of the island and afforded an extensive view of a large portion of the island to the north. Placed back from the beach behind a ridge of sand dunes, the house rested on piles some seven or eight feet above the salt marsh that began below the house and stretched far to the northwestward and westward. Protected thus from high water and the surf, it was a safe place under such conditions.

The tide that occurred on this day completely inundated the marsh and came to within one foot of the floor of Captain Cobb's house. While this tide was rising, I counted six pairs of adult Clapper Rails and their broods swimming above the marsh, striving desperately to reach the dunes, which were the only parts of the island still above water. But the northeast wind was driving them to the southward and made their attempts at reaching shore seemingly useless. Two broods ultimately came ashore; three others were swept past the southern point of the island to death in the rough ocean. The sixth brood was blown directly toward the house. My attention was naturally directed toward the welfare of the family group.

As this brood rapidly drifted toward the house, I was able to discern seven young birds, all of which were about of an equal age. I judged that they were two weeks old. They were barely able to keep their heads and backs above water. Waves, freshly whipped up by the wind, continually

washed over them, soaking their down and making them less buoyant each time. They seemed about to succumb and were making no attempts to swim. The two parent birds, however, were large enough and strong enough to keep their heads above the waves breaking over them and were swimming anxiously about their young. Every now and then the old birds would head toward the dunes but, seeing that their offspring were not following, would turn back and continue encircling them. In a very short time the rail family was floating along past the house. Captain Cobb and I soon rescued the seven young birds by plunging into the water and gathering them up and bringing them to the porch. We placed them in a carton two feet square and closed the four flaps. As a result of our interference the parent birds made away to the sand dunes calling loudly. Darkness set in before the tide went out, and the young rails passed the night in the carton on the porch. While their down was soaked and they seemed utterly exhausted, scarcely moving when we touched them, they were old enough and the temperature of the surrounding air was warm enough to permit their survival without brooding.

At sunrise the next morning we were awakened by the calling of the young birds in the carton and the noisy clatter of the parent birds which were frantically searching about beneath the house. Looking through the window on to the porch, we saw one parent bird fly to the porch floor and walk directly to the carton. Several times it walked around the box, striking at the sides as it did so. It jumped nimbly to the top and picked up the loose end of one of the flaps with its bill, lifted it up, and flipped it over backward. This allowed a small opening between the two underlying flaps, through which it thrust its head. Immediately, it made a quick thrust at one of the young birds. To us it appeared as if the old bird had actually grasped one of the young birds, but the young bird was too large to be drawn through the opening. Consequently the adult let go and remained on the box, continuing its clatter. When we went out on the porch to open the box, the old bird flew to the marsh grass below. The young birds were strong enough to hop out hurriedly, jump down from the porch, and follow their parent away. We last saw the young birds going through the marsh grass, responding to the coaxing sounds of their parent.

This episode, I found, was not new to Captain Cobb. During a high tide of the previous summer he had rescued a brood of young rails scarcely a week old. He had placed them in an open box on his small hand-cart and left them on one of the dunes during the storm. The top of the box was about three feet from the ground. Going back to his house, he observed that in a short while the cries from within the box attracted the parent birds to the vicinity. One adult, the bolder of the two, came up and circled the cart a number of times, walked underneath it, and then hopped first to the

edge of the cart, then to the top edge of the box with a young bird held firmly between its mandibles. It jumped to the ground with the burden and put it down, and both disappeared into the grass. Wishing to keep the remaining brood for a group of ornithologists who were coming the next day, Captain Cobb removed the birds to a large box resting on the ground. The open top of this box was at least three feet from the ground. To his surprise the same thing happened. An adult bird returned, found its way *directly* to the top of the box *without circling it*, and removed another young bird. Captain Cobb finally covered over the top. Toward night an old bird was back again and was standing and moving nervously about on the covers of the box. The young birds that had been previously removed were nowhere to be seen, having presumably remained in the grass with the other parent.

To my mind these acts of egg-returning and young-carrying showed intelligent behavior. I grant that they had as their basis the instinctive, cyclical drives to incubate *all* the eggs and to solace by brooding *all* the complaining young. Yet, in submitting to the driving force of instinct, they showed at least a coating of intelligent behavior by readily adapting themselves to certain circumstances that were not a part of their ordinary reproductive routine.

Let me analyze these cases more fully, to show in what ways intelligent behavior was evident. The egg was out of the nest and obviously could not be covered with the others. It was down among the dead grasses over the edge of the nest; it could not be easily rolled back over these entanglements with the bill; it could not even be reached from the nest with the bill, in the last instance. Similarly the young were separated from the adult by the sides of the carton; they could not be coaxed out. Where with most species of birds the egg would have remained *in situ* and the adult might or might not have forsaken its own nest to incubate the dislodged egg, and where with most species of birds the young would have remained in the carton until death by exposure or until removal by some animate means, the rail, through the medium of its long and strong bill, found a way of overcoming the conditions, which it instinctively realized were wrong; and it found this way by its capacity to adjust itself to a new situation. Thus by lifting the objects bodily it was able to change the conditions to suit its instinctive mental pattern.

Let me further analyze these cases for evidence of intelligent behavior. The second time and the times thereafter that the rail returned the egg to the nest, it acted with little hesitation. It did not fumble at the egg nor move it about, but picked it up and returned it deliberately. It even grasped the egg deliberately when it left the nest to bring it back. The adult rail that Captain Cobb observed returned to the taller box the second time,



CLAPPER RAIL APPROACHING ITS NEST



AN EGG DISPLACED OUTSIDE THE NEST



CLAPPER RAIL SEIZING DISPLACED EGG



RETURNING DISPLACED EGG TO NEST

flew directly to the top, went in, and did not bother to circle it as it had circled the box on the hand-cart. These rails learned by experience. Where they hesitated the first time, they acted more deliberately the second time. Had their acts been instinctive, they would not have learned by experience. But they *did* profit by experience, and their behavior was, to my mind, intelligent.

*Department of Zoology, Carleton College
Northfield, Minnesota*