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BEHAVIOR OF BLACK SKIMMERS AT CARDWELL ISLAND, VIRGINIA¹

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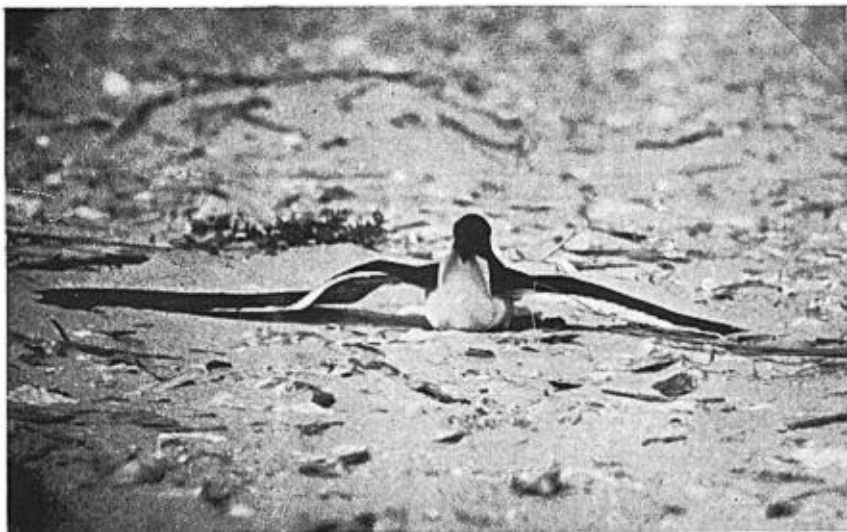
Plates 16, 17

CARDWELL ISLAND, a narrow strip of land three quarters of a mile in length, lies adjacent to the southwestern end of Cobb Island, Virginia. Scarcely more than an emerged sand-bar with a blunt, central ridge of grass-tufted dunes, its chief value to the ornithologist lies in the long south-eastern beach where a group of Black Skimmers (*Rynchops nigra nigra*) has returned each year to nest and rear their young.

In 1933, I was on Cobb Island and from June 23 to July 6 made frequent visits to this colony by crossing the narrow channel which separates the two islands. A short walk from this point brought me to the central section of the broad beach, where the birds were nesting. Here upon the loose, sandy terrain, the continuity of which is broken up by pieces of driftwood, small plants, clumps of grasses and innumerable multicolored shells of mollusks, were approximately four hundred skimmers' nests. Without any lining whatsoever, they were mere depressions in the soft soil. Two-thirds of them at the time of my first visit contained young; the remainder contained eggs. Three or four was the usual number in the clutch, rarely two or five. Interspersed among the skimmers' nests were two nests of the Least Tern (*Sterna antillarum antillarum*), five of the Gull-billed Tern (*Gelochelidon nilotica aranea*), and twelve of the Common Tern (*Sterna hirundo hirundo*).

In studying the behavior of the skimmers on these nesting grounds, a blind was occasionally used. This was placed in the midst of the colony within easy view of twenty-three skimmers' nests, as well as one of the Gull-billed Tern and two of the Common Tern. As a contribution to our

¹ Read at the Fifty-fourth Stated Meeting of the A. O. U., Pittsburgh, Pa., October 21, 1936. The author is indebted to Dr. Alfred O. Gross of Bowdoin College, Brunswick, Maine, and Mr. Francis H. Allen of West Roxbury, Massachusetts, for a critical reading of this manuscript.



BLACK SKIMMERS FEIGNING INJURY IN THE VICINITY OF THEIR NESTS.

knowledge of the Black Skimmer, I have presented in the following paragraphs certain of my observations pertaining to its behavior at Cardwell Island and the immediate vicinity. Unless otherwise indicated, these observations were made from a blind.

Mating.—Since the nesting season was already under way at Cardwell Island by June 23, I did not expect to see any sort of courtship behavior. On June 28, however, I saw it occur in one instance. Not twenty feet from me an adult, which I later ascertained to be a female, stepped from her nest to greet, a few feet distant, her mate who had just arrived in the vicinity. Walking to within three feet of him, she came to a stop. After a moment's hesitation the newcomer bowed his head, leaned forward, and with conspicuous deliberation picked up a small piece of driftwood six inches in length and nearly half an inch in diameter. In order to seize this with his mandibles of unequal length, he tilted his head slightly to one side and, opening his mouth, inserted the tip of the longer, lower mandible in the sand beneath it. Closing his mandibles, he lifted the stick crosswise between them. Then, assuming a stance more erect than usual, the suitor slowly and stiffly approached his inamorata, projecting his bill with its contents directly toward her. Within one foot of her he paused. The next move was hers. With bill pointing downward, head drawn closely back upon her shoulders, she cautiously, almost coyly, stepped toward him. Once within reaching distance, she hesitated and, then, with a sudden upward jerk of her head, took the stick gently from his mandibles and carefully returned it to the ground. Copulation immediately followed.

The nest which this female left contained two eggs. Two days later I noted three. Copulation had apparently continued during the laying of the clutch. This preliminary act in the discharge of the sexual function involving the passing of the stick, was undoubtedly a feeding reaction,—an inedible object being substituted for food,—and served as an extrinsic influence in the heightening of the sex impulse.

Activities during incubation.—The belief that the Black Skimmer leaves its nest and eggs for the entire day, allowing the sun to supply the heat required for incubation, was long ago dispelled by Dr. Frank M. Chapman.¹ The fallacy of such a belief is all the more emphasized if one visits this island on a hot summer's day and walks over the sand barefooted. The intensity of the heat absorbed from the solar rays is extremely painful. Certainly the skimmer embryo cannot be adapted to such high temperatures. Furthermore, if there is a wind, the dry, sifting sand levels over the nest depressions and buries the eggs in a very short while.

That the skimmer is able to cope to some extent with the constant sift-

¹ *Camps and Cruises of an Ornithologist*. D. Appleton and Co., New York, pp. 64-75, 1908.

ing of the sand when the wind blows, was exhibited on one occasion when I first placed my blind in the colony. For thirty-five minutes a skimmer was absent from a nearby nest. In the interim the eggs had become two-thirds covered with sand. This apparently caused the incubating bird no concern for, upon its return, it reached under each egg with its bill and pried it to the surface. Then, settling upon them, it began to turn round and round in the nest, pushing the new sand away from the eggs and out of the depression with backward thrusts of its feet until the nest was restored to its former depth.

A. C. Bent¹ and others have indicated that only the females take part in incubation. Two observations made by me show that both sexes take part in this reproductive process. In one case I saw an adult leave its nest and take wing just as its mate alighted beside it. The newly arrived bird paused several minutes and, as its mate disappeared over the colony, settled upon the eggs. In another instance a skimmer, which had been crouching four feet away from its incubating mate for an undetermined length of time, suddenly ambled up to the side of the nest. But the incubating bird, unlike the one in the observation previously cited, chose to remain upon the eggs. Its reluctance to leave, however, failed to quell the desire to incubate on the part of its mate. Consequently it proceeded to crouch beside the latter and, with an effective push, dislodged the occupant and took possession of the nest.

To what extent the male skimmer takes part in incubation is a matter for speculation, since the sexes are undeterminable both in appearance and in general behavior. These observations tend to indicate that both sexes take an equal part in the incubation process. The second observation particularly shows a strong incubative instinct in both parties concerned.

Activities of young.—One can readily see that the chicks of the Black Skimmer are well adapted to the vicissitudes of their hot, sandy environment. When brooding is not afforded by the adults, which often leave the nesting grounds temporarily, the young resort to the shade of the nearest grass clumps, plants, large shells, and driftwood, and there find protection from the sun's rays. Especially do I recall one large log lying on the beach in such a fashion as to give shade along one entire side. Here I counted twenty-one chicks, ranging in age from two to seven days, which had sought protection from the direct sunlight.

When left alone, the chicks would not permit themselves to be inundated by the blowing sand. Rather would they continue to move constantly, shaking the sand from their backs with much annoyance. If I appeared in plain view to them outside my blind, they would instinctively remain

¹ Life Histories of North American Gulls and Terns. Bull. U. S. Nat. Mus., no. 113, p. 314, 1921.

motionless. By so doing the fine sand would sprinkle over their buffy down and render them all the more protectively colored.

S. C. Arthur (cf. Bent, *Life Histories of North American Gulls and Terns*, p. 315, 1921) has called attention to the fact that occasionally the skimmer chicks will entrench themselves in the sand of their own accord, lying flush with the surface of the beach. This habit I noticed many times. Nevertheless I saw that, even though thus hidden, they would not allow the sand to cover their backs and would wriggle continually to keep it from collecting there.

Brooding of young by adults.—Although the skimmer chicks wander away to find shade under various objects, the parent birds, I observed, do not as a rule join them but return instead to the vicinity of their original nesting sites. This has apparently resulted in certain of the young returning to parents other than their own and being cared for by them. On June 23, I noted one adult brooding two chicks whose ages differed by at least five days. In another, more unusual case I saw an adult skimmer return to its nest which contained three small young, presumably its own. One of them had recently emerged from the egg. Shortly thereafter two more chicks, obviously much older, appeared at its side, one following the other. Both crawled beneath the old bird which offered no objection. Because of the noticeable difference in ages it was apparent to me that the chicks brooded by these two birds were not in each case hatched from the same set of eggs.

More extensive observations are necessary to prove conclusively that brooding birds of this species *always* tolerate the presence of young other than their own as these two adults appeared to do; but certainly throughout my hours of watching I saw no attempt on the part of the old birds to prevent their neighbors' chicks from intruding upon their territory nor any evidence of death resulting from attacks by adults.

Feeding of young by adults.—Both sexes assist in the feeding of the young; the parent birds return separately or sometimes together to give them food. On two occasions I saw an adult carry on the feeding activities while its mate brooded the young. The bird bearing the food alighted two feet away from its brooding mate and uttered several low, barely audible sounds, whereupon two chicks emerged from beneath their parent and walked directly to the bird with the food. After being fed they tried to creep under this bird but it flew away.

Most of the food, as far as I could determine, was held between the mandibles when brought to the young. I did not see any cases where it seemed that the food was regurgitated. The young took the food directly from the beak, although, if it were dropped, they were capable of picking it up and devouring it.

Feeding by adults.—Winding through the salt marshes of Cobb Island on

their way to the sea are numerous tidal creeks. At low tide scarcely any water runs through their muddy basins. If any does occur, it is very shallow and slow flowing. At such a time I was standing at a right-angled bend of one of these creeks that contained a ribbon of water averaging two feet in width when I discovered a skimmer flying very low over the marshes. I could see this bird only at intervals when it swung up above the tall marsh grasses, for most of the time it flew along below them. Finally I realized that this bird was following along one of these creeks, the identical one by which I was standing. Soon it appeared over the straightaway that led to the bend beside me. Its mouth was open and its thin, laterally compressed lower mandible was inserted in the stream as it dashed toward me. Once nearby, I noted a sizzling sound produced by the lower mandible as it cut the surface of the water. Without reducing speed the skimmer approached the bend and, continuing the steady beat of its long pinions, sailed around it, banking its body as a pilot would laterally incline his plane. As if no sharp turn had occurred at all, it continued to cut the water of the creek for several feet until it suddenly rose above the marsh and headed away toward shore. For at least thirty feet this bird had steadily cleaved the water with its lower mandible.

The skimmer's habit of cutting the water was noted many times every day. Along the shores of Cardwell Island these birds were watched cutting the troughs of the incoming breakers longitudinally, following each one until it all but flattened out on the beach, then flying out to cleave the next one as it rolled in. Their wings were always held high, in the upward strokes their manuses seeming almost to touch above their backs; in the downward strokes the tips of the primaries seldom were lowered below the level of the underparts. The horizontal plane of their bodies was tilted slightly forward. Their beaks were usually opened at an angle of about twenty degrees. The distal third of their lower mandibles was immersed, bringing the tips of the shorter upper mandibles nearly to the water's surface. Occasionally, when only the tips of the lower mandibles were touching the water, their beaks were not opened.

S. C. Arthur (*Auk*, vol. 38, p. 574, 1921) has said: "The skimming and 'plowing the main' is usually done with the mandibles closed save for the times they are opened to permit the cry or 'bark'."

I do not wish to imply in the above descriptions that water-cutting was observed only in the tidal creeks and in the near vicinity of the shore. Oftentimes it was seen to take place in tidal pools, even in deep water. I do not wish to imply, either, that this habit was observed *continually* while the birds were moving along here. Skimmers could be seen to fly very near the surface of the creeks or to fly parallel with the shore, following closely the troughs of the incoming breakers, without immersing their bills, save, perhaps, at very rare intervals.

I firmly believe that these skimmers seen along the tidal creek and shore were searching for food. For the most part they seemed altogether too intent upon the water beneath them to be flying along without such a purpose. Furthermore many of the skimmers seen along the shore were noticed going back and forth over the same course, sometimes several of them at a time. Their persistence in this behavior resembled markedly that of the terns in flying again and again over a certain area where fish are to be found.

In this paper I do not propose to review the extensive literature pertaining to the feeding habits of the skimmer since this has been satisfactorily done by S. C. Arthur (Auk, vol. 38, pp. 566-574, 1921) and Dr. R. C. Murphy ('Oceanic Birds of South America,' vol. 2, pp. 1175-1177, 1936). Neither do I attempt a final judgment on the traditional belief that the water-cutting habit is a means of obtaining food. My studies in this respect are far too limited to justify that. I wish to present, nevertheless, the following observation with a few comments.

While watching the skimmers cutting the water along the shores, three times I noticed an individual thrust its entire beak forward and retrieve a glistening fish crosswise between the mandibles. In each instance the bird lifted its bill parallel to the surface of the water, swallowed the fish, and continued on with its maneuvers. The method of securing the prey, each one of which was approximately two inches in length, was suggestive of fish-catching in the tern, except that the bill was already in the water before the lunge and the bird did not immerse its body for the bill and forehead were the only parts to disappear. So far as I could determine, no apparent advantage was offered either by the modified structure of the bill or by the fact that the lower mandible was previously cleaving the water.

Dr. Witmer Stone¹ once witnessed a skimmer driving its bill into the water and seizing a fish about three inches in length. In this case the fishing resembled even more decidedly that of a tern, for the bird was *not* cutting the water at the time.

The Black Skimmer, according to the observations of S. C. Arthur (Auk, vol. 38, pp. 566-574, 1921), feeds in the manner of herons by wading about in shallow water and striking at fish. Arthur (p. 569) has "*never* seen a Skimmer secure its fish food *while skimming the waters with its under mandible immersed*" and has concluded (p. 574) that the "Black Skimmer does not secure its food in the way generally set forth. . . ."

The observations just cited seem to indicate that the skimmer feeds commonly by catching fish while on the wing and that the lower mandible is sometimes but not always immersed immediately before the strike is

¹ Auk, vol. 38, pp. 595-596, 1921.

made. Further observations are needed to determine the extent and variations of this habit.

Defense of nests and young by adults.—My arrival in the immediate vicinity of certain skimmers' nests, particularly those containing young, was greeted with a type of behavior which struck me as being decidedly different from that of other colonial sea birds whose nests I had visited along the Atlantic Coast. Here I noted that adults feigned injury in the manner of certain gallinaceous and limicoline species. Since a part of this behavior has already been described by B. R. Bales,¹ I quote him as follows:

"The four birds [skimmers] that did not return to their nests used every means in their power to lure the strange object [blind] from their eggs. They would alight some distance from the blind and then toddle away on wobbly legs, with wings outspread; push themselves along by sliding upon their breasts; stagger away with outspread wings beating upon the sand; sit at a safe distance opening and closing their bills, but not making any sound as though they were swearing at us under their breath. . . ."

In the midst of the Cardwell Island skimmer colony a long, narrow tidal pool ran along the upper part of the sand beach. Individuals nesting near this water area feigned injury by swooping down upon it as upon land and dragging their bellies along the surface, or, flying just above it, splashing their feet in the water as if walking. Occasionally, too, they would nervously cut the water's surface for short distances with their lower mandibles, a habit to which Arthur has called attention.

On July 3, further studies of the Cardwell Island colony were interrupted by a severe northeast storm which, with its almost unprecedented high tides, completely washed the nesting grounds. From the porch of Captain George W. Cobb's house I watched the steady encroachment of the ocean upon the colony. Although I could not see the nests or the adults upon them, I knew when the first towering rollers rushed over them; for suddenly the old birds rose together in the air, hovered a moment, and settled out of sight. Again and again they took wing until finally they remained in the air constantly. It was apparent now that their nests were completely inundated. The adults were flying about here and there in a frenzied manner as if human intruders had suddenly come upon them. Darkness set in before the tide abated and it was, therefore, impossible to follow further their distressed activities.

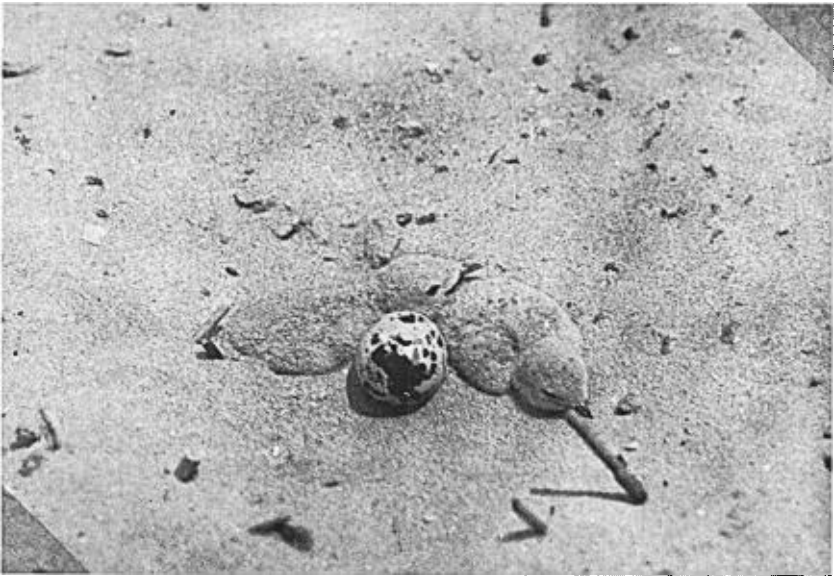
Early the next morning, on visiting the colony, I found the loose sandy soil hardened and flattened like a floor, while the vegetation, driftwood, shells, nests, eggs, and young were nowhere to be seen. Near the vicinity of my blind a pair of Gull-billed Terns swooped down upon me. They were obviously protesting against my appearance in the vicinity of their nest,

¹ Wilson Bull., vol. 31 (new ser., vol. 26), p. 85, 1919.

which had been located here the day before. But, strangely enough, no longer were the Black Skimmers objecting to my presence. Instead they were clustered together on the ground farther down the beach. At my approach the entire group flew up and moved farther away. Unlike the Gull-billed Terns, they had already surrendered "possession" of their nesting territories.

A careful search of Cardwell Island finally revealed a small group of nearly thirty partially feathered young scattered here and there on the débris at the base of the dunes on the southernmost point. My attention was first drawn to them by the vocal protestations and the injury-feigning of a few adults watching over them. Upon making this discovery, I realized what had been the direct fate of the eggs and small young of the colony. The beach, which faces in a southeasterly direction, had been swept by the giant waves as they came in from the northeast. This sidewise sweep had carried the movable objects of the beach down to the southernmost point and out to sea. Some of the older chicks of the colony were strong enough to hold their own against the force of the rollers and to take refuge at the base of the dunes. The adults, instead of remaining on their nesting area, had followed their young. Here they stayed,—a quarter of a mile from their original nesting grounds,—with the few offspring that had not been carried to sea.

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UPPER: YOUNG BLACK SKIMMERS BEING COVERED BY BLOWING SAND.
LOWER: BLACK SKIMMER FEEDING IN A LARGE TIDE POOL.