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## Notes on the Mexican Cormorant

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AMONG the rugged cliffs and headlands of the Aleutian Islands I first saw cormorants in sufficient numbers to become familiar with their habits. The impression made at this time by the birds and their surroundings was so lasting that ever since their presence in a locality creates a sense of strange wildness that adds a peculiar charm to their haunts. Some of the species, however, live in situations quite different from the rude storm beaten crags overlooking northern seas where so many of them congregate.

The Mexican cormorant (*Phalacrocorax mexicanus*) is one of these dwellers amid milder surroundings. It is a wide ranging species wandering up the Mississippi Valley to southern Illinois and is found thence south to Central America, and even known to Cuba and Watling's Island in the Bahamas. In the intermediate area on the mainland they occur mainly along the coast lagoons from Texas south on the gulf coast, and from southern Sonora on the Pacific side of Mexico. From the lagoons they range up the larger rivers well into the interior. During our work in Mexico Mr. Goldman and I have become most familiar with them in the tropical and subtropical parts of the southwestern section of that country. Although they are found in the coast lagoons north to southern Sonora they are most abundant in these situations from Sinaloa southward. We saw them on the Balsas River and its tributaries in the heart of Michoacan and Guerrero, and they follow the Rio Santiago up through Jalisco to Lake Chapala, at 5000 feet altitude, on the southwestern border of the Mexican tableland.

From the distribution given, it is apparent that this is mainly a fresh or brackish water species in its mainland distribution, and Gundlach states that the few he saw in Cuba were found about fresh water.

Though mainly habitants of fresh and brackish water, to some extent these birds also frequent sea islands. The most notable instance of this kind that has come to my attention is that of Watling's Island in the Bahamas. There, on July 11, 1903, Mr. J. H. Riley of the National Museum found about fifty pairs breeding in the tall mangroves about a salt lagoon. The eggs were mostly hatched at that time and the young were in all stages of growth. Some of them, though not able to fly, had left the nests and were swimming about in the lagoon. The last of April, 1901, while Mr. Goldman and I were cruising around the shore of Yucatan in a small boat we landed for a short time on Contoy Island near Cape Catoche. Here we found many of these cormorants perched in the mangroves bordering some small salt lagoons, in company with white ibises and man-o'-war birds. In the trees were some old cormorant nests, all of which were unoccupied.

Last March we camped on a small river at the bottom of a deep canyon in central Michoacan; this stream runs a tortuous course between high rocky walls



LAKE CHAPALA, JALISCO, MEXICO, SHOWING LARGE BOAT ROOFED WITH RUSHES

and at short intervals breaks into foaming rapids. Our camp was on a narrow sandy flat at the water's edge, under the overhanging branches of some small mahogany and other trees that had secured a foothold in the talus at the foot of a cliff. As we lived here unsheltered except by the foliage, the happenings among the wild life of this solitary place were under constant observation. Among the interesting daily events was the passage up the river each morning of several Mexican cormorants, always flying singly, their glossy black plumage gleaming in the intense sunlight as they turned. They were evidently on their way to some fishing ground higher up, and several hours later—usually about midday—came back following, as in the morning, all the wanderings of the river and giving a touch of completeness to the wild character of the surroundings.

In the summer of 1897 we found them in abundance about the lagoons and streams of the coast country in southern Sinaloa, and especially at some shallow rapids in the Rosario River a few miles above the town of Rosario. During the early part of the rainy season the river was low and at the place mentioned a short descent in the boulder strewn bed of the stream made a stretch, forty or fifty

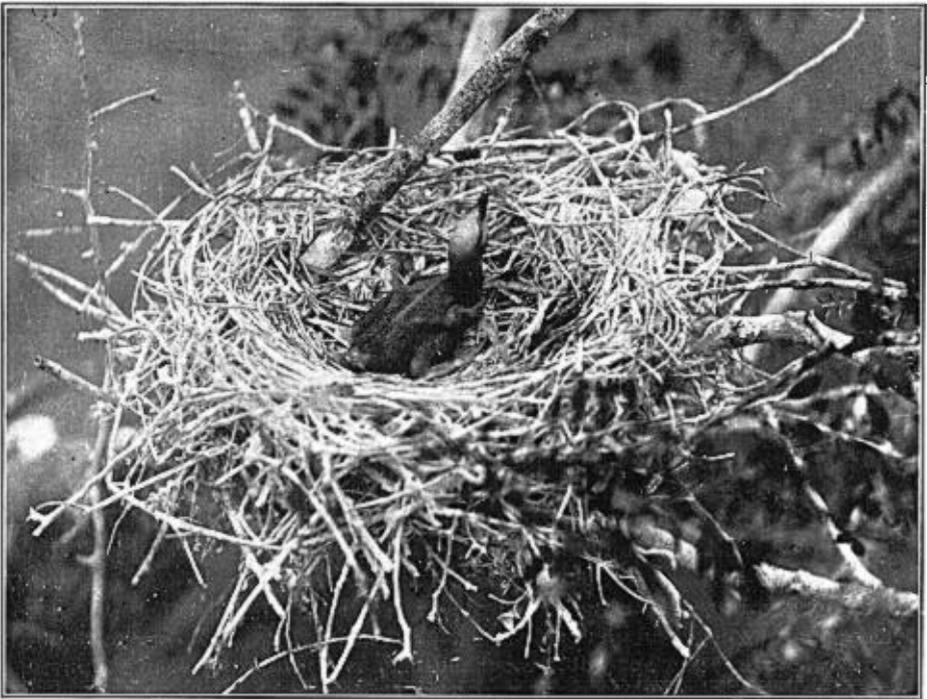
yards long, of brawling rapids. Every morning dozens of cormorants flew up stream to the rapids from the mangrove-bordered lagoons near the coast. They flew low along the water, sometimes singly and sometimes in small parties, usually keeping side by side in a well formed line when two or more were together. For a time most of them perched about on the numerous projecting stones in the river, preening their plumage and sunning themselves; others swam idly in the



NESTS OF MEXICAN CORMORANTS, LAKE CHAPALA

slow current about the rapids. At such times the brilliantly green masses of foliage bordering and often overhanging the water, the swift dark stream broken by jutting rocks on which were the numerous, black, sharply outlined forms of the cormorants, and overhead the crystalline depths of the morning sky of the rainy season made a wonderfully beautiful picture.

When a considerable number of cormorants had congregated they seemed to become suddenly animated by a common purpose and followed one another in swift flight to the foot of the rapids. There most of the assembled birds alighted and formed a line across a considerable section of the river. Then with flapping wings, beating the surface of the water into foam, the black line moved up stream, the birds showing much excitement but keeping their places very well. The surface of the water was churned to spray by the strokes of so many powerful wings and feet, yet in the midst of the apparent confusion the birds could be seen darting to one side or the other, or spurting a few feet ahead of the line, and sometimes disappearing for a moment below the surface but nearly always securing a fish. When they reached the head of the rapids the birds flew heavily to their perching stones or swam slowly up the quiet surface of the river. After a short rest the



YOUNG MEXICAN CORMORANT, LAKE CHAPALA, JAN. 5, 1903

line would reform and again beat up the rapids and this was repeated until the birds had satisfied their hunger.

The cormorants evidently fully appreciated the advantages of thus working in company, so that a fish trying to escape from one bird would almost certainly become the prey of another. The purpose of beating the surface of the water with their wings was evidently in order to alarm and confuse the fish so that they would dart blindly about and become more easily captured. I have seen parties of gannets doing the same thing in the midst of schools of fishes off the Tres Marias Islands.

When the cormorants were gorged they deserted the fishing ground for the day and streamed back down the river to the lagoons where they perched motionless for hours in large mangroves or other trees along the edge of the water.

The west coast lagoons are long lake-like bodies of brackish water varying greatly in size and proportion but nearly always fringed by a more or less dense growth of mangroves. These are low, rarely rising over twenty-five or thirty feet, and as the leafage begins at the water's edge they present a solid wall of dark green, back of which often rises the larger growth of scattered forests. Here and there among the mangroves occur dead and weathered trees, or lacking these, wide branching living trees which project over the water. These are favorite congregating places for the Mexican cormorants which, with their somewhat grotesque outlines, form a conspicuous figure of the bird life in such localities. These birds are not considered game by the Mexicans and this combined with the high price of ammunition, is sufficient to protect them from wanton killing so that they are not often disturbed and will permit a canoe to approach within easy gunshot before they clumsily take flight. They are heavy-bodied and awkward and frequently fall from the perch into the water and try to escape by swimming in preference to flight. When driven to take wing from such a perch they commonly make a broad circuit and returning pass near the canoe and turn their heads in evident curiosity to examine the cause of the alarm. Their flight like that of other cormorants is steady and rather labored, and as they circle about an intruder they often glide for some distance on outspread wings, turning their long outstretched necks toward the object of their curiosity and presenting almost as grotesque an appearance as the snake-bird.



MEXICAN CORMORANT ON NEST, LAKE CHAPALA

Although the cormorant had been familiar to me for a number of years, it was not until recently that I had the chance to learn anything of its breeding habits—and this to my surprise occurred on Christmas day, apparently a most unpropitious season to go bird nesting, even in the tropics, on this side of the Equator. On December 23, 1902, Mr. Goldman and I reached Ocotlan, Jalisco, a small town located on the Santiago River close to the point where it flows out of the northeastern corner of Lake Chapala. This lake, the largest body of fresh water in Mexico, is on the southwestern border of the tableland at an elevation of 5000 feet above the sea. In its greatest dimensions it measures about twenty by sixty miles. Its main tributary, the Lerma river, flows through extensive marshes into the eastern end of

the lake only a few miles from the outlet of the lake into the Santiago; the two sections of what is really the same stream thus, after Spanish fashion, bearing distinct names.

Our object in visiting this point was to learn as much as possible about the water-fowl which winter abundantly in the marshes bordering the east end of the lake and along the lower Lerma.

By invitation of an American in charge of a plantation near Ocotlan we embarked on Christmas day with our host and his wife in one of the large sail boats used for the commerce between the towns on the lake, for a trip to the mouth of the Lerma on a hunt for geese and ducks. The boat was large and apparently build on the model of a flat-iron with a thatched roof of rushes over the stern, and with such high sides that one could walk comfortably about on the flat bottom or climb up to the bow where a decked space covering the forward third of the boat gave a place where one could lie and watch the picturesque views furnished by the mountains which enclose the lake on nearly all sides. A large square sail caught the light breeze and drew us slowly away from shore and for some time I strained my eyes to but little purpose for signs of bird life. In the afternoon we reached the shore near the mouth of the Lerma and saw several species of herons and ducks about patches of rushes, and many cormorants were flying in pairs or in small parties drawn out in line and at a distance not easily distinguishable from geese. The cormorants were all headed toward a common point in the shallow part of the lake, beyond the mouth of the river, which our native boatmen assured us was their roosting place. The winter climate is delightful in this region and as Christmas night closed down we sat on the deck, while we drifted slowly along near the reedy shore, and watched the most brilliant display of stars come out as the rich afterglow faded away. In the intense blackness of the shoreline the cheerful twinkling of lights here and there marked the locations of villages and followed the tolling of the vesper bells that came to us, mellowed by distance, at twilight. There were no signs of the expected geese but from time to time the voices of other waterfowl arose on the adjacent marsh, exciting pleasant anticipations for the coming day. With some reluctance we left the beauties of the night and sought our blankets. Just as we were drifting into forgetfulness a medley of clanging notes awoke us and we heard a flock of white-fronted geese (*Anser gambeli*) settle near us in a pond on shore.

The next morning several flocks of geese left the ponds in the vicinity soon after daybreak and a large number of cormorants dispersed from the part of the lake where they had gathered the evening before. All day until the middle of the afternoon we poled about in the shallows at this end of the lake among patches of reeds and marsh grass with stretches of open water between and were very successful in securing numerous species of waterfowl. In the afternoon a long line of whitened bushes growing in the open water some distance away was pointed out by our host who said he had passed there a short time before and found a lot of cormorants nesting in them. I could scarcely credit this but the whitened appearance of the bushes showed that the birds used the place as a roost at least and I decided to investigate. As we poled near enough we saw that the bushes, or small trees which projected twelve or fifteen feet from the water were full of cormorants and many could be seen standing on nests. We stopped the boat when within one hundred yards and after removing our clothing slid cautiously overboard into from three to four feet of water. Camera in hand Goldman and I stalked the birds to within about forty yards and secured a few exposures. The

bushes extended in a narrow belt for about two hundred yards in the otherwise open water and in them were perched between two to three hundred birds. At our first stop the outstretched necks and changing position of some of the birds gave evidence of their uneasiness and as we waded still nearer most of them flew clumsily down into the open water. After moving out a hundred yards beyond the line of bushes they formed a black line on the water where they remained as long as we stayed in the vicinity. When the birds became alarmed at our approach they began a curious guttural grunting which came in a low continuous chorus from those left in the bushes as well as those in the water. These notes sounded much like the low grunting of a lot of small pigs while feeding. As we waded among the bushes the birds which had remained by their nests pitched off into the water one after the other and swam out to join the main flock; or took wing, and after a short detour, came circling close overhead, uttering at short intervals their guttural notes of alarm or protest.

The nests were strong platforms placed on forking branches and measured about fifteen inches across and four to six inches deep with a shallow depression in the top. They were composed entirely of small sticks compactly arranged as is shown in detail in the accompanying photographs. From one to half a dozen nests were placed in a bush and we planted our tripods in the muddy bottom and standing nearly waist-deep in the water secured good pictures before calling up the boat and getting abroad. As the bushes were scattered we had no trouble in poling about and examining the nests at leisure. Most of them were just completed and contained no eggs. Quite a number had a single egg and in a few cases two eggs were found. A series of eighteen eggs were taken. They are rather small for the size of the bird and have a pale green ground color overlaid with the usual chalky white deposit which gives them a greenish white shade.

Three eggs representing the extremes of variation out of this series measure respectively (in millimeters) 55.4 by 33.2; 52.2 by 41.6 and 53 by 34.3.

After finishing our inspection of the nests we returned to the large boat so late that the day breeze failed and left us drifting about the lake all night and prevented our reaching town until late the following day.

On January 5, 1903, we made another visit to this nesting place and with the exception of a single young bird recently hatched the nests of the entire colony were absolutely empty, so it was evident that the place had been deserted as the result of our former visit. Instead of between 200 and 300 birds which we saw on our first visit not more than fifty were seen this time.

The water in the lake and river was unusually low this season which may account for the presence of this unexpected colony, for the native fishermen agreed in saying that these birds only nest in some trees far up the lake shore, and sometimes in large willows along the marshy borders of the Lerma near its outlet in the lake. However that may be, it was a stroke of good Christmas luck that we made this find since the nesting habits of this species appear to be practically unknown so far as I have found in published accounts of the species.