

another was saddled on a dead limb of a fig tree. Other trees in which nests were found at Comondu were avocado, olive, lemon, orange, water willow and cottonwood.

The nesting material of the Comondu birds and the Laguna birds was about the same, the nests being composed of fine plant down, dried flower heads, plant fibers and small feathers, all bound together with spider webbing. Nest number 3 (figure 21) is covered on the outside with strips of bark of the water willow. Without exception all the nests of the Sierra birds are beautifully decorated with lichens from the oaks (1 and 2, figure 21). The Comondu birds do not decorate their nests with lichens, these not being available, but sometimes they do attempt a little decoration with bits of bark or leaves.

The nesting dates of the Laguna birds are also different from those at Comondu. We arrived in the Sierra de la Laguna on June 16 and remained until July 7, and in that time no nests were found, though I am not sure that the birds were not nesting. August 3 I re-visited the mountains and remained in Laguna Valley and vicinity until September 3, and in this month discovered twenty-five nests. On September 1 I found a nest just ready for eggs. Of those found, the greater number contained young or heavily incubated eggs, so it might be said that the nesting season in Laguna Valley started about the middle of July and continued to the middle of September. On one occasion, when a nest was found just started, I hung a fluff of cotton nearby and the bird finished the nest entirely of this cotton, decorating the outside with lichens. She then laid one egg. At this time a raven, that arch enemy of all birds, interfered and destroyed the nest and egg. Ravens were very common in the valley and if a person ever went to a nest when a Raven was in sight it meant certain destruction to the nest. One was caught in the very act of destroying a hummingbird's nest that I had just examined.

I could find no evil effect upon the nests from the almost daily heavy tropical rains that lasted from one to three hours. As with our Californian hummingbirds, the number of eggs laid is usually two. I found several nests with one heavily incubated egg and also some nests with one young, but I cannot state definitely that two eggs were not originally laid and one destroyed. Neither did I learn the time it took for the eggs to complete incubation, for here again the Ravens interfered. It may be that frequently one egg constitutes a normal set for the Xantus Hummingbird.

The eggs are white, of course. Measurements would not mean much, as the eggs differ much in shape, some being oval, others elliptical. The nests, too, are of different sizes, the outside measurements of some being much larger than others. The Xantus Hummingbird makes a very handsome nest, bulkier than that of any other hummingbird of the same size in the United States.

Los Angeles, California, January 29, 1925.

THE COURTSHIP OF THE BRANDT CORMORANT

By CHARLES W. TOWNSEND

AS NEITHER Dawson in his "Birds of California" nor Bent in his "Life Histories" has anything to say about the courtship of the Brandt Cormorant (*Phalacrocorax penicillatus*), I have ventured to report the following observations made at Pacific Grove, California, nearly all at the rocks close to the Hopkins Marine Station of Stanford University. I devoted about two hours on each of three days (February 20, 23 and 24, 1925) to this study, using 8-power prismatic binoculars from a distance of about forty to sixty yards.

Although most of the time of these cormorants on the rocks was occupied in preening their feathers and in sleeping, they would now and again engage in more or less complicated courtship actions. The most complete of these, which I witnessed several times, went as follows.

Two birds, presumably males, in the presence of a third, which, by appearance of indifference and of slightly smaller stature I judged to be a female, would suddenly dart open bills toward each other, the upper mandible of one and the lower mandible of the other entering his rival's mouth. Then each, with bills closed, stretched his head up, when the blue of the gular pouch—hitherto invisible—would flash out with great brilliancy. They would hop up and down once or twice, bow toward each other and again stretch up their heads and make the blue gular display. This seemed to be a fairly complete performance and it was often repeated in part or in full and in varying order. It was often limited to the up-stretching of the head and the display of the blue. Once, two, who were facing each other, turned their heads and necks, and, in perfect time, bowed toward the left until their bills touched the rock, then stretched up and displayed the blue and then simultaneously bowed and touched the rock on the right. It was a very pretty illustration of display and dance. Song, also, may have been included but I could not hear it.

When the light was poor and the birds passive I was generally unable to see the gular blue, although I could see the buffy edging; but during display, even in poor light, the blue seemed to flash out vividly. This flash was, as a rule, but for a moment; but it sometimes lasted several seconds. In bright sunlight the blue could sometimes, but not always, be seen in the passive ones, but the color seemed less vivid and less extensive. There was every appearance of the inflation or pushing out of the gular pouch during the display. In one case, seen in good light, the gular pouch during the display appeared to lie in longitudinal folds. In this case the mouth was slightly open and vibrating, and the vibrations were communicated to the gular pouch and to the white plumes standing out from the sides of the neck. Owing doubtless to the noise of the waves and of the gulls, I could not detect any sound. When the vibrations ceased, the blue of the gular pouch almost disappeared and seemed to be replaced by the buffy edgings. This bird was facing a quiet and apparently smaller bird, who voided at the height of her partner's excitement. This action on the part of the passive bird I noticed several times. It seemed to emphasize her show of indifference, but may have been merely the result of nervousness.

Several times I saw a bird flap its wings vigorously and immediately afterward stretch up its head and display the blue. Occasionally a bird would bow its head with neck curved, display while the head was low, and continue to display as it slowly raised it.

Most of the instances I have related seemed to involve rival males displaying before a female, and I have assumed this to be the case perhaps without sufficient evidence. There were other cases, however, where two, looking like a pair and sitting side by side, would suddenly bow and stretch up their necks and display. In birds where there is no difference in plumage between the sexes, the courtship act is often performed equally by both.

Boston, Massachusetts, February 26, 1925.