

Some Observations on the Nesting and the Young of Cormorants.

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Having heard that the Great Black Cormorant (*Phalacrocorax carbo novaehollandiae*) was nesting on Mundoo Island, my wife, son, and self made a trip to examine into the matter.

On November 24th, 1917, Mr. F. H. Downer kindly motored us to Goolwa, where a motor boat was waiting to convey us to Ram Island, where the shooting hut of Dr. Benson and Messrs. Cullen and Marshall had been placed at our disposal for the night.

After breakfast at 6 a.m. we went in the motor boat as far as it could get, and thence in the dinghy to the shaggery. On the way several of the bark nests of the Moorhen (*Gallinula tenebrosa*) were seen placed in the butts of large tea trees standing in the water, the contents were in all stages from fresh eggs to newly hatched young. One nest, which our boatman told us had been robbed three weeks before again contained seven eggs of a very light colour. We also found several nests of the Little Grass Bird containing eggs in the overhanging branches. On rounding a bend we came suddenly upon the nesting shags. The nests were all built of tea tree twigs, apparently broken off by the birds themselves, for in the new nests some of the twigs still had green leaves upon them. Only two species were nesting, the little black (*Mesocarbo ater*), and the little pied (*Microcarbo melanoleucus*); there were no Big Black Shags present at all, and although there was a number of orange-faced birds sitting about in the trees none of them was nesting. The two nesting species were more or less mingled, but there was a tendency for each to nest in small groups by themselves, though occasionally one or the other species had a nest in an alien group. The contents of the nests varied from incomplete clutches of fresh eggs to young birds able to fly. The young, when little more than half grown, disgorged the contents of their stomachs, flopped into the water and dived out of sight directly the nests were approached. It was a puzzle to us how they regained their nests, some of which were 10 or 12 feet from the water, until we saw one climbing up the branches using beak, claws, and wings.

The young of both species are quite black, and have the face and forehead bare until nearly full grown. It is not until



A. M. Morgan. Photo.

YOUNG CORMORANTS (*Hypoleucis varis hypoleucis*) JUST OUT OF THE NEST.

about half grown that the white feathers of the breast appear on the little pied bird, and even after they are able to fly the under part of the neck remains black.

The disgorged fish sank when ejected, hence very few were seen, the only species identified was the introduced carp, which has become very numerous in the river and lakes of late years.

The note of the young birds is a feeble chirping, uttered when the nest was approached or an old bird flew overhead; the adults were quite silent all the time.

After examining the shagery some time was spent in rowing about amongst the flooded tea trees and samphire, and some more moorhens' and grass birds' nests were examined; a disused swan's nest was also seen as well as many young black ducks and a few young swans. After an unsuccessful search for nests of the Baldcoot (*Porphyrio melanotus*), and the Musk Duck (*Biziura lobata*), we had lunch at the hut, and returned to Goolwa; a pleasant drive through the hills brought us back to Adelaide the same evening.

On the 4th of May of this year, my wife, son, and self journeyed to Port Broughton to pay a visit to the Orange-faced Cormorants (*Hypoleucus varius hypoleucus*), which we had heard were breeding on Shag Island.

On the morning of May 5th Mr. Wall, Jun., sailed us down the channel to as near the island as the boat could get, and then rowed us some further distance in the dinghy, after which a wade of a quarter of a mile brought us to the mangroves, at that time the tide being low, out of the water. The first birds met with were a flock of Silver Gulls (*Bruchigavia novaehollandiae*), about 200 in number, evidently in attendance for the purpose of picking up any unconsidered trifles such as disgorged fish and unprotected eggs or chicks; they were also eating the dead birds, for one such was seen with the breast muscles picked away, and many gulls' tracks about it in the mud. A few crows were also hanging about the rookery, sharing the office of scavengers with the gulls. The Island is such only at low water, the incoming tide covering all the mud and flooding the butts of the mangroves. A narrow belt of trees facing the sea was unoccupied, but on passing these we found ourselves at once in the rookery. The nests are all in the trees, some within reach of the hand, but many as high as 10 or 12 feet up, and sometimes as many as a dozen nests in one small tree; they are built of mangrove and samphire sticks, and at the time of our visit were mostly

lined with excrement, in some a few small shells were seen. The rookery covered an area of about two acres, all the trees in which were covered with excrement, leafless, and apparently dying. I had noticed on a former visit that the trees in which last year's nests were placed were quite dead. The smell, though not exactly aromatic, was by no means unbearable, perhaps because the ground was washed by each incoming tide. As we approached the trees the young birds disgorged the fish in their stomachs, and those old enough to do so flopped to the mud and waddled off towards the water. It was not very difficult to catch one of two for examination, but care had to be taken to avoid their sharply hooked bills, for they bite savagely when caught. By far the greater number of the birds were nearly full grown, though here and there younger birds were found, and a few nests still contained eggs in clutches of two or three.

Beneath the trees the mud was thickly strewn with disgorged fish in varying stages of digestion. The most numerous species was the Green Weedie (*Odx waterhousei*), next came the Rock Flathead (*Platycephalus sp.*). This fish, unlike the common Flathead (*P. fuscus*), lives on rocks and weedy bottoms; it is, I suppose, this species which Capt. S. A. White found in the stomachs of shags he dissected at Port Gawler (S.A. Ornithologist, Vol. ii., pp. 178 and 179). It is probably an edible fish, but is rarely if ever seen in the market. The next commonest was the Cat Fish (*Onidoglanus megastomus*), many of which were seen; there were also a few Trumpeter (*Atypichthys strigatus*), and one each of the Garfish (*Hemirhamphus intermedius*), and the Brown Weedie (*Odx balteatus*). Some of the fish measured as much as a foot in length, and one about $\frac{3}{4}$ lb. weight was seen. The young birds do not seem at all particular which nest they sit on; an adult sitting on two chicks and an egg was constantly pecking off young birds which were trying to get on to her nest, which they immediately occupied when she was driven off. The ownership of nests is a constant source of quarrelling amongst the young birds themselves, and when pecking and squabbling they are rather more noisy than usual. The young birds even when only a quarter grown are excellent climbers, using the hooked point of the bill, the wings and claws to assist themselves back into their nests, and when climbing the trees sometimes hoist themselves up by hooking the neck into a forked branch. Occasionally they get stuck and perish; we released one bird which was caught by a foot in a fork, and saw seven

ral dead ones in similar situations. The note of the young birds is a sibilant squawk, feeble by itself, but when some thousands of birds are uttering it at the same time the volume of sound is considerable. The old birds make no sound at all when flying over, but when a silver gull or a crow becomes too inquisitive they utter a hoarse grunting sound. When the adults or well-grown young get angry or afraid they half open the bill, partly extend the rami of the lower jaw, and keep the pouch and skin of the neck in a quiver.

The newly hatched chick is quite naked, of a greenish black colour above, and reddish black below. The eyes are closed.

Quarter grown young have the head naked, all the upper parts and wings covered with scanty black down, and the under parts with scanty white down; iris, dull brown.

Half grown birds have the forehead and crown of the head bare and of a light greenish black colour; iris, dull brown; pouch and bill, dull greenish yellow; neck and breast, white. The dome of neck in these two stages is much stained from putting the head down the parents gullet when feeding.

The fully grown nestling has the under parts of the neck and breast covered with white down, the upper parts and wings, dull black; iris, dull brown; beak, pouch, and bare parts of the face, pale dull yellow.

First stage out of the nest. Beak and soft parts of head, pale yellow; chin, neck, and upper part of breast, strongly mottled with black; abdomen, less mottled; iris, dull brown.

Second stage. Chin, white; middle of neck and upper part of breast, mottled with black; iris and soft parts as in first stage.

Third stage. Upper part of breast and abdomen, sparingly spotted with black; iris and soft part as in first stage.

Fourth Stage. Beak more greenish, culmen, dark brown colour; iris, dull brown, or brown with a grey margin, or all grey; bare part of face, dull yellow; abdomen, with a few black spots.

Fifth Stage. Ready to fly; all the under parts, white; wings and upper parts, dull black; iris, grey; bill and bare parts as in 4th stage.

The grey of the iris taking the place of the brown is probably the prelude to the sea green of the adult, but none of the birds we were able to capture had yet attained to that stage.

The breeding adult has a narrow band of green round the eye, all the rest of the face including the bases of the rami of the lower jaw is bright orange; bill, mottled horn colour; lower mandible somewhat darker. I had previously thought that the stage described by me (*S.A. Ornithologist*, Vol. iii., p. 77), was the breeding plumage. That colouration is probably the adult non-breeding plumage, or possibly a prelude to the breeding plumage. The occurrence of the black feathers on the breast of the young of both the little pied and orange faced birds is of phylo-genetic interest as indicating their descent from an all black ancestor.
