

Further Observation on the Cormorants and Bird Temperatures.

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On March 25th, 1916, Capt. S. A. White, on the invitation of Messrs. A. G. and E. S. Rymill, had an opportunity of making extensive observations on the orange faced Cormorant (*Hypolencus varius hypolencus*). I was unfortunately unable to go, but he has kindly handed over his notes to me for publication. The locality visited was a mangrove creek, a few miles north of the Outer Harbour, on the eastern side of St. Vincent's Gulf. Orange-faced cormorants only were found. A large number of birds was measured and dissected.

Stomach contents:—No. 1, Fish bones and seaweed; No. 2, Weedfish; No. 3, 6 Weedfish; No. 4, 2 Flathead; No. 5, 3 Flathead; No. 6, 1 Weedfish; No. 7, 1 Weedfish; No. 8, 1 Flathead; No. 9, 1 Squid; No. 10, 1 Squid; No. 11, 1 Flathead; No. 12, 4 Weedfish, 1 Leatherjacket; No. 13, 1 Toad fish and fish remains; No. 14, 3 Weedfish; No. 15, 1 Weedfish, 1 Flathead; No. 16, 1 Weedfish; No. 17, 1 Weedfish, 1 Tommy Rough; No. 18, 1 Weedfish; No. 19, 1 Flathead; No. 20, 2 Tommy roughs; No. 21, 1 Flathead; No. 22, 2 Squid; No. 24, 1 Flathead, 1

Weedfish; No. 25, 1 Flathead; No. 27, 1 Weedfish, 1 Flathead; No. 28, 1 Weedfish, 1 flathead; No. 29, Fish bones, Cockle shells, and spiral shells; No. 30, 27 Toad fish, and a number of small fish; No. 31, 2 Flathead, 4 Weedfish; No. 32, 1 Leather jacket; No. 33, 1 Flathead and fish bones; No. 34, 1 Flathead; No. 35, 1 Weedfish.

Measurements:—The wing measurement was taken from the axilla to tip of longest primary, for the reason that as this measurement can only be taken on fresh specimens it was considered advisable to take advantage of this opportunity. It would have been better to have taken the measurement from carpus to tip as well, and this will be done if other opportunities occur.

No.	Sex	Total length	Wing	Spread
		c.m.	c.m.	c.m.
1	♂	82.25	55.75	121.50
2	♂	76.00	55.75	124.00
3	♀	77.25	53.25	121.50
14	♂	83.50	53.25	121.50
17	♂	73.25	54.50	116.50
19	♀	77.25	55.75	121.50
20	♂	81.00	59.50	124.00
21	♂	82.25	55.75	121.50
22	♂	86.00	55.75	121.50
24	♀	76.00	53.25	114.00
25	♂	82.25	55.75	121.50
27	♀	79.75	51.25	119.00
28	♀	78.25	50.50	112.00

The average measurement of five females is:—Total length, 77.70 c.m.; wing, 52.60 c.m.; spread, 117.60 c.m.; and the average of eight males—Total length, 80.80 c.m.; wing, 55.75 c.m.; spread, 122.80 c.m. The average size of the males is therefore slightly greater than that of the females.

Of the 35 stomachs examined, sixteen contained fish of a marketable species. Two of these contained Tommy roughs (*Arripis georgianus*). As in my experience the Cormorant is a bottom fisher, and the tommy rough only occasionally a bottom feeder, these two may be regarded as accidental. The flathead (*Platycephalus fuscus*), lives entirely upon sandy bottoms. I have but rarely seen cormorants fishing, except over

a weedy bottom, so either the flatheads must sometimes invade the weeds, or the cormorants establish a special fishery where they are numerous. The other nineteen stomachs contained only vermin.

The comparative rarity of females is rather remarkable. Of the 35 birds dissected, only seven were females, and a previous trip of four birds dissected all were males.

—Colours of Soft Parts.—

No. 1 ♂, Spot in front of eye, orange; space around eye, blue; bill, upper mandible, yellowish white; ridge horn colour becoming almost black at base; curved tip, brownish yellow; lower mandible, light yellow; gular pouch, yellowish white. This bird showed slight signs of breeding.

No. 2 ♂, Iris sea green; spot in front of eye, orange; space around eye, pale yellow; top mandible, dark brown; lower, yellowish, gular pouch, pale yellow. Showed no signs of breeding.

Nos. 3, 4, 5, and 6 same as No. 2.

No. 8, ♂, bare space in front of eye, orange; bare space around eye, blue; lower eyelid, green; gular pouch, pink; bill, bluish black tip horn colour.

No. 7 and 9 same as 8; No. 10 to 15, same as No. 2; No. 16 to 18 same as 8.

Nos. 16 to 18 same as 8.

No. 19 ♀, Bare spot in front of eye, orange, extending round to the back of the eye; bare space below eye, very bright iridescent shades of blue and green; gular pouch, purplish red; bill, dark bluish black. This bird would have laid within a fortnight.

No. 20, 24, 25, 27, and 28 were the same as No. 8; No. 21 and 22 the same as No. 7. The iris was sea green, and the legs and feet black in all the specimens. The reason for the variation in the soft parts is obscure. Nos. 1 and 19 had very brightly coloured soft parts with black bills, and No. 1 showed slight signs of breeding; No. 2, distinct signs, this would seem to show that it was a breeding phase, but three males examined by us in January last, had brilliant blue periorbital spaces without showing any signs of breeding.

Again, a young bird examined in January had the bill light coloured, and the space about the eye yellow, while two of the birds with yellow eye spaces taken on this trip proved on dissection to be fully adult. The whole subject requires further investigation.

Last Easter, Messrs. A. G. and E. S. Rymill again kindly invited Capt. White and myself to accompany them on another trip into Spencer's Gulf, with the object of examining the cormorant rookery on Dangerous Reef, and visiting the Islands of Sir Joseph Banks group. Unfortunately the weather turned out stormy so that very little work was done, and we were unable to reach either of our objectives. We left Adelaide on the morning of Good Friday, and made straight across the gulf to Stansbury. Here a little dredging was done by Mr. Edgar Waite, Curator of the S.A. Museum, who accompanied us for Ichthyological purposes. On the following day we moved along the coast of the Peninsula to Foul Bay, where a landing was made. This part of the peninsula is almost destitute of bird life, the only specimens procured were a pair of Hooded Dotterels. Early next morning we made for Pondalowie Bay, but were obliged to put into Althorps light for shelter, where we were weather bound for three days. Advantage was taken of our enforced stay here to take the temperatures of Penguins and Mutton birds. The majority of the young mutton birds had left the island, but a few still showing signs of down, remained in the burrows. No old birds were present on the island, but numbers were skimming the waters in its vicinity. On April 27th the weather being somewhat calmer, we made for Pondalowie Bay, where a day and a half was spent. We here investigated the broken shells on top of one of the islands. They are chiefly of four species, viz. *Turbo stramineus*, *Turbo undulatus*, *Purpura succincta*, *Fusus undulatus* and *Haliotis* sp. Three live specimens of *Turbo stramineus* which Mr. Rymill collected from the rocks weighed from eight ounces to 10½ ounces, so that I am of opinion that they could not have been carried up by Pacific gulls, for at Althorp, one of these birds tried and failed to carry off a piece of fat which at a liberal estimate did not weigh more than 4 ounces. Two other birds which might have been reponsible, are the Osprey, and the Sea Eagle, both of which inhabit the islands, and there were at the time of our visit, no Pacific gulls about. This is however not evidence of much value, as none of the shells had

been recently dropped. I noticed that, though the shells were scattered about any suitable rock, the opercula were in heaps at the edge of the cliff, the bird had therefore extracted the mollusc where the shell was broken, and carried it to the edge of the cliff to eat it, this would point to either the Osprey or Sea Eagle being the carrying agent, for both these birds select prominent spots, from which they can see all round, for their feeding places. While at Pondalowie we saw an Osprey pick up something from the sea in its talons, and fly off to the beach to devour it. On Saturday, April 29th, we started on our return, as time would not now allow of our visiting Dangerous Reef, or the Banks Island. Saturday afternoon was spent ashore on Troubridge Island, and four cormerants secured. Capt. White also collected a specimen in immature plumage of the Double banded Dotterel (*Cirrepedesmus bicinctus*).

The cormorants were all of the orange faced species (*H. V. hypoleucus*).

No.	Sex	Total length	Wing axilla to tip	Carpus to tip	Spread	Culmen	Wt.
		c.m.	c.m.	c.m.	c.m.	c.m.	lbs.
1	♂	78.25	47.00	29.25	111.25	7.90	4½
2	♀	74.50	50.50	29.25	117.25	7.00	2½
3	♀	73.25	48.25	29.25	116.50	6.60	3¾
4	♂	83.75	54.25	30.50	124.00	7.20	6½

—Stomach Contents.—

No. 1, Large Leather jacket; No. 2, 1 Small Cuttle fish, fishbones; No. 3, Fish bones, 8 shells of 4 species, mostly cockles; No. 4, 2 Flathead, fish bones.

The shells found in the stomach of No. 4 and No. 29 of the first series were possibly swallowed to assist in the disintegration of the food. Both birds were shot in localities where there were no stones available.

—Temperatures.—

The temperatures of six penguins (*Eudyptula minor undina*) were taken. No. 1, 104.2 F.; No. 2, 100.2 F.; No. 3, 100.2 F.; No. 4, 100.0 F.; No. 5, 100.0 F.; No. 6, 103.0 F.

All were adult birds in full plumage, and all the temperatures were taken in the same manner, and under the same conditions.

Mutton birds (*Neonectris Tenuirostris brevicaudus*). The temperature of eight birds was taken. They were all young birds still showing traces of down, they were all taken under the same conditions:—No. 1, 99.8 F.; No. 2, 99.4 F.; No. 3, 100.2 F.; No. 5, 100.4 F. No. 6, 100.0 F.; No. 7, 101.0 F.; No. 8, 100.8 F. The record of No. 4 has been mislaid. I am unable to account for the variation in the temperatures of the penguins, and to a less degree on the mutton birds; all the birds naturally struggled when captured, but none appreciably more than another.

The temperatures of three leghorn laying hens were taken for comparison. They are in the order taken:—No. 1, 107 F.; No. 2, 107.8 F.; No. 3, 108.4 F. The birds had to be caught in a small yard, so that the one that was chased the most had the highest temperature. This would seem to show that the thermo-taxic mechanism of these birds was unstable, and readily upset by exercise or excitement. The temperature of a Hooded Dotterel, about one minute dead, was 107.

I have not access to any literature on this subject, nor do I know where any is to be obtained, so would be glad if any reader could tell me where such is to be had.
