Our Diminishing Heritage

A most maligned animal group, widely loathed, little understood and surrounded by myths—Crocodiles are reptiles but like spiders, enjoy low public esteem, being credited with many harmful and unpleasant habits.

So wrote Dr H. Robert Bustard, an authority on crocodiles.

In his many writings from which most of this article is taken, Dr Bustard points out that crocodiles have a place in nature and are no more than master predators that have already evolved a way of life making them supreme in their chosen habitat. They are descended from prehistoric reptiles called archosaurs—ancestral also to the dinosaurs, and somewhat like them in living pattern. Crocodiles have continued to maintain the same life style for 170 million years.

Like most reptiles, crocodiles do not thrive under cool conditions. For this reason they are restricted to the tropics, in Australia being found only in the north, occurring in Western Australia, the Northern Territory, and Queensland. In Western Australia they are restricted to the Kimberley Division.

In Australia there are two species of crocodile, the Freshwater or Johnstone's Crocodile (*Crocodylus johnstoni*) and the Saltwater or Estuarine Crocodile (*Crocodylus porosus*). These two species illustrate a number of points which have been central to evolution and distribution of the crocodile group. There has been a radiation or evolution in two main directions, namely, the development of long-snouted species with slender jaws and of short-snouted, broad-jawed species. The Australia freshwater species and the estuarine crocodile are representatives of these two groupings respectively. The distribution of freshwater crocodiles is usually closely circumscribed, since saltwater forms a barrier to their dispersal. Hence, adjacent areas of the world separated by even a narrow area of sea may have evolved quite distinct freshwater crocodiles.

The saltwater crocodiles on the other hand, like many seagoging animals, have been able to disperse and colonize other suitable habitats. Probably no crocodile has been as successful at this as the estuarine species (*C. porosus*). This crocodile is widely distributed in Asia from the Indian sub-continent eastwards, and extends southwards through the Malay peninsula and Indonesia to northern Australia. It often occurs on fairly small, remotely-placed Pacific islands having, for instance, been recorded at least once in the Fiji Islands, which are thousands of miles from any substantial land-mass.

The young crocodile begins life as one of a batch of eggs laid by the mother somewhere where they will not run the risk of being flooded by rising water.

Some crocodiles nest during high water levels, either in or immediately after the "wet". Some solve this problem by laying their eggs in nests which they construct in floating grass islands that rise and fall with the water. The estuarine crocodile constructs its nests in fresh water swamps or on the banks of rivers, usually above flood level. However, many nests are destroyed by sudden floods after heavy rain. Others, of which the Australian freshwater species is an example, nest during the dry season, laying their eggs in sandbanks. The young of the latter species must emerge before the water-levels rise at the start of the next wet season. Emergence is usually timed so that the rising flood-waters serve to disperse the recently-hatched young, which would be extremely vulnerable if they were all cooped up in small dry-season pools. When they hatch, baby crocodiles are quite tiny, a total length, including the tail, or around 23 cm being usual, although of course, there are species differences. They are extremely vulnerable to a whole host of predators, including many fish, birds, reptiles, and mammals which larger crocodiles themselves eat.

Although juvenile crocodiles have many enemies, without man to disturb the balance crocodiles would always be numerous. This is because they are long-lived animals and require only a very low level of survival among their progeny to offset natural losses.

All crocodiles are semi-aquatic, and show adaptations to their way of life. The eyes and nostrils (see the accompanying photos) are placed well up on top of the head so that the crocodile can swim or float with only the eyes and nostrils exposed. There is a fleshy flap at the back of the mouth which cuts off the throat so that crocodiles can open their mouths under water without drowning. The rear feet are webbed and the tail, the main organ of propulsion, is flattened laterally to make a powerful paddle. When swimming, all four limbs are folded back along the body. Crocodiles' jaws are well equipped with sharp teeth to hold the prey. This is particularly important with slippery prey such as fish, which forms an important part of the diet of all species at least during part of their life.

Crocodiles, like other reptiles, grow throughout life, old is synonymous with large. Let us take an example from the Australian estuarine species. Although females very rarely exceed 4.2 m, males certainly grow to at least 6.1 m. Sexual maturity in females is reached at between 1.8 m and 2.1 m. The old male crocodile is king within his territory or "station". In territorial battles the young males may be killed without having a chance to breed, breeding being the prerogative of the "station" owning crocodiles.

Crocodiles are carnivores and as they grow their diet changes from insects, tiny fish and frogs at birth, to crustacea, larger fish, then other reptiles and birds and in large individuals, mammals usually come to make up a large part of the diet.

They like fresh prey, and eat it at once. The idea that they keep food in underwater lairs until it is rotten is a myth.

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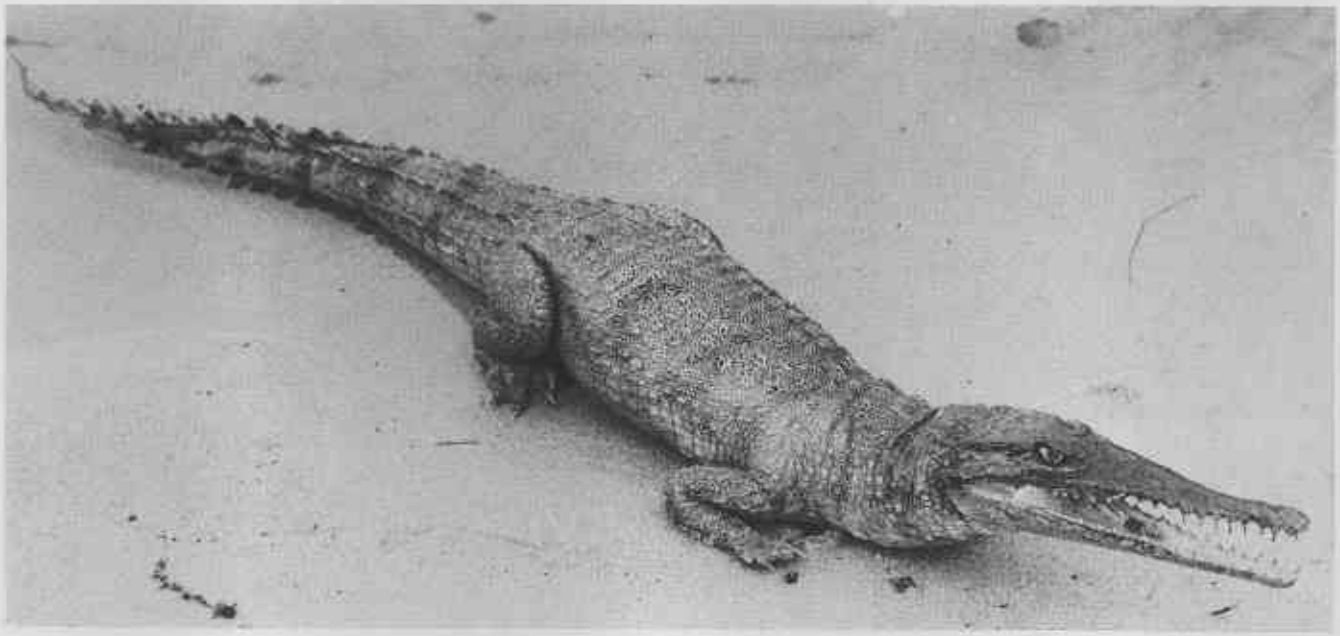
FRESHWATER OR "JOHNSTONE'S" CROCODILE

Crocodylus johnstoni

Description. Snout narrow, smooth without ridges; 19 teeth normally, on each side of the upper jaw, 15 on the lower; a post-occipital shield of scutes and a nuchal shield. The upper surface is brown, sides mottled, and ventral surface whitish. Attains 2-3 m.

Food. Any creature large enough to swallow, but preference is shown for frogs, giant shrimps, crayfish, small fish, and insects and spiders. In some dissected specimens have been found the remains of water rats, young *C. johnstoni,* and goannas.

Reproduction. During August and September the female, with her hind feet, scoops an ovoid hollow measuring about 15 cm by 30 cm, and 46 cm deep, in a high firm sandbank close to the water. She deposits from twelve to twenty-four white hard-shelled eggs and covers them with sand.



SALTWATER OR ESTUARINE CROCODILE

Crocodylus porosus

Description. Snout comparatively broad. A ridge extends from each eye to the premaxilla; normally 17 teeth on each side of the upper jaw, 15 on each side of the lower jaw. A shield of nuchal shields present but rarely any post-occipital scutes. Dorsal surface variable from blackish to mottled brown and yellow, ventral surface whitish to yellow.

Food. Principally fish and crabs in salt water, and fish, crayfish, and water rats in fresh water. Examination of the stomach contents of over three hundred Esturine Crocodiles, yielded fish, birds, turtles, turtle-eggs, smaller crocodiles, snakes and wallabies.

Reproduction. It was previously assumed that all Estuarine Crocodiles made their way to fresh water to breed, and returned to salt water every dry season. Actually they will breed wherever the banks are suitable along the salt-water rivers, usually away from the mouth.

Throughout the wet season to early in the dry season, between October and May, the female deposits from forty to eighty or more hard-shelled eggs, measuring up to 8 cm in length, on a hard bank well protected by river scrub. The eggs incubate in a nest mound of leaf mould roughly 2 m across by 46 cm deep.

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Crocodiles are not much interested in humans as food; estuarine species certainly prefer fish, dogs or pigs. The Australian Freshwater Crocodile is a shy, inoffensive little animal which will never attack humans unless attacked or wounded first.

A recent Departmental survey of saltwater crocodiles in some of the north west Kimberley river systems has shown that crocodile populations remain greatly depleted following extensive hunting for their skins in the 1950s and 1960s.

Counts were made of saltwater crocodiles in the estuarine portion of four river systems in the north west Kimberley—the Lawley, Mitchell, Roe-Hunter and Prince Regent. Only 463 crocodiles, 109 of which were hatchlings, were spotted during the ten day survey—an estimated 60% sighting. Based on these figures the maximum number of known hatchling crocodiles in the four systems is just short of 700. Few large crocodiles were seen.

Although the skin of the Saltwater Crocodile is preferred by poachers to that of the freshwater animal, the scarcity of the aforementioned has led to increased predation by humans of the smaller inferior skinned animal.

Although *C. johnstoni* is more prolific throughout its inland waterways than *C. porosus* in its marine habitat, the number of large breeders of both species has diminished.

In Western Australia hunting pressure on *C. porosus* was particularly high during the early 1960s and by 1969 the species had become rare. *C. johnstoni* was fully protected in 1962 but still suffers from poaching. *C. porosus* was not protected until April 1970, by which time commercial hunting had become uneconomic. Protection followed in the Northern Territory in 1972 and a total export-import ban on crocodile products was declared by the Commonwealth Government later the same year. It was this ban that effectively stopped hunting throughout Australia.

Both species have now been classified rare and likely to become extinct in Western Australia, it is unfortunate however, that hunting to near extinction of *C. porosus* was the reason to protect it.