underwater heron

AFRICAN DARTER

THE AFRICAN DARTER is a familiar bird throughout most of the Afrotropics, and its relatives are found in other tropical regions worldwide. Darters adapt readily to human-modified wetlands and often become quite tolerant of human disturbance. Yet, despite their unique foraging mode and peculiar moult strategy, they are surprisingly poorly studied. **Peter Ryan** lifts the lid on these fascinating birds. >

TEXT & PHOTOGRAPHS **PETER RYAN**

ALBERT FRONEMAN

MARIETJIE FRONEMAN

THE DARTERS are a small group of tropical freshwater birds allied to the cormorants and, more distantly, to gannets and boobies. With fossils dating back at least 18 million years, they have been separated from the cormorants for quite some time (perhaps as much as 40 million years) and, given several marked differences in structure and behaviour from cormorants, there is little doubt that they are best treated as a separate family.

There are distinct darter species in the Old and New Worlds, with the Old World form now generally regarded as comprising three allospecies: the African Darter *Anhinga rufa* in sub-Saharan Africa and Madagascar, the Oriental Darter *A. melanogaster* in India and South-East Asia east to the Philippines and Sulawesi, and the Australasian Darter *A. novaehollandiae* from east of Wallace's line in Indonesia, New Guinea and Australia.

Compared to the cormorants, darters have far fewer species and a much smaller global range, but they are widespread in tropical wetlands and can be quite tolerant of humans. They are well known to casual birders, probably at least in part because they are so distinctive in the water. When swimming, only the bird's head and neck protrudes above the surface, giving rise to the common name of 'snakebird'.

The genus name *Anhinga* is also used as a common name for the American Darter *A. anhinga* and is derived from a Tupi word meaning 'devil bird'. Apparently the first inhabitants of what is now Brazil regarded the bird as an evil spirit of the woods. Whether this dubious reputation resulted in the birds' protection or persecution is unrecorded.

Like cormorants, darters are foot-propelled divers that feed mainly on fish, although they also take crustaceans, frogs, insects and occasionally molluscs, small terrapins and aquatic snakes. They have been recorded taking food when on land, using the bill like a pair of forceps to catch insects, and the American Darter has even been reported to eat *Celtis* berries. Their large feet have all four toes webbed, and their legs are situated far back on the body, which allows them to swim efficiently but makes them rather clumsy out of water.

One of the striking differences from cormorants is the darters' long, dagger-like bill that lacks a hooked tip. It resembles a heron's bill, and indeed is used in much the same fashion, spearing prey rather than grasping it.

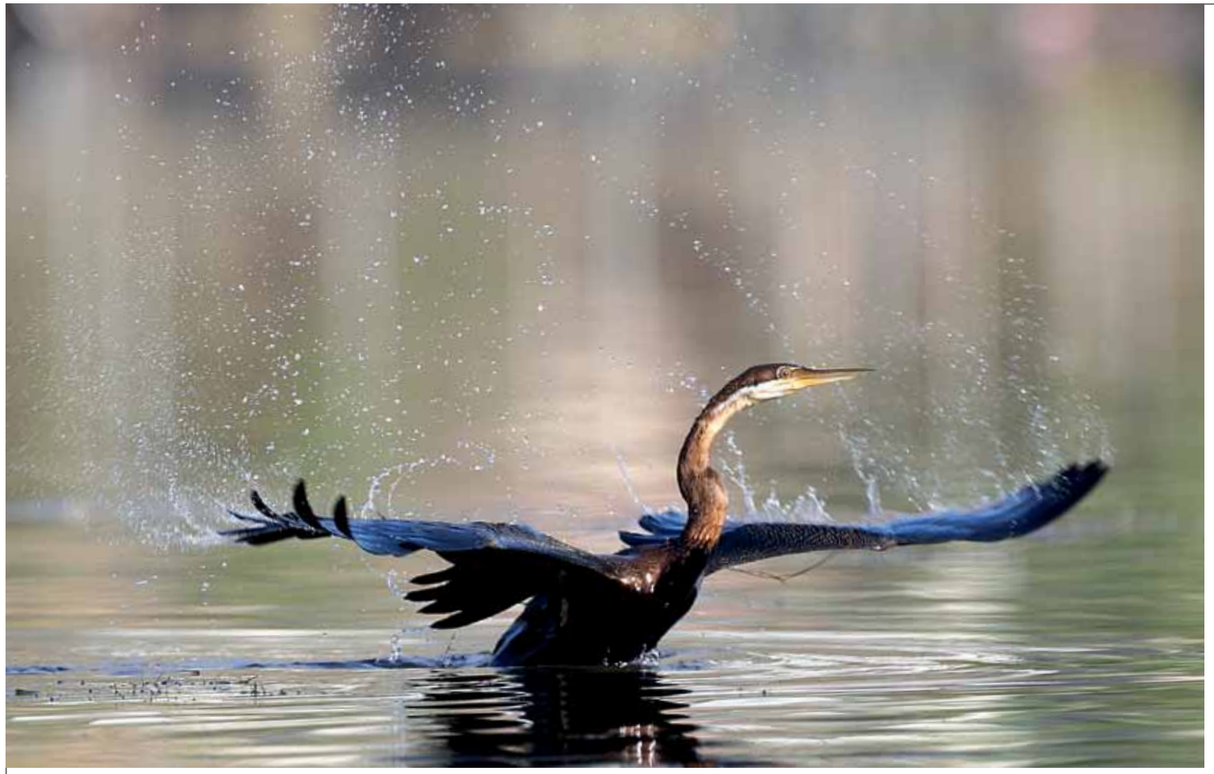
An aspect of darters that has been well studied is their morphology. They have a distinctively hinged joint between their eighth and ninth neck vertebrae which, coupled with powerful muscles inserted to special keels on vertebrae five to seven, allows them to shoot their head forward in much the same manner as a heron or egret, typically hitting their prey side-on. They strike with the bill slightly parted, and the bill tips have tiny, backward-pointing serrations that act like the barbs of a fishing hook to prevent prey from wriggling free.

Apparently a few very small prey items are swallowed underwater, but most are brought to the surface where they are shaken free from the bill tip. This tricky operation requires some practice. Ideally the prey item is tossed into the air, deftly caught and swallowed head first. If it falls into the water, there is often a frantic stab or even a series of rapid dives to attempt to recapture it. Small fish, which are usually speared only by the upper mandible, tend to be handled quite easily, but larger prey can require some effort to shake free, and even more time to orientate correctly to swallow. This leaves the bird vulnerable to kleptoparasites, with Giant Kingfishers, gulls, terns and even other darters not being averse to stealing a darter's fish. When threatened, the darter's usual response is to dive, often repeatedly. Large fish may be carried to the bank where they are less likely to be stolen, and in some cases really well-sized fish have to be abandoned because they are too big to swallow. I haven't come across a case with a darter, but cormorants and herons have been recorded choking to death while trying to gulp down too large a fish.

Spearing fish in the side typically requires a more subtle approach than chasing them down. Compared to cormorants, darters rely >

above *Freeing impaled prey from their bill tips requires some skill, and darters practice with other items, such as this piece of reed. This bird repeatedly tossed and caught it for several minutes.*

opposite and previous spread *The dagger-like bill has serrations on its tip to reduce the chances of losing prey. Coupled with the powerful neck muscles, it makes the bill a formidable weapon that helps to deter would-be predators.*



above *Darters often clamber out of the water at the end of a foraging bout, but they can take off directly from the water despite their sodden plumage. To do so, they habitually raise themselves partly out of the water for a few seconds with wings spread, apparently draining their plumage, before struggling into the air.*

right *This American Darter or Anhinga shows how darters have near-neutral buoyancy at the water surface, and use their fanned tail to assist with attitude control while waiting for fish to move within striking range.*

opposite *This bird shows a mosaic of juvenile and adult plumage. It is unknown at what age African Darters first start to breed.*

far more on stealth, moving slowly through the water or waiting for fish to come within range. This requires a heron's legendary patience, but darters face two significant problems: they don't have too much time to wait because they have to hold their breath while diving, and they can't afford to reveal their presence by swimming vigorously.

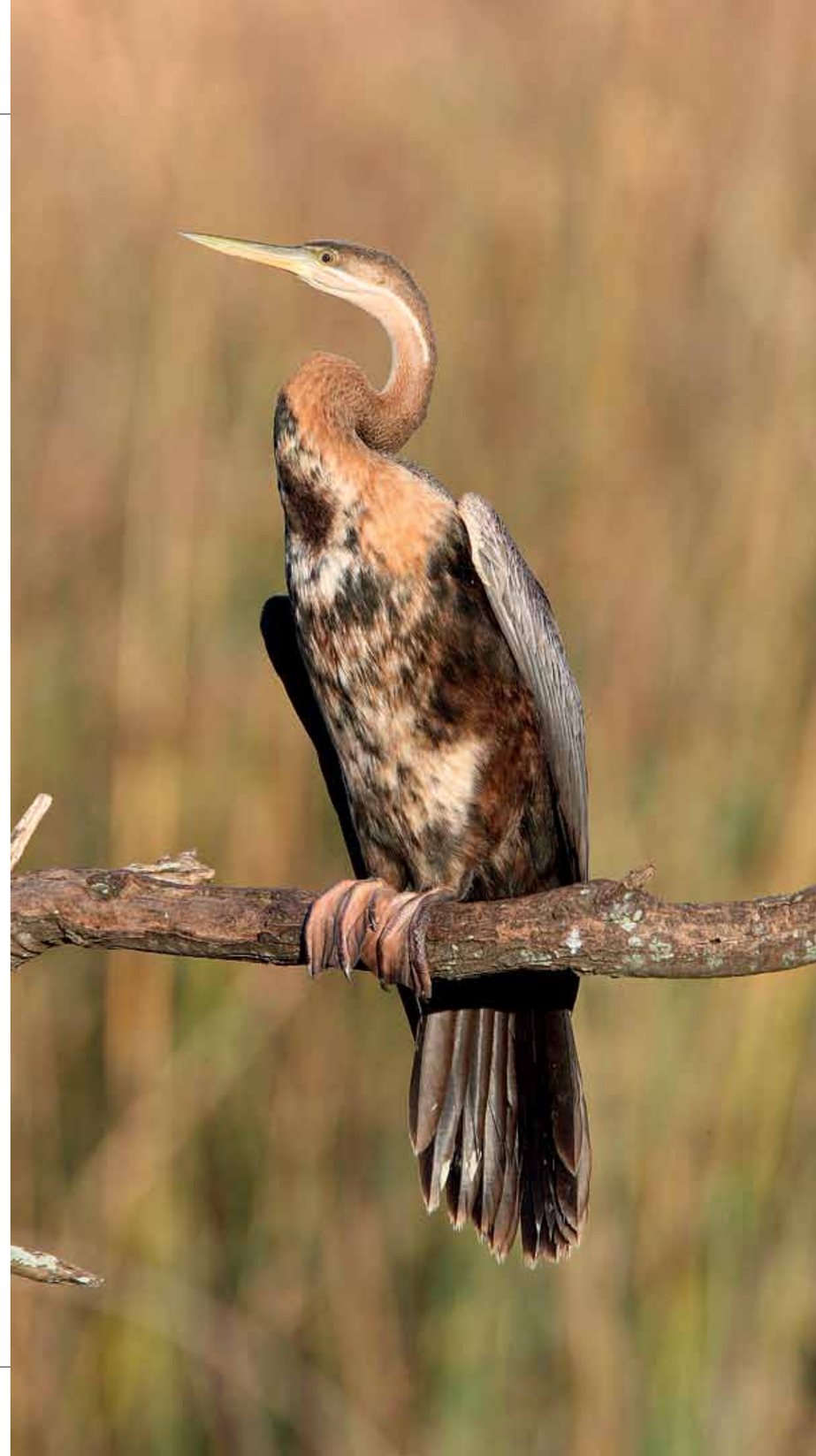
When you see birds swimming underwater they appear quite frenetic, kicking or flapping continuously, in stark contrast to the more languid action of fish and marine mammals. The main reason for this is that birds rely on the air trapped in their feathers for insulation, which makes them buoyant, at least near the water surface. As they dive deeper, this air layer gets compressed, reducing both their buoyancy and their insulation. Darters

THEY ARE ABLE TO HANG MOTIONLESS WITHIN CENTIMETRES OF THE WATER SURFACE, **WAITING TO AMBUSH THEIR PREY**

specialise in feeding in relatively shallow wetlands, but they can't afford to kick frantically to remain in place when feeding. So they forego their insulation, and allow their plumage to become fully saturated with water.

This explains why darters sit so low in the water. Aided by their unusually dense bones and relatively small air sacs, they are close to being neutrally buoyant at the water surface. They are able to hang motionless within centimetres of the water surface, waiting to ambush their prey. They often lie in the water with their wings and tails partly spread. It has been suggested that this is to create pools of shade to attract small fish, much as a Black Heron uses its wings as an 'umbrella' to shade the water, but it almost certainly also serves to help them remain stationary in the water. I once watched a darter dive for more than a minute in water less than half a metre deep, surfacing in exactly the same spot where it dived.

An added benefit of their low buoyancy is that they use much less energy – and oxygen – while diving. This allows them to remain underwater for longer without building up an oxygen debt. When I compiled the species account for the African Darter in *Roberts VII*, I was amazed to discover that very little was published on darter diving ecology, so I set about collecting some data. Compared to cormorants of similar size, darters' dives last roughly twice as long, yet their recovery periods between them are about the same length. This makes them extremely efficient divers. >



AFTER EMERGING FROM THE WATER, DARTERS TYPICALLY SIT WITH THEIR WINGS SPREAD AND THEIR BACKS TO THE SUN. THIS IS OFTEN TERMED **'DRYING THEIR WINGS'**, BUT THE MAIN REASON IS TO **SAVE ENERGY BY WARMING UP PASSIVELY**

Darters replace all their wing feathers at once, becoming flightless for several weeks while their new feathers grow. They are seldom seen during this vulnerable period, but the bird on the left is in full moult. It also puts paid to the notion that darters spread their wings to dry them; this bird has no wings to dry!

Darters typically spend about 80 per cent of a foraging bout underwater, more than any other diving bird.

The darters' unique foraging strategy explains why they are confined to the warmer parts of the world. Whereas cormorants breed in the polar regions and even spend the winter in Greenland, darters can't afford to hunt in cold water because they would lose too much body heat. As it is, their fishing sessions tend to be quite short, seldom lasting more than 20 minutes. After emerging from the water, darters typically sit with their wings spread and their backs to the sun. This is often termed 'drying their wings', but the main reason is to save energy by warming up passively. They fluff up their back feathers, just like a Little Grebe between dives, allowing the sun to warm their skin directly. It would be interesting to measure how much a darter's body temperature falls during a foraging bout.

The other way in which darters differ strikingly from cormorants is that they moult all their wing feathers at once. After breeding, they drop their primaries, secondaries and greater coverts, remaining flightless for several weeks while their new feathers grow. They don't moult their tail feathers synchronously, probably because they need their long, stiff tails to forage effectively.

They presumably select large, perennial wetlands at which to moult, and may undertake moult migrations in the way that many ducks and geese do, but this has not been studied. There are surprisingly few observations of moulting darters, apparently because they become very secretive during this period. Conventional wisdom is that they retreat to the heart of large swamps, where they can slip unobtrusively into and out of the water without revealing their temporary handicap. However, I recently saw a bird in full moult sitting three metres up in a eucalyptus tree overhanging a busy canal in a coastal marina. I have no idea quite how it got there or how it planned to get down!

Darters have other mysteries still to be resolved. For example, no one has yet come up with a convincing explanation for why the central tail feathers and elongated scapular feathers of adult birds have transverse corrugations. Suggestions range from structural benefits to sexual displays. Fortunately, with the exception of the Oriental Darter, *Anhinga* species remain common and are relatively easy to observe. Maybe next time you see one you'll look a little closer and add to our meagre knowledge of these intriguing birds. ◆