Observations on a Living Coelacanth

DURING the recent Franco–British–American expedition to the Comoro Islands at the north end of the Mozambique channel we had the opportunity to observe a living coelacanth. The fish, a small specimen 85 cm in length, was caught by a native fisherman at Iconi, Grande Comore, at 0200 on March 22, 1972. It was caught from a pirogue by hand line, using a piece of tuna as bait. The fish was transferred by the fishermen to a cylindrical cage approximately 1.5 m diameter by 2 m length which had been built at Iconi during a previous Canadian expedition.

We arrived at Iconi at approximately 0340, by which time the fish was in the cage, grounded in shallow water. The fish was observed by the light of electric torches during the remaining hours of darkness; since it survived until 0745 it was possible also to watch and film it by daylight. For this it was transferred to a white glass-reinforced plastic tank.

During the period of observation the fish swam gently around the cage and the tank, and slow swimming movements were well seen. No rapid swimming movements were seen, nor did the gentle movements cease until the fish was moribund.

Forward propulsion was achieved by the concerted action of the second dorsal and anal fins. These were moved from side to side across the body with a sculling action. The fin was twisted on its pedicle so that its anterior edge led the movement, the lobe being oblique to the direction of movement and with a forward convexity like the blade of a propellor. For the return stroke, the twist was reversed; thus the anterior edge always led, but the right and left sides of the fin were functionally front and rear faces of the "propellor" on alternate strokes (Fig. 1). The second dorsal and anal fins moved synchronously, and to the same side of the body at the same time. Each of them moved through an angle of approximately 90°. During these movements, the two fins raked back from the longitudinal axis of the fish by an angle which varied between approximately 75° and 45°. The tail undulated from side to side slightly during these movements, but the undulations appeared to be passively induced by the movements of the fins. No sinusoidal body swimming movements nor active swimming movements of the tail were seen; the abundant body musculature suggests, however, that powerful tail strokes are possible.

The pectoral fins also performed sculling movements, but they moved independently of one another. Their movements were in the vertical plane, but their angles of twist and rake were not constant; their anterior edges led the movements, which were comparable with those of the second dorsal and anal fins. They did not appear to be concerned with forward propulsion, but with stabilizing and balancing movements. The pelvic fins were not seen to make any active movements, but trailed at an angle of approximately 30° to the longitudinal axis. The first dorsal fin was held in a half-erect position, and did not move actively.

Respiratory movements were not prominent; the mouth was held partially open, and irregular active closing movements of the operculum at intervals of approximately 20–30 s were seen. The head and jaws were watched carefully, but only feeble movements of these parts were observed.

During the period of observation the fish at no time rested on the bottom, so its behaviour in contact with a solid substrate could not be noted. Despite its gentle swimming movements the fish dived or approached the surface easily, the snout breaking the surface at times. Sometimes it became turned on one side, and swam so for several seconds; righting movements were made eventually, but were by no means immediate. A strong impression was gained that the fish was in a state of neutral buoyancy during life, though it just floated when moribund.

The eyes were seen to make only small movements, but their great passive mobility within the orbits, observed just after death, suggests that they are capable of more extensive excursions than were seen. The eyes exhibit a striking pale yellow eyeshine when illuminated, although no luminescence was noticed; the lenses were slightly cloudy, a frequent occurrence in fishes brought up from some depth, but both they and the corneae were seen to be colourless when the fish was subsequently dissected.

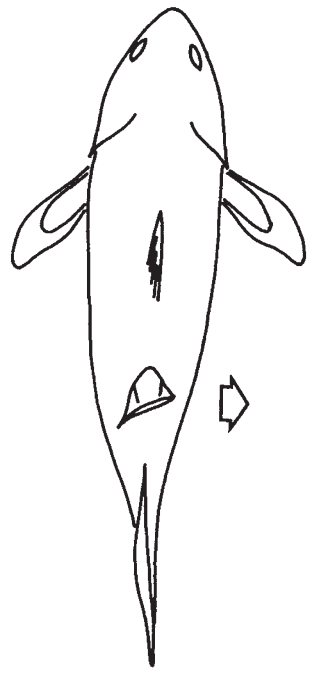

Fig. 1 Diagram of coelacanth as seen from above. The second dorsal fin is moving across the back in the direction of the arrow. It is drawn as if cut across, to show the curvature assumed by the lobe. The left side of the fin is the front face on this stroke; on the return stroke, the right side of the fin would become the front face. The anal fin would be moving in the direction of the arrow, synchronously and with the same action as the second dorsal fin.

The colour in life was a uniform dark grey–brown, shot with an unsaturated bluish element, reminiscent of the colour of thin polythene sheet. Some pale patches, often seen in preserved specimens, were present; some of these seemed to have been caused by the displacement of some scales, although others were patches of pallor on an intact field of scales.

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Changes in Distribution of *Acanthaster planci* Populations on the Great Barrier Reef

POPULATIONS of the coral predator, *Acanthaster planci*, are changing their distribution on the Great Barrier Reef. Investigations before late 1969 indicated that it was commonest on reefs between 14° 40′ S and 18° S[1–5] (see also Table 1). I have been studying *Acanthaster* since 1969, and have found that it has become less common in the north and more common further south.

For convenience, the Great Barrier Reef has been divided into six zones to show the known recent distribution of

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