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Art, ichthyology, Charles Darwin and the Northern Territory of Australia

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ABSTRACT

This paper reflects on the antiquity and continuation of depictions of fishes dating back 24 000 years as highlighted by some specific illustrations. The earliest Aboriginal depictions of fishes date to about 8000 years ago. An Aboriginal x-ray bark painting of a barramundi, *Lates calcarifer* (Centropomidae), by Jimmy Njiminumna is juxtaposed with a modern scientific illustration of a barramundi skeleton by Christopher May. A recent commissioned x-ray painting of a nurseryfish, *Kurtus gulliveri* (Kurtidae), from the Adelaide River by Joshua Bangarr represents the first known Aboriginal drawing of this species. Some fishes named in honour of Charles Darwin and the Port of Darwin are discussed. A drawing from 1878 of a jawfish, *Opistognathus darwiniensis* (Opisthognathidae), described from Darwin Harbour and a 1911 drawing of the gudgeon, *Mogurnda mogurnda* (Eleotridae), described from Port Essington in 1844, are presented.

KEYWORDS: Aboriginal art, barramundi, Charles Darwin, Port of Darwin, *Lates calcarifer*, *Kurtus gulliveri*, *Mogurnda mogurnda*, *Opistognathus darwiniensis*, prehistoric art, scientific illustration, skeleton.

INTRODUCTION

Symbolic engravings appeared in the archaeological repertoire of anatomically modern *Homo sapiens* in the Middle Stone Age of southern Africa 77 000 years ago (Henshilwood *et al.* 2002). About 40 000 years ago, at the beginning of the Upper Paleolithic in Europe, an explosion of image-making coincided with a major cultural transformation that included musical instruments, new kinds of tools and weapons, fired ceramics, weaving, and long-distance trade (White 2003). Traditionally, the oldest cave paintings in the world were radiocarbon dated from about 32 000 years ago in Chauvet Cave of the Ardèche region of France (Clottes *et al.* 1996, Clottes 2003; Wong 2005). Recent developments in radiocarbon dating methodology indicate that the spectacular menagerie of Ice Age animals drawn in ochre in the galleries of Chauvet Cave can now be said to date from about 36 000 years BP in real terms as compared to about 32 000 years BP in radiocarbon terms (Mellars 2006a). Klingender (1971) comprehensively reviewed animals in art.

People have been depicting fishes for millennia. The oldest known fish representation is a salmon sculpted in the roof of the 'Shelter of the Fish' at Les Eyzies, in the Dordogne River region of France about 24 000 years ago (Ruspoli 1987). A pike is engraved along the back of a horse at Pech-Merle in the Lot River region of France. This site is 20 000 years old (Ruspoli 1987). The Magdalenian culture (18 000–11 000 years ago) of Western and Central Europe represents the apogée of Palaeolithic art and Lascaux Cave (France) is its most notable example (Ruspoli 1987; White 2003). Depictions of salmon, trout, pike, sole and eel, although rare on rock walls, were more commonly etched on small artifacts of reindeer antler and bone (mobiliary art) from Middle-Magdalenian sites about 14 000 years ago (Ruspoli 1987; Moyle and Moyle 1991).

The style and materials used by artists is a reflection of the culture from which the artist comes. This includes an indigenous taxonomy and totemic system used by the people of that culture. Similarly, scientific illustrators are guided by principles and conventions (e.g., Weitzman 2003) and aided by available technology such as camera lucidae, stereoscopic microscopes and computer graphics. Moyle and Moyle (1991) introduced a series of 80 papers detailing many forms of fish imagery in art in *Environmental Biology of Fishes* from 1991–1995. Whitehead (1991) described what he termed "scientific surrealism" which involves the combination of incongruous images as in a dream. This surely reached its peak with the fish art of Ray Troll (2004).

ABORIGINAL ICHTHYOLOGY AND SCIENTIFIC ILLUSTRATION

An emerging consensus points to the arrival of humans in Australia shortly after 60 000 years ago (Roberts and Jones 2001), although some authorities consider this date speculative and contested, and prefer a more conservative

estimate of 45 000 BP (Mellars 2006b). The oldest known Aboriginal campsites may date back to an upper limit of 60 000 years ago in Kakadu National Park at the foot of the western escarpment of the Arnhem Land plateau (Roberts *et al.* 1990). Used pieces of haematite and red ochre-impregnated grindstone from the Kakadu area suggest pigment use 50 000 years ago (Chaloupka 1993). Some of the earliest representations of fishes were made by Aboriginal rock artists during the Estuarine Period 8000–1500 years ago (Chaloupka 1993). White (2003) considered the Estuarine Period as 6000–1500 years ago. Mulvaney and Kamminga (1999) discussed alternative schemes for dating and classifying different motifs, but they also noted areas of concordance among the various approaches. Sixteen fish taxa from fresh, brackish, and marine waters have been identified by Chaloupka (1993) in the rock art of the Arnhem Land Plateau (Table 1). A similar list of 11 species is given by Taylor (1987). The greatest concentration of fish images is found in shelters near the lower reaches of the East Alligator River. The most commonly represented species (barramundi, fork-tailed catfish and mullet) were of economic importance to the local people, and they are rendered with substantial accuracy (Taylor 1987; Chaloupka 1993). Commonly illustrated freshwater species from the middle reaches of northern rivers include archerfish, sooty grunter, long tom, saratoga and eel-tailed catfish.

X-ray paintings are so called because they are naturalistic depictions that show skeletal or iconically motivated motifs to represent internal organs such as the spinal column, heart and digestive tract (Taylor 1987; Mulvaney and Kamminga 1999). Taylor (1987), in his analysis of both mundane and esoteric ceremonial encoded meanings in Kunwinjku bark paintings from western Arnhem Land, showed how their x-ray art is basically iconic, that is, it reflects the naturalistic features of particular species. Iconicity is defined as the formal resemblance between the painted form and the object or species represented. The artists say that the depicted organs "look like" the organs they represent as opposed to geometric, cross-hatched or parallel line infill x-ray motifs that symbolise some organs or body regions (Taylor 1987). The organs (or species) are meant to be obvious to other Kunwinjku or even Europeans familiar with the species under discussion.

Figure 1 is a representative x-ray painting of a barramundi from the collection of the Museum and Art Gallery of the Northern Territory (hereafter NTM) (ABART-0660). The natural pigments on bark painting was done by the late Jimmy Njiminjuma of Maningrida in 1979 and is entitled Namarngol the Barramundi. The vertebral column with neural and haemal spines is shown as white dashes and chevron-shaped marks along the length of the middle of the body. The crescent-shaped white structure below the spinal column represents the swim bladder atop the brown stomach. A long wavy intestine leaves the ventral surface of the stomach and exits the body posteriorly. The lateral line is correctly shown extending onto the rounded caudal fin. This feature is characteristic of the family Centropomidae. Sensory pores are also represented on the head. The long spiny dorsal fin joins the rounded soft dorsal fin posteriorly, and the concave head slope is accurately depicted. This indicates a high degree of realism based upon observation and familiarity with the species, and the naturalistic x-ray infill is typical of items restricted to the pragmatic realm of food (Taylor 1987). Other examples of Njiminjuma's art are discussed by Taylor (1987: plates 4.14, 8.20), and a Njiminjuma Rainbow Serpent is reproduced in Isaacs (1980: 63).

Table 1. Fishes depicted in Arnhem Land rock art, updated from Chaloupka (1993), and their corresponding Aboriginal name, widely understood by Western Arnhem Land peoples. Paintings of these fishes are illustrated in Chaloupka's *Journey in Time*. The phylogenetic arrangement of families follows Nelson (1994) and Berra (2001).

Family	Species	Common Name	Aboriginal Name
Carcharhinidae	*Carcharhinus leucas*	Bull shark	
Pristidae	*Pristis microdon*	Freshwater sawfish	
Dasyatidae	*Dasyatis fluviorum*	Estuary stingray	
Osteoglossidae	*Scleropages jardinii*	Gulf saratoga	Guluibirr
Megalopidae	*Megalops cyprinoides*	Oxeye herring	Garlalba
Clupeidae	*Nematolosa erebi*	Bony bream	Nabardebarde
Plotosidae	*Anodontiglanis dahli*	Toothless catfish	Nagurl
Plotosidae	*Neosilurus ater*	Black catfish	Binijdjarrang
Plotosidae	*Neosilurus* sp.	Eel-tailed catfish	Ganbaldjdja
Ariidae	*Ariopsis leptaspis*	Fork-tailed catfish	Almakkawarri
Mugilidae	*Liza alata*	Diamond mullet	Madjabarr
Belonidae	*Strongylura kreffti*	Freshwater longtom	Burrugulung
Centropomidae	*Lates calcarifer*	Barramundi	Namarngorl
Toxotidae	*Toxotes chatareus*	Common archerfish	Njarlgan
Toxotidae	*Toxotes lorentzi*	Primitive archerfish	
Terapontidae	*Hephaestus fuliginosus*	Sooty grunter	Nagenjhmi (male) Galarrk (female)

Fig. 1. X-ray painting, natural pigments on bark, Namarngol the Barramundi, by Jimmy Njiminjuma from the collection of the NTM ABART-0660. 124 x 55 cm. © Jimmy Njiminjuma licensed by Viscopy, Australia, 2005. Photo by Gilbert Herrada.

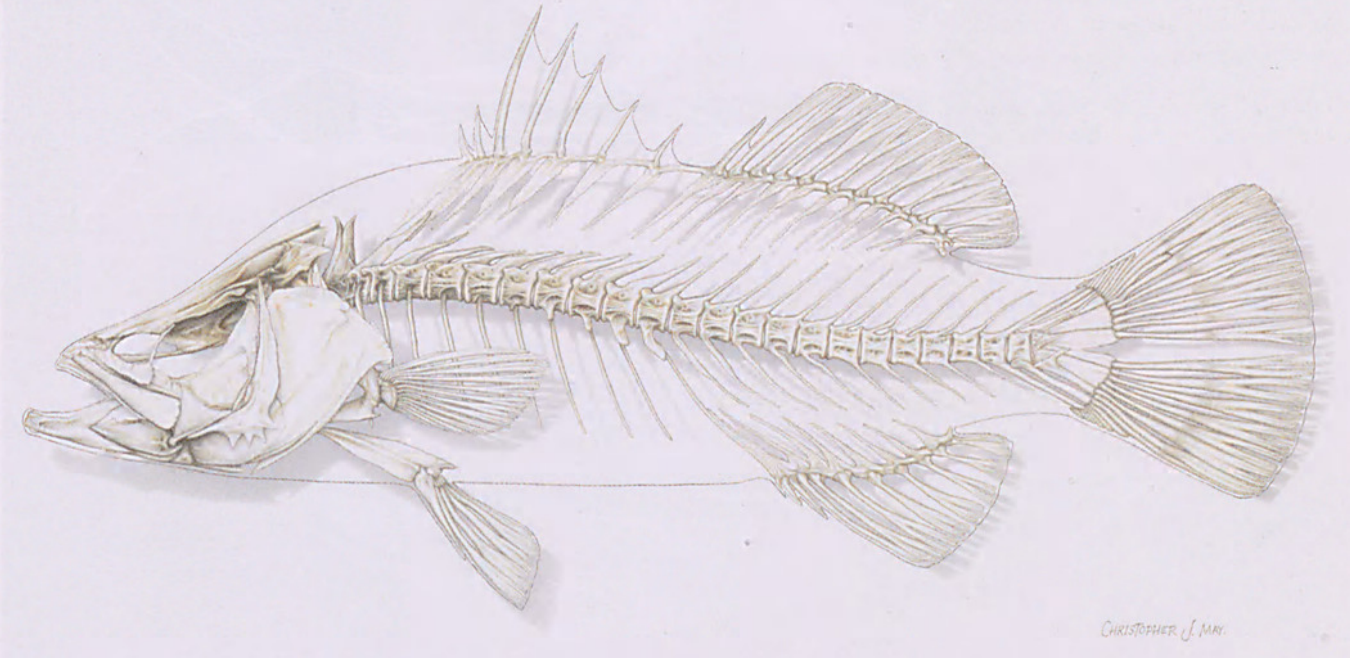

Fig. 2. Barramundi skeleton in colour pencil by Christopher May. The actual total length of the drawing is 538 mm. © Christopher May.

Figure 2 is a recent scientific illustration of the barramundi's skeleton drawn in coloured pencil by Queensland artist, Christopher May. The skeleton was prepared as a display specimen for the NTM in the late 1980s by Ian Archibald and Andrew Cappo. There are no recorded collection data for it, but the specimen's total length is 1080 mm. This illustration shows the exact number of vertebrae (25, Nelson 1994), protruding lower jaw with small teeth, serrated preopercle and the very large mouth typical of barramundi. The first dorsal fin has seven spines. One spine precedes the second dorsal fin and its 11 branched soft rays. Three anal spines precede the eight soft anal rays. Greenwood (1976) reviewed the osteology of centropomids including *Lates*.

The x-ray painting is obviously more stylised than the scientific illustration, but it is nevertheless clearly recognisable as a barramundi. Both representations are aesthetically pleasing and objects of beauty from the cultures they represent. Their appeal is cross-cultural.

The nurseryfish, *Kurtus gulliveri* Castelnau (Perciformes: Kurtidae), is an unusual fish found in fresh and brackish waters of northern Australia and southern New Guinea (Berra 2003). This species has a remarkable method of egg brooding. The male carries the eggs on a hook on his head like a bunch of grapes (Weber 1913; de Beaufort 1914). Until 2001 when I began fieldwork on the Adelaide River, the most recent papers published on this species were the two references cited above. The seven recent papers published on nurseryfish biology to date are referenced by Berra *et al.* (2004). This species is unknown to local people. No representation of nurseryfish is present in the art collection of the NTM. Local Aboriginal artists did not recognise the fish when I showed them photographs or specimens, and they have no word for this species in their language. Barramundi anglers almost never catch nurseryfish. So poorly was this fish known that several people in Darwin called the local radio station to express disbelief that such a fish existed when my research was discussed on the ABC radio in 2001. The only group aware of its existence was the commercial barramundi fishers who caught it in their gill nets, and referred to it as "breakfast fish". Dennis McCarthy of the Didgeridoo Hut and Art Gallery south of Darwin arranged for Joshua Bangarr, a well-known Kunwinjku artist from Arnhem Land, whose work appears in *Images in Ochre* (Parker 1997), to draw a male and female nurseryfish for me from photographs I supplied. This drawing is reproduced as Figure 3. It was done with the fibrous stem of a freshwater reed pared to the thickness required for undertaking the fine line work in the artist's Yirridja moiety group (D. McCarthy, pers. comm.). The four ochre colours are used: yellow, red, white, black. The artist captured the essential sexual dimorphism of the male's supraoccipital hook. The concave snout, long anal fin and deeply forked caudal fin

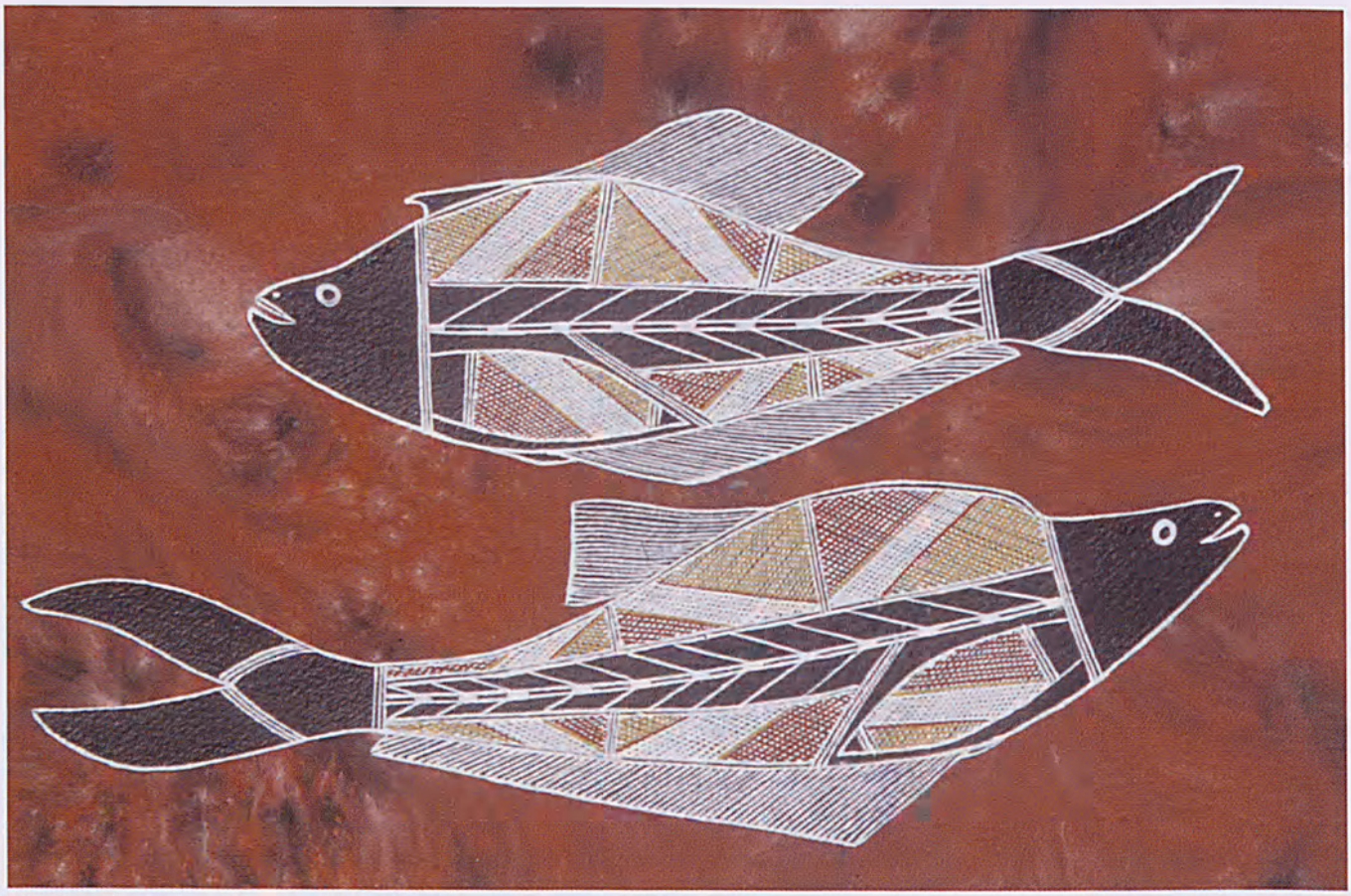

Fig. 3. Male (top) and female nurseryfish, *Kurtus gulliveri*, by Joshua Bangarr from the private collection of the author. X-ray painting on fibreboard (cropped) 58 x 41 cm.

are accurately represented. The painting is also an x-ray image with a naturalistic vertebral column and oval shaped stomach depicted in a geometric type of infill.

CHARLES DARWIN, THE NORTHERN TERRITORY AND NEW FISH SPECIES DESCRIPTIONS

Charles Darwin collected 137 fish species during the voyage of the *Beagle* from 1831–1836. The vast majority of those were described by Jenyns (1840–1842). From the scholarship of Pauly (2004), we know that Darwin commented on 91 species of mostly European fishes in his publications, notebooks and correspondence. Seventeen fish species have been named after Charles Darwin. *Gephyroberyx darwinii,* Darwin's roughy, is an example of such an eponym. This member of the Trachichthyidae was originally described as *Trachichthys darwinii* by Johnson (1866) from deep water off Madeira, but now is known from around the world including western and southern Australia in waters about 270–825 m deep. The Australian name of roughy is due to the large, sharp ventral scutes (Wheeler 1975). This species can reach 46 cm and is remarkably long-lived, up to 149 years (Fenton *et al.* 1991).

A number of fish species were named after the Port of Darwin. Such second order eponyms include *Lates darwiniensis* Macleay (1878), which is a junior synonym of *Lates calcarifer* (Bloch), the barramundi (Paxton *et al.* 1989). The Darwin jawfish, *Opistognathus darwiniensis,* was described by Macleay (1878) from Port Darwin (Fig. 4). This Australian member of the Opistognathidae is known from Ningaloo Reef, Western Australia to the Gulf of Carpentaria. It inhabits shallow reefs in sandy or rubble areas and can reach 50 cm. It is distinguished by the presence of yellow and brown bands on its fins (Allen 2000). Jawfish live in burrows that they construct themselves and enter tail first. Figure 4 resembles a sketch a scientist might make in a field notebook rather than a formal scientific illustration. It does not attempt to represent the individual scale count or pattern. While not possessing the artistic elegance of Figure 5, it does convey the essential scientific information required for a new species description. The bulbous head with large mouth and canine teeth, tapering narrow body, pelvic fins positioned anteriorly to pectoral fins, and lateral line canals embedded in the skin clearly assign this fish to the Opistognathidae (Smith-Vaniz 2000). In this way Figure 4 may also be considered an iconic illustration not unlike Figures 1 and 3. A modern colour painting of *Opistognathus darwiniensis* can be found in Allen (2000).

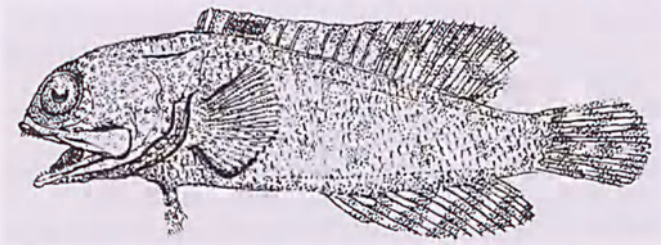

Fig. 4. The Darwin jawfish, *Opistognathus darwiniensis*. The actual total length of the drawing as it appeared in Macleay (1878: pl. 9, fig. 3) was only 50 mm.

Larson and Martin (1990) listed 17 taxa of fishes described as new to science from fresh waters of the Northern Territory. One of these, the purple-spotted gudgeon, *Mogurnda mogurnda* (Richardson), was described from Port Essington. This species is widespread in vegetated streams of the Timor and Gulf of Carpentaria drainages, southern New Guinea and parts of inland Lake Eyre drainage in the Northern Territory. It commonly reaches 10 cm, may grow to 17.5 cm, is colourful, especially the males during courtship, and breeds readily in captivity. Figure 5 is a portrait by J. F. Obbes of *M. mogurnda* from Weber (1911) that shows two to three diagonal dark bands radiating from below the eye across the operculum and the distinctive series of seven to eight

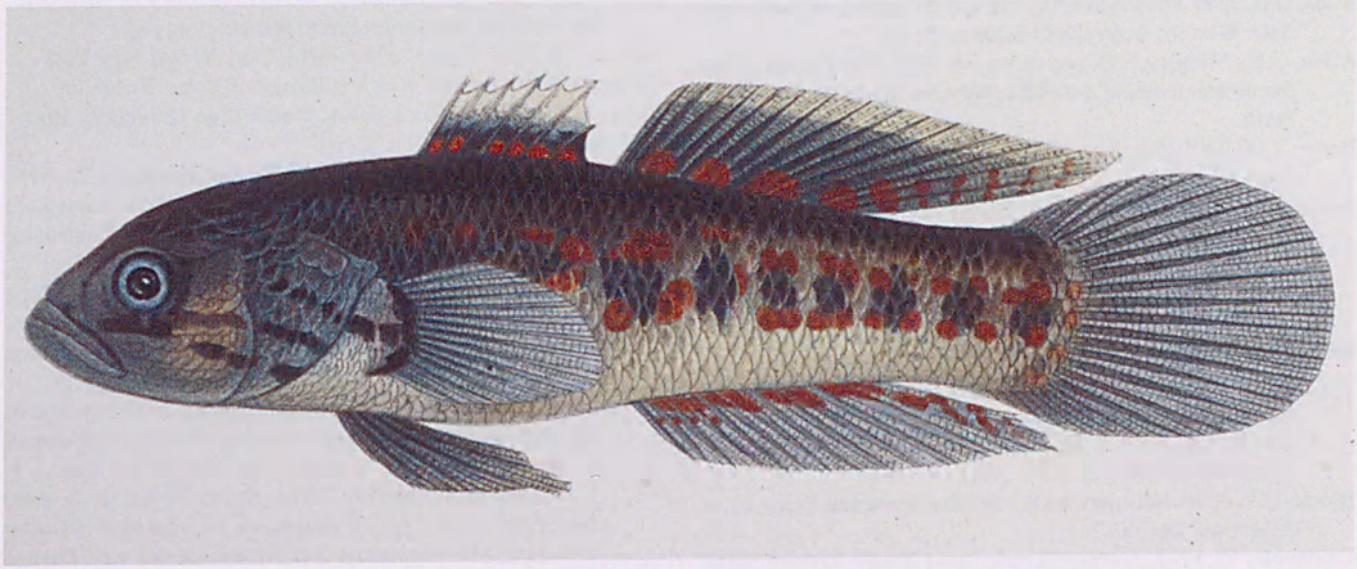

Fig. 5. The purple-spotted gudgeon, *Mogurnda mogurnda*, drawn by J. F. Obbes and reproduced from Weber (1911: pl. 1, fig. 1).

purple and red blotches along the flanks of the body (Larson and Martin 1990; Allen *et al.* 2002). Scales and fin spines and rays are accurately depicted as they should be in a scientific illustration while the overall impression is aesthetically pleasing.

It may be suggested that the portrayal of fishes by artists represents a sliding scale of differences in which certain iconic similarities exist according to the particular requirements and cultural orientations of the illustrator. Aboriginal and indigenous artists of different cultures use fish images that are more symbolic to convey a message or an abstract idea. Scientific illustrators convey a precise essence of the animal itself for a practical application. Fine artists that delve into exact likenesses of fishes and use science to fuel their creative fires, blur the distinctions. An example of the latter include the fish paintings of Tasmanian convict-artist William Buelow Gould, so imaginatively portrayed in the literary masterpiece *Gould's Book of Fish* by Australian novelist Richard Flanagan (2001).

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