

## CASTELNAU'S COLLECTION OF SINGAPORE FISHES DESCRIBED BY PIETER BLEEKER

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**ABSTRACT.** – Recently discovered watercolour paintings of Singapore fishes by the French naturalist F. L. Castelnau in the Zoological Museum of the University of Liège, Belgium, include illustrations of seven hitherto unrecognized species of apogonid fishes and a gobiid fish that formed the basis of new species descriptions by Pieter Bleeker in 1860. Based on examination of the paintings, we assign Bleeker's species as follows: *Apogonichthys taeniopterus* Bleeker, 1860, is a junior synonym of *Jaydia truncata* (Bleeker, 1854); *Cheilodipterus polystigma* Bleeker, 1860, is a junior synonym of *Pseudamia amblyuroptera* Bleeker, 1856; *Cheilodipterus singaporensis* Bleeker, 1860, is a valid species; *Apogonichthys macrophthalmus* Bleeker, 1860, is a valid species, but because it has not been used in the literature is unavailable and *Apogon compressus* Smith & Radcliffe in Radcliffe, 1911 (nomen protectum) is retained for this species; and *Gobius melanopus* Bleeker, 1860, is shown to be the senior synonym of *Cryptocentrus leptocephalus* Bleeker, 1876. The identities of the remaining species are uncertain: *Apogon melanurus* Bleeker, 1860, may represent a species of *Cheilodipterus*, possibly *C. macrodon* (Lacépède, 1802); *Apogon singaporensis* Bleeker, 1860 (nomen oblitum) is identified as a synonym of *Apogon endekatania* Bleeker, 1852, based on dried skins; the painting may represent a member of the *Apogon hartzfeldii* complex, possibly *Apogon cavitensis* (Jordan & Seale, 1907) (nomen protectum); and *Apogon arenatus* Bleeker, 1860, may represent a species of *Zoramia*, possibly *Z. leptacantha* (Bleeker, 1856–57).

**KEY WORDS.** – Apogonid fishes, *Cryptocentrus*, Singapore, F.L. Castelnau, Pieter Bleeker.

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### INTRODUCTION

In one of a series of papers on the fishes of Singapore, Pieter Bleeker (1860c) described seven new apogonid and one new gobiid species based on watercolour paintings by the French diplomat, explorer and naturalist F. L. Castelnau. Except for one of these species (*Cheilodipterus singaporensis*) type specimens are unknown, and the status of the others has remained uncertain (Eschmeyer et al., 2009). During a visit to the Zoological Museum of the University of Liège (ZMUL), Belgium in 2004, the first author became aware of a collection of fishes made by Castelnau together with five annotated sketchbooks. Amongst the many illustrations and paintings in the sketchbooks, approximately 400 are of fishes from Singapore, including those described by Bleeker.

François Louis Nompard de Caumont Laporte, comte de Castelnau (henceforth Castelnau; also variously known as Francis de la Porte de Castelnau; Francis de La Porte Castelnau; Francis Louis Laporte; Francis Louis Laporte, comte de Castelnau; François Louis Nompard de Caumont de Laporte; Francis Louis de la Porte, comte de Castelnau), was a widely traveled naturalist and diplomat. Born in London on 25 December 1810 (some sources give his year of birth as 1812), he studied natural science in Paris under Baron Cuvier, Geoffroy Saint-Hilaire and other noted zoologists. In 1837–41 he led an expedition to the United States, the (then) Republic of Texas and Canada, where he studied the fauna and political systems. In 1843–47, under the patronage of King Louis-Philippe of France, he led an expedition to South America, crossing from the Mato Grosso to Peru and returning via the Amazon River (Howgego, 2004; Loneux,

2006). After the 1848 French revolution, he took up a diplomatic career. In the years between 1848 and 1855, he was the French Consul at Salvador, Bahia, Brazil. In 1855, he returned to France and later travelled by steamer to the Cape of Good Hope, where he was French Consul from 1856 to 1858 (Almanach de Gotha, 1857, 1858). He was posted as the French Consul to Siam (Thailand) from 1858 to 1862 (Ministère des Affaires étrangères, 1859, 1860, 1861, 1862) and during this time, he also visited India, Malacca, Sumatra, Java, Ceylon (Sri Lanka) and Singapore (Whitley, 1965). In 1863, Castelnau was appointed Consul-General for France in Melbourne (Birch & Robinson, 1867) where he remained after his retirement in 1877 until his death on 4 February 1880 (Whitley, 1965, 1974).

Castelnau was a prolific ichthyologist, who described a total of 469 new species of fishes from Brazil and Peru (Castelnau, 1855), South Africa (Castelnau, 1861) and Australia (Castelnau, 1872, 1873a & b, 1875, 1876, 1878a–c, 1879 a & b). He was also the first European to study the fishes of Siam (Smith, 1945). The collections and sketchbooks in the ZMUL reveal that Castelnau made extensive collections of fishes from Siam and Singapore, many of which were illustrated in colour in two of his five sketchbooks. Castelnau's work between 1858–1862, during his time in Siam and Singapore, remained largely unknown. For over 140 years, Castelnau's collections from these two countries and sketchbooks were thought to be lost, until recently uncovered by Dr Michelle Loneux in the ZMUL (Loneux, 2002, 2006).

Castelnau's sketchbooks, together with collections of birds (697 specimens), fishes (291 specimens – not yet surveyed for missing or unknown types), mammals (45 specimens) and a few marine invertebrates, were purchased in 1865 by Jean-Theodore Lacordaire, Professor of Natural Sciences at the University of Leige, to improve the ZMUL collections (Loneux, 2002, 2006). The sketchbooks include landscape pencil sketches and paintings of fishes from Bahia's Bay, Brazil; and paintings of fishes from Île Bourbon (Réunion) and the Cape of Good Hope (in 1856), Algoa Bay (in 1857), and various parts of Siam, Bangkok, Saigon (Ho Chi Minh City), Malacca, Palembang, Banka, Batavia (Jakarta) and Singapore (variously dated between 1859–1861).

Each sketchbook page contains between one to 12 illustrations, most numbered and named, and some with annotations such as fin counts or other characters handwritten in pencil. All of the species discussed below had notes accompanying the illustrations that gave a new name along with authorship and abbreviations such as 'nov sp' indicating Castelnau's opinion on the specimen in question.

No correspondence between Castelnau and Bleeker were found in the collections at the ZMUL, and Castelnau's sketchbooks are mostly undated. However, it is known that Castelnau passed through Batavia en route to Siam in 1858 (Money, 1861: 10) where he undoubtedly met Bleeker. The two evidently remained in close contact, as Bleeker's papers on Singapore fishes published between 1860 and 1861, were based largely on various fish paintings found in Castelnau's

sketchbook pages, which Bleeker must have seen at the time. As Bleeker dated most of his publications (date of writing), and using these dates (Table 1), it is possible to deduce that Castelnau must have made his paintings between 1859 and 1861. A few paintings labeled 'Singapore' are dated: June 1859; 16 October 1860; and 19 June 1861. A letter found amongst the sketchbooks at ZMUL dated 12 June 1860 to Castelnau from John Siellarttieu and Fredrick Keslar for the payment of insect and bird collections from Malacca also indicates Castelnau was in Singapore then.

## CASTELNAU'S SINGAPORE FISHES DESCRIBED BY BLEEKER

### *Apogonichthys taeniopterus* Bleeker, 1860

*Apogonichthys taeniopterus* Bleeker, 1860c, is based on two coloured paintings by Castelnau, No. 93 (Fig. 1) and No. 342 (Fig. 2). No specimen has been identified that served as the basis for the painting and the name. Bleeker provided a brief accurate description in Latin and made no additional comments. In his second description of this species, Bleeker (1874) changed two words in an otherwise repeated Latin description. These words were "3" for "4" in reference to the body depth (about 4.3 from the painting) in its length and "vitta" for "fascia". He provided remarks on characteristics he could not determine, such as number of fin elements, number of scales and an uncertainty of serration on the preopercle. He believed the colour pattern was distinct. In Bleeker's "Atlas Ichthyologique" (1871–1876: 99) the Latin description reverted to the original description although his remarks were brief with sentences lifted from his 1874 paper. In the latter two publications Bleeker placed this species just after *Apogon truncatus* Bleeker, 1854.

Weber & de Beaufort (1929) listed Bleeker's name as a synonym of *Apogon ellioti* Day, 1875, pre-empted by *Apogon taeniopterus* Bennett, 1836. Gon (1996) reviewed the nomenclature of *Apogon truncatus* in his revision of the species group but did not list or comment on Bleeker's *taeniopterus*. Gon's illustration and Day's (1875) description and figure of *Apogon ellioti* agree on most of the diagnostic colour pattern present in Castelnau's painting. The figure of *Apogon truncatus* in Bleeker's Atlas (1871–76, Pl. 41) shows only the distal dark portion of the first dorsal fin. No other markings were present.

We conclude that *Apogonichthys taeniopterus* is a junior synonym of *Apogon truncatus*, agreeing with Weber & de Beaufort. Gon (1996) treated *Apogon truncatus* in the subgenus *Jaydia*, now recognized as a genus, removing the homonym conflict with Bennett's description of *Apogon taeniopterus* in 1836.

### *Cheilodipterus polystigma* Bleeker, 1860

*Cheilodipterus polystigma* Bleeker, 1860c, is based on a coloured painting by Castelnau, No. 137 (Fig. 3). Bleeker

provided a brief description in Dutch based on this painting. In his revision of the Apogonidae, Bleeker's (1874) redescription in Latin of this species was based on two specimens, one from Singapore (collected during a ten day stopover on his return to Europe in 1860) and the other from Ambon (RMNH 5610). Bleeker's translated remarks (1874) are as follows: "Rem. I described this species for the first time in the year 1859 according to a drawing of Mr. the Count de Castelnau. At the time of my passage to Singapore, in the year 1860, I obtained a beautiful specimen, and I also have a smaller specimen, poorly preserved from Ambon. One easily can identify the species by the eye-like black mark offset dorsally on the side of the caudal peduncle".

Randall et al. (1985) mention these specimens in their material list of *Pseudamia amblyuroptera* (Bleeker, 1856) but did not identify either of them as a possible syntype. Castelnau's painting is the representation of the type specimen, lost or possibly yet to be located among the preserved/dried material at the ZMUL. As both the Singapore specimen and the Ambon specimen apparently were obtained after Bleeker's original description of *C. polystigma* was published, neither can be regarded as types. In their remarks, Randall et al. (1985) discuss their reasons why *Pseudamia polystigma* should be considered a synonym of *P. amblyuroptera* as the result of variation associated with size.

The coloured painting can be easily identified with the species treated by Randall et al. (1985) and with Bleeker's figure of *Cheilodipterus polystigma* (Bleeker, 1875–1876: Pl. 70). The figure of *Pseudamia amblyuroptera* (Bleeker, 1871–1876: Pl. 32) appears more diagrammatic. We agree that *Pseudamia amblyuroptera* is the senior synonym of *P. polystigma*.

#### ***Cheilodipterus singaporensis* Bleeker, 1860**

*Cheilodipterus singaporensis* Bleeker, 1860c, is based on a specimen which was related to a coloured painting by Castelnau, No. 67 (Fig. 4), with notes "*Cheilodipterus singaporensis* Cast. Blk *octovittatus* Cu? Val nov. spec.". The mouth is partly open and shows large teeth. In the original Latin description, Bleeker (1860c) lists a single specimen of 149 mm total length (TL) and in the Dutch remarks he refers to another specimen of 119 mm TL. By 1874 Bleeker had added three more specimens and modified his description. A figure was provided by Bleeker (1875–1876b: Pl. 35) in the Atlas. No changes were made to the description or remarks in 1876 from the additions in 1874. The descriptions by Bleeker, his figure and Castelnau's painting do not show a black mark in the area of the anal and genital openings. Bleeker's (1875–1876) figure was based on the juvenile colour pattern, probably from one of the smaller specimens. Gon (1993) provided the most recent revision of *Cheilodipterus* and recognized *C. singaporensis* as a valid species.

Although Gon listed Bleeker's material, RMNH 5619 with three specimens, no types are mentioned or discussed. Ernest A. Lachner examined Bleeker's material in 1956. He recorded four specimens present, one with a "conspicuously

dark vent" (Lachner original notes). Four specimens were present when Fraser examined the lot in 1972. The largest specimen in the lot is about 144 mm TL not 149 mm. Martin Boeseman (in litt.) suggested that Bleeker may have made a 5 mm error reading his ruler, the printer misread a 9 for a 3, or the holotype was in the second lot of the Auction Catalog and went elsewhere, or is lost.

We regard the largest specimen as the probable holotype and one of the two smaller specimens mentioned by Bleeker is a paratype. The third specimen has no type status. No Bleeker specimen has been reported at the British Museum, another possible repository for the specimen. The specimen with the dark vent was identified as *Cheilodipterus truncatus* (139 mm TL) and removed to RMNH 26674 in 1972. While there are two interpretations of the significance of the blackish vent (Lachner, 1953; Gon 1993), neither Bleeker's written descriptions nor Castelnau's figure provide any evidence that they observed this colour pattern. We conclude that Castelnau's figure of an adult was used appropriately by Bleeker.

#### ***Apogon melanurus* Bleeker, 1860**

The painting of *Apogon melanurus* Bleeker, 1860c, No. 149 (Fig. 5), has the mouth closed so placement in *Cheilodipterus* is not certain, however, the drawn specimen was slender. Bleeker (1860c) thought this species was similar to *Apogon aureus* based on the caudal marking, but differed in its body shape and the stripe-like spots. No known species of *Apogon*, sensu lato, has this combination of colours on the head, body or fins. Perhaps *Apogon taeniopterus* Bennett, 1836, could be considered a possible candidate, but it has well-defined dark mid-stripes in the second dorsal and anal fins, characteristics absent from the painting and descriptions. *Cheilodipterus macrodon* (Lacépède, 1802) as described by Gon (1993) and the photos (Kuiter & Kozawa, 2001) of *Cheilodipterus octolineatus* appear to be close to Castelnau's painting. The painting differs from both of these possibilities by lacking stripes on the head, by having a blackish distal area on the anal fin and a uniform first dorsal fin. The blackish portions of the caudal peduncle and caudal fin are consistent with some species of *Cheilodipterus*.

Other species of *Cheilodipterus* drawn by Castelnau are similar: *C. lineatus*, No. 507 (Fig. 6), *C. quinquelineatus*, No. 574 (Fig. 7) and *C. octovittatus*, No. 575 (Fig. 8). All are slender species. We consider this painting to be a *Cheilodipterus* of unknown identity, perhaps a poor representation of *Cheilodipterus macrodon* which is known from Singapore.

#### ***Apogon singaporensis* Bleeker, 1860**

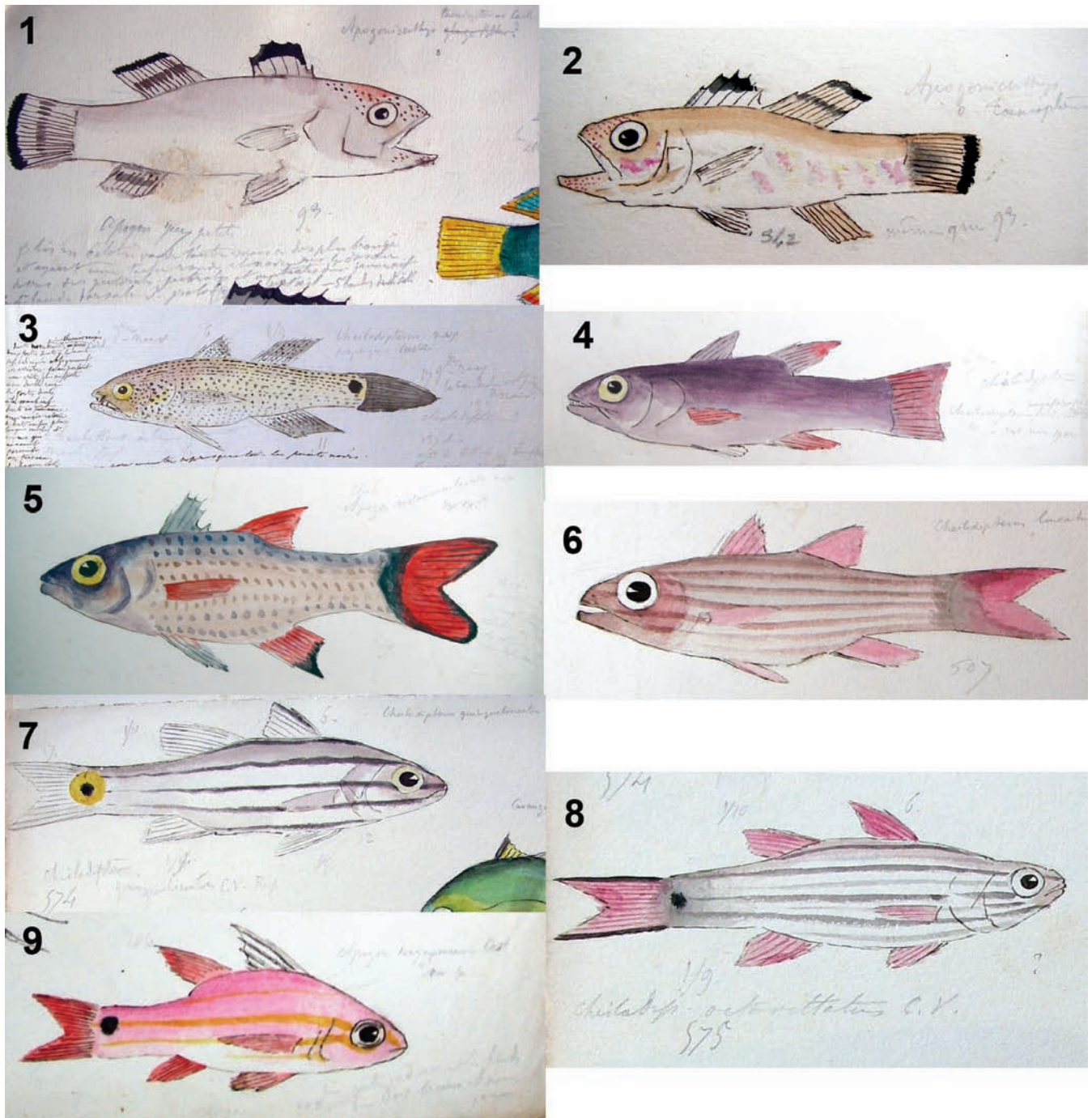
The painting of *Apogon singaporensis*, No. 208 (Fig. 9), is of an *Apogon*, sensu lato, with at least six first dorsal spines. Cardinalfish without stripes in the dorsal and anal fins, with reddish and golden or yellowish stripes and a medium-sized

blackish peduncle spot include *Apogon cavitensis* and *Apogon chrysotaenia*. None of these species has been well-studied. Kuitert & Kozawa (2001) suggest that there are three species in this grouping identified as the *Apogon hartzfeldii* complex. Bleeker (1876) thought this species had some similarity to *Apogon wassinki*. However, the presence of the blackish caudal peduncle spot eliminates any candidate species in the *Apogon cyanosoma* complex.

Two Castelnau specimens, both dried mounts from Singapore, are listed in the Catalogue of the ZMUL as 2378a, 2378b, 72–75 mm SL or about 90 mm TL (Fig. 10, 11) as *Apogon singapurensis*. These specimens have VIII-I,9 in the dorsal

fins, II,8 for the anal fin and 13–14 fin rays in the pectoral fin. The basicaudal spot was round, relatively large and blackish, consistent with *Apogon endekataenia* Bleeker, 1852b. The eighth dorsal spine was probably hidden under the skin in life. No other dark stripes or other darkish marks were present on these specimens.

If either or both dried specimens represent the material that Castelnau used for his painting, then the painting may be a poor representation of *Apogon endekataenia*. The darkish stripes on these specimens of *Apogon endekataenia* are not as intensely black as the basicaudal spot in life (see Kuitert & Kozawa, 2001: 20, Figs. A, B) or in preservation (Fraser,



Figs. 1–9. Castelnau's paintings numbers 93, 342, 137, 67, 149, 507, 574, 575 and 208, respectively.

Table 1. Publication dates and dates of writing of Bleeker's papers on Singapore fishes.

Publication date	Journal	Date of writing	Based on Castelnau sketches	No species reported
Bleeker 1851	<i>Nat. Tijdschr. Ned. Ind.</i> , <b>1</b> : 480–481	Undated	No	122
Bleeker 1852a	<i>Nat. Tijdschr. Ned. Ind.</i> , <b>3</b> : 51–86	December 1851	No	73
Bleeker 1858	<i>Nat. Tijdschr. Ned. Ind.</i> , <b>15</b> : 241–254	January 1858	No	80
Bleeker 1860a <sup>1</sup>	<i>Nat. Tijdschr. Ned. Ind.</i> , <b>20</b> : 216–217	11 August 1859 <sup>2</sup>	Yes	29
Bleeker 1860b <sup>1</sup>	<i>Nat. Tijdschr. Ned. Ind.</i> , <b>20</b> : 236–239	24 August 1859 <sup>2</sup>	Yes	88
Bleeker 1860c <sup>1</sup>	<i>Nat. Tijdschr. Ned. Ind.</i> , <b>20</b> : 446–456	October 1859	Yes	123
Bleeker 1860d	<i>Nat. Tijdschr. Ned. Ind.</i> , <b>21</b> : 334	9 February 1860 <sup>2</sup>	Yes	4
Bleeker 1861a	<i>Nat. Tijdschr. Ned. Ind.</i> , <b>22</b> : 101–102	10 May 1860 <sup>2</sup>	Yes	11
Bleeker 1861b	<i>Versl. Akad. Amsterdam</i> , <b>12</b> : 28–63	10 January 1861	Yes	155

## Notes:

<sup>1</sup> The publication dates of Bleeker (1860a-c) are problematical. These papers appeared in the 1859-1860 volume of "Natuurkundig Tijdschrift voor Nederlandsch Indie" (vol. 20). As Kottelat (2000) has pointed out, the publication pattern of this journal was somewhat irregular, with two or three volumes appearing every year between 1855 and 1860. Volume 17 is dated 1858–59, volumes 18 and 19 as 1859, volume 21 as 1860 and volume 22 as 1861 (The decrease in publication rate after 1860 is apparently linked with Bleeker's departure from Batavia in September 1860) (Kottelat, 2000). Volume 20 was distributed as a single issue and as the last paper was dated December 1859 (date of writing), it seems difficult (if not impossible) that it could have appeared in 1859 (Kottelat, 2000), and we agree with Kottelat that the actual date of publication was most likely early in 1860.

<sup>2</sup> Although Bleeker dated most of his publications (date of writing), a few (Bleeker, 1860a, b, d and e) were not dated. In a footnote, however, Bleeker (1861b: 29) provides the dates for them indicated here, presumably the dates upon which they were completed and submitted for publication.

1974: Fig. 1). The alternating stripes may have changed colours post-mortem and may have been lost in preservation. The reddish and yellowish markings in the post-mortem watercolour would certainly be lost in preservation.

We regard the *Apogon hartzfeldii* complex as the most likely candidate grouping for the painting. *Apogon cavitisensis* Jordan & Seale, 1907, is known from Singapore and the painting may represent this species in the absence of the actual specimen(s). If so, then Bleeker's name is not available because *singaporensis* (nomen oblitum) has not been consistently used as a valid name since its description and the clear identity of *cavitisensis* (nomen protectum) to the present in literature (see Eschmeyer et al., 2009, for a partial list), books and electronic media. We regard *Apogon endekataenia* as the most likely name for the dried specimens (ZMUL 2378a-b) based on the size of the basicaudal spot. We have no evidence that Castelnau used, if at all, one or both specimens as the basis for the painting. The best course of action is to treat *Apogon singaporensis* as a junior synonym of *Apogon endekataenia* because of Castelnau's dried material from Singapore.

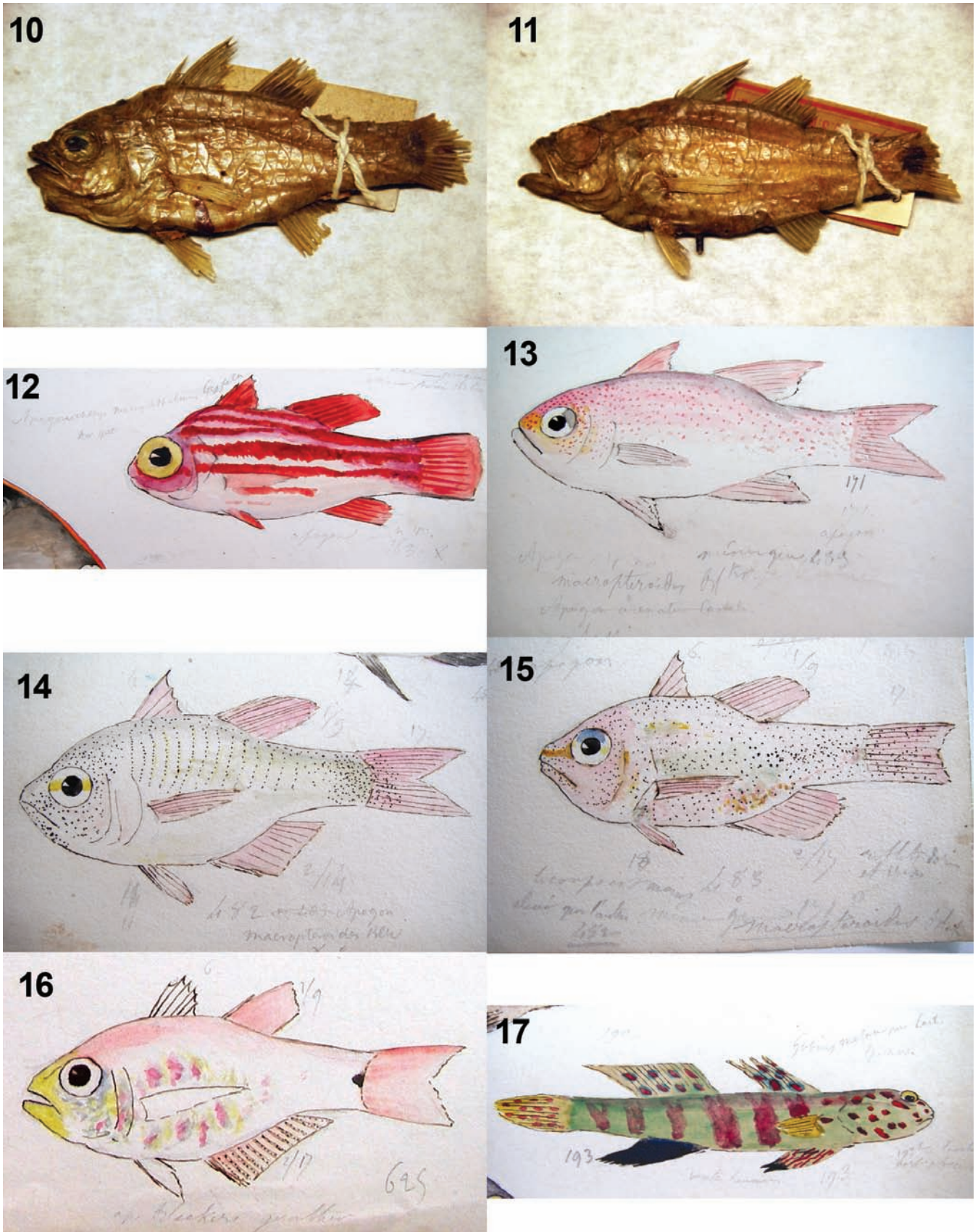
### *Apogonichthys macrophthalmus* Bleeker, 1860

Castelnau's painting of *Apogonichthys macrophthalmus* Bleeker, 1860c, No. 163 (Fig. 12) is striking with the large eye, reddish stripes and dark edges to the truncated or rounded caudal fin. Bleeker did not alter his descriptions significantly from the original description (1860c), the revision (1874) or the "Atlas" (1876). His comments added little information.

None of the known cardinalfish in *Apogonichthys*, *Foa*, *Fowleria*, *Neamia*, the *Apogon taeniatus* complex or the *Apogon poecilopterus* complex has any stripes. We assume that the caudal fin was probably emarginate, not deeply forked.

There are several species of striped cardinalfish which have some similarity in stripes to Castelnau's painting: *Apogon compressus*, *Apogon kalosoma* and *Apogon breviceaudatus*. However, none has a good fit to the painting. Two species, *Apogon kalosoma* and *Apogon breviceaudatus*, have convex second dorsal and anal fins. The fin markings of *Apogon breviceaudatus* and the restricted distribution of this species (Kuitert & Kozawa, 2001) make it an improbable candidate. There are more narrow stripes present on the body of *Apogon kalosoma* than depicted in the painting, but dark edges on the caudal fin shown in the painting may be present on this species. The body stripes of *Apogon compressus* are more consistent with the painting. This species has six first dorsal spines and nine rays in the anal fin and a relatively deeper body. The painting depicts a fish with relatively short first dorsal fin and a relatively large eye, which could be consistent with *Apogon compressus*. However, *Apogon compressus* has a slightly concave anal fin with a longer base, not seen in the painting.

Both *Apogon compressus* and *A. kalosoma* have been collected at Singapore. We believe the species that Castelnau drew was a specimen of *Apogon compressus*. Specimens of *Apogon compressus* has been easily identified by ichthyologists since it was described by Smith & Radcliffe in Radcliffe (1911). There have been no subsequent synonyms. It seems unusual



Figs. 10–17. Figures 10, 11: dried mounted specimens in the collection of the Zoological Museum of the University of Liège, Belgium (ZMUL), catalogue numbers 2378a and 2378b. Figures 12–17: Castelnau's paintings, numbers 163, 171, 482, 483, 625 and 193, respectively.

that no one other than Bleeker described this species from the West Pacific prior to 1911. Bleeker's name should be considered as unavailable because *macrophthalmus* (nomen oblitum) has never been used as a valid name and the clear identity of *compressus* (nomen protectum) to the present in literature (see Eschmeyer, et al. 2009 for a partial list), books and electronic media.

#### ***Apogon arenatus* Bleeker, 1860**

*Apogon arenatus* Bleeker, 1860c, No. 171 (Fig. 13), has few markings other than small reddish or pinkish spots and some yellowish area, on the snout. The angled mouth and body shape suggests a fairly compressed fish. A species from among *Zoramia*, *Archamia*, *Siphamia*, and *Apogon* could be considered based on the absence of any stripes, bars or dark marks. The notes refer to "*Apogon* sp nov, *macropteroides* CV même qui 483, *Apogon arenatus* Castelnau". Castelnau drew at least two, perhaps three species now in *Archamia*: *Apogon macropteroides*, No. 482 (Fig. 14); *Apogon macropteroides*, No.483 (Fig. 15); and *Apogon bleekeri*, No. 625 (Fig. 16). These species are painted with long anal fin bases in contrast to the painting of *Apogon arenatus*. Bleeker did not alter the original description in his later publications. Bleeker's abbreviated comments on this species provide little help in determining the identity of this fish. A few species were considered: *Apogon gularis*, *Zoramia leptacantha*, *Archamia fucata* and *Siphamia jebbi*. None of these species have been recorded from Singapore, but all have distributions that suggest they are likely to occur there. *Apogon gularis* and *Siphamia jebbi* are found in deeper waters, and therefore, less likely to be collected or seen by Bleeker. *Siphamia jebbi* has a bioluminous organ system located along the side of the abdomen extending on to the peduncle (Allen, 1993). Presumably, this structure would have been noticed by Castelnau and subsequently included in his painting. *Apogon gularis* has a dark mark on the snout (Fraser & Lachner, 1984) which is not present in the painting. *Zoramia leptacantha* (Bleeker, 1856–57) is the only species of *Zoramia* without clusters of melanophores and/or a dark spot on the caudal peduncle or basicaudal region. This species can have a very long filamentous spinous dorsal spine, and has a few yellowish bars on the opercle and adjacent body, a line present along the base of the dorsal fins onto the peduncle and a line along the base of the anal fin onto the peduncle (Fraser & Lachner, 1985; Kuitert & Kozawa, 2001). These distinctive characteristics are all absent in the painting. *Archamia fucata* has a very long anal fin, finely curved bars on the body and a yellowish snout. Most photographs of *Archamia fucata* show a darkish basicaudal spot except one photograph of a specimen from Bali with a very faint and diffused caudal marking (Kuitert & Kozawa, 2001). The anal fin and dorsal fin base are not significantly different in their lengths in the painting which would eliminate any *Archamia*, but not *Zoramia*.

We believe that the painting of *Apogon arenatus* is most likely from a specimen of *Zoramia*, probably *Z. leptacantha* (Bleeker, 1856–57) without the filamentous dorsal spine.

Unless another undescribed species of *Zoramia* is recognized and corresponds with *arenatus*, Bleeker's name should be treated as a junior synonym of *Zoramia leptacantha*.

#### ***Gobius melanopus* Bleeker, 1860**

Castelnau painting No. 193 (Fig. 17) is labeled as "*Gobius* sp. nov." and "*Gobius melanopus* Cast." *Gobius melanopus* was described by Bleeker in 1860c, based on Castelnau's figure and the name attributed to Castelnau. No type material is known. The species name has been used as a valid name by Larson (in Randall & Lim 2000: 637); where it was cited as '*Cryptocentrus*' *melanopus*, as at that time it was thought that the species name may refer to a group of species that include *Cryptocentrus russus* and *C. voigtii* – species that may belong to a separate genus.

The species illustrated by Castelnau agrees with *Cryptocentrus leptocephalus* Bleeker, 1876, based on a specimen from Singapore (RMNH 4665). Castelnau's painting clearly shows the large pink spots and short pink streaks on the head, dorsal fins and pectoral fin base, dark anal fin, the oblique pinkish brown bars on the body, and the characteristic pinkish red and yellow-striped pelvic fins with blackish tips (compare with photos in Kuitert & Tonzuka, 2001: 631; Senou et al., 2004: 316–317). Hence, *Cryptocentrus melanopus* Bleeker, 1860c, is the senior synonym of *C. leptocephalus* Bleeker, 1876. Under the 2000 ICZN Code, precedence must be maintained, as reversal of precedence (Article 23.9) cannot be met since the senior synonym has been used as a valid name after 1899 (although the junior synonym has been used for the species by at least 10 authors).

#### **DISCUSSION**

*Apogon melanurus*, *A. arenatus*, *A. singapurensis* and *Apogonichthys macrophthalmus*, all described in Bleeker (1860c) are based on coloured paintings by Castelnau. No specimens are mentioned in any of his subsequent descriptions (Bleeker, 1874, 1876). Weber & de Beaufort (1929) treated these as doubtful species; their descriptions are translations from Bleeker's Latin descriptions. No subsequent publications have associated these names with any recognized species (Eschmeyer et al., 2009). Most of the basic characteristics on which Bleeker based his usual descriptions from specimens were not available to him via the watercolour paintings or in any subsequent ichthyological literature.

Based on examination of the paintings, we assign Bleeker's species as follows: *Apogonichthys taeniopterus* Bleeker, 1860c, is a junior synonym of *Jaydia truncata* (Bleeker, 1854); *Cheilodipterus polystigma* Bleeker, 1860c, is a junior synonym of *Pseudamia amblyuroptera* Bleeker, 1856; *Cheilodipterus singapurensis* Bleeker, 1860c, is a valid species; *Apogonichthys macrophthalmus* Bleeker, 1860c, is a valid species, but because it has not been used in the literature is unavailable and *Apogon compressus* Smith & Radcliffe in

Radcliff, 1911 (nomen protectum) is retained for this species; and *Gobius melanopus* Bleeker, 1860c, is shown to be the senior synonym of *Cryptocentrus leptocephalus* Bleeker, 1876. The identities of the remaining species are uncertain: *Apogon melanurus* Bleeker, 1860c, may represent a species of *Cheilodipterus*, possibly *C. macrodon* (Lacépède, 1802); *Apogon singaporensis* Bleeker, 1860c (nomen oblitum) is identified as a synonym of *Apogon endekataenia* Bleeker, 1852b, based on dried skins; the painting may represent a member of the *Apogon hartzfeldii* complex, possibly *Apogon cavitensis* (Jordan & Seale, 1907) (nomen protectum); and *Apogon arenatus* Bleeker, 1860c, may represent a species of *Zoramia*, possibly *Z. leptacantha* (Bleeker, 1856–57).

Now that these paintings have been rediscovered there is more clarity for the Bleeker names. The Castelnau watercolour paintings and the dried skins may prove valuable in sorting out the identities of other fishes with limited descriptions.

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