A new species detected in the collection of the Natural History Museum of Denmark of the Dana Expedition from 1928–30: *Carybdea irregularis* sp. nov. (Cnidaria, Scyphozoa, Cubomedusae, Carybdeida, Carybdeidae) from French Polynesian waters

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**Abstract:** A new carybdeid species, *Carybdea irregularis* sp. nov., is described from the Dana Expedition 1928–30 collections of the Natural History Museum of Denmark, Copenhagen, originally sampled from French Polynesia. It can be distinguished from its congeners by the combination of the following morphological features: pedalial canal knee bend rounded, 2 very narrow velarial canal roots/octant with slim, irregularly shaped canals (no canal resembles another one) and bottle tree-like gastric filaments.

Description, photo and and drawings by Bigelow (1909) on three French Polynesian carybdeid medusae, sampled in Rikitea Harbor, Mangareva, Gambier Islands (French Polynesia) during the Albatross Expedition in 1905 and identified by him as *Carybdea rastonii*, fit exactly the anatomical structures of this new species and are therefore designated to it.

Up to now, *Carybdea irregularis* sp. nov. is the smallest species of the genus *Carybdea*, maturing with at a bell height of 15 mm.

**Key words:** box jellyfish, carybdeid species, misidentification, geographic distribution

**Introduction**

Bigelow (1909) identified three carybdeid specimens from Mangareva, French Polynesia collected by the crew of the "Albatross" Expedition and/or himself between 27 January and 05 February 1905 in the water surfaces of Rikitea Harbor (Agassiz 1906, Bigelow 1909). He identified them as *Carybdea rastonii* Haacke, 1887 after comparing them with juvenile specimens of *Carybdea arborifera* Maas, 1897 from Hawaii and descriptions of juvenile specimens of *C. rastonii* from Adelaide, Australia by Haacke (1887).

In 2016 to 2017, two misidentified samples of very small but mature carybdeid specimens from French Polynesia were found in the Natural History Museum of Denmark, Copenhagen. One was from an expedition of the Museum of Comparative Zoology, Cambridge University, to Niku Hiva, the Marquesas, in 1925 and consisted of five medusae in quite bad condition due to the sampling method (trawl) and had been identified as *Carybdea rastonii*. The other one was from the Dana Expedition 1928–30, Station no. 3565, Niku Hiva, the Marquesas, in 1928, consisting of 10 specimens (eight were in good condition) and had been identified as *Carybdea alata* Reynaud, 1830. When trying to identify the correct species for these specimens, which definitely belonged to the genus *Carybdea* according to the heart-shaped rhopalial niche opening and epaulette-shaped gastric phacellae, it was realised that the specimens from the Polynesian population did not belong to any described carybdeid species. In Bigelow's (1909) publication of a supposed French Polynesian *C. rastonii* population from Mangareva there were images and descriptions that could be compared to the specimens from the Marquesas and signif-
icant similarities (Fig. 1) were found. Thus, the goal of this paper is to provide a proper description of this undescribed carybdeid species from French Polynesia.

Material and Methods

Morphological comparison

All medusae of the Polynesian *Carybdea* population observed were preserved in 5–7% formalin seawater, therefore, no molecular analysis could be performed but as all anatomical structures were excellently preserved in several specimens a direct comparison with the structures of other *Carybdea* species worldwide was possible. Therefore, only morphological characters were used to identify the species, which is still a valid approach for primary taxonomy (Páll-Gergely 2017).

Species observed

Specimens of the Polynesian population identified as "*Carybdea alata*" and "*Carybdea rastonii"" were compared to all members of the genus. Special attention was paid to the species: *C. rastonii* from Australia, *Carybdea brevipedalia* Kishinouye, 1891 from Japan and *Carybdea arborifera* from Hawaii. The comparison was performed morphologically through direct observation of museum-deposited specimens (Table 1), and descriptions available in the literature.

Measurements

Standard measurements were used (Straehler-Pohl 2014, Acevedo et al. 2019): bell height (BH) as length between bell turn-over (velarium excluded from measurement) and top of apex; interpedalial diameter (IPD) as distance between opposite pedalia (outer pedalia wing edges) at the level of the bell turn-over; pedalia length (PL) from attachment to bell (pedalial base) to the tentacle insertion; pedalial width (PW) at the widest diagonal level.

For measurements manual callipers were used.

Photographs were taken under the same conditions with digital cameras Canon Powershot G12 and Canon Eos 550D through the objectives of the stereomicroscope Olympus SZX12.

"Gonads" in Cubozoa

Campbell (1974: 142) stated that "gonads" in most cnidarians are not separate organs, as found in higher animals, because germ cells are generally found in the interstitial portions of the body tissue which, prior to the formation of germ cells, exhibit no reproductive specialization. However, we follow Campbell (1974), Marques & Collins (2004), Bentlage et al. (2010), Morandini & Marques (2010), Straehler-Pohl & Toshino (2015) and Straehler-Pohl & Gul (2017) in using the term gonads to refer to areas where gametes are formed.

Results

Taxonomy

I use herein the currently accepted taxonomy in the interests of stability but I stand by my previous 2017 hierarchy (Straehler-Pohl 2017) confirmed solidly by results of another study (Straehler-Pohl, in review).

Due to the morphological analyses of this study I conclude that the Polynesian carybdeid populations from Nuku Hiwa and Mangareva belong to none of the eight currently accepted species (Acevedo et al. 2019) of the Carybdeidae but instead represents a new species, resulting in the following diagnosis:

*Phylum Cnidaria* Verrill, 1865
*Subphylum Medusozoa* Petersen, 1979
*Class Cubozoa* Werner, 1973
*Order Carybdeida* Gegenbaur, 1857
*Family Carybdeidae* Gegenbaur, 1857
*Genus Carybdea* Péron & Lesueur, 1810

*Carybdea irregularis* sp. nov

Original description

Bigelow, HB (1909) Reports on the scientific results of the expedition to the eastern tropical Pacific, in charge of Alexander Agassiz, by the U.S. Fish Commission Steamer "Albatross" from Oct. 1904 to March 1905, Lieut. Commander L.M. Garrett, U.S.N., commanding, XVI. The Medusae. Mem Mus Comp Zoology Harv Coll 37: 1–243.

Etymology: Latin (*irregularis*=irregular); the velarial canals of this species have no regular pattern as in other species that normally show a near mirror image of the pattern of one octant in the other octant of one quadrant of the velarium. Even if the pattern differs slightly from quadrant to quadrant, normally the complexity of all canals near the pedalium or of all canals near the frenulum are equal. But in *C. irregularis*, all canals differ in complexity and every octant shows a different canal pattern.

Synonyms

*Charybdea rastonii*: Bigelow. 1909: 17–20 (description of 3 specimens, comparison with other *Carybea* species), Plate 1 Fig. 4 (Photo of habitus), Plate 10 Figs. 1–7 (line drawings of habitus and anatomical features).

Type material

HOLOTYPE: Denmark: Natural History Museum of Denmark (NHMD), Copenhagen: French Polynesia, Marquesas, Nuku Hiva, Taiohae Bay (8°54.5’S, 140°05’W), Dana Exp. St. 3565, 1 female specimen with embryos (NHMD-195430), identified originally as "*Carybdea alata*", BH 20 mm, IPD 18 mm, PL 8 mm, PW 4 mm, collected by Dana Crew, 13 Oct 1928.

ALLOTYPE: Denmark: Natural History Museum of Den-
Fig. 1. Comparison of sketches (A, E, D, G, I, J, L) and a photo (B) by Bigelow (1909) of a carybdeid medusa sampled during the "Albatross" Expedition 1904–05 in Mangareva, the Gambier Islands (French Polynesia) with preserved carybdeid medusae (C, F, H, K, M) sampled during the "Dana" Expedition 1928–30 in Nuka Hiwa, the Marquesas (French Polynesia): A: Sketch of habitus (bell height 14 mm); B: Photo of habitus (bell height 14 mm), C: Habit of preserved specimen (bell height 15 mm); D: Sketch of diagonal section of bell at apex level; E: Sketch of longitudinal section of bell at apex level, note very short manubrium; F: Lateral view of apex of preserved specimen, note very short manubrium; G: Sketch of gastric phacellum, note thick, branched stems of filaments; H: Gastric phacellum of preserved specimen, note thick, branched stems (contracted state) of filaments; I: Sketch of longitudinal section of bell at rhopalial niche level, note single triangular covering scale hanging over rhopalium; J: Sketch of rhopalium, note 6 eyes (2 median, 2 lateral pit eyes and 2 lateral slit eyes); K: Lateral view of rhopalial niche with rhopalium; L: Sketch of diagonal section of bell at velarium level, note 4 simple velarial canals per quadrant; M: Quadrant of velarium, dotted lines mark 4 quite simple velarial canals: cv/vc: velarial canal; f/fr: frenulum; gp: gastric phacellum; M: manubrium; o1: single ocelli (median eyes); o2: paired ocelli (lateral eyes); oc: otocyst (statocyst); t: stump of tentacle
Table 1. Specimens from museum collections examined for this study.

| Collection | Code No. | No. specimens | Species identification* | Original identification | Sampling location*** | Collector | Sampling date |
|------------|----------|---------------|-------------------------|------------------------|----------------------|-----------|---------------|
| MZB        | 2015-1703| 5             | Carybdea arborea Maas, 1897* | Carybdea arborea Maas, 1897 | Kewalo Basin (Hawaii) (21°17′33.84″N, 157°51′27.71″W) | A. Yanagihara | 29 May 2013 |
| NHM        | 1903-A25.1| 1             | Carybdea arborea Maas, 1897 | Carybdea marsupialis (Linnaeus, 1758) | No sampling location, collection of Durban Museum (South Africa) | E.T. Brown beq. | Dec 1914 |
| NHM        | 2000-1800-1803| 4 | Carybdea branchi Gershw & Gibbons, 2009 | Carybdea rothsoneae (identified by Gershwin in 2009) | Simon’s Town Docks, False Bay, South Africa | Discovery Expedition | 17 Nov 1958 |
| MZB        | 2015-4807| 1             | Carybdea branchi Gershw & Gibbons, 2009 | Carybdea branchi Gershw & Gibbons, 2009 | South Africa, Hout Bay (34°03′4.8″S, 18°20′53.99″E), swimming at surface near pier | A.C. Morandini & S. N. Stampar | 05 May 2013 |
| MZB        | 2015-1704| 2             | Carybdea brevipedalia Kishinouye, 1891* | Carybdea brevipedalia Kishinouye, 1891 | Japan, Kamagawa, Aburatsubo (34°36′7.77″N 139°37′1.91″E) | S. Toshino | 24 Aug 2011 |
| NHM        | 2111.16.14| 3           | Carybdea brevipedalia Kishinouye, 1891 | Carybdea rastoni Haacke, 1887 | Japan, Osaka, Misaki (34°18′60″N, 135°08′60″E) | ?, collected for Exhibition | 1921 |
| CASIZ      | 197981   | 1             | Carybdea confusa Strahler-Pohl, Matsubato & Acevedo, 2017 | Carybdea marsupialis (Linnaeus, 1758) | California, Santa Barbara, 20 meters west of Goleta Pier (34°24′58″N, 119°49′43″W), 5 m depth | S. Anderson | 21 Oct 1998 |
| CASIZ      | 197982   | 2             | Carybdea confusa Strahler-Pohl, Matsubato & Acevedo, 2017 | Carybdea marsupialis (Linnaeus, 1758) | California, Santa Barbara, 20 meters west of Goleta Pier (34°24′58″N, 119°49′43″W), 5 m depth | S. Anderson | 21 Oct 1998 |
| NHMD       | 7/1.18   | 1             | Carybdea confusa Strahler-Pohl, Matsubato & Acevedo, 2017 | Carybdea rastoni Haacke, 1887 | California, San Diego, La Jolla, 5–10 foot scoop | Th. Mortensen’s Pacific Expedition 1914–1915 | 03 Sep 2015 |
| NHMD       | 195430   | 1             | Carybdea irregularis sp. nov.** | Carybdea alata Reynaud, 1830 | French Polynesia, Marquesas, Nuku Hiva, Taioha’e Bay (8°54′5′S, 140°05′W), Dana Exp. St. 3565 | Dana crew | 13 Oct 1928 |
| NHMD       | 195642   | 1             | Carybdea irregularis sp. nov.** | Carybdea alata Reynaud, 1830 | Same as holotype | Dana crew | 13 Oct 1928 |
| NHMD       | 195436   | 8             | Carybdea irregularis sp. nov.** | Carybdea alata Reynaud, 1830 | Same as holotype | Dana crew | 13 Oct 1928 |
| NHMD       | No ident no. yet | 5 | Carybdea irregularis sp. nov.** | Carybdea rastoni Haacke, 1887 | French Polynesia, Marquesas, Nuku Hiva, (8°52′S 140°08′W), trolled, 10 fathoms (18.288 m) | C. Crossland | 19 Jan 1925 |
| MZB        | 2015-1701| 1             | Carybdea marsupialis (Linnaeus, 1758)** | Carybdea marsupialis (Linnaeus, 1758) | Denia, Spain, between Racons-Molinel River (38°53′09″N, 00°02′14″E) and 2 km south of Denia harbour (38°50′55″N, 00°02′14″E) | M. J. Acevedo | 06 Oct 2010 |
| NHM        | 1972-5.24.1| 1             | Carybdea marsupialis (Linnaeus, 1758) | Carybdea marsupialis (Linnaeus, 1758) | South Italy, Gargano Peninsula, Bay of Campi (41.733 °N 15.750° E) | P.R. Laming | Oct 1971 |
| NHM        | 1997.768-781| 14 | Carybdea rastoni Haacke, 1887 | Carybdea rastoni Haacke 1887 | Australia, New South Wales, Cabbage Tree Bay (33°48′08″S, 151°17′58″E) | P.F.S. Cornelius | 18 Feb 1994 |
| NHMD       | 196.1906| 2             | Carybdea saymacana Conant, 1897 | Carybdea alata Reynaud, 1830 | West Indies, U.S. Vergin Islands, St. Croix, Off Christiansted (17.75′N, 64.75′W) | Th. Mortensen | Feb 1906 |
| NHMD       | 10-4-1912| 1             | Carybdea saymacana Conant, 1897 | Carybdea marsupialis (Linnaeus, 1758) | West Indies, U.S. Verigin Islands, St. Thomas, Great Bay (18°20′N, 64°55′W) | P.L. Kramp | Dec 1911 |
| NHMD       | 1-2-1949| 2             | Carybdea saymacana Conant, 1897 | Carybdea rastoni Haacke, 1887 | West coast of Columbia, Bahia octavia (6°45′00″N, 77°34′00″W) | E.M. Poulsen | 17 Nov 1948 |

* Identifications were done in 19 October 2017. ** Identifications were done in September 2016 during a Carybdea revision project (Acevedo et al. 2019). *** Some longitudes and latitudes were taken from http://latitude.to. CASIZ: California Academy of Sciences, San Francisco. NHM: Museum of Natural History, London. NHMD: Natural History Museum of Denmark, Copenhagen. MZB: Natural History Museum of Barcelona. USNM: Natural History Museum of the United States, Washington, D.C.
**Carybdea irregularis** sp. nov. from French Polynesia

**Introduction**

Small Carybdea with very short manubrium, single-rooted, multiple-stemmed, epaulette-shaped gastric phacellae, pedalial manubrial knee bend rounded without any appendage and 4 velarial canal roots/quadrant with slim, irregularly-shaped canals (simple, forked, dendritic, undulating shape, pointed, blunt—all in one animal possible), canals resembling another one.

**Description**

Bell: highly transparent, pyramidal to nearly cuboid (Figs. 1C, 2A, B), feeble mesogloea, no nematocyst warts could be detected in any specimen (might be rubbed off due to handling), apex domed with coronal constriction; bell size of preserved specimens: bell height up to 20 mm, bell width up to 20 mm (IPD).

Rhopalial niche: orifice heart-shaped (Fig. 2K); upper covering scale, triangular (Figs. 1I, 2K), approx. 1/4–1/5 of bell height up from margin; rhopalium with 6 eyes (2 major with lenses+2 lateral slit eyes+2 lateral pit eyes; Figs. 1I, J).

Pedalium: simple, unbranched, flattened, scalpel-shaped (Figs. 1A, B, 2I), approx. 1/2-2/3 bell height in length, situated in each interradial corner; outer wing/keel free of nematocyst warts (maybe rubbed off; Fig. 2I); inner wing free of nematocyst warts, not overhanging tentacle insertion; pedalial canal broad at base, flaring slightly below knee bend, staying the same breadth from knee bend towards tentacle insertion, slightly flaring at distal end, tentacle insertion same breadth as distal end of canal, going straight through pedalium, cross section ellipsoid, knee bend rounded without appendages (Fig. 2I, H); pedalium carries single, white to flesh-coloured, filiform tentacle (preserved specimens, Fig. 2J).

Velarium: free of nematocyst warts (maybe rubbed off); velarional canals, 4 roots per quadrant, 1 simple to slightly branched velarial canal per root; canals slim, slightly dendritic or lobate, giving an undulating apperance, tips rounded, blunt or sharp; canals in young/small specimens simple (Figs. 1A, L, M, 2N), canals in older/larger specimens more complex (Figs. 2m, L, O); canals beside frenulum or pedalium slim, irregularly shaped (simple, forked, dendritic, undulating shape, pointed, blunt, rounded—all in one animal possible (Fig. 2L)), no canal resembles another one, no mirror image of octants within one quadrant (Figs. 2L, M, O).

Manubrium: four-lobed, cruciform (Figs. 1L), without nematocyst warts, 1/5–1/6 bell height in length (Figs. 1C, E, F, 2D); stomach flat, shallow, communicating perradially with 4 gastric pockets. Gastric phacellae 4 in number, epaulette-shaped, mounted on four stomach corners, consisting of one circular root per quadrant, several long, flask-shaped, thick stems (when contracted) with several long branches with long unbranched filaments (Figs. 1G, H, 2E). Gonads: paired, narrow leaf (Figs. 1A–C, 2A, B, F) to butterfly-shaped (Fig. 2C), separated by perforated interradial septum, extending from stomach rim to pedalial base, tapering towards stomach rim and bell margin, lateral margins do not overlap; sexes separated but unimorph; ripe gonads milky whitish to flesh coloured (Fig. 2C).

**Nematocysts, stinging:** No data.

**Biology:** *Carybdea irregularis* inhabits the shallow waters of tropical French Polynesian Island reefs. No data about mating and brooding behaviour, and nothing known about life cycle. Up to now, *C. irregularis* sp. nov. is the smallest species of the genus *Carybdea*, maturing at a bell height of 15 mm.

**Distribution**

Oceania: French Polynesia: Marquesas, Nuku Hiva, (32°51′4″N, 117°16′0″W); Nuku Hiva, Taiohae Bay
Fig. 2. Comparison of anatomical structures of pedalial canal knee bend, velarial canals and gastric phacellae/filaments in species of the genus *Carybdea* (numbers indicate the velarial canal roots per octant): A–C: *Carybdea arborifera*; D–F: *Carybdea branchi*; G–I: *Carybdea brevipedalia*; J–L: *Carybdea confusa*; M–O: *Carybdea irregularis* sp. nov.; P–R: *Carybdea marsupialis*; S–U: *Carybdea rastonii*; V–X: *Carybdea xaymacana*.

(8°54.5′S, 140°05′W); Gambier Islands, Mangareva, Rikitea Harbor (23°07′03.0″S, 134°58′08.6″W) (Agassiz 1906, Bigelow 1909);

**Discussion**

**Morphological identification**

All species of the genus *Carybdea* (Table 1) were inspected and several similarities and distinct differences
in morphological structures concerning the French Polynesian Carybdea populations and other Carybdea species were detected.

The French Polynesian specimens possess just two velarial canal roots per octant (Figs. 1M, 2N, 3L–O), therefore, it was easy to exclude those species with more than two velarial canal roots per octant from the list of comparable species: the Mediterranean Carybdea marsupialis.
I. Straehler-pohl

(Linnaeus, 1758) (Claus 1878, Straehler-Pohl et al. 2017, Acevedo et al. 2019; Fig. 2Q) and *Carybdea brevipedalia* (Fig. 2H) from Japan. *C. brevipedalia* possesses horizontally linear gastric phacellae (Kishinouye 1891, Straehler-Pohl et al. 2017, Acevedo et al. 2019; Fig. 2I) instead of epaulette-shaped ones and peaked pedalial knee bends (Straehler-Pohl et al. 2017, Acevedo et al. 2019; Fig. 2G) instead of the rounded ones of the French Polynesian specimens. The French Polynesian specimens possess rounded pedalial canal knee bends (Figs. 2M, 3H, I) without any appendages, therefore, the next specimens to exclude from the species list were the African *Carybdea branchi* Ger.shwin & Gibbons, 2009, the Californian *Carybdea confusa* Straehler-Pohl, Matsumoto & Acevedo, 2017 and the

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Fig. 4. Type location of *Carybdea irregularis* (Nuku Hiva, Marquesas Islands, blue circle) and location of specimens collected and described by Bigelow (1909: Magareva, Gambier Islands, red circle), both in French Polynesia. Distance between both locations is 1676 km. (Map after L. Claudel: https://commons.wikimedia.org/w/index.php?curid=5005926)
Caribbean Carybdea xaymacana Conant, 1897 which all show slightly peaked to volcano-shaped knee bends (Gershwin & Gibbons 2009, Straehler-Pohl et al. 2017, Acevedo et al. 2019; Figs. 2D, J, V). Next to that, the velarial pattern in C. branichi is far too complex and its size is too large at up to 85 mm bell height (Gershwin & Gibbons 2009, Straehler-Pohl et al. 2017, Acevedo et al. 2019) compared to the 20 mm bell height in the mature French Polynesian medusae. Additionally, C. confusa and C. xaymacana possess both just one stem per gastric phacellum (Bigelow 1938, Straehler-Pohl et al. 2017, Acevedo et al. 2019; Figs. 2L, X) while the French Polynesian population shows multiple stems per phacellum (Figs. 1H, 2O, 3E). Carybdea rastonii can be excluded next as the gastric phacella are horizontally linear, like in C. brevipedalia instead of epaulette-shaped (Haacke 1887, Straehler-Pohl et al. 2017, Acevedo et al. 2019; Fig. 2U). Finally, Carybdea arborifera from Hawaii must be compared. It is by far the most similar species, as already mentioned by Bigelow (1909). Its mature size ranges between 15 to 35 mm, which includes the size range of the French Polynesian population (15 to 20 mm). The pedalial knee canal bend is rounded (Fig. 2A) like in the Polynesian medusae, it possesses two velarial canal roots per octant (Maas 1897, Straehler-Pohl et al. 2017, Acevedo et al. 2019; Fig. 2B) and its epaulette-shaped gastric phacella (Straehler-Pohl et al. 2017, Acevedo et al. 2019; Fig. 2C) consist of multiple stemmed filaments (Maas 1897, Straehler-Pohl et al. 2017, Acevedo et al. 2019; Fig. 2C) like in the Polynesian medusae, in general (Figs. 1H, M, 2N,O, 3L–O). Fine examination of the detailed structures was necessary. While the velarial canal roots in both species are narrow compared to other species (Fig. 2), the velarial canals flare to become broad in C. arborifera (Fig. 2B) while the canals taper to become slim in the Polynesian ones (Fig. 2N). Also the velarial canal pattern of octants within one quadrant in the Hawaiian specimens is mirror-imaged or symmetrical (Maas 1897; own observation) while the velarial canal pattern in the Polynesian specimens is completely irregular (Figs. 2N, 3L). The gastric phacella in C. arborifera consist of many short, slim stems (Fig. 2C1, arrow), with long, dendritic filaments attached (Maas 1897, Plate 14, Fig. 9) while the phacella in the Polynesian medusae consist of a few long, stout stems with short branches and 2–4, non-dendritic filaments attached per branch (Figs. 2O, 3E).

Mangareva specimens

The specimens from Mangareva were identified as Carybdea rastonii because during that time the distinguishing characters of carybdeids were not completely clarified (Bigelow 1909, 1938, Straehler-Pohl et al. 2017) and therefore, scientists during that time agreed that C. arborifera should be synonymised with C. rastonii because they were morphologically very similar and it was suggested that C. arborifera might be a younger stage of the adult stages of C. rastonii described by Haacke (1887) (Maas 1903, Mayer 1906, Bigelow 1909, 1938, Stiasny 1919, Thiel 1928, 1936, Kramp 1961). In Bigelow’s opinion (1909), the Mangareva specimens were assignable juveniles of C. rastonii because they were very small (BH: 9–14 mm, Bell diameter: 8–13 mm) and the gonads were not yet fully developed, in addition to the structure of the gastric phacellae being very similar to C. arborifera and also to the descriptions of juveniles of C. rastonii by Haacke (1887, Plate 35, Fig. 4). Furthermore, most of the velarial canals were very simple except for one slightly branched canal in the largest specimen of the Magareva specimens, as had also been described for juvenile specimens of C. rastonii by Haacke (1887). Bigelow (1909, p. 18) mentions that “It is true that branching of the canals appears to take place rather earlier in the Australian than in the Mangarevan specimens; but this slight difference, even if it proves to be constant, can hardly be considered anything more than a local peculiarity.” He also saw the difference in phacella structure (Mangareva medusae: “The filaments in each phacella (PI. 10, fig. 7) have become collected into three or four groups, each group arising from a distinct stalk. The filaments, furthermore, arise from the stalk at different levels, and some of them are apparently branched, so that they present a tree-like appearance”; C. arborifera: “phacellae were dendritic, all the filaments of each arising from a single stalk”, Bigelow 1909, p. 17–19) as “less important” and “to be no sufficient grounds for establishing a new species” (Bigelow 1909, p. 19). But as shown above, the structure of the velarial canal system and the gastric phacellla is essential information when distinguishing Carybdea species.

As shown in Fig. 1, the similarities of the specimens from Mangareva and the specimens from Nuku Hiva are far more, and more distinct, than the differences (smaller body size, simple velarial canals in Mangareva specimens) which are due to their immaturity, and can also be found in immature medusae from Nuku Hiva. Therefore, I conclude that the medusae from Mangareva and the ones from Nuku Hiva belong to the same species.

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