

## **An Illustrated Catalogue of Type Specimens from the H.M.S. *Challenger* Voyage in Castracane's Slide Collection in the Natural History Museum, London**

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**Abstract** Castracane's diatom collection from the H.M.S. Challenger voyage, housed in the Natural History Museum, London (BM), was examined for type slides. Of the 259 taxa described in his report, 17 type specimens have been discovered. Details of their type status and illustrations are provided.

**Key words:** Castracane, diatoms, H.M.S. Challenger, Type.

### **Introduction**

Francesco Saverio Castracane degli Antelminelli (1817–1899, referred to as Castrance; see TL2, volume 1, p. 469, 1976 and TL2, supplement 3, pp. 460–462, 1995 for details of Castracane's biographers, collections and major publications) described 259 taxa in his report on the diatoms collected on the H.M.S. Challenger voyage (Castracane 1886, see also Castracane 1887 [“1886”]), which are important for the taxonomy of marine diatoms (T-2 in CD).

The Castracane diatom collection in the Natural History Museum, London (BM) consists of 143 microscope slides (T-1 in CD). Roughly half of these slides consist of a single valve and/or a single species, with its name attached to the label. Twenty three slides have the annotation “n. sp.” indicating their possible holotype status. As there is no certainty of their status, the specimens below are considered as lectotypes. The remaining slides are strewn mounts with the annotation “Collections of H.M.S. Challenger” with longitude and latitude indicated or a place name.

No other slide collection exists of Castracane Challenger material. Some of the original material collected on the Challenger voyage is retained in the Mineralogy Department, Natural History Museum, London, and should be considered as isotype material.

### **Methods**

An Olympus BH2 microscope equipped with Zeiss objectives (40× and 63×) and Lumera CCD camera (LU135M) was used for the micrographs. The 40× was used as some of the slides in Castracane's collection have coverslips that are too thick for the use of the 63× lens.

## Results and Discussion

### a) *Valid species*

1. *Actinocyclus complanatus* Castracane, *Rep. Voy. Challenger, Diatom*, p. 145, *pl. iv. f. 9.* 1886.

Lectotype: BM33771a.

Locality from Castrance 1886: “In mari Japonico” [“... Sea of Japan”]

Locality from slide: “... Dredge...”

Figure: Pl. 1, figs 1a–b.

2. *Actinocyclus* (?) *denticulatus* Castracane, *Rep. Voy. Challenger, Diatom*, p. 146, *pl. iv. f. 5.* 1886.

Lectotype: BM33776.

Locality from Castrance 1886: “In mari Arafura, et fossilis as Richmond in Virginia” [“... Arafura Sea, and has been observed in a fossilized condition at Richmond, Virginia”]

Locality from slide: “Richmond earth”.

Figure: Pl. 2, figs 2a–c.

3. *Actinocyclus pruinosus* Castracane, *Rep. Voy. Challenger, Diatom*, p. 144, *pl. iv. f. 2.* 1886.

Lectotype: BM33772.

Locality from Castrance 1886: “In mari Pacifico” [“... in the Pacific Ocean...”]

Locality from slide: “Chall.[enger] trawl, lat. 34°, 37'N. long. 140°, 32'S”.

Figure: Pl. 1, figs 2a–b.

4. *Cestodiscus convexus* Castracane, *Rep. Voy. Challenger, Diatom*, p. 123, *pl. vii. f. 6.* 1886.

Lectotype: BM33780.

Locality from Castrance 1886: “In oceano Pacifico”

Locality from slide: “Chall.[enger] sound. 25.8.75.”

Figure: Pl. 4, figs 2a–c.

5. *Cestodiscus coronatus* Castracane, *Rep. Voy. Challenger, Diatom*, p. 124, *pl. vii. f. 9.* 1886.

Syntypes: BM 33781, BM33782.

Locality from Castrance 1886: “In mari Pacifico”

Locality from slide: BM 33781, “Chall.[enger] sound. 25.8.75.”; BM 33781, “Chall.[enger] trawl 2900<sup>th</sup>, lat. 24°, 42'N, long. 152°, 1' W”.

Figures: BM 33781: Pl. 4, figs 1a–d; BM33782: Pl. 3, figs 1a–d, 2a–d.

6. *Coscinodiscus denticulatus* Castracane, *Rep. Voy. Challenger, Diatom*, p. 155, *pl. iii. f. 8.* 1886.

Lectotype: BM33796.

Locality from Castrance 1886: “In mari Pacifico”

Locality from slide: “Dredge. Bay of Kerguelen, 4<sup>th</sup>.”

Figure: Pl. 9, figs 1a–b, 2–4.

7. *Coscinodiscus megacoccus* Castracane, *Rep. Voy. Challenger, Diatom*, p. 162, *pl. xvii. f. 2.* 1886.

Lectotype: BM33784.

Locality from Castrance 1886: "In Oceano Pacifico" [...Pacific Ocean...].

Locality from slide: "Philippines 785<sup>th</sup>. 2.11.74."

Figure: Pl. 5, figs 3a–c.

8. *Coscinodiscus reniformis* Castracane, *Rep. Voy. Challenger, Diatom*, p. 160, *pl. xii. f. 12.* 1886.

Lectotype: BM33797.

Locality from Castrance 1886: "... from different and widely separated localities".

Locality from slide: "Chall.[enger] Zebu 95<sup>th</sup>."

Figure: Pl. 10, figs 3a–b.

9. *Glyphodesmis challengerensis* Castracane, *Rep. Voy. Challenger, Diatom*, p. 44, *pl. xviii. f. 13.* 1886.

Lectotype: BM33794.

Locality from Castrance 1886: "... Ad mare Philippinarum".

Locality from slide: "200<sup>th</sup>. Sound Philippines."

Figure: Pl. 9, figs 7a–c.

10. *Glyphodesmis murrayana* Castracane, *Rep. Voy. Challenger, Diatom*, p. 43, *pl. xviii. f. 12.* 1886.

Holotype: BM33793.

Locality from Castrance 1886: "... Ad insulas Philippinas".

Locality from slide: "576<sup>th</sup> sound, 25/22 1/2, 25.1.75".

Figure: Pl. 10, figs 2a–b.

11. *Isthmia enervis* var. *japonica* Castracane, *Rep. Voy. Challenger, Diatom*, p. 96, *pl. xxv. f. 5.* 1886.

Lectotype: BM33812.

Locality from Castrance 1886: "... from the Sea of Japan...".

Locality from slide: "lat. 32°, 31'N, long. 135°, 29'E."

Figure: Pl. 10, figs 1a–e.

12. *Navicula janischii* Castracane, *Rep. Voy. Challenger, Diatom*, p. 29, *pl. xxx. f. 5.* 1886.

Lectotype: BM33808.

Locality from Castrance 1886: "... Ad insulas Bermudas".

Locality from slide: "Zebu 100<sup>th</sup> Challenger."

Figure: Pl. 9, figs 6a–b.

13. *Stictodiscus affinis* Castracane, *Rep. Voy. Challenger, Diatom*, p. 119, *pl. i. f. 4.* 1886.

Holotype: BM33787.

Locality from Castrance 1886: "... Ad Zebu in mari Philippinarum".

Locality from slide: "Chall. [enger] Zebu 100<sup>th</sup>"

Figure: Pl. 8, figs 1a–c.

14. *Stictodiscus affinis* var. *late-zonata* Castracane, *Rep. Voy. Challenger, Diatom*, p. 119. *pl.*

*xvii. f. 11.* 1886.

Lectotype: BM33788.

Locality from Castrance 1886: None

Locality from slide: “off Manila sea 100<sup>th</sup>. 2.11.74.”

Figures: Pl. 6, figs 1a–d, Pl. 7, figs 1a–c, 2a–b.

15. *Stictodiscus bicoronatus* Castracane, *Rep. Voy. Challenger, Diatom*, p. 120, *pl. vi. f. 5.* 1886.

Syntypes: BM33785, BM 33789.

Locality from Castrance 1886: “... Ad oras Japonicas”.

Locality from slide: BM 33785: “Chall.[enger] trawl, lat. 34°, 37’N. long 140°, 32’S”; BM 33789: “Chall.[enger] dredge Hyalnema ground 345<sup>th</sup>.”

Figures: BM 33785: Pl. 5, figs 2a–b; BM33789: Pl. 5, figs 1a–c.

16. *Stictodiscus elegans* Castracane, *Rep. Voy. Challenger, Diatom*, p. 121, *pl. xii. f. 3.* 1886.

Holotype: BM33786.

Locality from Castrance 1886: “In mari Japonico”

Locality from slide: “Chall.[enger] trawl, 14.4.75”.

Figure: Pl. 8, figs 2a–c.

17. *Stictodiscus margaritaceus* Castracane, *Rep. Voy. Challenger, Diatom*, p. 120, *pl. xvii. f. 12.* 1886.

Holotype: BM33783.

Locality from Castrance 1886: “As insulas Philippinas”

Locality from slide: “Philippines 705<sup>th</sup>. 2.11.74”

Figure: Pl. 6, figs 2a–b.

*b) Invalid species*

1. *Actinocyclus decipiens* Castracane ex Rattray *nom. nud.*

Specimen: BM33775.

Locality from slide: “Surface net, Arafura sea, Challenger.”

Rattray (1890, p. 146) notes this taxon as a synonym of *A. subocellatus*; he provides no description. The name has never been validly published.

Figure: Plate 1, figs 3a–c.

2. *Odontodiscus trochos* Castracane, *nom. herb.*

Slide: BM33778.

Locality from slide: “Chall.[enger] sound 25.8.75”

Figure: Plate 2, figs 1a–c.

3. *Odontodiscus parmula* Castracane, *nom. herb.*

Slide: BM33779.

Locality from slide: “Chall.[enger] sound 26.8.75”

Figure: Plate 2, figs 3a–b.

4. *Navicula spectabilis* var. Castracane *nom. nud.*, *Rep. Voy. Challenger, Diatom*, p. 32, *pl. xviii.*

f. 9. 1886.

Slide: BM33807.

Locality from slide: "Zebu 95<sup>th</sup> Chall.[enger]"

Figure: Plate 9, fig. 5.

### References

Castracane, C. A. F., 1886. Report on the Diatomaceae collected by H. M. S. Challenger during the years 1873–1876. *Rep. Sci. Res. Voy. H. M. S. Challenger 1873–1876, Bot.*, **2**, 1–178, 30 pls.

Castracane, C. A. F., 1887 ("1886"). Le raccolte di Diatomee pelagiche del Challenger ... *Atti Accad. pont. Nuovi Lincei*, **39**: 231–239.

Rattray, J., 1890. A revision of the genus *Actinocyclus* Ehrb. *Jour. Quekett Microscopical Club, Ser. 2*, **4**: 137–212.

(Note: All the plates and other tables are prepared as the attachments in the CD at the back of the monograph.)