

# Annotated Catalogue of Recent Echinoderm Type Specimens in the Collection of the Zoologische Staatssammlung München

(Echinodermata)

By Michel Jangoux, Chantal De Ridder and Hubert Fechter

## Abstract

The Munich collection houses 335 type specimens of recent echinoderms representing 102 nominal species, 4 nominal subspecies and 14 varieties. Each species, subspecies or variety is presented (original name, current status, museum characteristic, brief bibliography, and eventual remarks).

## 1. Introduction

The echinoderm collection of the Munich Museum houses specimens from all over the world, being particularly rich in species originating from Japanese seas and the tropical Indo-West Pacific area. The collection was mainly built up by Ludwig Döderlein (1855–1936) who spent most of his professional life in Strasbourg as Director of the Zoological Museum and Professor of Zoology in the University. After the first world war, he and the echinoderm collection moved to Bavaria where he was nominated to the direction of the Zoological Museum of Munich until his retirement in 1927 (see JANGOUX 1986). Before to reach Strasbourg in 1883, Döderlein taught natural sciences for three years in the School of Medicine of Tokyo, Japan. That was the beginning of his interest for marine invertebrates, especially echinoderms (see DÖDERLEIN 1885, 1887, 1902 a, b, 1906 b, 1911).

Beside Döderlein's collection of Japanese echinoderms, the Munich Museum houses echinoderm specimens from many scientific expeditions such as the Semon Zoological Survey of Ambon and Thursday Island (see DÖDERLEIN 1896 a, b, 1898, 1902 c), the Deutsche Tiefsee-Expedition (Valdivia Expedition; see DÖDERLEIN 1901, 1905, 1906 a, 1912 a), the Siboga Expedition (see DÖDERLEIN 1907, 1917, 1921, 1935, 1936), the Doflein Expedition to Japan (see AUGUSTIN 1908, DÖDERLEIN 1911), the Schultze Zoological Survey in South Africa (see DÖDERLEIN 1910), the Michaelsen and Hartmeyer Zoological Survey in South West Australia (see DÖDERLEIN 1914), and the Deutsche Südpolar-Expedition (see DÖDERLEIN 1927 b). It also includes some specimens from the collection of the Würzburg Institute of Zoology that were studied either by Semper or by Ludwig (see SEMPER 1868, LUDWIG 1875), as well as part of the echinoderm collection of the Meteor Expedition (see FECHTER 1973, BARTSCH 1983 a, b).

The echinoderm collection of Munich was never revised. On the whole it houses 335 type specimens representing 102 nominal species, 4 nominal subspecies and 14 varieties of recent echinoderms, viz. 5 species of crinoids (24 type specimens), 16 species and one variety of holothuroids (27 type specimens), 36 species and 8 varieties of echinoids (169 type specimens), 14 species, 3 subspecies and 5 varieties of asteroids (42 type specimens), and 31 species and one subspecies of ophiuroids (73 type specimens).

## 2. Catalogue of nominal species

The five classes of recent echinoderms are considered successively. Within each class species are presented according to the alphabetic order of the specific names used in the original descriptions. Main bibliographical references and actual status are given for each species. Other informations are the reference numbers of the type specimens, the number of syntypes, the mode of preservation (dry or alcohol-preserved), and the origin of the specimens (type locality and/or collector).

### 2.1 Crinoidea

The Munich collection houses type specimens of 5 nominal species of crinoids. They were all collected by scientific expeditions (Valdivia Expedition: types of 2 species; Siboga Expedition: types of 1 species; Albatross Expedition: type of 1 species; Meteor Expedition: types of 2 species).

**asper**, *Teliocrinus* Döderlein, 1912: 22, textfig. 8, pl. 9 figs 3–6, pl. 10 figs 1–5, pl. 11 figs 1–2.

= *Teliocrinus springeri* (A. H. Clark, 1909); see RASMUSSEN & SIEVERTS-DORECK 1978: T860.

Type specimen: ref. 44/1, 1 syntype (alcohol), Valdivia Expedition, station 190, 0°39' S – 98°52' E, 750 m.

Remark: *T. asper* (= *T. springeri*) is the type species of the genus *Teliocrinus*.

**meteorensis**, *Cyathidium* Fechter, 1973: 162, textfigs 1–2d.

= *Cyathidium foresti* Cherbonnier & Guille, 1972: 2193, pl. 1; see A. M. CLARK 1980: 209.

Type specimen: ref. 585/1, holotype (alcohol), Meteor Expedition, station 178, 29°57'.9 N – 28°15'.7 W, 690–610 m.

**monticola**, *Meteorometra* A. M. Clark, 1980: 200, textfig. 4.

Type specimens: ref. 717/1, holotype (alcohol), Meteor Expedition, Cruise 19 station 157 KT 115, 29°55'.5 N – 28°30' W, 292–297 m; ref. 717/2, 4 paratypes (alcohol), same origin; ref. 717/3, 6 paratypes (alcohol), Meteor Expedition, Cruise 9c station 180a AT 77, 30°01'.1 N – 28°24' W, 315–320 m.

Remark: *M. monticola* is the type species of the genus *Meteorometra*.

**nodipes**, *Bathycrinus* Döderlein, 1907: 9, textfigs 2a–d & 3, pl. 1 figs 2–4, pl. 3 figs 1–2, pl. 4 figs 1–5, pl. 5 figs 1–4, pl. 6 figs 1–3.

Type specimens: ref. 9/1, 3 syntypes (alcohol), Siboga Expedition, station 211, 5°40'.7 S – 120°45'.5 E, 1158 m.

**robustus**, *Rhizocrinus* A. H. Clark, 1909: 675.

Type specimen: ref. 41/1, 1 syntype (alcohol; fragment), Albatross Expedition, station 2401, 28°38'30'' N – 85°52'30'' W (Gulf of Mexico), 142 fathoms.

**valdiviae**, *Oceanometra* A. M. Clark, 1967: 153, textfig. 1.

Type specimens: ref. 36/1, holotype and 7 paratypes (alcohol), Valdivia Expedition, station 257, 1°48' N – 45°42' E (off Somalia), 1644 m.

### 2.2 Holothuroidea

The Munich collection houses type specimens of 16 nominal species and 1 nominal variety of holothuroids. All were collected by individual naturalists, mostly by Doflein and Semper. They originate

from Japan (types of 8 species and 1 variety), Australia (types of 3 species), Philippines (types of 2 species), Pacific Islands (Palao and Samoa: types of 2 species), Mozambique (type of 1 species), and Chile (type of 1 species).

**africana**, *Cucumaria* Semper, 1868: 53 & 270, pl. 15 fig. 16.

= *Afrocucumis africana* (Semper, 1868); see HEDING & PANNING 1954: 109, textfigs 39a–b; A. M. CLARK & ROWE 1971: 182.

Type specimen: ref. 52/1, 1 syntype (alcohol), Mozambique (Querimba?).

**asper**, *Psolus* Augustin, 1908: 30, textfig. 20, pl. 2 fig. 4.

= *Psolus squamatus* (Koren, 1844); see OHSHIMA 1915: 280; EKMAN 1923: 55, textfigs 36–37.

Type specimen: ref. 110/1, 1 syntype (alcohol), Okinose Bank (Japan), ? 750 m, coll. Doflein.

**australis**, *Colochirus* Ludwig, 1875: 88; see also PANNING 1949: 441, textfigs 39–40.

Type specimens: ref. 53/1, 2 syntypes (alcohol), Sydney.

**depressus**, *Stichopus* Augustin, 1908: 11, textfigs 8–9, pl. 1 fig. 4.

= *Parastichopus nigripunctatus* (Augustin, 1908); see OHSHIMA 1915: 248, pl. 9 figs 13a–b; H. L. CLARK 1922: 46, 47.

Type specimen: ref. 115/1, holotype (alcohol), 35°13'40'' N – 139°31'40'' E (Sagami Bay, Japan), 200 m, coll. Doflein.

**discrepans**, *Holothuria* Semper, 1868: 251, pl. 40 fig. 17; see also PEARSON 1913: 84, pl. 12 fig. 20; A. M. CLARK & ROWE 1971: 178 (in subgenus *Stauropora*).

Type specimen: ref. 75/1, 1 syntype (alcohol), Samoa.

**dofleinii**, *Holothuria* Augustin, 1908: 4, textfigs 1–3, pl. 1 fig. 1.

= *Holothuria (Mertensiothuria) pervicax* Selenka, 1867; see PANNING 1936: 6, textfig. 109 (as *H. curiosa* var. *pervicax*); A. M. CLARK & ROWE 1971: 176.

Type specimens: ref. 76/1, 1 syntype (alcohol), Enoshima (Sagami Bay), coll. Doflein; ref. 76/2, 1 syntype (alcohol), Hatsushima (Sagami Bay), 150 m, coll. Haberer.

**exigua**, *Cucumaria* Ludwig, 1875: 84, pl. 6 figs 11a–c.

= *Eupentacta exigua* (Ludwig, 1875); see PANNING 1949: 458, textfig. 54

Type specimens: ref. 56/1, 2 syntypes (alcohol), Chile.

**flavomaculata**, *Holothuria* Semper, 1868: 80, pl. 6; see also A. M. CLARK & ROWE 1971: 178.

Type specimen: ref. 78/1, 1 syntype (alcohol), Palao Islands.

**inflatum**, *Ankyroderma* Augustin, 1908: 33, textfig. 21, pl. 2 fig. 5.

Type specimen: ref. 47/1, holotype (alcohol), Sagami Bay, 600 m, coll. Doflein.

Remark: actual status unknown.

**mitsukurii**, *Psolidium* Augustin, 1908: 29, pl. 2 fig. 3.

Type specimen: ref. 108/1, holotype (alcohol), Uraga Strait (Japan), coll. Doflein.

Remark: actual status unknown.

**multipes**, *Thyone* Augustin, 1908: 27, textfig. 19, pl. 2 fig. 2; see also OHSHIMA 1915: 268.

Type specimens: ref. 121/1, 5 syntypes (alcohol), Uraga Strait (Japan), 350 m, coll. Doflein; ref. 121/2, 1 syntype (alcohol), Kotawa (Sagami Bay), 180 m, coll. Doflein.

**nigripunctatus**, *Stichopus* Augustin, 1908: 7, textfig. 5, pl. 1 fig. 2.

= *Parastichopus nigripunctatus* (Augustin, 1908); see H. L. CLARK 1922: 46, 47.

Type specimen: ref. 115/1, holotype (alcohol), Enoshima (Sagami Bay), 200 m, coll. Doflein.

**reticulata**, *Synapta* Semper, 1868: 13, pl. 4 figs 4–5, pl. 5 figs 12 & 23, pl. 6 fig. 9.

= *Synaptula reticulata* (Semper, 1868); see HEDING 1928: 191; A. M. CLARK & ROWE 1971: 188.

Type specimen: ref. 119/1, 1 syntype (alcohol), Bohol (Philippines), coll. Semper.

**sagamiensis** var. **alba**, *Stichopus* Augustin, 1908: 10, textfig. 7, pl. 1 fig. 3.

Type specimen: ref. 118/1, holotype (alcohol), Misaki (Sagami Bay), 180 m, coll. Doflein.

Remark: Status unclear; a Synallactidae according to H. L. CLARK (1922: 47).

**schmeltzii**, *Thyonidium* Ludwig, 1875: 94

= *Cladolabes schmeltzi* (Ludwig, 1875); see HEDING & PANNING 1954: 126, textfig. 54.

Type specimen: ref. 106/1, 1 syntype (alcohol), Gulf of St Vincent (Australia), coll. Mus. Godeffroy.

**tegulata**, *Cucumaria* Augustin, 1908: 24, textfigs 16–17.

Type specimen: ref. 64/1, holotype (alcohol), Uraga Strait (Japan), 180 m, coll. Doflein.

Remark: actual status unknown.

**typicus**, *Actinocucumis* Ludwig, 1875: 91, pl. 7 figs 24 a–d; see also HEDING & PANNING 1954: 72, textfigs 19–20.

Type specimens: ref. 46/1, 2 syntypes (alcohol), Bowen (Australia), coll. Dietrich (Mus. Godeffroy).

Remark: *A. typicus* is the type species of the genus *Actinocucumis*.

**versicolor**, *Cucumaria* Semper, 1868: 49, pl. 12 fig. 4, pl. 13 fig. 11, pl. 14 fig. 8; see also PANNING 1949: 460, textfig. 56 (as *Pentathyone versicolor*).

= *Havelockia versicolor* (Semper, 1868); see A. M. CLARK & ROWE 1971: 180.

Type specimen: ref. 65/1, 1 syntype (alcohol), Bohol (Philippines).

### 2.3 Echinoidea

The Munich collection houses type specimens of 36 nominal species and 8 nominal varieties of echinoids. They were collected either by scientific expeditions (Valdivia Expedition: types of 8 species and 5 varieties; Deutsche Südpolar-Expedition: types of 3 species; Hamburger Expedition to South West Australia: types of 3 species; Vettor Pisani Expedition: types of 2 species; Danish Ingolf Expedition: type of 1 species), or by individual naturalists (Japan: types of 21 species; coast of Sachaline: types of 1 variety; Red Sea: types of 1 variety; Thursday Island, N. Australia: types of 1 variety).

**aethiopicum**, *Hygrosoma* Döderlein, 1905: 621; see also DÖDERLEIN 1906a: 141, textfig. 24, pl. 36 figs 1–4, pl. 39 fig. 2.

= *Hygrosoma hoplacantha* (Wyville Thompson, 1877); see MORTENSEN 1935: 208, pl. 18 fig. 1, pl. 19 fig. 1, pl. 20 figs 1–2, pl. 78 fig. 2.

Type specimens: ref. 176/1, 3 syntypes (alcohol), Valdivia Expedition, station 246, 5°24' S – 39°20' E, 818 m; ref. 176/2, 3 syntypes (alcohol), Valdivia Expedition, station 247, 3°39' S – 40°16' E, 863 m.

**agassizi**, *Brissus* Döderlein, 1885: 36; see also MORTENSEN 1951: 520, pl. 33 fig. 7, pl. 34 fig. 2, pl. 35 figs 1 & 6–8, pl. 62 figs 9–10, 12, 16–21 & 23–28.

Type specimens: ref. 681/1, 2 syntypes (dry), Enoshima (Sagami Bay), coll. Herbst.

**agulhensis**, *Paracentrotus* Döderlein, 1905: 623; see also DÖDERLEIN 1906a: 207, pl. 27 figs 1–4, pl. 35 fig. 17, pl. 47 fig. 1.

= *Polyechinus agulhensis* (Döderlein, 1905); see MORTENSEN 1943: 118, pl. 17 figs 4–5, pl. 21 figs 1–8, pl. 57 figs 16 & 21–28.

Type specimens: ref. 195/1, 22 syntypes (10 alcohol, 12 dry), Valdivia Expedition, station 103, 35°10' S – 23°02' E, 500 m.

**antarctica**, *Aporocidaris* Mortensen, 1909: 25, pl. 3 figs 5 & 7, pl. 5 figs 2 & 9–11, pl. 7 figs 4–5, pl. 10 figs 6 & 9, pl. 11 fig. 10, pl. 13 figs 3 & 6, pl. 14 fig. 16, pl. 15 figs 8, 12–13, 16 & 24–28, pl. 16 fig. 15; see also MORTENSEN 1928: 116.

Type specimens: ref. 601/1, 2 syntypes (dry), Deutsche Südpolar-Expedition, station unknown, ca. 65° S – 80° to 90° E, 2450–3486 m.

**biserialis**, *Stephanocidaris* Döderlein, 1885: 79.

= *Goniocidaris biserialis* (Döderlein, 1885); see MORTENSEN 1928: 173, pl. 14 figs 12–20, pl. 78 figs 29–30.

Type specimens: 167/4, 3 syntypes (dry), Enoshima (Sagami Bay), coll. Fischern.

**capensis**, *Spatangus* Döderlein, 1905: 624; see also DÖDERLEIN 1906a: 261, pl. 33 fig. 1, pl. 48 fig. 4; MORTENSEN 1951: 16, pl. 1 figs 1–3.

Type specimens: ref. 584/1, 3 syntypes (1 alcohol, 2 dry), Valdivia Expedition, station 114, 34°20' S – 18°36' E, 70 m.

**chuni**, *Palaeolampas* Döderlein, 1905: 624; see also DÖDERLEIN 1906a: 239, pl. 30 figs 3–4; MORTENSEN 1948: 296.

Type specimens: ref. 578/1, 2 syntypes (alcohol), Valdivia Expedition, station 192, 0°43' S – 98°34' E, 371 m.

**clypeus**, *Clypeaster* Döderlein, 1885: 100.

= *Clypeaster japonicus* var. *clypeus* Döderlein, 1885; see MORTENSEN 1948: 99 & 101, pl. 31 fig. 1, pl. 34 figs 4 & 6–7, pl. 35 fig. 2, pl. 42 fig. 3, pl. 67 figs 1–2 & 9–10.

Type specimen: ref. 653/1, holotype (dry), Kagoshima Bay, coll. Döderlein.

**decorum**, *Temnotrema* Döderlein, 1914: 459.

= *Temnotrema elegans* Mortensen, 1918; see MORTENSEN 1943: 254 & 259, pl. 19 figs 9–11, pl. 45 fig. 6.

Type specimen: ref. 243/1, 1 syntype (dry).

Remark: Formally Döderlein's name should have priority but Döderlein did not describe nor illustrate his specimen which was showed by MORTENSEN (1943) to be similar to *T. elegans* Mortensen, 1918. Whatever, *T. elegans* is very closely related to *Temnotrema bothryoides* (L. Agassiz & Desor, 1846) and MORTENSEN (1943) reported "that it may be questionable whether it is more than a West Australian race or variety of the N. and E. Australian *bothryoides*".

**droebachiensis** var. **sachalinica**, *Strongylocentrotus* Döderlein, 1906b: 517.

= *Strongylocentrotus sachalinicus* Döderlein, 1906b; see MORTENSEN 1943: 215, pl. 25 figs 15–22, pl. 59 figs 11 & 13–24.

Type specimens: ref. 649/1, 2 syntypes (dry), Bay of Terpenje (S. E. coast of Sachaline), Brashnikow coll.

**elegans**, *Toxopneustes* Döderlein, 1885: 99; see also MORTENSEN 1943: 485, pl. 28 figs 3–4, pl. 31 figs 6–8, pl. 54 fig. 12.

Type specimens: ref. 241/1, 12 syntypes (1 alcohol, 11 dry), Kagoshima, ca. 10 fathoms, coll. Döderlein.

**fudsiyama**, *Laganum* Döderlein, 1885: 104; see also MORTENSEN 1948: 338, pl. 54 figs 5–6 & 10–13, pl. 79 figs 8–9 & 14–15.

Type specimens: ref. 179/1, 2 syntypes (1 alcohol, 1 dry), Sagami Bay, 120–200 fathoms.

**galapagensis**, *Cidaris* (*Eucidaris*) Döderlein, 1887: 20, pl. 9 figs 3a–3d, pl. 10 figs 1–14.

= *Eucidaris thouarsii* var. *galapagensis* Döderlein, 1887; see MORTENSEN 1928: 399, pl. 42 fig. 13, pl. 86 figs 8–10.

Type specimens: ref. 566/1, 5 syntypes (dry), Vettor Pisani Expedition, between Floreana and Chatham (Galapagos), 30 m.

**gaussensi**, *Notocidaris* Mortensen, 1909: 18, pl. 1 figs 1–2, pl. 2 figs 1–2, pl. 5 figs 13–16 & 19–21, pl. 7 fig. 2, pl. 10 figs 5 & 8, pl. 11 fig. 3, pl. 13 fig. 1, pl. 14 figs 2, 4, 10 & 15, pl. 15 fig. 10, pl. 16 fig. 14, pl. 18 figs 9–11, 14 & 17–18; see also MORTENSEN 1928: 134.

Type specimen: 601/1, 1 syntype (dry), Deutsche Südpolar-Expedition, Gauss-station, 350–385 m.

Remark: specimen figured by MORTENSEN (1909, pl. 2 fig. 2).

**hirsutus**, *Echinus* Döderlein 1905: 623.

= *Echinus gilchristi* Bell 1904; see DÖDERLEIN 1906a: 213, pl. 26 figs 1–5, pl. 35 figs 10 & 14, pl. 46 fig. 9 (as *E. gilchristi* var. *hirsuta*); MORTENSEN 1943: 57, pl. 15 figs 7–12, pl. 16 figs 1–9, pl. 55 figs 14, 16, 20 & 26–27.

Type specimens: ref. 163/1, 7 syntypes (1 alcohol, 6 dry), Valdivia Expedition, station 103, 35°11' S – 23°2' E, 500 m.

**grandis**, *Dorocidaris* Döderlein, 1885: 77.

= *Stereocidaris grandis* (Döderlein, 1885); see DÖDERLEIN 1887: 3, pl. 1 figs 1–6, pl. 2 figs 1–11, pl. 8 2a–2m; MORTENSEN 1928: 233, pl. 18 figs 4–6, pl. 19 figs 1–3, pl. 70 figs 1–2, pl. 80 fig. 35.

Type specimens: ref. 607/1, 3 syntypes (dry), Sagami Bay, 100 m, coll. Döderlein.

**indica** var. **africana**, *Stereocidaris* Döderlein, 1901: 20; see also DÖDERLEIN 1906a: 109, pl. 11 figs 1–2, pl. 12 fig. 3, pl. 36 fig. 5, pl. 37 fig. 6.

= *Stereocidaris indica* Döderlein, 1901; see MORTENSEN 1928: 263, pl. 25 fig. 1, pl. 71 figs 4–5, pl. 81 figs 15–20.

Type specimens: ref. 221/3, 2 syntypes (1 alcohol, 1 dry), Valdivia Expedition, station 259, 2°58' N – 46°6' E, 1289 m.

**indica** var. **capensis**, *Stereocidaris* Döderlein, 1901: 19.

= *Stereocidaris capensis* Döderlein, 1901; see DÖDERLEIN 1906a: 110, pl. 10 figs 3–6, pl. 12 fig. 2, pl. 36 fig. 4, pl. 37 fig. 1; MORTENSEN 1928: 269, pl. 71 fig. 1.

Type specimens: ref. 605/1, 4 syntypes (dry), Valdivia Expedition, station 103, 35°10' S – 23°2' E, 500 m.

**indica** var. **carinata**, *Stereocidaris* Döderlein, 1901: 20; see also DÖDERLEIN 1906a: 108, pl. 11 figs 3–5, pl. 12 figs 7–10, pl. 36 figs 6–8, pl. 37 figs 2–4.

= *Stereocidaris indica* Döderlein, 1901; see MORTENSEN 1928: 263, pl. 25 fig. 1, pl. 71 figs 4–5, pl. 81 figs 15–20. Type specimens: ref. 221/1, 3 syntypes (alcohol), Valdivia Expedition, station 264, 6°18' N – 49°32' E, 1079 m; ref. 221/5, 1 syntype (dry), Valdivia Expedition, station 256, 1°49' N – 45°29' E, 1134 m; ref. 221/6, 1 syntype (dry), Valdivia Expedition, station 252, 0°24' S – 42°49' E, 1019 m; ref. 221/7, 1 syntype (dry), same origin as 221/1.

**indica** var. **integra**, *Stereocidaris* Döderlein, 1901: 20; see also DÖDERLEIN 1906a: 105, pl. 10 figs 1–2, pl. 12 figs 4–6, pl. 36 fig. 9, pl. 37 fig. 5.

= *Stereocidaris indica* Döderlein, 1901; see MORTENSEN 1928: 263, pl. 25 fig. 1, pl. 71 figs 4–5, pl. 81 figs 15–20. Type specimens: ref. 221/2, 1 syntype (alcohol), Valdivia Expedition, station 262, 4°40' N – 48°39' E, 1242 m; ref. 221/4, 1 syntype (alcohol), same origin as 221/2.

**indica** var. **tricarinata**, *Stereocidaris* Döderlein, 1901: 20; see also DÖDERLEIN 1906a: 112, pl. 9 figs 1–3, pl. 10 fig. 7, pl. 12 fig. 1, pl. 36 figs 1–3 (as *Stereocidaris tricarinata*).

= *Stereocidaris alcocki* (Anderson, 1894); see MORTENSEN 1928: 266, pl. 71 fig. 8, pl. 82 fig. 18. Type specimens: ref. 226/1, 2 syntypes (1 alcohol, 1 dry), Valdivia Expedition, station 199, 0°15' N – 98°4' E, 470 m.

**ingolfiana**, *Stereocidaris* Mortensen, 1903: 36, pl. 6 figs 1–5 & 11, pl. 8 figs 4, 10–11, 16, 19–21, 23, 26, 28–30 & 36, pl. 11 figs 12, 16–17, 23, 28, 30 & 32–33, pl. 16 fig. 1; see also MORTENSEN 1928: 267, pl. 27 figs 1–3, pl. 70 fig. 6.

Type specimen: ref. 218/1, 1 syntype (alcohol), Danish Ingolf Expedition, station 16, 65°28' N – 27°54' W, 250 fathoms.

**japonica**, *Dorocidaris* Döderlein, 1885: 76.

= *Stereocidaris japonica* (Döderlein, 1885); see DÖDERLEIN 1887: 6, pl. 3, pl. 8 figs 1 a–1 h (as *Cidaris* subgen. *Stereocidaris*); MORTENSEN 1928: 280, pl. 28 figs 1–10, pl. 70 fig. 9, pl. 82 figs 11–17.

Type specimens: ref. 224/2, 6 syntypes (dry), Sagami Bay, 100–160 fathoms, coll. Döderlein; ref. 224/3, 5 syntypes, Tango coast (Kioto), ca. 40 fathoms, coll. Döderlein.

**japonicus**, *Clypeaster* Döderlein, 1885: 100; see also MORTENSEN 1948: 99, pl. 31 fig. 1, pl. 34 figs 4 & 6–7, pl. 35 fig. 2, pl. 42 fig. 3, pl. 47 figs 1–2 & 9–10.

Type specimens: ref. 594/2, 4 syntypes (dry), Kadsiyama (Tokyo Bay), coll. Döderlein.

**leucoglobus**, *Amblypneustes* Döderlein, 1914: 463, pl. 9 figs 8–9; see also MORTENSEN 1943: 195, pl. 13 figs 29–30, pl. 48 figs 1, 8, 10 & 25.

Type specimen: ref. 631/1, 1 syntype (dry), Fremantle or Bunbury (S. W. Australia), on the beach.

**lucidus**, *Echinus* Döderlein, 1885: 97; see also MORTENSEN 1943: 74, pl. 3 figs 5–8, pl. 4 fig. 2, pl. 54 figs 14–17, 20–24, 28 & 30.

Type specimen: ref. 645/1, holotype (dry), Enoshima (Sagami Bay), 100–200 fathoms.

**michaelseni**, *Salmacis* Döderlein, 1914: 454, textfig. 1.

= *Temnopleurus michaelseni* (Döderlein, 1914); see MORTENSEN 1943: 105, pl. 3 figs 4–5 & 13–15, pl. 45 figs 19, 25–26 & 29–31.

Type specimens: ref. 236/1, 2 syntypes (alcohol), Oyster Harbor (Albany District, S. W. Australia), 1–6 m; ref. 236/2, 1 syntype (alcohol), Koombana Bay (Bunbury District, S. W. Australia), 14–18 m; ref. 236/3, 1 syntype

(alcohol), Mouth of Swan River (Fremantle District, S. W. Australia), 3 m; ref. 236/4, 2 syntypes (alcohol), Cockburn Sound (Fremantle District, S. W. Australia), 14–18 m; ref. 236/5, 2 syntypes (alcohol), Warnbro Sound (Fremantle District, S. W. Australia), 12–14 m; ref. 236/6, 2 syntypes (alcohol), Fremantle district (S. W. Australia).

**mikado, *Discocidaris* (*Cidaris*) Döderlein, 1885: 80.**

= *Goniocidaris mikado* (Döderlein, 1885); see MORTENSEN 1928: 178, pl. 14 figs 1–11, pl. 69 fig. 16, pl. 79 figs 7–8.

Type specimens: ref. 168/4, 2 syntypes (alcohol), Sagami Bay, 200–500 m.

**molle, *Dermatodiadema* Döderlein, 1901: 22; see also DÖDERLEIN 1906: 160, pl. 20 figs 4–5, pl. 41 fig. 1.**

= *Plesiodiadema molle* (Döderlein, 1901); see MORTENSEN 1940: 34, pl. 63 figs 16–19.

Type specimens: ref. 142/1, 4 syntypes (alcohol), Valdivia Expedition, station 220, 1°57' S – 73°19' E, 2919 m.

**niasica, *Palaeopneustes* Döderlein, 1901: 22; see also DÖDERLEIN 1906a: 245, pl. 32 fig. 1, pl. 48 fig. 8.**

= *Heterobrissus niasicus* (Döderlein, 1901); see MORTENSEN 1950: 201, pl. 6 fig. 2, pl. 7 figs 3–4, pl. 8 fig. 3, pl. 22 figs 1, 5, 6, 14 & 20, pl. 23 figs 2, 3, 6, 9 & 16.

Type specimens: ref. 439/1, 2 syntypes (alcohol), Valdivia Expedition, station 199, 0°15' N – 98°4' E, 470 m.

**olivacea, *Salmacopsis* Döderlein, 1885: 93.**

= *Microcyphus olivaceus* (Döderlein, 1885); see MORTENSEN 1943: 163, pl. 19 figs 42–44, pl. 47 figs 6, 10, 14, 27 & 29.

Type specimen: ref. 630/1, 1 syntype (alcohol), Sagami Bay, 100–150 fathoms.

**pacifica, *Salenia* Döderlein, 1885: 84; see also DÖDERLEIN 1887: 52, pl. 11 figs 9–28.**

= *Salenocidaris pacifica* (Döderlein, 1885); see MORTENSEN 1935: 364, pl. 84 fig. 2, pl. 85 figs 22–23.

Type specimen: ref. 147/1, holotype (alcohol), Sagami Bay, 120 fathoms, coll. Döderlein.

**pellucida, *Peronella* Döderlein, 1885: 104; see also MORTENSEN 1948: 281, pl. 47 fig. 5, pl. 48 figs 3–4, pl. 72 figs 1 & 11.**

Type specimens: ref. 200/1, 3 syntypes (1 alcohol, 2 dry), Sagami Bay, ca. 100 fathoms.

**pitillaris var. *erythrea*, *Leiocidaris* Döderlein 1902: 694, pl. 59 fig. 5.**

= *Prionocidaris baculosa* (Lamarck, 1816); see MORTENSEN 1928: 437, pl. 45, pl. 46, pl. 47 figs 2–3, pl. 48 fig. 2, pl. 51 fig. 2, pl. 53 figs 3–11, pl. 55 fig. 2, pl. 57 figs 6–7, pl. 73 figs 13–16, pl. 87 figs 1–5 & 10–11.

Type specimens: ref. 204/4, 3 syntypes (dry), Assab (Red Sea), 10 m.

**rosea, *Rhopalocidaris* Mortensen, 1928: 68; see also MORTENSEN 1928: 220, pl. 17 figs 13–18, pl. 69 fig. 20, pl. 79 figs 18–22.**

Type specimen: ref. 609/1, 1 paratype (dry), Sagami Bay, 400 fathoms, coll. Mortensen.

**rotundata, *Linthia* Döderlein, 1906a: 249, pl. 29 figs 2–3, pl. 50 fig. 8.**

= *Paraster rotundatus* (Döderlein, 1906); see MORTENSEN 1951: 223

Type specimens: ref. 182/1, 7 syntypes (alcohol), Vettor Pisani Expedition, Chatham Island (Galapagos), 20 m.

**ruber, Pleurechinus** Döderlein, 1885: 92.

= *Temnotrema rubrum* (Döderlein, 1885); see MORTENSEN 1943: 252, pl. 19 fig. 12.  
Type specimen: ref. 686/1, 1 syntype (dry), Tokyo Bay, 20 fathoms.

**rubra, Peronella** Döderlein, 1885: 106; see also MORTENSEN 1948: 274, pl. 51 figs 23 & 29.

Type specimen: ref. 201/1, holotype (alcohol), Tagawa (Inland Sea, Japan), ca. 25 fathoms.

**sceptriferoides, Cidaris (Stereocidaris)** Döderlein, 1887: 5, pl. 2 figs 12–17, pl. 3 figs 3a–3e.

= *Stereocidaris sceptriferoides* Döderlein 1887; see MORTENSEN 1928: 274, pl. 29 figs 5–7, pl. 67 figs 1–3 & 13, pl. 70 fig. 12, pl. 81 figs 1–4.

Type specimen: ref. 280/1, holotype (alcohol), Japan, coll. Hilgendorf.

**sphaeroides var. belli, Salmacis** Döderlein, 1902: 76, pl. 64 figs 1–1c.

= *Salmacis belli* Döderlein, 1902; see MORTENSEN 1943: 120, pl. 8 figs 1–2 & 7–8, pl. 10 figs 11–12, pl. 46 figs 6, 7 & 17.

Type specimens: ref. 223/1, 3 syntypes (alcohol), Thursday Island, coll. Semon.

**triplopora, Rhynchocidaris** Mortensen, 1909: 6, pl. 3 figs 4 & 6, pl. 4 figs 1–4, pl. 5 figs 1 & 3–8, pl. 10 figs 2–3 & 10, pl. 11 figs 1–2, 4–7, 9 & 11, pl. 12, pl. 13 figs 4–5, 9–10, 12–16 & 18–20, pl. 14 figs 5, 8, 14 & 20, pl. 15 figs 3, 5–6, 9 & 11, pl. 16 figs 11–13; see also MORTENSEN 1928: 140

Type specimens: ref. 209/1, 4 syntypes (2 alcohol, 2 dry), Deutsche Südpolar-Expedition, Gauss-station, 350–385 m.

**valdiviae, Gymnopatagus** Döderlein, 1901: 23; see also DÖDERLEIN 1906a: 266, pl. 29 fig. 7, pl. 32 figs 2–3, pl. 48 fig. 7; MORTENSEN 1951: 447.

Type specimen: ref. 170/3, 1 syntype (dry), Valdivia Expedition, station 266, 6°44' N – 49°44' E, 741 m.

**variabilis, Pleurechinus** Döderlein, 1885: 90.

= *Opechinus variabilis* (Döderlein, 1885); see MORTENSEN 1943: 303, pl. 18 figs 35–36, pl. 50 figs 15, 18 & 22.  
Type specimen: ref. 194/2, 1 syntype (dry), Yogashama (Sagami Bay), 50–100 fathoms, coll. Döderlein.

**virescens, Clypeaster** Döderlein, 1885: 102; see also MORTENSEN 1948: 96, pl. 33 fig. 1, pl. 38 figs 1–5, pl. 40 figs 1 & 10, pl. 47 figs 5–7, 12–14, 20, 21 & 23, pl. 69 fig. 6.

Type specimens: ref. 132/1, 7 syntypes (1 alcohol, 6 dry), Sagami Bay, 40–100 fathoms, coll. Döderlein; ref. 132/2, 1 syntype (alcohol), Kagoshima Bay, 60 m, coll. Döderlein; ref. 132/3, 1 syntype (alcohol), Enoshima (Sagami Bay), coll. Döderlein.

## 2.4 Asteroidea

The Munich collection houses type specimens of 14 nominal species, 3 nominal subspecies and 5 nominal varieties of asteroids. They were collected either by scientific expeditions (Siboga Expedition: type of 1 subspecies; Deutsche Südpolar-Expedition: type of 1 species) or by individual naturalists (Japan: types of 4 species and 2 varieties; Australia: types of 3 species; Indonesia: types of 1 species and 1 variety; Brazil: type of 1 subspecies; Taiwan: type of 1 subspecies; Dahomey: types of 1 species; Samoa: type of 1 species; Barbados: type of 1 species; Mauritius: type of 1 variety; Philippines: types of 1 species; China Sea: type of 1 species; unknown origin: type of 1 variety).

**aspera**, *Anthenea* Döderlein, 1915: 35, pl. 4 figs 1–2; see also A. M. CLARK & ROWE 1971: 30 & 51.

Type specimens: ref. 248/1, 2 syntypes (alcohol), Australia.

**australiae**, *Anthenea* Döderlein, 1915: 52, pl. 9 figs 1–4, pl. 10 figs 1–3; see also A. M. CLARK & ROWE 1971: 32 & 51.

Type specimens: ref. 812/2, 1 syntype (dry), Fremantle Bay (S. W. Australia), coll. Michaelsen & Hartmeyer; ref. 812/3, 1 syntype (dry), Sharks Bay (S. W. Australia), coll. Michaelsen & Hartmeyer.

**brasiliensis riensis**, *Astropecten* Döderlein, 1917: 84, pl. 1 fig. 10, pl. 8 fig. 2

= *Astropecten riensis* Döderlein, 1917; see TOMMASI 1970: 6; WALENKAMP 1976: 37, textfigs 11 & 15, pl. 5 figs 1–3.

Type specimen: ref. 762/1, holotype (dry), Rio de Janeiro, ex. coll. Mus. Strassbourg.

**carcharicus formosanus**, *Astropecten* Döderlein, 1917: 141, pl. 6 fig. 12, pl. 13 figs 8–8a.

Type specimen: ref. 766/1, lectotype (dry), Takao (South coast of Taiwan), ex coll. Mus. Berlin.

Remark: Specimen figured by DÖDERLEIN (1917).

**dahomensis**, *Astropecten* Döderlein, 1917: 77, pl. 16 figs 3–3d.

= *Astropecten michaelseni* Koehler, 1914; see JOHN 1948: 502; CHERBONNIER & NATAF 1973: 1247, textfigs 2a–e & 3f–i, pl. 5.

Type specimens: ref. 769/1, 2 syntypes (dry), Dahomey, coll. Klinghardt.

**foraminatus**, *Goniodiscus* Döderlein, 1916: 415, textfig. A.

= *Goniodiscaster foraminatus* (Döderlein, 1916); see DÖDERLEIN 1935: 79, pl. 20 fig. 6, pl. 21 figs 5–5b; A. M. CLARK & ROWE 1971: 32 & 50.

Type specimens: ref. 820/1, 2 syntypes (dry), Freycinet (Sharks Bay, S. W. Australia).

**godeffroyi**, *Anthenea* Döderlein, 1915: 45, pl. 11 figs 1–2; see also A. M. CLARK & ROWE 1971: 32 & 52.

Type specimen: ref. 312/1, holotype (alcohol), Samoa, coll. Mus. Godeffroy.

**hartmeyeri**, *Asterina* Döderlein & Hartmeyer, 1910: 154; see also H. L. CLARK 1933: 27, pl. 3 figs a–b.

Type specimens: ref. 272/2, 6 syntypes, West coast of Barbados, coll. Kükenthal & Hartmeyer.

**kagochimensis** var. **kochianus**, *Astropecten* Döderlein, 1902b: 329; see also GOTO 1914: 185, pl. 4 figs 62–69.

Type specimen: ref. 284/1, holotype (alcohol), Kochi (Shikoku, Japan), coll. Döderlein.

Remark: Taxon of doubtful status: A variety of *A. kagochimensis* according to GOTO (1914); a subspecies of *Astropecten brasiliensis* (sic) according to DÖDERLEIN (1917: 85).

**mauritanus** var. **mascarena**, *Astropecten* Döderlein, 1917: 143, pl. 6 fig. 3, pl. 13 figs 2–2b.

= *Astropecten mauritanus* Gray, 1840; see JOHN 1948: 505, pl. 4 figs 3–4.

Type specimens: ref. 782/1, 2 syntypes (dry), Mauritius, coll. Robillard.

**mimicus malayanus**, *Pectinaster* Döderlein, 1921: 32, pl. 7 figs 1–5a, pl. 8 figs 2 & 4–9; see also A. M. CLARK 1981: 94 & 121.

Type specimen: ref. 796/1, 1 syntype (dry), Siboga Expedition, station 175, 2°38' S – 130°33' E (Ceram), 1914 m.

**mindanensis**, *Astropecten* Döderlein, 1917: 132, pl. 12 figs 2–2 a, pl. 17 figs 5–5 b, 6–6 a; see also A. M. CLARK & ROWE 1971: 30 & 44.

Type specimens: ref. 778/1, 3 syntypes (dry), Mindanao (Philippines), coll. Schneider.

**muricatus** var. **multispina**, *Oreaster* von Martens, 1866: 79.

= *Pentacaster multispinus* (von Martens, 1866); see DÖDERLEIN 1936: 336, pl. 24 fig. 12, pl. 26 figs 1–3; A. M. CLARK & ROWE 1971: 34 & 56.

Type specimen: ref. 853/1, 1 syntype (dry), Larentuka (Florès, Indonesia), ex coll. Mus. Berlin.

**nipon**, *Asterias* Döderlein, 1902b: 334.

= *Distolasterias nipon* (Döderlein, 1902); see FISHER 1928: 103, pl. 43 fig. 5, pl. 60 figs 2–2 a, pl. 81 fig. 8.

Type specimen: ref. 860/1, holotype (dry; 1 arm), N. E. coast of Kanto, coll. Döderlein.

**platyacanthus** var. **pedicellifera**, *Astropecten* Döderlein, 1917: 95, pl. 3 fig. 10, pl. 8 figs 12–12 a.

Type specimen: ref. 784/1, holotype (dry), origin unknown.

**pretiosum**, *Astrogonium* Döderlein 1902b: 326.

= *Dipsacaster pretiosus* (Döderlein, 1902); see DÖDERLEIN 1921: 21; HAYASHI 1973: 19, pl. 3 figs 2–3.

Type specimens: ref. 316/1, 7 syntypes (alcohol), Kadsiyama (Tokyo Bay: 20–30 m) and Sagami Bay (50–100 m), coll. Döderlein; ref. 316/5, 1 syntype (dry), Kadsiyama (Tokyo Bay), 20–30 m, coll. Döderlein.

**ritteri**, *Bunaster* Döderlein, 1896b: 317, pl. 22 figs 1–1 g; see also A. M. CLARK & ROWE 1971: 34 & 61, textfig. 15 f.

Type specimen: ref. 935/1, holotype (dry), Ambon, coll. Semon.

**sagaminus**, *Astropecten* Döderlein, 1917: 64, pl. 1 fig. 4, pl. 7 fig. 4.

= *Ctenopleura sagamina* (Döderlein, 1917); see HAYASHI 1973: 38, textfig. 1, pl. 6 figs 2–3.

Type specimen: ref. 788/1, holotype (dry), Sagami Bay, 600 m, coll. Doflein.

**satsumana**, *Asterias* Döderlein, 1902b: 334.

= *Sclerasterias satsumana* (Döderlein, 1902); see HAYASHI 1973: 100, pl. 1 fig. 2, pl. 16 fig. 6.

Type specimens: ref. 297/1, 2 syntypes (dry), Kagoshima Bay, 20 m, coll. Döderlein.

**sinicus**, *Astropecten* Döderlein, 1917: 64, pl. 16 figs 1–1 c.

Type specimen: ref. 789/1, holotype (dry), China Sea.

Remark: status unknown.

**submembranacea**, *Brisinga* Döderlein, 1927: 292, pl. 11 figs 2 a–2 b, pl. 12 fig. 2.

= *Brisingella submembranacea* (Döderlein, 1927); see A. M. CLARK 1962: 68.

Type specimen: ref. 272/2, 1 syntype (arm fragments in alcohol), Deutsche Südpolar-Expedition, 65°31' S – 85°14' E, 2450 m.

**volsellata** var. **sakurana**, *Asterias* Döderlein, 1902: 331.

= *Coronaster sakuranus* (Döderlein, 1902); see HAYASHI 1973: 98, textfig. 12, pl. 16 figs 4–5.

Type specimens: ref. 264/1, 2 syntypes (dry), Kagoshima Bay (Japan), ca. 40 m, coll. Döderlein.

## 2.5 Ophiuroidea

The Munich collection houses type specimens of 31 nominal species and 1 nominal subspecies of ophiuroids. They were collected either by scientific expeditions (Albatross Expedition: types of 5 species; Valdivia Expedition: types of 2 species and 1 subspecies; Deutsche Südpolar Expedition: types of 2 species; Siboga Expedition; type of 1 species; Meteor Expedition: types of 1 species) or by individual naturalists (Japan: types of 12 species; S. Africa: type of 2 species; Ambon: types of 2 species; W. Australia: type of 1 species; Tonga Islands: type of 1 species; Singapore: type of 1 species).

**cacaoticum**, *Astrophyton* Lyman, 1874: 250, pl. 6 figs. 1–3.

= *Astrogordius cacaoticus* (Lyman, 1874); see DÖDERLEIN 1911: 54 & 88; DÖDERLEIN 1927: 96.

Type specimen: ref. 451/1, paratype (alcohol; arm fragment), Guadeloupe, 20 fathoms.

Remark: *A. cacaoticus* is the type species of the genus *Astrogordius*.

**concava**, *Amphiophiura* Hertz, 1927 b: 76, textfig. 2, pl. 1 figs 11–13.

Type specimens: ref. 391/1, 12 syntypes (alcohol), Valdivia Expedition, station 251 (1°40' S – 41°47' E, 693 m) and station 254 (0°29' S – 42°47' E, 977 m).

**coniferum**, *Astrophyton* Döderlein, 1902 a: 325.

= *Astrocladus coniferus* (Döderlein, 1902); see DÖDERLEIN 1911: 46, pl. 2 figs 7–7a, pl. 4 figs 1–3 a, pl. 7 figs 5–6 a & 16; DÖDERLEIN 1912: 267, pl. 17 fig 5; DÖDERLEIN 1927: 94; Irimura 1982: 9, textfig. 5, pl. 1 fig. 3, pl. 4 figs 1–3.

Type specimen: ref. 453/1, 1 syntype (alcohol), Kagoshima Bay, ca. 30 m, coll. Döderlein.

**dofleini**, *Astrocladus* Döderlein, 1910: 256; see also DÖDERLEIN 1911: 41, textfig. 9, pl. 2 fig. 6, pl. 3 figs 1–4, pl. 4 figs 4–5, pl. 7 figs 15–15 b; DÖDERLEIN 1927: 35, pl. 3 figs 2–2 a.

= *Astrocladus coniferus* var. *dofleini* Döderlein, 1910; see IRIMURA 1982: 11, textfig. 6, pl. 4 figs 5–6.

Type specimens: ref. 440/1, 4 syntypes (alcohol), Okinose Bank (Sagami Bay), 250–600 m, coll. Doflein.

**dolichodactylus**, *Gorgonocephalus* Döderlein, 1911: 34, textfig. 6, pl. 1 figs 4–5, pl. 7 figs 3–4 b; see also DÖDERLEIN 1912: 264, pl. 16 fig. 2; DÖDERLEIN 1927: 27; BAKER 1980: 52, textfigs 18 a, 20 & 30.

Type specimens: ref. 462/1, 2 syntypes (dry), Yagoshima (Sagami Bay), 150 m, coll. Doflein.

**drygalskii**, *Ophiocamax* Hertz, 1927 a: 41, pl. 8 figs 3–5; see also MADSEN 1967: 127.

Type specimens: ref. 540/1, 6 syntypes (alcohol), Deutsche Südpolar-Expedition, 65°31' S – 85°14' E, 2450 m.

**elegans**, *Astrophyton* Koehler, 1905: 123, pl. 13 fig. 2, pl. 18 fig. 1.

= *Astroboa nuda* (Lyman, 1894); see DÖDERLEIN 1927: 45.

Type specimen: ref. 431/1, holotype (1 arm in alcohol), Siboga Expedition, station 305, Kampong Menanga (Solor Strait), 113 m.

**enoshimanum**, *Asteroschema* (*Ophiocreas*) Döderlein, 1911: 60, pl. 6 figs 8–8 a.

= *Ophiocreas japonicum* Koehler, 1907; see MATSUMOTO 1917: 51.

Type specimen: ref. 560/1, holotype (alcohol), Sagami Bay, coll. Doflein.

Remark: According to FELL (1960) the taxon *Ophiocreas* has a generic status.

**ernae, Astroboa** Döderlein, 1911: 82, pl. 9 figs 7–7a; see also DÖDERLEIN 1912: 270, pl. 17 fig. 6; DÖDERLEIN 1927: 38, pl. 5 fig. 3; BAKER 1980: 58, textfigs 28 & 33.

Type specimen: ref. 268/1, holotype (arm fragments in alcohol), Sharks Bay (W. Australia), 11–12 m, coll. Michaelsen & Hartmeyer.

**facunda muta, Ophiomusium** Hertz, 1927b: 103, pl. 2 fig. 16, pl. 3 figs 13–14.

Type specimens: ref. 515/1, 3 syntypes (alcohol), Valdivia Expedition, station 245, 0°29' S – 42°47' E, 977 m.

**globiferum, Astrophyton** Döderlein, 1902a: 324.

= *Astroboa globifera* (Döderlein, 1902); see DÖDERLEIN 1911: 51, textfigs 10a–10c, pl. 2 figs 8–9, pl. 7 figs 7–7a; DÖDERLEIN 1912: 269, pl. 16 figs 1–1b, pl. 18 fig. 8; DÖDERLEIN 1927: 94.

Type specimen: ref. 429/1, holotype (dry), Enoshima (Sagami Bay), 150–200 m, coll. Döderlein.

**glutinosus, Asteroschema (Ophiocreas)** Döderlein, 1911: 59, pl. 6 figs 5–5a, pl. 7 fig. 9; see also DÖDERLEIN 1927: 99.

= *Ophiocreas glutinosus* Döderlein, 1911; see remark.

Type specimen: ref. 422/1, 1 syntype (alcohol), Sagami Bay, coll. Doflein (specimen figured by DÖDERLEIN 1911, pl. 7 fig. 9).

Remark: According to FELL (1960) the taxon *Ophiocreas* has a generic status.

**gymnopora, Amphilepis** Hertz, 1927a: 26, textfigs 6–7, pl. 6 figs 1–2; see also CHERBONNIER 1962: 4.

Type specimen: ref. 504/1, 1 paratype (alcohol), Deutsche Südpolar-Expedition, 65°31' S – 85°14' E, 2450 m.

**japonicus, Gorgonocephalus** Döderlein, 1902a: 321; see also DÖDERLEIN 1911: 31, textfigs 5a–5d, pl. 1 figs 1–3, pl. 7 figs 1–2c.

= *Gorgonocephalus caryi* (Lyman, 1860); see H. L. CLARK 1911: 287; DÖDERLEIN 1927: 91.

Type specimen: ref. 464/1, 1 syntype (alcohol), W. of Yagashima (Sagami Bay), ca. 200 m, coll. Döderlein.

**koehleri, Asteroschema** Döderlein, 1898: 487, pl. 37 figs 5–5a; see also DÖDERLEIN 1911: 111.

Type specimen: ref. 424/1, 1 syntype (alcohol), Ambon, coll. Semon.

**leonis, Ophioderma** Döderlein, 1910: 252, pl. 5 figs 1–1a.

= *Ophioderma wahlbergi* Müller & Troschel, 1842; see A. M. CLARK and COURTMAN-STOCK 1976: 183 & 262, textfigs 276c–d.

Type specimens: ref. 525/1, 3 syntypes, Lüderitz Bay (S. Africa), coll. Schultze.

**ludwigi, Euryale** Döderlein, 1896: 299, pl. 7 figs 28–28c.

= *Astrocladus ludwigi* (Döderlein, 1896); see DÖDERLEIN 1911: 40, textfigs 8a–8d; DÖDERLEIN 1927: 33, pl. 3 figs 3–3b; BAKER 1980: 63, textfigs 28 & 30.

Type specimen: ref. 442/1, holotype (alcohol), Ambon, coll. Semon.

**luzonicus, Asteronyx** Döderlein, 1927: 64, pl. 7 figs 4–6d.

Type specimens: ref. 418/1, 3 syntypes (alcohol), Albatross Expedition, station 5114, 13°36'11'' N – 120°45'26'' E, 340 fathoms.

**meteoris**, *Ophiambix* Bartsch 1983 a: 97, textfigs 1–8.

Type specimens: ref. 753/1, holotype and 8 paratypes (alcohol), Meteor Expedition, station M3 30/AT3, 42°49'.8 N – 14°14'.8 W, 5315 m.

**mindanaensis**, *Astrothammus* Döderlein, 1927: 21, pl. 1 figs 2–2 c.

Type specimen: ref. 543/1, 1 syntype (alcohol), Albatross Expedition, station 5424, 9°37'05'' N – 121°12'37'' E, 340 fathoms.

**mindorensis**, *Asteroschema* (*Ophiocreas*) Döderlein, 1927: 74, pl. 10 figs 1–1 b.

= *Ophiocreas mindorensis* Döderlein, 1927; see remark.

Type specimen: ref. 425/1, 1 syntype (alcohol), Albatross Expedition, station 5367, 13°34'37'' N – 121°07'30'' E, 180 fathoms.

Remark: According to FELL (1960) the taxon *Ophiocreas* has a generic statute.

**minor**, *Ophiactis* Döderlein, 1910: 253, pl. 5 figs 3–3 a.

= *Amphipholis squamata* (Delle Chiaje, 1828); see A. M. CLARK and COURTMAN-STOCK 1976: 151.

Type specimens: ref. 390/1, 4 syntypes (alcohol), Lüderitz Bay (South Africa), coll. Schultze.

**misakiensis**, *Astrothorax* Döderlein, 1911: 24, textfigs 3 a–3 c, pl. 6 figs 2–2 b, pl. 7 fig. 12; see also DÖDERLEIN 1927: 88.

Type specimen: ref. 454/1, holotype (alcohol), Misaki (Sagami Bay), coll. Doflein.

Remark: *A. misakiensis* is the type species of the genus *Astrothorax*.

**moluccanus**, *Gorgonocephalus* Döderlein, 1927: 26, pl. 2 figs 2–2 b.

Type specimen: ref. 467/1, holotype (a few arms in alcohol), Albatross Expedition, station 5635, 01°53'30'' S – 127°39' E, 400 fathoms.

**nigrofurcata**, *Astroboa* Döderlein, 1927: 45, pl. 4 figs 1–4; see also BAKER 1980: 60, textfigs 23, 28 & 33.

Type specimen: ref. 346/1, 1 syntype (dry, labelled as paratype), Albatross Expedition, station unknown, Buan Island (Philippines).

**nitida**, *Ophiochasma* Hertz, 1927b: 116, pl. 4 figs 13–14.

Type specimen: ref. 538/1, 1 syntype (alcohol), Valdivia Expedition, station 105, 35°29' S – 21°02' E, 86 m.

**pardalis**, *Astrophyton* Döderlein, 1902a: 323.

= *Astrocladus coniferus* var. *pardalis* (Döderlein, 1902); see IRIMURA 1982: 12, textfig. 7, pl. 4 fig. 4.

Type specimen: ref. 453/2, holotype (alcohol), Sagami Bay, coll. Haberer.

**sagaminum**, *Asteroschema* (*Ophiocreas*) Döderlein, 1911: 60, pl. 6 figs 6–6 a, pl. 7 fig. 10.

= *Ophiocreas caudatum* (Lyman, 1879); see MATSUMOTO 1917: 49, textfigs 13 a–b; DÖDERLEIN 1927: 99.

Type specimens: ref. 426/1, 2 syntypes (alcohol), Misaki (Sagami Bay), coll. Doflein.

Remark: According to FELL (1960), the taxon *Ophiocreas* has a generic statute.

**sagaminus**, *Gorgonocephalus* Döderlein, 1902a: 321.

= *Astrodendrum sagaminum* (Döderlein, 1902); see DÖDERLEIN 1911: 38 & 71, pl. 2 figs 3–5, pl. 7 fig. 8, pl. 8 figs 8–8 a; DÖDERLEIN 1912: 266, pl. 17 fig. 4; DÖDERLEIN 1927: 32; IRIMURA 1982: 7, textfig. 4, pl. 3 figs 4–5.

Type specimen: ref. 448/1, 1 syntype (alcohol), Sagami Bay, coll. Haberer.

**studeri**, Euryale de Loriol, 1900: 86, pl. 8 figs 4–4b, pl. 9 figs 1–1k.

= *Euryale aspera* Lamarck, 1816; see DÖDERLEIN 1911: 65, pl. 5 figs 7–7a.

Type specimens : ref. 458/2, 4 syntypes (alcohol), Singapore, coll. Schneider.

**tonganus**, *Astrocladus* Döderlein, 1911: 77, pl. 9 fig. 8; DÖDERLEIN 1927: pl. 5 fig. 10; BAKER 1980: 64, textfigs 24, 28 & 33.

Type specimen : ref. 362/1, holotype (1 arm dry), Tonga Island, coll. Museum Godeffroy.

**tuberosus**, *Gorgonocephalus* Döderlein, 1902 a: 322; see also DÖDERLEIN 1911: 33, pl. 2 figs 1–2; DÖDERLEIN 1927: 92.

Type specimen : ref. 562/1, holotype (alcohol), Sagami Bay, ca. 240 m, coll. Döderlein.

## References

- AUGUSTIN, E. 1908: Über japanische Seewalzen. – Abhand. math.-phys. Kl. K. Bayer. Akad. Wiss. (II Suppl.) 1: 1–44, 2 pls.
- BAKER, A. N. 1980: Euryalinid Ophiuroidea (Echinodermata) from Australia, New Zealand, and the south-west Pacific Ocean. – N. Z. J. Zool. 7: 11–83
- BARTSCH, I. 1983 a: *Ophiambix meteoris* n. sp. (Ophiacanthidae, Ophiuroidea), ein neuer Schlangensterne aus der Iberischen Tiefsee. – Spixiana 6: 97–100
- 1983 b: Ophiuroidea (Echinodermata) from the northeastern Atlantic deep sea. – Meteor Forsch.-Ergebnisse (D) 36: 13–20
- CLARK, A. H. 1909: Four new species of the crinoid genus *Rhizocrinus*. – Proc. US natn. Mus. 36: 673–676
- CLARK, A. M. 1962: Asteroidea. – B. A. N. Z. Antarct. Res. Exped. 1929–1931, 9: 1–104, 6 pls.
- 1967: Crinoids of the zoological collection of the Bavarian State. – Veröff. Zool. Staatssamml. München 11: 151–174
- 1980: Crinoidea collected by the Meteor and Discovery in the NE Atlantic. – Bull. Br. Mus. nat. Hist. (Zool.) 38: 187–210
- 1981: Notes on Atlantic and other Asteroidea. 1. Family Benthoplectinidae. – Bull. Br. Mus. nat. Hist. (Zool.) 41: 91–135
- CLARK, A. M. and COURTMAN-STOCK, J. 1976: The Echinoderms of South Africa. – Trustees British Museum (Nat. Hist.), 277 pp.
- CLARK, A. M. and ROWE, F. W. E. 1971: Monograph of shallow-water Indo-west Pacific Echinoderms. – Trustees British Museum (Nat. Hist.), 238 pp., 31 pls.
- CLARK, H. L. 1911: North Pacific ophiurans in the collection of the United States National Museum. – Bull. US natn. Mus. 75: 1–302
- 1922: The holothurians of the genus *Stichopus*. – Bull. Mus. comp. Zool. Harvard 45: 39–74, 2 pls.
- 1933: A handbook of the littoral echinoderms of Porto Rico and the other West Indian Islands. – Scient. Surv. Porto Rico & Virgin Islands 16(1): 1–147, 7 pls.
- CHERBONNIER, G. 1962: Ophiures de l'Expédition Antarctique Belge. – Bull. Inst. R. Sci. nat. Belgique 38 (37): 1–31, 7 pls.
- CHERBONNIER, G. and GUILLE, A. 1972: Sur une espèce actuelle de Crinoïde crétacique de la famille Holopodidae: *Cyathidium foresti* nov. sp.. – C. R. hebd. Acad. Sci. Paris 274: 2193–2196
- CHERBONNIER, G. and NATAF, G. 1973: *Astropecten* des côtes occidentales d'Afrique. – Bull. Mus. natn. Hist. nat. Paris (3) 181: 1233–1300, 13 pls.
- DÖDERLEIN, L. 1885: Seeigel von Japan und den Liu-Kiu-Inseln. – Arch. Naturgesch. 51: 72–112
- 1887: Die japanischen Seeigel. – E. Koch, Stuttgart. 59 pp., 11 pls.
- 1896 a: Bericht über die von Herrn Professor Semon bei Amboina und Thursday Island gesammelten Ophiuroidea. – Denkschr. Ges. Jena 8: 279–300, 5 pls.
- 1896 b: Bericht über die von Herrn Professor Semon bei Amboina und Thursday Island gesammelten Asteroidea. – Denkschr. Ges. Jena 8: 301–322, 4 pls.

- 1898: Über einige epizoisch lebende Ophiuroidea. – Denkschr. med.-naturw. Gesellsch. Jena 8: 483–488, 1 pl.
- 1901: Diagnosen einiger von der Valdivia-Expedition gesammelten Seeigel-Arten aus dem Indischen Ocean. – Zool. Anz. 24: 19–23
- 1902a: Japanische Euryaliden. – Zool. Anz. 25: 320–326
- 1902b: Japanische Seesterne. – Zool. Anz. 25: 326–335
- 1902c: Bericht über die von Herrn Professor Semon bei Amboina und Thursday Island gesammelten Echinoidea. – Denkschr. Ges. Jena 8: 683–726, 8 pls.
- 1905: Über Seeigel der Deutschen Tiefsee-Expedition. – Zool. Anz. 28: 621–624
- 1906a: Die Echiniden der Deutschen Tiefsee-Expedition. – Wiss. Ergebn. der Deutschen Tiefsee-Exped. 1898–1899, 5: 61–290, 42 pls.
- 1906b: Die polypteren Echinoiden von Japan: Zool. Anz. 30: 515–521
- 1907: Die gestielten Crinoiden der Siboga-Expedition. – Siboga Exp. Rep. 47a: 1–54, 13 pls.
- 1910: Asteroidea, Ophiuroidea, Echinoidea. In L. Schultze: Zool. u. anthr. Ergebnisse einer Forschungsreise im westl. u. zentr. Südafrika 4 (1) 245–258, 2 pls.
- 1911: Über japanische und andere Euryalae. – Abhand. math.-phys. Kl. K. Bayer. Akad. Wiss. (II Suppl.) 5: 1–123, 9 pls.
- 1912a: Die gestielten Crinoiden der Deutschen Tiefsee-Expedition. – Wiss. Ergebn. Deutsche Tiefsee-Exped. 1898–1899, 17: 1–34, 12 pls.
- 1912b: Die Arme der Gorgonocephaliden. – Zool. Jahrb. Suppl. 15: 256–274, 1 pl.
- 1914: Echinoidea. – Die Fauna Südwest-Australiens (W. Michaelsen & R. Hartmeyer eds) 4: 444–492, 1 pl.
- 1915: Die Arten der Asteroiden-Gattung *Anthenea* Gray. – Jb. Nassau. Ver. Naturk. 68: 21–55, 11 pls.
- 1916: Über die Gattung *Oreaster* und Verwandte. – Zool. Jb. 40: 409–440
- 1917: Die Asteriden der Siboga-Expedition. II. Die Gattung *Astropecten* und ihre Stammesgeschichte. – Siboga-Exped. Rep. 46a: 1–190, 17 pls.
- 1921: Die Asteriden der Siboga-Expedition. I. Porcellanasteridae, Astropectinidae, Benthoplectinidae. – Siboga-Exped. Rep. 46<sup>1</sup>: 1–47, 13 pls.
- 1927a: Indopazifische Euryalae. – Abhand. math.-naturwiss. Abt. Bayer. Akad. Wiss. 31 (6): 1–105, 10 pls.
- 1927b: Die Seesterne – Deutsche Südpolar-Exped. 1901–1903, 19: 289–301, 4 pls.
- 1935: Die Asteriden der Siboga-Expedition. III. Oreasteridae. – Siboga-Exped. Rep. 46<sup>3</sup>: 71–110, 8 pls.
- 1936: Die Asteriden der Siboga-Expedition. III. Die Unterfamilie Oreasterinae. – Siboga-Exped. Rep. 46c: 295–369, 11 pls.
- DÖDERLEIN, L. and HARTMEYER, R. 1910: Westindische Seeigel und Seesterne. – Zool. Jb. Suppl. 11: 144–156
- EKMAN, S. 1923: Über *Psolus squamatus* und verwandte Arten. – Ark. Zool. 15 (5): 1–59
- FECHTER, H. 1973: *Cyathidium meteorensis* spec. nov., ein neuer Crinoide aus der Familie Holopodidae. – Helgoländer wiss. Meeresunters. 25: 162–169
- FELL, H. B. 1960: Synoptic keys to the genera of Ophiuroidea. – Zool. Publ. Victoria Univ. Wellington 26: 1–44
- FISHER, W. K. 1928: Asteroidea of the North Pacific and adjacent waters. Part 2. Forcipulatida (part). – Bull. US. natn. Mus. 76 (2): 1–245, 81 pls.
- GOTO, S. 1914: A descriptive monograph of Japanese Asteroidea. I–J. Coll. Sci. imp. Univ. Tokyo 29 (1): 1–808, 19 pls.
- HAYASHI, R. 1973: The Sea-Stars of Sagami Bay. – Biological Laboratory, Imperial Household (Japan). 114 pp., 18 pls.
- HEDING, S. G. 1928: Synaptidae. – Vidensk. Meddr. dansk naturh. Foren. 85: 105–323, 2 pls.
- HEDING, S. G. and PANNING, A. 1954: Phyllophoridae. – Spolia Zool. Mus. hauniensis 13: 1–209
- HERTZ, M. 1927a: Die Ophiuriden der Deutschen Südpolar-Expedition. – Deutsche Südpolar-Exped. 1901–1903, 22: 57–120, 9 pls.
- 1927b: Die Ophiuriden der Deutschen Tiefsee-Expedition I. – Wiss. Ergebn. Deutsche Tiefsee-Exped. 1898–1899, 22: 57–122, 4 pls.
- IRIMURA, S. 1982: The Brittle-Stars of Sagami Bay. – Biological Laboratory, Imperial Household (Japan). 95 pp., 15 pls.
- JANGOUX, M. 1986: La collection d'échinodermes du Musée zoologique de Strasbourg. – Bull. Ass. philomat. Alsace Lorraine 22: 125–131
- JOHN, D. D. 1948: Notes on Asteroids in the British Museum (Natural History). I. The species of *Astropecten*. – Novitates Zool. 42: 485–508, 4 pls.

- KOEHLER, R. 1905: Ophiures de l'expédition du Siboga. 2. Ophiures littorales. — Siboga-Exped. Rep. **45b**: 1–142, 18 pls.
- LORRIOL, P. DE 1900: Notes pour servir à l'étude des échinodermes. VIII. — Rev. suisse Zool. **8**: 55–96, 4 pls.
- LUDWIG, H. 1875: Beiträge zur Kenntnis der Holothurien. — Arb. zool. zoot. Inst. Würzburg **2**: 77–120, 2 pls.
- LYMAN, T. 1874: Ophiuridae and Astrophytidae, old and new. — Bull. Mus. comp. Zool. Harvard **3**: 221–272, 7 pls.
- MADSEN, F. J. 1967: Ophiuroidea. — B. A. N. Z. Antarct. Res. Exped. 1929–1931, **9**: 121–145, 1 pl.
- MARTENS, E. VON 1866: Seesterne des indischen Archipels. — Arch. Naturgesch. **32**: 57–88
- MATSUMOTO, H. 1917: A monograph of Japanese Ophiuroidea, arranged according to a new classification. — J. coll. Sci. imp. Univ. Tokyo **38**(2): 1–408, 7 pls.
- MORTENSEN, T. 1903: Echinoidea (pars I). — Danish Ingolf-Exped. **4**: 1–183, 21 pls.  
 — 1909: Echinoiden. — Deutsche Südpolar-Exped. 1901–1903, **11**: 1–104, 19 pls.  
 — 1928a: New Cidaridae. — Vidensk. Meddr. dansk naturh. Foren. **85**: 65–74  
 — 1928b: A Monograph of the Echinoidea. I. Cidaroida. — C. A. Reitzel, Copenhagen. 551 pp., 88 pls.  
 — 1935: A Monograph of the Echinoidea. II. Bothriocidaroida, Melonechinoida, Lepidocentrotida, and Stirodonta. — C. A. Reitzel, Copenhagen. 647 pp., 89 pls.  
 — 1940: A Monograph of the Echinoidea. III 1. Aulodonta. — C. A. Reitzel, Copenhagen. 370 pp., 77 pls.  
 — 1943a: A Monograph of the Echinoidea. III 2. Camarodonta I. — C. A. Reitzel, Copenhagen. 553 pp., 56 pls.  
 — 1943b: A Monograph of the Echinoidea. III 3. Camarodonta II. — C. A. Reitzel, Copenhagen. 446 pp., 66 pls.  
 — 1948a: A Monograph of the Echinoidea. IV 1. Holoctypoida, Cassiduloida. — C. A. Reitzel, Copenhagen. 371 pp., 14 pls.  
 — 1948b: A Monograph of the Echinoidea. IV 2. Clypeasteroida. — C. A. Reitzel, Copenhagen. 471 pp., 71 pls.  
 — 1950: A Monograph of the Echinoidea. V 1. Spatangoida I. — C. A. Reitzel, Copenhagen. 432 pp., 25 pls.  
 — 1951: A Monograph of the Echinoidea. V 2. Spatangoida II. — C. A. Reitzel, Copenhagen. 583 pp., 64 pls.
- OHSHIMA, H. 1915: Report on the holothurians collected by the united states fisheries steamer "Albatross" in the Northwestern Pacific during the Summer of 1906. — Proc. US natn. Mus. **48**: 213–291, 4 pls.
- PANNING, A. 1936: Die Gattung *Holothuria*. 5. Teil, Schluß. — Mitt. zool. Inst. Mus. Hamburg **46**: 1–18  
 — 1949: Versuch einer Neuordnung der Familie Cucumariidae. — Zool. Jb. **78**: 404–470
- PEARSON, J. 1913: Notes on the Holothurioidea of the Indian Ocean. — Spolia Zeylanica **9**: 49–100, 10 pls.
- RASMUSSEN, H. W. and SIEVERTS-DORECK, H. 1978: Classification of Articulata. In R. C. Moore: Treatise on Invertebrate Paleontology. Part T, Echinodermata 2, vol. 3, pp. T813–T928.
- SEMPER, C. 1868. Holothurien. — Reisen im Archipel der Philippinen. 2. Wissenschaftliche Resultate. 288 pp., 40 pls. Wiesbaden
- TOMMASI, L. R. 1970: Lista dos asteroides recentes do Brasil. — Contr. Inst. oceanogr. S. Paulo (ser. Ocean Biol.) **18**: 1–61, 38 pls.
- WALENKAMP, J. H. C. 1976: The asteroids of the coastal waters of Surinam. — Zool. Verhand., Leiden **147**: 1–91, 18 pls.

Dr. Michel Jangoux  
 Laboratoire de Biologie marine  
 Université Libre de Bruxelles  
 Avenue F.-D. Roosevelt, 50  
 B-1050 Bruxelles  
 Belgique

Dr. Chantal De Ridder  
 Laboratoire de Biologie marine  
 Université Libre de Bruxelles  
 Avenue F.-D. Roosevelt, 50  
 B-1050 Bruxelles  
 Belgique

Dr. Hubert Fechter  
 Zoologische Staatssammlung  
 Münchenhausenstr. 21  
 D-8000 München 60  
 BRD