The Synaptidæ of Japan.

By

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In his "List of Holothurians known to occur in Japan"[1] the late Prof. K. Mitsukuri gave seven species of Synaptids, founded on the reports of v. Marenzeller and Théel. They are: 1) *Synapta incerta*, var. *variabilis* Théel [=*Labidoplax dubia* (Semper)]; 2) *S. ooplax* v. Marenzeller [=*Leptosynapta ooplax*]; 3) *S. distincta* v. Marenzeller [=*Protankyra bidentata* (Woodward et Barrett)]; 4) *S. autopista* v. Marenzeller [=*Protankyra autopista*]; 5) *S. aculeata* Théel [=*Protankyra aculeata*]; 6) *Chiridota japonica* v. Marenzeller [=*Scoliodota japonica*]; and 7) *Ch. rufescens* Brandt [=*Polycheira rufescens*].

Since that time four more species have been reported from Japan and adjacent localities, viz., 1) *Myriotrochus minutus* Östergren; 2) *Anapta ludwigi* Britten; 3) *A. amurensis* Britten; and 4) *Chiridota regalis* Clark.

To the above list of eleven Synaptid species, I have added seven more, besides an indeterminable form, in my report on the Holothurians collected by the "Albatross" off the coasts of Japan, which report will shortly be published in another place. Further, from examination of the Synaptidæ in the Science College Museum, I have come to know that there still existed five more species, including one new species, to be added to the list, thus bringing the number of Synaptid species occurring in the waters around Japan, up to twenty-three altogether.

I here propose to present brief notes on all these Synaptids, to supplement in a way the late Professor Mitsukuri's excellent mono-

1) Zoological Magazine, vol. VIII, no. 97, 1896.

graph on pedate Holothurians.[1] In the matter of classification I follow Dr. H. L. Clark.[2]

Family SYNAPTIDÆ.

Subfamily I. SYNAPTINÆ.

1. *Synapta maculata* (Chamisso et Eysenhardt).

Holothuria maculata Chamisso et Eysenhardt, Nov. Act. Acad. Leop.-Carol., Pasc. II, vol. X, 1821, p. 352; pl. XXV.

Synapta maculata Clark, The Apodous Holothurians, 1907, pp. 23, 78–79; pls. I; IV, figs. 17–19, 26.

Two specimens. Under Nami-no-Uyé Temple (tide pool), Napha, Okinawa, Liu-Kiu Islands. Mitsukuri, Ikeda, etc. coll. Apr., 1901. (Cat. no. 1184).

This species, hitherto known from numerous localities throughout the Indo-Pacific region, is now found to extend north to the Liu-Kiu Islands. Mr. S. Hozawa tells me that he and his party observed gigantic Synaptids at Kōshun, near the south end of Formosa. It is exceedingly probable that they had this remarkable species before them.

2. *Leptosynapta inhærens* (O. F. Müller).

Holothuria inhærens O. F. Müller, Zool. Dan. Prodr., 1776, p. 232.

Leptosynapta inhærens Verrill, Trans. Conn. Acad., 1867, vol. I, p. 325.—Clark, The Apodous Holothurians, 1907, pp. 23–24, 88–89; pl. V, figs. 14, 18–20. — Becher, Beitr. z. Morphol. u. Systemat. d. Paractinopod., 1910, pp. 316–348; pl. XX, figs. 2, 3; pl. XXII, figs.

1) Studies on Actinopodous Holothurioidea. Jour. Coll. Sci., Imp. Univ., Tokyo. Vol. XXIX, Art. 2, 1912.

2) The Apodous Holothurians. Smithsonian Contributions to Knowledge, Vol. XXXV, 1907.

9–12; pl. XXIII, figs. 1–13; pl. XXIV, figs. 14–17.—Ohshima, Synaptiden von Misaki,[1] 1913, pp. 253–254; pl. VI, fig. 4.

Many specimens. Kurokami-Mura, Sakura Jima, Kagoshima Bay, Kyūshū. Azuma coll. (Cat. no. 1122).

Many specimens. Enoura, Suruga Bay, Honshū. Apr., 1884. (Cat. no. 1823).

One specimen. Jōga Shima, Misaki. (Cat. no. 1826).

Several specimens, reared in aquarium at Misaki. Ohshima. Jan., 1911. (Cat. no. 1804).

Several specimens. Katsuura, Chiba Prefecture. Ohshima coll. Aug. 15–16, 1913. (Cat. no. 1838).

Color either pure white or light brown with fine pigments scattered over body. Largest specimens do not exceed 50 mm. in length. Each tentacle beset with 9 or 11 digits. Anchors 65–195 μ long, anchor-plates 70–150 μ long. The terminal hole of anchor-plate usually markedly larger than any of the others as was noticed by Becher, and often divided into two or three small holes. In these and all other characters the specimens answer well to descriptions of the Atlantic form.

3. *Leptosynapta ooplax* (v. Marenzeller).

Synapta ooplax v. Marenzeller, Neue Holothurien von Japan und China, 1881, pp. 122–123; pl. IV, figs. 1, 1 A–D.—Britten, Holothurien a. d. japan. u. ochotsk. Meere, 1907, pp. 150–152.

Leptosynapta ooplax Clark, The Apodous Holothurians, 1907, pp. 24, 90–91.—Ohshima, Synaptiden von Misaki, 1913, pp. 254–255; pl. VI, fig. 5.

One specimen. Sakibaru, Napha (coral reef), Okinawa, Liu-Kiu Islands. Mitsukuri coll. Apr. 7, 1901. (Cat. no. 1769).

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1) Zoological Magazine, vol. XXV, no. 295, 1913, pp. 253–262; pl. VI. (Japanese, with an abstract in German).

One specimen. Makurazaki, Kagoshima Prefecture, Kyūshū. Miyajima coll. Aug. 5, 1900. (Cat. no. 1121).

One specimen. Kashiwajima, west of Shikoku. Tago coll. Mar. 22, 1905. (Cat. no. 1783).

Many specimens. Tsuro-Mura, Province Tosa, Shikoku. Tago coll. Feb. 18, 1905. (Cat. no. 1781).

Two specimens. West coast of Tsuro-Mura, Province Tosa, Shikoku. Tago coll. Feb. 16, 1605. (Cat. no. 1780).

Several specimens. Gogo Shima, Province Iyo, Shikoku. Ikeda and Takeshita coll. July, 1903. (Cat. no. 1785).

Many specimens. Agu Bay, Province Shima, Honshū. Nishikawa coll. Oct. 29, 1905. (Cat. no. 1788).

Many specimens. Koajiro, Misaki. July 17, 1890. (Cat. no. 1814).

Several specimens. Koajiro, Misaki. Mitsukuri coll. Aug. 12, 1897. (Cat. no. 1120).

Eight specimens. Aburatsubo Bay, Misaki. (Cat. no. 1856).

Several specimens. Aburatsubo Bay, Misaki. Ohshima coll. Jan. 7, 1911. (Cat. no. 1806).

Several specimens. Aburatsubo Bay, Misaki. Ohshima coll. Aug. 11, 1910. (Cat. no. 1803).

In all the specimens before me, the anchors measure 115–195 μ and the anchor-plates 57–135 μ in length. For precise discription of the species I refer to Britten and Clark.

4. *Labidoplax dubia* (Semper).

Synapta dubia Semper, Holothurien, 1867–'68, p. 10; pl. IV, fig. 11; pl. V, fig. 14; pl. VIII, figs. 4, 16.

Labidoplax dubia Östergren, Das System der Synaptiden, 1898, p. 116.—Clark, The Apodous Holothurians, 1907, pp. 24, 96–97; pl. V, figs. 25, 28.

Four fragments. Izugahara Bay, Tsushima Islands, northwest of Kyūshū. Namiyé and Tsuchida coll. Feb., 1891. (Cat. no. 1789).

Anchors 110–155 μ, and anchor-plates 90–140 μ long. Thus, the specimens now before me agree better with the "Challenger" specimens described by Théel than with those of the "Albatross" described by Clark.

5. *Protankyra bidentata* (Woodward et Barrett).

Synapta bidentata Woodward et Barrett, Proc. Zool. Soc., London, vol. XXVI, 1858, p. 365; pl. XIV, figs. 23–25.

Synapta distincta v. Marenzeller, Neue Holothurien von Japan und China, 1881, p. 123; pl. IV, fig. 2.—Théel, Challenger Holothurioidea, part 2, 1886, p. 11; pl. I, fig. 8.

Protankyra bidentata Östergren, Das System der Synaptiden, 1898, p. 117.—Clark, The Apodous Holothurians, 1907, pp. 102–103; pl. V, fig. 30.—Ohshima, Synaptiden von Misaki, 1913, pp. 256–258, 261; pl. VI, figs. 7, 8.

Six specimens. Kagoshima (?). Nakagawa coll. (Cat. no. 1117).

One specimen. Shimabara, Province Hizen, Kyūshū. Kaneko coll. (Cat. no. 1763).

Many specimens. 2.5 miles off Tekama-Mura, Miike, Fukuoka Prefecture, Kyūshū. Azuma coll. Mar. 31, 1904. (Cat. no. 1779).

One specimen. Gogo Shima, Province Iyo, Shikoku. Ikeda and Takeshita coll. July, 1903. (Cat. no. 1827).

Several specimens. Hachihama, Kojima Bay, Inland Sea. Izuka coll. (?) Oct., 1899. (Cat. no. 1670).

Six specimens. Kojima Bay, Inland Sea. Izuka coll. Dec. 21, 1906. (Cat. no. 1761).

Two specimens. Kojima Bay (Shore), Inland Sea. Izuka coll. Dec. 21, 1906. (Catalog. no. 1667).

Many specimens. Hachihama, Kojima Bay, Inland Sea. Nishikawa don. (Cat. no. 1118).

Two specimens. Nanao Bay, Province Noto, Honshū. Yamashina coll., Ichimura don. Nov. 4, 1902. (Cat. no. 1791).

Three fragments. Nanao, Province Noto, Honshū. (Cat. no. 1119).

One specimen. Okinosé, inside, Sagami Sea, 300–400 *hiro* (=ca. 240–310 fathoms). Aoki coll. March 7, 1895. (Cat. no. 1669).

Three specimens. Koajiro, Misaki. (Cat. no. 1815).

Several specimens. Koajiro, Misaki. Aug., 1887. (Cat. no. 1668).

Two specimens. Koajiro (Shore), Misaki. July 17, 1890. (Cat. no. 1116).

It may be worthy of note that this littoral species may occur at a depth of 240–310 fathoms (no. 1669). This species has been reported before from Miya Bay (v. Marenzeller) and from the "Challenger" Station 233 B, off Sanuki, Inland Sea, 8–50 fathoms (Théel).

In a former paper I made notice of spicules being of very different sizes in radii and interadii. I now find in some specimens that that arrangement is not quite distinctly carried out; nevertheless the anchors and anchor-plates are largest in the middle part of interradii and decrease in size towards radii. Anchors range 170–545 μ and anchor-plates 140–430 μ in length. Large anchors in interradii show on each arm ten or more minute teeth.

6. *Protankyra autopista* (v. Marenzeller).

Synapta autopista v. Marenzeller, Neue Holothurien von Japan und China, 1881, p. 123; pl. IV, fig. 3.—Britten, Holothurien a. d. japan. u. ochotsk. Meere, 1907, pp. 147–150.

Protankyra autopista Östergren, Das System der Synaptiden, 1898, p. 117.—Clark, The Apodous Holothurians, 1907, p. 103; pl. V, fig. 31.—Ohshima, Synaptiden von Misaki, 1913, pp. 255–256; pl. VI, fig. 6.

Two specimens. *Balanoglossus*-beach, Misaki. Izuka coll. Apr. 2, 1904. (Cat. no. 1801).

Several specimens. *Balanoglossus*-beach, Misaki. Aug. 23, 1899. (Cat. no. 1802).

One specimen. *Veretillum*-beach, Moroiso, Misaki. Mitsukuri coll. Aug. 12, 1897. (Cat. no. 1825).

This species is fairly well distinguishable from the preceding by the following characteristics. Length of anchors 86–140 μ nearly always shorter than wide; each arm of anchor with one or two large teeth near end, which very offen assumes bifurcate appearance on their account; handle of anchor fan-shaped, instead of T-shaped; anchor-plates irregularly quadrangular, 86–125 μ long, commonly with a pair of large holes near centre; miliary granules not X-shaped, but are cup-shaped buttons, 30–50 μ in diameter, each perforated by 3–10 holes; in the radii there are found deeply imbedded smooth, oval granules, 20 μ in diameter.

The species has before been reported from Miya Bay (v. Marenzeller) and from Misaki (Britten). Britten's statement that it is known from Amoy through Ludwig is a mistake, probably based on confounding the species with the preceding.

7. *Protankyra aculeata* (Théel).

Synapta aculeata Théel, Challenger Holothurioidea, part 2, 1886, pp. 13–14; pl. I, figs. 2 a–f.

Protankyra aculeata Östergren, Das System der Synaptiden, 1898, p. 117.—Clark, The Apodous Holothurians, 1907, p. 104.

Since a fragment was obtained by the "Challenger" at her Station 232, Sagami Bay, no other occurrence has been recorded.

8. *Protankyra kagoshimensis* Ohshima.

Protankyra kagoshimensis Ohshima, Albatross Holothurians (m.s.).

This species is known only from the "Albatross" Station 4945, Kagoshima Bay, Kyūshū.

9. *Anapta ludwigi* Britten.

Anapta ludwigi Britten, Holothurien a. d. japan. u. ochotsk. Meere, 1907, pp. 152–153.

This form known from Southern Saghalien is represented in the

Sci. Coll. collection by twelve specimens from Chibisani, Saghalien, 18 *hiro* (=ca. 14 fathoms), collected by Prof. Ijima on Aug. 22, 1906 (Cat. no. 1795).

The largest specimen measures 80 mm. long and 6 mm. across. Pigment spots present in skin, but discernible only under the microscope. In two specimens opened, Polian vesicles were found numbering 14 and 17 respectively.

10. *Anapta amurensis* Britten.

Anapta amurensis Britten, Holothurien a. d. japan. u. ochotsk. Meere, 1907, pp. 153–154.

Britten based the species on specimens from the mouth of the Amur and from an unknown locality. No second record of its occurrence has since been given.

Subfamily II. CHIRIDOTINÆ.

11. *Chiridota regalis* Clark.

Chiridota regalis Clark, The Apodous Holothurians, 1907, pp. 28, 117.

The species was obtained by the "Albatross" from off the south coast of Honshū (Station 3695) and from Suruga Bay (Station 3737). I have no specimens of it at my disposal.

12. *Chiridota uniserialis* Fisher.

Chiridota uniserialis Fisher, Hawaiian Holothurians, 1907, pp. 733–735; pl. LXXXI, fig. 4; pl. LXXXII, figs. 5, 5 a–c.

Two fragments probably belonging to one individual. South of Jōga Shima, Sagami Sea (Sengenzuka-line, inside). 400 *hiro* (=ca. 310 fathoms). Aoki coll. Feb. 26, 1897. (Cat. no. 1115).

When fresh the specimen is said to have been "pink on the five muscle bands, transparent in other parts" and wheel-papillæ to have

been flat. Length, as measured on the two fragments put together, 120 mm.; diameter 9 mm. Each of the twelve tentacles bears five pairs of digits. Polian vesicles five.

The specimen agrees very well in characters with those from Hawaii as described by Fisher.

13. *Chiridota discolor* Eschscholtz.

Chiridota discolor Eschscholtz, Zoologischer Atlas, 1829, pp. 12–13; pl. X, fig. 2.—Clark, The Apodous Holothurians, 1907, pp. 26–28, 120.—Ohshima, Albatross Holothurians (m.s.).

Besides several stations in Alaska, Aleutian Islands and Bering Islands, the present species has also been reported from Okhotsk Sea (Grube) and from Robben Island (Clark).

14. *Chiridota albatrossii* Edwards.

Chiridota albatrossii Edwards, Albatross Holothurians, 1907, pp. 50–52; textfigs. 1 a–c, 2 d–f, 3.—Ohshima, Albatross Holothurians (m.s.).

Within the limits of the Japanese Empire, the species was obtained from the "Albatross" stations off the coasts of Southern Saghalien and of Hokkaidō.

15. *Polycheira rufescens* (Brandt).

Chirodota rufescens Brandt, Prodr. descr. anim. ab H. Mertensis obs., 1835, p. 59.

Chiridota variabilis Semper, Holothurien, 1867–'68, p. 20; pl. V, figs. 6, 7, 9, 11, 19; pl. VI, fig. II.—Augustin, Japanische Seewalzen, 1908, p. 39.

Polycheira rufescens Clark, The Apodous Holothurians, 1907, pp. 120–121; pl. VII, figs. 14–18.—Ohshima, Synaptiden von Misaki, 1913, pp. 258–259; pl. VI, fig. 9.

The species has been known from Bonin Islands (Brandt) and

from Nagasaki (Augustin). I have examined numerous specimens obtained at the following localities :

Two specimens. Kōshun, Akō-Chō, near the south end of Formosa. Watasé, Hozawa, etc. coll. June 9, 1911. (Cat. no. 1864).

Two specimens. Sakibaru, Napha (dead coral reef), Okinawa, Liu-Kiu Islands. Mitsukuri coll. Apr. 7, 1901. (Cat. no. 1767).

One specimen. Tomari-Mura, Napha, Okinawa, Liu-Kiu Islands. Miyajima coll. May 23, 1900. (Cat. no. 1768).

One specimen. Off Itoman (Okaha reef, dead coral reef), Okinawa, Liu-Kiu Islands. Mitsukuri, Ikeda, etc. coll. Apr. 11, 1901. (Cat. no. 1771).

One specimen. ? Koniya-Mura (shore), Amami Ōshima, south of Kyūshū. Tamura coll. Mar. 28, 1900. (Cat. no. 1857 a).

One specimen. Katsuyoshi-Mura, Kageroma Island, Amami Ōshima, south of Kyūshū. Mitsukuri, Ikeda, etc. coll. Apr. 1, 1901. (Cat. no. 1773).

One specimen. Kurokami-Mura, Sakura Jima, Kagoshima Bay, Kyūshū. Azuma coll. (Cat. no. 1123).

Many specimens. Teuchi-Mura, Shimo-Koshiki Island, Kagoshima Prefecture, Kyūshū. Miyajima coll. Jul. 11, 1900. (Cat. no. 1778).

Several specimens. Shimo-Kataura, Kagoshima Prefecture, Kyūshū. Miyajima coll. Jul. 27, 1900. (Cat. no. 1776).

Three specimens. Akuné, Kagoshima Prefecture, Kyūshū. Mitsukuri and Hara coll. Apr. 19, 1896. (Cat. no. 1108).

One specimen. Shimabira (shore), Kagoshima Prefecture, Kyūshū. Mitsukuri and Hara coll. Apr. 18, 1896. (Cat. no. 1107).

One specimen. Ōtomari, Shimo-Sata-Mura, Kagoshima Prefecture, Kyūshū. Azuma coll. (Cat. no. 1777).

Many specimens. Hosojima Bay (under stones), Miyazaki Prefecture, Kyūshū. Terasaki coll. Mar. 15, 1899. (Cat. no. 1112).

Many specimens. Natsui (shore), Ariaké Bay, Miyazaki Prefecture, Kyūshū. Mitsukuri and Hara coll. Apr. 13, 1896. (Cat. no. 1106).

Several specimens. Kashiwa Jima, west of Shikoku. Tago coll. Mar. 22, 1905. (Cat. no. 1784).

Many specimens. Province Tosa, Shikoku. Tago coll. 1905. (Cat. no. 1782).

Many specimens. Tsuro-Mura, Province Tosa, Shikoku. Tago coll. Feb. 18, 1905. (Cat. no. 1671).

Several specimens. Futami Harbor, Chichi Jima, Bonin Islands. Hirota and Sekiguchi coll. Feb.-Mar., 1894. (Cat. no. 1109).

Many specimens. Hachijō Island. (Cat. no. 1110).

Many specimens. South coast of Kōzu Island. Aoki coll. May 9, 1901. (Cat. no. 1797).

Several specimens. Kōzu Island. Aoki coll. May 9, 1901. (Cat. no. 1798).

Many specimens. Mito and Awa Shima, off Enoura, Suruga Bay. Matsumoto coll. Feb. 12, 1911. (Cat. no. 1760).

Many specimens. Enoura, Suruga Bay. Apr., 1884. (Cat. no. 1105).

One specimen. Moroiso, Misaki. Izuka coll. Aug. 15, 1896. (Cat. no. 1807).

One specimen. Koajiro, Misaki. Aoki coll. Dec. 31, 1900. (Cat. no. 1113).

The largest specimen measures 150 mm. in length.

16. *Tæniogyrus cidaridis* Ohshima.

Tæniogyrus cidaridis Ohshima, Albatross Holothurians (m.s.).

Besides the specimens collected by the "Albatross" off the Gotō Islands, I have examined several others from the following localities:

One specimen. South-west of Jōga Shima, Sagami Sea. 70 *hiro* (=ca. 55 fathoms). Ikeda coll. (Cat. no. 1800).

Seventeen specimens. North side Uraga Channel, Mouth of Tōkyō Bay (Amezaki in line with Takeyama). 150 *hiro* (=ca. 120 fathoms). Mitsukuri and Aoki coll. Aug. 27, 1903. (Cat. no. 1811).

Eight specimens. Off Misaki, Sagami Sea (Bishamon-gaké-Kimura ippai). 80 *hiro* (=ca. 60 fathoms). Matsumoto and Chiba coll. Jul. 21, 1913. (Cat. no. 1844).

The largest specimen measures 36 mm. by 3.5 mm.

Dendy and Hindle's statement[1] that the sigmoid hooks in *Chirodota geminifera* are present constantly in pairs, was probably founded on observations on specimens with half-dissolved deposits. In a specimen of the present species (no. 1800), I have observed a similar phenomenon in that every hook was longitudinally split by the action of acidiferous alcohol.

17. *Trochodota dunedinensis* (Parker).

Chirodota dunedinensis Parker, On a New Holothurian, 1881, p. 418.—Dendy, The Holothurians of New Zealand, 1897, pp. 26–28; pl. III, figs. 1–8.

Trochodota dunedinensis Ludwig, Holothurien d. Hamburg. Magalh. Sammelr., 1898, pp. 87–88.—Clark, The Apodous Holothurians, 1907, p. 124.

One specimen. Off Misaki, Sagami Sea (Bishamon-gaké-Kimura ippai). 80 *hiro* (=ca. 60 fathoms). Matsumoto and Chiba coll. Jul. 21, 1913. (Cat. no. 1846).

Length 30 mm., diameter 3 mm. Color white. Tentacles ten, each with four pairs of digits. Wheels confined to the three dorsal interradii and thinly scattered; diameter 75–130 μ. Sigmoid hooks 95–130 μ long. In tentacles delicate rods are profusely found; they are 45–70 μ long, shaped like an elongated C, and are provided with 6–10 short processes along the convex side. Ciliated funnels not found. Genital tube undivided, one on each side.

The specimen differs from the New Zealand form in that the wheels are much smaller and the genital tube is not divided. The

1) Jour. Linn. Soc. London (Zool.), vol. XXX, no. 196, 1907, p. 113; pl. XIV, figs. 30 b, c.

dark spots observed by Parker inside the base of tentacles could not be made out. None of the previous writers on New Zealand specimens seem to have observed the deposits in tentacles. It may be that the Japanese specimens represent a distinct species.

18. *Trochodota rosea*, sp. nov.

Two specimens. Down off Nami-no-Uyé Temple (dead coral reef), Napha, Okinawa, Liu-Kiu Islands. Mitsukuri coll. Apr. 8, 1901. (Cat. no. 1770).

Length 30 mm., diameter 4 mm. Color in life pink. Tentacles ten, each with three pairs of digits, which increase in length towards the distal end. Wheels numerous, distributed all over the body, in some parts so clustered as to overlap one another, but nowhere forming wheel-papillæ. They vary 37–105 μ in diameter. Sigmoid hooks of the ordinary shape, generally 90 μ long though in some few individuals the length ranged 80–95 μ. In the tentacles are found bent rods of a shape exactly the same as in those of *T. purpurea* (Lesson)[1], measuring 50–100 μ in length. Segment of calcareous ring 1 mm. by 0.4 mm., narrowed in the middle. Polian vesicle one, stone-canal not made out. Ciliated funnels in a thick zone along middorsal and the left dorsal interradii. Genital tubes not divided.

The present species is very close to *T. purpurea*, the only important difference from that species consisting in the much smaller size of sigmoid hooks.

19. *Scoliodota japonica* (v. Marenzeller).

Chirodota japonica v. Marenzeller, Neue Holothurien von Japan und China, 1881. pp. 123–124.

Scoliodota japonica Clark, The Apodous Holothurians, 1907, pp. 30, 125; pl. VII, fig. 5.—Ohshima, Synaptiden von Misaki, 1913, pp. 259–262, textfigs. A–D; pl. VI, figs. 1–3.

1) Ludwig, 1898, pl. III, fig. 43; or Clark, 1907, pl. VII, fig. 7.

To the locality reported by v. Marenzeller, i.e., east side of Eno Shima, Sagami Bay, I may add the following :

Jōga Shima, Misaki. Three specimens. (Cat. no. 1114).

Bishamon (a few fathoms), near Misaki. One specimen. (Cat. no. 1127).

Moroiso, Misaki (*Veretillum* beach). Several specimens. Mitsukuri coll. Aug. 12, 1897. (Cat. no. 1128).

The largest specimen is 55 mm. long and 8 mm. broad. Sigmoid hooks measure 63–120 μ in length, exceptionally only 47 μ in the anterior region of body. The hooks gather together into the characteristic conical "hook-papillæ," each of which may contain them numbering up to sixteen. In the anterior region of body a papilla contains only two hooks, or even one only. The wheels are extremely infrequent, though near the base of tentacles they can be found without much difficulty.

Clark presented his *Scoliodota* as being characterized by the presence of ten tentacles and of hook-papillæ, and by the absence of wheels. The discovery of wheels, extremely rare though these be, and the presence of tentacles in the same number have reduced the differences of the present species from *Trochodota* to the one point that the former is in possession of hook-papillæ, which are wanting in the latter. Now, in view of the fact that in *Tæniogyrus australianus* the presence of hook-papillæ is not regarded as giving to that species a distinct generic status, the tenability of Clark's genus *Scoliodota* becomes doubtful. I should not wonder if it would turn out to be inseparable from *Trochodota*.

20. *Toxodora pacifica* Ohshima.

Toxodora pacifica Ohshima, Albatross Holothurians (m.s.).

The species is based on a series of specimens secured by the "Albatross" in Suruga Bay (Station 5073).

The character of the genus, very meagrely described by the

founder, has been obscure untill Clark placed it on a firm basis by revision of the original specimens. The discovery of the present species should serve as a further support for the validity of this singular genus.

Subfamily III. MYRIOTROCHINÆ.

21. *Myriotrochus rinkii* Steenstrup

Myriotrochus rinkii Steenstrup, Videnskab. Med. fr. d. naturh. For., 1851, pp. 55–60; pl. III, figs. 7–10.—Östergren, The Holothurioidea of Northern Norway, 1902, pp. 14–18.—Clark, The Apodous Holothurians, 1907, pp. 30–31, 128; pl. VIII, figs. 21–22.—Ohshima, Albatross Holothurians (m.s.).

In the North Pacific this species has been reported from the Bering Strait region, Pribilof Islands and Kamchatka.

In the Science College Museum there is a specimen of *Myriotrochus*, which I may refer to the present species though with much hesitation. It hails from 170 *hiro* (=ca. 130 fathoms) in Naka-no-Yodomi, Sagami Sea, having been captured by the late Prof. Mitsukuri and Aoki (Cat. no. 1855). The specimen lacks the anterior part and measures only 12 mm. by 3 mm. The wheels are absent on ventrum; they measure 175–240 μ, on an average 214 μ, in diameter; number of spokes 14–19, on an average 14.5; peripheral teeth number 23–30, on an average 25.6. I have come across only two cases of exceptionally small wheels, measuring 80 μ and 150 μ respectively, but such small wheels do not seem to constitute a distinct class by themselves, as they do in *M. minutus* Östergren. Ratio of the number of spokes to that of peripheral teeth ranges from 56.7 to 74%, with a mean of 65%. In Kamchatka specimens I have found the ratio to vary from 60 to 100%, with a mean of 79%. This seems to stand in accord with the result arrived at by Östergren and Clark, that the number of spokes tends to decrease in specimens from

more southern regions. Noteworthy is the fact that such an arctic form occurs in Sagami Sea (lat. 35° N.).

22. *Myriotrochus minutus* Östergren.

Myriotrochus minutus Östergren, Zwei koreanische Holothurien, 1905, pp. 194–196, fig. 1A.—Clark, The Apodous Holothurians, 1907, p. 129.

Since the original specimen of this species was obtained off the coast of Korea, no second specimen seems to have been captured.

23. *Myriotrochus mitsukurii* Ohshima.

Myriotrochus mitsukurii Ohshima, Albatross Holothurians (m.s.).

This interesting species, bearing some relationship to *Acanthotrochus*, is known only from off the west coast of Hokkaidō.

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