

SCLERACTINIAN CORALS FROM KAMAE BAY, OITA PREFECTURE, NORTHEAST OF KYUSHU, JAPAN^{1) 2)}

HUZIO UTINOMI

Seto Marine Biological Laboratory

With Plates X-XIII and 1 Text-figure

Introductory Note

During a preliminary ecological survey of the reef coral area of Kamae Bay on the northeastern coast of Kyushu carried out under the collaboration of the Seto Marine Biological Laboratory and the Oita Ecological Aquarium on July 17–21th, 1965, the distributional outline of reef corals thriving there was investigated only from the ecological viewpoint. In subsequent years additional collections of reef corals have been made by Dr. Shiro TAKAMATSU, chief of the research section of the Aquarium.

The specimens thus collected were not extensive due to the limited procedure for conservation of biological environments as the future marine park project in the environs. The majority of the coral samples were cleaned and later sent to our Laboratory together with the detailed photographs of coralla prepared by Dr. TAKAMATSU, and the writer has had the pleasure of studying them. After determination they are to be stored in the exhibition gallery of marine products in that Aquarium.

Although there are many nomenclaturally unsettled problems inconsistent with the International Code of Zoological Nomenclature, London, 1961, the classification arrangement in the following list follows largely WELLS' system (1954, 1956), which has been universally adopted, but in a few respects I deviate from it, partly following YABE, SUGIYAMA and EGUCHI (1936, etc.) and UMBGROVE (1939).

-
- 1) Contributions No. 554 from the Seto Marine Biological Laboratory and No. 27 from the Oita Ecological Aquarium.
 - 2) Biological studies of the reef coral area of Japanese main islands, No. 5. This work was financially supported by the research fund from the 'Oita Marine Palace' (President, Mr. T. UEDA) and in part by a grant from the Ministry of Education, 84089 (in 1969).

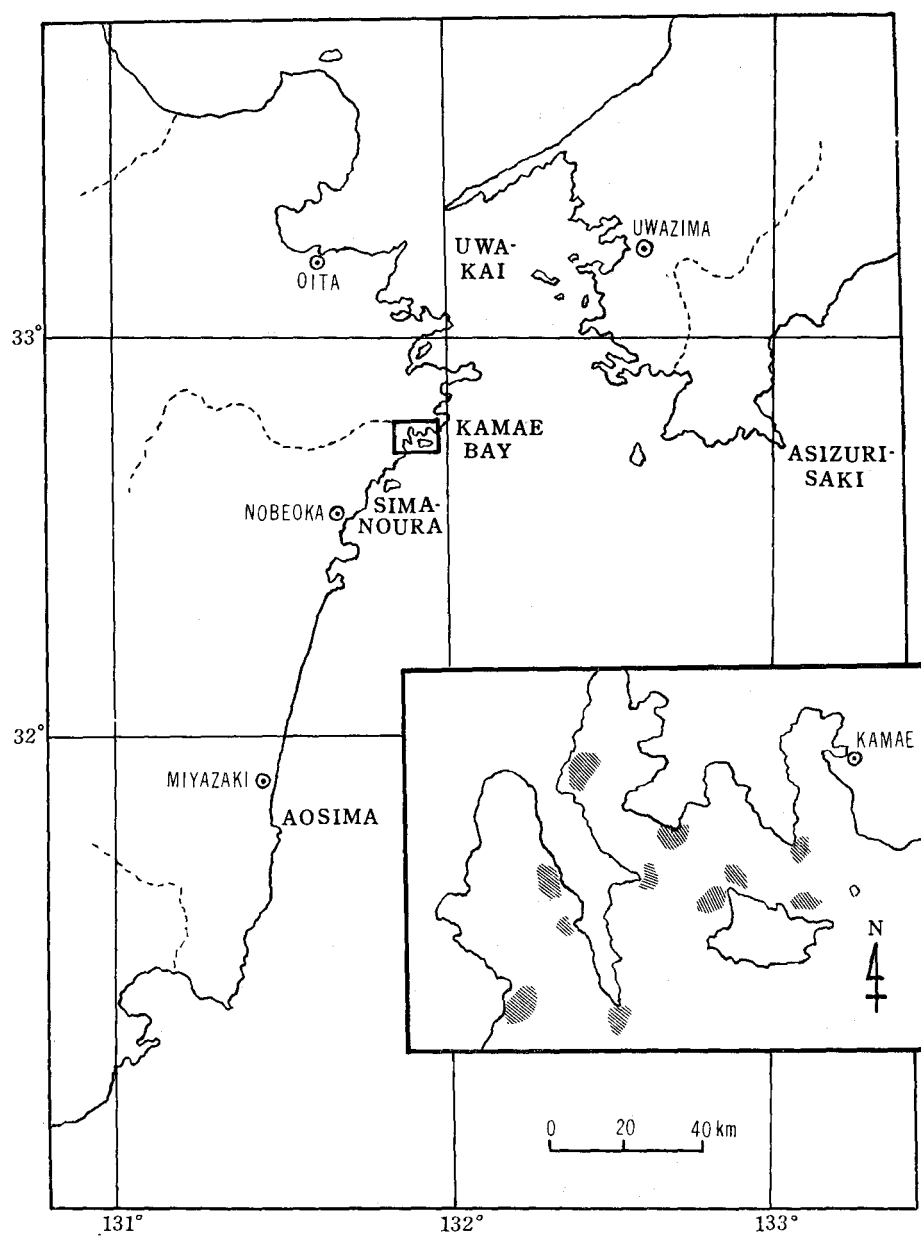


Fig. 1. Map of Kamae Bay, with places where reef corals are luxuriant (striated), showing together the neighboring coasts of Kyushu and Shikoku.

Order SCLERACTINIA

Suborder ASTROCOENIINA

Family *Astrocoeniidae* Koby*Stylocoeniella armata* (HEMPRICH & EHRENBERG) ムカシサンゴ

(Pl. XI, figs. 1a, 1b)

Coll. No. 27 (Kamae Bay).

Syn. and Ref.—

Madrepora (*Porites*) *armata* H. et E. in EHRENBERG, 1834, p. 119.*Stylocoenia hanzawai* YABE and SUGIYAMA, 1933, p. 11, pl. 2, figs. 1–4.*Stylocoeniella hanzawai* (YABE & SUGIYAMA): YABE, SUGIYAMA & EGUCHI, 1936, p. 16, pl. 11, figs. 1–3; HAMADA et al., 1963, p. 29, pl. 13, figs. 1–4; NEMENZO, 1964, p. 196, pl. 2, fig. 1 (Cebu).*Stylocoeniella armata* (EHRENBERG): WELLS, 1950, p. 33 (Cocos-Keeling Atoll; Discussion on synonymy); WELLS, 1954, p. 409, pl. 96, figs. 1–4 (Marshall Isl.); UTINOMI, 1966, p. 100 (Kii coast).

Distribution.—Red Sea eastward to Marshall Is. and northward to Honsyu (Tateyama Bay).

Family *Pocilloporidae* GRAY*Pocillopora damicornis* (LINNÉ) ハナヤサイサンゴ

Coll. No. 29 (Kamae Bay).

Syn. and Ref.—

Millepora damicornis LINNÉ, 1758, p. 791 (O. Asiatico).*Pocillopora damicornis* (LINNÉ): DANA, 1846, p. 527, pl. 49, fig. 7; VAUGHAN, 1918, p. 76, pl. 21, figs. 2–3a; YABE, SUGIYAMA & EGUCHI, 1936, p. 12, pl. 4, figs. 3–5; UMBGROVE, 1939, p. 21; CROSSLAND, 1952, p. 110; WELLS, 1954, p. 412, pl. 99, fig. 2; NEMENZO, 1964, p. 212, pl. 8, fig. 2; UTINOMI, 1965, p. 245 (S.W. coast of Sikoku); KIKUCHI, 1968, p. 5, pl. 1, fig. 1 (Amakusa Is.); YAGI, 1970, p. 12, fig. 10 (off Tosa Bay).

Distribution.—Indian Ocean eastward to the tropical west coast of North America and northward to Honsyu (Kusimoto).

Family *Acroporidae* VERRILL*Acropora tumida* (VERRILL) エンタクミドリイシ

(Pl. XI, figs. 2a, 2b)

Coll. No. 31 (Kamae Bay).

Syn. and Ref.—

Madrepora tumida VERRILL, 1866, p. 21 (Hong Kong); BROOK, 1893, p. 163.*Acropora tumida* (VERRILL): VERRILL, 1902, p. 241, pl. 36 figs. 11–11b, pl. 36B figs. 2–2b, pl. 36F fig. 3; UTINOMI, 1966, p. 100 (Kii coast); YAGI, 1970, pp. 1, 5, fig. 1 (Inan coast, SW. of Sikoku).

Acropora sp. [*A. cf. leptocyathus*: EGUCHI, 1965, p. 273, fig. 359; UTINOMI, 1965, p. 245 (Inan coast); KIKUCHI, 1968, p. 5, pl. 1, fig. 2 (Amakusa Is.)] [*non* BROOK, 1891, 1893]

Distribution.—Common from Honsyu (Kii coast) to South China Sea (Hong Kong—type locality) and Ogasawara Is. (unpublished), thriving on surf-swept open rocky reef.

Acropora cerealis (DANA) コシバミドリイシ

Coll. No. 35 (Kamae Bay).

Syn. and Ref.—

Madrepora cerealis DANA, 1846, p. 460, pl. 35, figs. 2–2a (Sulu Sea); BROOK, 1893, p. 91.

Acropora cerealis: VERRILL, 1902, p. 213; FAUSTINO, 1927, p. 266, pl. 86, figs. 1–2; UTINOMI, 1966, p. 101 (Kii coast); NEMENZO, 1967, p. 83, pl. 25, fig. 2 (Philippines).

Distribution.—Indian Ocean eastward to Fiji Is. and northward to Honsyu (Kii coast).

Acropora pectinata (BROOK) クシハダミドリイシ

Coll. No. 32 (Kamae Bay).

Syn. and Ref.—

Madrepora pectinata BROOK, 1893, p. 95, pl. 27, figs. D, E.

Acropora pectinata (BROOK): VAUGHAN, 1918, p. 172, pl. 71, figs. 1–2; THIEL, 1932, p. 119, pl. 14, fig. 4; UTINOMI, 1956, p. 341, pl. 32, figs. 4–5 (Tokara Is.); UTINOMI, 1965, p. 246 (Inan coast, SW of Sikoku); NEMENZO, 1967, p. 92, pl. 27, figs. 1–2 (Philippines).

Distribution.—Great Barrier Reef northward to Honsyu (Kii coast) and Ogasawara Is.

Acropora studeri (BROOK) タナミドリイシ(改称)

Coll. No. 37 (Kamae Bay).

Syn. and Ref.—

Madrepora studeri BROOK, 1893, p. 126, pl. 25 (Singapore and Indian Ocean).

Acropora studeri (BROOK): EGUCHI, 1965, p. 273, fig. 360; UTINOMI, 1966, p. 100 (Kii coast); NEMENZO, 1967, p. 97 (Palawan Is.); KIKUCHI, 1968, p. 5, pl. 1, fig. 3 (Amakusa Is.; *non* fig. 2); YAGI, 1970, p. 11, fig. 9 (Inan coast, SW of Sikoku).

Distribution.—Indian Ocean northward to Honsyu (Tateyama Bay, after HAMADA et al., 1963, p. 26). Common on the Pacific coast of southern Japan.

Acropora spicifera (DANA) カラマツミドリイシ(新称)

(Pl. XI, figs. 3a, 3b)

Coll. Nos. 38, 39 and 41 (Kamae Bay).

Syn. and Ref.—

Madrepora spicifera DANA, 1846, p. 442, pl. 33, figs. 4–5 (Singapore and Fiji Is.); BROOK, 1893, p. 92.
Acropora spicifera (DANA): VERRILL, 1902, p. 218; VAUGHAN, 1918, p. 172, pl. 68, figs. 3–3b (Cocos-Keeling Is.); WELLS, 1954, p. 421, pl. 121, figs. 1–3 (Marshall Is.); NEMENZO, 1967, p. 96, pl. 27, figs. 4–5 (Philippines).

Distribution.—Indian Ocean eastward to Tongatabu Is. and northward to Honsyu (Kii coast) and Ogasawara Is. (unpublished).

Acropora surculosa (DANA) ハイミドリイシ

Coll. No. 40 (Kamae Bay).

Syn. and Ref.—

Madrepora surculosa DANA, 1846, p. 445, pl. 32, figs. 4, 4a and 5 (Society Is., Fiji Is. and East Indies); BROOK, 1893, p. 104.
Acropora surculosa (DANA): VERRILL, 1902, p. 254; CROSSLAND, 1952, p. 214, pl. 38, figs. 2–5; WELLS, 1954, p. 421, pl. 118, figs. 1–2, pl. 119, figs. 1–3; UTINOMI, 1965, p. 247 (Tosa-simizu, Sikoku); UTINOMI, 1966, p. 101 (Kii coast); YAGI, 1970, p. 10, fig. 6 (Ryukyu Is.).

Distribution.—Indian Ocean eastward to Marshall Is. and northward to Honsyu (Kii coast).

Acropora digitifera (DANA) ナカユビミドリイシ

Coll. No. 33 (Kamae Bay).

Syn. and Ref.—

Madrepora digitifera DANA, 1846, p. 454; BROOK, 1893, p. 75.
Acropora digitifera (DANA): VERRILL, 1902, p. 228, pl. 36, fig. 12, pl. 36B, fig. 3; VAUGHAN, 1918, p. 175, pl. 76, figs. 1–2; WELLS, 1954, p. 427, pl. 127, figs. 1–2; NEMENZO, 1967, p. 112; YAGI, 1970, p. 8, fig. 4 (Inan coast, SW of Sikoku).

Distribution.—Indo-West Pacific, from Madagascar eastward to Marshall Is. and northward to Honsyu (Kii coast).

Acropora tubicinaria (DANA) シメジミドリイシ (新称)

(Pl. XI, figs. 4a, 4b)

Coll. No. 42 (Kamae Bay).

Syn. and Ref.—

Madrepora tubicinaria DANA, 1846, p. 451, pl. 32, figs. 7–7a (Fiji Is.); BROOK, 1893, p. 139 (Discussion on synonymy).
Acropora tubicinaria (DANA): VERRILL, 1902, p. 219 (Tahiti); WELLS, 1954, p. 423, pl. 122, figs. 3–5 (Bikini Atoll).

Distribution.—Recorded only from Fiji Is., Tahiti and Bikini Atoll. So new to Japanese fauna.

Acropora syringodes (BROOK) クダバナミドリイシ

Coll. No. 34 (Kamae Bay).

Syn. and Ref.—

Madrepora syringodes BROOK, 1893, p. 177, pl. 33, fig. E.

Acropora syringodes (BROOK): VAUGHAN, 1918, p. 185, pl. 83, figs. 1-1d; WELLS, 1954, p. 428, pl. 129 figs. 3-4, pl. 130 figs. 5-6; U TINOMI, 1965, p. 247 (Tosa-simizu); NEMENZO, 1967, p. 123 (Philippines); YAGI, 1970, p. 9, fig. 5 (Inan coast, SW of Sikoku).

Distribution.—Great Barrier Reef northward to Honsyu (Kii coast) and eastward to Marshall Is.

Acropora humilis (DANA) オヤユビミドリイシ

Coll. No. 36 (Kamae Bay).

Syn. and Ref.—

Madrepora humilis DANA, 1846, p. 483, pl. 31, fig. 4, pl. 41, fig. 4.

Acropora humilis (DANA): WELLS, 1954, p. 425, pl. 100, fig. 1, pl. 126, figs. 1-6, pl. 127, figs. 3-4, pl. 128, figs. 3-5 (Discussion on synonymy); U TINOMI, 1965, p. 246 (Inan coast, SW of Sikoku); NEMENZO, 1967, p. 129, pl. 36, figs. 1-2 (Philippines); YAGI, 1970, p. 6, fig. 2 (Amami-osima, prob. forma *pyramidalis* KLUNZINGER).

Acropora gemmifera (BROOK): VAUGHAN, 1918, p. 177, pl. 77, figs. 1-3a (Murray Is.); U TINOMI, 1956, p. 342, pl. 31, fig. 1 (Tokara Is.); OISHI, 1970, p. 83 (Kita Iwo Zima, Volcano Is.).

Distribution.—Widespread throughout the Indo-Pacific, from Red Sea eastward to Tuamotu Arch. and northward to Honsyu (Kii coast).

Montipora cactus BERNARD サボテンコモンサンゴ

Coll. No. 16 (Kamae Bay).

Syn. and Ref.—

Montipora cactus BERNARD, 1897, p. 118, pl. 21, fig. 5, pl. 33, fig. 16; EGUCHI, 1965, p. 275, fig. 365; U TINOMI, 1966, p. 101 (Kii coast); NEMENZO, 1967, p. 26, pl. 8, figs. 3-4 (Palawan, Philippines); KIKUCHI, 1968, p. 6, pl. 3, fig. 6 (Usibuka, Amakusa Is.).

Distribution.—Throughout the Indo-West Pacific, from Singapore eastward to Tongatabu Is. and northward to Honsyu (Kii coast).

Montipora informis BERNARD ノリコモンサンゴ

(Pl. XI, figs. 5a, 5b)

Coll. No. 18 (Kamae Bay).

Syn. and Ref.—

Montipora informis BERNARD, 1897, p. 133, pl. 27, fig. 3, pl. 34, fig. 3 (Torres Straits); VAUGHAN, 1918, p. 156, pl. 64, figs. 3-4c, pl. 65, figs. 1-1a (Cocos-Keeling, Murray Is.); CROSSLAND, 1952, p. 195 (Great Barrier Reef); EGUCHI, 1965, p. 274, fig. 364.

Distribution.—Great Barrier Reef northward to Honsyu (Kii coast).

Montipora caliculata (DANA) コブツキコモンサンゴ (新称)

(Pl. XII, figs. 1a, 1b and 1c)

Coll. No. 25 (Kamae Bay).

Syn. and Ref.—

Manopora caliculata DANA, 1848, p. 492, pl. 44, fig. 1 (Fiji Is.).

Montipora caliculata (DANA): BERNARD, 1897, p. 57, pl. 9 and pl. 32 fig. 14 (Torres Straits).

Distribution.—Recorded only from Fiji Is. (type locality) and Torres Straits. New to the Japanese fauna.

Suborder FUNGIINA

Family Agariciidae GRAY

Pavona decussata DANA シコロサンゴ

Coll. No. 15 (Kamae Bay).

Syn. and Ref.—

Pavonia decussata DANA, 1846, p. 329, pl. 22, figs. 4-4b (Fiji Is.).

Pavona danai (MILNE EDWARDS & HAIME): VAUGHAN, 1918, p. 136, pl. 55, fig. 2, pl. 56, figs. 2-2a (Cocos-Keeling Is.); WELLS, 1954, p. 441 (Jaluit Atoll).

Pavona decussata DANA: HOFFMEISTER, 1925, p. 40, pl. 4, fig. 1, pl. 8, figs. 3a-3b (Samoa; Discussion on synonymy); FAUSTINO, 1927, p. 204, pl. 67, figs. 2-3 (Philippines); YABE, SUGIYAMA and EGUCHI, 1936, p. 56, pl. 39, figs. 4-6; UMBGROVE, 1939, p. 46 (Bay of Batavia); NEMENZO, 1955, p. 14 (Cebu, Philippines); UTINOMI, 1965, p. 248 (Inan coast); UTINOMI, 1966, p. 101 (Kii coast); KIKUCHI, 1968, p. 6, pl. 1, fig. 6 (Amakusa); YAGI, 1970, p. 15, fig. 14 (Inan coast).

Distribution.—Red Sea eastward to Samoa and northward to Honsyu (Enoura Bay).

Family Fungiidae DANA

Lithophyllon lobata (VAN DER HORST) カワラサンゴ

Coll. No. 17 (Kamae Bay).

Syn. and Ref.—

Podabacia lobata VAN DER HORST, 1921, p. 27, pl. 4, fig. 5, pl. 6, fig. 4 (Japan).

Podabacia elegans lobata (VAN DER HORST): YABE, SUGIYAMA and EGUCHI, 1936, p. 65, pl. 48, figs. 1-2, pl. 50, fig. 1, pl. 53, figs. 1-2, pl. 15 (not LX) figs. 1-2; HAMADA et al., 1963, p. 29, pl. 33, fig. 2, pl. 34, fig. 1a-1b (Tateyama-Kôyatu Holocene); KIKUCHI, 1968, p. 6.

Lithophyllon lobata (VAN DER HORST): VAUGHAN & WELLS, 1943, p. 309, pl. 17, fig. 10; UTINOMI, 1965, p. 249 (Asizuri-saki, Sikoku); UTINOMI, 1966, p. 101 (Kii coast); YAGI, 1970, p. 20, fig. 20 (Inan coast).

Distribution.—Luxuriant especially in Japan, with varietal forms.

Lithophyllon elegans (MILNE EDWARDS & HAIME)

ハボタ ンサンゴ(新称)

(Pl. XII, fig. 2)

Coll. No. 20 (Kamae Bay).

Syn. and Ref.—

Mycedium elegans MILNE EDWARDS et HAIME, 1850, p. 132 (East Indies).

Podabacia elegans (M. EDWARDS et H.): VAN DER HORST, 1921, p. 28, pl. 4, figs. 6–8 (Japan).

Podabacia elegans (M. EDWARDS et H.), together with 3 formae *plicata*, *varians* and *setoensis* YABE, SUGIYAMA & EGUCHI, 1936, pp. 64–65, pl. 16, figs. 2–3, pl. 51, figs. 1–4, pl. 52, figs. 3–6, pl. 56, figs. 1–3 (Tanabe Bay and Hukushima, Nagasaki-ken); HAMADA et al., 1963, pp. 25, 29, pl. 19, fig. 3, pl. 26, fig. 1 (Tateyama-Kôyatu Holocene).

Distribution.—Indian Ocean eastward to Honsyu (Tateyama Bay).

Family **Poritidae** GRAY

Porites lutea MILNE EDWARDS & HAIME ヒメハマサンゴ

Coll. No. 19 (Kamae Bay).

Syn. and Ref.—

Porites lutea MILNE EDWARDS & HAIME, 1851, p. 28 (Tongatabu, Fiji); VAUGHAN, 1918, p. 198, pl. 88, figs. 1–1b (Fiji; Discussion on synonymy); UMBGROVE, 1939, p. 58 (Bay of Batavia); WELLS, 1954, p. 452, pl. 165, figs. 1–2, pl. 166, figs. 5–6, pl. 167, figs. 1–7 (Marshall Is.); NEMENZO, 1955, p. 40 (Cebu); UTINOMI, 1956, p. 343 (Tokara Is.); UTINOMI, 1966, p. 101 (Kii coast); YAGI, 1970, p. 30, fig. 34 (Osumi Pen., Kyushu).

Porites haddoni VAUGHAN, 1918, p. 197, pl. 87, figs. 1–1b (Murray Is.); CROSSLAND, 1952, p. 241 (Great Barrier Reef).

Porites lutea haddoni VAUGHAN: EGUCHI, 1937, p. 385 (Palau Is.).

Distribution.—South Pacific Ocean (Tongatabu, Fiji, Great Barrier Reef, Australia) eastward to Marshall Is. and northward to Honsyu (Kii coast).

Porites andrewsi VAUGHAN フタマタハマサンゴ(新称)

(Pl. XII, figs. 3a, 3b)

Coll. No. 7 (Kamae Bay).

Syn. and Ref.—

Porites andrewsi VAUGHAN, 1918, p. 203, pl. 91, figs. 1–2a (Murray Is.); HOFFMEISTER, 1925, p. 77, pl. 22, figs. 2a–2c (Samoa Is.); THIEL, 1932, p. 135, pl. 13, fig. 3; EGUCHI, 1937, p. 383 (Palau Is.); CROSSLAND, 1952, p. 244; WELLS, 1954, p. 454, pl. 165, fig. 4, pl. 169, figs. 5–6 (Bikini Atoll).

Distribution.—Great Barrier Reef, Samoa, Tonga, Murray Is., Djakarta, Pulau-pulan Banda, Palau Is., Bikini Atoll, Ryukyu Is. Formerly not recorded northward.

Alveopora japonica EGUCHI アワサンゴ

(Pl. XII, figs. 4a, 4b)

Coll. No. 54 (Kamae Bay).

Syn. and Ref.—

Alveopora cfr. *verilliana* DANA: YABE & SUGIYAMA, 1935, pp. 191, 206; HAMADA et al., 1963, p. 26, pl. 8, figs. 1a-1c, 2, pl. 41, fig. 4 (Tateyama Bay). [*non* DANA, 1872]*Alveopora japonica* EGUCHI, 1965, p. 278, fig. 377; UTINOMI, 1966, p. 101, (Kii coast); EGUCHI, 1968, p. C19, pl. C1 figs. 1-2, pl. C3, figs. 1-2, pl. C7, figs. 1-11, pl. C26, figs. 4-5, pl. C29, figs. 4-5 (Sagami Bay); KIKUCHI, 1968, p. 6, pl. 3, fig. 11 (Tomioka).Distribution.—Sagami Bay, Tanabe Bay, Kyushu, Ryukyu Is., Noto Peninsula.
Color of living colonies.—Uniformly sea green (Cf. EGUCHI, 1968, pl. C3, figs. 1-2; NISHIMURA & SUZUKI, 1971, pl. 3, fig. 4)

Suborder FAVIINA VAUGHAN & WELLS

Family Faviidae GREGORY

Subfamily Faviinae GREGORY

Caulastraea tumida MATTHAI タバネサンゴ

Coll. No. 11 (Kamae Bay).

Syn. and Ref.—

Caulastraea tumida MATTHAI, 1928, p. 275, pl. 72, figs. 5-6 (King's Sound, Australia); YABE, SUGIYAMA & EGUCHI, 1936, p. 19, pl. 10, figs. 6-7, pl. 13, figs. 1-2 (Kyushu and Honsyu); UMBROGROVE, 1939, p. 25, pl. 2, fig. 1 (Bay of Batavia); NEMENZO, 1959, p. 85 (Bohol, Philippines); HAMADA et al., 1963, pp. 23, 28, pl. 12, figs. 1a-3b (Tateyama-Kôyatu Holocene); UTINOMI, 1965, p. 250 (Tosashimizu); UTINOMI, 1966, p. 101 (Kii coast); KIKUCHI, 1968, p. 6, pl. 1, fig. 7 (Gosyonoura, Kosiki Is.); YAGI, 1970, p. 25, fig. 26 (Inan coast).

Distribution.—Common along the Pacific coast of Japan from Tateyama Bay to Kyushu, although occasionally recorded far southward from Philippines, Indonesia and Australia (type locality).

Favia speciosa (DANA) キクメイシ

Coll. Nos. 1, 1', 1" and 1''' (Kamae Bay).

Syn. and Ref.—

Astraea speciosa, *A. pandanus* and *A. puteolina* DANA, 1846, pp. 220-221, 222-223, 223-224, pl. 11, figs. 1, 2 and 3.*Favia clouei* (VALENCIENNES): MATTHAI, 1914, p. 89, pl. 12, fig. 6, pl. 23, figs. 1, 2, 5, pl. 25, fig. 2, pl. 34, fig. 1.*Favia speciosa* (DANA): VAUGHAN, 1918, p. 103, pl. 36, figs. 1-4a, pl. 37, figs. 1-4a (Discussion on synonymy); FAUSTINO, 1927, p. 130, pls. 25-26; YABE, SUGIYAMA & EGUCHI, 1936, p. 28, pl. 20, fig. 7, pl. 23, fig. 1; and many later authors.

Distribution.—Widespread throughout the Indo-Pacific.

Favia pallida (DANA) ウスチャキクメイシ (新称)

Coll. No. 49 (Kamae Bay).

Syn. and Ref.—

Astraea pallida, *A. versipora* and *A. denticulata* DANA, 1846, pp. 224, 233, 234, pl. 10, figs. 13-13e, pl. 12, figs. 5a-5b, 6-6c (Fiji Is., East Indies).

Favia doreyensis (MILNE EDWARDS & HAIME): MATTHAI, 1914, p. 84, pl. 9, figs. 1, 3, pl. 22, figs. 8-9, pl. 32, figs. 2-3 (Indian Ocean); CROSSLAND, 1952, p. 127.

Favia pallida (DANA): VAUGHAN, 1918, p. 105, pl. 38, figs. 1-7 (Fiji and Murray Is.; Discussion on synonymy); FAUSTINO, 1927, p. 132 (Cebu); YABE, SUGIYAMA & EGUCHI, 1936, p. 29, pl. 19, figs. 1-2; WELLS, 1954, p. 457, pl. 173, figs. 1-4, pl. 174, fig. 1 (Marshall Is.); NEMENZO, 1958-59, p. 89, pl. 5, fig. 2 (Philippines); OISHI, 1970, p. 84, pl. 5, figs. 2-3 (Ogasawara Is.).

Distribution.—Western Indian Ocean eastward to Samoa Islands and northward to Sikoku.

Favites abdita (ELLIS & SOLANDER) カメノコウキクメイシ

Coll. No. 3 (Kamae Bay).

Syn. and Ref.—

Madrepora abdita ELLIS & SOLANDER, 1876, p. 162, pl. 50, fig. 2.

Favites abdita (ELLIS & SOLANDER): VAUGHAN, 1918, p. 109, pl. 40, figs. 1, 3-5 (Murray Is.; Discussion on synonymy); HOFFMEISTER, 1925, p. 24, pl. 7, figs. 20-20b (Samoa); YABE, SUGIYAMA & EGUCHI, 1936, p. 31, pl. 22, figs. 3-4; WELLS, 1954, p. 459; NEMENZO, 1958-59, p. 94, pl. 7, fig. 1; EGUCHI, 1965, p. 278, fig. 380; U_TINOMI, 1965, p. 251 (Tosa-simizu); YAGI, 1970, p. 27, fig. 28 (Inan coast); OISHI, 1970, p. 84, pl. 5, fig. 4 (Ogasawara Is.).

Distribution.—Red Sea eastward to Fiji Islands and northward to Honsyu (Enoura Bay).

Favites virens (DANA) オオカメノコウキクメイシ

(Pl. X, fig. 1, colored)

Coll. No. 55 (Kamae Bay).

Syn. and Ref.—

Astraea virens DANA, 1846, p. 228, pl. 11, figs. 8, 8a-8d (Fiji Is.).

Favites virens (DANA): VAUGHAN, 1918, p. 111, pl. 41, fig. 4 (Murray Is.; Discussion on synonymy); FAUSTINO, 1927, p. 137, pl. 28, fig. 2; YABE, SUGIYAMA & EGUCHI, 1936, p. 33, pl. 19, figs. 8-9; UMBGROVE, 1939, p. 29; CROSSLAND, 1952, p. 130, pl. 6, figs. 1-2; WELLS, 1954, p. 459; EGUCHI, 1968, p. C21, pl. C18, figs. 1-3, pl. C26, figs. 6-7 (Sagami Bay).

Favia vasta (KLUNZINGER): MATTHAI, 1914, p. 108, pl. 27, figs. 3, 5, 6.

? Gen. et sp. nov.: YABE, SUGIYAMA & EGUCHI, 1936, pl. 52, fig. 2 (Enoura Bay).

Distribution.—Red Sea eastward to Fiji Islands and northward to Honsyu (Sagami Bay).

Color of living colonies.—Yellow brown with bluish green peristomes.

Favites pentagona (ESPER) ゴカクキクメイシ(新称)

Coll. No. 2 (Kamae Bay).

Syn. and Ref.—

Madrepora pentagona ESPER, 1794, p. 29, pl. 39, figs. 1–2.

Favites pentagona (ESPER): VAUGHAN, 1918, p. 112, pl. 42, figs. 1–2 (Discussion on synonymy); YABE, SUGIYAMA & EGUCHI, 1936, p. 32, pl. 24, figs. 1–2.

Distribution.—Western Indian Ocean eastward to New Hebrides and northward to Honsyu (Susami, Kii coast).

Platygyra lamellina (HEMPRICH & EHRENBERG) ノウサンゴ

Coll. No. 9 (Kamae Bay).

Syn. and Ref.—

Maeandra (Platygyra) lamellina H. et E. in EHRENBERG, 1834, p. 99 (Red Sea).

Maeandra lamellina EHRENBERG: VAUGHAN, 1918, p. 119, pl. 45, figs. 2–2a (Murray Is.); HOFFMEISTER, 1925, p. 29 (Samoa); FAUSTINO, 1927, p. 145, pl. 35, fig. 1 (Philippines).

Coeloria lamellina (EHRENBERG): MATTHAI, 1928, p. 37, pl. 6, figs. 2–6, pl. 8, figs. 1–3, 5–6, pl. 34, fig. 1, pl. 53, fig. 5, pl. 54, fig. 1, pl. 56, figs. 2–3, 5, 7, pl. 65, figs. 1–3, pl. 66, fig. 3, pl. 71, fig. 7 (Discussion on synonymy); YABE, SUGIYAMA & EGUCHI, 1936, p. 36, pl. 16, fig. 1, pl. 21, fig. 3, pl. 25, figs. 4–5; UMBGROVE, 1939, p. 33; CROSSLAND, 1952, p. 149.

Platygyra lamellina (EHRENBERG): STEPHENSON & WELLS, 1956, p. 35; NEMENZO, 1958–59, p. 107 (Philippines); UTINOMI, 1965, p. 251 (Inan coast); KIKUCHI, 1968, p. 7, pl. 3, fig. 3 (Tomioka, etc.); YAGI, 1970, p. 23, fig. 24 (Inan coast).

Distribution.—Red Sea eastward to Marshall Is. and northward to Honsyu (Enoura Bay).

Platygyra rustica (DANA) チジミノウサンゴ(新称)

Coll. Nos. 8, 8', 8" and 23 (Kamae Bay).

Syn. and Ref.—

Maendrina rustica DANA, 1846, p. 258, pl. 14, figs. 5a–5b (Wake Is.).

Madrepora daedalea ELLIS & SOLANDER, 1786, p. 163, pl. 46, fig. 1.

[After MATTHAI, 1928, non *M. daedalea* FORSKÅL, 1775]

Coeloria daedalea (ELLIS et SOLANDER): MATTHAI, 1928, p. 24, pl. 1 figs. 1–2, pl. 5 figs. 1–8, pl. 6 figs. 1, 7–8, pl. 8 fig. 4, pl. 12 fig. 1, pl. 44 fig. 3, pl. 48 fig. 1, pl. 54, fig. 6, pl. 63, fig. 3, pl. 68, fig. 5 (Discussion on synonymy); CROSSLAND, 1952, p. 148, pl. 11, fig. 1, pl. 12, fig. 2.

Maeandra daedalea (ELLIS et SOLANDER): VAUGHAN, 1918, p. 119, pl. 44, figs. 3–3a, pl. 45, fig. 1 (Murray Is.); HOFFMEISTER, 1925, p. 28 (Fiji Is. and Samoa).

Coeloria rustica (DANA): YABE, SUGIYAMA & EGUCHI, 1936, p. 36, pl. 21, figs. 4–10; UMBGROVE, 1939, p. 33.

Platygyra rustica (DANA): WELLS, 1954, p. 462; HAMADA et al., 1963, pp. 25, 29, pl. 27, fig. 2 (Tetayama-Kôyatu Holocene); KIKUCHI, 1968, p. 7; EGUCHI, 1968, p. C22 (Sagami Bay); OISHI, 1970, p. 84, pl. 6, figs. 3–4 (Ogasawara Is.).

Distribution.—Red Sea eastward to Samoa Is. and northward to Ogasawara Is. and Honsyu (Tateyama Bay).

Hydnophora exesa (PALLAS) イボサンゴ

Coll. Nos. 22 and 24 (Kamae Bay).

Syn. and Ref.—

Madrepora exesa PALLAS, 1766, p. 290 (Indian Ocean); ELLIS & SOLANDER, 1786, p. 161, pl. 49, fig. 3 (Pacific Ocean).

Hydnophora exesa (PALLAS): MILNE EDWARDS & HAIME, 1849, p. 300; MATTHAI, 1928, p. 140, pl. 14, fig. 5, pl. 15, figs. 1–2, pl. 16, figs. 1–4, pl. 17, fig. 3 (Discussion on synonymy); YABE, SUGIYAMA & EGUCHI, 1936, p. 39, pl. 29, fig. 2, pl. 30, fig. 2, pl. 35, fig. 7; HAMADA et al., 1963, pp. 24, 26, 29, pl. 43, figs. a1-1c (Tateyama Bay); UINOMI, 1965, p. 252 (Inan coast); KIKUCHI, 1968, p. 7, pl. 2, fig. 5 (Amakusa Is.); EGUCHI, 1968, p. C24, pl. C19, figs. 1–2 (Sagami Bay); OISHI, 1970, 84, pl. 6, figs. 5–6 (Ogasawara Is.).

Distribution.—Red Sea eastward to Tongatabu Is. and northward to Honsyu (Sagami Bay).

Subfamily Montastreinae YABE & SUGIYAMA

Leptastrea purpurea (DANA) ルリサンゴ

Coll. No. 51 (Kamae Bay).

Syn. and Ref.—

Astraea purpurea and *A. pulchra* DANA, 1846, pp. 239–240, pl. 12, figs. 10–10e, 11–11f (Fiji Is.).

Leptastrea ehrenbergiana MILNE EDWARDS & HAIME, 1849, p. 120 (Red Sea); MATTHAI, 1914, p. 68, pl. 17, figs. 5–7, pl. 18, figs. 2, 7, pl. 19, figs. 3–4.

Leptastrea purpurea (DANA): VAUGHAN, 1918, p. 91, pl. 30, figs. 1–3a (Discussion on synonymy); FAUSTINO, 1927, p. 119, pl. 19, figs. 1–2, pl. 20, figs. 1–2; YABE, SUGIYAMA & EGUCHI, 1936, p. 26, pl. 48, figs. 5–7; KIKUCHI, 1968, p. 7, pl. 3, fig. 1 (Tomioka).

Distribution.—Red Sea eastward to Hawaiian Is. and northward to Honsyu (Sagami Bay).

Color of living colonies.—Mainly pale brown, sometimes with violet tints.

Cyphastrea microphthalma (LAMARCK) トゲキクメイシ

Coll. Nos. 4 and 5' (Kamae Bay).

Syn. and Ref.—

Astraea microphthalma LAMARCK, 1816, p. 261 (after MATTHAI).

Astraea (Orbicella) microphthalma (LAMARCK): DANA, 1846, p. 217, pl. 10, figs. 11–11e (New Holland and Fiji).

Cyphastrea microphthalma (LAMARCK): MATTHAI, 1914, p. 43, pl. 7, fig. 6, pl. 12, figs. 4–9, pl. 13, figs. 1, 2, 7, pl. 34, fig. 4; VAUGHAN, 1918, p. 88, pl. 29, figs. 1–1a (Discussion on synonymy); FAUSTINO, 1927, p. 115, pl. 16, figs. 1–2; YABE, SUGIYAMA & EGUCHI, 1936, p. 23, pl. 17, figs. 7–8; HAMADA

et al., 1963, p. 23, pl. 15, figs. 1a-1b (Tateyama-Kôyatu Holocene); EGUCHI, 1965, p. 280, fig. 388; UTINOMI, 1966, p. 101; KIKUCHI, 1968, p. 7; OISHI, 1970, p. 84, pl. 6, fig. 7 (Ogasawara Is.).

Distribution.—Red Sea eastward to Fiji Islands and northward to Honsyu (Sagami Bay).

Cyphastrea chalcidicum (FORSKÅL) コトゲキクメイシ

Coll. No. 5 (Kamae Bay).

Syn. and Ref.—

Madrepora chalcidicum FORSKÅL, 1775, p. 136 (after VAUGHAN).

Astrea (*Orbicella*) *ocellina* DANA, 1846, p. 218, pl. 10, fig. 10 (Hawaii).

Cyphastrea chalcidicum (FORSKÅL): MATTHAI, 1914, p. 41, pl. 7 figs. 1, 5, pl. 12 figs. 1-3, pl. 14, fig. 1 (Discussion on synonymy); FAUSTINO, 1927, p. 117, pl. 18 figs. 1-4; YABE, SUGIYAMA & EGUCHI, 1936, p. 24, pl. 18, fig. 1, pl. 49, fig. 5; CROSSLAND, 1952, p. 117; WELLS, 1954, p. 464; NEMENZO, 1958-59, p. 115; HAMADA et al., 1963, p. 23; UTINOMI, 1965, p. 252; KIKUCHI, 1968, p. 7, pl. 2 fig. 7.

Cyphastrea ocellina (DANA): VAUGHAN, 1907, p. 103, pl. 25, figs. 4-5a, pl. 26, fig. 1 (Hawaii); VAUGHAN, 1918, p. 87 (claimed as a valid species).

Distribution.—Red Sea eastward to Marshall Islands and northward to Honsyu (Sagami Bay).

Cyphastrea chalcidicum tanabensis YABE & SUGIYAMA

タナベコトゲキクメイシ (新称)

(Pl. XIII, figs. 1a, 1b)

Coll. No. 53 (Kamae Bay).

Syn. and Ref.—

Cyphastrea chalcidicum tanabensis YABE et SUGIYAMA in YABE, SUGIYAMA & EGUCHI, 1936, p. 25, pl. 17, figs. 1-3 (Tanabe Bay, etc.); HAMADA et al., 1963, p. 23, pl. 14, fig. 1, pl. 15, figs. 2-3 (Tateyama-Kôyatu Holocene).

Distribution.—Tanabe Bay (type locality), Kusimoto, Uwazima Bay, Hukushima (Nagasaki-ken), Sakura-zima (Kagosima-ken), Tateyama Holocene (Tiba-ken).

Cyphastrea japonica YABE & SUGIYAMA

ニホントゲキクメイシ (新称)

(Pl. XIII, figs. 2a, 2b)

Coll. No. 10 (Kamae Bay).

Syn. and Ref.—

Cyphastrea japonica YABE et SUGIYAMA in YABE, SUGIYAMA & EGUCHI, 1936, p. 25, pl. 17, figs. 4-6.

Distribution.—Misaki (Kōti-ken, SW of Sikoku—type locality).

Cyphastrea serailia (FORSKÅL) フカトゲキクメイシ

Coll. No. 52 (Kamae Bay).

Syn. and Ref.—

Madrepora serailia FORSKÅL, 1775 (after VAUGHAN).

Cyphastrea serailia (FORSKÅL): MATTHAI, 1914, p. 39, pl. 7, fig. 4, pl. 11, figs. 1–9, pl. 13, fig. 8, pl. 38, figs. 1, 5; VAUGHAN, 1918, p. 88, pl. 29, figs. 2–2b; FAUSTINO, 1927, p. 116, pl. 17, figs. 1–2; YABE, SUGIYAMA & EGUCHI, 1936, p. 24, pl. 18, fig. 2; NEMENZO, 1958–59, p. 114; WELLS, 1954, p. 463; HAMADA et al., 1963, p. 23, pl. 14, figs. 2a–2c, pl. 16, figs. 1–2, pl. 17, fig. 2 (Tateyama-Kōyatu Holocene); U TINOMI, 1966, p. 101 (Kii coast).

Distribution.—Red Sea eastward to Marshall Islands and northward to Honsyu (Tateyama Bay).

Subfamily Trachyphylliinae VERRILL

Trachyphyllia geoffroyi (AUDOUIN) オオバナサンゴ

(Pl. X, fig. 2, colored)

Coll. No. 56 (Kamae Bay).

Syn. and Ref.—

Turbinolia geoffroyi AUDOUIN, 1828, p. 233, for SAVIGNY (1817)'s pl. 4, figs. 1 and 1a (Red Sea).

Manicina amaranthum DANA, 1846, p. 189, pl. 9, fig. 1 and fig. 2 (var. *stricta*) (East Indies).

Trachyphyllia amaranthum, *T. (?) Geoffroyi* and *T. (?) stricta*: MILNE EDWARDS & HAIME, 1849, pp. 275, 267; MILNE EDWARDS & HAIME, 1857, II, pp. 341, 342.

Trachyphyllia amaranthum (DANA): MATTHAI, 1924, p. 26, pl. 5, fig. 2; YABE, SUGIYAMA & EGUCHI, 1936, p. 22, pl. 12, figs. 1–12 (Tanabe Bay and Uwazima Bay); EGUCHI, 1965, p. 281, fig. 391.

Trachyllia amaranthus (MÜLLER): FAUSTINO, 1927, p. 147, pl. 38, figs. 1–2 (Southern Philippines).

Antillia (or *Antillophyllia*) *constricta* BRÜGGEMANN, 1877, p. 309 (Borneo); GARDINER, 1904, p. 758, pl. 59, figs. 4–5 (Maldives Is., as var. *maldivensis*); FAUSTINO, 1927, p. 152, pl. 37, figs. 2–3 (Philippines); YABE & SUGIYAMA, 1931, p. 125, pl. 38, figs. 5–6 (Tanabe Bay, as var. *kiiensis*); YABE, SUGIYAMA & EGUCHI, 1936, p. 21 (Tanabe Bay, as ssp. *kiiensis*); OISHI, 1970, p. 85, pl. 7, figs. 7–8 (Ogasawara Is.).

Trachyphyllia geoffroyi (AUDOUIN): MATTHAI, 1928, p. 97, pl. 22, figs. 1–11, pl. 23, figs. 1, 2, 5, pl. 26, fig. 1, pl. 60, fig. 1, pl. 62, figs. 1–3, 7, 8, 11 (Discussion on synonymy); VAUGHAN & WELLS, 1943, p. 170, pl. 28, fig. 7, pl. 29, fig. 1; U TINOMI, 1965, p. 252 (Asizuri-saki and Uwazima-wan); U TINOMI, 1966, p. 101 (Kii coast); KIKUCHI, 1968, p. 7, pl. 4, figs. 10a–10b (Amakusa Is.); YAGI, 1970, p. 29, fig. 31 (Inan coast).

?? *Lobophyllia japonica* (YABE & SUGIYAMA) and *Lobophyllia* sp.: HAMADA et al., 1963, pp. 24, 29, pl. 21, figs. 3a–3b, pl. 22, figs. 2a–2b (Tateyama-Kōyatu Holocene). [Non *Protolobophyllia japonica* (YABE & SUGIYAMA)]

Distribution.—Red Sea eastward to Ogasawara Islands and northward to Honsyu (Tateyama Bay).

Color of living polyps.—Usually pale olive, irregularly blended with dull red on

the oral disc. Tentacles are not expanded in daylight (Cf. CATALA, 1964, pl. XII, fig. 2; UTINOMI, 1969, pl. 12, fig. 7; NISHIMURA & SUZUKI, 1971, pl. 3, fig. 6).

Family Mussidae ORTMANN

Cynarina lacrymalis (MILNE EDWARDS & HAIME)

コハナガタサンゴ

(Pl. X, fig. 3, colored; Pl. XIII, fig. 3)

Coll. No. 57 (Kamae Bay).

Syn. and Ref.—

- ? *Caryophyllia carduus*: AUDOUIN, 1828, p. 233, for SAVIGNY (1817)'s pl. 4, fig. 2 (Red Sea; non *Madrepora carduus* ELLIS & SOLANDER, 1786, p. 153, pl. 35; nec *Caryophyllia carduus* LAMARCK, 1816).
Caryophyllia lacrymalis MILNE EDWARDS & HAIME, 1849, p. 238, pl. 6, figs. 1-1a (Philippines?).
Lithophyllia lacrymalis: MILNE EDWARDS & HAIME, 1857, II, p. 292.
Cynarina savignyi BRÜGGEMANN, 1877, p. 305 (Suez); KLUNZINGER, 1879, III, p. 4 (Red Sea); CROSSLAND, 1952, p. 137, pl. 4, figs. 1-2 (Great Barrier Reef).
Mussa (*Lithophyllia*) *lacrymalis* (M. EDW. & H.): FAUSTINO, 1927, p. 154, pl. 38, figs. 3-4 (copies of MILNE EDWARDS & HAIME's figures).
Antillia japonica YABE & SUGIYAMA, 1931, p. 128, pl. 37, figs. 1-5, pl. 38, figs. 1, 2 (Hamazima, Prov. Sima and Enoura Bay).
Protolobophyllia japonica (YABE & SUGIYAMA): YABE & SUGIYAMA, 1935, p. 381, pl. 9, figs. 3-4 (Hamazima), nec. figs. 1-2 (Kikaizima, = *Parascolumia vitiensis* BRÜGGEMANN); YABE, SUGIYAMA & EGUCHI, 1936, p. 45, pl. 16, figs. 8-9a (Hamazima and Enoura Bay); EGUCHI, 1965, p. 283, fig. 400.
Lobophyllia constricta (BRÜGGEMANN): HAMADA et al., 1963, pp. 24, 29, 69, 70, pl. 20, figs. 3a, 3b (Tateyama-Kôyatu Holocene). [Non *Antillia constricta* BRÜGGEMANN, 1877]
Lobophyllia nomaensis (YABE & SUGIYAMA): HAMADA et al., 1963, pp. 24, 29, 68, 70, pl. 20, figs. 4a-4b, pl. 21, fig. 1 (Tateyama-Kôyatu Holocene (Non *Antillia nomaensis* YABE & SUGIYAMA, 1931)]
Lobophyllia japonica (YABE & SUGIYAMA): HAMADA et al., 1963, pp. 24, 29, 70, pl. 19, fig. 4, pl. 21, figs. 2a-2c, 4a-4b (Tateyama-Kôyatu Holocene).
Cynarina lacrymalis (MILNE EDWARDS & HAIME): WELLS, 1964, p. 376, pls. 20, 21 and 23 fig. 4 (New Caledonia; Discussion on synonymy); UTINOMI, 1966, p. 102 (Kii coast).

Distribution.—Miocene, Java (*Anthemiphyllia verbeeki* GERTH). Pliocene, Naha limestone, Okinawa; Java (*Lithophyllia martini* FELIX). Holocene (Subrecent fossil), raised coral reef (YOKOYAMA's 'Numa coral bed'), Tateyama district, Honsyu, Japan. Recent, Indo-Pacific, from Red Sea eastward to New Caledonia, Loyalty Islands and northward to Honsyu (Bôshô Peninsula).

Color of living polyps.—Light brown in a contracted state; when the tentacles are fully extended, the oral disc shows radial striae of paler tone (Cf. CATALA, 1964, pl. X, figs. 1-5; NISHIMURA & SUZUKI, 1971, pl. 3, fig. 8).

Lobophyllia robusta YABE & SUGIYAMA ハナガタサンゴ

Coll. No. 12 (Kamae Bay).

Syn. and Ref.—

Lobophyllia robusta Y. & S. in YABE, SUGIYAMA & EGUCHI, 1936, p. 44, pl. 32, figs. 2–4 (Enoura Bay, etc.); HAMADA et al., 1963, p. 24, pl. 22, figs. 1a–1b (Tateyama-Kôyatu Holocene); EGUCHI, 1965, p. 283, fig. 399; UINOMI, 1965, p. 253 (Tosa-simizu, etc.); KIKUCHI, 1968, p. 8, pl. 4, fig. 4 (Amakusa Is.); YAGI, 1970, p. 33, fig. 39 (off Tosa Bay).

Distribution.—Endemic to Japan, from Sagami Bay southward to Kita-Daito-zima.

Family Echinoporidae VERRILL

Echinophyllia aspera (ELLIS & SOLANDER) キクカサンゴ

Coll. Nos. 28, 30 and 58 (Kamae Bay).

Syn. and Ref.—

Madrepora aspera ELLIS & SOLANDER, 1786, p. 156, pl. 39.

Echinopora aspera (ELLIS): DANA, 1846, p. 281 (East Indies); MILNE EDWARDS & HAIME, 1849, p. 188; MILNE EDWARDS & HAIME, 1857, II, p. 625.

Oxyphyllia aspera (ELLIS & SOLANDER): YABE & EGUCHI, 1935a, p. 377, figs. 1–4 (Oura, Miyazaki-ken, with var. *tosaensis* from Susaki, Kôti-ken and Udo, Miyazaki-ken); YABE, SUGIYAMA & EGUCHI, 1936, p. 50, pl. 36, figs. 1–4, 6; UMBGROVE, 1939, p. 40, pl. 10, figs. 1–2.

Echinophyllia aspera (ELLIS & SOLANDER): KLUNZINGER, 1879, III, p. 69; VAUGHAN & WELLS, 1943, p. 197, pl. 40, figs. 3–4; WELLS, 1954, p. 467, pl. 176 (Marshall Is.; Discussion on synonymy); NEMENZO, 1958–59, p. 119, pl. 17, fig. 1; HAMADA et al., 1963, p. 23, pl. 38, figs. 1–2b, pl. 39, figs. 1–6 (Tateyama-Kôyatu Holocene); UINOMI, 1965, p. 253 (Asizuri-saki, Kôti-ken); EGUCHI, 1965, p. 284, fig. 402; KIKUCHI, 1968, p. 8, pl. 4, fig. 5 (Amakusa Is.).

Family Pectiniidae VAUGHAN & WELLS

(=Tridacophylliidae THIEL)

Pectinia lactuca (PALLAS) ウミバラ

Coll. No. 26 (Kamae Bay).

Syn. and Ref.—

Madrepora lactuca PALLAS, 1766, p. 289 (Mare Americanum ?); ELLIS & SOLANDER, 1786, p. 158, pl. 44.

Tridacophyllia lactuca (PALLAS): DANA, 1846, p. 195, pl. 9, figs. 10–10a (East Indies); MILNE EDWARDS et HAIME, 1849, p. 273 (New Guinea); MATTHAI, 1924, p. 36, pl. 3, figs. 8–9, pl. 8, fig. 6 (Indian Ocean); MATTHAI, 1928, p. 262; THIEL, 1932, p. 103, pl. 18, fig. 3; YABE, SUGIYAMA & EGUCHI, 1936, p. 51, pl. 31, fig. 2, pl. 34, fig. 7, pl. 35, fig. 3.

Tridacophyllia manicina DANA, 1846, p. 196 (West Indies ?); MILNE EDWARDS et HAIME, 1849, p. 274.

Tridacophyllia laciniata and *T. symphylloides* MILNE EDWARDS et HAIME, 1849, pp. 274–275 (China Sea); THIEL, 1932, p. 107, pl. 13, figs. 1–2, pl. 21, fig. 2 (Banda Sea).

Tridacophyllia paeonia DANA, 1846, p. 196, pl. 9, figs. 11–11a (Fiji Is.).

Pectinia lactuca (PALLAS): FAUSTINO, 1927, p. 160, pl. 41; VAUGHAN & WELLS, 1943, p. 198, pl. 40, fig. 7; NEMENZO, 1958–59, p. 124, EGUCHI, 1965, p. 284, fig. 404; HAMADA et al., 1963, p. 24, pl. 31, figs. 1a–1b (Tateyama-Kôyatu Holocene); UINOMI, 1965, p. 253; KIKUCHI, 1968, p. 8, pl. 4, fig. 1; YAGI, 1970, p. 35, fig. 41.

Pectinia laciniata (M.E. et H.): FAUSTINO, 1927, p. 161, pl. 42, fig. 2; NEMENZO, 1958-59, p. 124.

Pectinia paeonia (DANA): FAUSTINO, 1927, p. 160, pl. 42, fig. 1; NEMENZO, 1958-59, p. 124.

Pectinia symphyllodes (M. E. et H.): FAUSTINO, 1927, p. 162, pl. 43.

Distribution.—Widespread from East African coast eastward to Fiji Islands and northward to Honsyu (Bôso Peninsula). This fragile coral is very luxuriant in bays in southern Japan and its growth form is exceedingly variable as emphasized by THIEL (1932, pp. 96-110), so that many different varietal or specific names have been assigned.

Suborder CARYOPHYLLIINA VAUGHAN & WELLS

Family Caryophylliidae GRAY

Euphyllia fimbriata (SPENGLER) ナガレハナサンゴ

Coll. No. 14 (Kamae Bay).

Syn. and Ref.—

Madrepora fimbriata SPENGLER, 1799, Saml. Videnskab. Selskabs Skrifter, 2nd ser., vol. 5, pp. 607-614, plate opposite p. 614 (after VAUGHAN).

Euphyllia turgida DANA, p. 166, pl. 9, figs. 9a-9b (Malacca, East Indies); GARDINER, 1906, p. 759; MATTHAI, 1928, p. 177, pl. 40, fig. 2, pl. 52 fig. 2 (Mauritius Is.); THIEL, 1932, p. 55, pl. 4, figs. 1-2 (Banda Sea).

Euphyllia meandrina DANA, 1846, p. 167, pl. 6, figs. 4-4b (East Indies).

Leptosmilia ramosa MILNE EDWARDS et HAIME, 1848, p. 268, pl. 6, fig. 1 (Singapore).

Euphyllia fimbriata (SPENGLER): VAUGHAN, 1918, p. 83, pl. 27, figs. 1-2 (Discussion on synonymy); MATTHAI, 1938, p. 179, pl. 40 fig. 1, pl. 41 figs. 1-2 pl. 52 fig. 1, pl. 59 fig. 1 (Discussion on synonymy); YABE, Sugiyama & EGUCHI, 1936, p. 17, pl. 8, figs.; HAMADA et al., 1963, p. 23, pl. 11, figs. 3a-5b (Tateyama-Kôyatu Holocene) 1-4; UTINOMI, 1965, p. 225; EGUCHI, 1965, p. 291, fig. 430; UTINOMI, 1966, p. 102; YAGI, 1970, p. 37, fig. 43 (Inan coast); OOSHII, 1970, p. 85, pl. 8, figs. 4-5 (Hutami Bay, Ogasawara Is.).

? *Flabellum multifore* GARDINER, 1904, p. 954, pl. 93, figs. 28-29 (Maldives Arch.); FAUSTINO, 1927, p. 57, pl. 4, figs. 1-2 (Philippines).

? *Antillia flabelliformis* YABE & SUGIYAMA, 1931, p. 127, pl. 38, figs. 8-9.

? *Antillophyllia flabelliformis* (YABE & SUGIYAMA): YABE, SUGIYAMA & EGUCHI, 1936, p. 21 (Uranoutimura, Kôti-ken, Tosa Prov.); EGUCHI, 1965, p. 281, fig. 390.

Color of polyps...Tentacles are fully extended during daylight and brilliantly dull green with fluorescence.

Distribution.—Indian Ocean eastward to Palau Islands and northward to Honsyu (Tateyama Bay).

Suborder DENDROPHYLLIINA VAUGHAN & WELLS

Family Dendrophylliidae GRAY

Dendrophyllia micrantha (EHRENBERG) ナンノウキサンゴ

Coll. No. 47 (Kamae Bay).

Syn. and Ref.—

Oculina micranthus EHRENBURG, 1834, p. 80 (Red Sea).

Dendrophyllia micranthus (EHRENBURG): MILNE EDWARDS et HAIME, 1848, p. 104; VAN DER HORST, 1922, p. 49 (Red sea, Indonesia and Japan); VAN DER HORST, 1926, p. 43, pl. 2, figs. 6–7 (Japan and Indonesia); FAUSTINO, 1927, p. 218, pl. 72, figs. 1–2; EGUCHI, 1937, p. 372 (Palau Is.); NEMENZO, (with var. *fruticosa*); UTINOMI, 1965, p. 256 (off Asizuri-saki, Tosa Prov.); EGUCHI, 1965, p. 294, fig. 442; KIKUCHI, 1968, p. 9, pl. 5, fig. 10 (Amakusa Is.); EGUCHI, 1968, p. C66, pl. C24, figs. 2–3 (Sagami Bay); YAGI, 1970, p. 45, fig. 54 (Inan coast).

Coenopsammia nigrescens (DANA): MILNE EDWARDS et HAIME, 1860, p. 129.

Dendrophyllia nigrescens DANA, 1846, p. 386, pl. 27, figs. 1, la-lf (Fiji Is.); MILNE EDWARDS et HAIME, 1848, p. 104; VAUGHAN, 1918, p. 143, pl. 60, figs. 1–1a (Murray Is.).

Dendrophyllia micranthus var. *grandis* CROSSLAND, 1952, p. 173, pl. 55, fig. 1, pl. 56, fig. 1 (Great Barrier Reef).

Distribution.—Red Sea eastward to Fiji Islands and northward to Korean Straits. 1~90 m in depth.

Color of living colonies.—Brown-black, with a greenish fluorescence around the oral disc of polyps.

Dendrophyllia arbuscula VAN DER HORST ジュウジキサンゴ

(Pl. XIII, figs. 4a, 4b)

Coll. No. 48 (Kamae Bay).

Syn. and Ref.—

Dendrophyllia arbuscula VAN DER HORST, 1922, p. 53, pl. 8, fig. 6 (Kei Is.); EGUCHI, 1965, p. 294, fig. 444; UTINOMI, 1966, p. 102 (Kii coast); KIKUCHI, 1968, p. pl. 5, fig. 6 (Tomioka, Amakusa Is.); EGUCHI, 1968, p. C55, pl. C21, figs. 5, 13 (Sagami Bay, 40–50 m).

Distribution.—East Indies (Kei Islands) northward to Honsyu (Aomori-ken). 15–311 m in depth.

Color of living polyps.—Orange in column wall and oral disc, and yellow in tentacles and oral margin (Cf. NISHIMURA & SUZUKI, 1971, pl. 4, fig. 5).

Tubastrea aurea (QUOY & GAIMARD) イボヤギ

Coll. Nos. 44 and 45 (Kamae Bay).

Syn. and Ref.—

Lobophyllia aurea QUOY & GAIMARD, 1833, p. 195, pl. 15, figs. 7–11 (Port Royal George and Port Jackson, Australia).

Dendrophyllia aurantiaca: DANA, 1846, p. 388. [Maybe a mistake for 'aurea']

Tubastrea coccinea LESSON, 1834 (after VAUGHAN & WELLS, 1943).

Coenopsammia? aurea: MILNE EDWARDS & HAIME, 1848, p. 111.

Coenopsammia tenuilamellosa MILNE EDWARDS & HAIME, 1848, p. 110, pl. 1, fig. 11 (Panama).

Coenopsammia coccinea (LESSON): MILNE EDWARDS & HAIME, 1848, p. 107; MILNE EDWARDS & HAIME, 1860, III, p. 126.

Coenopsammia ehrenbergiana MILNE EDWARDS & HAIME, 1848, p. 109, pl. 1, fig. 12 (Seychelles Is. and Red Sea); MILNE EDWARDS & HAIME, 1860, III, p. 127.

- Coenopsammia willeyi* GARDINER, 1900, p. 359, pl. 34 (Loyalty Is.).
Coenopsammia manni VERRILL, 1866, p. 30 (Hawaii Is.).
Dendrophyllia manni (VERRILL): VAUGHAN, 1907, p. 156, pl. 46, figs. 6–7a (Hawaii Is.); VAUGHAN, 1918, p. 144 (Hawaii Is.).
Dendrophyllia willeyi (GARDINER): VAUGHAN, 1918, p. 143, pl. 60, figs. 4–4a (Cocos-Keeling Atoll); VAN DER HORST, 1922, p. 56, pl. 8, figs. 17–18 (Japan).
Dendrophyllia aurea (Q. et G.): VAN DER HORST, 1926, p. 46, pl. 2, figs. 1–9 (Discussion on synonymy).
Tubastraea willeyi (GARDINER): WELLS, 1950, p. 55 (Cocos-Keeling Atoll).
Tubastraea tenuilamellosa (M.E. et H.): VAUGHAN & WELLS, 1943, p. 238, pl. 50, fig. 5; BOSCHMA, 1953, p. 110, pl. 9 figs. 1–4, pl. 10 figs. 1, 3–5, pl. 11 figs. 1–3 (Curaçao; Discussion on morphology).
Tubastraea aurea (Q. et G.): VAUGHAN & WELLS, 1943, p. 238; BOSCHMA, 1953, p. 110, pl. 9 figs. 5–6, pl. 10 figs. 2, 6, pl. 11 figs. 2, 4–6, pl. 12 figs. 1–6 (Kei Is. and Seychelles; Discussion on morphology); SQUIRES, 1959, p. 427 (Gulf of California; Discussion on synonymy); SQUIRES, 1960, p. 200, pl. 35, fig. 12 (Norfolk Is. Cable, New Zealand).
Tubastraea aurea (Q. et G.): UTINOMI, 1965, p. 257; EGUCHI, 1965, p. 295, fig. 448; UTINOMI, 1966, p. 102; KIKUCHI, 1968, p. 9; EGUCHI, 1968, p. C68, pl. C16, figs. 5, 6, pl. C17, figs. 17, pl. C26, figs. 2, 3 (Sagami Bay).

Distribution.—Circumtropical throughout the west Atlantic and Indo-Pacific, living usually on shaded rock surface in shallow waters.

Color of living colonies—Peach red, with yellowish tentacles and oral margin (Cf. UTINOMI, 1969, pl. 12, fig. 1; NISHIMURA & SUZUKI, 1971, pl. 4, fig. 8).

Tubastraea coccinea (HEMPRICH & EHRENBERG) オオイボヤギ

(Pl. XIII, figs. 5a, 5b)

Coll. No. 50 (Kamae Bay).

Syn. and Ref.—

- Oculina coccinea* H. et E. in EHRENBERG, 1834, p. 80 (Red Sea).
Dendrophyllia coccinea (H. et E.): DANA, 1846, p. 388, pl. 27, fig. 4 (Singapore and Fiji Is.); MILNE EDWARDS et HAIME, 1848, p. 103.
Dendrophyllia ehrenbergiana (M.E. et H.): VAN DER HORST, 1922, p. 55, pl. 7, figs. 3–4 (Ambon). [Non M.E. et H., 1838 = *Tubastraea aurea* (Q. et G.)]
Dendrophyllia coccinea (EHRENBERG): VAN DER HORST, 1926, p. 45, pl. 3, figs. 1–3 (Maldives, Jaluit and Ambon); GARDINER and WAUGH, 1939, p. 236; UTINOMI, 1965, p. 257 (Inan coast); EGUCHI, 1965, p. 296, fig. 449.
Dendrophyllia erecta NEMENZO, 1960, p. 13, pl. 10, fig. 1 (Sulu Is.).
Tubastraea coccinea (EHRENBERG): EGUCHI, 1968, p. C60, pl. C2 fig. 3, pl. C14, fig. 4, 5, 8, 9 (Sagami Bay); KIKUCHI, 1968, p. 9, pl. 5, fig. 4 (Amakusa Is.).
Tubastraea coccinea titijimensis (YABE & EGUCHI, 1934): EGUCHI, 1968, p. C71, pl. C17, fig. 16, pl. C31 figs. 1–4 (Ogasawara Is. and Sagami Bay).

Distribution.—Red Sea eastward to Marshall Islands and northward to Sagami Bay. Its habitat is the same as that of the preceding.

Color of living colonies.—Vermilion, with light-shaded oral margin and tentacles (Cf. EGUCHI, 1968, pl. C2, fig. 3; NISHIMURA & SUZUKI, 1971, pl. 4, fig. 7).

Turbinaria bifrons BRÜGGEMANN ヒダベリスリバチサンゴ

(Pl. XIII, fig. 6)

Coll. No. 46 (Kamae Bay).

Syn. and Ref.—

Turbinaria bifrons BRÜGGEMANN, 1877, p. 415; BERNARD, 1896, p. pl. 21 and pl. 33, fig. 1 (West Australia); YABE & SUGIYAMA, 1941, p. 85, pl. 95, figs. 1-1b (Misaki, Koti-ken); CROSSLAND, 1952, p. 176, pl. 21, figs. 1-2 (Great Barrier Reef); UTINOMI, 1965, p. 258 (Tosa-simizu, Koti-ken); UTINOMI, 1966, p. 102 (Kii coast); YAGI, 1970, p. 50, fig. 59 (Inan coast).
 ? *Turbinaria conspicua* BERNARD, 1896, p. 70, pl. 22, figs. 1-2, pl. 33, fig. 2 (Sharks Bay, W. Australia).

Distribution.—West Australia, Great Barrier Reef and Japan (Sikoku and Kii coast).

Turbinaria auricularis BERNARD

ミミガタスリバチサンゴ(改称)

(Pl. XIII, fig. 7)

Coll. No. 21 (Kamae Bay).

Syn and Ref.—

Turbinaria auricularis BERNARD, 1896, p. 47, pl. 10, pl. 31 fig. 20 (Ponape Is.); THIEL, 1932, p. 112, pl. 17, fig. 1 (Banda Sea); YABE & SUGIYAMA, 1941, p. 85, pl. 96, figs. 4-4b, pl. 97, figs. 2-2d, pl. 101, fig. 4, pl. 104, fig. 2 (Tanabe Bay, Susaki and Amami-osima); NEMENZO, 1960, p. 6 (Cebu).

Distribution.—Ponape (type locality), New Caledonia, Banada Sea, New Guinea, Philippines, Amami-osima and Sikoku and Tanabe Bay.

Turbinaria peltata (ESPER) ハシラスリバチサンゴ

Coll. No. 6 (Kamae Bay).

Syn. and Ref.—

Madrepora peltata ESPER, Fortsetzungen, Th. I, 1977, p. 27, pl. 42 (after BERNARD).

Gemmipora peltata (ESPER): DANA, 1846, p. 410, pl. 30, figs. 4-4b (Fiji Is.).

Turbinaria peltata (ESPER): BERNARD, 1896, p. 38, pls. 6-8 and pl. 31, fig. 1; FAUSTINO, 1927, p. 247, pl. 78, figs. 1-2 (Luzon); UMBGROVE, 1939, p. 54 (Bay of Batavia); YABE & SUGIYAMA, 1941, p. 87, pl. 93, and pl. 94, figs. 1-2; CROSSLAND, 1952, p. 174, pl. 16 fig. 5, pl. 18 fig. 2, pl. 19 fig. 2 (Great Barrier Reef); NEMENZO, 1960, p. 4, pl. 1, fig. 1 (Philippines); UTINOMI, 1965, p. 258; EGUCHI, 1965, p. 296, fig. 451; UTINOMI, 1966, p. 102; KIKUCHI, 1968, p. 9, pl. 4, fig. 7 (Amakusa Is.); YAGI, 1970, p. 48, 57 (Inan coast).

Distribution.—Indian Ocean (Mauritius) eastward to Palau Islands and northward to Honsyu (Enoura Bay).

Distribution of Shallow-water Corals on the Eastern Coast of Kyushu (from Oita-ken to Kagosima-ken)

Kamae Bay is a small cove formed of three shallow inlets with a depth of 10–30 meters and opened to the south. The bay is located approximately at the Latitude 32°47'N, where is nearly the northern limit of existing range of living reef corals along the eastern coast of Kyushu, and faces the Bungo Channel through which oceanic water flows northward to the Inland Sea of Seto.

The coral fauna of Kamae Bay elucidated by the present survey for the first time is, although incomplete, represented by 49 species belonging to 24 genera. They are mostly hermatypic (reef-building) corals, although partly ahermatypic, practically common types in the Japanese seas and elsewhere in the tropical Pacific. The following table is a check-list of shallow-water corals from Kamae Bay and three nearby areas, as cited from previous records such as SUGIYAMA (1937), EGUCHI (1938) and UMINOMI (1965). Some more species will no doubt be added to the fauna of Kamae Bay in the future.

Acknowledgments

I must firstly extend my hearty thanks to Mr. T. UEDA, president of the Oita Marine Ecological Aquarium who planned and sponsored the preliminary biological survey of the reef coral area of Kamae Bay on the southeast coast of Oita Prefecture with our staffs of the Seto Marine Biological Laboratory cooperated in this survey. My special thanks are due to Dr. Shiro TAKAMATSU, chief of the research section of that aquarium for the laborious works to collect the reef corals in Kamae Bay and to photograph the specimens transferred to his laboratory in aquaria and then the cleaned ones in detail. Finally I wish to thank Dr. M. EGUCHI, Professor emeritus of the Tohoku University for giving me helpful informations and literature concerning the taxonomy of corals as well as his constant friendship.

Table

Species	Kamac Bay (32°47'N)	Simanoura* (32°40'N)	Aosima* (31°37'N)	Uwa-kai or Inan coast** (33°13'~32°47'N)
<i>Stylocoeniella armata</i> (H. et E.)	×	×	•	•
<i>Psammocora profundacella</i> G.	•	•	×	×
<i>Stylophora pistillata</i> (Esper)	•	•	×	×
<i>Pocillopora damicornis</i> (Linné)	×	•	×	×
<i>Acropora tumida</i> (Verrill)	×	×	•	×
<i>A. cerealis</i> (Dana)	×	•	•	•
<i>A. pectinata</i> (Brook)	×	•	•	×
<i>A. studeri</i> (Brook)	×	×	×	×
<i>A. spicifera</i> (Dana)	×	•	•	•
<i>A. surculosa</i> (Dana)	×	•	•	×
<i>A. digitifera</i> (Dana)	×	•	•	•
<i>A. tubicinaria</i> (Dana)	×	•	•	•
<i>A. syringodes</i> (Brook)	×	•	•	×
<i>A. humilis</i> (Dana)	×	•	•	×
<i>A. squarrosa</i> (H. et E.)	•	×	×	×
<i>A. variabilis</i> (Klunz.)	•	×	•	•
<i>Astreopora gracilis</i> Bern.	•	•	•	×
<i>Montipora cactus</i> Bernard	×	•	•	•
<i>M. informis</i> Bernard	×	•	×	•
<i>M. caliculata</i> (Dana)	×	•	•	•
<i>M. cf. ramosa</i> Bernard	•	•	•	×
<i>Pavona decussata</i> Dana	×	×	×	×
<i>P. frondifera</i> Lamarck	•	×	•	×
<i>Coscinaraea columna</i> (Dana)	•	•	×	•
<i>Lithophyllon lobata</i> (v.d.H.)	×	•	×	×
<i>L. elegans</i> (M.E. et H.)	×	•	•	•
<i>Goniopora tenuidens</i> (Quelch)	•	•	•	•
<i>G. planulata</i> (H. et E.)	•	•	•	×
<i>Porites lutea</i> M.E. et H.	×	•	•	×
<i>P. andrewsi</i> Vaughan	×	•	•	•
<i>P. compressa abacus</i> V.	•	•	×	•
<i>P. cf. quelchi</i> Studer	•	•	•	×
<i>P. tenuis</i> Verrill	•	•	•	×
<i>Alveopora japonica</i> E.	×	•	×	•
<i>Caulastraea tumida</i> M.	×	×	•	×
<i>C. t. conglobata</i> (Y. et S.)	•	•	•	•
<i>C. t. multiseptata</i> (Y. et S.)	•	•	•	•
<i>Favia speciosa</i> (Dana)	×	×	×	×
<i>F. pallida</i> (Dana)	×	×	•	×
<i>F. valenciennesi</i> (M.E. et H.)	•	•	×	×
<i>Favites abdita</i> (Ellis et Solander)	×	×	×	×

Species	Kamae Bay (32°47'N)	Simanoura* (32°40'N)	Aosima** (31°37'N)	Uwa-kai or Inan coast** (33°13'~32°47'N)
<i>F. favosa</i> (Ellis et Solander)			•	×
<i>F. aspera</i> (Verrill)	•	•	×	×
<i>F. virens</i> (Dana)	×	•	×	×
<i>F. pentagona</i> (Esper)	×	•	•	×
<i>Goniastrea pectinata</i> (H. et E.)	•	×	×	×
<i>Platygyra lamellina</i> (H. et E.)	×	•	×	×
<i>P. rustica</i> (Dana)	×	×	×	×
<i>P. gigantea</i> (Y. et S.)	•	•	•	×
<i>Plesiastrea versipora</i> (Lamarck)	•	×	×	×
<i>Hydnophora exesa</i> (Pallas)	×	×	×	×
<i>Leptastrea purpurea</i> (Dana)	×	×	×	×
<i>Cyphastrea microphthalma</i> (Lom.)	×	•	×	•
<i>C. chalcidicum</i> (Forskaal)	×	×	×	×
<i>C. serailia</i> (Forskaal)	×	•	•	×
<i>C. ch. tanabensis</i> Y. et S.	×	•	•	×
<i>C. japonica</i> Y. et S.	×	•	•	×
<i>Trachyphyllia geoffroyi</i> (Audouin)	×	•	•	•
<i>Cynarina lacrymalis</i> (M.E. et H.)	×	•	•	×
<i>Lobophyllia robusta</i> Y. et S.	×	•	•	•
<i>L. costata</i> (Dana)	•	•	×	×
<i>Symphylia recta</i> (Dana)	•	•	•	×
<i>S. radians</i> M.E. et H.	•	•	×	×
<i>Acanthastrea cf. echinata</i> Dana	•	×	×	×
<i>Merulina ampliata</i> (Ellis et Solander)	•	×	•	•
<i>Echinophyllia lactuca</i> (Ellis et Solander)	×	•	×	×
<i>Physophyllia aylei</i> Wells	•	•	•	×
<i>Pectinia actaca</i> (Pallas)	×	×	•	×
<i>Euphyllia fimbriata</i> (Speng.)	×	×	•	×
<i>Dendrophyllia micrantha</i> (Ehr.)	×	•	×	×
<i>D. arbuscula</i> v. d. Horst	×	•	•	•
<i>D. minuscula</i> Bourne	•	•	•	×
<i>Tubastrea aurea</i> (Q. et G.)	×	•	×	×
<i>T. coccinea</i> (H. et E.)	×	•	•	×
<i>Turbinaria bruggemanni</i> B.	•	×	×	×
<i>T. bifrons</i> Bruggemann	×	•	•	×
<i>T. peltata</i> (Esper)	×	×	×	×
<i>T. crater</i> (Pallas)	•	×	×	×
<i>T. undata</i> Bernard	•	•	•	×
<i>T. contorta</i> Bernard	•	•	×	×
<i>T. auricularis</i> Bernard	×	•	•	•
<i>T. tubifera</i> Bernard	•	×	×	•

* Cited after YABE & SUGIYAMA (1935), SUGIYAMA (1937) and EGUCHI (1938).

** Cited after SUGIYAMA (1937), UENOMI (1965) and YAGI (1970).

LITERATURE CITED

This list contains main references and monographs important for plotting the distribution of the species common in the Indo-West Pacific area and for saving the illustration of each of the species treated here. Some easily available popular books are also included.

- AUDOUIN, Victor 1828. Explication sommaire des planches de l'Égypte et de la Syrie, publiées par Jules-César Savigny, dans: Description de l'Égypte. Paris. (Madrepores: pp. 233-236 for SAVIGNY's Pls. 4-5.)
- BERNARD, H. M. 1896. The genus *Turbinaria*. The genus *Astraeopora*. Cat. Madreporarian corals of the British Mus. (Nat. Hist.), v. 2, 106 pp., 33 pls.
- 1897. The genus *Montipora*. The genus *Anacropora*. Ibid., v. 3, 192 pp., 34 pls.
- 1903. The genus *Goniopora*. Ibid., v. 4, 206 pp., 14 pls.
- 1905. *Porites* of the Indo-Pacific region. Ibid., v. 5, 206 pp., 14 pls.
- BOSCHMA, H. 1953. On specimens of the coral genus *Tubastraea*, with notes on phenomena of fission. Studies on the Fauna of Curaçao and other Caribbean Islands, v. 4: 109-119, pls. IX-XI.
- BROOK, G. 1893. The genus *Madrepora*. Cat. Madreporarian corals of the British Mus. (Nat. Hist.), v. 1, 212 pp., 35 pls.
- BRÜGGEMANN, F. 1877. Notes on stony corals in the British Museum. A revision of the Recent solitary Mussaceae. Ann. Mag. nat. Hist., (iv), 20: 300-313.
- CATALA, R. 1964. Carnival under the sea. Edited by R. SICARD, Paris. 141 pp., 27 color pls.
- CROSSLAND, C. 1952. Madreporaria, Hydrocorallineae, *Heliopora* and *Tubipora* (K. TOTTON ed.). Great Barrier Reef Expedition 1928-29, Sci. Repts., v. 6, 257 pp., 56 pls.
- DANA, J. D. 1846-49. Zoophytes. U.S. Exploring Exped., v. 7, Text 740 pp. (1846), Atlas 61 pls. (1849). C. Sherman, Philadelphia.
- EGUCHI, M. 1935. [Corals and coral reefs of Palau Islands.] Contr. Inst. Geol. Palaeontol., Tohoku Imp. Univ. in Jap. Lang., no. 16, 49 pp., 13 pls. (In Japanese.)
- 1937. A systematic study of the reef-building corals of the Palao Islands. Palao Trop. Biol. Sta. Studies, 1 (1): 325-390.
- 1938. [Reef corals found near Aosima, Hiuga and littoral stony corals around the coast of Miyazaki Prefecture.] Bot. and Zool., 6 (12): 2013-2022. (In Japanese.)
- 1965. Scleractinia. New Illustrated Encyclopedia of Japan, v. 1: 272-296, figs. 353-452. Hokuryu-kan, Tokyo. (In Japanese.)
- 1968. The hydrocorals and scleractinian corals of Sagami Bay, collected by His Majesty of the Emperor of Japan. Edited by the Biol. Lab. of Imp. Household. Maruzen Co., Tokyo. xv+53 pp., 36 pls. 17 pp. (Hydrocorals); C80 pp., C33 pls. C43 pp. (Scleractinian corals); Appendix—Red coral, A2 pp., 1 pl. A2 pp. (In English and Japanese.)
- EHRENBERG, C. G. 1834. Die Corallenthiere des rothen Meeres physiologisch untersucht und systematisch verzeichnet. Königl. Akad. Wiss., Berlin. 156 pp.
- ELLIS, J. & D. SOLANDER 1786. The natural history of many curious and uncommon zoophytes, collected from various parts of the globe. Benjamin White and son, London. xii+208 pp., 63 pls.
- FAUSTINO, L. A. 1927. Recent Madreporaria of the Philippine Islands. Bureau of Science, Manila, Monograph 22, 310 pp., 100 pls.
- GARDINER, J. S. 1906. Madreporaria. Parts I and II. In: J. S. GARDINER (ed.), The Fauna and Geography of the Maldiva and Laccadive Archipelagoes, v. 2: 755-790, pls. 59-64.
- 1906. Ditto. Parts III and IV. Ibid., v. 2: 933-957, pls. 90-93.
- GARDINER, J. S. & P. WAUGH 1939. Madreporaria excluding Flabellidae and Turbinolidae. John Murray Exped., 1933-34, Sci. Repts., 6 (5): 225-250, pls. 1-2.
- HAMADA, T. et al. 1963. [Scleractinia.] In: Geological figures of Chiba-ken, v. 4. Edited by Chiba-ken Chigaku-kyoiku-kenkyukai, Chiba. 119 pp. (including 45 pls.) (In Japanese.)
- HOFFMEISTER, J. E. 1925. Some corals from American Samoa and the Fiji Islands. Pap. Dept. mar. Biol., Carnegie Inst. Wash., 22 (Carnegie Inst. Wash. Publ. 343): 1-90, pls. 1-23.

- HORST, C. J. VAN DER 1922a. Madreporaria of the Siboga Expedition, Part II. Madreporaria Fungida. Siboga-Expeditie, monogr. **16b** (Livr. 90): 1-46, pls. 1-6.
- 1922b. Ditto, Part III. Eupsammidae. Ibid., monogr. **16c** (Livr. 92): 47-75, pls. 7-8.
- 1926. Madreporaria: Eupsammidae. Trans. Linn. Soc. Lond., ser. 2, Zool., **19**: 43-53, pls. 2-3; J. S. GARDINER (ed.), The Percy Sladen Trust Expedition to the Indian Ocean in 1905, v. **8**, no. 2.
- KIKUCHI, T. (ed.) 1968. [Zoantharia, Coelenterata.] Fauna and flora of the sea around the Amakusa Marine Biological Laboratory, part VII, 16 pp., 5 pls. [Scleractinians identified by M. EGUCHI.] (In Japanese.)
- KLUNZINGER, C. B. 1879. Die Koralthiere des rothen Meeres. pt. 2: Die Madreporaceen und Oculinaceen. 88 pp. 10 pls. pt. 3: Die Astraeaceen und Fungiaceen. 100 pp., 10 pls. Verlag Gutmansch Buchhandl., Berlin.
- LINNAEUS, C. 1758. Systema Naturae. Regnum Animale. Editio Decima, 1758. Cura Societatis Zoologicae Germanicae. Iterum Edit. Lipsiae (1894). 824+iii pp.
- MATTHAI, G. 1914. A revision of the Recent colonial Astreidae possessing distinct corallites. Trans. Linn. Soc. Lond., ser. 2, Zool., **17**: 1-140, pls. 1-38; J. S. GARDINER (ed.), The Percy Sladen Trust Expedition to the Indian Ocean in 1905, v. **6**, no. 1.
- 1924. Report on the madreporarian corals in the collection of the Indian Museum, Calcutta. Mem. Ind. Mus., **8**: 1-59, pls. 1-11.
- 1928. A monograph of the Recent meandroid Astreidae. Cat. Madreporarian corals of the British Mus. (Nat. Hist.), v. **7**, 288 pp., 72 pls.
- MILNE EDWARDS, H. & J. HAIME 1848-51. Recherches sur les polypiers. Mémoire 1-7. Ann. Sci. nat. (3) Zool. **9** (1848): 37-89, pls. 4-6; **9** (1848): 211-344, pls. 7-10; **10** (1848): 65-114, pl. 1; **10** (1848): 209-321, pls. 5-10; **11** (1849): 233-312; **12** (1849): 95-197; **13** (1850): 63-110, pls. 3-4; **15** (1850): 73-144; **16** (1851): 21-70, pl. 1.
- 1857-60. Histoire naturelle des coralliaires ou polypes proprement dits. Tome **1** (1857), 326 pp. Tome **2** (1857), 633 pp. Tome **3** (1860), 559 pp. Atlas (1857), 11 pp., 31 pls. Libr. Encyclop. Roret, Paris.
- NEMENZO, F. 1955-67. Systematic studies on Philippine shallow water scleractinians: I-VI. Nat. Appl. Sci. Bull., **15** (1955): 3-84, pls. 1-14; **16** (1958/59): 73-135, pls. 1-24; **17** (1960): 207-213, pls. 1-2; **18** (1960): 1-22, pls. 1-10; **18** (1964): 193-223, pls. 1-12; **20** (1967): 1-141, pls. 1-40.
- NISHIMURA, S. & K. SUZUKI 1971. [Common seashore animals of Japan in color.] Hoikusha, Osaka. (In Japanese.) xii+196 pp., 64 color pls. [Scleractinians: pls. 3-4].
- OISHI, Sh. 1970. Marine invertebrate fauna of the Ogasawara and Volcano Islands collected by S. OISHI, Y. TOMIDA, K. IZAWA and S. MANABE. In: Report on the marine biological expedition to the Ogasawara (Bonin) Islands, 1968: 75-104, pls. 1-25. Published by the Toba Aquarium and the Asahi Shimbun Publ. Co., Nagoya.
- PALLAS, P. S. 1766. Elenchus zoophytorum. The Hague. 28+451 pp.
- QUOY, J. R. C. & P. GAIMARD 1833. Zoophytes. Voyage de découverte de l'Astrolabe, exécuté par ordre du Roi, pendant les années 1826-1827-1828-1829, sous le commandement de M. J. DUMONT D'Urville. Zoologie, Tome **IV**. J. Tastu, Editeur-Imprimeur, Paris. 390 pp., 26 folio pls.
- SAVIGNY, J.-C. DE, 1817. Description de l'Égypte ou recueil des observations et des recherches qui ont été faites en Égypte pendant l'expédition de l'armée française publié par les ordres de sa Majesté l'Empereur Napoléon le Grand. Histoire naturelle. Tome Premier. Imprimerie Impériale, Paris. 125 folio pls. (Pls. 4-5: Madreporae).
- SQUIRES, D. F. 1959. Results of the Puritan-American Museum of Natural History Expedition to western Mexico. 7. Corals and coral reefs in the Gulf of California. Bull. Amer. Mus. Nat. Hist., **118** (7): 371-431, pls. 28-34.
- 1960. Scleractinian corals from the Norfolk Island Cable. Rec. Auck. Inst. Mus., **5** (3/4): 195-201, pls. 33-35.

- STEPHENSON, W. & J. W. WELLS 1956. The corals of Low Isles, Queensland, August, 1954. Univ. Qld. Pap. Dept. Zool., **1** (4): 1-59.
- SUGIYAMA, T. 1937. [On the Recent reef-building corals found in the coastal waters of Japan.] Contr. Inst. Geol. and Paleontol., Tohoku Imp. Univ. in Japanese lang., no. **26**, 60 pp., 2 pls. and 1 table. (In Japanese.)
- THIEL, M. E. 1932. Madreporaria. Zugleich ein Versuch einer vergleichenden Oekologie der gefunden Formen. Mém. Mus. Hist. Nat. belge, Hors Ser., **2** (12), 177 pp., 21 pls.
- UMBROGROVE, J. H. F. 1939. Madreporaria from the Bay of Batavia. Zool. Meded., **22** (1/2): 1-64, pls. 1-18.
- UTINOMI, H. 1954. On a small collection of Anthozoa from the Inan coast, Ehime Prefecture. Mem. Ehime Univ., Sect. II (Sci.), Ser. B (Biol.), **2** (1): 101-106.
- 1956. Invertebrate fauna of the intertidal zone of the Tokara Islands. XIV. Stony corals and hydrocorals. Publ. Seto Mar. Biol. Lab., **5** (3): 339-346, pls. 31-32.
- 1965. A revised catalogue of scleractinian corals from the southwest coast of Sikoku in the collections of the Ehime University and the Ehime Prefectural Museum, Matuyama. Ibid., **13** (3): 243-261.
- 1966. [Outline of shallow-water coral fauna on the coasts of Kii Peninsula.] Survey Report of Jap. Assoc. Nature Protection, no. **27** (Scientific Report of Marine Park of Wakayama Pref.): 97-102. (In Japanese.)
- 1969. [Coloured illustrations of seashore animals of Japan.] Second and revised edition. Hoikusha, Osaka. (In Japanese.) xx+166 pp., 64 color pls. and 12 unicolored pls. (Scleractinians: pls. 12-13).
- VAUGHAN, T. W. 1907. Recent Madreporaria of the Hawaiian Islands and Laysan. U.S. Nat. Mus. Bull. **59**, 427 pp., 96 pls.
- 1918. Some shoal-water corals from Murray Island, Cocos-Keeling Islands, and Fanning Island. Pap. Dept. Mar. Biol. Carnegie Inst. Wash., **9** (Carnegie Inst. Publ. no. 213): 51-234, pls. 20-93.
- VAUGHAN, T. W. & J. W. WELLS 1943. Revision of the suborders, families and genera of the Scleractinia. Geol. Soc. America Special Paper **44**, 363 pp., 3 tables and 51 pls.
- VERRILL, A. E. 1901. Variations and nomenclature of Bermudian, West Indian and Brazilian reef corals, with notes on various Indo-Pacific corals. Trans. Conn. Acad., **11**: 63-206, pls. 10-35.
- 1902. Notes on corals of the genus *Acropora* (*Madrepora* Lam.) with new descriptions and figures of types, and of new species. Ibid., **11**: 207-266, pls. 36-36F.
- WELLS, JOHN W. 1936. The nomenclature and type species of some genera of Recent and fossil corals. Amer. J. Sci., 5th Ser., **31**: 97-134.
- 1950. Reef corals from the Cocos-Keeling Atoll. Bull. Raffles Mus., Singapore, no. **22**: 29-52, pls. 9-14.
- 1945. Recent corals of the Marshall Islands. Geol. Survey Prof. Pap. **260-1**: i-iv, 385-486, pls. 94-185.
- 1955. Recent and subfossil corals of Moreton Bay, Queensland. Univ. Qnd. Pap. Dept. Geol., N. S., **4** (10): 1-18, pls. 1-3.
- 1956. Scleractinia. In: Raymond C. MOORE (ed.), Treatise on Invertebrate Paleontology, Part F, Coelenterata: F328-F444. Univ. Kansas Press.
- 1961. Notes on Indo-Pacific Scleractinian corals. Part 3. A new reef coral from New Caledonia. Pacific Sci., **15** (2): 189-191.
- 1964. The Recent solitary Mussid scleractinian corals. Zool. Meded., **39** (Festbundel H. BOSCHMA): 375-384, pls. 20-23.
- YABE, H. & M. EGUCHI 1935a. *Oxyphyllia*, a new genus of hexacorals. Proc. Imp. Acad. Tokyo, **11**: 376-378.
- 1935b. Revision of reef coral genera *Echinopora*, *Oxyphyllia*, *Mycedium*, *Oxypora* and *Physophyllia*. Ibid., **11** (10): 429-431.

- YABE, H. & T. SUGIYAMA 1931. A study of Recent and semi-fossil corals of Japan. 1. *Antillia* and 2. *Caulastraea*. Sci. Rep. Tohoku Imp. Univ., 2nd Ser. (Geol.), **14** (2A).
- 1935a. Revised lists of the reef corals from the Japanese seas and of the fossil reef corals of the raised reefs and the Ryukyu limestone of Japan. J. Geol. Soc. Japan, **42** (502): 379–403, pls. 9–10.
- 1935b. Geological and geographical distribution of reef-corals in Japan. J. Paleontol., **9** (3): 183–217, pl. 21.
- 1932a. A living species of *Stylocoenia* recently found in Japan. Jap. Jour. Geol. and Geogr., **9** (3): 153–154, pl. 15.
- 1932b. Reef corals found in the Japanese seas. Sci. Rep. Tohoku Imp. Univ., 2nd Ser. (Geol.), **15** (2): 143–168.
- 1933. Notes on three new corals from Japan. Jap. J. Geol. and Geogr., **11** (1/2): 11–18, pls. 2–4.
- 1941. Recent reef-building corals from Japan and the South Sea Islands under the Japanese mandate. II. Sci. Rep. Tohoku Imp. Univ., 2nd Ser. (Geol.), Spec. vol. **2**: 69–91, pls. 60–104.
- YABE, H., SUGIYAMA, T. & M. EGUCHI 1936. Ditto. I. Ibid, Spec. vol. **1**: 1–66, pls. 1–59.
- YAGI, Sh. (ed.) 1970. [Illustrated catalogue of scleractinian corals, etc. stored in the Ehime Prefectural Museum.] (Scleractinia: Identified by H. UENOMI.) Nature of Ehime, spec. number. (In Japanese.) Publ. by the Ehime Sizenkagaku-kyositu in Ehime Prefectural Museum, Matuyama. 61 pp.

EXPLANATION OF PLATE X

- Fig. 1. *Favites virens* (DANA), upper view, in living state. Coll. No. 55.
- Fig. 2. *Trachyphyllia geoffroyi* (AUDOUIN), somewhat obliquely upper view, in living state. Coll. No. 56.
- Fig. 3. *Cynarina lacrymalis* (MILNE EDWARDS et HAIME), two specimens in contact, somewhat obliquely upper view, in living state. Coll. No. 57.



1



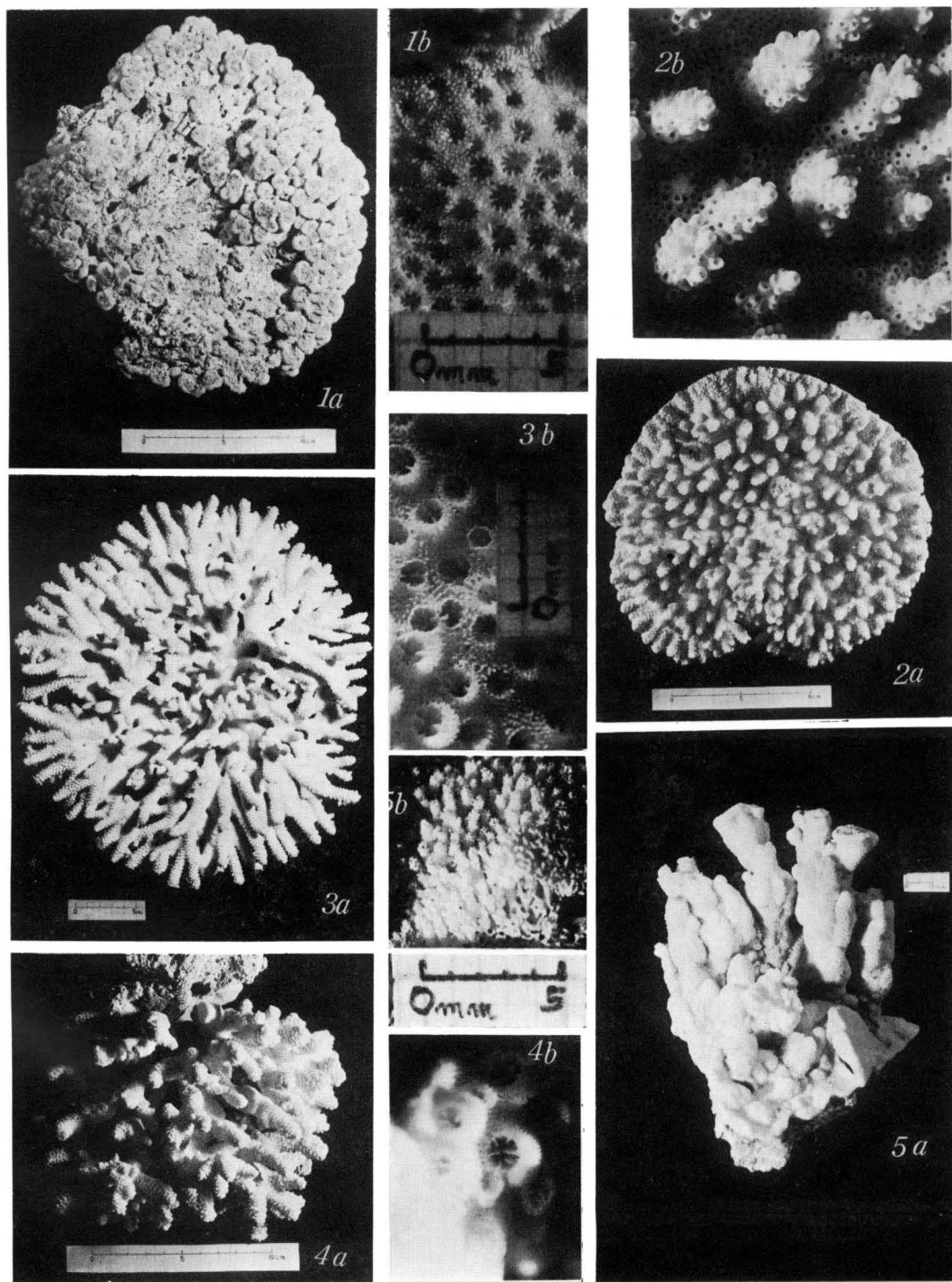
2



3

EXPLANATION OF PLATE XI

- Figs. 1a, 1b. *Stylocoeniella armata* (HEMPRICH et EHRENBURG).
1a. A colony (Coll. No. 27), side view.
1b. Calices magnified.
- Figs. 2a, 2b. *Acropora tumida* (VERRILL).
2a. A complete colony (Coll. No. 31), upper view.
2b. Erect branchlets on upper surface of round plate formed by the fusion of horizontal branches, magnified.
- Figs. 3a, 3b. *Acropora spicifera* (DANA).
3a. A complete colony (Coll. No. 38), upper view.
3b. Calices magnified.
- Figs. 4a, 4b. *Acropora tubicinaria* (DANA).
4a. A stunted colony (Coll. No. 42), side view.
4b. Calices magnified.
- Figs. 5a, 5b. *Montipora informis* BERNARD.
5a. A complete colony (Coll. No. 18), side view.
5b. Spiny excrescences on outer surface, magnified.



H. UTINOMI: *Scleractinian corals from Kamae Bay*

EXPLANATION OF PLATE XII

Figs. 1a, 1b, 1c. *Montipora caliculata* (DANA).

- 1a. A complete colony (Coll. No. 25), upper view.
- 1b. Part of upper surface, showing galls formed by the infection of commensal barnacles.
- 1c. Calices magnified.

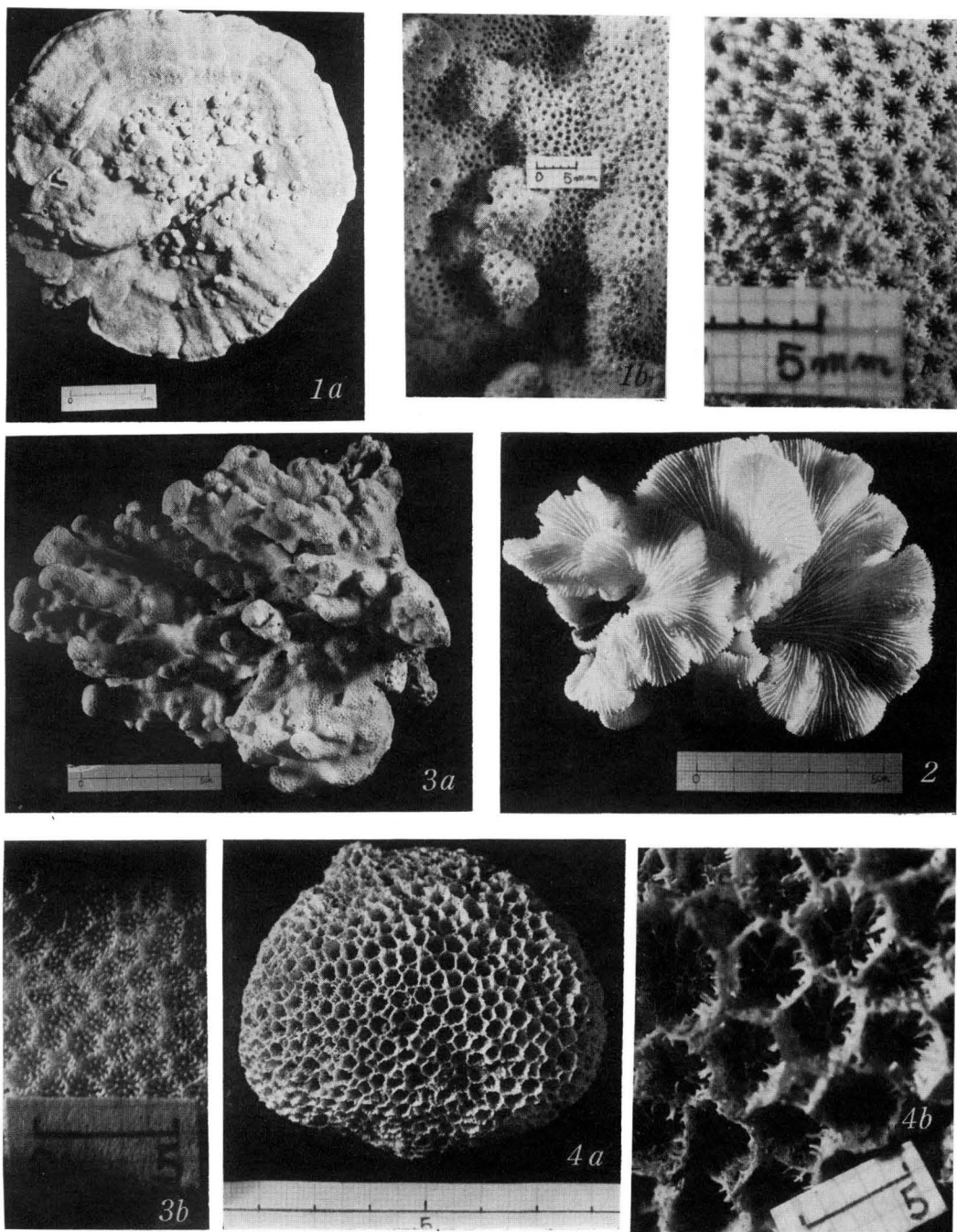
Fig. 2. *Lithophyllon elegans* (MILNE EDWARDS et HAIME) (Coll. No. 20), upper view.

Figs. 3a, 3b. *Porites andrewsi* VAUGHAN.

- 3a. A complete colony (Coll. No. 7), side view.
- 3b. Calices magnified.

Figs. 4a, 4b. *Alveopora japonica* EGUCHI.

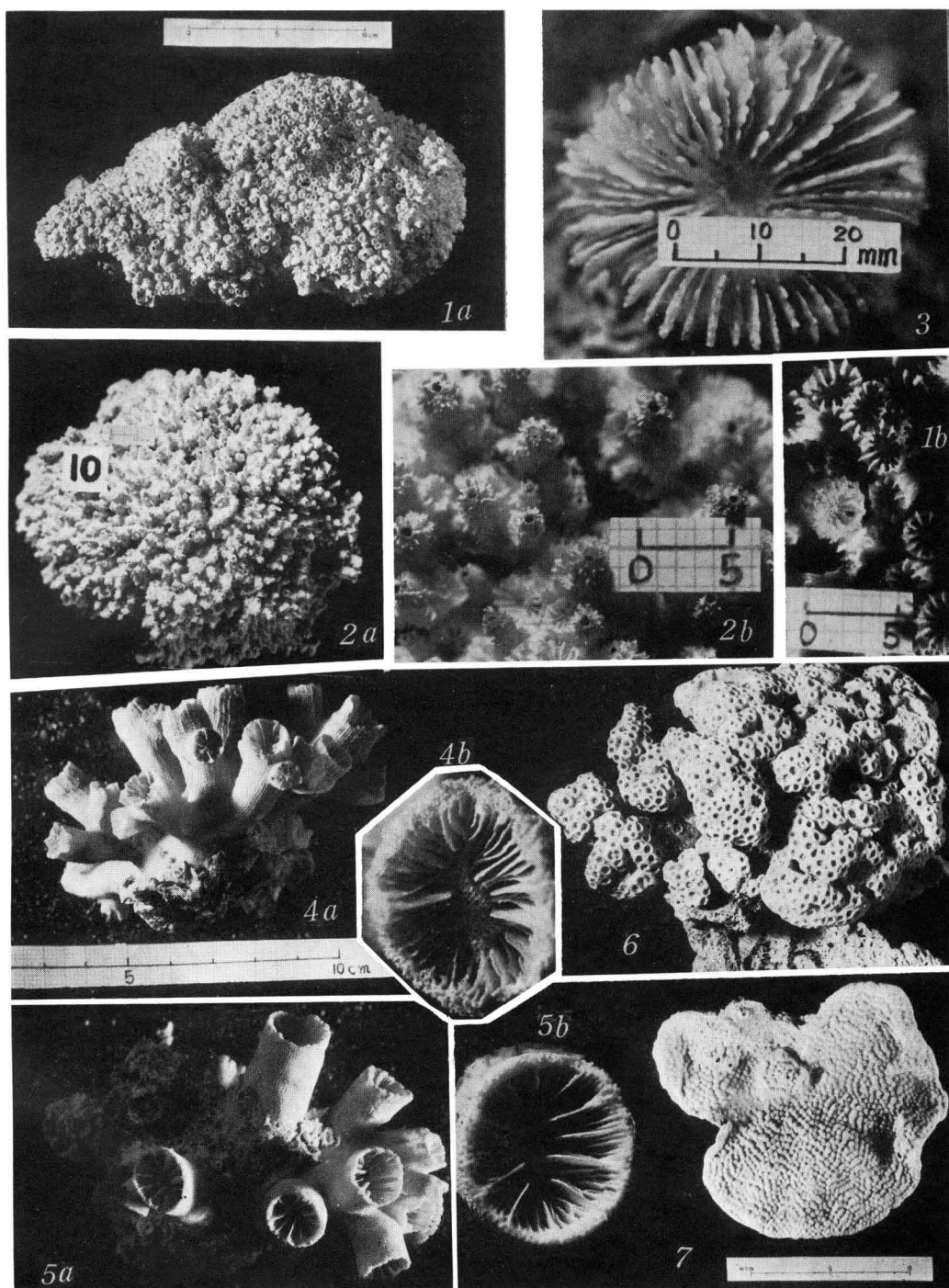
- 4a. A round colony (Coll. No. 54), upper view.
- 4b. Calices magnified.



H. UTINOMI: *Scleractinian corals from Kamae Bay*

EXPLANATION OF PLATE XIII

- Figs. 1a, 1b. *Cyphastrea chalcidicum tanabensis* YABE et SUGIYAMA.
1a. A complete colony (Coll. No. 53), upper view.
1b. Calices magnified.
- Figs. 2a, 2b. *Cyphastrea japonica* YABE et SUGIYAMA.
2a. A complete colony (Coll. No. 10), upper view.
2b. Spinose calices magnified.
- Fig. 3. *Cynarina lacrymalis* (MILNE EDWARDS et HAIME) (Coll. No. 57), upper view, magnified.
- Figs. 4a, 4b. *Dendrophyllia arbuscula* VAN DER HORST.
4a. A colony (Coll. No. 48), side view.
4b. Calice magnified.
- Figs. 5a, 5b. *Tubastrea coccinea* (HEMPRICH et EHRENBERG).
5a. A colony (Coll. No. 50), side view.
5b. Calice magnified.
- Fig. 6. *Turbinaria bifrons* BRÜGGEMANN (Coll. No. 46), side view.
- Fig. 7. *Turbinaria auricularis* BERNARD (Coll. No. 21), upper view.



H. UTINOMI: *Scleractinian corals from Kamae Bay*