DENDRONEPHTHYA OF JAPAN, II.

NEW SPECIES AND NEW RECORDS OF *DENDRONEPHTHYA* AND THE ALLIED *STEREONEPHTHYA* FROM KII REGION[1)]

HUZIO UTINOMI
Seto Marine Biological Laboratory, Sirahama

With Plates XXXIX–XL and 11 Text-figures

Since I have reported twenty nine species of *Dendronephthya* chiefly from the coast of Kii Peninsula in a previous paper (UTINOMI, 1952), some new materials have been accumulated. A large part of the material upon which this report is being made was collected by Mr. Torao YAMAMOTO and myself, mostly at Kusimoto and Tanabe Bay along the Kii coast.

The new collection includes 7 species of *Dendronephthya*, two of which are new to science, and 4 new species of *Stereonephthya*, an allied genus hitherto unknown from Japan. Descriptions of and notes on these new or imperfectly known species from the same or adjacent areas, but from other collections, are also included.

On this occasion I would like to express my cordial thanks to Mr. Torao YAMAMOTO for his earnest help in collecting the material. Thanks are also due to Prof. T. KAMOHARA of Kochi University and Prof. T. ITO of Ehime University for the loan of material from the Sikoku area, west of Kii Peninsula.

Genus ***Dendronephthya*** KÜKENTHAL

Bushy or tree-like Nephtheids with the polyps arranged in groups or bundles. The polyps have a supporting bundle which generally projects far out of the head. The canal-walls with or without spicules.

Type species: *Nephthya savignyi* EHRENBERG, 1834 (here designated newly).

1. *Dendronephthya yamamotoi* n. sp.

(Pl. XXXIX, Fig. 1; Text-fig. 1)

1) Contributions from the Seto Marine Biological Laboratory, No. 224.
This study was aided in part by a grant from the Scientific Research Fund from the Ministry of Education.

A beautiful, rigid colony with a polyparium flattened in one plane, though not uniform in outline. Its total height is about 11 cm, of which the upper two-thirds belongs to the polyparium, and the maximum breadth is 7 cm at the top. Sterile stalk, about 4 cm long and 3 cm wide, robust, cylindrical and bears numerous stolons at the base. Polyparium consists of a lower main stem and 2 upper main branches on which short-stalked and widely divergent twigs are borne. These twigs are loosely set and the lowest ones are not foliaceous, so that the stem and branches are almost exposed.

Polyps in groups of 3 to 6 at ends of terminal twigs about 2—3 mm long. Polyp head rather large, about 0.6 mm long and 0.8 mm wide, making an obtuse angle with its short stalk less than 0.5 mm long. It is armoured with the usual crown of 8 close-set points which are found in 5 pairs of subequal spicules, about 0.2—0.3 mm long, finely warted; uppermost one or a pair on lateral sides somewhat longer than others and often a little projecting. Intermediate spicules of one pair, rather large. Tentacles thickly armed with elongate spicules in 2 rows. S. B. strongly

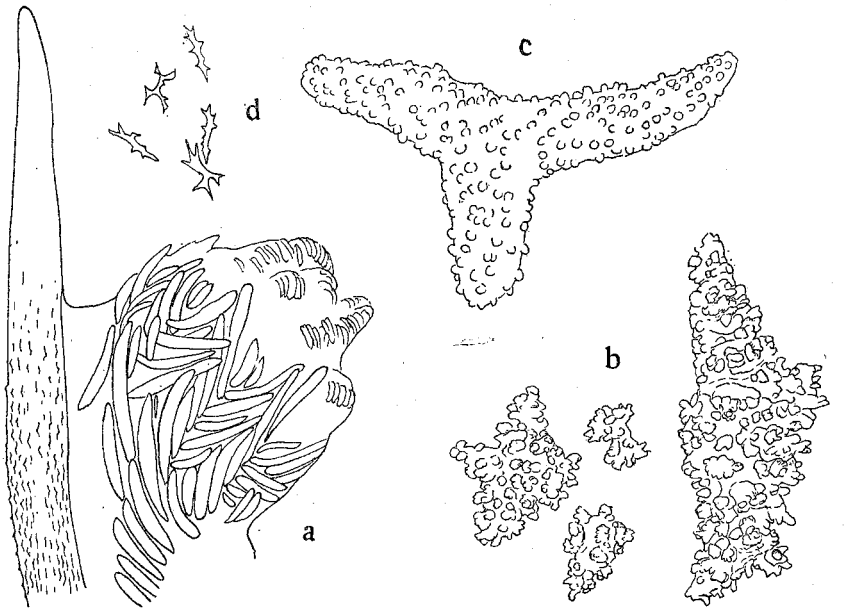


Fig. 1. *Dendronephthya yamamotoi* n. sp. *a*, Polyp; *b*, spicules from stalk cortex; *c*, spicules from canal-walls; *d*, flat antlers from canal-walls. (All×55)

developed, 1 to 3 stronger spicules, finely warted, project beyond polyp head for about 0.5 mm long, where it is smooth. Anthocodial formula:

$$\text{III} = 5\,\text{p} + 0\ \text{Cr} + \text{strong S. B.} + 1\ \text{M}$$

On upper cortex are long flesh-colored spindles up to 5 mm long, transversely arranged. Stalk cortex thickly covered with red or white, strongly warted, curved spindles or boomerangs, spheres and stars, from 0.17×0.08 mm to 0.7×0.2 mm. Canal-walls thickly filled with flat antlers, 0.18 mm long, together with robust spindles, triradiates, quadriradiates and multiradiates with strong rounded warts, up to 2 mm long and 0.3 mm wide which increase in number downwards.

Coloring. Upper stem and main branches flesh-colored, becoming orangish red towards the polyp-bearing twigs. Stalk wholly bright red. Polyp itself pale yellow and point spicules opaque, milky white, while S. B. and stalk spicules orangish red.

Locality. Kusimoto. January 22, 1952. T. YAMAMOTO coll.

Remarks. In the growth-form of colony this is related to *D. speciosa* KÜKENTHAL (1905) from unknown locality and may belong to the *rigida*-group of the Divaricatae as well, but easily separable from the latter in the polyp armature and coloration,

2. *Dendronephthya suensoni* (HOLM)

(Pl. XXXIX, Fig. 2; Text-fig. 2)

Spongodes suensoni HOLM, 1895, p. 35, pl. 2, figs. 14–16.
Dendronephthya suensoni KÜKENTHAL, 1905, p. 586, pl. 28, fig. 19; KÜKENTHAL, 1906b, p. 40.
Dendronephthya aculeata UTINOMI, 1952, p. 171, text-fig. 5, pl. 9, fig. 6.
? *Dendronephthya suensoni* THOMSON & MACKINNON, 1910, p. 185; THOMSON & DEAN, 1931, p. 117, pl. 19, fig. 11.

All examined colonies consist of short divergent branches arising in all directions from a short sterile stalk; the average height of the colony is 8 cm, with the stalk about 2 cm long. Thus they are apparently shrubby in form. Lowest branches of the polyparium about 5 in number, directed downwards and distinctly foliaceous, almost completely covering the stalk.

Polyp head small, about 0.4—0.6 mm long and 0.6—0.8 mm wide, standing at an obtuse angle with its stalk about 0.5—1 mm long. Anthocodial armature consists of thickly set 8 points, of which the uppermost spicule is far projecting and the lower 4 or 5 pairs in chevrons. Besides, there are always 5 or 6 short intermediate spicules between points, converging downwards like a fan. S. B. well developed, composed of 4 or more strong spindles, up to 3 mm long, one of which extends usually for 0.5—1 mm beyond polyp head. These spicules are strongly spinose throughout the length, although often smooth at the end in the extremely projecting one. Polyp stalk densely packed with long or short spicules. Anthocodial formula:

$$\text{IV} = 1\ \text{P} + (5-6)\ \text{p} + 0\ \text{Cr} + \text{strong S. B.} + 3\ \text{M}$$

On cortex of branches and twigs are rather small spindles, about 1 mm long,

with close-set rounded warts. On stalk cortex are however smaller spindles and derivatives, with rather sparsely-set pointed warts. In upper canal-walls are warty spindles, about 0.2—0.28 mm long, which may be somewhat flattened. In lower canal-walls are similar spindles or flat antlers with sparsely-set low pointed warts, larger ones of which become thicker approaching those of lower cortex (0.3—0.4 mm long).

Coloring. Stem and branches white, stalk dirty white. All polyp spicules dark red, becoming orangish towards the stalk and twigs.

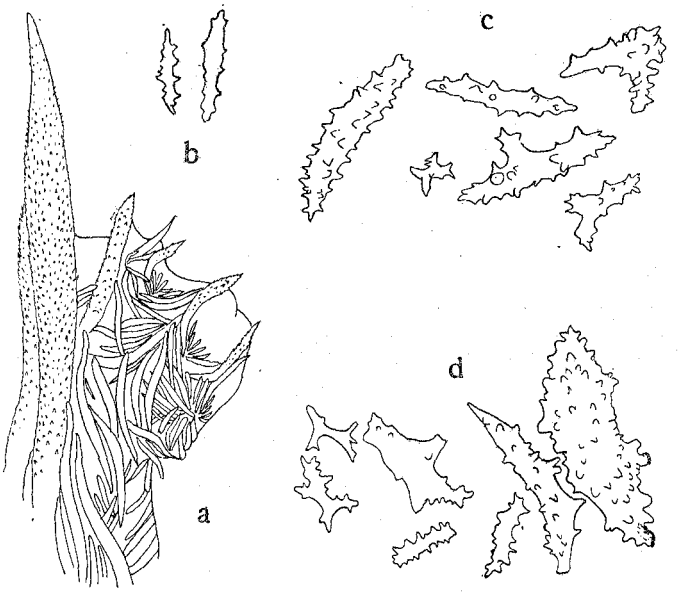


Fig. 2. *Dendronephthya suensoni* (HOLM). *a*, Polyp; *b*, flat rods from canal-walls of branches; *c*, spicules from lower cortex; *d*, spicules from canal-walls of stalk. (*a*×35, *b*–*d*×55)

Localities. Kusimoto. January 29, 1952. T. YAMAMOTO coll.; Taizi. March, 1954. T. HORIHATA coll.

Remarks. In a previous paper I have regarded erroneously a shrivelled dry specimen from Kii-Ôsima as *D. aculeata.* By re-examination I found that it should also be referred to *D. suensoni*, although not in quite agreement with the original description as to the proportion of the stalk to the total height.

This species seems to be widespread along the Pacific coast of southern Japan, from Sagami Bay to Hirado Strait (Hirudo Strasse as originally misspelt). The records of this species from the Indian and Malayan waters seem dubious.

3. *Dendronephthya golgotha* UTINOMI

(Text-fig. 3)

Dendronephthya golgotha UTINOMI, 1952, p. 184, text-fig. 14, pl. 10, fig. 12.

Numerous specimens of three different colorations taken from the same locality may be referable to this species. They measure from 3 cm to 13 cm in total height. As mentioned before, the polyparium is distinctly flattened in one plane in large colonies more than 6 cm in height, whereas in smaller ones not distinctly flattened. The relative length of the sterile stalk varies greatly; in medium-sized colonies it is

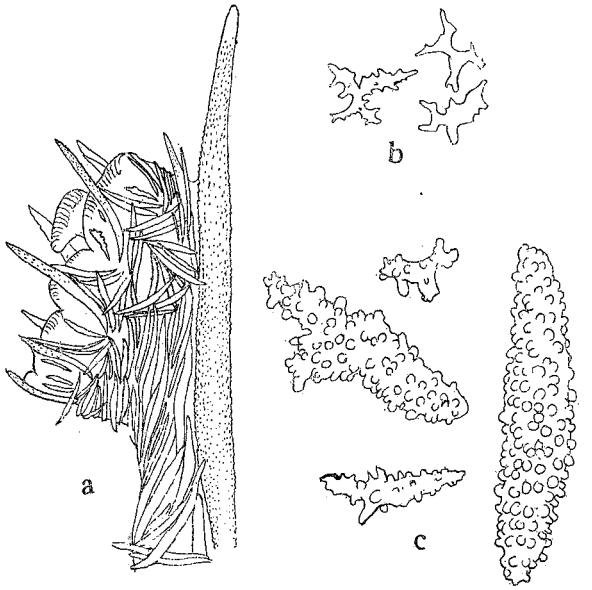


Fig. 3. *Dendronephthya golgotha* UTINOMI. *a*, Polyp; *b*, flat antlers from canal-walls; *c*, spicules from lower cortex. (*a*×35, *b*–*c*×55)

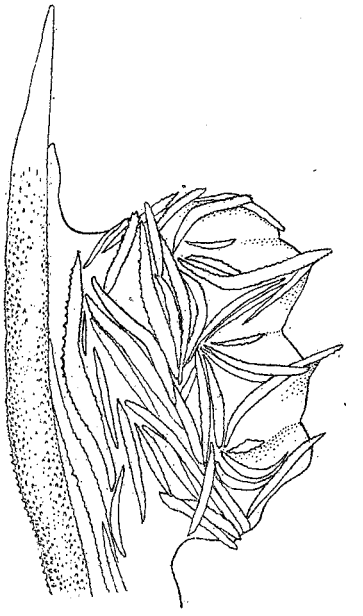


Fig. 4. *Dendronephthya gracillima* KÜKENTHAL. Polyp. (×55)

about one-third of the total height, while in larger ones about one-fifth, being 2—3 cm long. Their lowest branches are exclusively foliaceous and directed downwards, encircling the top of stalk. Main branches are cylindrical, not so tapering distally as in the preceding *suensoni*, and on all the surface are borne a number of short twigs rather loosely.

Polyp armature resembles closely that of *D. suensoni* in general appearance, but the intermediate spicules are less numerous, being only one to three. Crown or lower spicules are thickly disposed either in transverse or converging rows. Cortical spicules in both branches and stalk are covered densely with simple rounded

warts. Canal-walls contain only flat antlers, about 0.25 mm across, which have been overlooked.

Coloring. Seventeen perfect or imperfect specimens here examined can be divided into three forms in coloration. In most of them (10 in number) polyps are carmin red. In two colonies, polyps are dark red, paler downwards to orangish. In five colonies, however, they are quite orange with yellowish white branches. In any case, the sterile stalk is dirty white or greyish.

Locality. Kusimoto. January 29 and April 29, 1952. T. YAMAMOTO coll.

4. *Dendronephthya gracillima* KÜKENTHAL

(Text-fig. 4)

Spongodes flabellifera HOLM, 1895, p. 43, pl. 3, figs. 1-3.
Dendronephthya gracillima KÜKENTHAL, 1905, p. 623, pl. 29, fig. 29; KÜKENTHAL, 1906 b, p. 45.
Dendronephthya gracillama (mispr.) ROXAS, 1933, p. 447, pl. 5, fig. 13.

A flattened polyparium alone, 45 mm long and 65 mm wide. It consists of five main branches of subequal length with two flattened blade at the base, which are yellowish white, mottled with orangish hue in places. The stalk is missing. Polyp head large, somewhat flattened laterally, about 0.9 mm wide and 0.6 mm long, standing almost perpendicularly to the stalk up to 1 mm long. Its spicule formula is:

$$\text{VI} = 1\,\text{P} + (3-4)\ \text{Cr} + \text{very strong S. B.} + \left(\frac{1}{2} - 1\right)\text{M}$$

Locality. Kusimoto. January 29, 1952. T. Yamamoto coll.

Previously recorded from Hirado Strait, Kyusyu and Misaki, Sagami Bay and from Legaspi Bay, Philippines.

5. *Dendronephthya flabellifera* (STUDER)

(Pl. XXXIX, Fig. 3; Text-fig. 5)

Spongodes flabellifera STUDER, 1888, p. 72.
Dendronephthya flabellifera KÜKENTHAL, 1905, p. 679, text-fig. C^2, pl. 31, fig. 49.

A handsome perfect colony of the Umbellate type, 12.5 cm in total height of which the lower 5 cm belongs to sterile stalk. Polyparium flattened in a long oval contour, about 85 mm high, 55 mm wide and 40 mm thick, and covered wholly with compactly massed umbels; its basal branches not foliaceous, unlike STUDER's type. Stalk robust, cylindrical and its lower part bears many filamentous stolons. Another fragment which is only a hemispherical umbel is 4×5 cm in expanse.

Polyp head large, about 0.6 mm long and 1.0—1.2 mm wide, making an obtuse

angle with short polyp stalk, which is 0.5—0.8 mm long and 0.4—0.5 mm wide. Its upper margin is distinctly toothed with eight protruding points, that is a feature characteristic to this species. Point spicules 6—8 in one row, subequal in length and finely warted downwards. No crown spicules. Intermediate spicules usually numerous, up to 5 pairs. Tentacles large, long, thickly armed with elongate rods in 2 rows. S. B. moderately developed; one or two spicules predominate, up to 4 mm long, a little projecting beyond polyp head often for up to 1 mm long, and faintly warted all over. Polyp stalk covered wholly with slender spindles irregularly disposed. Anthocodial formula:

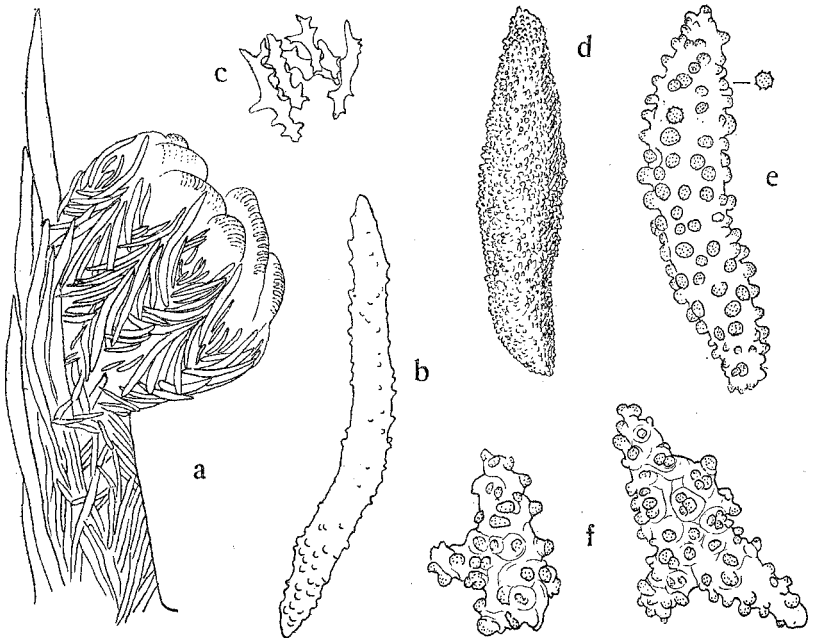


Fig. 5. *Dendronephthya flabellifera* KÜKENTHAL. *a*, Polyp; *b*, uppermost point spicule; *c*, flat rods from canal-walls of branches; *d*, spindle from canal-walls; *e*, small spindle from branch cortex: *f*, spicules from stalk cortex. (*d*×10, *a*×35, *c*, *e*, *f* ×80, *b*×150)

III = (6—8) p+0 Cr+medium S. B.+(2—5) M

On cortex of branches and twigs are large warty spindles up to 4×0.35 mm and smaller spindles from 0.3×0.06 mm to 0.75×0.18 mm. On stalk cortex are short plump spindles, spheres or stars, covered with large rounded warts, dotted on surface, from 0.1×0.05 mm to 0.6×0.2 mm. Upper canal-walls are thickly filled with jagged flat rods, 0.1—0.17 mm long, together with large spindles, 1.5×0.35 mm. In lower canal-walls, flat spicules diminish but spindles occur more numerously. The spicules give place here to blunt-ended curved spindles (3×0.47 mm), triradiates and

quadriradiates.

Coloring. Point and tentacle spicules yellowish white or wholly white, while other polyp spicules together with cortex of twigs yellow. Stem cortex yellowish white, but large part of sterile stalk deep red.

Locality. Kusimoto. January 29, 1952. T. YAMAMOTO coll.

A fragment from the same locality. April 29, 1952. T. YAMAMOTO coll.

Previously recorded from Enosima, Sagami Bay.

6. *Dendronephthya dendritica* n. sp.

(Pl. XXXIX, Fig. 4; Text-fig. 6)

An imperfect specimen expanded in one plane, of which the stalk is lacking, seems to belong to the *spinulosa*-group after KÜKENTHAL's system. But it can not be referred to any of the described species within the group.

From the base of polyparium, where remains a large foliate expansion on one side, arise five cylindrical, flexible, main branches in a palmate form, of which the upper three are larger, 5 to 7 cm long and the lower two smaller, 3 to 5 cm long. The branching of twigs is obviously umbellate. Polyp-bearing twigs are given off sporadically on all surface of the main branches and a few secondary branches. These twigs are short-stalked and scarcely divergent. But they are densely massed together to form a small umbel, each one being only 3—5 mm wide and 3—5 mm high. Those at the terminal ends of branches form a group of umbels with a convex outer surface.

Polyps densely massed in groups of 3—5. Polyp head very small, 0.25 mm long and 0.28 mm wide, borne at a right or acute angle to a very short stalk. S. B. of the entheathing type strongly developed, one or two longer spicules, about 2 mm long, protruding beyond polyp head for a length of about 0.5—1 mm. All points consist of 7—9 pairs of converging spicules, the uppermost of which markedly projecting. Tentacle spicules elongate rods, colorless, closely packed in 2 rows. Anthocodial formula:

$$\text{III} = 1\,\text{P} + (6-8)\,\text{p} + 0\,\text{Cr} + \text{strong S. B.} + (1-3)\,\text{M}$$

On branch cortex are thickly set, colorless, transparent spindles with rounded warts, from 0.35×0.07 mm to 1×0.13 mm, arranged transversely. Canal-walls contain only flat antlers, about 0.1 mm across.

Coloring. Polyps and twigs with their spicules are all orange, while cortex of branches yellowish white.

Locality. Kusimoto. April 29, 1952. T. YAMAMOTO coll.

Remarks. In the mode of branching this specimen resembles *D. spinulosa* of

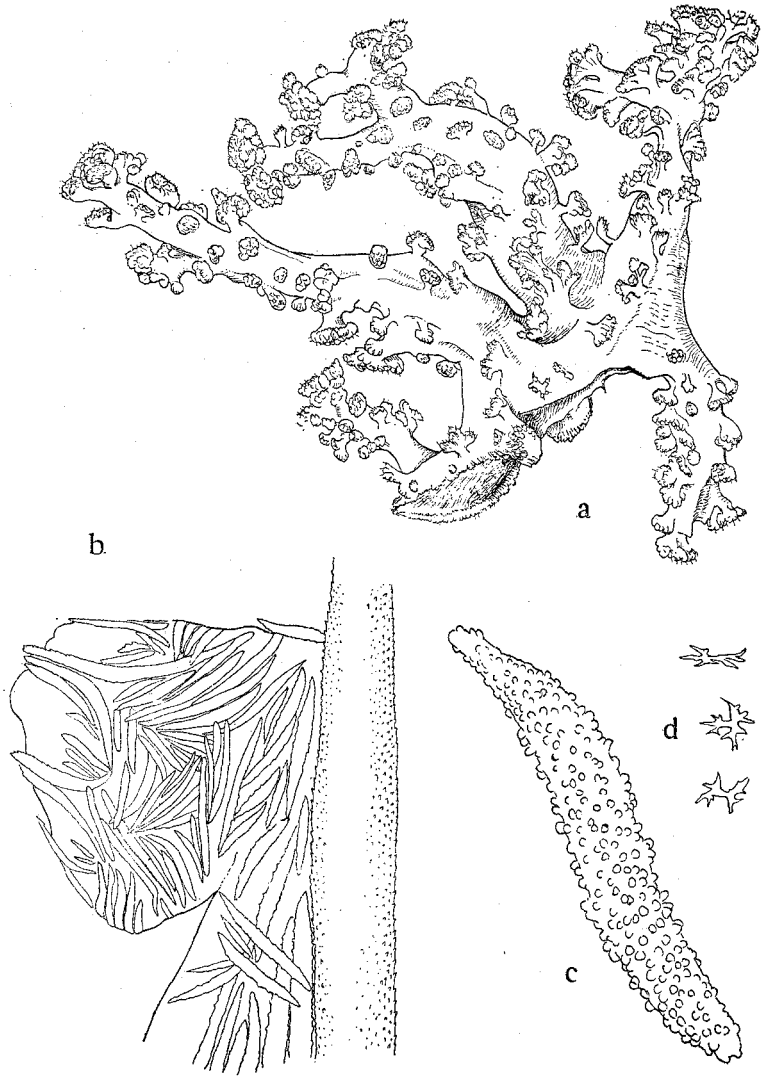


Fig. 6. *Dendronephthya dendritica* n. sp. *a*, Polyparium; *b*, polyp; *c*, spindle from cortex; *d*, flat antlers from canal-walls.
(*a*×4/5, *b*×55, *c*–*d*×80)

the Umbellatae and somewhat *D. gardineri* THOMSON & MACKINNON of the Divaricatae, but by no means identical with any one. Very distinctive character of this species for erecting as new is the palmate branches bearing short twigs sporadically on all surface.

7. *Dendronephthya querciformis* KÜKENTHAL

(Text-fig. 7)

Dendronephthya querciformis KÜKENTHAL, 1906a, p. 286; KÜKENTHAL, 1906b, p. 50, text-figs. 40–41, pl. 4, fig. 26.

Three specimens of the Umbellate type from Tosa Bay agree with this interesting species ever recorded from Sagami Bay only. They are uniformly light brown and 5 to 6.5 cm in total height. Two specimens have a long oval polyparium distinctly delimited from the sterile stalk, about half as long as the polyparium, while the other bears a widely diverging stalk as in *D. umbellulifera* KÜKENTHAL and *D. planoregularis* (BURCHARDT). The lowest branches are not foliaceous. Weak spiculation in polyps and cortex is the most remarkable characteristics.

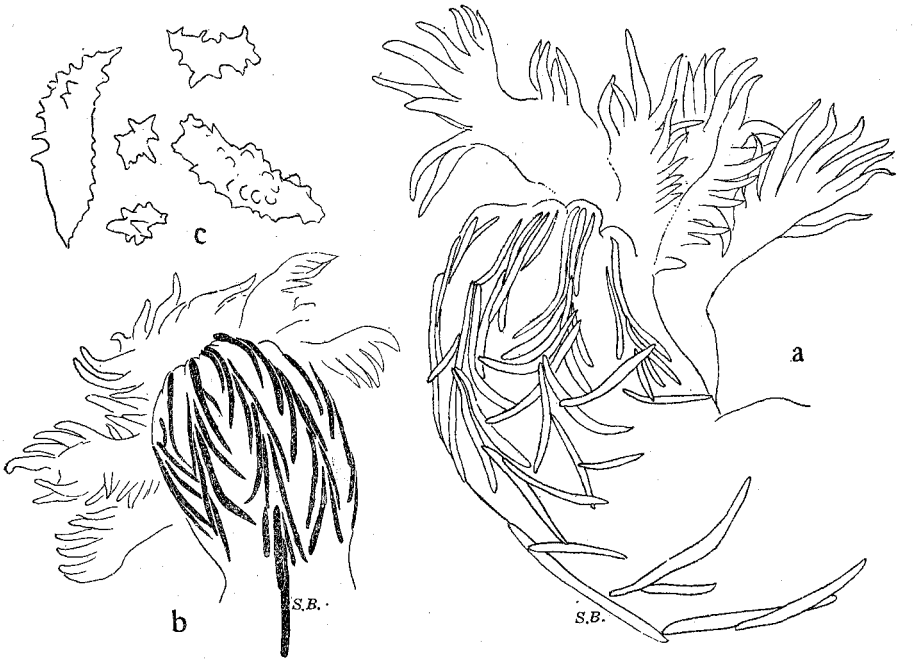


Fig. 7. *Dendronephthya querciformis* KÜKENTHAL. *a*, Polyp, viewed from lateral side; *b*, polyp, viewed from dorsal side; *c*, spicules from lower cortex. *S. B.* spicules of supporting bundle. (*b*×55, *a*×70, *c*×80)

Polyp head very small, longer than wide, up to 0.53 mm long by 0.45 mm wide and its stalk very short, about 0.3 mm long. Anthocodial armature consists of eight double rows of very steeply converging spindles (0.23—0.26 mm long), usually 4 or 5 in each row on laterals and 3 on ventrals. S. B. is very weak and usually does not protrude beyond points on dorsal side; their spicules are very few and slightly

larger than point spicules, 0.3—0.4 mm long and disposed only linearly below dorsal point spicules. All these polyp spicules are uniformly slender and weakly warted. Ventral side of polyp stalk is wholly nude. Tentacles comparatively large, about 0.3 mm long and bear about 10 pairs of 0.2 mm long pinnules on sides and jagged flat rods closely set in two rows on aboral surface. Anthocodial formula:

$$\text{IV} = (3-5)\ \text{p}+0\ \text{Cr}+\text{very weak S. B.}+0\ \text{M}$$

On cortex of stem and branches are sparsely-set chalky white, slender spindles, up to 3 mm long; sometimes they are absent. Stalk cortex is thickly covered with small spindles or star-shaped spicules with strong thorns, about 0.08—0.3 mm across. Canal-walls apparently devoid of spicules, although KÜKENTHAL mentions that many tiny flat antlers exist. Since all these spicules are not so perfectly calcified as in other species, tiny spicules, even if practically present, may have been macerated in formalin.

Locality. Tosa Bay, about 100—300 m in depth. 1953. Dr. T. KAMOHARA coll.

Genus ***Stereonephthya*** KÜKENTHAL

Bushy or tree-like Nephtheids with the polyps arranged singly or in small groups directly on the stem or main branches, never forming definite bundles or lobes. The polyps have a strong supporting bundle, usually of the entheathing type. The canal-walls are thin and usually with very few spicules.

Type species: *Stereonephthya papyracea* KÜKENTHAL, 1905 (here designated newly).

As far as can be confirmed, there are at least twenty four species hitherto described. None of them were recorded from Japan, but the following four species are herein described as new.

By a comparative study of the specimens at hand and the described species from literature, some important and taxonomically significant characters, which may or may not exist in common in this group, are found, as follows:

1) Each polyp is firmly supported by a well-developed bundle of large spicules, usually of the entheathing type, with a strongly projecting tip.

2) Ventral side of polyp stalk is usually studded with a number of tiny spicules.

3) Polyp head is usually hanging down on its stalk like a campanulate flower.

4) Generally, polyp head is strongly spiculated on the abaxial (dorsal) side, while poorly spiculated or quite devoid of spicules on the adaxial (ventral) side.

From these characteristics, *Spongodes rakaiyae* described by HICKSON and HILES (1900) from New Britain seems to be a member of *Stereonephthya*, against

KÜKENTHAL's view regarding it as *Dendronephthya*.

1. *Stereonephthya japonica* n. sp.

(Pl. XL, Figs. 1–2; Text-fig. 8)

Colony low and shrubby in form, usually less than 5 cm in total height and 10 cm in maximum spread, in the preserved state. From a short common stalk are given off numerous slender or stout branches in all directions which may again divide into secondary and tertiary branches. In badly developed specimens occurring in unfavourable environment, the branches are often slender and polyps rather sparsely scattered, as in Pl. XL, fig. 2. In well-developed specimens, however, the colony becomes larger and has an erect, distinctly delimited stalk. Generally the terminal branches are thickly grouped, so that the colony appears a compact mass wholly covered with a number of rounded lobes formed by polyps. Therefore, in the preserved or contracted state, the lower portion of branches uncovered with polyps is not visible from outsides.

Polyp head large, up to 1.2 mm long and 0.8 mm wide, stands at an acute angle to the stalk; its oral margin usually wider than the base of attachment. Polyp stalk mostly shorter than 0.5 mm, though often up to 1.5 mm long when isolated; it is very thick and robust, being covered dorsally with a firm supporting bundle of the entheathing type which is of a triangular outline as viewed from dorsad. Its uppermost 2 or 3, up to 2.5 mm long and 0.23 mm wide, together with polyp spicules close to the tip, sometimes project upwards and outwards, giving the tip a pectinate appearance. Anthocodial armature consists of eight double rows of thorny spindles *en chevron*; the spicules in 4 dorsal rows are well-developed and 6—8 in each pair, while those in 4 ventral rows diminish in number as well as in size, though not wholly suppressed. Between points there are many smaller intermediate spicules (rods or spindles up to 0.12 mm long) irregularly arranged.

These spicules, both points and intermediates, are normally glistening yellow, thorny spindles, but sometimes the outermost ones tend to be swollen, opaque, chalky white at the tip, showing the clavate or often ovate to spherical appearance. Such is the case with the spicules in the proximal part of tentacles. The tentacle spicules are usually feebly warted rod, about 0.14 mm long and 0.025 mm wide, transparent, light yellow or colorless, but those towards the base sometimes tend to be larger and opaque white, quite like the uppermost point spicules, so as to be almost indistinguishable from them. The ventral side of polyp stalk is wholly nude just below the head, but further downwards irregularly scattered with very tiny rods, on the average 0.05 mm long, alongside the sloping spicules of supporting bundle.

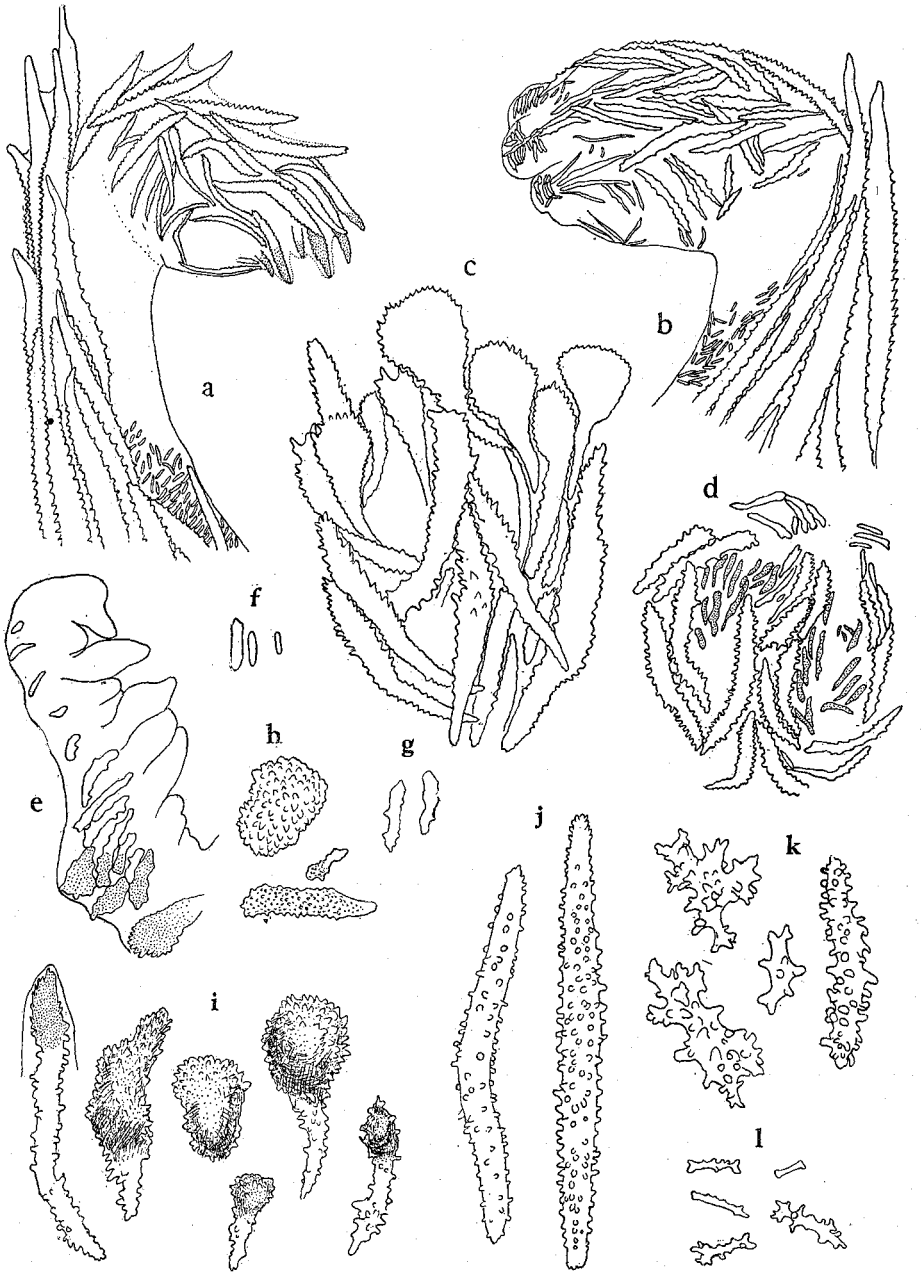


Fig. 8. *Stereonephthya japonica* n. sp. *a*, Polyp with clavate uppermost point spicules; *b*, polyp with normal point spicules; *c*, a part of points, showing the arrangement of clubs and spindles; *d*, a part of polyp armature, showing the arrangement of points, intermediates (dotted) and tentacle spicules; *e*, aboral surface of tentacle; *f*, tiny rods from base of polyp stalk; *g*, translucent median spicules of tentacle; *h*, opaque spicules at the base of tentacle; *i*, point spicules (dotted part is opaque white and the rest lemon-yellow in color); *j*, spindles from branch cortex; *k*, spicules from stalk cortex; *l*, spicules from canal-walls. (*a-b*×35, *c-d*, *j-l*×55, *e-i*×70)

Branch cortex is covered with yellow, slender, warty spindles, up to 1.5 mm long and 0.12 mm wide. Between them are thickly set much smaller, colorless, jagged rods (0.18 mm long) to smooth rods (0.05 mm long), which are similar to those in canal-walls. On the basal cortex are stouter but shorter, yellowish-white warty spindles (up to 0.4 mm long), triradiates or irregular bodies with rounded high warts. Canal-walls are very thin and sparsely filled with small warty or smooth rods, about 0.05—0.15 mm long.

Coloring. As described above, the general color of colony is lemon yellow, though varying from cream color to gold yellow in different colonies.

Localities. Tanabe Bay (type locality) and many other places of Kii, Tosa Provinces, Bungo Channel, Kagosima Bay and Amakusa Island. Besides, I have found a large specimen of this species in the museum of the Zoological Institute, Kyoto University, which was taken from Misaki, Sagami Bay long years ago. On these coasts where I have explored, this species and also the next are commonly found on coastal rocks just below the low tidal belt and apparently more abundant there than common species of *Dendronephthya*, such as *D. gigantea, nipponica* and *aurea.*

2. *Stereonephthya rubriflora* n. sp.

(Pl. XL, Figs. 3–4; Text-fig. 9)

This species does not essentially differ from the preceding in the form of colony and the general spiculation, except for the coloration. This is also a low bushy form, though not so compact in appearance. Preserved specimens measure 3—4 cm in height and 7 cm in maximum expanse.

Anthocodial armature in eight double rows of steeply sloping, red or purplish red, slender spindles, of which the two dorsal point rows on each side are closely arranged together and well developed, 5—7 in a row, while the ventral rows are reduced to 1 or 2 in a row or unpaired. The point spicules in the dorsal rows are sometimes swollen at the tip, like a clavate form and here become to be opaque white, without any indication of red hue. Small intermediate spicules also occur between points.

Tentacles have a series of spicules of different coloration; that is, (1) spicules in the proximal part are transversely or obliquely arranged rosy colored warty rods, about 0.14—0.18 mm long and 0.03 mm wide, where are exposed slightly out of the polyp even when the tentacles are retracted, and followed by (2) translucent, flat toothed rods, about 0.07—0.14 mm long and 0.014—0.026 mm wide, transversely arranged in two rows, and terminate to (3) opaque (dark as seen under a lens), oval discs, about 0.017—0.05 mm long and 0.017 mm wide, irregularly arranged.

S. B. is of the entheathing type and composed of short, about 1—2.8 mm long, yellow or yellowish white spindles as many as 20, forming a curved equilateral triangle around the polyp stalk. Its height attains about 2 mm and basal width about 1 mm. The remaining surface of polyp stalk is almost nude, except a number of tiny rods near the base and on the sides.

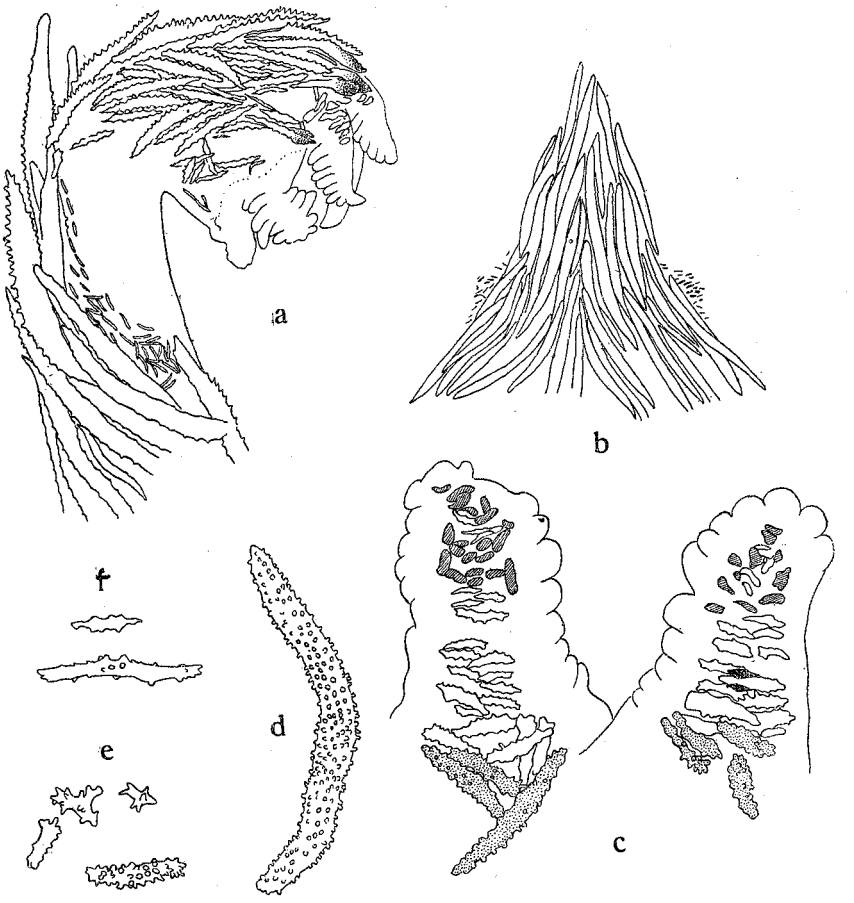


Fig. 9. *Stereonephthya rubriflora* n. sp. *a*, Polyp; *b*, supporting bundle viewed from dorsal side; *c*, two tentacles with spicules of different coloration (for details see text); *d*, spindle from branch cortex; *e*, spicules from stalk cortex; *f*, spicules from canal-walls. (*a*, *d*, *e*×35, *b*, *f*×55, *c*×70)

Cortical spicules of branches and stalk are almost similar to those in the preceding *japonica* in shape and coloration. In canal-walls are very few spindles, usually 0.17—0.34 mm long, to rods of about 0.08 mm long, with few weak warts.

Coloring. All cortex of branches white to yellow. S. B. spicules also white or yellow, but the anthocodial spicules exclusively red or purplish red. The color of

point spicules is usually purplish when alive, but fades to bright or pale red in longtime preservation.

Localities. The same as *St. japonica.*

Remarks. The general morphological characters of both species described above are almost similar to each other but the coloration is quite distinctive. In the same habitat, both forms are commonly found side by side, and no intermediate form has ever been encountered. The difference in coloration of polyps is too marked to refer them to a mere color variation. For these reasons I regard both forms newly as separate species.

3. *Stereonephthya osimaensis* n. sp.

(Pl. XL, Fig. 5; Text-fig. 10)

This is also a low bushy form of a globular contour, about 2.5 cm in height with a maximum expanse of 5.8 cm. A number of short branches, up to 15 mm long, arise from the small base in all directions and terminate to the rounded summits. Polyps are thickly set on all surface of branches and fewer downwards. The upright stalk is ill-defined and the basal naked portion of branches are not visible from above. Most characteristic at a glance is the coloration, with lemon-yellow polyps

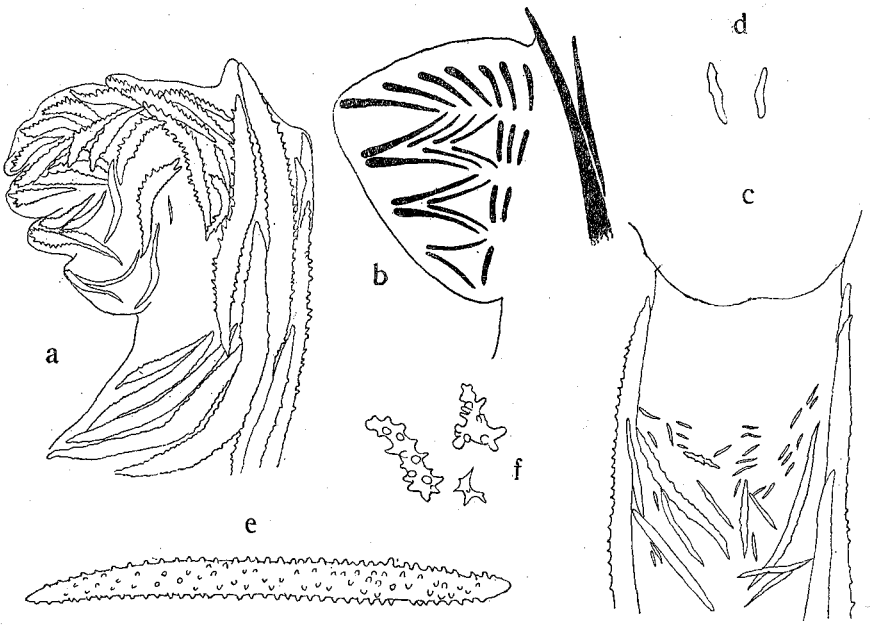


Fig. 10. *Stereonephthya osimaensis* n. sp. *a*, Polyp; *b*, diagram showing the polyp armature; *c*, polyp stalk viewed from ventral side; *d*, spicules from canal-walls; *e*, spicules from branch cortex; *f*, spicules from stalk cortex. (*a–c*×35, *d–f*×55)

on a pink background of branches, which towards the stalk is paler to colorless.

Polyp head large, about 0.8—0.9 mm long, ovoid in outline, with short and very stout stalk of about the same length; it makes a right or somewhat acute angle with the stalk. Anthocodial armature is very striking, its two pairs of dorsal points being twice as high as the two ventral pairs. In the outermost point on each side of the head, there is only one row of obliquely arranged 7 strong warty spindles, not so paired as in other species. The remaining points on laterals consist of upper converging and basal transverse spicules, both of which decrease to the ventral side in number and size, as schematically figured here. All point spicules are broadened distally and sometimes opaque, chalky white at the clavate end. S. B. is as usual of the entheathing type and composed of 12—18 short plump spindles, about 1.5—1.8 mm long, of which the uppermost one or two project slightly beyond polyp head. All these spicules are light pink, often yellowish at the projecting tip alone. Ventral side of polyp stalk is usually nude, but rarely provided with very few tiny rods, about 0.035—0.12 mm long, downwards. Small tentacle spicules are arranged indistinctly in two rows, and their proximal ones are often larger and opaque as in the preceding species.

Upper cortex is filled with translucent, slender warty spindles, about 0.4—1.8 mm long. On lower cortex of sterile stalk are similar but smaller spindles up to 0.7 mm long and also irregular-shaped or stellate forms with simple warts. Canal-walls contain very few simple rods, mostly 0.12 mm long and 0.018 mm wide.

Locality. A single specimen from the shore of Tuyasima, Kii-ôsima. March 27, 1939. Mr. S. SAKAGUCHI coll.

Remarks. This new species is closely related to the preceding two in general appearance, but clearly distinguishable in the spiculation and coloration.

4. *Stereonephthya hyalina* n. sp.

(Pl. XL, Figs. 6–7; Text-fig. 11)

Two small specimens are attached to a dead coral branch. One of them which is designated as holotype, measures 5 cm in total height and its lower 1 cm belongs to the sterile stalk with a diameter of 6 mm. The remaining one is only 3 cm in total height with 1 cm long stalk.

The colony consists of an upright stem with a weak encrusting base and a few short side branches arising irregularly around the stem. It is very flabby, semi-transparent and wholly snowy white. Few polyps arise either singly or in small groups, so that the naked cortex elsewhere is wholly exposed.

Polyp head itself is about 0.75—0.88 mm long and 0.5—0.6 mm wide, hanging

down like a *Campanula*-flower on the tip of short stalk, about 0.5—1.2 mm long from base to tip. Its armature consists of eight points of which the dorsal two on each side are well-developed in converging rows of uniformly slender spindles, up to 0.35 mm long, and about 7 in one row. Between these points there are many small spicules, about 0.08—0.09 mm long, disposed longitudinally and merged insensibly with tentacle spicules. The ventral two points are rather rudimentary, not forming definitely double rows. Tentacles are about 0.8 mm long and bear 0.05 mm long flat rods, loosely disposed in two rows. S. B. is formed of only 2 to 7 spindles, usually 1—1.8 mm long and sharply pointed at the tip, though slightly projecting beyond polyp head itself. Below the head small flat rods, either smooth or slightly toothed, are scattered about. All these spicules are weakly warted, colorless and almost transparent.

Cortex of stem and branches are loosely covered with slender, colorless spindles

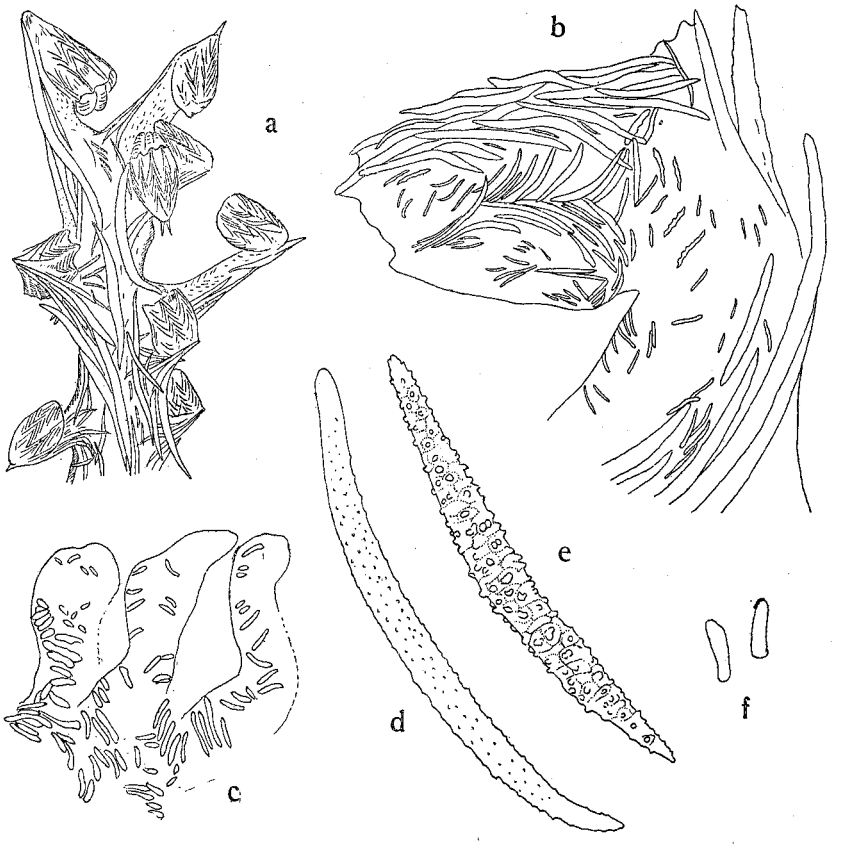


Fig. 11. *Stereonephthya hyalina* n. sp. *a*, Terminal branchlet; *b*, polyp; *c*, three tentacles; *d*, spindle from upper cortex; *e*, spindle from lower cortex; *f*, flat rods from tentacle. (*a*×10, *b*, *d*, *e*×55, *c*×70, *f*×150)

with fine warts, about 1—2 mm long and 0.05—0.1 mm wide. On stalk cortex are somewhat shorter spindles covered with stouter large warts, mostly 1.2 mm long and 0.11 mm wide. Canal-walls are very thin and devoid of spicules.

Locality. Not certain.

Remarks. This feebly branched and white colony comes very near to *S. unicolor* (GRAY) and *S. urex* (HOLM) in form of growth, but the polyp armature is quite different.

LITERATURE

KÜKENTHAL, W. 1905. Versuch einer Revision der Alcyonarien. II. Die Familie der Nephthyiden. 2 Teil. Die Gattungen *Dendronephthya* n. g. und *Stereonephthya* n. g. Zool. Jahrb. Abt. Syst., vol. 21, pp. 503-726, pls. 26-32.

——— 1906a. Diagnosen neuer japanischer Alcyonaceen. Zool. Anz.. vol. 30, pp. 280-289.

——— 1906b. Japanische Alcyonaceen. Abhandl. K. Bayer. Akad. Wiss. II. Kl. Suppl. Bd. 1, Abt., pp. 9-86, pls. 1-5.

UTINOMI, H. 1952. *Dendronephthya* of Japan, I. *Dendronephthya* collected chiefly along the coast of Kii Peninsula. Publ. Seto Mar. Biol. Lab., vol. 2, pp. 121-212, pls. 9-11.

(For other references see UTINOMI, 1952).

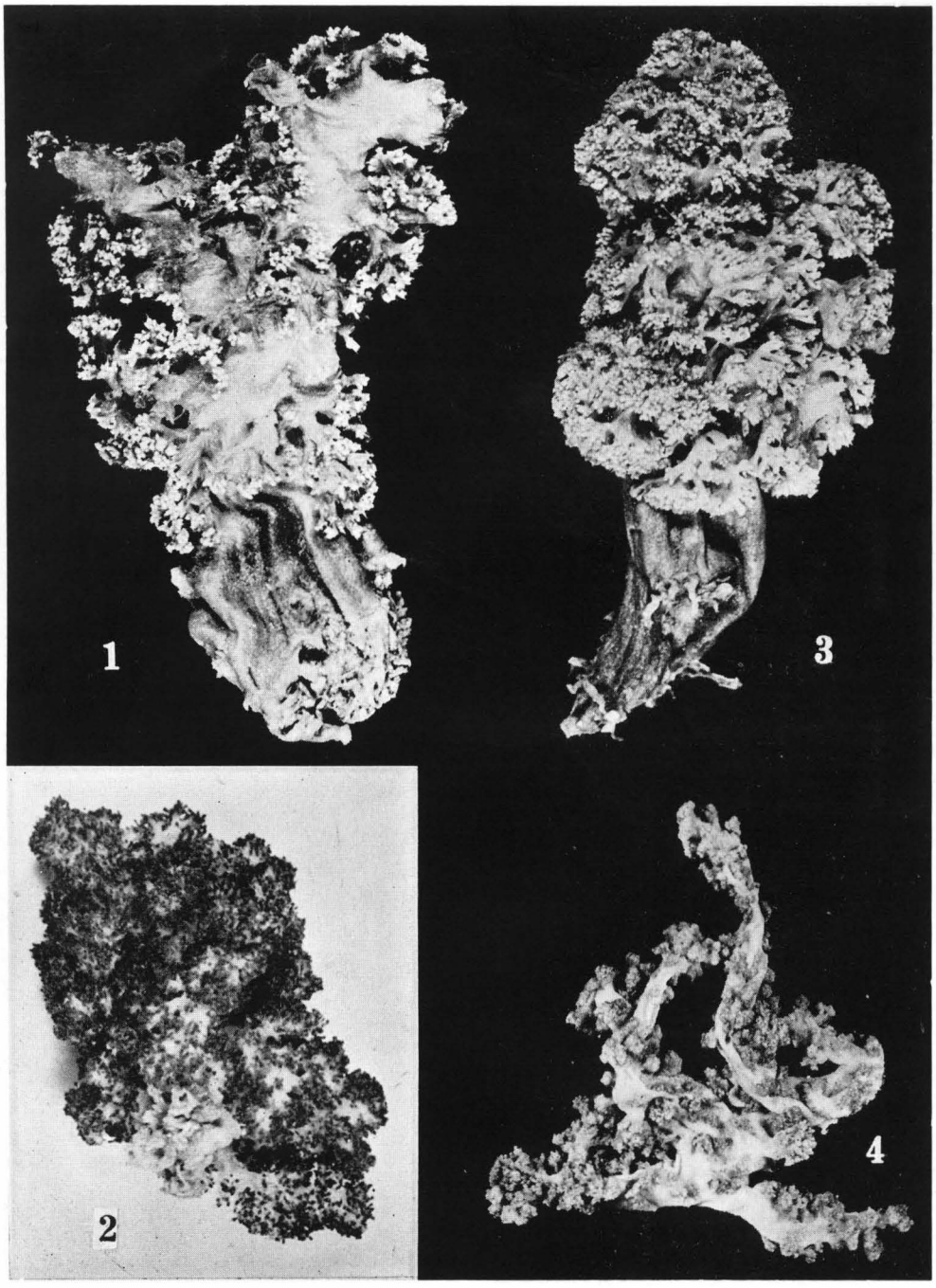
EXPLANATION OF PLATES XXXIX-XL

PLATE XXXIX

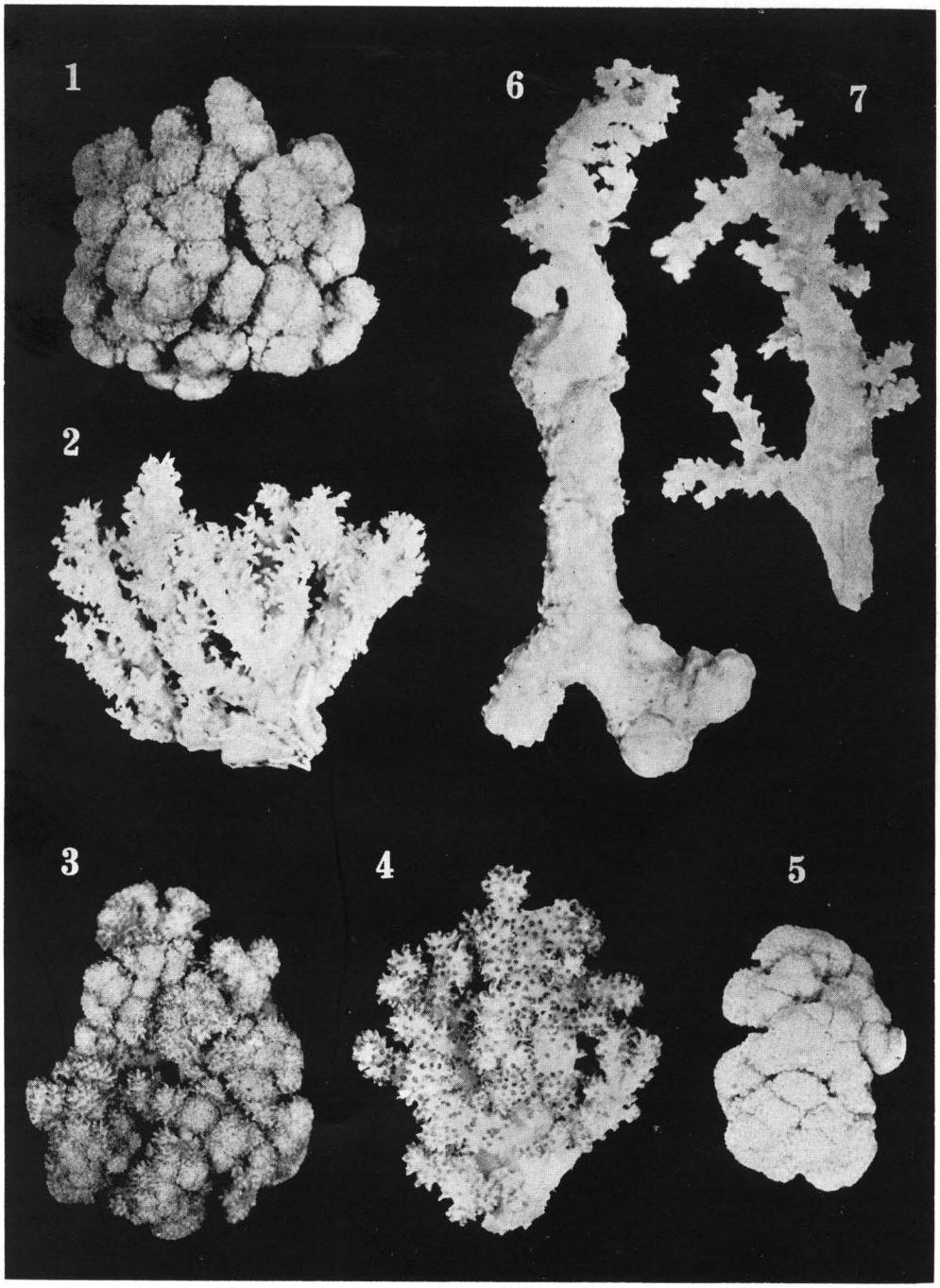
Fig. 1. *Dendronephthya yamamotoi* n. sp. (Holotype) ×1.
Fig. 2. *Dendronephthya suensoni* (HOLM). ×1/2.
Fig. 3. *Dendronephthya flabellifera* (STUDER). ×4/5.
Fig. 4. *Dendronephthya dendritica* n. sp., polyparium only. (Holotype) ×2/3.

PLATE XL

Fig. 1. *Stereonephthya japonica* n. sp., compact form, viewed from above. (Holotype) ×2/3.
Fig. 2. The same, slender form, viewed from side. ×1.
Fig. 3. *Stereonephthya rubriflora* n. sp., compact form, viewed from above. (Holotype) ×2/3.
Fig. 4. The same, slender form, viewed from side. ×1.
Fig. 5. *Stereonephthya osimaensis* n. sp., viewed from above. (Holotype) ×4/5.
Fig. 6, 7. *Stereonephthya hyalina* n. sp. (Holotype and paratype) ×5/3.



H. UTINOMI : *DENDRONEPHTHYA* OF JAPAN, II.



H. UTINOMI : *DENDRONEPHTHYA* OF JAPAN, II.