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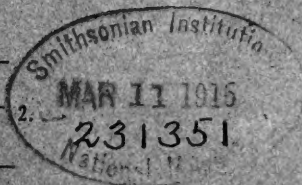
Department of Trade and
Customs

FISHERIES

Biological Results of the Fishing Experiments
carried on by the F.I.S. "Endeavour," 1909-14.

H. C. Dannevig,
Commonwealth Director of Fisheries.

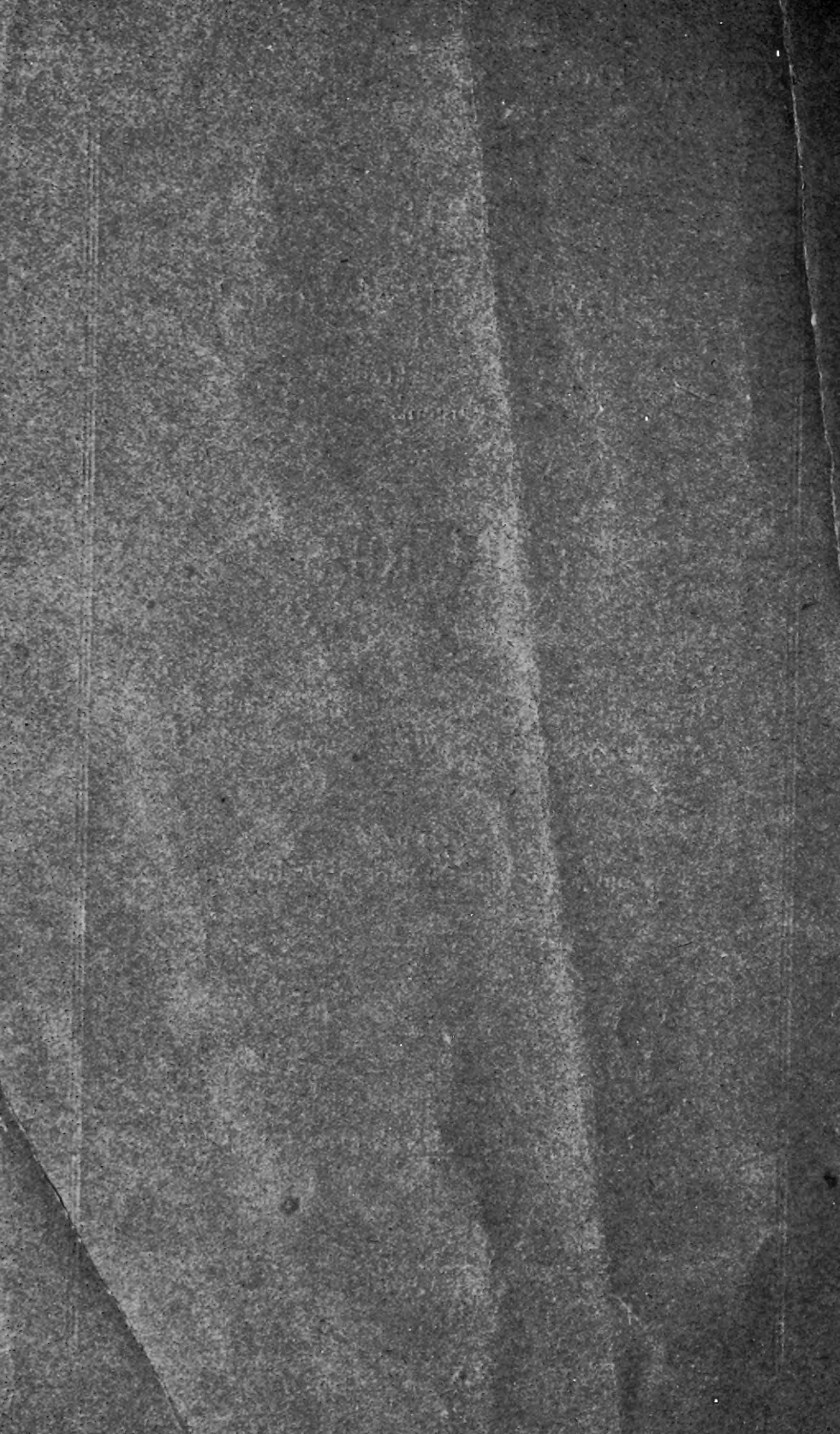
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III. Report on the Alcyonarians obtained by the F.I.S.
"Endeavour" on the Eastern and Southern Coasts of
Australia.

PART I.

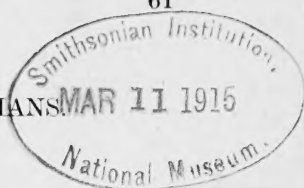
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Plates iv.-xii.

REPORT ON THE ALCYONARIANS



Part I.

I.—Introduction.

Previous to the publication of Wright and Studer's Report¹ on the Alcyonaria collected by the "Challenger," our knowledge of the Alcyonarian Fauna of Australia was confined mainly to forms from western and north-western localities, and from the shallow waters of Queensland and Torres Strait. This knowledge is based on collections obtained by the "Herald"² and "Fly,"³ the Antarctic Expedition under Ross⁴, the German Circumnavigatory Expedition in the "Gazelle,"⁵ and to the zoological collections made in the Indo-Pacific Ocean during the voyage of the "Alert."⁶ The "Challenger" Expedition extended this field, and also collected and recorded a number of forms from the southern and south-eastern shores of Australia. Since then fresh instalments of new species have been added by Prof. S. J. Hickson⁷, who described the collection of Alcyonaria brought together by Mr. J. B. Wilson during the biological survey of Port Phillip, Victoria; and by Prof. W. Kükenthal⁸, who has recorded a number of species from Western Australia. Finally, Prof. J. A. Thomson and Miss D. L. Mackinnon⁹ published a detailed account of the Alcyonaria, which were gathered together by the "Thetis" Expedition during trawling operations within the one hundred fathom line off the coast of New South Wales.

The Alcyonarians described in the present Report were trawled by the "Endeavour" on the eastern and southern coasts of Australia in depths of from fifteen to three hundred fathoms. The collection includes twenty-seven species, of which twenty-four are referable to known species distributed among fifteen genera; the remainder have required the establishment of three new species.

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1. Wright and Studer—Chall. Rep., Zool., xxxi., 1889.
 - 2, 3, 4. Gray—Proc. Zool. Soc., 1862 and 1872; *Id.*, Ann. Mag. Nat. Hist., (3), v., 1860; (4), ii., 1868; (4), iii., 1869; *Id.*, Cat. Lithophytes in Brit. Mus., 1870.
 5. Studer—Monatsber. Akad. Wiss. Berlin, 1878.
 6. Ridley—Report Zool. Coll. H.M.S. "Alert," 1884.
 7. Hickson—Proc. Roy. Soc. Viet., (n.s.), ii., 1890, pp. 136-140.
 8. Kükenthal—Die Fauna Südwest-Australiens, iii., 1, 1910, pp. 3-108.
 9. Thomson and Mackinnon—Mem. Austr. Mus., iv., 13, 1911, pp. 661-695.

The following table shows the general nature of the collection :—

	Total number of genera.	Total number of species.	New species.
Order Alcyonacea	1	1	0
Order Pseudaxonia	2	3	0
Order Axifera	8	18	3
Order Stelechotokea	4	5	0
Totals	15	27	3

Of the new species, two belong to the genus *Mopsea* and one to *Plumarella*.

LIST OF SPECIES.

Order ALCYONACEA, *Verrill* (pro parte).

Family ALCYONIDÆ.

Alcyonium (*Erythropodium*) *membranaceum*, *Kükenthal*.

Order PSEUDAXONIA, *G. von Koch*.

Family MELITODIDÆ.

Mopsella clavigera, *Ridley*.

Mopsella textiformis (*Lamarek*).

Acabaria gracillima (*Ridley*).

Order AXIFERA, *G. von Koch*.

Family ISIDÆ.

Isis hippuris, *Linnæus*.

Mopsea dichotoma (*Linnæus*).

Mopsea encrinula (*Lamarek*).

Mopsea australis, *Thomson and Mackinnon*.

Mopsea stabellum, *Thomson and Mackinnon*.

Mopsea elegans, *Thomson and Mackinnon*.

Mopsea whiteleggei, *Thomson and Mackinnon*.

Mopsea plumacea, sp. nov.

Mopsea repens, sp. nov.

Family PRIMNOIDÆ.

- Stachyodes studeri*, Versluys.
Amphilaphis plumacea, Thomson and Mackinnon.
Plumarella thetis, Thomson and Mackinnon.
Plumarella filicoides, Thomson and Mackinnon.
Plumarella australis, sp. nov.
Primnoella australasiæ, Gray.
Primnoella grandisquamis, Wright and Studer.
Caligorgia flabellum (Ehrenberg).

Family GORGONELLIDÆ.

- Ctenocella pectinata* (Pallas).

Order STELECHOTOKEA, Bourne

Section I. ASIPHONACEA.

Family TELESTIDÆ.

- Telesto arborea*, Wright and Studer.
Telesto trichostemma (Dana).

Section II. PENNATULACEA

Family KOPHOBELEMNONIDÆ.

- Kophobelemnion schmeltzii* (Kölliker).

Family PTEROEIDIDÆ.

- Godeffroyia elegans*, Kölliker.
Sarcophyllum grande (Gray).

II.—Description of the Genera and Species.

Order ALCYONACEA, Verrill (pro parte).

Family ALCYONIDÆ.

Genus ALCYONIUM, Linnæus.

ALCYONIUM (ERYTHROPODIUM) MEMBRANACEUM, *Kükenthal*.

Alcyonium (Erythropodium) membranaceum, *Kükenthal*,
 Alcyonacea Wiss. Ergeb. deutsch. Tiefsee Exped.,
 xiii., 1, 1906, p. 52, pl. i., fig. 3, pl. ix., figs. 42-44. *Id.*,
 Thomson and Mackinnon, Mem. Austr. Mus., iv., 13,
 1911, p. 665.

There are in the collection two branched Gorgonid axes,
 from which all trace of the original cœnenchyma has dis-

appeared. They are completely overgrown by a light brown Sympodium-like Alcyonid, which agrees with Kükenthal's account of *Alcyonium (Erythropodium) membranaceum*. Owing to the friable nature of the specimens in the dried condition, very little of the internal structure can be distinguished.

There is considerable variety in the spicules of the cœnenchyma. There are (1) approximately spherical bodies— $\cdot 087 \times \cdot 080$ mm. ; $\cdot 120 \times \cdot 105$ mm. ; $\cdot 122 \times \cdot 105$ mm. ; (2) short, thick cylinders with about two bands of thorny warts— $\cdot 087 \times \cdot 070$ mm. ; $\cdot 105 \times \cdot 070$ mm. ; $\cdot 122 \times \cdot 075$ mm. ; and (3) irregular bodies and a few crosses— $\cdot 087 \times \cdot 077$ mm. ; $\cdot 105 \times \cdot 087$ mm. ; $\cdot 122 \times \cdot 122$ mm.

The polyp-spicules are spindles— $\cdot 227 \times \cdot 070$ mm. ; $\cdot 240 \times \cdot 070$ mm. ; $\cdot 245 \times \cdot 077$ mm.

Localities.—Shoalhaven Bight, New South Wales, 15-45 fathoms.

Great Australian Bight, 190-300 fathoms.

Distribution.—Francis Bay, $34^{\circ}7'3''$ S. Lat., $24^{\circ}59'3''$ E. Long., 100 metres (Kükenthal). The "Thetis" specimens were obtained at the following localities off the coast of New South Wales :—Eleven miles east of Broken Bay ; Station 34, off Port Jackson, 39-36 fathoms ; Station 42, off Wata Mooli, 70-78 fathoms ; Station 43, off Botany Bay, 43-66 fathoms ; Station 44, off Coogee, 49-50 fathoms ; Station 47, off Bulgo, 63-57 fathoms ; Station 48, off Wollongong, 55-56 fathoms (Thomson and Mackinnon).

Order PSEUDAXONIA, *G. von Koch*.

Family MELITODIDÆ.

Genus MOPSELLA, *Gray*.

MOPSELLA CLAVIGERA, *Ridley*.

Mopsella clavigera, Ridley, Report Zool. Coll. H.M.S. "Alert," 1884, p. 360, pl. xxxvii., fig. B, pl. xxxviii., figs. a-aIII. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 670, pl. lxxviii., fig. 9. *Id.*, Nutting, Gorgonacea Siboga Exped., viii., Scleraxonia, 1911, p. 49.

Sixteen specimens agree with Ridley's description of *Mopsella clavigera*, though there is no anastomosis. They

are all in the dried condition. The height of the largest colony is 61 cm., with a width of 27 cm. across the expanded portion. The branching is strictly in one plane, and is generally dichotomous. The nodes are very swollen, and in the largest specimens they have a diameter of 17 mm. The branches are given off from the nodes.

The polyps are retracted into slightly projecting verrucæ, which are scattered over the surface of the stem and branches, but are usually wanting on a median space on the posterior aspect of the colony.

The spicules of the cœnenchyma agree well with those described by Ridley :—(1) coarsely tuberculate, swollen, orange-coloured, fusiform shapes— 175×0.35 mm. ; 140×0.35 mm. ; (2) lemon-yellow coloured “Blattkeulen”— 0.70×0.35 mm. ; 0.52×0.35 mm. ; 0.47×0.26 mm. The measurements agree fairly closely with Thomson and Mackinnon's measurements of the “Thetis” specimens.

The colour is lemon-yellow to brick-red.

Locality.—Shoalhaven Bight, New South Wales, 15-45 fathoms.

Distribution.—Port Curtis, 5-11 fathoms, and Port Molle, Queensland, 14 fathoms ; Thursday Island, Torres Straits, 4-6 fathoms (Ridley). Dirk Hartog Island, West Australia, 45 fathoms (Studer). The “Thetis” specimens were obtained at the following localities off the coast of New South Wales :—Eleven miles east of Broken Bay, 30-40 fathoms ; Station 34, off Port Jackson, 39-36 fathoms ; Station 40, off Wata Mooli, 52 fathoms ; Station 42, off Wata Mooli, 70-78 fathoms ; Station 48, off Wollongong, 55-56 fathoms (Thomson and Mackinnon). A fragmentary specimen was taken by the Siboga Expedition in the Bay of Nangamessi, Sumba, 36 metres (Nutting).

MOPSELLA TEXTIFORMIS (*Lamarck*).

Melitæa textiformis, Lamarck, Mém. Mus. Hist. Nat., I., p. 412. *Id.*, Lamouroux, Hist. Polyp. corall. flexibles, 1816, p. 464, pl. xix., fig. 1. *Id.*, Gray, Proc. Zool. Soc., 1857, p. 285.

Melithæa textiformis, Milne-Edwards et Haime, Hist. Nat. Corall., I., 1857, p. 201.

Melitella textiformis, Gray, Cat. Lithophytes in Brit. Mus., 1870, p. 7.

Mopsella textiformis, Verrill, Bull. Mus. Comp. Zool., I., 1864, p. 38. *Id.*, Ridley, Report Zool. Coll. H.M.S. "Alert," 1884, p. 358. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., IV., 13, 1911, p. 671, pl. lxiii., figs. 4, 5.

Several almost complete specimens in the collection agree closely with the description of *Mopsella textiformis* (Lamarck), given by Ridley. The largest specimen has a height of 34cm., with a width of 37cm. across the branched portion. The diameter near the base is 2cm. The basal attachment is lacking. The branching is strictly in one plane with abundant anastomosis. The labyrinthine pattern, to which Thomson and Mackinnon have directed attention, is clearly shown on the weathered axis; and there is a well-marked tendency, as pointed out by Ridley, for the stem and main branches to "break up almost immediately into a reticulum of undulating thin branchlets, which almost all anastomose." The internodes vary in length from 4 to 10 mm., and the nodes from 4 to 6 mm.

The polyps are mainly confined to the anterior aspect of the colony. They are disposed irregularly in slightly projecting verrucæ.

The spicules are exactly like those described by Ridley—(1) fusiform shapes sharply pointed at both ends, and covered with irregularly scattered tubercles— 210×0.35 mm.; 171×0.35 mm.; 157×0.35 mm.; (2) "Blattkeulen" with orange shafts and lemon-yellow heads— 140×0.52 mm.; 122×0.52 mm.; 087×0.43 mm. Very few of the "Blattkeulen" have the long shafts mentioned by Ridley. The spicules of the verrucæ are—(3) curved fusiform shapes tapering to sharp points, with few tubercles— 245×0.35 mm.; 220×0.35 mm.; 210×0.35 mm.; (4) curved fusiform shapes pointed rather bluntly and covered with closely set blunt tubercles— 297×0.52 mm.; 236×0.52 mm.; 218×0.70 mm.

Localities.—Off the coast of South Australia.

Fifteen miles south of St. Francis Island, Great Australian Bight, 30 fathoms.

Distribution.—Australia (Lamouroux, Gray, Verrill). South Seas (Gray). Port Curtis, 5-7 fathoms, and Port Molle, Queensland, 12-20 fathoms; Thursday Island and Prince of Wales Channel, Torres Straits, 4-7 fathoms (Ridley). Lord Howe Island (Thomson and Mackinnon).

Genus ACABARIA, Gray.

In his "Die Gorgonidenfamilie der Melitodidae," Kükenthal¹ includes the genus *Psilacabaria* Ridley in *Acabaria* Gray—"Zu dieser Gattung rechne ich auch die Gattung *Psilacabaria* Ridley, die keine durchgreifenden Merkmale aufzuweisen hat. Insbesondere tritt das Abgehen der Zweige in rechtem Winkel auch bei andern Arten ein. Hierhin gehört auch *Anicella* Gray, nicht zu *Melitodes*, wie Ridley will."

ACABARIA GRACILLIMA (Ridley).

Psilacabaria gracillima, Ridley, Report Zool. Coll. H.M.S. "Alert," 1884, p. 364, pl. xxxvii., figs. D-D¹, pl. xxxviii., figs. f-f¹¹. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 671.

A number of broken pieces in a dried condition are referred to this species. The largest fragment is 90 mm. high. Branching is dichotomous and approximately in one plane. The branches are given off approximately at right angles, although in several instances the angle of the dichotomy is somewhat smaller. They have a diameter of about 1 mm. There is no anastomosis. The axis is hard and white.

The polyps occur in spirals on the large branches, but, on the twigs, they have an irregular bilateral arrangement. The individual calyces are low, rounded, tubercular verrucæ.

The spicules include the following types:—(1) large cylinders, fusiform to subclavate, slightly tapering to round-pointed ends and provided with tubercles arranged roughly in whorls— 280×070 mm.; 262×052 mm.; 245×070 mm.; (2) smaller spindles, more or less curved, with sharply pointed ends, and tubercles— 262×070 mm.; 245×052 mm.; 210×052 mm.; (3) small subclavate spicules, tapering from a broad to a sharp-pointed end, with tubercles— 210×053 mm.; 201×043 mm.; 192×035 mm.

The colour is cream to violet.

Locality.—Great Australian Bight, Long. 131°E., 62 fathoms.

Distribution.—Port Molle, Queensland, 12-20 fathoms; Port Darwin, North Australia, 8-12 fathoms; East Australia, 42 fathoms (Ridley). The "Thetis" specimens were obtained at the following localities off the coast of New South Wales:—Station 34, off Port Jackson, 39-36 fathoms; Station 36, off Botany Bay, 23-20 fathoms; Station 48, off Wollongong, 55-56 fathoms; South coast of New South Wales (Thomson and Mackinnon).

1. Kükenthal—Zool. Anz., xxxiii., 1903, p. 194.

Order AXIFERA, *G. von Koch.*

Family ISIDÆ.

Genus ISIS, *Linnæus.*ISIS HIPPURIS, *Linnæus.*

(Plate v., figs. 1-2 ; Plate xi., fig. 1.)

Isis hippuris, Linnæus, Syst. Nat., 10th ed., 1758, p. 799.
Id., Pallas, Elenchus Zoophytorum, 1766, p. 233.
Id., Ellis and Solander, Nat. Hist. Zoophytes, 1786,
 p. 105, pl. iii., figs. 1-5. *Id.*, Esper, Die Pflanzenthier, i., 1791, p. 279, pl. i., figs. 1-4, pl. ii., pl. iii., figs. 1-3, pl. iiiA., figs. 1-4. *Id.*, Lamouroux, Hist. Polyp. corall. flexibles, 1816, p. 476. *Id.*, Lamarek, Hist. Anim. sans vert., ii., 1816, p. 302. *Id.*, Lamouroux, Exposition Méthodique, 1821, p. 59, pl. iii., fig. 1. *Id.*, Blainville, Manuel Actinologie, 1834, p. 503, pl. lxxxvi., fig. 1. *Id.*, Lamarek, Hist. anim. sans vert., 2nd ed., 1836, p. 475. *Id.*, Steenstrup, Om slægter og der under *Isis hippuris* Linn. sammenblendede Arten, 1848, p. 1. *Id.*, Milne-Edwards et Haime, Hist. Nat. Corall., i., 1857, p. 194. *Id.*, Gray, Proc. Zool. Soc., 1857, p. 283. *Id.*, Kölliker, Icones Histologicæ, ii., 1865, p. 140, pl. xvi., fig. 4, pl. xix., figs. 1-3. *Id.*, Wright and Studer, Chall. Rep., Zool., xxxi., 1889, p. 280. *Id.*, Simpson, Journ. Linn. Soc., Zool., xxix., 1906, p. 421, pl. 43, figs. 1-4. *Id.*, Thomson and Simpson, Alcyonaria Indian Ocean, ii., 1909, p. 180, pl. vi., figs. 1-3. *Id.*, Nutting, Gorgonacea Siboga Exped., v., Isidae, 1910, p. 6, pl. i., figs. 1, 1a, 1b, pl. v., fig. 1.

Although a well-known and striking form, this species was very imperfectly described until Simpson (1906) published his results of an examination of a number of specimens from the Andaman Sea. In the "Endeavour" collection there is a solitary specimen from the coast of Queensland, and the Australian Museum collection contains five others.

The largest specimen is an incomplete colony rising to a height of 13.3 cm., with a breadth of 6.4 cm., and a thickness of 3.5 cm. The main stem, flattened in section, is 9 mm. in thickness. From this arise the main branches, lateral in position, which are compressed in the plane of ramification. The secondary branches are thick and compressed, and give

rise to cylindrical branches, which may remain simple, but usually bear terminal twigs with swollen and rounded ends. The twigs have a diameter of 5 mm. near the tips.

A small specimen, evidently the terminal portion of a large colony, agrees with the third of the specimens described by Simpson in its robust and bushy appearance, the marked upward growth, and the palmate terminations of the twigs.

The remaining four colonies, whose measurements in centimetres are included in the following table, correspond most closely with the largest specimen:—

	Height.	Breadth.	Thickness.
I.	7	3	3
II.	10	6·2	1·5
III.	11·2	3·3	2
IV.	12·5	8·2	1·5
V.	12·6	6·4	3
VI.	13·3	6·4	3·5

The axis consists of white calcareous internodes with longitudinal fluting, and short brown horny nodes. The longitudinal ridges of the calcareous joints are dentate. Near the base of the main stem the calcareous joints have lengths of 5·6 mm., and the horny nodes 1·5-2 mm. In the branches the internodes are 7 mm. in length, the nodes being reduced to about 1 mm. The branches arise from the calcareous joints.

The cœnenchyma is very thick and fleshy, in some parts 2 mm. It is very compact and smooth, and does not show any indication of the presence of the jointed axis. The polyps occur all over the surface; they are numerous, and about 0·5 mm. apart. There are no verrucæ.

There is considerable variety in the spicules of the cœnenchyma:—(1) rods with warty knobs irregularly arranged— $\cdot 157 \times \cdot 105$ mm.; $\cdot 140 \times \cdot 070$ mm.; $\cdot 105 \times \cdot 070$ mm.; (2) spicules of similar form to (1) but with the warts arranged in whorls— $\cdot 157 \times \cdot 080$ mm.; $\cdot 150 \times \cdot 080$ mm.; $\cdot 140 \times \cdot 070$ mm.; (3) tri- and quadri-radiate forms— $\cdot 140 \times \cdot 105$ mm.; $\cdot 122 \times \cdot 122$ mm.; $\cdot 105 \times \cdot 087$ mm.; (4) stellate and irregular forms— $\cdot 087 \times \cdot 087$ mm.; $\cdot 087 \times \cdot 052$ mm.; $\cdot 079 \times \cdot 052$ mm.

The colour is light brown. Associated with the majority of the colonies are specimens of the bivalve *Pteria chinensis*, Leach.

Localities.—Off the coast of Queensland ("Endeavour"). Murray Island, Torres Strait (Austr. Mus. Coll.).

Distribution.—Indian Ocean (Ellis, Pallas). Mediterranean Sea and America (Pallas). North Sea (Linnæus). Iceland (Olafsen and Polvesen, Lamouroux). Antilles and United States (Lamouroux). Straits of Sunda and southern coast of Sumatra (Ellis and Solander). East Indies (Dana). Amboina (Milne-Edwards et Haime). Pacific Ocean (Wright and Studer). Andaman Sea, surf line and 20 fathoms (Thomson and Simpson). The Siboga Expedition obtained specimens at nine stations in the eastern part of the Indian Archipelago at depths varying from 22-45 metres (Nutting).

Genus MOPSEA, *Lamouroux*.

MOPSEA DICHOTOMA (*Linnæus*).

Isis dichotoma, Linnæus, Syst. Nat., 10th ed., 1, 1758, p. 799. *Id.*, Lamarck, Hist. anim. sans vert., ii., 1816, p. 302.

Mopsea dichotoma, Lamouroux, Hist. Polyp. corall. flexibles, 1816, p. 467. *Id.*, Milne-Edwards et Haime, Hist. Nat. Corall., 1857, p. 197. *Id.*, Wright and Studer, Chall. Rep., Zool., xxxi., 1889, p. 41, pl. ix., fig. 10. *Id.*, Hickson, Proc. Roy. Soc. Vict., (n.s.), ii., 1890, p. 137. *Id.*, Roule, Expéd. Antarctique Française, 1908, Aleyonaires, p. 5. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 673, pl. lxxvii., fig. 1.

A number of broken pieces showing dichotomous branching are referred to this species. In the majority of the specimens the polyps are arranged in close-wound spirals all over the branches. On the most slender specimens, however, the polyps occur in alternating rows on each side, here and there encroaching on the free median spaces. The spicules are as described by Thomson and Mackinnon.

Locality.—South east coast of Australia.

Distribution.—Indian Ocean (Lamarck, Lamouroux). Port Jackson, New South Wales, 35 fathoms (Wright and Studer). Port Phillip, Victoria (Hickson). Booth-Wandel Island, Antarctica (Roule). The "Thetis" specimens were obtained at the following localities off the coast of New South Wales:—Station 47, off Bulgo, 63-57 fathoms; station 48, off Wollongong, 55-56 fathoms; station 53, off Crookhaven River, 23 fathoms (Thomson and Mackinnon).

MOPSEA ENCRINULA (*Lamarck*).

Isis encrinula, Lamarck, Hist. anim. sans vert., ii., 1816, p. 302.

Mopsea verticillata, Lamouroux, Hist. Polyp. Corall. flexibles, 1816, p. 467, pl. xviii., fig. 2.

Mopsea encrinula, Ehrenberg, Corallenth. d. rothen Meeres, 1834, p. 131. *Id.*, Milne-Edwards et Haime, Hist. Nat. Corall., 1857, p. 198. *Id.*, Gray, Proc. Zool. Soc., 1857, p. 284; *Id.*, Gray, Cat. Lithophytes in Brit. Mus., 1870, p. 15. *Id.*, Studer, Monatsber. Akad. Wiss. Berlin, 1878, p. 665. *Id.*, Wright and Studer, Chall. Rep., Zool., xxxi., 1889, p. 43, pl. vii., figs. 1, 1a, 1b, pl. ix., fig. 11. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 674.

Entangled with a mass of Hydrozoa were found a few broken specimens, which agree with Wright and Studer's description of *Mopsea encrinula* (*Lamarck*). The salient characters may be summarised thus:—Branching is plume-like and in one plane; the cœnenchyma is thick; the polyps club-shaped and arranged in close spirals, bending in towards the stem. The axis is composed of calcareous internodes with distinct longitudinal furrows, and horny nodes. The branches arise from the calcareous joints.

The spicules include the following types:—(1) curved, warty, somewhat flattened spindles, with the convex side produced into a number of strong, prominent teeth— 192×087 mm.; 157×052 mm.; 140×061 mm.; 122×052 mm.; (2) scales with irregular margins and spiny warts— 105×070 mm.; 087×052 mm.; 070×052 mm.; 052×043 mm.; (3) small irregular bodies and "capstans"— 087×070 mm.; 052×035 mm.; 035×035 mm.

The colour is yellowish-white.

Locality.—Great Australian Bight, 80-100 fathoms.

Distribution.—"Les mers de la Nouvelle—Hollande" (*Lamarck*). Australia (*Lamouroux*, *Milne-Edwards* et *Haime*, *Gray*). North-west coast of Australia, 50 fathoms (*Studer*). "Challenger" Station 162, off East Monœur Island, Bass Strait, 38 fathoms (*Wright* and *Studer*). The "Thetis" specimens were obtained at the following localities off the coast of New South Wales:—Eleven miles east of Broken Bay; Station 34, off Port Jackson, 39-36 fathoms; Station 44, off Coogee, 49-50 fathoms; Station 47, off Bulgo, 63-57 fathoms (*Thomson* and *Mackinnon*).

MOPSEA AUSTRALIS, Thomson and Mackinnon.

(Plate vi.)

Mopsea australis, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 675, pl. lxiv., figs. 1, 2, pl. lxvii., fig. 5.

A solitary but magnificent lyre-shaped colony represents this species, which was described by Thomson and Mackinnon from very fragmentary specimens.¹ It is 37·5cm. high, and consists of a main stem, 4 mm. in diameter, which arises from an encrusting, disc-like, calcareous base. The colony is expanded in one plane, and has a width of 20cm. in its widest part. At 3·2cm. from the base the main stem divides into two equal branches. These primary branches give off, along the upper side alone, a series of parallel ascending secondary branches, which soon attain to nearly the same thickness as the main branches. In this manner there arises the appearance of a continuous dichotomy. At the same time the main branch tends to bend outwards after each secondary branch is given off, so that its course describes a series of shallow curves. The secondary branches either divide dichotomously or remain simple throughout their length. In general appearance and mode of branching the colony is very similar to *Mopsea dichotoma* (Linnæus).

The cœnenchyma is thin, and where it has been worn off, the axis shows the usual white calcareous internodes with well marked longitudinal fluting, and the short brown-coloured nodes.

The polyps are club-shaped, and occur in close spirals round the branches, to which they are very closely pressed, so that their mouths are hidden.

The spicules include the following forms:—(1) elongate to oval scales, with large teeth round their edges, and a few warts scattered over the surface— 192×087 mm.; 183×105 mm.; 157×087 mm.; 122×070 mm.; (2) warty spindles and clubs— 157×035 mm.; 122×017 mm.; 105×035 mm.; (3) Capstans, a few crosses, and small irregular bodies— 070×035 mm.; 052×035 mm.; 052×052 mm.; 052×017 mm.

1. I have not been able to find, among the specimens returned to the Australian Museum by Thomson and Mackinnon, any specimen labelled as the type of *Mopsea australis*. I conclude, therefore, that it must have broken up. The co-type, consisting of a number of "branching pieces of various lengths" has been preserved.

The colour of the colony is cream.

Locality.—Fifteen miles N. 35° E. of Saddle Hill, New South Wales, 34-35 fathoms.

Distribution.—Hitherto recorded only from eleven miles east of Broken Bay, New South Wales (Thomson and Mackinnon).

MOPSEA FLABELLUM, *Thomson and Mackinnon*.

Mopsea flabellum, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 676, pl. lxiii., figs. 1-3, pl. lxxvii., fig. 6, pl. lxxi.

The collection contains two incomplete branching specimens, the characters of which agree in detail with Thomson and Mackinnon's description of *Mopsea flabellum*. The larger of the two colonies is 24 cm. in height. The basal attachment is lacking. The branching is dichotomous and strictly confined to one plane. The branches, though slender, maintain an almost uniform diameter of about 2 mm. throughout their length.

The lower portions of the stem and branches are devoid of cœnenchyma, and the axis, which is about 3 mm. in diameter, is composed of creamy-white calcareous internodes with well marked longitudinal fluting, and brown-coloured horny nodes. In the twigs, however, the colour of the calcareous joints is deep orange.

The club-shaped polyps are arranged in close-wound spirals all over the branches. Their armature consists of about eight longitudinal rows of overlapping spicules. A low operculum is formed of eight plates similar in appearance to the scales with which the polyps are covered.

The superficial spicules are flat, yellow-coloured, circular, 8-shaped, irregular scales— 262×105 mm.; 210×157 mm.; 192×61 mm.; 175×175 mm. Each scale is smooth or bears a few simple warts; the margin is deeply dentate or serrate. The spicules of the cœnenchyma are (1) yellow-coloured spindles with a few large warts— 175×52 mm.; 157×52 mm.; 122×35 mm.; and (2) small irregular bodies— 87×52 mm.; 70×35 mm.; 52×52 mm.

The colour of the colonies is orange-brown; the polyps yellowish.

Locality.—Thirty-six miles S. 58° W. of Cape Wickham, King Island, Bass Strait, 72-80 fathoms.

Distribution.—Hitherto known only from "Thetis" specimens taken off the coast of New South Wales at the following localities:—Station 34, off Port Jackson, 39-36 fathoms; Station 44, off Coogee, 49-50 fathoms (Thomson and Mackinnon).

MOPSEA ELEGANS, *Thomson and Mackinnon.*

Mopsea elegans, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 677, pl. lxiv., figs. 3, 4, pl. lxxviii., fig. 5, pl. lxxii.

A number of broken pieces showing dichotomous, sub-parallel branching, agree with Thomson and Mackinnon's type. The height of the largest fragment is 18 cm., with a width of 1.3 cm. The branches vary from 1.5 mm. to 2 mm. in diameter.

The polyps are arranged in two alternating rows on each side of the younger branches, leaving a median bare line on each surface. They tend, however, to encroach on these, especially towards the lower portions of the colony, where they are arranged in three or four rows. A comparison with the polyps of the "Thetis" type shows that the "Endeavour" specimens are more slender, a difference due probably to drying.

The spicules of this species are:—(1) superficial ctenoid scales, each with a nucleus from which radiate fine ridges— $\cdot077 \times \cdot052$ mm.; $\cdot061 \times \cdot052$ mm.; $\cdot043 \times \cdot043$ mm.; (2) tuberculate capstans with scarcely any waist— $\cdot057 \times \cdot043$ mm.; $\cdot049 \times \cdot035$ mm.; $\cdot038 \times \cdot035$ mm.

The colour is golden-brown.

Localities.—Shoalhaven Bight, New South Wales, 15-45 fathoms.

Six miles S. 30° E. of Brush Island, New South Wales, 65 fathoms.

Distribution.—Hitherto known only from "Thetis" specimens taken off the coast of New South Wales at the following localities:—Station 34, off Port Jackson, 39-36 fathoms; Station 41, off Wata Mooli, 52-71 fathoms; Station 42, off Wata Mooli, 70-78 fathoms; Station 47, off Bulgo, 63-57 fathoms; Station 48, off Wollongong, 55-56 fathoms (Thomson and Mackinnon).

MOPSEA WHITELEGGEI, *Thomson and Mackinnon.*

Mopsea whiteleggei, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 678, pl. lxxvi., figs. 2, 3, pl. lxxiii.

Two well-preserved specimens, referable to this species, were obtained from the same locality. The larger of the two rises from a slightly encrusting base to a height of 26 cm., with a width of 20 cm. across the expanded portion. Branching begins at a height of 2·5 cm. from the base, and is typically plume-like; the branches are confined almost entirely to one plane. The stouter branches have an average diameter of 2 mm., and the twigs of 1 mm. near their tips. The second specimen is 21·5 cm. high, with a spread of 16·5 cm. across the branched part.

The diameter of the axis near the base is 3 mm. The cœnenchyma has worn away from this portion of the stem, and the axis shows the white calcareous internodes with fine longitudinal ridges, and the amber-coloured nodes. The twigs arise from the calcareous internodes.

The polyps are arranged alternately in a single row along the twigs, here and there encroaching on the middle line and becoming irregular in disposition. They are club-shaped, with truncate mouths, and turn upwards towards the extremity of the twig. The average length of a polyp is about ·6 mm.

The spicules are (1) small, colourless, flattened spindles and curved lancet-shaped plates, produced more strongly on one side of the spicule than on the other into a number of tooth-like warts— $·262 \times ·052$ mm.; $·245 \times ·052$ mm.; $·175 \times ·070$ mm.; $·131 \times ·087$ mm.; (2) small spindles and club-like forms— $·131 \times ·026$ mm.; $·122 \times ·035$ mm.; $·096 \times ·035$ mm.; $·087 \times ·035$ mm.; $·052 \times ·026$ mm.

The colour of the colonies is creamy-white.

Locality.—Six miles S. 30° E. of Brush Island, New South Wales, 65 fathoms.

Distribution.—Hitherto known only from "Thetis" specimens taken off the coast of New South Wales at the following localities:—Eleven miles east of Broken Bay; Station 10, off Broken Head, 28 fathoms; Station 40, off Wata Mooli, 52 fathoms; Station 44, off Coogee, 49-50 fathoms; Station 48, off Wollongong, 55-56 fathoms (Thomson and Mackinnon).

MOPSEA PLUMACEA, *sp. nov.*

(Plate iv., fig. 1 ; Plate vii.)

This new species is well represented by several complete colonies, and a number of incomplete branching pieces.

One complete specimen is 22·5cm. in height, with a maximum breadth across the expanded portion of 11cm. The colonies are typically feather-like, the long frond-like branches bearing on each side a row of alternating twigs. These twigs usually remain simple, but occasionally branch in the same pinnate manner. The colony is attached by a well developed calcareous expansion, about 12mm. in thickness. From this there rises a cylindrical stem, 2·5mm in diameter. At a height of 5·7cm., the stem divides into two main branches, which bear numerous twigs. The branches have a diameter of 2mm. Branching is confined to one plane.

The axis is composed of white calcareous internodes with fine longitudinal fluting, and short amber-coloured nodes. The longitudinal ridges of the calcareous joints are dentate. Near the base of the stem, the horny nodes have lengths of 2·3mm., and the calcareous internodes of 0·5mm. In some cases the internodes are entirely overlapped by the horny joints. Higher up the calcareous joints are 1·5mm. in length, the horny joints being reduced to 0·25mm. The calcareous internodes give rise to one twig each in alternate succession.

The cœnenchyma is thin, and on the twigs is almost entirely hidden by the numerous polyps. These occur in close-wound spirals over the whole surface of the twigs. In the youngest twigs the spiral is wider, but nowhere is there any trace of a bilateral arrangement. On the branches, however, a few scattered polyps occupy a lateral position, here and there encroaching on the middle line.

The polyps are small, 0·5-0·75mm. in height, and club-shaped, with truncate mouths, which turn upward toward the extremity of the twig. In several instances inverted polyps were observed with their mouths directed towards the proximal end of the twig. The calyces are armoured with longitudinal rows of transversely arranged, slightly overlapping scales ; there are from ten to twelve of these in the abaxial rows. These spicules are arranged in an imbricate manner ; the imbrication being clearly seen in a profile view of the polyp.

The calyx spicules are colourless, flat scales, transversely elongate, 8-shaped, and irregular. The following measurements of the length and breadth in millimetres were taken :— $\cdot 192 \times \cdot 113$; $\cdot 175 \times \cdot 122$; $\cdot 157 \times \cdot 105$; $\cdot 140 \times \cdot 087$; $\cdot 105 \times \cdot 087$. Their free edge is deeply dentate; simple warts are scattered over the surface, and the border round the exposed portion of the scale bears fine radiating ridges. A low eight-rayed operculum is formed by similar scales. There are also somewhat flattened, curved spindles, with the convex side produced into a number of sharp projecting warts— $\cdot 192 \times \cdot 052$ mm.; $\cdot 175 \times \cdot 043$ mm.; $\cdot 157 \times \cdot 035$ mm.; $\cdot 149 \times \cdot 035$ mm.

The spicules of the cœnenchyma are (1) stout spindles with prominent warts— $\cdot 113 \times \cdot 070$ mm.; $\cdot 122 \times \cdot 070$ mm.; $\cdot 105 \times \cdot 052$ mm.; $\cdot 096 \times \cdot 052$ mm.; and (2) capstan-like forms and small irregular bodies— $\cdot 105 \times \cdot 061$ mm.; $\cdot 087 \times \cdot 070$ mm.; $\cdot 070 \times \cdot 052$ mm.; $\cdot 052 \times \cdot 035$ mm.

The colour of the colonies is creamy-white.

Position.—This species agrees in many respects with *Mopsea whiteleggei*, Thomson and Mackinnon¹, but is distinguished from that species by (1) the invariable arrangement of the polyps in close-wound spirals round the twigs, (2) the smaller number of scales in the abaxial rows of the polyp calyx, and (3) the quite different type of spicules.

Localities.—South Australian Coast.

Fifteen miles south of St. Francis Island, Nuyt Archipelago, Great Australian Bight, 30 fathoms.

Thirty-six miles S. 58° W. of Cape Wickham, King Island, Bass Strait, 72-80 fathoms.

MOPSEA REPENS, *sp. nov.*

(Plate iv., fig. 2; Plate viii.)

This species is based on several branching specimens, of which the largest is 13·5cm. in height, with a spread of 14·5cm. across the expanded portion. The branching is strictly confined to one plane. The basal attachment of the stem is missing. Branching begins at a height of 1·4cm., and is very luxuriant. The main stem is bent in a zigzag manner, forming an angle wherever branches arise. The

1. Thomson and Mackinnon—Mem. Austr. Mus., iv., 13, 1911, p. 678, pl. lxxvi., figs. 2 and 3, pl. lxxiii.

branches ascend in the same zigzag manner, and are bent at the point of departure of each twig. The stem has a maximum diameter of 2.5cm. ; the average diameter of the larger branches is 2mm., and of the twigs 1mm.

The axis is made up of orange-coloured calcareous internodes with fine longitudinal fluting, and short brown-coloured nodes. Near the base of the colony the major portion of the stem is composed of horny nodes, which are 1.5mm. long. These entirely overlap the calcareous internodes. Higher up the calcareous joints are 2mm. in length ; the horny joints being reduced to 0.5mm. The branches arise from the horny nodes.

The polyps are mainly confined to the twigs, along each side of which they are arranged alternately in a single row. A few occur here and there on the branches. The arrangement of the polyps on the twigs shows great regularity and evenness. There are about eleven polyps on one side in a length of 1cm.

The polyps are 0.75-1mm. in height, and club-shaped with truncate mouths, which are incurved toward the cortex of the twig. The calyces are armoured with eight rather indefinite, longitudinal rows of transversely arranged, overlapping scales. The abaxial rows are composed of about sixteen such spicules. The calyx spicules are elongate to oval, ctenoid scales with their free edge crisply waved ; the remainder of the margin bears more or less deep indentations. Warts are scattered over the surface of the scale, and the clear border round the exposed portion of the scale bears strongly-marked radiating ridges. The following measurements of the length and breadth in millimetres were taken :— $\cdot 166 \times \cdot 087$; $\cdot 140 \times \cdot 087$; $\cdot 122 \times \cdot 070$; $\cdot 105 \times \cdot 052$. A low eight-rayed operculum is formed by similar scales.

The spicules of the cœnenchyma are yellow spindles— $\cdot 140 \times \cdot 052$ mm. ; $\cdot 122 \times \cdot 070$ mm. ; $\cdot 105 \times \cdot 052$ mm. ; $\cdot 087 \times \cdot 035$ mm. They have relatively few, but large warts. There are also a few crosses and small irregular bodies— $\cdot 087 \times \cdot 070$ mm. ; $\cdot 070 \times \cdot 052$ mm. ; $\cdot 052 \times \cdot 052$ mm. The cœnenchyma is thin and the spicules follow the longitudinal direction of the stalk.

The colour of the colonies is reddish-brown.

Localities.—Thirty-six miles S. 58° W. of Cape Wickham, King Island, Bass Strait, 72-80 fathoms.

Fifteen miles south of St. Francis Island, South Australia, 30 fathoms.

Family PRIMNOIDÆ.

Genus STACHYODES, *Wright and Studer*.STACHYODES STUDERI, *Versluys*.

Stachyodes regularis, Wright and Studer, Chall. Rep., Zool., xxxi., 1889, p. 55, pl. xi., figs. 2, 2a, pl. xx., fig. 3.

Stachyodes studeri, Versluys, Gorgoniden Siboga Exped., ii., Primnoidæ, 1906, p. 94, figs. 112-117. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 680.

A single specimen in the collection agrees with the description of *Stachyodes studeri* given by Versluys. The fragment is 55 mm. in length, without a basal attachment. The polyps occur in whorls of eight to ten. Whorls of new young polyp buds are sometimes visible between the whorls of adult polyps.

The colour of the specimen is creamy-white; the axis is greenish-bronze, with fine longitudinal striations.

Locality.—Off Long Reef, New South Wales, 50 fathoms.

Distribution.—"Challenger" Station 171, off the Kermadec Islands, 600 fathoms (Wright and Studer). Celebes Sea, 1080 and 1165-1264 metres (Versluys). The "Thetis" specimens were obtained off the coast of New South Wales at the following localities:—Station 15, off Norah Head, 32-48 fathoms; Station 42, off Wata Mooli, 70-78 fathoms; Station 44, off Coogee, 49-50 fathoms (Thomson and Mackinnon).

Nutting¹ records the occurrence of *Stachyodes regularis*, Wright and Studer, at "Albatross" Station 3879, south of Lanai Island, 923-1081 fathoms. He states, moreover, that "the original specimens were secured by the *Challenger* in the South Atlantic, near Tristan da Cunha, 75-150 fathoms." I can find no authority for this locality, since Wright and Studer and Versluys state definitely that the type locality is the Kermadec Islands.

1. Nutting—Proc. U.S. Nat. Mus., xxxiv., 1908, p. 577.

Genus AMPHILAPHIS, *Wright and Studer.*AMPHILAPHIS PLUMACEA, *Thomson and Mackinnon.*

(Plate iv., fig. 4).

Amphilaphis plumacea, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 680, pl. lxxv., fig. 3, pl. lxxviii., fig. 3, pl. lxxiv.

The occurrence of five colonies in this collection allows of the addition of several details, especially as regards habit, to the description given by Thomson and Mackinnon.

They are slightly smaller than the 18·5 cm. high colony obtained by the "Thetis" Expedition off the coast of New South Wales; the largest is 17·5 cm. in height, with a diameter of 1·5 mm. at the base. One markedly flabellate colony, 7·5 cm. high, has a width of as much as 13·7 cm., and a diameter of 2 mm. at the base of the stem. The corresponding dimensions of another flabellate colony are—height 9 cm.; width 13·5 cm.; diameter of stem 2 mm.

The following significant characters can be made out. The colonies are expanded in one plane. From a slightly swollen base arises a cylindrical stem, which soon branches. Lateral branches, varying much in size, are given off from either side of the plane, and from these spring other branches, which again divide in a dichotomous manner.

In a few cases the cœnenchyma, which is very thin, is intact; generally it is more or less worn away. The axis is dark bronze in colour, and marked by fine longitudinal furrows.

The polyps are densely crowded and arranged in a spiral. They vary from 1·1·5 mm. in length.

The dimensions of the ctenoid scales, with which the polyps are armoured, are— 315×236 mm.; 297×201 mm.; 245×192 mm.

The opercular scales (in the form of isosceles triangles) yielded the following measurements:— 420×227 mm.; 400×210 mm.; 358×218 mm.

The spicules of the cœnenchyma are circular to oval scales. The following measurements were taken:— 175×105 mm.; 157×122 mm.; 122×105 mm.

The colour of the colonies is creamy-white.

Locality.—South-east coast of Australia.

Distribution.—Hitherto known only from "Thetis" specimens taken off the coast of New South Wales at the following localities:—Eleven miles E. by N. of Barrenjoey, 30-40 fathoms; Station 22, off Newcastle Bight, 40-26 fathoms; Station 40, off Wata Mooli, 52 fathoms; Station 44, off Coogee, 49-50 fathoms (Thomson and Mackinnon).

Genus *PLUMARELLA*, Gray.*PLUMARELLA THETIS*, Thomson and Mackinnon.

(Plate ix.).

Plumarella thetis, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 683, pl. lxvi., fig. 5, pl. lxxiii., fig. 6, pl. lxxvi.

Two frond-like branches correspond with Thomson and Mackinnon's description of *Plumarella thetis*. They are remarkably robust, the larger being 32.5 cm. long, with a diameter of 4 mm. near the base. The branches give off along each side a row of alternating twigs, which remain simple. The twigs are 11 cm. long, with a diameter of 2 mm. There are seven to eight twigs in each row in a length of 5 cm.

The second frond is 26 cm. long, and has a diameter of 3 mm. near the base. The twigs are 7.5 cm. in length, with a diameter of 2 mm.

The polyps are arranged in close-wound spirals round the twigs, but are scattered irregularly over the whole surface of the branches. They are armed with longitudinal rows of large overlapping scales, of which there are about six in the abaxials; they are broad, shield-like, and fan-like scales, with a nucleus surrounded by numerous finely-tuberculate warts, and with a clear border between the outer margin and the warted portion bearing radiating ridges— 612×367 mm.; 595×280 mm.; 507×367 mm.; 455×297 mm. The opercular scales are isosceles triangles with a strong T-square ridge— 472×210 mm.; 455×192 mm. The scales of the cenenchyma are triangular, oval, and fan-shaped, with tuberculate warts surrounding an excentric nucleus— 385×350 mm.; 367×236 mm.; 280×227 mm.

The colour of the specimens is light-brown. The axis is almost black and bears fine longitudinal striations.

Locality.—Fifteen miles N. 35° E. of Saddle Hill, New South Wales, 34-35 fathoms.

Distribution.—Hitherto known only from specimens obtained by the "Thetis" off the coast of New South Wales at the following localities:—Eleven miles E. by N. of Broken Bay, 30-40 fathoms; Station 34, off Port Jackson, 39-36 fathoms; Station 40, off Wata Mooli, 52 fathoms; Station 42, off Wata Mooli, 70-78 fathoms; Station 47, off Bulgo, 63-57 fathoms; Station 48, off Wollongong, 55-56 fathoms; Station 53, off Crookhaven River, 23 fathoms (Thomson and Mackinnon).

PLUMARELLA FILICOIDES, *Thomson and Mackinnon.*

Plumarella filicoides, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 686, pl. lxxv., fig. 5, pl. lxxviii., fig. 1, pl. lxxviii.

Two specimens represent this species. One colony has the basal portion intact. The larger of the two has a height of 20·5cm., with a width of 17·5cm. across the expanded portion. Its basal attachment consists of a slightly encrusting expansion from which rises a cylindrical stem, 3mm. in diameter. Branching is typically feather-like, and is confined to one plane. At 5·5cm. from the base, the stem gives off two stout branches which bear on each side a row of alternating twigs. The stem also bears twigs, alternating in a single row along each side. The twigs remain simple, and their average length is 4cm., with a diameter of 2mm. There are ten to eleven twigs on each side of a branch in a length of 5cm.

The polyps are arranged bilaterally on the stem and branches; a few, however, are scattered over the free median surfaces of the latter. They are arranged in close-wound spirals on the twigs. The polyps are of two sizes:—(1) small polyps partially sunken in the cœnenchyma and closely pressed against the branch. They are armed with a few broad scales; there are three or four of these in the abaxial longitudinal rows. The operculum forms a sharp, well-defined cone of eight isosceles triangles; (2) large swollen polyps armed with four scales in the abaxial rows, and two or three in the adaxial-laterals. The operculum is low.

The calyx scales are broad, shield-like and fan-like with a distinct nucleus surrounded by numerous tuberculate warts, and a narrow clear border bearing strongly marked ridges— 490×280 mm.; 367×350 mm.; 297×262 mm.; 262×525 mm. The opercular scales are high, sharp-pointed isosceles triangles bearing a strong T-square ridge— 455×210 mm.; 385×192 mm.; 350×175 mm. The spicules of the cœnenchyma are large, oval and fan-shaped scales, without the clear border. They are covered with tuberculate warts, which surround a well-defined nucleus— 332×210 mm.; 280×280 mm.; 192×122 mm.; 122×122 mm.

The colour of the colonies is very light brown. The axis is furrowed, and of a greenish-bronze colour.

Locality.—Six miles S. 30° E. of Brush Island, New South Wales, 65 fathoms.

Distribution.—Hitherto known only from specimens obtained by the "Thetis" off the coast of New South Wales at the following localities:—Station 13, off Cape Three Points, 41-50 fathoms; Station 17, off Broughton Island, 29-48 fathoms; Station 34, off Port Jackson, 39-36 fathoms; Station 48, off Wollongong, 55-56 fathoms (Thomson and Mackinnon).

PLUMARELLA AUSTRALIS, *sp. nov.*

(Plate iv., fig. 3; Plate x.; Plate xi., fig. 2.)

This new species is represented by both dried specimens and others in spirit.

The colonies are typically feather-like. In the largest specimen there is a slightly flattened stem, 5mm. in thickness. The colony has a height of 43cm., with a spread of 32.5cm. across the expanded portion. The basal attachment is lacking. The branching is confined strictly to one plane. The stem gives off strongly flattened branches at rather wide intervals, which bear on each side a row of alternating twigs. These twigs occasionally branch in the same pinnate manner, but usually they remain simple. The longest twigs are 8cm. in length, with a diameter of 2mm. There are eight twigs in each row in a length of 5cm.

Some of the colonies show the basal portion, which consists of a well-developed calcareous expansion about 20mm. in thickness. From this there rises a cylindrical stem, 7mm. in diameter, which soon becomes compressed with its long axis lying in the same plane as that of the colony.

The polyps are arranged bilaterally on the stem and branches; on the twigs their arrangement is also lateral, but there is a tendency, in some instances, to encroach on the middle line. They are arranged in a double row along each side on the twigs, those of one row alternating with those of the other on the same side. The polyps have an average length of .75 mm.

Scattered among the normal-sized polyps in some of the colonies, there are a few large swollen polyps of about twice the size of the others; these contain reproductive bodies.

The calyx scales are arranged in longitudinal rows, of which the abaxials alone are complete. These consist of three to four relatively large overlapping scales. The adaxials are practically absent. The abaxial-laterals are reduced to about one small scale. The operculum is a well defined sharp cone formed of eight rather high isosceles triangles, which bear on their inner surface a well marked keel or ridge. The abaxial pair is the largest; the adaxial pair is very small and lies bent under the other opercular scales.

The large swollen polyps differ from the normal ones not only in size, but they have a much lower operculum, and the polyp scales are more numerous. The armature consists of overlapping scales of which there are about five in the abaxial longitudinal rows, and two to three in the adaxial-laterals.

The calyx scales are broad, shield-like and fan-like, with finely toothed margins, and a well marked excentric nucleus surrounded by tuberculate warts. The relatively clear border of the scale is narrow, and bears strongly marked radiating ridges. The following measurements of the length and breadth of the calyx scales were taken in millimetres :— $\cdot 612 \times \cdot 315$; $\cdot 577 \times \cdot 315$; $\cdot 525 \times \cdot 385$; $\cdot 455 \times \cdot 332$; $\cdot 367 \times \cdot 350$; $\cdot 332 \times \cdot 437$. The eight opercular scales are of very unequal size— $\cdot 525 \times \cdot 210$ mm.; $\cdot 490 \times \cdot 192$ mm.; $\cdot 402 \times \cdot 192$ mm.; $\cdot 350 \times \cdot 210$ mm.; $\cdot 280 \times \cdot 140$ mm. They are sharply pointed isosceles triangles with a strong median ridge. Numerous small warts are grouped along the sides of the ridge. The border is relatively broad and bears a number of jagged projections. The margins of the two long sides of the scale are minutely dentate.

The spicules of the cœnenchyma are rather large scales, oval, fan-shaped and triangular, closely studded with tuberculate warts, and without a clear border. The following measurements were taken :— $\cdot 490 \times \cdot 332$ mm.; $\cdot 437 \times \cdot 341$ mm.; $\cdot 420 \times \cdot 350$ mm.; $\cdot 385 \times \cdot 332$ mm.; $\cdot 315 \times \cdot 297$ mm. A few oval to spherical bodies covered with warts are also present— $\cdot 192 \times \cdot 175$ mm.; $\cdot 175 \times \cdot 175$ mm.; $\cdot 122 \times \cdot 122$ mm.

The colour of the colonies is creamy-white; the axis is greenish-bronze to black, and bears fine longitudinal striations.

Locality.—Fifty miles south of Cape Wiles, South Australia, 75 fathoms.

Genus PRIMNOELLA, Gray.

PRIMNOELLA AUSTRALASIE, Gray.

Primnoa australasiæ, Gray, Proc. Zool. Soc., 1849, p. 146, pl. ii., figs. 8, 9; *Id.*, Gray, Ann. Mag. Nat. Hist., (2), v., 1850, p. 510.

Primnoella australasiæ, Gray, Proc. Zool. Soc., 1857, p. 286, and 1859, p. 483; *Id.*, Gray, Cat. Lithophytes in Brit. Mus., 1870, p. 50. *Id.*, Verrill, Bull. U.S. Nat. Mus., 1876, p. 76. *Id.*, Wright and Studer, Chall. Rep., Zool., xxxi., 1889, p. 88, pl. xviii., figs. 1, 1a, pl. xxi., fig. 15. *Id.*, Versluys, Gorgoniden Siboga Exped., ii., Primnoidæ, 1906, p. 52, figs. 55-60. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 688, pl. lxi., fig. 1.

This species is represented by a single colony, which is imperfect at the tip, and has a length of 81 cm. The lower portion of the stem is devoid of polyps and cœnenchyma, which is first met with at a height of 55 mm. The thickness of the axis at its base is 5 mm., but rapidly diminishes to 3 mm. in diameter. At the point of attachment of the colony the axis is hard and calcareous, but soon becomes horny and flexible. There are fifteen to nineteen calyces, 2 mm. in length, on each closely packed whorl.

Locality.—Fifteen and a-half miles S. 8° E. of Cape Everard, Victoria, 66 fathoms.

Distribution.—*P. australasiæ* has been recorded frequently from the eastern and southern coasts of Australia, from Tasmania (Gray), and from Bluff Harbour, New Zealand (Verrill). Gray also gives as a locality the "Australian Seas." The "Challenger" Expedition obtained specimens from Port Jackson, New South Wales, 30-35 fathoms, and from off Twofold Bay, New South Wales, 150 fathoms. Records by Thomson and Mackinnon tell of its presence at nine stations on the coast of New South Wales.

Under the name *Primnoella australasiæ* (Gray), Hickson¹ recorded a Primnoid from Port Phillip, Victoria, which he now refers to *Caligorgia flabellum*, Ehrenberg. He writes² "I ask therefore to correct my report by substituting the name *Caligorgia flabellum* (Ehrenberg) for *Primnoella australasiæ* (Gray), in the list of species obtained at Port Phillip."

1. Hickson—Proc. Roy. Soc. Vict., (n.s.), ii., 1890, p. 138.

2. Hickson—Proc. Roy. Soc. Vict., (n.s.), xix., 1907, p. 46.

PRIMNOELLA GRANDISQUAMIS, *Wright and Studer*.

Primnoella grandisquamis, Wright and Studer, Chall. Rep., Zool., xxxi., 1889, p. 86, pl. xvii., fig. 4, pl. xxi., fig. 13. *Id.*, Versluys, Gorgoniden Siboga Exped., ii., Primnoidæ, 1906, p. 55.

The collection contains a number of broken pieces of *Primnoella grandisquamis*, Wright and Studer, which does not appear to have been obtained since those authors published their original description of a specimen 39 mm. in length.

They were trawled from the type locality in 40 fathoms. The largest has a height of 210 mm.; the basal attachment is lacking. The axis has an almost uniform diameter of 0.5 mm. The colony is a long, flexible, thread-like, unbranched stem around which the polyps are arranged in whorls. There are four to five polyps in a whorl. The average length of a polyp is 1.5 mm., with a diameter of 0.9 mm. The whorls are about 1.5 mm. apart. Young polyp buds, arranged in whorls, are visible in the internodes.

The calyx scales are large, transversely elongate, and overlapping, and only two longitudinal rows are visible from the dorsal side. Each scale shows a nucleus with fine lines radiating from it. The surface is studded with small warts. The free margin of the scale is entire; the remainder is strongly toothed. Their dimensions are— 385×262 mm.; 315×227 mm.; 315×262 mm.; 297×245 mm. The opercular scales are short, flat structures— 227×070 mm. The spicules of the cœnenchyma are oval, four-cornered, and polygonal plates, with a central nucleus and teeth round the edges, and with warts over the surface— 402×227 mm.; 385×262 mm.; 350×297 mm.; 192×113 mm.

The colour of the specimens is creamy-white.

Locality.—Off Eden, Twofold Bay, New South Wales, 40 fathoms.

Distribution.—Hitherto recorded only from "Challenger" Station 163A, off Twofold Bay, New South Wales, 150 fathoms (Wright and Studer).

GENUS CALIGORGIA, *Gray* (emend. *Studer*).CALIGORGIA FLABELLUM (*Ehrenberg*).

Gorgonia verticillaris, Esper, Fortsetz. der Pflanzenthier, x., 1797, p. 156, pl. 42.

Primnoa flabellum, Ehrenberg, Corallenthier rothen Meeres, 1834, p. 134. *Id.*, Kölliker, Icones Histiologicæ, 1865, p. 135, pl. xvii., fig. 11.

- Callogorgia fiabella*, Gray, Proc. Zool. Soc., 1859, p. 484.
Calligorgia verticillata, Gray, Cat. Lithophytes Brit. Mus., 1870, p. 35.
Xiphocella esperi, Gray, Cat. Lithophytes Brit. Mus., 1870, p. 36.
Calligorgia flabellum, Studer, Monatsber. Akad. Wiss. Berlin, 1878, p. 646, pl. ii., fig. 13, a, b.
Caligorgia flabellum, Wright and Studer, Chall. Rep., Zool., xxxi., 1889, p. 79, pl. xiv., fig. 2. *Id.*, Studer, Bull. Mus. Comp. Zool., xxv., 1894, p. 65. *Id.*, Versluys, Gorgoniden Siboga Exped., ii., Primnoidæ, 1906, p. 69, pl. v., fig. 13, pl. vi., fig. 14. *Id.*, Thomson and Henderson, Alcyonaria Indian Ocean, i., 1906, p. 43. *Id.*, Kükenthal, Zool. Anzeig., xxxi., 1907, p. 209. *Id.*, Kinoshita, Journ. Coll. Sci. Tokyo, xxiii., 12, 1908, p. 35, pl. vi., fig. 45. *Id.*, Nutting, Proc. U.S. Nat. Mus., xliii., 1913, p. 60.

The collection contains a single incomplete specimen, which I am unable to separate from the Japanese *Caligorgia flabellum* (Ehrenberg). The polyps and spicules agree with the description and figures given by Versluys, except that the sculpture of the distal scales is not so pronounced as figured. In my specimen the number of polyps in a whorl is usually four, sometimes five, never so many as seven as in those of Versluys. Nutting's specimen has eighteen polyps to a whorl on the bases of the larger branches.

The colour of the colony is cream.

Locality.—Great Australian Bight, Long. 129° 6½', 200-300 fathoms.

Distribution.—Previously recorded from near Mauritius, Japan, Formosa, and the western part of the Indian Ocean. "Challenger" Station 232, Hyalonema-ground, south of Japan, 345 fathoms (Wright and Studer). Port Phillip, Victoria (Hickson¹). The "Albatross" Expedition obtained it at the following localities:—Station 3406, Lat. 0° 16' N., Long. 90° 21' 30" W., 551 fathoms; Station 3424, Lat. 21° 15' N., Long. 106° 23' W., 676 fathoms; Station 3353, Lat. 7° 6' 15" N., Long. 80° 34' W., 695 fathoms (Studer). "Siboga" Station 251, 5° 28' 4" S., 132° 0' 2" E., Kei Island, 204 metres (Versluys). "Investigator" Station 333, 6° 37' N., 79° 38¾' E., 401 fathoms (Thomson and Henderson). Indian Ocean, 752 metres (Kükenthal). Sagami Sea, Japan (Kinoshita). "Albatross" Station 4936, Sata Misaki Light, N. 21° E., 103 fathoms (Nutting).

1. Under the name of *Primnoella australasia* (Gray).

Family GORGONELLIDÆ.

Genus CTENOCELLA, Valenciennes.

Simpson¹ and Nutting² have both shown that the genus *Scirpearia*, as understood by authors generally, is not identical with that of Cuvier, the latter being based on a Penatulid. Simpson has retained the genus in its emended form, which, however, cannot be admitted according to the rules of zoological nomenclature. Nutting, on the other hand, has distributed the various species which were included in *Scirpearia* into other genera of the Gorgonellidæ.

Simpson also argued that *Ctenocella* is not distinct from his emended *Scirpearia* from which it only differs in the mode of branching. If his opinion be accepted, the single species of *Ctenocella* (*C. pectinata*) must be placed in one of the several genera into which Nutting has distributed the various species erroneously included in *Scirpearia*. Nutting, however, has not recognised the identity of *Ctenocella* and *Scirpearia* (emended), but maintains it as a good genus; under the circumstances I prefer to follow him.

CTENOCELLA PECTINATA (Pallas).

(Plate iv., fig. 5; Plate xii.)

Gorgonia pectinata, Pallas, Elenchus Zoophytorum, 1766, p. 179. *Id.*, Ellis and Solander, Nat. Hist. Zoophytes, 1786, p. 85. *Id.*, Lamouroux, Hist. Polyp. corall. flexibles, 1816, p. 416.

Gorgonella pectinata, Kölliker, Icones Histiologicæ, ii., 1865, p. 140, pl. xviii., fig. 41.

Ctenocella pectinata, Valenciennes, Comptes Rendus, xli., 1855, p. 14. *Id.*, Milne-Edwards et Haime, Hist. Nat. Corall., 1857, p. 185. *Id.*, Gray, Cat. Lithophytes Brit. Mus., 1870, p. 26. *Id.*, Studer, Monatsber. Akad. Wiss. Berlin, 1878, p. 657. *Id.*, Ridley, Zool. Coll. H.M.S. "Alert," 1884, p. 348. *Id.*, Studer, Versuch eines Systems der Alcyonarien, 1887, p. 68. *Id.*, Wright and Studer, Chall. Rep., Zool., xxxi., 1889, p. lxvi. *Id.*, Studer, Alcyonarien Sammlung

1. Simpson—Proc. R. Irish Academy, xxviii., 1910, p. 307.

2. Nutting—Gorgonacea Siboga Exped., vi., Gorgonellidæ, 1910, p. 5.

Naturhistorischen Museums Lübeck, 1894, p. 119. *Id.*, Nutting, Gorgonacea Siboga Exped., vi., Gorgonellidae, 1910, p. 15. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 691, pl. lxxxii.

Scirpearia pectinata, Simpson, Proc. R. Irish Academy, xxviii., 1910, p. 319, figs. 36-45.

The first detailed descriptions of this species are those of Nutting (1910) and Simpson (1910), who gave a comprehensive review of its structure. The species is represented in the collection by twenty-nine specimens, all of which are preserved in the dry condition. Although showing a moderate amount of variation in external form, the colonies may be described as typically lyre-shaped. The description and figure of a colony given by Thomson and Mackinnon (1911) portray with exactitude their salient features. The largest specimen is 62cm. in height, with a spread of 31cm. The main stem, which arises from an encrusting base, is 3cm. long and 8mm. in diameter. The main branches into which the stem forks, diverge at an angle of about 45° , and from their upper surface alone give off a series of erect, parallel twigs. The main branches have a basal diameter of 7mm., and the longest is 52cm. in length. Some of the lesser branches are more strongly developed than the rest, and these either give off ascending twigs, or divide in a dichotomous manner. The twigs, up to 23cm. in length, have a uniform diameter of about 2.5mm. They are regularly spaced, and average about 11mm. apart.

The cœnenchyma is thin, compact and smooth. A distinct median furrow can be made out both on the main branches and on the twigs. Where the cœnenchyma is worn away the axis of the colony is seen to be light brown in colour and deeply furrowed.

The polyps are very numerous, 0.5-1mm. apart, and are retracted into low wart-like verrucæ. They are scattered all over the surface of the larger branches, but tend towards a more or less bilateral arrangement on the twigs.

The spicules include (1) colourless warty double clubs— 0.070×0.035 mm.; 0.066×0.035 mm.; (2) elongated forms approaching double spindles— 0.087×0.026 mm.; 0.070×0.026 mm.; and (3) a few crosses— 0.052×0.052 mm.; 0.035×0.035 mm.

The colour of the colonies is creamy-white to yellowish.

Localities.—Shoalhaven Bight, New South Wales, 15-45 fathoms.

Eight miles east of Sandon Bluff, Queensland, 35-40 fathoms.

Distribution.—Indian Ocean (Lamouroux). Seas of the Moluccas (Lamarck). India and China (Gray). Cuba (Ridley). Elphinstone Island, Mergui Archipelago (Ridley)¹. Australia (Studer, Ridley, Thomson and Mackinnon). Rotti and Aru Islands (Nutting). Burma and Andamans (Simpson).

Order STELECHOTOKEA, *Bourne*.

Family TELESTIDÆ.

Genus TELESTO, *Lamouroux*.

TELESTO ARBOREA, *Wright and Studer*.

Telesto arborea, Wright and Studer, Chall. Rep., Zool., xxxi., 1889, p. 262, pl. xxxix., figs. 1, 1a. *Id.*, Thomson and Henderson, Proc. Zool. Soc., i., 1906, p. 434. *Id.*, Thomson and Simpson, Alcyonaria of the Indian Ocean, ii., 1909, p. 276. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 692, pl. lxxvii., fig. 2.

This species is represented by two fragments of a dark brown colour. The lateral polyps are cylindrical, 4 to 5 mm. in length and 2 mm. in diameter. The spicules agree with the figure given by Thomson and Mackinnon. They are transparent spindles with long, irregular, sharp spines.

Locality.—Shoalhaven Bight, New South Wales, 15-45 fathoms.

Distribution.—"Challenger" Station 190, in the Arafura Sea, lat. 8° 56' S., long. 136° 5' E., 49 fathoms (Wright and Studer). Kokotoni Harbour, 5 fathoms, and Wasin Channel, 10 fathoms, Zanzibar (Thomson and Henderson). Andamans, 270-45 fathoms; southern portion of Malacca Strait; Gaspar Straits; east coast of Sumatra; Karachee (Thomson and Simpson). "Thetis" Station 42, off Wata Mooli, New South Wales, 70-78 fathoms (Thomson and Mackinnon).

1. Ridley—Journ. Linn. Soc., Zool., xxi., 1889, p. 243.

TELESTO TRICHOSTEMMA (*Dana*).

Gorgonia trichostemma, Dana, Zooph., 1846, p. 665, pl. lix., figs. 3, 3a, 3b.

Telesto trichostemma, Verrill, Amer. Journ. Sci. and Arts, xlv., 1868, p. 415. *Id.*, Wright and Studer, Chall. Rep., Zool., xxxi., 1889, p. 264. *Id.*, Hickson, Fauna Geography Maldive and Laccadive Archipelagoes, ii., 1, 1903, p. 481. *Id.*, Thomson and Henderson, in Herdman, Rep. Ceylon Pearl Oyster Fisheries, Part III., Suppl. Rep., xx., Alcyonaria, 1905, p. 319. *Id.*, Thomson and Simpson, Alcyonaria of the Indian Ocean, ii., 1909, p. 277. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 692.

A solitary specimen is referred to this species. It is 13 cm. in length, and of a yellowish-brown colour. It agrees with the description given by Wright and Studer, and with specimens in the Australian Museum collection. The basal attachment is intact, and consists of a flattened expansion. The spicules are exactly like those described in the "Challenger" Report.

Locality.—Shoalhaven Bight, New South Wales, 15-45 fathoms.

Distribution.—Fiji Islands (*Dana*). Torres Strait, 3-11 fathoms (Wright and Studer). Mulaku Atoll, 25 fathoms, and Miladumadulu Atoll, Maldive Archipelago, 24 fathoms (Hickson). Patani, Siam (Thomson and Henderson). "Thetis" Station 44, off Coogee, New South Wales, 49-50 fathoms (Thomson and Mackinnon).

Family KOPHOBELEMNONIDÆ.

Genus KOPHOBELEMNON, *Kölliker*.KOPHOBELEMNON SCHMELTZII (*Kölliker*).

Sclerobelemnon schmeltzii, Kölliker, Anatom. Systemat. Beschreib. Alcyonarien, Abth. i., Pennatuliden, 1872, p. 312, pl. xxi., figs. 184a, 184b, 185.

Kophobelemnon schmeltzii, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 693.

A single specimen of a light brown colour represents this species, which was originally described by Kölliker from Formosa.

The dimensions in centimetres are as follows :—

Length of entire colony	..	..	..	15·3
Length of polyp-bearing portion	..	..	..	9·2
Length of the stalk	..	..	..	6·1
Breadth of polyp-bearing portion	..	..	..	1·1
Breadth of the stalk	..	..	..	0·5

Locality.—Between Port Stephens and Newcastle, New South Wales, 22-60 fathoms.

Distribution.—Formosa (Kölliker). "Thetis" Station 25, off Newcastle, New South Wales, 48-42 fathoms (Thomson and Mackinnon).

Family PTEROEIDIDÆ.

Genus GODEFFROYIA, *Kölliker*.

GODEFFROYIA ELEGANS, *Kölliker*.

Godeffroyia elegans, Kölliker, Anatom. Systemat. Beschreib. Alcyonarien, Abth. I., Pennatuliden, 1872, p. 116, pl. viii., figs. 63-65. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 693.

This species was founded on a single specimen, 134 mm. in length, from the Gulf of Siam. There are three specimens in the present collection which agree in detail with Kölliker's description.

The dimensions in centimetres are as follows :—

	Sp. I.	Sp. II.	Sp. III.
Length of entire colony	.. .. 20·5	19·4	18
Length of rachis	.. .. 11	10·4	10·7
Length of stalk	.. .. 9·5	9	7·3
Breadth of rachis	.. .. 5·5	4·8	4·5
Breadth of stalk	.. .. 1·2	1·2	1·2
Breadth of keel in the middle	.. .. 1	1·1	1·1
Length of pinnules on the ventral side	.. .. 3	2·2	2·6
Maximum breadth of pinnules	.. .. 1·1	1	1·1
Number of pinnules on each side	.. .. 27	32	31

The colour is light brown.

Localities.—Shoalhaven Bight, New South Wales, 15-45 fathoms.

Between Port Stephens and Newcastle, New South Wales, 22-60 fathoms.

Distribution.—Gulf of Siam (Kölliker). The "Thetis" obtained it at the following localities off the coast of New South Wales :—Station 22, Newcastle Bight, 40-26 fathoms ; Station 54, Jervis Bay, 10-11 fathoms (Thomson and Mackinnon).

GENUS *SARCOPHYLLUM*, *Kölliker*.*SARCOPHYLLUM GRANDE* (*Gray*).

Sarcoptilus grandis, Gray, Proc. Zool. Soc., xvi., 1848, p. 45, pl. i. *Id.*, Gray, Ann. Mag. Nat. Hist., v., 1860, p. 23. *Id.*, Gray, Cat. Sea-Pens Brit. Mus., 1870, p. 25.

Sarcophyllum australe, Kölliker, Anatom. Systemat. Beschreibung. Alcyonarien, Abth. 1., Pennatuliden, 1872, pp. 120, 364, pl. viii., figs. 66, 67. *Id.*, Hickson, Proc. Roy. Soc. Vict., (n.s.), ii., 1890, p. 140. *Id.*, Thomson and Mackinnon, Mem. Austr. Mus., iv., 13, 1911, p. 694, pl. lxxxii.

Sarcophyllum grande, Kölliker, Chall. Rep., Zool., i., 1880, p. 2.

A number of specimens of a light brown colour agree on the whole with Kölliker's description of *Sarcophyllum australis* (= *S. grande*, Gray).

Gray's original description, which was based on a single specimen from an unknown habitat, contains the following passage:—"Pinnæ placed in two crowded rows, one on each side of one of the faces of the upper part of the shaft, kidney-shaped, crumpled, with the polyps scattered on the edge and upper surfaces, especially near the edge."

After an examination of specimens from Sydney, New South Wales, he writes "When I first described this genus I believed that the polypes were 'scattered over the upper surface of the pinnæ'; but that is a mistake which I was led into by the imperfect state of the specimen; the polyps are only placed on the margin of the pinnæ as in other *Pennatulidæ*."

In the present specimens there are numerous rows of autozooids on the margin of the pinnules. The characteristic spicules of the species are situated in the base of the colony, and consist of large white S-shaped forms measuring up to 4mm. in length.

The dimensions in centimetres of the largest specimen are as follows:—

Length of entire colony	..	..	..	29
Length of the rachis	..	..	..	20.5
Length of the stalk	..	..	..	8.5
Breadth of the rachis	..	..	..	8
Breadth of the stalk	..	..	..	3.5
Maximum breadth of pinnules	..	..	..	4.6
Height of pinnules in the middle	..	..	..	3
Number of pinnules on each side	..	..	..	40

Localities.—Between Port Stephens and Newcastle, New South Wales, 22-60 fathoms.

East coast of Flinders Island, Bass Strait, 60 fathoms.

Fifteen miles south of St. Francis Island, South Australia, 30 fathoms.

Thirty-six miles S. 58° W. of Cape Wickham, King Island, Bass Strait, 72-80 fathoms.

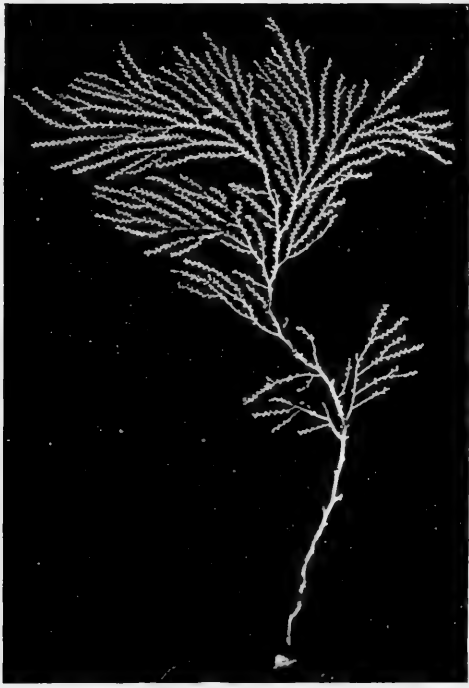
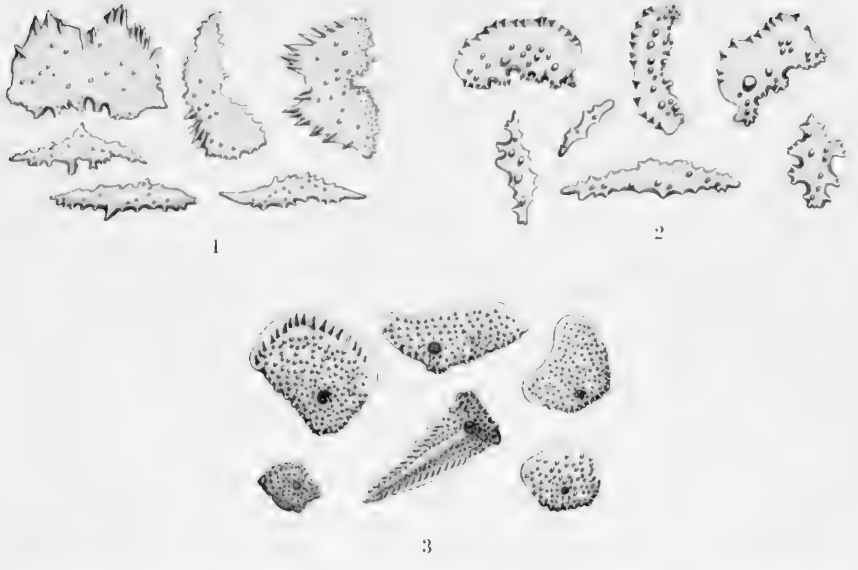
Off Kangaroo Island, South Australia, 17 fathoms.

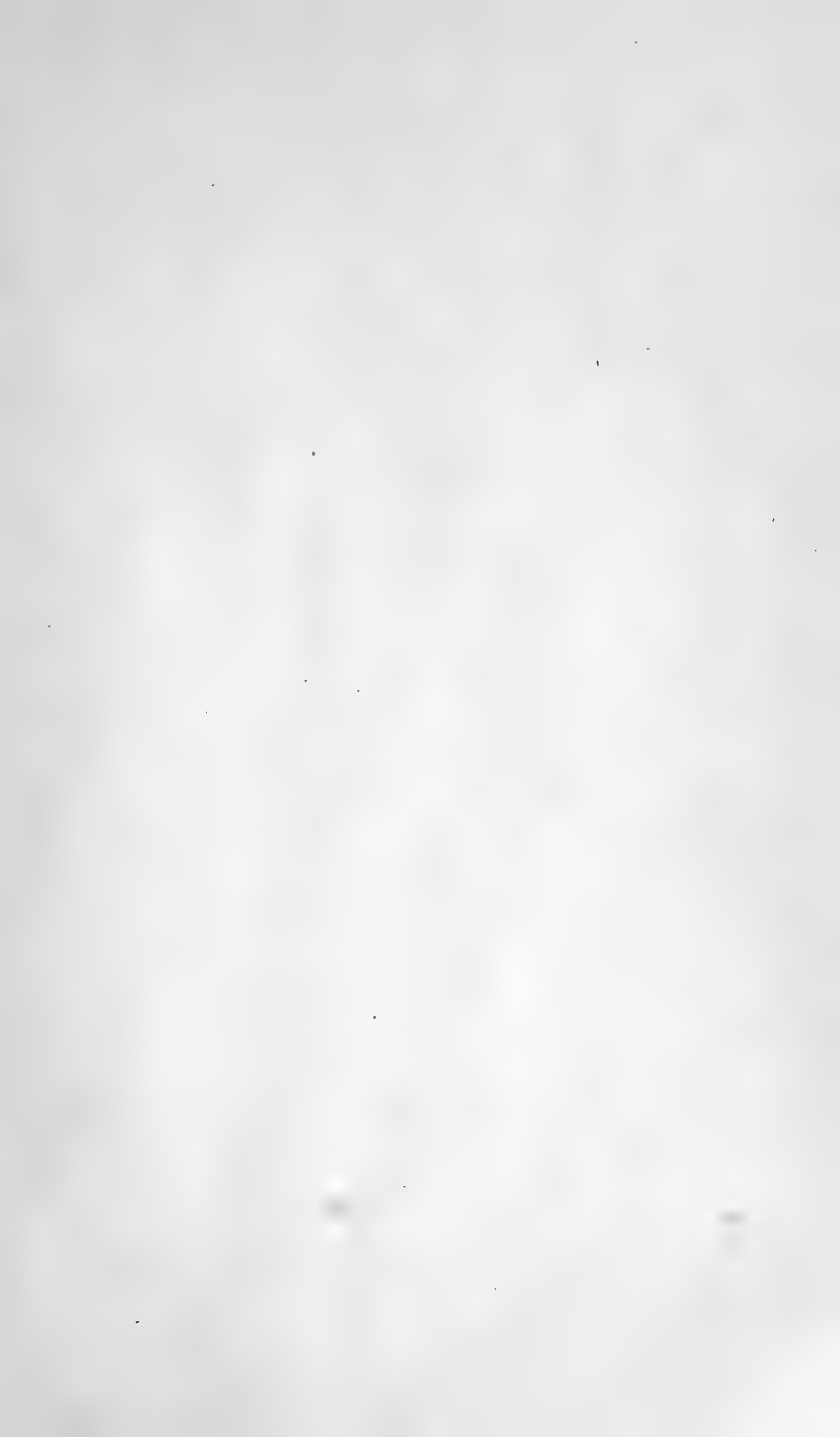
Distribution.—Sydney, New South Wales (Gray). Australia (Kölliker). Port Jackson, 6-15 fathoms (Kölliker). Port Phillip, Victoria (Hickson). The "Thetis" obtained specimens from the following localities off the coast of New South Wales:—Station 28, off Manning River, 22 fathoms; Station 31, off Cape Hawke, 28-25 fathoms, and 10-12 fathoms; Station 54, Jervis Bay, 10-11 fathoms; off Port Stephens, 32-48 fathoms (Thomson and Mackinnon).



EXPLANATION OF PLATE IV.

- Fig. 1.—Spicules of *Mopsea plumacea*, sp. nov.; from the specimen figured on Plate vii.
- Fig. 2.—Spicules of *Mopsea repens*, sp. nov.; from the specimen figured on Plate viii.
- Fig. 3.—Spicules of *Plumarella australis*, sp. nov.; from the specimen figured on Plate x.
- Fig. 4.—*Amphilaphis plumacea*, Thomson and Mackinnon. Photograph of a specimen 17·5cm. in height, from the south east coast of Australia.
- Fig. 5.—*Otenocella pectinata* (Pallas). Branches showing distinct median furrow. Photograph of a specimen from eight miles east of Sandon Bluff, Queensland, 35-40 fathoms.





EXPLANATION OF PLATE V.

- Fig. 1.—*Isis hippuris*, Linnæus. Part of a colony showing the palmate terminations of the twigs. Photograph of a specimen 7cm. in height, from off the coast of Queensland.
- Fig. 2.—*Isis hippuris*, Linnæus. Photograph of a specimen 13·3cm. in height, from Murray Island, Torres Strait.

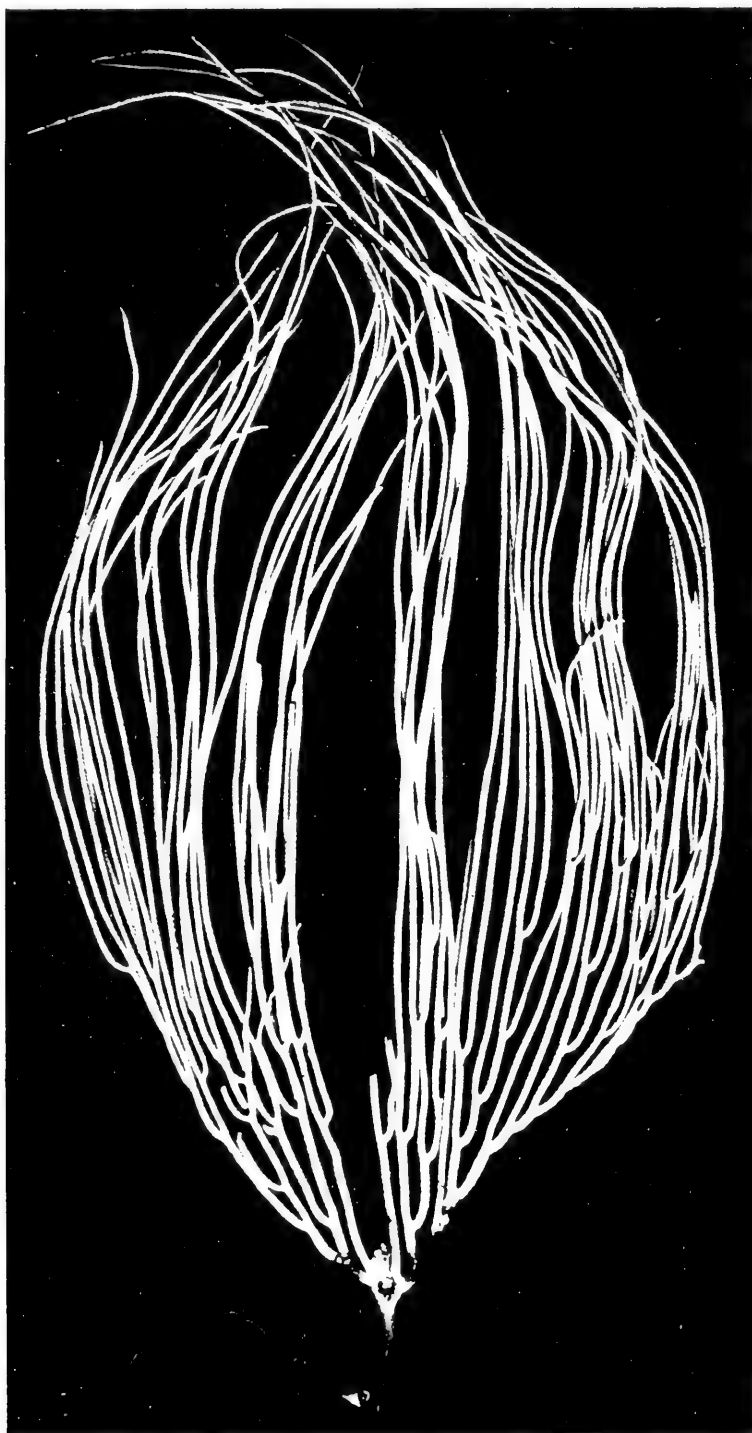


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EXPLANATION OF PLATE VI.

Mopsea australis, Thomson and Mackinnon. Photograph of a specimen 37·5cm. in height, from fifteen miles N. 35° E. of Saddle Hill, New South Wales, 34-35 fathoms.



E. A. BRIGGS, photo.

EXPLANATION OF PLATE VII.

Mopsea plumacea. sp. nov. Photograph of the type, 22.5cm.
in height, from the South Australian Coast.



F. A. BRUCE, photo.



EXPLANATION OF PLATE VIII.

Mopsea repens, sp. nov. Photograph of the type, 13.5cm. in height, from thirty-six miles S. 58° W. of Cape Wickham, King Island, Bass Strait, 72-80 fathoms.

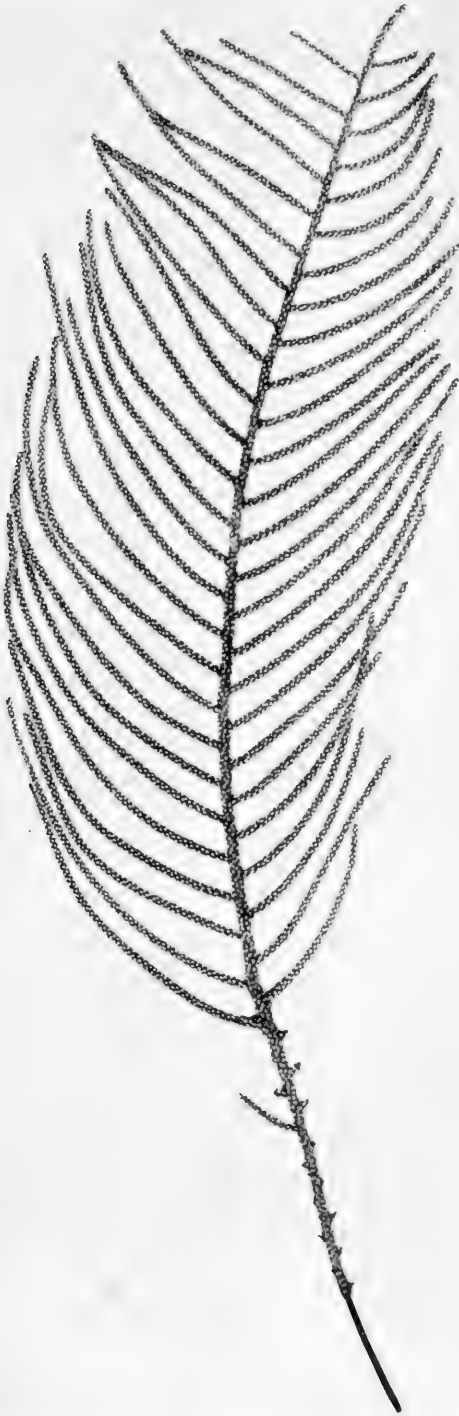


E. A. BRIGGS, photo.



EXPLANATION OF PLATE IX.

Plumarella thetis, Thomson and Mackinnon. Photograph of a specimen 26cm. in height, from fifteen miles N. 35° E. of Saddle Hill, New South Wales, 34-35 fathoms.

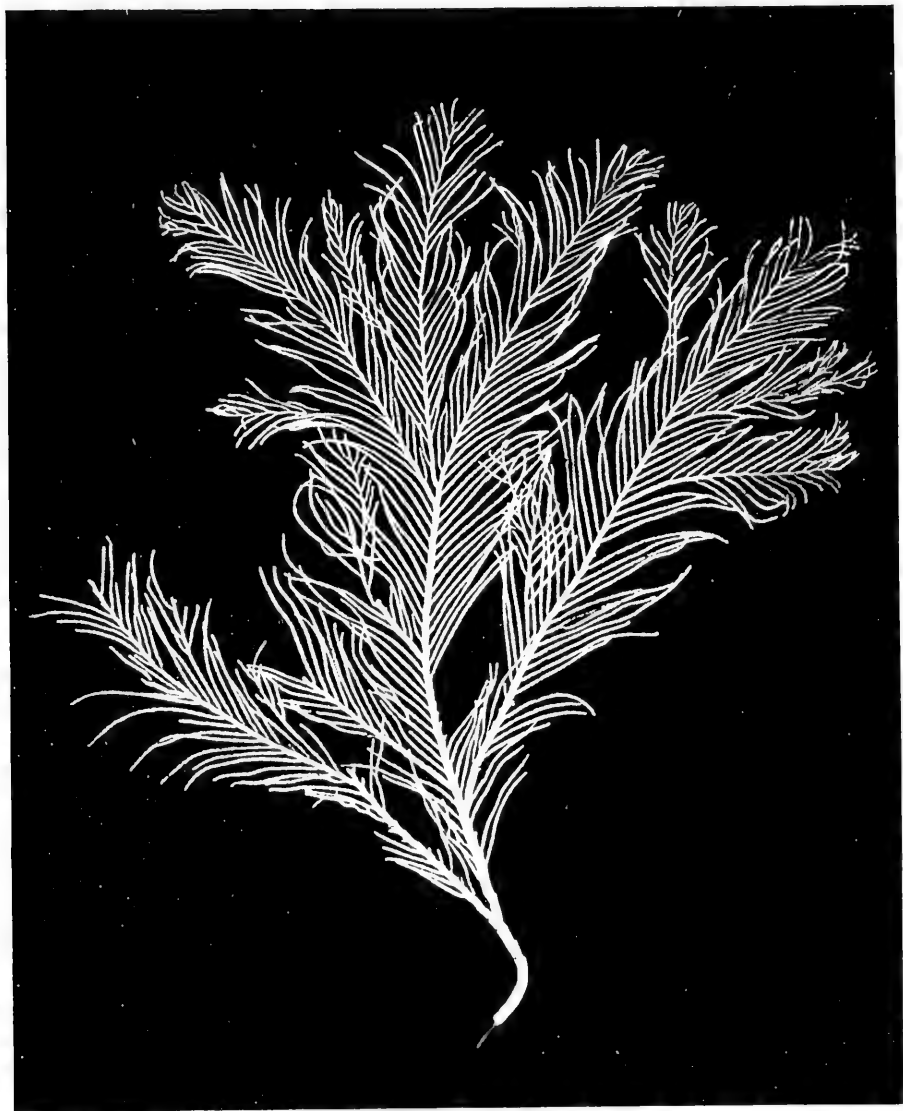


E. A. BRIGGS, photo.



EXPLANATION OF PLATE X.

Plumarella australis, sp. nov. Photograph of the type,
43cm. in height, from fifty miles south of Cape Wiles,
South Australia, 75 fathoms.



E. A. Briggs, photo.



EXPLANATION OF PLATE XI.

- Fig. 1.—Axis of *Isis hippuris*, Linnæus. Photograph of a specimen 9 cm. in height, from Murray Island, Torres Strait.
- Fig. 2.—Basal portion of *Plumarella australis*, sp. nov. Photograph of a specimen 24.7cm. in height, from fifty miles south of Cape Wiles, South Australia, 75 fathoms.

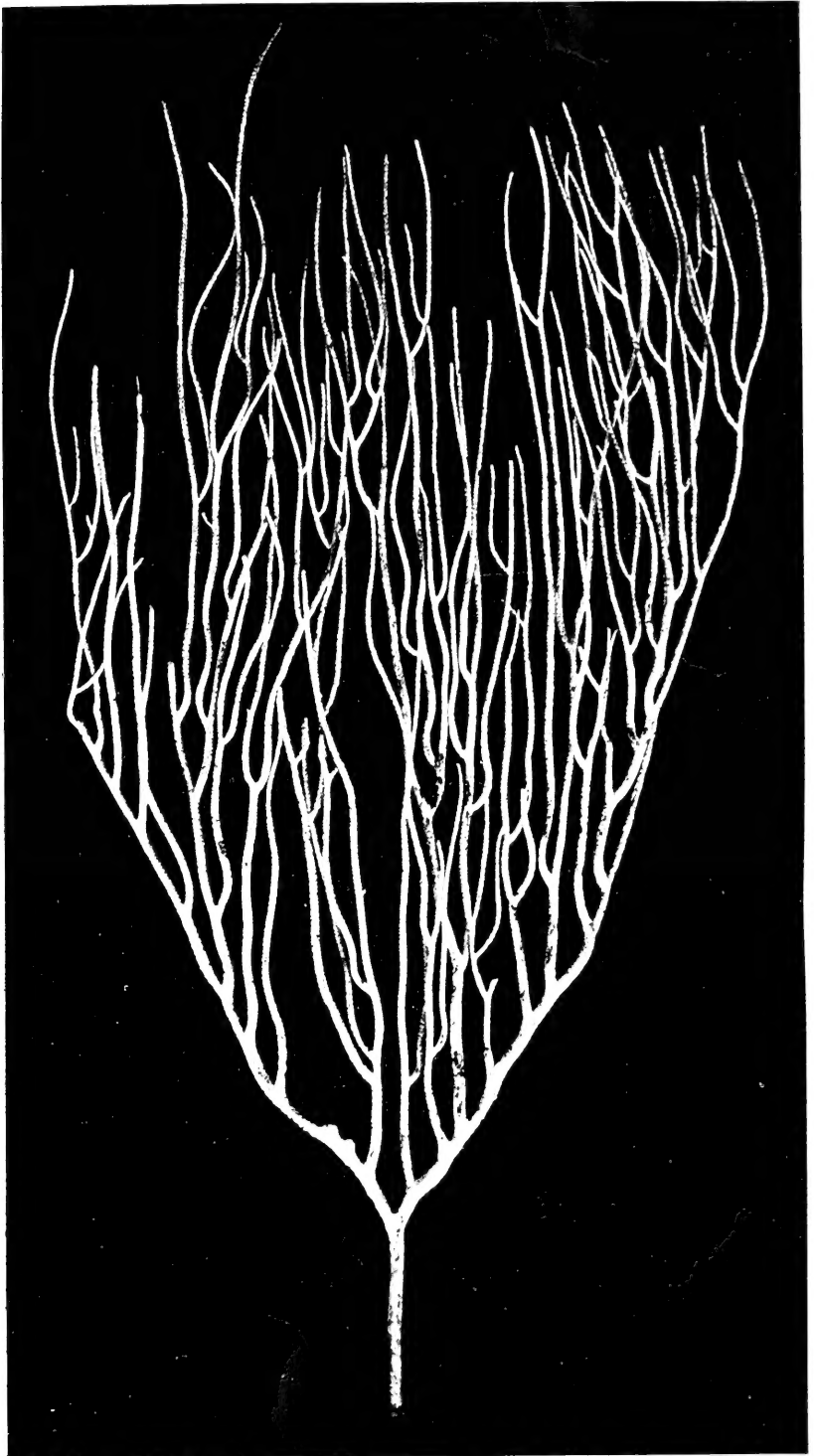


E. A. BINGGS, photo.



EXPLANATION OF PLATE XII.

Ctenocella pectinata (Pallas). Photograph of a specimen 42cm. in height, from eight miles east of Sandon Bluff, Queensland, 35-40 fathoms.



E. A. BRIGGS, photo.



