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SPONGES.

PART I.—ADDENDA.

PART II.

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SPONGES.

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Part I.—Addenda.

The new species herein described are as follows :—

Paresperella repens.
Amphilectus munitus.
Dendoryx mirabilis.

PARESPERELLA, *Dendy.*

PARESPERELLA REPENS, *sp. nov.*

(Plate xlv., fig. 22.)

Station 44.

Sponge incrusting and more or less permeating the whole substance of *Dendoryx fusca*, Whitelegge. Characters as usually afforded to the naked eye or to a hand lens are wanting, and it is only by sections of the sponge (*Dendoryx*) that the organism can be localized under the microscope. Notwithstanding its want of definite form it is quite evident and distinct in every section examined. The union between the two sponges is so complete that it is impossible to obtain a section of the *Dendoryx* without abundant traces of the *Paresperella*. The spicular characters of the latter are sufficiently definite and distinct to warrant a description of it as a new species.

The choanosome is rather dense and pale yellow in colour; it is fully charged with tylota or tylostyli, serrated c-shaped spicules and anisochelæ of two kinds, one large—always arranged in rosettes—the other small, and scattered throughout the sponge.

The skeletal characters are rather indefinite, but usually there are indications of fibres consisting of five or six spicules in a row, the rest are radiate or scattered through the body with the apical portion of the spicules directed inwards.

Megascleres :—tylota or tylostyli narrowly fusiform with more or less elongate oval ends; the apex is often furnished with two or three short spines, but usually both ends are evenly rounded. Size :— 0·35 to 0·37 by 0·006 mm.

Microscleres :—anisochelæ of two sizes, the larger kinds are arranged in rosettes, the smaller are scattered.

Sizes :—0·038 and 0·01 mm. Serrated c-shaped spicules with three teeth, directed backwards. Size 0·06 mm.

This species differs from *P. serratohamata*, Carter, in the size of the spicules and in wanting the curved toxa.

AMPHILECTUS, *Vosmaer.*

AMPHILECTUS MUNITUS, *sp. nov.*

(Plate xlvi., fig. 40.)

Station 36.

This form is commensal, living in close association with, and completely investing a gorgonoid colony of the family Cornularidæ—probably a species of *Sympodium* (?). The spicules are similar to those of *S. verrilli*, as figured by Wright and Studer*. The skeletal portion consists of a hollow cylindrical tube of closely packed spicules. The main stem gives off several lateral branches which are disposed in a plane. These develop lateral polyp buds which form low dome-shaped elevations along the branches. Each elevation has a small circular aperture at the summit. These apertures, although oscula-like, are really the openings through which the polyps become expanded.

The example is 120 mm. in height, and the branches vary from 35 to 75 mm. in length and from 5 to 10 mm. in diameter. The sponge forms an even coating over the whole of the gorgonoid, and is about 1 mm. in thickness. The surface generally is like that of some species of *Suberites*, and is marked by a very fine reticulation, and innumerable minute pores. There is no evident epidermis—at least it is not revealed even with a hand lens—and I failed to find any oscula unless the polyp apertures be regarded as such. Texture slightly resilient but rather brittle. Colour bluish-grey.

The skeleton consists of stoutish bundles of stylote spicules, without evident spongin. The primary fibres are parallel to the axis of the gorgonoid for a short distance, they then curve outwards and give off several branches, each of which terminates at the surface in a densely packed tuft of radiating spicules; if transversely arranged binding spicules are disposed; in the apical portions of the tufts they are few and far between, and obscured by numerous fragments of foreign spicules.

The primary fibres are about 0·15 to 2 mm. in diameter, and from 3 to 4 mm. apart; the secondaries at their origin measure 0·1 mm., but as they near the surface they become much wider owing to the spreading out of the spicules; the radiating tufts at the extremities are usually 0·25 or 0·3 mm. in diameter.

Megascleres:—straight cylindrical styli of the fibres and the dermal tufts, with well rounded base and obtusely pointed apex; size 0·2 to 0·22 by 0·008 to 0·01 mm.

Microscleres:—strongly bent toxa, with short straight ends which are obtuse and apparently smooth; size 0·04 to 0·05 mm. in length; these are fairly abundant in the choanosome.

* Wright and Studer—Chall. Rep., Zool., xxxi., 1889, pl. xlii., fig. 12.

Isochelæ of the Clathria type, confined to the thin dermal membrane; size 0·014.

This species is remarkable on account of the complete union of the gorgonoid with the sponge. It was only after a prolonged study of many sections that I realised its true significance. A fortunate section cut transversely displays the intimate union of the two organisms. The following is a brief description of the principal features as seen in a mounted section. The central cavity of the stem of the gorgonoid is about 1 mm. in diameter, and the wall of spicules is 0·1 mm. in thickness; laterally a bud is given off and measures 5 mm. in length and 1·2 mm. in diameter. The retractor muscles are plainly visible, together with several long vermiform mesenteric filaments. The mesenteries are also present in the main axis, and outside its walls there is no trace of the sarcode of the gorgonoid. The spicular walls are strongly contracted at the base of the tentacular crown, but again expand for a short distance and then converge to the small polyp aperture. The latter is surrounded by a layer of sponge, about 0·2 mm. in thickness. The sponge presents a series of echinating spicules which have their bases imbedded in the walls of the gorgonoid. Many are at right angles, but others are sub-parallel and finally united in a compact bundle which on approaching the surface branch several times, and ultimately form wide funnel-shaped tufts at the surface. The bases of the spicules are in close contact; at the ends of the secondary branches, their apices are widely divergent and all attain to nearly the same level. There are a few proper styli arranged transversely to the spicular tufts, but the majority of the binding spicules are of foreign origin. The space between the gorgonoid and the surface of the sponge is charged with fine brown granulose matter, and the large subdermal spaces are more or less occupied by oval bodies, which are probably the gemmules of the sponge. They consist of a series of well defined cells, and measure about 0·15 by 0·1 mm. The collar at the base of the tentacles is composed of curved spiny blunt-ended spicules about 0·25 mm. in length. The tentacles are supported by numerous fusiform spicules, which are feebly spined and measure 0·3 to 0·25 in length.

DENDORYX, *Gray*.*

DENDORYX MIRABILIS, *sp. nov.*

Station 47.

Sponge incrusting, growing on a large, branched, papyraceous worm colony. It forms around the tubes a layer of about a quarter of an inch in thickness. The surface is very porous and furnished with scattered circular oscula—about 1 mm. in

* See Part 9, p. 480.

diameter. They are situated in irregular depressions and margined by low, rounded meandering ridges. Texture firm but rather brittle; colour yellowish-grey.

Skeleton:—stellately reticulate (Bowerbank* gives a section of *Halichondria incrustans*, Johnston, which is the exact counterpart of the spicular characters of the species herein described) without obvious spongin. Mesh usually triangular and often obscured by the presence of scattered spicules. The spicular characters are rather remarkable, the choanosome is charged with stout straight or slightly curved, and strongly spined styli; the ectosome and subdermal layers present a series of slender, spined styli, and numerous straight cylindrical tornota with an abruptly tapering point ending in a slender spine; occasionally there are oval terminations, with a trace of a spine, such as are figured by Bowerbank.† The dermal surface is furnished with abundant isochelæ of two sizes, and a series of c- and s-shaped spicules; the latter are scarce, but occur more or less throughout the sponge.

Megascleres:—(1) Stout, straight or slightly curved spined styli, with the base somewhat dilated, and exhibiting numerous spines; the latter are continued on the shaft to within one diameter of the very acute apex; size 0·15 by 0·01 mm.

(2) Slender curved spine styli; size 0·1 by 0·005 mm.

(3) Tornota:—straight, cylindric, ends tapering or oval, with a terminal spine; size 0·18 by 0·006 mm.

Microscleres:—large isochelæ with the shaft almost straight; size 0·02 mm. Small isochelæ, size 0·001 mm. Sigmata simple and contort; size 0·02 mm.

This species is closely allied to *Dendoryx* (*Halichondria*) *dickiei*, Bowerbank, but the spicular characters differ greatly.

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* Bowerbank—Mon. British Spongidæ, i., 1864, pl. xxxv., fig. 323.

† Bowerbank—Mon. British Spongidæ, iii., 1874, pl. xlv., fig. 3.

Part II.

MONAXONIDA *continued.*

The present part (Part II.) embraces the remaining portion of the Monaxonida. It includes thirty species, twenty-three of which are introduced as new. Species previously described consist of some obtained by the "Challenger" Expedition and a few described by Dr. R. v. Lendenfeld. The new species have been described as fully as the material would allow and all except four have been figured. The species already described have been carefully examined and additional details added, which may be of service from a classificatory point of view.

The new species described are:—

Stylostichon conulosum.
Microciona clathrata.
Clathria striata.
,, *multipora.*
,, *chartacea.*
,, *favosa.*
,, *calopora.*
,, *arcuophora.*
Rhaphidophlus tenebratus.
,, *bispinosus.*
Echinochalina reticulata.
Allantophora plicata, gen. et. sp. nov.
Spongosorites variabilis.
Phakellia multiformis.
Axinella symbioctica.
,, *frondula.*
,, *vermiculata.*
Higginsia scabra.
Raspailia, dichotoma.
,, *echinata.*
,, *sp.*
Sigmaxinella dendroides.
,, *mammillata.*

The species of the following Sub-family previously described are :—

Plumohalichondria australis, Lendf.
Clathria lendenfeldi, R. & D.
,, *inanchorata*, R. & D.
Echinoclathria macropora, Lendf.
Echinochalina glabra, R. & D.
Phakellia jacksoniana, Dendy.
Axinella arborescens, R. & D.

Subfamily ECTYONINÆ, *Carter.*

PLUMOHALICHONDRIA, *Carter.*

PLUMOHALICHONDRIA AUSTRALIS, *Lendenfeld, sp.*

Clathria australis, Lendenfeld, Austr. Mus. Cat., xiii., Sponges, 1888, p. 222.

Clathria macropora, Lendenfeld, *loc. cit.*, p. 221.

Echinonema lævis, Lendenfeld, *loc. cit.*, p. 220.

Plumohalichondria australis, Whitelegge, Rec. Austr. Mus., iv., 2, 1901, p. 90.

Station 50.

Two much worn examples of this species were obtained off Shoalhaven Bight in 15-18 fathoms.

The specimens are infested with barnacles and exhibit numerous perforations made by the boring Isopod *Cymodoce*.

STYLOSTICHON, *Topsent.*

STYLOSTICHON CONULOSUM, *sp. nov.*

(Plate xlv., figs. 21, 30.)

Station 44.

Sponge incrusting, growing on the axis of a gorgonoid; it measures about 80 mm. in length, 7 mm. in its shorter and 12 mm. in its longer diameter The surface exhibits innumerable conuli, which are often compressed at the tips and bear here and there a series of minute nodules; the latter as well as the conuli are finely hispid, with projecting spicules. The rest of the surface presents a somewhat honeycombed aspect, with a few scattered circular oscula, and small, smooth, porous, depressed, epidermal areas. Texture elastic and rather tough; colour greyish brown.

Skeleton consisting of a series of plumose columns from 0·3 to 0·5 mm. in diameter. They give off lateral branches at irregular

intervals. These often coalesce marginally, and the mesh between the fibres varies from elongate to rhomboidal. Near the surface and in the central regions the fibres are somewhat plexoid and run parallel to each other, being separated by narrow spaces charged with scattered spicules. The fibres are composed of a central core of spined styli—about six or more spicules in a row—enclosed in a broad mass of spongin, which is densely echinated by spined styli of two sizes, the smaller being the most abundant. The larger correspond with those of the axial core in general appearance. The summits of the fibres and the valleys between are clothed with radiating tufts or irregularly scattered oxeote spicules, interspersed with an immense number of stoutish isochelæ. The latter in the choanosome are fairly scattered and about their own length or more apart, but in the ectosome they are so densely packed that it is somewhat difficult, under a low power lens, to distinguish them as separate spicules.

Megascleres :—(1) Spined styli of the spicular core and also sparsely echinating the fibres. These are slightly curved, with the base a little swollen, and very spiny ; the shaft tapers gradually to an acute point, and the spines become smaller and more distinct as the apex is approached ; size 0·15 to 0·2 by 0·01 mm. less the spines.

(2) Echinating styli, straight, spined and gradually tapering ; size 0·1 by 0·008 mm.

(3) Smooth oxea of the ectosome, straight cylindrical to within about one diameter of the not very acute points ; size 0·18 by 0·006 mm.

Microscleres :—stout, strongly curved, tridentate isochelæ ; size 0·02 to 0·024 mm.

This species is closely allied to *Stylostichon plumosa*, Montagu, but differs in habit and in its spicular characters.

MICROCIONA, *Bowerbank.*

MICROCIONA CLATHRATA, *sp. nov.*

(Plate xlvi., figs. 38-38a.)

Stations 48, 56.

Sponge arising from a small basal plate, and having a well defined peduncle, which gives off a series of more or less flattened branches ; the latter are distinct at their origin, but rapidly become lost in a mass of stoutish trabeculæ. Six out of the seven specimens are fusiform or subclavate in outline, and measure 100 mm. in height and about 40 in their greatest diameter. The

trabeculæ usually have their edges directed outwards, they vary from 1 to 3 mm. in thickness, and the spaces between are on an average about 5 mm. or less in diameter.

The surface is hispid and minutely porous; a few oscula-like openings about 0·5 mm. wide are present on some of the elevated processes.

Texture both dry and in spirits resilient and rather tough; colour from greyish-yellow to dark brown.

The skeleton consists of stout horny fibres arranged in plumose columns; they are about 0·1 mm. in diameter and the same distance apart; the lateral branches given off from the main fibres are gracefully curved and terminate at the surface in tufts of spicules.

Megascleres:—(1) Slightly curved styli or subtylostyli; the base is provided with numerous spines; the shaft also carries a series which are somewhat variable in size aud number; they are generally reflexed and are continued to within one or two diameters of the acute apex. These spicules are extremely abundant, and both echinate and invest the whole of the fibres; size 0·15 to 0·2 by 0·015 mm.

(2) Stout, curved, basally spined styli; the shaft is smooth, and gradually tapers to a long acute point. These spicules are sparingly distributed in the fibres and are here and there echinating and form slightly divergent tufts of four or five spicules at the ends of the fibres; the tufts have numerous spiny styli, enveloping the basal area and others, which are either parallel or echinating; size 0·35 to 0·45 by 0·025 to 0·03 mm.

(3) Slender, straight, smooth styli, chiefly dermal; they form radiating tufts, and also a thin layer in which the spicules are disposed at right angles to the larger projecting spicules at the ends of the fibres; size 0·15 to 0·23 by 0·0045 mm.

Microscleres:—(1) Bow-shaped toxa, rather scarce; size 0·06 to 0·1 mm. (2) Small isochelæ; size 0·009 mm.

CLATHRIA, *Schmidt.*

CLATHRIA LENDENFELDI, *Ridley and Dendy.*

Clathria lendenfeldi, Ridley and Dendy, Chall. Rep., Zool., xx., 1887, p. 148, pl. xxviii., fig. 5, pl. xxix., fig. 6, pl. xlvii., fig. 5.

Stations 41, 48.

There are two examples of this well-marked species in the collection. The principal specific features are the hispid surface, the lateral branches—which are usually short and are given off at nearly right angles—and the stout, very spiny, echinating spicules.

CLATHRIA INANCHORATA, *Ridley and Dendy.*

Clathria inanchorata, Ridley and Dendy, Chall. Rep., Zool., xx., 1887, p. 150, pl. xxviii., fig. 4, pl. xxix., figs. 13, 13a.

Station 48.

Four examples of this well marked species were obtained off Wollongong. The specimens measure about 130 mm. in height and from 5 to 10 mm. in diameter. Three out of the four examples are attached to fragments of gorgonoid stems or bits of shells. The rugose appearance of the external surface and the abundant stout toxa are characteristic of this interesting species.

The "Thetis" specimens were obtained at a depth of 56 fathoms, and the "Challenger" examples were procured from a depth of 150 fathoms.

CLATHRIA STRIATA, *sp. nov.*

(Plate xlv., fig. 27.)

Stations 36, 44.

Sponge flabellate, shortly stipitate, with a well developed attachment base. The specimen figured measures 335 mm. in height, and nearly 200 mm. in breadth; the footstalk is 10 mm. in diameter; the lamina is about 5 mm. in thickness near the base, and gradually becoming thinner as the margin and summit is approached; here it measures about 1·5 or 2 mm. The dermal surface exhibits a thin, white, porous crust, and presents a somewhat wavy aspect, together with numerous striæ about 1 or 2 mm. in diameter. The latter are very distinct on the basal half of the sponge, and their course is irregular, but mainly longitudinal; here and there they combine and form low ridges. Texture in the dried state slightly compressible, but rather brittle; colour white, the worn surface being yellowish-grey.

The skeleton consists of a stout axial plexus of horny fibres; the secondaries are given off at nearly right angles except near the summit, where they gracefully curve outwards, and terminate in radiating tufts of slender, smooth styli. The primary fibres are from 0·2 to 0·3 mm. in diameter, and are frequently less than that distance apart; they are cored with stout smooth styli, which are ill-arranged and rarely more than three or four in a row; the surface bears only a moderate number of short, faintly spined echinating styli. The spicular characters of the secondary fibres do not differ greatly from the primaries. The connecting fibres are slender, with one or more spined styli, and either with or without spicules in the axis. Centrally the mesh is oval or oblong, laterally it is more or less rectangular.

Megascleres:—(1) Short, straight, minutely spined styli; size 0·6 to 0·8 by 0·008 to 0·01 mm.

(2) Stout, straight or slightly curved smooth styli in the fibres; size 0·4 to 0·5 by 0·018 to 0·02 mm.

(3) Smooth, rarely curved cylindrical styli, the longer kind chiefly dermal; the shorter are sparingly scattered throughout the sponge; size 0·2 to 0·32 by 0·0(45 to 0·006 mm.

Microscleres:—small isochelæ; these are found mostly near the surface; they occur in dense bundles or stringy fibres, and are so densely packed that it is difficult to see their form, except in the thin margins of the clusters; size 0·012 to 0·018 mm.

CLATHRIA MULTIPORA, *sp nov.*

(Plate xlv., fig. 23.)

Station 36.

Sponge arising from a well formed disc attachment, with a short peduncle and a great number of cylindric or slightly compressed branches; the mode of branching is mostly dichotomous, and anastomization is exhibited by nearly every branch. The specimen figured attains a height of 337 mm. The peduncle is about 15 mm. in diameter, and the branches vary from 5 to 10 mm. The surface generally is minutely hispid, and exhibits a white dermal incrustation, a series of shallow and mostly transverse grooves, as well as innumerable oscula in the shape of round pores, which are scattered over the whole of the branches; on an average they are about 0·5 mm. in diameter, and from 1 to 3 mm. apart.

Texture slightly resilient, but somewhat brittle; colour greyish-brown.

The skeleton consists of a series of stout primary fibres, which form a closely arranged axial column and give off at regular intervals gracefully curved secondaries which terminate at the surface in radiating tufts of spicules. The main fibres are from 0·05 to 0·1 in diameter; they have an axial core of closely arranged smooth styli, about six or more in a row. The secondary fibres measure 0·05 mm., and are usually furnished with three or four spicules in the axial line and a few distinct echinating styli. The connecting fibres are mostly unispicular and correspond with the length of the spicule. The mesh is more or less rectangular, and measures about 0·2 to 0·3 mm.

Megascleres:—(1) Straight echinating styli, with recurved spines, especially in the upper third; size 0·1 by 0·06 mm.

(2) Large smooth styli in the fibres; size 0·3 by 0·016 mm.

(3) Small dermal, smooth styli; size 0·25 by 0·0065 mm.

Microscleres :—(1) Angular chelæ; size 0·024 mm. (2) Bow-shaped toxa; size 0·06 mm.

Four specimens were obtained off Botany in from 20 to 23 fathoms.

CLATHRIA (?) CHARTACEA, *sp. nov.*

Stations 41, 44.

Sponge arising from a discoidal base, with a well developed compressed peduncle; the lamina is thin, paper-like, and may consist of a flabellate frond or a number of strap-shaped expansions. The largest example obtained by the "Thetis" measures 224 mm. in height, and 60 mm. in its broadest part; from thence it gradually narrows to the somewhat alate footstalk; the lamina rarely exceeds about 1 mm. in thickness except near the base. A specimen from the beach at Middle Harbour consists of a short stout pedicle and three narrow fan-shaped lobes; the measurements are as follows :—height 227 mm., total width 337 mm. The various lobes are about 60 mm. in breadth and are 4 or 5 mm. in thickness at the base, but they rapidly become thinner towards the very acute margins.

Dermal surface minutely porous, apparently smooth, but harsh to the touch, with faint indications of a white incrustation due to the radiating tufts of the stout styli of the ends of the fibres and the slender styli of the epidermis; oscula absent (?).

Texture thin and parchment-like, resilient, and somewhat tough in spirit, but brittle when dry; colour yellowish-grey.

The skeleton is remarkable for its stout horny fibres, which are arranged in close subparallel lines running from base to summit. The primary fibres are very evident by transmitted light in a much worn specimen; they are subcontinuous from base to apex, and exhibit frequent dichotomous branching, with numerous slender secondaries connecting the main fibres.

The general appearance is like some textile fabric with strong longitudinally arranged threads, and connected at regular intervals by very slender processes, which are disposed at right angles to the main fibres; the latter are from 0·25 to 0·5 mm. in diameter, and about the same distance apart. The secondaries and connecting fibres are generally about 0·1 or less in diameter and 0·4 apart. The mesh is more or less subcircular, but frequently obscured by the echinating styli, which are arranged in a sort of confused Renieroid fashion throughout the sponge.

The primary fibres are cored with a few scattered smooth styli; the secondaries are bi- or trispicular, and at the surface the latter terminate in tufts of three or four stout styli, and are intermixed with long slender cylindrical subtylostyli with a short acute apex and a slightly spiny base.

Megascleres :— (1) Straight, fusiform, minutely spined styli; these not only echinate the fibres, but in many instances they are incorporated and arranged parallel to the large smooth styli; frequently they are enveloped in horny matter at their bases or apices forming triangular meshes, which are in keeping with the length of the spicules; size 0·1 by 0·008 to 0·01 mm.

(2) Stout, slightly curved smooth styli, with a thick well-rounded base, and gradually tapering to the acute apex; these occur in the fibres and form tufts at the surface; size 0·3 by 0·014 mm.

(3) Long straight cylindrical subtylostyli, with an abrupt acute point and a slightly spiny base; size 0·3 by 0·004 mm. This form of spicule occurs chiefly in the dermal layer, but is also found in the fibres and scattered throughout the sponge.

Microscleres :— have not been observed.

CLATHRIA FAVOSA, *sp. nov.*

Station 44.

Sponge consisting of a series of irregular subcylindrical branches; the longest is 170 mm. in length and from 3 to 7 mm. in diameter. The smaller branches exhibit a few branchlets, some of which are lateral and others dichotomous, but without any coalescence. Surface minutely honeycombed; the cells are from 1 to 2 mm. in diameter, and often covered by a white porous membrane; the walls are thin, prominent, and finely hispid.

Texture rather inelastic and somewhat brittle; colour, when the dermal surface is intact, white, elsewhere yellowish-grey.

Skeleton :—the primary fibres consist of densely packed styli, enclosed in a thin sheath of spongin; they are about 0·1 mm. more or less in diameter; the secondaries have usually three or four spicules in a row, and the connecting fibres are 0·5 in diameter and frequently aspiculous; both the smooth and spined styli are often limited to one or two. The mesh is reticulate but very loose and irregular, varying from oblong to rhomboidal, and from 0·4 to 0·5 mm. in diameter.

Megascleres :—(1) Short, stout, spined, echinating styli, very few in number and widely scattered or absent altogether in some parts of the skeleton; near the ends of the fibres they are, however, more frequent, and often occur in tufts of three or more; they are cylindrical to within about two diameters of the abruptly pointed, conical apex. The base has three or four irregular spines; the middle third of the shaft is smooth, and the distal—less the acute conical point—bears a few long stoutish spines, some of which almost equal half the diameter of the spicule; size 0·6 to 0·7 by 0·01 mm.

(2) Straight smooth styli, chiefly dermal, but also scattered in the choanosome ; size 0·13 to 0·2 by 0·008 mm.

(3) Large smooth styli, of the main fibres, generally more or less curved, and gradually tapering to long acuminate points ; size 0·3 by 0·01 to 0·015 mm.

Microscleres :—(1) Slender toxodragmata, rather abundant ; size 0·07 to 0·12 by 0·002 mm.

(2) Strongly bent toxa, scarce ; size 0·035 by 0·0015 to 0·002 mm.

(3) Isochelæ with a nearly straight shaft and long flukes which almost meet at the ends ; size 0·018 mm.

(4) Very small isochelæ ; size 0·008 to 0·01 mm.

The above species is closely allied to *Clathria typica*, Carter, sp., but on comparison with many examples from Victoria it appears to be quite distinct ; the spicular characters enumerated above separate it from any other species known to or examined by the writer.

CLATHRIA CALOPORA, *sp. nov.*

(Plate xlvi., fig. 34.)

Station 50.

Sponge consisting of a series of knotty cylindrical branches ; the branching is either dichotomous or lateral, and coalescence is evident in some parts. The specimen is 195 mm. in height, and the branches vary from 3 to 8 mm. in diameter. Surface hispid, reticulate, finely porous throughout ; the pores are mostly circular and about 1 mm. or less in diameter ; the walls are thin, prominent, and minutely conulose, presenting a minutely honeycomb-like surface without any distinct trace of dermal incrustation.

Texture hard, inelastic, and rather tough ; colour greyish-yellow.

Skeleton consisting of stoutish horny fibres, which are densely clothed with short but very spiny echinating spicules ; the axial core is slender, and has from 3 to 6 spicules in a row, the apices of which are more or less divergent. Near the surface a number of slender styli occur, some of which run parallel to the stout styli of the core, and at the surface they are either arranged at right angles or form a thin layer and occasional radiating tufts. Long slender sinuous toxa subtend the fibres, especially in the curves of the mesh ; some few exhibit a very slight well rounded bend in the middle, but the majority are arranged in wavy bunches.

The primary fibres are sinuous and often plexoid, in some places they almost form a complete horny core ; they are usually from 0·2 to 0·4 or more in diameter ; the secondaries are given off at an acute angle, and after traversing the axial line for a

short distance, branch off at right angles and form the walls of the pores at the surface; the connecting fibres are few and far between, and are usually about 0·5 to 1 mm. in diameter.

The mesh between the main fibres is usually elongate, and about 0·3 mm. in diameter; laterally and near the surface it becomes round or rectangular; all the fibres, especially the apices, are very densely covered with echinating styli, the bases of which are in close contact, and scarcely admit of additional spicules.

Megascleres:—(1) Short, stout, entirely and strongly spined styli; these echinate the fibres in vast numbers; size 0·3 to 0·8 by 0·012 mm.

(2) Stout, curved, smooth, acutely pointed styli; these occur in the fibres and form radiating tufts at the surface; size 0·3 to 0·5 by 0·0015 to 0·022 mm.

(3) Curved or straight slender styli, with a tendency to become subtylostyli; chiefly dermal, but also scattered between the fibres; size 0·15 to 0·2 by 0·002 to 0·004 mm.

Microscleres:—(1) Long slender toxa mostly in bundles; scattered ones have usually a long bend in the centre; size 0·2 to 0·3 by 0·002 mm.

(2) Isochelæ of the usual Clathria type; size 0·008 to 0·01 mm.

CLATHRIA ARCUOPHORA, *sp. nov.*

(Plate xlv., fig. 29.)

Station 8.

Sponge with a discoidal base, short peduncle, and an irregular flabellate lamina; the latter is 225 mm. in height and 170 mm. in breadth, and from 3 to 5 mm. in thickness; the pedicel is 70 mm. long and 15 mm. in diameter. Surface faintly marked with longitudinal ridges; the lamina when viewed by transmitted light appears as if it consisted of a series of coalescent branches, between which many thin places and some perforations occur. The dermal layer is thinly coated with a delicate membrane, which is moderately charged with radiating tufts of smooth stylote spicules; these occur between the stout projecting styli at the ends of the fibres. The oscula are regularly distributed over the whole of the sponge; they are from 0·5 to 1 mm. in diameter, and about 1 or 2 mm. apart; the intermediate spaces are finely reticulate and minutely porous.

Texture inelastic, brittle, and extremely harsh to the touch, the latter character being due to the numerous projecting spicules; colour greyish-yellow.

The skeleton consists of a series of stout primary fibres ; they are longitudinally arranged, and present a very wavy outline ; they exhibit a few scattered, echinating, spined styli, and an axial core of from two to six or more stout smooth styli ; they are usually about 0·15 mm. in diameter and 0·35 mm. apart ; the secondaries are about 0·1 mm. or less in diameter, and the spicular core appears to be increased in size as the surface is approached ; each fibre terminates in a divergent tuft of from six to twelve acutely pointed styli ; the connecting fibres are mostly uni- or bispicular, with only a trace of spongin ; the length of the spicule evidently regulates the distance between the stouter fibres ; frequently a solitary spicule may be seen ensheathed in a scarcely perceptible layer of spongin, and yet it exhibits from one to three or four echinating styli.

The mesh is rather variable and may be round, oval, or sub-rectangular ; this is due to the spreading of the spongin at the points of origin or union of the fibres ; the average diameter is about 0·3 to 35 mm.

Megascleres :—(1) Echinating spined styli, which are very irregularly distributed and usually are about half their length apart on the more slender fibres, but on the primaries they are widely separated. The base is slightly swollen ; the shaft is faintly spined and rapidly tapers from the middle to a long, smooth, acute point ; size 0·35 by 0·008 mm.

(2) Slightly curved, stout, smooth styli, with a well rounded base and a long acutely pointed apex ; these are chiefly confined to the fibres ; size 0·3 to 0·4 by 0·022 to 0·024 mm.

(3) Slender, smooth, cylindrical styli ; abundant in the dermal layer as radiating tufts, and also scattered between the fibres ; the base is often perceptibly enlarged and is generally tipped with a series of minute spines ; the apex terminates in an abrupt acute point ; size 0·2 to 0·3 by 0·0045 to 0·005 mm.

Microscleres :—(1) Small toxa 0·04 by 0·0025 mm. (2) Large, stout, bow-shaped toxa, size 0·11 by 0·04 mm., both forms are abundant everywhere, except in the epidermal region and the axis of the fibres. (3) Small isochelæ fairly plentiful throughout the sponge ; size 0·02 mm. This form approaches *Clathria angulifera*, Dendy, in some of its characters, but the habit and the size of the spicules differ greatly.

RHAPHIDOPHLUS, *Ehlers.*

RHAPHIDOPHLUS TENEBRATUS, *sp. nov.*

(Plate xlv., fig. 19.)

Station 48.

Sponge with a slightly expand base, and a short peduncle, from which arise a series of parallel branches ; they are more or

less coalescent and connected by transverse branchlets, thus forming a subflabellate clathrous expansion. The branches are flattened in the plane of branching, and measure from 5 to 15 mm. in their greater and 3 to 4 mm. in their lesser diameter; the total height is 200 mm., and the greatest width about 60 mm.; the peduncle is 40 mm. long and 5 mm. thick. The surface generally is very rugose and marked by a series of sinuous grooves and uneven knotty ridges; near the summit of the sponge the grooves and ridges become more regular and distinct. The dermal layer of spicules is rather scanty and partly obscured by the large smooth styli which project from the ends of the fibres in great numbers and give the stem and branches an extremely hispid appearance. The branches exhibit abundant perforations; these are situated in the grooves; they are from 1 to 2 mm. in diameter and 2 or 3 mm. apart. By transmitted light the sponge appears as if it had been riddled by small shot. These perforations probably represent the oscula; the ridges are reticulated and minutely porous.

Texture slightly compressible, but very tough; colour greyish-brown.

The skeleton consists of a series of very stout, horny fibres; in the axial region they are from 0·4 to 0·5 mm. in diameter; occasionally some appear to have coalesced and measure from 0·7 mm. In the less dense portions of the axial plexus the primaries are usually 2 or 3 mm. in diameter; the secondaries are about the same, but diminish to 1·5 or 1 mm. near the surface; the connecting fibres are 1 mm. or less. The spicular core consists of stout, smooth styli, with from 3 to 5 in ill-arranged rows; they are approximated at the base and more divergent at their apices, especially at the terminal portions of the fibres.

The echinating styli are unevenly distributed, being abundant only on the secondaries, or the outer part of the primaries, where they form the encircling margin of the larger pores. The mesh centrally is oblong and about twice as long as broad; elsewhere it is more or less subquadrangular.

Megascleres:—(1) Straight, gradually tapering, and entirely spined styli; size 0·08 to 0·1 by 0·008 mm.

(2) Stout, curved, smooth styli; size 0·25 to 0·5 by 0·015-0·018; the latter occur in the fibres and project more than half their length at their ends.

(3) Straight, slender styli; these form the dermal crust and are also scattered throughout the sponge; the base is often a little swollen and tipped with a few minute spines; the apex is long and acute; size 0·25 to 0·4 by 0·005 mm.

Microscleres:—(1) Long, slender toxa, with a very slight bend in the middle and straight shafts; size 0·2 mm.; they occur throughout the choanosome and often arranged in bundles.

(2) Small isochelæ rather abundant especially in the dermal region ; size 0·016 mm.

The species described above is closely allied to *R. filifer*, Ridley and Dendy, but differs in wanting the thick dermal crust, as well as in habit and a slight difference in the spicular characters. It also differs from *R. seriatus*, Theile, in habit and in the size of the spicules. *R. topsénti*, Theile, is allied in general features as to surface and mode of branching, but here again the spicules differ in size, and in *R. topsenti* the peculiar toxa are absent (?).

RHAPHIDOPHLUS BISPINOSUS, *sp. nov.*

Station 45.

Sponge arising from a well defined discoidal base, with a short peduncle, and two primary and four short secondary branches. The total height is 50 mm., and the diameter of the somewhat angular stem and branches is from 4 to 5 mm. The surface is minutely honeycombed and densely hispid, with projecting, smooth, stylote spicules. The dermal membrane is finely porous and here and there forms a tympanic covering over the apices of the cells. Oscula apparently absent. Texture highly elastic, reticulate, and rather tough ; colour yellowish-grey.

The skeleton consists of an open network of fibres with a moderate amount of spongin ; the primaries are cored with stout and also with slender smooth styli, intermixed with which are a number of spined styli ; these are fairly uniform in length, but vary greatly in diameter. The spicules in the primary fibres are arranged in compact bundles, about 0·2 mm. in diameter ; in the secondaries they are more diffused and generally divergent at their apices ; the connecting fibres consist of one or two rows of spicules, but as a rule they are ill defined, and the mesh is occupied with scattered spicules. All the fibres are echinated by spined styli, and also by long smooth styli ; the latter are arranged at right angles and are fairly abundant centrally ; at the ends of the fibres they are densely packed and project through the dermis, thus giving the surface its hispid appearance. The mesh is usually elongate and about 0·25 to 0·5 mm. in its narrow diameter.

Megascleres :—(1) Curved, gradually tapering, and wholly spined styli ; the base is somewhat swollen, the apex acute, and the longer spines are recurved ; these chiefly echinate the fibres ; size 0·17 to 0·2 by 0·01 mm.

(2) Slender, straight, spined styli ; these occur in the fibres and scattered in the choanosome ; size 0·2 by 0·002 mm. or less.

(3) Long curved styli; the base is spiny for about one or two diameters; the shaft is smooth and terminates in a very acute point. This form of spicule forms the main part of the axial core and also echinates the fibres, as well as projecting through the dermal surface for half or two-thirds their length; size 0·7 to 1 mm. by 0·015 mm.

(4) Slender, straight, cylindrical, smooth styli of the fibres, choanosome, and dermal membrane; size 0·25 to 0·5 by 0·003 to 0·004 mm.

Microscleres :—isochelæ, these are fairly plentiful in all parts of the sponge; size 0·02 mm.

ECHINOCLATHRIA, *Carter.*

ECHINOCLATHRIA MACROPORA, *Lendenfeld, sp.*

Plectispa macropora, Lendenfeld, Austr. Mus. Cat. xiii., Sponges, 1888, p. 226.

Echinoclathria macropora, Whitelegge, Rec. Austr. Mus., iv., 2 and 5, 1901-2, pp. 35, 117, 212.

Stations 37, 44, 48, 50.

Four examples of this species are in the collection; the largest is about 500 mm. in height and over 100 mm. wide. The sponge consists of a tangled mass of anastomozing branches from 5 to 15 mm. in diameter. After full examination I feel inclined to regard this form as being quite distinct from *Echinoclathria carteri*, Ridley and Dendy.

AULENA, *Lendenfeld.*

AULENA GIGANTEA, var. MICROPORA, *Lendenfeld, sp.*

Halme gigantea, Lendenfeld, Proc. Linn. Soc. N. S. Wales, x., 1886, p. 849.

Aulena gigantea, var. *micropora*, Lendenfeld, Austr. Mus. Cat. xiii., Sponges, 1888, p. 230.

Aulena gigantea, var. *micropora*, Whitelegge, Rec. Austr. Mus., iv., 2, 1901, p. 118.

Stations 8, 54.

Several specimens of this variety are in the collection from Barranjoey and Jervis Bay. The examples do not, however, afford any additional characters to those already published.

ALLANTOPHORA, *gen. nov.*

Sponge branched; skeleton reticulate; fibres with a moderate amount of spongin, cored and echinated by smooth monactinal megascleres. Microscleres:—sigmata, microxea, and microstrongyla.

ALLANTOPHORA PLICATA, *sp. nov.*

(Plate xlv., fig. 28.)

Station 53.

Sponge composed of an intricate mass of flattened branches; their edges are directed outwards; they are acute, and finally terminate in long acuminate points. Centrally the various lamellate branches are here and there coalescent, from base to summit, so that a transverse section would present an irregular honeycombed structure with wide cells. The specimen is 130 mm. in height, 90 mm. in its greater and 60 in its lesser diameter. The branches vary from 3 to 10 mm. in thickness and from 10 to 30 mm. in width. The surface generally presents a series of highly conulose, longitudinally disposed ridges, between which numerous pores are situated; they vary from round to oval or elongate, and are from 3 to 5 mm. in diameter. The pores are enclosed by thin fibrous walls, which are fringed with slender conulose processes about 5 mm. long and 2 or 3 mm. apart. The sponge is somewhat water worn, and the dermal layer is only visible here and there as a thin transparent membrane covering some of the pores; this epidermal film is richly furnished with microscleres, including sigmata, microstrongyla, and microxea. Texture hard, inelastic, tough, and presenting a coarse, fibrous surface; colour greyish-yellow.

Skeleton centrally reticulate, with oblong or elongate mesh; apically or laterally there is a tendency to become plumose. The primary fibres consist of a moderate amount of pale spongin, cored with dense whispy bundles of smooth styli; their diameter varies from 0·2 to 0·4 mm., and they are usually about 0·5 to 0·6 mm. apart. The secondaries are similar to the primaries, but slightly thinner; the connecting fibres are few and far between except in the central region, where they measure from 0·05 to 0·1 mm., and are cored with six or more spicules in a row. All the fibres are abundantly echinated by smooth styli, which are usually disposed at right angles, but occasionally they occur in subradiating tufts consisting of several spicules.

Megascleres :—(1) Smooth echinating styli, often slightly bent near the base ; size 0·25 to 0·4 by 0·014 to 0·016 mm. (2) Smooth straight styli of the core ; size 0·45 to 0·5 by 0·008 to 0·012 mm.

Microscleres :—(1) Sigmata, extremely abundant throughout the sponge especially in the dermis ; size 0·018 mm. (2) Microxea, scattered or in loose bundles ; size 0·08 to 0·1 by 0·0015 to 0·002 mm. (3) Microstrongyla ; these are present in great numbers everywhere ; size 0·01 to 0·02 by 0·006 to 0·008 mm.

The genus is evidently intermediate between *Echinoclathria* and *Ophlitaspongia*.

ECHINOCHALINA, *Thiele*.

ECHINOCHALINA RETICULATA, *sp. nov.*

(Plate xlv., figs. 25-25a.)

Stations 48, 53.

Sponge consisting of a rather loose, irregular, honeycombed network of thin trabeculæ ; the latter are connected—in the dried skeleton—by delicate webs of interlaced fibres which form the walls of the cells. In spirit examples the gossamer-like partitions are covered with a very thin layer of sarcode ; the epidermal surface exhibits a series of small pores, with here and there a few circular areas covered by a tympanic membrane. There is no trace of oscula, except the pores are to be regarded as such. Texture resilient, and rather tough ; colour grey.

The skeleton consists of a series of horny fibres, which are often trellis-like in arrangement, but near the surface they are somewhat plumose ; the primaries measure from 0·1 to 0·2 mm. in diameter, and are densely echinated by smooth, straight, tapering styli, and exhibit a slender core of ill-arranged slender tylostyli and tylota. The secondary fibres are about 0·5 mm. or less in diameter, and internally they either have two or three distinct spicules or are aspiculous. The connecting fibres are very slender and form an intricate network between the primaries and secondaries ; they usually present from three to four echinating styli on one side and occasionally one or more slender spicules within. The mesh is generally narrowly oval or oblong and about 0·2 mm. wide.

Megascleres :—(1) Straight, smooth styli, echinating the fibres ; size 0·15 by 0·008 to 0·01 mm. (2) Slender, straight tylostyli, in the fibres ; size 0·22 by 0·004 mm. (3) Straight, slender tylota, with evenly rounded ends ; size 0·22 by 0·0045 mm. The latter occur chiefly in the dermal membrane.

ECHINOCHALINA GLABRA, *Ridley and Dendy, sp.*

Echinoclathria glabra, Ridley and Dendy, Chall. Rep., Zool., xx., 1887, p. 163, pl. xxix., figs. 11, 11a, pl. xxxi., fig. 2.

Station 48.

Five examples of this species were obtained off Wollongong. They are mostly washed out specimens but they afford sufficient characters to recognise their full specific value as described in the "Challenger" Report. All the specimens are attached to dead gorgonoid stems or to large branching colonies of bryozoa, and agree with the figured type in contour less the fleshy connecting ridges, which are somewhat broken and only here and there exhibit a continuous surface.

The skeleton agrees with the published description. The spicules, however, are slightly larger than those of the type, a fragment of which was presented as a mounted slide by Prof. Dendy from the "Challenger" specimen (R.N. 707, Dendy). The latter example affords the following spicular measurements: echinating smooth subtylostyli 0·11 by 0·0063 mm.; long smooth tylota 0·22 by 0·0032 mm. The spicules of the "Thetis" specimen are as follows: echinating smooth styli 0·12 to 0·16 by 0·007 to 0·008 mm.; tylota 0·2 to 0·23 by 0·0045 mm.

Family AXINELLIDÆ, *Ridley and Dendy.*

PHAKELLIA, *Bowerbank.*

PHAKELLIA JACKSONIANA, *Dendy.*

Phakellia jacksoniana, Dendy, Proc. Roy. Soc. Vict., ix., n.s., 1897, p. 236.

Phakellia flabellata, Ridley and Dendy, Chall. Rep., Zool., xx., 1887, p. 171, pl. xxxiv., figs. 2, 3, 3a, pl. xl., figs. 6, 6a.

Station 44.

Six examples of this well marked species were obtained off Coogee in 49 to 50 fathoms. The specimens display considerable variation; they are flabellate, with here and there an elongated opening in the frond; the rest are branched at the base, and many are either slightly coalescent or free at their dilated apices. Apart from the slight difference in habit the examples agree in every detail as to surface, structure, and spicular characters with the "Challenger" description and figures.

PHAKELLIA MULTIFORMIS, *sp. nov.*

(Plate xlvi., fig. 41.)

Station 44, 46, 47, 48, 50.

Sponge varying from spatulate to flabellate or half to complete cup-shape; in the latter form the cup is always higher than broad. The figured example is 200 mm. high, 120 mm. in diameter and from 3 to 5 mm. in thickness. All the specimens (about 20) have a more or less distinct peduncle, which is usually about 10 mm. or more in diameter, and from 10 to 40 mm. in length.

The surface is harsh to the touch, and abundantly supplied with small pores about 0·3 mm. in diameter and from 0·2 to 0·4 apart. Both inner and outer surfaces are alike and destitute of oscula. The marginal area is thin, and presents a series of minute ridges; these are 0·3 in diameter, about 0·25 apart, and extending on each surface for a distance of 3 or 4 mm.

Texture hard, tough, and somewhat elastic; colour yellowish-white.

Skeleton composed of a series of stoutish bundles of spicules from 0·3 to 0·4 mm. in diameter; they exhibit little or no spongin. The primary fibres are rather indefinite, but the secondaries are well defined. They are about 0·1 or 0·15 mm. in diameter and 0·2 to 0·25 mm. apart. They are given off mostly at right angles and terminate at the surface in tufts of radiating spicules.

Megascleres:—(1) Curved or slightly bent styli; size 0·2 to 0·25 by 0·02 mm. (2) Curved oxea, tapering at the ends to not very acute points; size 0·15 to 0·25 by 0·018 to 0·02 mm. This species is allied to *Phakellia villosa*, Carter, and *Phakellia crassa*, Carter, but it differs from both in its spicular characters.

AXINELLA, *Schmidt.*

AXINELLA SYMBIOTICA, *sp. nov.*

(Plate xlvi., fig. 33.)

Stations 34, 53.

Sponge more or less flabellate, with a series of irregular terminal branches, some of which are coalescent at a short distance from their origin. The example figured measures 180 mm. in height and about the same in breadth. The branches vary from 5 to 20 mm. in width and are usually 5 mm. in thickness. The surface is generally beautifully reticulate, having here and there a few smooth patches, due to a grey incrustation. The rest of

the surface exhibits numerous verruciform processes; the latter are from 2 to 3 mm. apart and from 0·5 to 1 mm. in height; on the marginal areas of the branches they are a little more prominent. Texture rather brittle, harsh to the touch, and slightly compressible; colour yellowish-grey.

Skeleton composed of a few very stout, axial, primary fibres, from 0·5 to 0·8 mm. in diameter. The secondaries are given off at pretty regular intervals; they are about 0·25 mm. in diameter at their origin, but as they approach the surface in graceful curves they rapidly diminish in diameter and finally terminate in tufts of radiating spicules, of about twelve or more. The fibres consist of a large amount of dark yellow spongin; they frequently anastomose, and although the plumose ramification is well marked at the surface, the central regions present a more or less reticulate appearance.

Megascleres:—(1) Slightly curved styli, gradually tapering to acute points; size 0·2 to 0·25 by 0·01 to 0·015 mm. (2) Curved, blunt-ended styli and strongyli, the latter rather abundant; size 0·25 to 0·3 by 0·015 to 0·02 mm. (3) Oxea bent in the middle; very scarce and may not belong to the sponge.

In my preliminary examination of this species it was noted as a commensal with a gorgonoid. In the final examination I failed to find the latter to fix it definitely. Still the specimen contains abundant spicules in the verrucæ, and when boiled out in caustic soda they were to be seen in great numbers. The spicules remind one of irregular bundles of *Nostoc*, being arranged in bead-like lines, and in many cases they are dumbbell-shaped, but perfectly smooth. Spicules of gorgonoid:—size 0·015 by 0·004 mm.

AXINELLA ARBORESCENS, *Ridley and Dendy.*

Axinella arborescens, Ridley and Dendy, Chall. Rep., Zool., xx., 1887, p. 1, 178, pl. xxxv., fig. 4-4a.

Stations 34, 44, 53.

Three examples of this species are in the collection; they agree in every character with the description in the "Challenger" Report.

AXINELLA FRONDULA, *sp. nov.*

(Plate xlvi., fig. 32.)

Station 50.

Sponge consisting of a thin frondose lamina, 75 mm. high, 50 mm. in width, and from 1 to 2 mm. in thickness. There is a distinct flattened peduncle which gives rise to four well marked lobes; these are more or less dilated apically and either rounded or truncated.

Surface partly covered with a thin transparent membrane beneath which may be traced a series of subradiating grooves about 0·5 to 1 mm. in diameter. The abraded surface is finely pilose, and velvet like to the touch. Texture soft, flexible, elastic, and tough; colour generally olive brown, but inclined to grey where the epidermis is intact.

Skeleton consisting of rather slender, but numerous whispy bundles of more or less plumosely arranged spicules, which terminate in divergent tufts at the surface.

Megascleres:—(1) Straight or but little curved styli with a well rounded base and an acute apex; size 0·4 to 0·45 by 0·008 to 0·012 mm.

(2) Short styli frequently with a slight bend near the base; size 0·15 by 0·004 to 0·005 mm.

(3) Slightly curved oxea; size 0·11 by 0·0035 mm. The oxea are very scarce and occur chiefly in or near the dermal portion of the sponge.

AXINELLA VERMICULATA, *sp. nov.*

(Plate xlvi., fig. 43.)

Station 53.

Sponge stipitate, flabellate, but equally expanded; the marginal border is rather thin and exhibits a series of irregular lobes, separated by incisions of varying width and depth.

Surface generally minutely conulose, neatly reticulate, and finely porous. The most striking features, however, are the numerous subradiating ridges and grooves; the latter are usually from 2 to 3 mm. wide, and the former vary between 1 to 3 mm. in height and in thickness. The grooves commence in the central areas of both surfaces, and after a more or less sinuous course converge, and become deeper and more distinct between the lobes at the margin of the frond. There is no definite trace of oscula, except a few scattered apertures or perforations be regarded as such.

Texture hard, incompressible, and tough; colour greyish-yellow.

Skeleton:—The central regions of the sponge consist of a series of plexoid fibres, which are scarcely distinguishable on account of the large amount of spongin and the numerous scattered spicules; the secondary fibres are, however, very distinct; they are usually about 0·25 mm. in diameter and from 0·3 to 0·5 mm. apart. There is an axial core of closely arranged spicules; this is echinated with numerous others, which are disposed at an high angle and terminate in radiating tufts at the surface. Between the latter a few scattered oxea occur and are generally disposed at right angles to the fibres.

Megascleres :—(1) Short, straight styli, chiefly axial and scattered in the choanosome ; size 0·3 to 0·4 by 0·025 mm. (2) Styli both marginal and terminal ; size 0·6 to 0·65 by 0·02 to 0·025 mm. (3) Curved oxea ; size 0·35 to 0·45 by 0·01 to 0·015 mm.

HIGGINSIA, *Higgins.*

HIGGINSIA SCABRA, *sp. nov.*

(Plate xlvi., fig. 44.)

Station 34.

Sponge sub-flabellate, with a few flattened branches, some of which are coalescent. The figured specimen is 110 mm. in height and about the same in width ; the branches are from 8 to 12 mm. in thickness. Surface uneven and closely conulose, the conuli being about 3 to 5 mm. high, and from 1 to 3 mm. apart. The epidermal membrane is neatly arranged between the conuli, forming a smooth coating with here and there a few circular pores. Oscula, either apical, marginal, or occasionally on the flat surface of the sponge ; their diameter varies from 2 to 5 mm.

Texture hard, incompressible, and somewhat brittle ; colour yellowish-cream.

Skeleton :—The primary fibres are somewhat indefinite and obscured by a confused envelope of spicules ; in some places, however, an axial series may be distinguished consisting of from six to twelve closely arranged spicules ; in longitudinal section the fibres present features which may be described as nodes and internodes ; the latter affords a view of the spicules indicating the course of the fibres, and the former exhibit dense nodes of spicules, from which the secondary fibres arise ; from their origin their course is upwards and outwards ; in each fibre a distinct axial thread of three or more spicules can be traced ; they are frequently hidden from view by numerous sub-echinating spicules which terminate in radiating tufts at the surface, being most evident on the apices and sides of the conuli.

Megascleres :—oxea of two sizes—(1) generally curved and tapering to acute points about three or four diameters from the extremities ; size 0·7 by 0·024 mm.

(2) Slender, curved, and gradually tapering to acute points ; size 0·6 by 0·01 mm.

Microscleres :—microxea somewhat boomerang-shaped, with a sharp bend in the middle ; they are minutely spined throughout their length, and are very abundant in the epidermal membrane and scattered in the intrafibrous portions of the sponge.

This species is described with some hesitation, but the spicular characters differ considerably from those hitherto known, both in arrangement and in dimensions of the spicules.

SIGMAXINELLA, *Dendy.*

SIGMAXINELLA MAMMILLATA, *sp. nov.*

(Plate xlvi., fig. 39.)

Station 15.

Sponge consisting of about ten mammiform processes, arising from a well developed base and a short peduncle; the branches are coalescent in their lower three-fourths, but mostly free at the summits. The example is 70 mm. high, 75 mm. wide, and about 40 mm. in thickness. The free apices of the branches vary from 15 to 25 in height and are generally 15 mm. in diameter. The surface has a thin epidermal layer provided with numerous minute pores about 0·5 mm. or less in diameter; these are more or less connected by a series of small radiating grooves; the pores are from 1 to 1·5 apart and are evenly distributed over the whole sponge. In places where the dermis has been abraded the surface presents a velvet-like aspect. The summits of the well-rounded or sometimes slightly compressed branches bear from two to seven oscula from 1 to 1·5 or 2 mm. in diameter; interspersed between the oscula apertures are a series of subradiating grooves 0·5 wide, and extending down the sides for a distance of 5 mm. or more.

Texture rather hard, tough, and resilient; colour yellowish-brown.

Skeleton composed of a series of somewhat diffuse primary and secondary fibres; the former are from 0·3 to 0·5 mm. in diameter, and consist of ill-arranged spicules imbedded in much yellow spongin; the latter are better defined; they are about 0·1 to 0·15 mm. in diameter, and the spicules are arranged in axial lines of six or more, with a series of echinating spicules placed at rather acute angles, and finally terminating in radiating tufts at the surface. The secondary fibres are mostly given off at right angles to primaries, and here and there connecting fibres are present containing one or two spicules. The length of the latter indicates the distance between the fibres.

Megascleres:—styli with a straight shaft tapering to an acute point; the base is usually bent about two or three diameters from its well-rounded extremity; size 0·25 to 0·28 by 0·015 to 0·018 mm.

Microscleres:—sigmata, 0·03 by 0·0025 mm.

SIGMAXINELLA DENDROIDES, *sp. nov.*

(Plate xlvi., fig. 42.)

Station 41.

Sponge arising from a peduncle 25 mm. long and 5 mm. in diameter. The branches are dichotomous, subparallel, frequently coalescent, and terminate in acute points. The figured specimen is 180 mm. high and about 70 wide. The branches are usually from 4 to 5 mm. in diameter. The surface has been denuded of its epidermis and presents an extremely villose appearance, from the base to the summits of the branches.

Texture tough, resilient, and compressible; colour yellowish-grey.

Skeleton composed of a series of very slender primary fibres about 0·7 mm. in diameter; these are centrally situated and consist of five or six spicules. The secondaries are composed of two or three closely arranged spicules with only a trace of hyaline spongin; they are gracefully curved upwards and outwards and terminate at the surface in tufts of spicules, which are mostly subparallel, but rarely radiating.

Megascleres:—straight or but little curved styli; their greatest diameter is near the centre; the base is rounded and apex tapers to a not very acute point; size 0·45 to 0·5 by 0·01 to 0·02 mm.

Microscleres:—sigmata 0·025 by 0·002 mm.

This species is apparently intermediate between *Sigmaxinella australiana*, Dendy, and *S. arborea*, Kirkpatrick.

SPONGOSORITES, *Dendy.*

SPONGOSORITES VARIABILIS, *sp.*

(Plate xlvi., fig. 45.)

Station 53.

Sponge rudely cup-shaped, with several lateral lamellæ both within and without. The specimen has a short peduncle, but the base is wanting; when obtained it was probably torn from its support, and the cup-like shape was also destroyed; the example figured is only half of the original. When complete the measurements would be approximately as follows:—130 mm. high, 120 mm. in its greater and 80 mm. in its lesser diameter; the walls of this cup and the lamellæ vary from 7 to 2 mm. in thickness. The marginal region of the sponge is irregularly lobate and somewhat coarsely fimbriate.

The outer surface presents a series of low longitudinal ridges which are more or less radiate and terminate at the ends of the lobes; the inner aspect exhibits numerous shallow radiating grooves, which are furnished with abundant oscula (?) pores from 0·5 to 1 mm. or more in diameter; when viewed by transmitted light the sponge appears as if it had been perforated with very small shot. The dermis is somewhat silvery white, minutely porous, and fairly smooth. Texture elastic and rather tough; colour yellowish-grey or cream.

Skeleton plumose consisting of loosely arranged whispy-bundles of spicules; the fibres when distinct are generally about 0·5 mm. in diameter, the same distance apart, and enclosed in a considerable amount of pale diffused spongin. The dermal layer is about 0·1 in thickness, and is charged with numerous small oxea.

Megascleres:—styli of various shapes and sizes.

(1) Tapering, acutely pointed styli, with a sharp bend near the base, or curved in the basal third; size 0·6 to 0·15 by 0·02 to 0·03 mm.; these are very plentiful.

(2) Straight, acutely pointed styli; size 0·5 by 0·02 to 0·03 mm.

(3) Long, cylindrical, sharp point styli; size 1·3 to 1·5 by 0·02 mm.

Microscleres:—small, straight oxea; size 0·08 to 0·004 mm. Besides the above no other oxea have been observed.

RASPAILIA, *Nardo.*

RASPAILIA ECHINATA, *sp. nov.*

(Plate xlvi., fig. 37.)

Stations 44-47.

Sponge pedunculate, with a small attachment disc, a well-defined pedicel, and numerous dichotomous branches which are cylindrical and disposed in a plane. The apices of the branches are neatly rounded except in two cases—indicating further dichotomization—in which they are broad and compressed; their diameter is about 5 to 7 mm. Surface minutely honeycombed; the cells are generally oblong, and their marginal walls are furnished with numerous rigid, sharp, aculeations from 1 to 1·5 mm. in height and about 0·5 to 1 mm. in diameter. Texture hard, elastic, and extremely harsh to the touch; colour dark greyish-brown.

Skeleton consisting of a series of slender subparallel fibres without much evident spongin; their course is axial, and at the surface they bifurcate and terminate in closely arranged tufts of long, stout styli. The primary fibres are about 1·5 mm. in dia-

meter, and contain about 6 or 8 spicules in a row ; the secondaries are scarce and ill-defined except near the surface ; they are generally bi- or trispicular and measure 0·5 mm. The connecting fibres are mostly unispicular and occur at fairly regular intervals, being arranged at right angles ; the mesh is square or oblong, and is usually about 0·3 by 0·4 mm. in diameter.

Megascleres :—(1) Straight, smooth styli of the fibres and dermis ; size 0·9 to 1·05 by 0·02 to 0·025 mm.

(2) Slightly curved, smooth styli of the connecting fibres ; size 0·3 to 0·5 by 0·01 mm.

(3) Short, straight, echinating styli ; the shaft, base, and the abruptly-pointed apex are more or less covered with recurved spines ; size 0·5 to 0·6 by 0·02 mm.

RASPAILIA DICHOTOMA, *sp. nov.*

(Plate xlvi., fig. 36.)

Station 44.

Sponge with a small discoidal base, a short peduncle, and numerous curved, subcylindrical, dichotomous branches, chiefly disposed in a plane. The figured specimen is 200 mm. high and about 70 mm. wide ; the branches and peduncle vary from 3 to 5 mm. in diameter ; the apices are more or less acutely pointed. Surface reticulated, with irregular honeycombed or villose patches here and there, which are frequently interrupted by shallow, longitudinal grooves, the latter presenting a few small pores. Oscula scattered, about 1 mm. or less in diameter.

Texture hard, incompressible, and somewhat brittle ; colour greyish-yellow.

Skeleton composed of a dense series of slender primary fibres about 0·15 mm. in diameter and 0·2 mm. apart ; scattered spicules are present in such numbers that the main fibres cannot be traced in the central regions of the branches ; the secondaries are more definite, especially near the margins ; they are 0·05 mm. in diameter and a little more apart at the surface ; they terminate in long, whispy tufts of slender styli ; these are crossed and inlaced by short, curved oxea.

Megascleres :—(1) Straight, smooth styli, variable in dimensions ; size 0·35 to 0·7 by 0·008 mm.

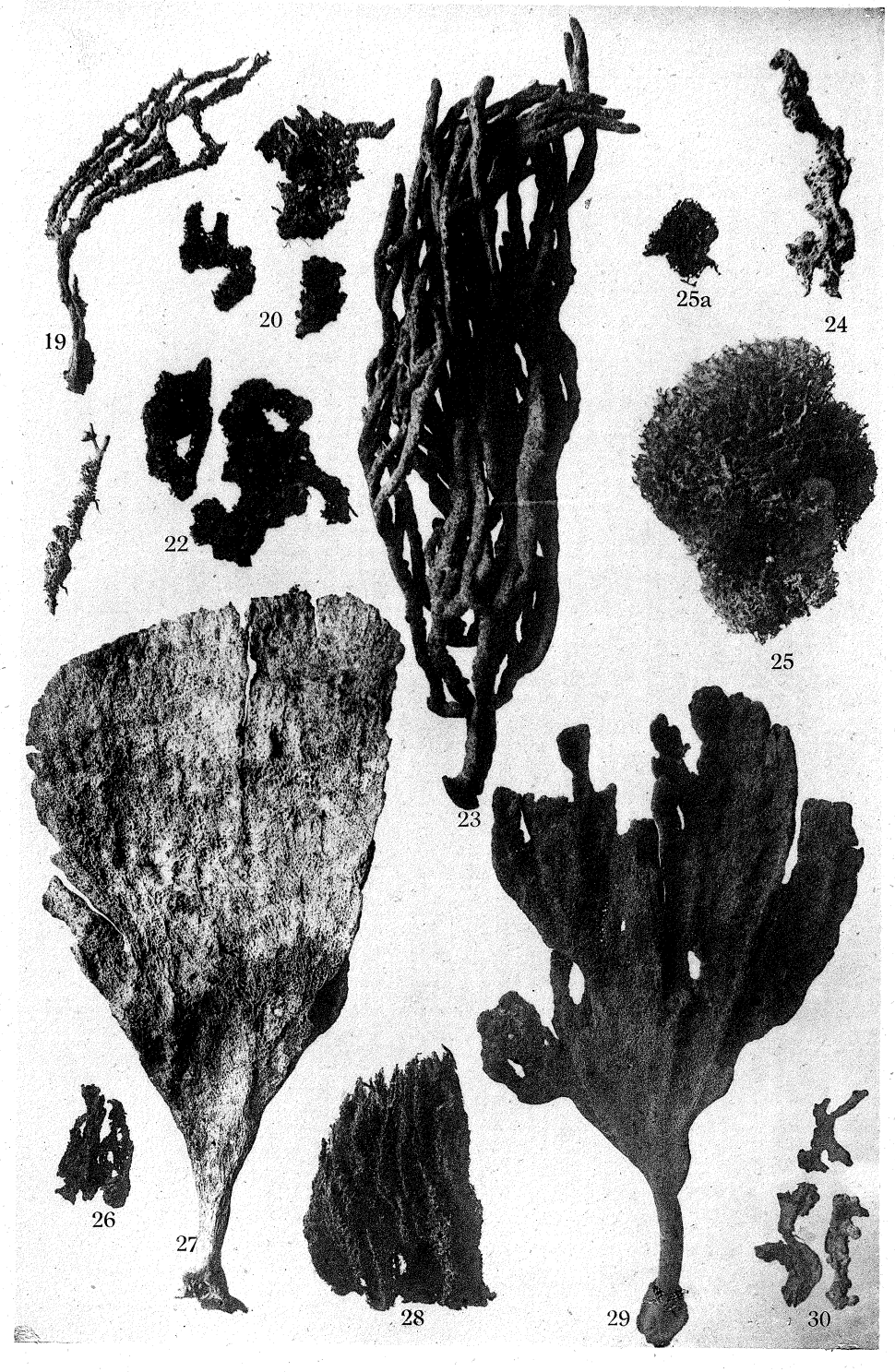
(2) Smooth styli ; size 0·2 by 0·015 mm.

(3) Curved oxea ; size 0·2 by 0·007 mm.

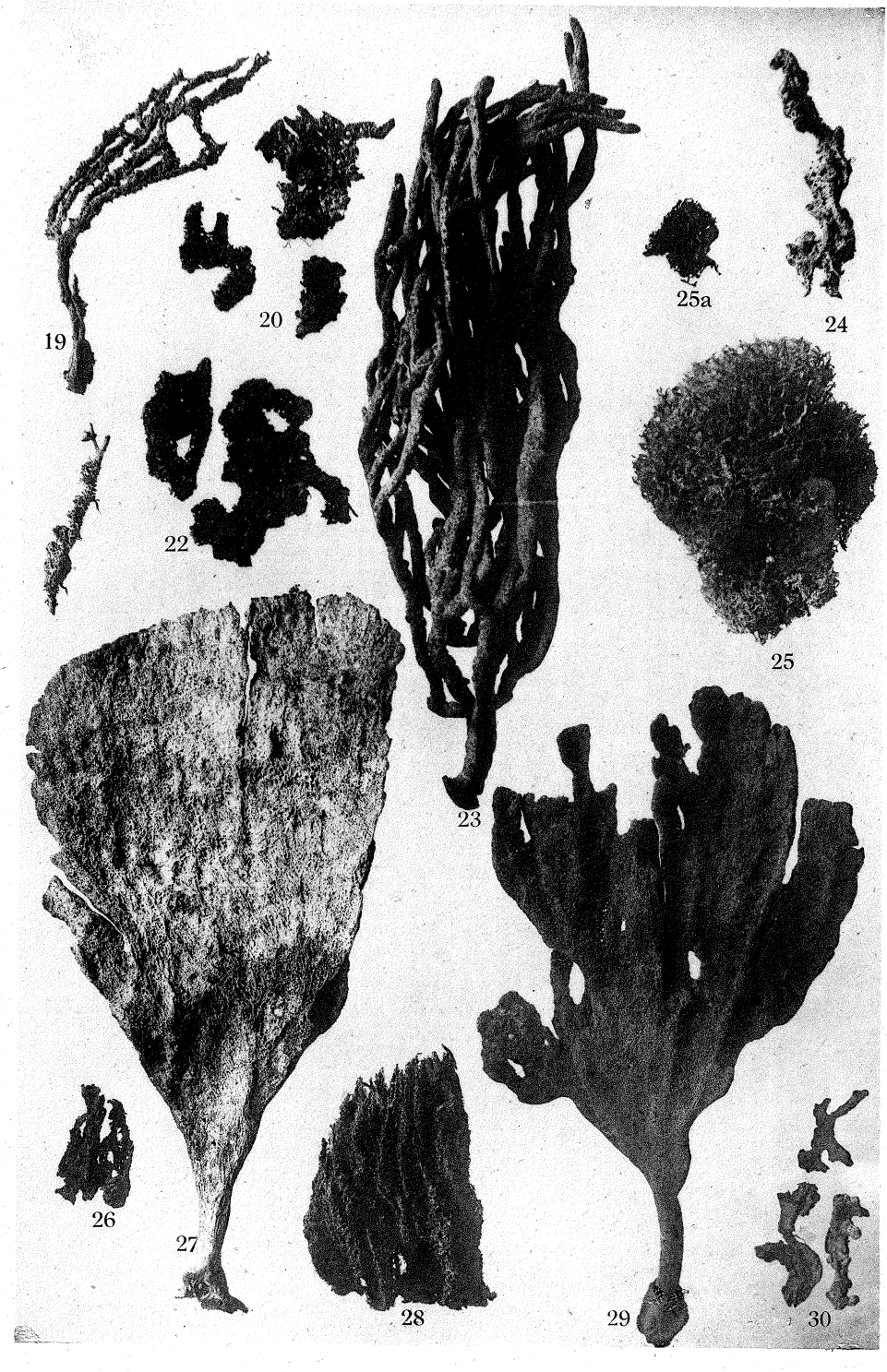
EXPLANATION OF PLATE XLV.

Fig. 19.—*Rhaphidophlus tenebratus*, Whitelegge.
Fig. 20.—*Dendoryx fusca*, Whitelegge.—See p. 481.
Fig. 21.—*Stylostichon conulosum*, Whitelegge.
Fig. 22.—*Paresperella repens*, Whitelegge.
Fig. 23.—*Clathria multipora*, Whitelegge.
Fig. 24.—*Dendoryx pumicea*, Whitelegge.—See p. 480.
Fig. 25.—*Echinochalina reticulata*, Whitelegge.
Fig. 26.—*Esperiopsis ferruginea*, Whitelegge.—See p. 472.
Fig. 27.—*Clathria striata*, Whitelegge.
Fig. 28.—*Allantophora plicata*, Whitelegge.
Fig. 29.—*Rhaphidophlus arcuophora*, Whitelegge.
Fig. 30.—*Dendoryx pumicea*, Whitelegge.

(All the figures are about one-third natural size.)



T. WHITELEGGE, Photo.

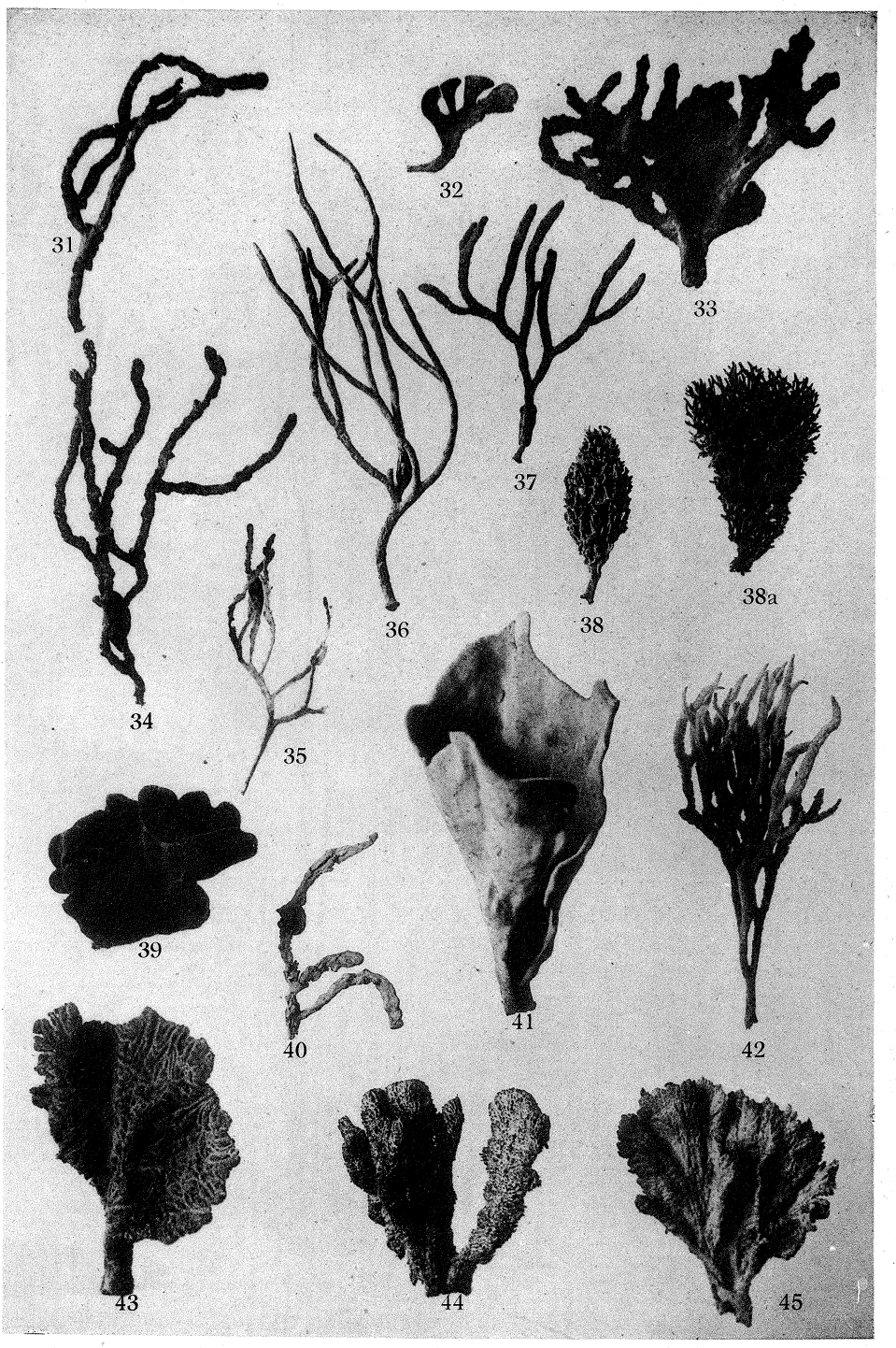


T. WHITELEGGE, Photo.

EXPLANATION OF PLATE XLVI.

Fig. 31.—*Desmacidon porifera*, Whitelegge.
Fig. 32.—*Axinella frondula*, Whitelegge.
Fig. 33.— ,, *symbiotica*, Whitelegge.
Fig. 34.—*Clathria calopora*, Whitelegge.
Fig. 35.—*Raspailia, sp.*
Fig. 36.— ,, *dichotoma*, Whitelegge.
Fig. 37.— ,, *echinata*, Whitelegge.
Fig. 38, 38a.—*Microciona clathrata*, Whitelegge
Fig. 39.—*Sigmaxinella mammillata*, Whitelegge.
Fig. 40.—*Amphilectus munitus*, Whitelegge.
Fig. 41.—*Phakellia multiformis*, Whitelegge.
Fig. 42.—*Sigmaxinella dendroides*, Whitelegge.
Fig. 43.—*Axinella vermiculata*, Whitelegge.
Fig. 44.—*Higginsia scabra*, Whitelegge.
Fig. 45.—*Spongosorites variabilis*, Whitelegge.

(All the figures are about one-third natural size.)



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