Art. L.—*Sponges collected at the Kermadec Islands by Mr. W. R. B. Oliver.*

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Plate XXVII.

In May of this year I received from Mr. W. R. B. Oliver a small collection of sponges from the Kermadec Islands. Apparently about eleven or twelve species are represented in the collection. Nearly all of these, so far as I have at present been able to examine them, are species hitherto undescribed. This is surprising, in view of the fact that the "Challenger" collections contained some sponges from the Kermadec Islands, and Von Lendenfeld has described others. It is remarkable also that there is so much distinctness from the Australian sponges. It is, however, highly probable that most of these Kermadec Island sponges are found in New Zealand. I hope to deal with the remainder of this collection in a subsequent paper.

In the descriptions in this paper I have not generally given the diameter of fibres, but the scale of the drawing is shown in each case. All drawings of fibrous skeletons are from specimens treated with water and afterwards carefully dehydrated and brought into balsam. In the dried specimens as received the fibres were in nearly all cases much shrunken.

Genus Tethya Lamarck.

More or less spherical *Tethyidae*, without highly specialized pore-bearing grooves, and without a sand-layer in the choanosome.

Tethya lyncurium Lin. var. **australis** var. nov. Fig. 1.

Sponge about 2 cm. in diameter and 1·5 cm. in height. Surface marked by rounded elevations and depressions, the elevations echinated by the spicules of the brush. No appearance of tesselation. Colour of formalin-preserved specimen pale yellow.

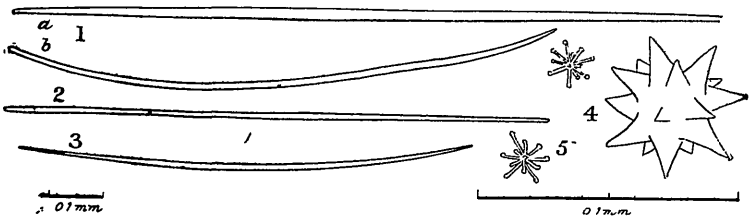

Fig. 1.—*Tethya lyncurium* var. *australis*.

1*a*, 1*b*. Styli. 2. Strongyle. 3. Oxeote. 4. Spheraster. 5. Chiaster.

The general arrangement of the skeleton is that of the typical *T. lyncurium*. Megascleres are for the most part styli (fig. 1, 1*a*, 1*b*) with the base rounded, the apex usually blunt but sometimes sharp, and the widest part of the spicule about a third of the distance from the base. The styli vary in size; an average size is 1·3 mm. by 0·02 mm. There are

a smaller number of strongyloxea, 1·05 mm. by 0·015 mm., and a few undoubted oxea, 0·9 mm. by 0·015 mm. Spicules of all three kinds occur also in the choanosome, between the rays. The microscleres are very small chiasters, and larger and more massive spherasters. The chiasters are most abundant just at the surface of the sponge, where they form a close layer, as in the type (see Bowerbank, "British *Spongiadae*," vol. 2, p. 93). They are also abundant in the inner portion of the ectosome, and are freely scattered throughout ectosome and choanosome. The spherasters are unevenly scattered through the ectosome, and are rare in the choanosome. The chiasters have a very small centrum, and about 12 slender straight rays always distinctly tylote. This tylote termination of the rays is like that of *T. japonica*, figured by Sollas (IX, pl. xliv), and that of *T. lyncurium* var. *a*, described by Dendy (IV, p. 113). The chiaster is noticeably different from that of the type as figured by Schmidt (VIII, pl. iv), Carter (XI, pl. ii), and others. Length of ray, 0·01 mm. The spheraster has a massive body and from 12 to 18 stout pointed rays, which are never spined. The length of the ray is 0·02 mm., and the total diameter of the spicule 0·06 mm.

This sponge is identical with one found on the New Zealand coasts, but not hitherto described. It is perhaps identical with Lendenfeld's *T. multistella* (V, p. 46), in which, however, no strongyloxea nor oxea are reported. It is also very near Dendy's *T. lyncurium* var. *a* (IV, p. 113). I note these points of difference :—

T. lycurium var. *a.*	*T. lycurium* var. *australis.*
Vent noticeable in preserved specimens.	Vent not noticeable in preserved specimens.
Megascleres : Styli faintly tylote. No oxea nor strongyla.	Styli not tylote. Oxea and strongyla present.
Microscleres : Spheraster rarely spined. Spheraster-rays about 12.	Spheraster never spined. Spheraster-rays usually more than 12.
Chiaster : Rays 6–9.	Rays more than 9.

I propose to establish this variety with some reluctance, and only do so to avoid any possible confusion in notions of distribution.

Five specimens were received, preserved in formalin. "Meyer Island, near Sunday Island, in rock-pools ; 24/4/08."

Genus RENIERA Nardo.

Skeleton forming a close reticulation of usually single megascleres, each forming one side of a mesh. Spicules short, usually oxeote. In most cases the ends of the spicules are bound to the adjacent spicules by a little spongin.

Reniera reversa n. sp. Fig. 2.

Sponge flattened and encrusting. Length, 4·5 cm. Thickness, 0·7 cm. There are a few scattered oscula flush with the surface of the sponge, and about 4 mm. in diameter.

The skeleton consists mainly of blunt oxea, which are slightly curved. These are bound together by scarcely discernible spongin into meshes which may be 3-, 4-, or 5-sided. From the upper surface of the sponge there project slightly curved styli, the blunt end directed outwards. These are imbedded for about half their length. They form various angles with the surface.

Size of spicules: Oxea, 0·1 mm. by 0·005 mm.; styli, 0·84 mm. by 0·014 mm.

Two specimens were received, dry and somewhat broken. The label reads, "Taken in rock-pools, Meyer Island (near Sunday Island); 29/2/08."

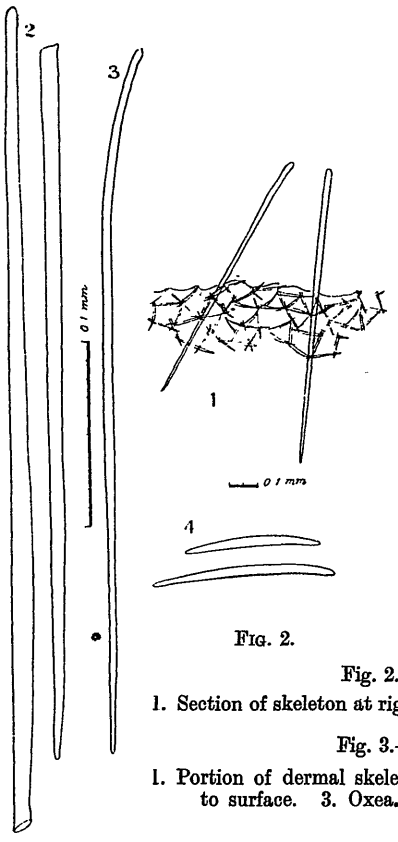

FIG. 2.

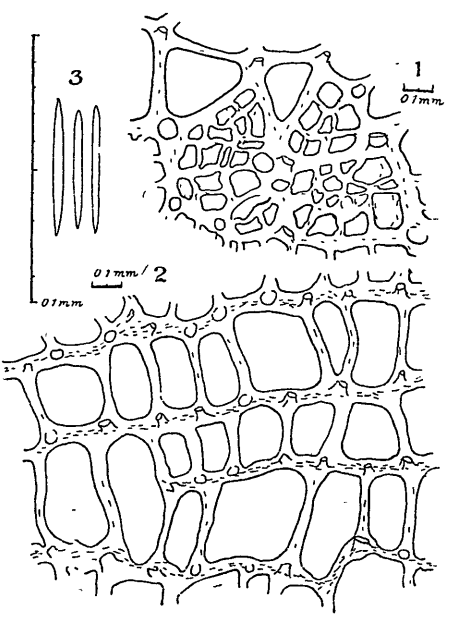

FIG. 3.

Fig. 2.—*Reniera reversa.*

1. Section of skeleton at right angles to surface. 2, 3. Styli. 4. Oxea.

Fig. 3.—*Chalina fistulosa.*

1. Portion of dermal skeleton. 2. Section of skeleton at right angles to surface. 3. Oxea.

Genus CHALINA Grant.

Chalininae whose skeletal reticulation is typically rectangular. Fibres usually slender, with much spongin, and few, but usually well-developed, spicules.

Chalina fistulosa n. sp. Fig. 3.

Sponge massive, sessile; with well-developed oscula, oval or rounded, which terminate short fistular processes on the upper surface of the sponge. Fistulae from 5 mm. to 12 mm. in height; oscula from 5 mm. to 8 mm. in diameter. Surface smooth. Colour of dry specimen dirty-yellow. Texture harsh.

Internal skeleton showing approximately rectangular meshes. Longitudinal fibres usually a little stronger than the transverse ones, and loosely cored with a strand of spicules often arranged with some irregularity. In the transverse fibres the spicules are few, never forming a connected strand and never polyserial.

Dermal skeleton shows fibres that are about the same diameter as the primary fibres of the internal skeleton, but dark in colour. They form a

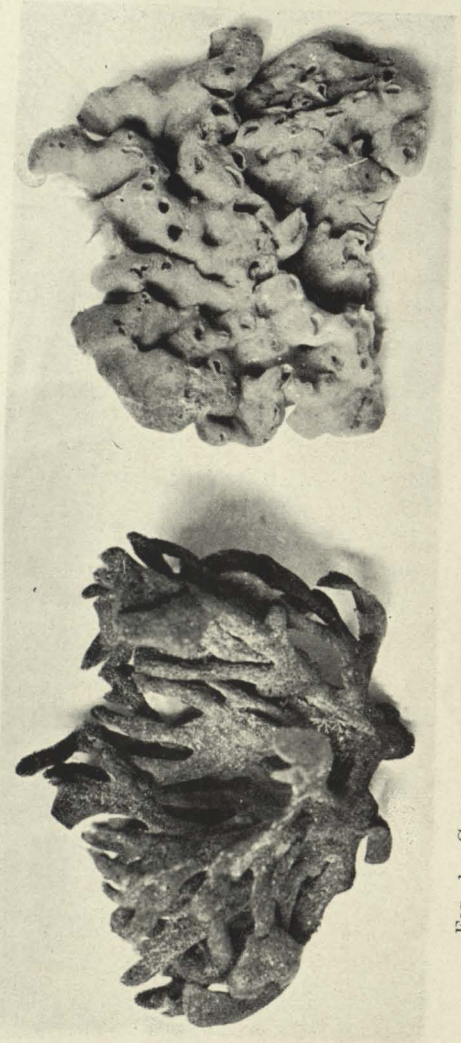

Fig. 2.—Toxochalina oliveri.

Fig. 1.—Clathriodendron rubrum.

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polygonal network, the meshes of which are broken up by finer, irregular fibres of light colour. Spicules are never polyserial in the dermal skeleton, and are more numerous in the secondary fibres. Many lie outside the fibres.

Spicules are all oxea, straight or slightly curved, running somewhat suddenly to a fairly sharp point. Size, 0·05 mm. by 0·004 mm.

This sponge appears to be close to Dendy's *C. clathrata* (IV, p. 151) and to Topsent's *C. similis* (X, p. 481).

A single dry specimen received. "Cast up on Denham Bay beach, Sunday Island; 27/7/08."

Genus TOXOCHALINA Ridley.

Ridley (VII, p. 402) founded the genus *Toxochalina* for "*Chalinidae* with well-developed horny fibre arranged rectangularly. Spicules, a skeleton acerate and a tricurvate acerate ('Bogen') flesh spicule."

One of the Kermadec Island sponges is a *Chalina* in every respect of structure, except that it has minute flesh spicules in the form of oxea. In view of the fact that many of the *Chalininae* have been described from beach-worn specimens, and some of them may yet be found to possess flesh spicules, it seems unwise to establish—at present, at all events—a new genus differing from *Toxochalina* only in the form of its microscleres. I therefore suggest a slight emendation of the generic character to admit sponges differing from *Chalina* in the presence of simple linear microscleres.

Toxochalina oliveri n. sp. Fig. 4, and Plate XXVII, fig. 2.

Sponge attached by the greater part of the lower surface. Oscula prominent, on the summit of rounded elevations on the upper surface, or on the crest of level ridges formed by the concrescence of such elevations. Colour yellowish-buff. Texture firm. Length of specimen, 9·5 cm.; width, 6 cm.; height, 1·5 cm.

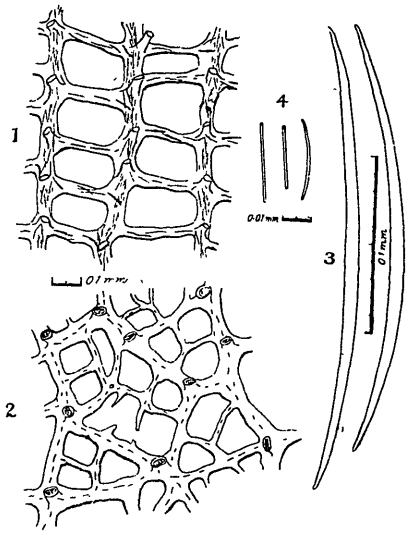

FIG. 4.—*Toxochalina oliveri.*
1. Section of skeleton at right angles to surface. 2. Portion of dermal skeleton. 3. Oxea. 4. Microscleres.

Structure of skeleton: Primary fibres running in parallel or in radiating lines to the surface, connected by the secondary fibres, which form with them and with each other rectangular meshes. The primary fibres contain an uneven strand of oxea loosely and irregularly arranged, most numerous at the nodes. The strand thins out in places to the point of disappearance, but usually it consists of about six series of spicules. Secondary fibres thinner than the primary, containing few spicules, and these not polyserial and not in contact end to end. The general appearance of a section of the skeleton is very like that of *Siphonochalina procumbens* as figured by Dendy (III, pl. 58, fig. 4). In the dermal skeleton the meshes are subdivided by finer fibres (fig. 4, 2).

Spicules: The spicules of the skeleton are slightly curved oxea with bluntish ends. Size, 0·24 mm. by 0·008 mm. The microscleres are minute strongyla, smooth and straight or slightly curved.

The sponge is quite unlike *Toxochalina foliodes* (*Desmacidon foliodes* Bowerbank), reported by Lendenfeld (VI, p. 797) from Thursday Island. That sponge is not in Mr. Oliver's collection.

A single dry specimen received. "Cast up in Coral Bay, Sunday Island; 2/5/08."

Genus CLATHRIA Schmidt.

"*Ectyoninae* of various habit, frequently clathrous. Skeleton a reticulation of fibre, usually with much spongin, containing smooth styli and echinated by spined styli."—Dendy (IV, p. 170).

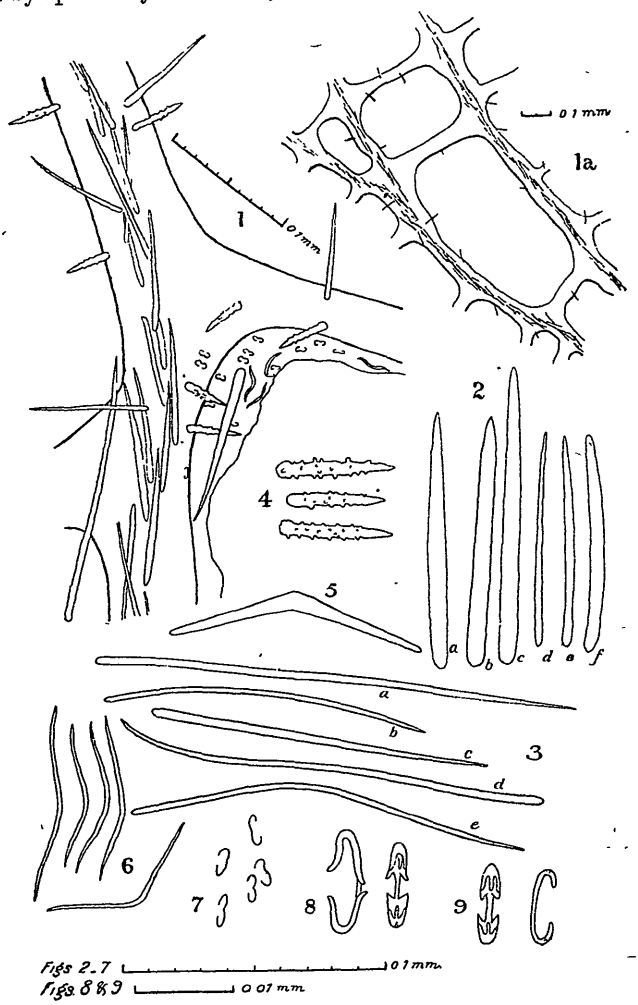

FIG. 5.—*Clathria intermedia.*

1. Portion of skeleton. 1*a*. Portion of skeleton at right angles to surface. 2 *a*, *b*, *c*. Echinating smooth styli. 2 *d*, *e*, *f*. Smooth styli, sometimes echinating, more often in fibre or in sponge-flesh. 3 *a*, *b*, *c*, *d*, *e*. Smooth slender styli of fibre and sponge-flesh. 4. Echinating spined styli. 5. A diact spicule in boiled-out preparation. 6. Toxa. 7, 8. Isochelae. 9. Simple sigma.

A Clathrioid sponge in Mr. Oliver's collection has both smooth and spined echinating styli. I think it best to interpret the generic character as to echination to mean that there must be spined echinating styli and that there may be smooth echinating styli as well, rather than to establish a new genus for this sponge.

Clathria intermedia n. sp. Fig. 5.

Sponge massive, encrusting, harsh to the touch. On the upper surface are numerous low, conical elevations, each terminating in a circular osculum, which is about 3 mm. in diameter.

The single specimen is 5 cm. long, 1·5 cm. high. Colour brownish-grey.

Skeleton showing primary and secondary fibres. The former generally radiate from the walls of the gastral cavity to the surface; the latter connect the primary fibres, giving approximately right-angled meshes. Colour in balsam light amber. The primary fibres are cored by a strand of smooth styli, the strand being from 1 to 4 spicules thick. The apex of the spicules is nearly always directed towards the surface of the sponge, where one or two of these smooth styli may project from the end of the primary fibres. Secondary fibres seldom contain spicules. Both primary and secondary fibres are echinated sparsely by smooth and by spined styli in about equal numbers. Only the base of the echinating spicule is imbedded in the spongin, and the spicules project at almost right angles to the fibre. There is no special dermal skeleton. The sponge-flesh contains abundant smooth styli showing no definite arrangement.

Spicules: Megascleres all styli. (1.) The most characteristic are fairly stout spicules with well-rounded base, the broadest part of the spicule being about one-third of the length from the base. These spicules usually run abruptly to a sharp point. Size, 0·1 mm. by 0·009 mm. The smooth echinating spicules are all of this kind, as are most of these that core the fibres or that lie loose in the sponge-flesh. In the latter position the styles may be blunt, and there are long and slender styli. The most slender have a thickness of about 0·001 mm., and these may be variously curved. (2.) Spined styles occurring as echinating spicules only; somewhat tylote, spines irregularly scattered, directed straight outwards. The spicule tapers to a fairly sharp point. The apical portion of the spicule—about one-sixth of the whole length—is the only part that is always free from spines. Microscleres —(1) Isochelae, palmate. As the spicule lies on its side it presents a distinct indentation on the convex side; this represents the shank of the spicule, along which the palmate expansion does not extend. (2.) Simple sigmata, somewhat larger than the isochelae. These are few in number. (3.) Toxa, slender, sharp-pointed; usually with a well-marked primary curve, and feeble secondary curves.

A single dry specimen. "Cast up on Denham Bay beach, Sunday Island; 27/7/08."

Genus CLATHRIODENDRON Lendenfeld (V, p. 215).

"*Desmacidionidae* with exceedingly large tylostylote megasclera. The spongin fibres of the supporting skeleton contain only few spicules. Echinating spicules spined styli."

Clathriodendron rubrum n. sp. Fig. 6, and Plate XXVII, fig. 1.

External Characters: Sponge erect, branching freely, the branches spreading widely. Branching begins close to the basal disc, and here the branches are thick and in section roundish or oval; above they become flattened and expanded, the ultimate branchings being digitate processes on the margins of these palmate portions. Surface unbroken by conuli; no oscula observable in the dry state. Height of largest specimen, 9·5 cm. Colour of dried specimen reddish-brown, becoming dark red on immersion

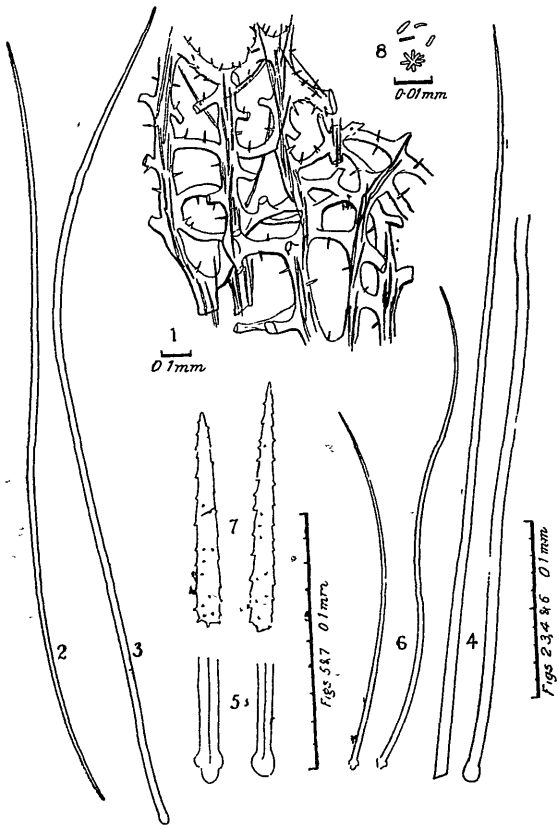

FIG. 6.—*Clathriodendron rubrum.*

1. Section at right angles to surface. 2. Oxeote. 3. Stylus. 4. Tylostyli. 5. Bases of tylostyli. 6. Filiform tylostyli. 7. Spined styli. 8. Doubtful microscleres.

in water. The colouring-matter is in the sponge-flesh, and dissolves out readily; it appears to be due to associated *Algae*. Skeleton tough, and harsh to the touch, becoming soft when wetted.

Skeleton reticulated; spongin abundant; primary fibres generally radiating, and somewhat uneven. The secondary fibres form with them meshes that are oval or polygonal, or often rectangular, the rectangular shape most observable in the younger parts of the sponge. Primary fibres cored more or less abundantly with smooth slender styli and tylostyli,

among which are a few slender oxea. Similar spicules lie in the sponge-flesh, and often parallel to the fibres. Secondary fibres not cored. Both primary and secondary fibres are sparsely echinated by spined styli. On the older surfaces of the sponge the echinating spicules are much more numerous, and many of the styli that lie outside the fibres become closely bound to them.

Spicules: Megascleres—(1.) Smooth styli. These are long and slender, and variously curved. They may be 0·5 mm. long, but seldom exceed 0·005 mm. in thickness. The thickest part of the spicule is usually about one-quarter of the length from the base. Apex sharp. (2.) Smooth tylostyli; very numerous, and presenting much variation. The most characteristic are, on an average, 0·7 mm. long and 0·008 mm. thick; apex sharp, base either simply tylote or with the tylosis not quite terminal (fig. 6, 5). There are also exceedingly slender, hairlike tylostyli, sometimes with a double tylosis (fig. 6, 6). (3.) Oxea: These are not numerous; they are slender and variously curved. Length, 0·045 mm.; usually sharp-pointed. Intermediate forms between these and the smooth styli occur. (4.) Spined styli: These occur as echinating spicules only. They usually taper from near the base to the apex. Size, 0·09 mm. by 0·007 mm. Spined irregularly throughout their length, the spines directed backwards. Microscleres (?): There occur both in the sections and in the boiled-out preparations, numerous irregular rodlike bodies that are possibly microscleres (fig. 6, 8). They are usually straight, and may be scattered or arranged in starlike masses. They seldom exceed 0·005 mm. in length.

Three specimens received, two of them small and battered. Owing to the great length of the characteristic spicules and to the fact that the sponges had been much crushed in transit, the longer spicules are usually broken.

"Cast up on Denham Bay beach, Sunday Island; 29/8/08."

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