REPORT ON SOME DEEP-SEA SPONGES FROM THE INDIAN MUSEUM COLLECTED BY THE R. I. M. S. "INVESTIGATOR." PART I. HEXACTINELLIDA AND TETRAXONIDA (PARS.).*

By the late PROFESSOR A. DENDY, *F.R.S., completed and edited by* M. BURTON, *M.Sc., Assistant in the Department of Zoology, British Museum.*

It is with a very deep regret and a feeling of insufficiency that I find myself called upon to complete the task so ably begun by my friend the late Professor Dendy. I cannot let this occasion pass without expressing my deep sense of obligation to him for his ever-ready advice and help and my admiration for his powers as a tutor and his extremely thorough and careful methods of research. His death occurred at a time when he was about to commence what would probably have proved the most comprehensive and complete survey of the Porifera ever attempted and, as a consequence, his loss as a colleague is incalculable.

Prior to his death, Professor Dendy had completed the descriptions of all but the last four species contained in this report. In deference to his far greater knowledge and experience, I propose leaving the work he had completed exactly as it stood at the time that I commenced the task of completion, except in so far as the minor corrections are concerned.

Although the Sponge-fauna of the Indian Ocean has been very completely investigated, chiefly by Dendy himself, and although the number of species actually recorded for the first time in this report may be comparatively few, it is of considerable interest to be able to study the Sponge-fauna of the deeper parts of these waters. The bulk of the collection belongs to the Hexactinellida and the Astrotetraxonida. The remaining groups are but poorly represented while the Calcarea and the Myxospongida are conspicuously absent.

Euplectella sp.

There is in the collection a very beautiful, completely macerated skeleton of a large *Euplectella*, closely resembling the figures given by Ijima [1901, Pl. II, Fig. 9] of his *Euplectella imperialis* and by Schulze [1904, Pl. IV, Fig. 4] of his *Euplectella* (? *simplex*). The height of the specimen is 330 mm.; the diameter at the bottom is 35 mm. and at the top 60-70 mm. The almost cylindrical tube tapers very gradually from top to bottom. Root tufts and terminal sieve plate are both missing. The dictyonal framework is wonderfully regular, consisting of sub-equidistant vertical strands of soldered spicules, about 4 mm. apart

*The holotypes and most of the remaining specimens will be deposited in the Indian Museum, Calcutta. By kind permission of the Director of the Zoological Survey of India, some paratypes and a few of the specimens of the better known species will be deposited in the British Museum (Natural History).

(in the middle), united by transverse hoops formed by similar strands of soldered spicules arranged at very regular intervals of about 10 mm. The transverse hoops lie inside the longitudinal bands, with which they form a series of rectangles. There is also a double system of more slender diagonal bands lying between the longitudinal and transverse bands and intersecting each other so as to form a series of diamonds. An irregular network of still more slender bands occupies the interspaces between the foregoing, except in the middle of each rectangle, which is left vacant and was doubtless the position of an aperture in the sponge wall during life.

In the complete absence of soft tissues and loose spicules it is impossible either to make an identification or to propose a new specific name.

Register No., Locality, etc., XXIII, Station 303, Arabian Sea, Lat. 20° 5′ 15″ N., Long. 65° 12′ 13″ E., 966 fathoms.

Farrea occa Carter.

[For literature and synonymy *vide* Schulze (1904).]

There are a number of fragmentary specimens of *Farrea* in the collection, some of which (R. N. XI, XXXIX, LVII 1) it is impossible to identify specifically with certainty on account of their macerated condition, but they probably all belong to the same species.

R. N. IX 1, which, though very fragmentary, has the soft parts partially preserved, is undoubtedly *Farrea occa*. R. N. LIV is still more fragmentary, but again a certain amount of the soft parts is present, so that the spiculation can be studied. I find that, in this specimen, the oxyhexasters, which are very numerous, have the terminal rays longer than the main rays, but in spite of the fact that Schulze makes use of this character in distinguishing *Farrea clavigera* from F. *occa*, I cannot attribute specific importance to it, especially as the clavulæ are those of *F. occa*, the characteristic club-shaped forms of *F clavigera* being, so far as I can make out, totally wanting.

Schulze has already reduced the numerous so-called species of this genus to seven, and it seems highly probable that a further reduction will be necessary when we have more knowledge of intermediate forms.

It is worth noting that R. N. LVII 1 was associated with a specimen of *Aphrocallistes beatrix* (R. N. LVII 2), and in one part the *Aphrocallistes* appears to have grafted itself on to the *Farrea* so as actually to form part of the same tube-wall.

Register Nos., Localities, etc., IX 1, Station 201, 296—320 fathoms; XI, Station 204, 180—217 fathoms; XXXIX, S. W. of C. Comorin, Lat. 7° 77′ 30″ N., Long. 76° 54′ 30″ E., 787 fathoms; XLIII, 4, 8 miles west of Interview Is., Andamans, 45—270 fathoms; LIV, Andamans 238—458 fathoms; LVII 1, N. Sentinel Is., Andamans, 250 fathoms.

Aphrocallistes beatrix Gray [1858 B].

[For literature, synonymy and general discussion *vide* Schulze (1904).]

Schulze, in his report on the Indian Triaxonida collected by the "Investigator" (1895), distinguished three species of *Aphrocallistes*

from the Indian Ocean, *viz.*, *A. beatrix*, Gray, *A. bocagei*, Wright (1870 B) and *A. ramosus*, Schulze (1887). These so-called species were evidently all very closely related and it is a relief to the systematist to find that in his Valdivia Report (1904), Schulze has abandoned the attempt to keep them distinct and recognises only two species of the genus, *viz.*, *A. beatrix*, Gray, and *A. vastus*. Schulze (1887).

There are a considerable number of specimens of *Aphrocallistes beatrix* in the present collection, but the species has so often been described and figured that it is unnecessary to do more than record the localities, etc.

Register Nos., Localities, etc., V 3, Station 56; IX 2, Station 201; XVIII, Station 237; XXI, Station 297; XXVI, Station 373; XLII, 1, off Port Blair, Andaman Is., 29th December 1888, 112 fathoms; LVI, Bay of Bengal, 480 fathoms; LVII 2, N. Sentinel Is., Andamans, 250 fathoms; LVIII, 7 miles S. E. by S. of Ross Is., 11th April 1888, 265 fathoms.

Hexactinella minor, n. sp.

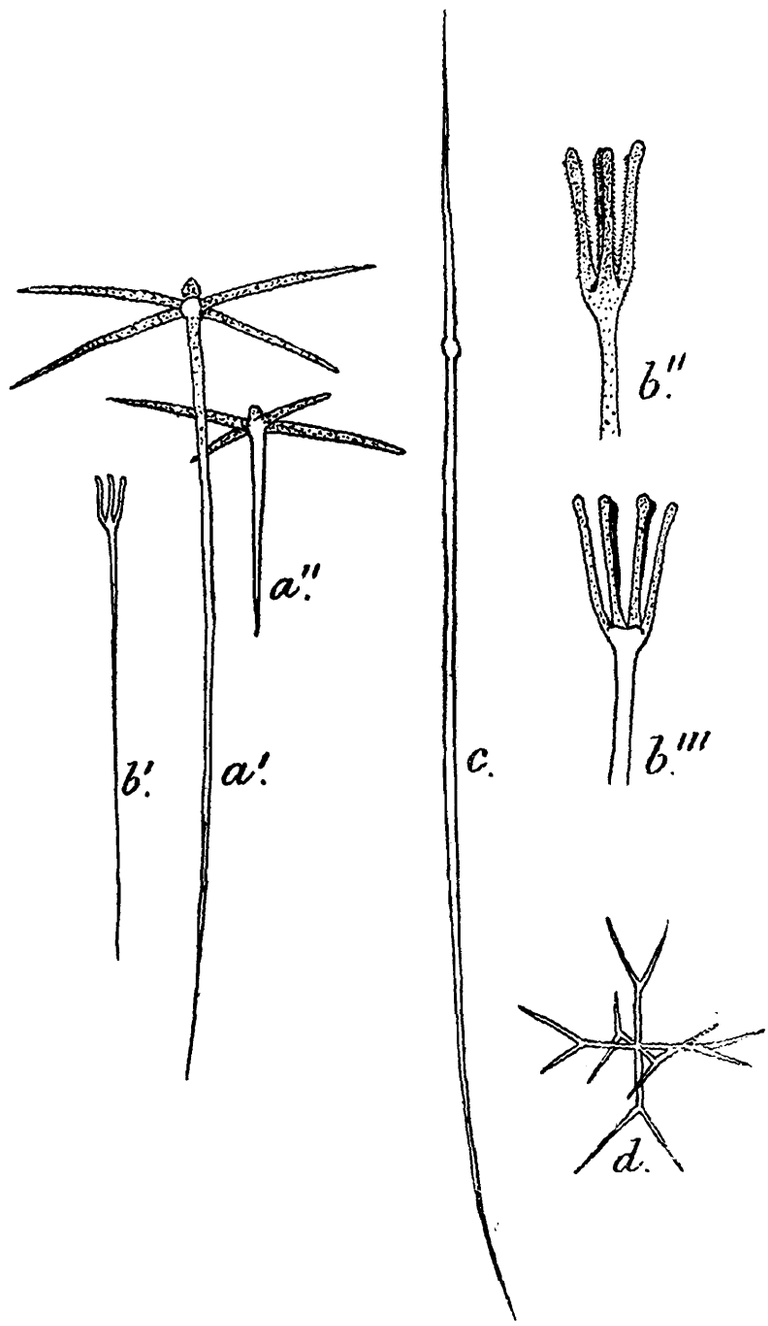
There are three specimens, all from the same locality in the Andaman group, for which it seems to me desirable to propose a new specific name. They evidently belong to Carter's genus *Hexactinella* and come near to Schulze's *Hexactinella tubulosa* (1887) from Japan, but differ from that species in certain particulars concerning both external form and spiculation. The three specimens are not very unequal in size, the two larger ones measuring each about 25 mm. in maximum breadth.

The sponge appears at first sight as a reticulate plate, or lamella, some 3 or 4 mm. in thickness, with scattered, circular vents about 2 mm. in diameter, which may or may not be marginal. Closer examination shows that the structure may be interpreted as an irregular complex of laterally fused tubes with fenestrated walls about 1 mm. in thickness. The fenestrations are usually more or less elongated and about 1 mm. in width. They are separated by trabeculæ of rather greater width, and they may have been closed in life by a dermal membrane, though this seems doubtful.

R. N. XLIII 3, which shows the tubular character more distinctly than the other two, has evidently been attached to some cylindrical object, from which it has been removed; a deep semi-cylindrical groove having been left in the sponge. R. N. XLVI 1, *a* and *b* are more like miniature specimens of Carter's *Hexactinella ventilabrum* (1885c), and each has a suggestion of a short stalk placed very excentrically.

The dictyonal skeleton framework closely resembles that described and figured by Schulze (1887) for *Hexactinella tubulosa*. It consists of a rather irregular network of stout bars, about 0·05 mm. in diameter, with roughened surfaces; with slender, terminally thickened spikes sometimes projecting from the nodes at the dermal and gastral surfaces. This framework grows centripetally by addition of slender-rayed hexacts on its gastral aspect. These are irregularly arranged and the junction of their rays with one another and with the older parts of the skeleton takes place in a very irregular fashion. The slender rays of these hex-

acts appear to be slightly roughened even before they join on to the main framework, but this secondary thickening seems to commence only after such junction has been effected, when it spreads from the already thickened bars first to the tips of the slender rays. The secondary thickening, therefore, affects the skeleton as a whole rather than the individual spicules. If a spicule-ray does not happen to come into



Text-Fig. 1.—*Hexactinella minor*, n. sp.

a', *a''*. Pentacts of the dermal surface × 65; *b'*. Scopula ×65; *b''*, *b'''*. Heads of scopulæ, *b''* four-pronged and *b'''* six-pronged × 280; *c*. Diact × 280; *d*. Oxyhexaster × 280.

contact with any other part of the skeletal framework, that ray remains unthickened long after its fellows have become transformed into stout bars.

The remainder of the skeleton consists of separate spicules which may be classified as follows:—

(1) Pentacts of the dermal surface (*a'*, *a''*); arranged in the usual way; with the four approximately equal rays lying tangentially; the fifth ray directed inwards, sometimes very much longer than the others, but variable; the sixth ray represented by a knob, which is sometimes quite well developed and shaped like a fir-cone, and sometimes sharply pointed. The four tangential rays and the knob are commonly roughened, the fifth ray to a less extent. These spicules vary considerably in size; when fully developed the tangential rays measure about 0·26 mm. by 0·017 mm. There appear to be no pentacts on the gastral surface.

(2) Scopulæ (*b'*, *b''*, *b'''*); arranged radially at both dermal and gastral surfaces; number of prongs variable, up to at least nine; prongs usually roughened and slightly knobbed terminally; shaft smooth or rough, slender, tapering to a fine point. Total length up to about 0·82 mm.

(3) Slender diacts (*c*); arranged radially, at right angles to the two surfaces; very slender; smooth; tapering gradually to a fine point at each end; sometimes with an excentrically placed, subspherical enlargement. These spicules vary in length up to about 0·5 mm. They are very abundant.

(4) Oxyhexasters (*d*); with slender primary rays each bifurcating into two secondaries; secondaries gradually and finely pointed, about equal in length to primaries; all rays quite smooth. Total diameter of spicule about 0·08 mm.

The above account of the spiculation was taken from R. N. XLVI, 1 *a*, which may be regarded as the type specimen.

This species obviously resembles Schulze's *Hexactinella tubulosa*, as already pointed out, but differs in several respects, *viz.*, (1) the tubular constituents of the sponge are much smaller and more completely fused into a plate-like whole; (2) there are no uncinates though these may perhaps be represented by the smooth diacts; (3) the number of prongs of the scopulæ ranges up to at least nine, instead of being restricted to four.

It appears to resemble more closely the Mediterranean species of *Hexactinella* described by Schulze (1900) and considered by him as possibly identical with *H. tubulosa*. It seems quite probable that this Mediterranean species, which is represented so far by very poor material, is identical with that now described from the Andaman Islands.

Register Nos., *Locality*, *etc.*, XLIII, 3, XLVI 1 *a* and *b*, 8 miles W. of Interview Is., Andamans, 45—270 fathoms.

Pheronema sp.

There are two small specimens of *Pheronema* from Station 56, which are so badly macerated as to be unidentifiable. Schulze's *Pheronema raphanus* (1894, 1902), however, was obtained from the Andaman Islands and these perhaps belong to that species. They were in the same tube

as the single specimen of *Hyalonema pirum*, from which they are at once distinguished by their long, laterally projecting diacts and by their somewhat larger size.

Register No., Locality, etc., VI, 2, *a* and *b*, Station 56, between N. and S. Sentinel Is., Andamans, 240 fathoms.

Hyalonema pirum Schulze (1894, 1902) ?

There is a single small, piriform specimen, with a terminal vent, but without the stalk, which may perhaps be identified with Schulze's *Hyalonema pirum*, especially as both came from the neighbourhood of the Andaman Is. Schulze has already pointed out that this "species" may be a young form of *Hyalonema indicum* or some other species.

Register No., Locality, etc., VI 1, Station 56, between N. and S. Sentinel Is., Andamans, 240 fathoms.

Hyalonema nicobaricum Schulze (1904).

This species, represented in the Valdivia collection by a single detached body from the Nicobar Islands, is again represented in the present collection by a similar but smaller specimen found amongst a large number of specimens of *Thenea corallophila* from S. W. of Ceylon. The specimen is much damaged and it is doubtful if any of the real outer surface remains, while the stalk has completely disappeared. The body is rather narrowly conical in shape, about 41 mm. in height, and 22 mm. in diameter across the opening of the funnel. The cavity of the funnel is fairly deep[1] and there is a prominent central cone projecting into it. There is no trace of a terminal sieve-membrane, though it is not impossible that one may have been present during life.

The spiculation agrees very closely with that described and figured by Schulze for the type specimen, but the teeth of the large amphidiscs are less broadly rounded off at the free end than he represents them, and in this respect they approach those of the closely related *Hyalonema schmidti* Schulze (1899) from the east coast of America, though not so sharp as the latter.

Register No., Locality, etc., XXIV 40, Station 333, Lat. 6° 31′ N., Long. 79° 38′ 45″ E., S. W. of Ceylon, 401 fathoms.

Genus **Astroplakina** n. gen.

Plakinidæ with diact, triact, tetract and polyact spicules, the larger ones usually smooth, the smaller forming oxy- or strongyl- asters with roughened rays.

This genus forms a most interesting link between the Homosclerophora (Plakinidæ) and Astrotetraxonida and completely justifies my derivation of the asters of the latter group from the polyacts of the former.

It also throws considerable light upon the systematic position of Sollas's genus *Calthropella*, which that author includes amongst the Pachastrellidæ, in spite of the anomaly afforded by the presence of

[1] It is occupied by a small Ophiuroid.

euasters. We may now derive *Calthropella* from the Plakinidæ through *Astroplakina* and its lack of streptasters and possession of euasters is at once explained.

Astroplakina stelligera n. sp.

This very interesting species is represented by a thin, white crust growing upon the outer surface of the smaller of the two specimens of *Taprobane herdmani* Dendy. Unfortunately it has been dried and nothing can be said of the canal system or histology, but the spiculation of the sponge leaves no doubt as to its being a Plakinid, and it seems to come very near to the genera *Plakortis* and *Dercitopsis*, though sufficiently different from any hitherto known species to warrant generic separation.

I have already pointed out (1921A) the importance of the genus *Dercitopsis* as indicating the starting point in the evolution of the tetraxonid spicule and shown how, in *Dercitopsis minor*, meristic variation in the number of rays leads to the formation of triacts, diacts and pentacts, as well as tetracts, while at the same time increase in size of the diacts points to the future distinction between mega- and microscleres. The pentact spicules, however, were only very rarely met with in *D. minor*.

In *Astroplakina stelligera* we find a much greater range of variation. Not only are pentacts abundant, but the number of rays may be increased up to at least eight, while at the same time the whole spicule diminishes in size and the rays tend to become more and more roughened by small spines, so that the final stage is a typical oxy- or strongylaster with minutely spined rays, such as occurs so commonly amongst the Stellettidæ. All gradations seem to exist between the different sizes of spicules and it is only possible to classify them in accordance with the number of rays. My preparations have been made merely by teasing small fragments of the sponge and show no definite skeleton arrangement.

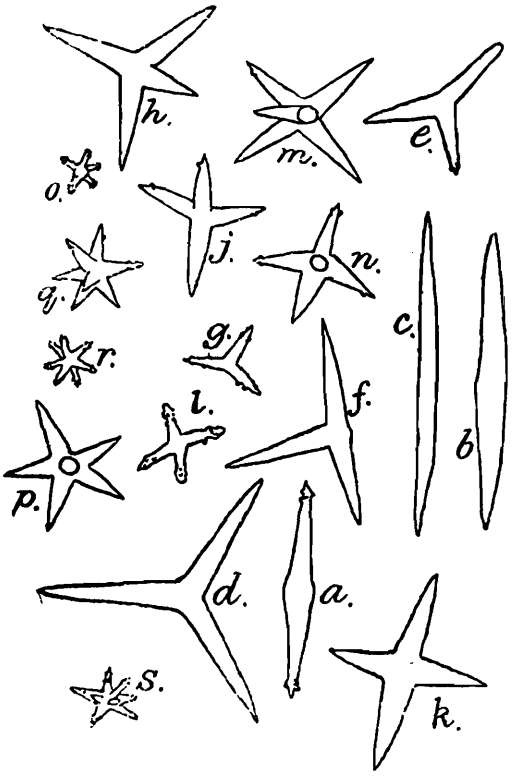
Spicules :—(1) Diacts (*a*—*c*) ; fusiform, sharply pointed at each end, sometimes with a more or less distinct enlargement in the middle (*a*, *b*), sometimes with a few small spines near the apices (*a*). There are also numerous much larger diacts, taking the form of typical oxea, many, if not all, of which belong to the sponge (*Taprobane herdmani*) upon which the *Astroplakina* is growing. Owing to the commingling of the spiculation of the two species it is impossible to say to what size the diacts of *Astroplakina stelligera* may attain. The spicule marked *b* in Fig. 2, measures 0·063 by 0·006 mm. and certainly belongs to the *Astroplakina*, as does *a*, but *c*, which is about the same length but rather more slender than *b*, may belong to the *Taprobane*, though much smaller than most of the oxea of that species.

(2) Triacts (*d*, *e*, *f*, *g*) ; regular (*d*) or irregular (*e*, *f*) ; rays usually sharp-pointed, smooth in the larger forms (*d*), roughened towards the apices in the smaller (*g*), ranging from about 0·03 down to about 0·01 mm. in length.

(3) Tetracts (*h*, *j*, *k*, *l*) ; regular (*h*, *j*) or irregular (*k*, *l*) ; rays ranging from smooth and sharply pointed (*h*, *k*) to roughened at the apices and

bluntly pointed (*l*), and from about 0·021 down to about 0·0063 mm. in length.

(4) Pentacts (*m*, *n*, *o*); ranging from forms with almost or quite smooth rays about 0·017 mm. in length, to minute asters (*o*) with blunted and distinctly roughened rays, the whole spicule only about 0·01 mm. in diameter.



TEXT-FIG. 2.—*Astroplakina stelligera*, n. sp.

a—*c*. Diacts; *d*—*g*. Triacts; *h*—*l*. Tetracts; *m*—*o*. Pentacts; *p*. Hexacts; *q*. *r*. Heptacts; *s*. Octacts.

All figures are magnified 475 times.

(5) Hexacts (*p*); rare, ranging from forms with smooth, medium-sized, sharp-pointed rays, to small asters with rays terminally roughened.

(6) Heptacts (*q*, *r*); rare, only observed as oxyasters with terminally roughened rays.

(7) Octacts (*s*); rare, only observed as an oxyaster with terminally roughened rays.

Register No., Locality, etc., XXXIII, *a*, Station 535, Mergui Archipelago, 65 fathoms.

Thenea corallophila, n. sp.

There are in the collection between thirty and forty specimens of this species, all from the same locality. Many of them are still attached to the broken branches of a dead Madreporarian coral (apparently an Ocutinid) from which the remainder have probably been removed. There is no sign of a root tuft, the attachment to the coral being by slight adhesion. There is usually a single deep poral recess, lined by a fine sieve-membrane and overhung by a broad spicular fringe, and a single oscular recess nearly diametrically opposite to the poral recess and more or less surrounded by a broad spicular fringe. The oscular recess usually shows a number of relatively large vents in its floor but

occasionally exhibits a fine sieve-membrane like that of the poral recess. The poral recess may extend nearly half way round the equator of the sponge (R. N. XXIV 6). In one case (R. N. XXIV 2) there are three quite separate recesses, each lined by a fine sieve-membrane and each surrounded by a spicular fringe, so that it is impossible to tell which may be oscular and wh ch poral. The surface between the recesses is coarsely hispid but the projecting ends of the spicules are practically all broken off and there is a good deal of sand (chiefly Foraminifera) mingled with their remains. A typical specimen (R. N. XXIV 1) measures about 35—40 mm. in diameter. The colour in spirit is light brown. The arrangement of the skeleton is typical. The large dichotriænes are placed radially, with their cladi extended at or near the surface. Closely associated with their stout shafts are the much more slender shafts of the anatriænes whose cladomes usually project far beyond the surface. Long oxea, stout and slender, occur in abundance, but it is difficult to determine their typical position in the sponge. The oscular and poral fringes consist chiefly of stout mesotriænes but there seem to be a few long oxea amongst them. Great numbers of centrotylote microxea are scattered through the ground-substance in the interior of the sponge, along with the other microscleres.

Spicules :—(1) Dichotriænes (*a*, *a'*, *a''*) ; secondary cladi typically much longer than the primaries and gradually sharp-pointed (*a*), but often shortened and knobbed at the extremity (*a'*, *a''*) ; shaft ranging from gradually and sharply pointed (*a'*) to distinctly knobbed (*a''*). These spicules are of very large size ; the cladome may measure as much as 2·46 mm. across with the shaft about 5·8 mm. in length and 0·1 mm. in diameter at the base.

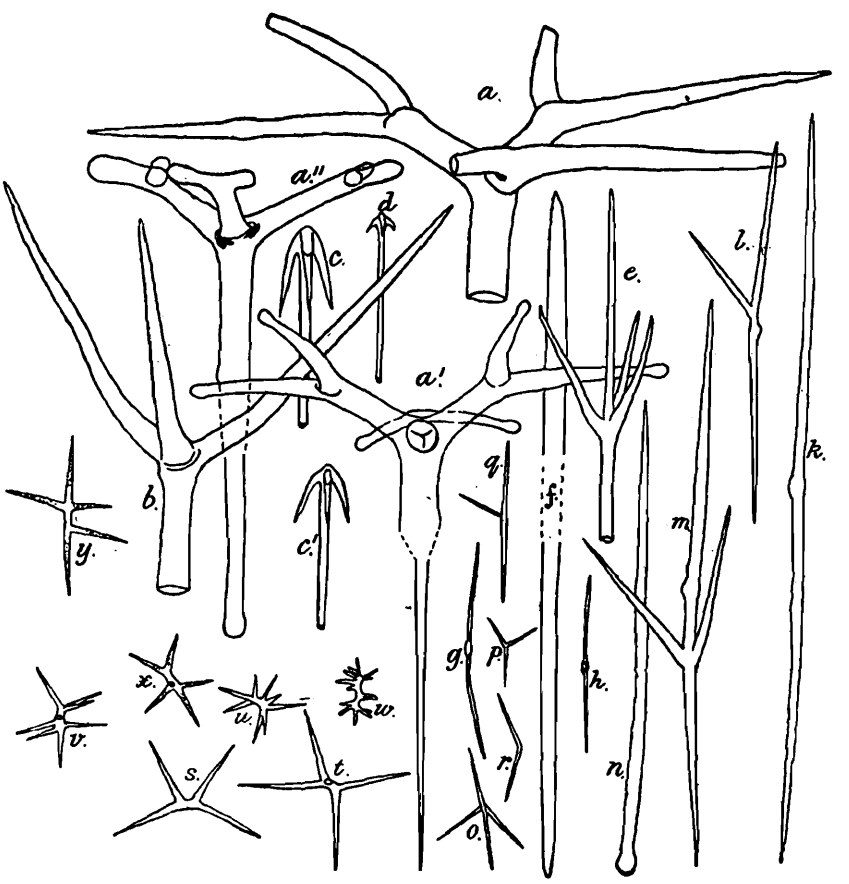
(2) Plagiotriænes (*b*) ; large and stout, with gradually and sharply pointed shaft and cladi ; characteristic of the basal portion of the oscular and poral fringes ; *e.g.*, shaft 3·6 mm. by 0.1 mm., with cladi about 0·6 mm. by 0·08 mm. Sometimes the cladi are directed forwards to such an extent that the spicule might be regarded as a protriæne.

(3) Anatriænes (*c*, *c'*, *d*) ; usually with large cladome, with long, narrow, sharply recurved and gradually and sharply pointed cladi ; shaft usually rounded off terminally, but sometimes drawn out nto a long, slender thread, sharply pointed at the end. In a typical example, with long-drawn-out shaft, the cladi measured about 0·017 mm. in length and the shaft was about 6·8 mm. long by 0·02 mm. in diameter at the proximal end. There are also a few anatriænes with very small cladomes with short but sharply pointed cladi (*d*). The two forms are connected by intermediates.

(4) Mesotriænes (*e*) ; long, stout, sharply pointed at each end ; the three cladi well developed, gradually and finely pointed, sharply turned forwards, only about half as long as the apical continuation of the shaft. Shaft broadest in the middle and tapering gradually to each end, about 8·5 mm. by 0·04 mm., with cladi about 0·275 mm. long. In the poral fringe they may be much longer, up to 17 mm.

(5) Oxea (*f*) ; large and stout, symmetrical or asymmetrical, fairly gradually and sharply pointed, measuring, *e.g.*, about 6·8 mm. by 0·068 mm.

(6) Oxea ; long and slender, gradually sharp-pointed at each end ; measuring, *e.g.*, 4·5 mm. by 0·017 mm. (R. N. XXIV, 7 contains a number of long, slender spicules, sharply pointed at one end but with a well-developed knob at the other, and I have also seen one with a well-developed knob at each end. I think these are most probably abnormal derivatives of the slender oxea. Whether or not they occur in other specimens I am uncertain, but knobbed fragments occur in boiled out preparations of R. N. XXIV, 1 which are almost certainly of the same nature.)



Text-fig. 3.—*Thenea corallophila*, n. sp.

a, *a'*, *a''*. Dichotriænes × 39 ; *b*. Plagiotriænes × 39 ; *c*, *c*^{1}, *d*. Anatriænes × 39 ; *e*. Mesotriænes × 39 ; *f*. Oxea × 39 ; *g*, *h*. Microxea × 39 ; *k*—*m*. Microxea × 168 , *n*. Tylotemonact × 168 ; *p*, *q*, *o*. Triacts and derivatives × 39 ; *r*. Angulate diact, × 39 ; *s*—*y*. Streptasters or dichotriacts × 270.

(7) Microxea (*g*, *h*, *k*, *l*, *m*) ; centrotylote ; straight, curved or angulate ; tapering gradually from the central inflation to each finely pointed extremity ; surface slightly uneven ; size usually about 0·46 by 0·01 mm. (at the central inflation), but very variable and up to at least 0·64 by 0·016 mm. These spicules are doubtless to be regarded as diact derivatives of an original triact, or possibly tetract form. They occasionally exhibit one or two adventitious branches (*l*, *m*), which are evidently of a secondary nature and suggest a possible mode of origin for the so-called mesotriænes. Very rarely a tylote monact reduction form of the microxeote occurs (*n*). The microxea pass into strongly angulate diacts (*r*), from which they differ in having the angle more or less straightened out.

(8) Triacts (*p*, *q*, *o*) of the same order of magnitude as the microxea, but rare and variable; occasionally tetract? (*o*) or polyact?

(9) Dichotriacts (Streptasters) (*s*, *t*, *u*, *v*, *w*, *x*, *y*); very variable in form and size; ranging from comparatively large plesiasters with few rays (*s*, *t*) through metasters (*u*, *v*), to small spirasters (*w*); with abnormal forms such as *x* and *y*. The plesiasters measure about 0·056 mm. and the spirasters about 0·024 mm. in longest total diameter. The rays may be slightly roughened. The study of this and the following species has thrown considerable light on the true nature of these so-called streptasters, the discussion of which must be postponed until the other species in question has been described.

This species exhibits a combination of the characters of two other species from the Indian Ocean described by Lendenfeld (1906) in his Report on the Tetraxonia of the Valdivia Expedition, having the microxea characteristic of *Thenea centrotylota* and the mesotriænes of *T. mesotriæna*, while there is little, if anything, that is distinctive about its external form.

Register Nos., Locality, etc., XXIV, 1—7, etc., Station 333, Lat. 6° 31′ N., Long. 79° 38′ 45″ E., S. W. of Ceylon 401 fathoms.

Thenea andamanensis n. sp.

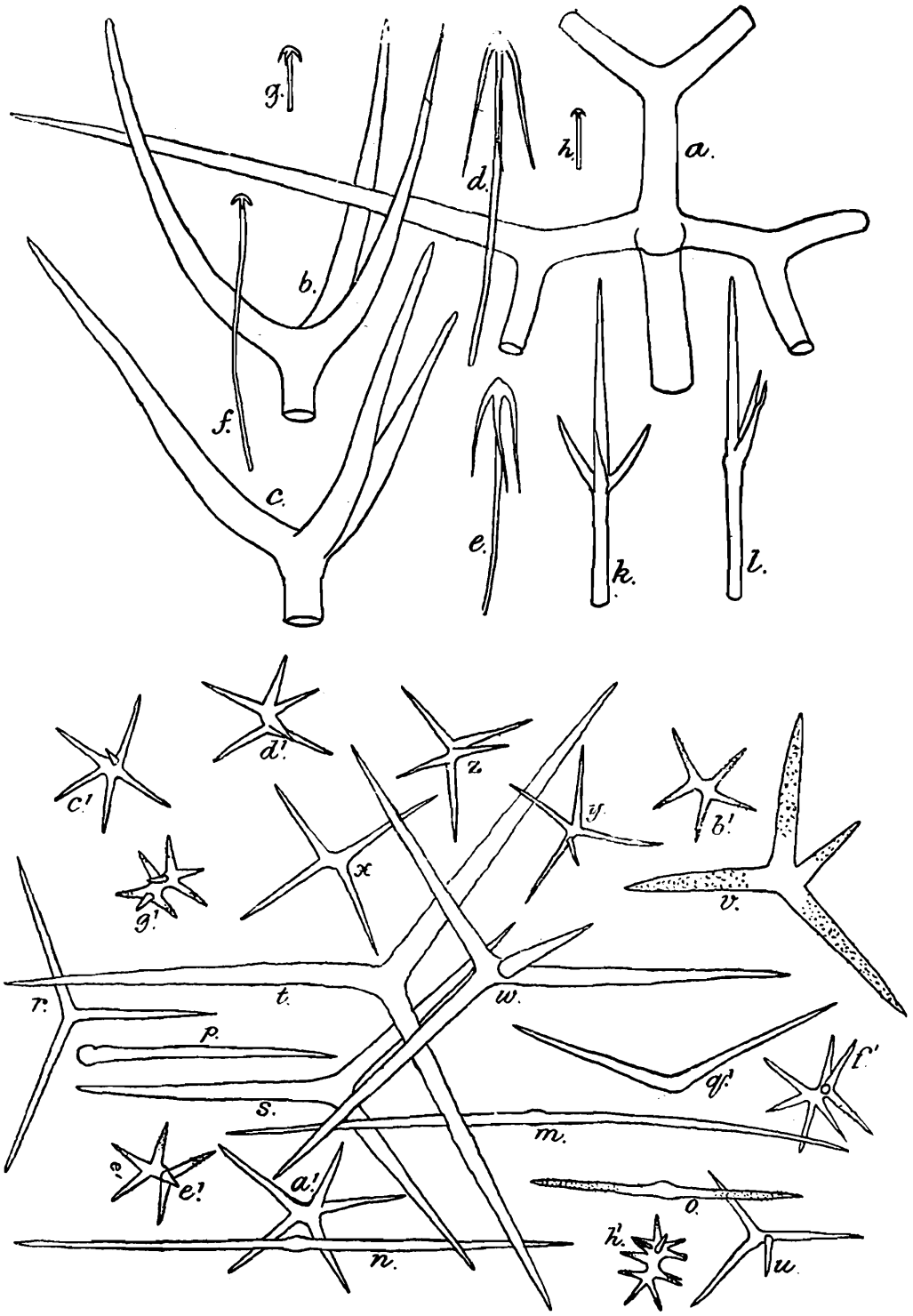
This species is represented by two good specimens, closely resembling one another and from the same Station. In both the upper surface is strongly flattened, the lower less so. In one (R. N. XV, 1) there are indications of a root tuft in the form of a few vertically descending columns of spicules broken-off short. In each there is a deep poral groove or recess extending half way round the sponge on or just above the equator and overhung by a spicular fringe in which the bases of the spicules are imbedded in a thin extension of the upper surface, while the projecting ends are nearly all broken off. This groove is lined, as usual, by the pore-bearing membrane and its lower margin is without a well-developed spicular fringe. Opposite to this groove and also on or just above the equator of the sponge, is a large, oval oscular recess, also lined by a cribriform membrane and overhung by a spicular fringe, but without such a fringe at its lower margin. The maximum diameter of each specimen is about 31 mm. The surface is coarsely but only slightly hispid. The colour is spirit in light greyish brown.

The skeleton is arranged as usual.

Spicules:—(1) Dichotriænes (Pl. 3, Fig. 1, *a*); of the usual type, with short primary cladi and long, slender, gradually sharp-pointed secondaries; shaft gradually tapering to its very slender but bluntly pointed apex. In a typical example the cladome measures about 2·4 mm. across and the shaft about 4·25 mm. in length by 0·085 mm. in diameter at the base. I have found no knobbed forms of these spicules, such as occur in *Thenea corallophila*.

(2) Protriænes (*b*, *c*); large and stout; cladi usually strongly turned forwards (*b*), more rarely approaching the plagiotriæne condition (*c*); the cladi are as a rule gradually and fairly sharply pointed, but sometimes knobbed; the shaft usually tapers gradually away to a very slender apical portion which ends bluntly, but it may be greatly abbre-

viated and terminate in a large knob; in a typical example the shaft measures about 6·2 by 0·085 mm. (at the base), and the cladi about 0·8 by 0·068 mm. These spicules are abundant in the basal portions of the oscular and poral fringes. They are evidently homologous with the large " plagiotriænes " of *Thenea corallophila.*



TEXT-FIG. 4.—*Thenea andamanensis*, n. sp.

a. Dichotriænes × 52; *b*, *c*. Protiænes × 52; *d*, *e*. Large anatriænes × 52; *f*.—*h*. Small anatriænes × 52; *k*. Mesotriænes × 52; *m*.—*o*. Microxea × 360; *r*—*t*. Triacts × 360; *u*—*z* and *a'*—*g'* × 360.

(3) Large anatriænes (*d*, *e*); with very long, slender, finely pointed and sharply recurved rays, running back almost parallel with the shaft,

and measuring, say, about 0·3 by 0·013 mm. The shaft is long and very slender, but I have never seen it unbroken so can say nothing of its mode of termination nor exact length, though I have measured it up to nearly 8 mm.

These spicules are distinctly scarce.

(4) Small anatriænes (*f*, *g*, *h*); with short, slender, bluntly ended shaft and very small, sharp cladi. The cladi are often reduced in number and the entire cladome may be represented by a mere knob. These spicules are abundant on the upper surface of the sponge, from which the cladomes project freely. They appear to form quite a distinct category from the large anatriænes and there are few, if any, intermediates. In a typical example the shaft measures about 0·6 by 0·009 mm. and the cladome about 0·05 mm. across.

(5) Mesotriænes (*k*); often reduced to mesodiænes (*l*); of large size; apical prolongation of shaft 2—3 times as long as the cladi; ends of shaft and cladi gradually and sharply pointed. These spicules are probably most abundant in the oscular and poral fringes, but they are nearly all broken short. A typical example measures about 8·0 by 0·034 mm., with cladi about 0·17 mm. long. Probably much larger examples occur in the fringes.

(6) Large, stout oxea; gradually and fairly sharply pointed at each end; measuring, say, about 7·6 by 0·068 mm. There are also some long and slender oxea, but it is difficult to find them intact, and I doubt whether they can be regarded as belonging to a distinct category.

(7) Microxea (*m*, *n*, *o*); centrotylote; straight, curved or angulate; tapering gradually from the central inflation to each finely pointed extremity; surface very slightly uneven; occasionally minutely spined (*o*); size usually about 0·16 by 0·005 mm. (central inflation) seldom more. Very rarely a tylote monact reduction form (*p*) occurs. The microxea pass into strongly angulate diacts (*q*), from which they differ in having the angle more or less straightened out.

(8) Triacts (*r*, *s*, *t*); with long, slender, gradually sharp-pointed rays, nearly equal in length and more or less in one plane, and rather variable angles. Size very variable; in a typical case the rays measure about 0·092 by 0·006 mm.

(9) Dichotriacts (streptasters) (*u*, *v*, *w*, *x*, *y*, *z*, *a'*, *b'*, *c'*, *d'*, *e'*, *f'*, *g'*); very variable in form and size, ranging from comparatively large plesiasters (*u*, *v*, *w*, *x*, *y*, *z*, *a'*, *b'*) with four or five rays; through metasters (*c'*, *d'*, *e'*, *f'*, *g'*) with six to eight rays, to small spirasters (*h'*) with purhaps twelve or more rays and measuring only about 0·028 mm. in maximum diameter. The rays of these spicules may be minutely spined.

This species is evidently closely related to *Thenea corallophila*, but appears to be sufficiently distinct to merit recognition. Amongst the differentiating characters the chief seem to be the presence of a root-tuft, the presence of the minute, short-shafted surface anatriænes, the much greater abundance of the larger triacts and dichotriacts and the smaller size of the microxea.

Register Nos., Locality, etc., XV, 1, 2, Station 234, Lat. 13° 15′ 30″ N., Long. 93° 26′ E., Andaman Sea, 498 fathoms.

Genus **Pœcillastra,** Sollas.

Sponge lamellar, with inhalant and exhalant surfaces; not corticate. Megascleres oxea (and abnormal derivatives), calthrops and triænes of various kinds (usually short-shafted and often very irregular). Microscleres streptasters (plesiasters to spirasters) and sometimes microxea.

I have on a former occasion (1916c) followed Lendenfeld (1903) in merging Sollas's genus *Pœcillastra* in *Pachastrella*. Further experience has convinced me that Sollas was right in separating the two. The chief distinctions lie in the plate-like form of *Pœcillastra*, with its inhalant and exhalant surfaces, and in the presence in *Pachastrella* of characteristic microrhabds which are absent in *Pœcillastra*.

Pœcillastra tenuilaminaris Sollas.

[For Literature and Synonymy *vide* Dendy (1916c.)].

There are three specimens in the collection which agree very closely with Sollas's original type except that the metasters give place to spirasters at the surface of the sponge. This fact seems to justify Lendenfeld's [1903] identification of *P. tenuilaminaris* with *P. crassiuscula* Sollas, and indeed it is probable that several of the species of "*Pœcillastra*" described by Sollas will have to be united. The thin plate-like form of the present specimens, however, is perhaps of no less specific significance than the very shadowy distinction between metasters and spirasters, and I propose to retain the name *tenuilaminaris* for the present.

The best specimen (R. N. XXXII, 6) is a much folded and to some extent anastomosing lamina; the plate itself only about 2—3 mm. in thickness, but the entire specimen, even in its present evidently reduced condition, measuring about 40 by 36 by 20 mm.

Previously known distribution; Japanese Seas (Sollas, Lebwohl); Amirante, Indian Ocean (Dendy).

Register Nos., Localities, etc., XXXI, 6, Station 532, Mergui Archipelago, Lat. 12° 15′ 20″ N., Long. 97° 10′ 10″ E., 62 fathoms; XXXII, 6, Station 535, Mergui Archipelago, Lat. 13° 4′ 30″ N., Long. 96° 44′ E., 65 fathoms; XLVI, 4, 8 miles west of Interview Is., Andamans, 45—270 fathoms.

Pœcillastra eccentrica, n. sp.

This species is represented, in the first place, by parts of a single specimen (R. N. V 1), broken, apparently in the dredge. The habit is remarkably Phakellia-like. The largest piece is a thin, almost flat plate, about 3 or 4 mm. thick, with broadly rounded, slightly indented margin of about the same thickess and without marginal vents. It measures about 43 by 25 mm. superficially. The next largest fragment is squarish, about 17 mm. each way, and attached to a calcareous organism of doubtful nature which probably formed the support of the entire sponge. The two surfaces are not very different, but one is rather smoother than the other and more distinctly marked with numerous small, rounded, closely set areas, each only about 0·5 mm. in diameter. These areas mark

the ends of narrow canals which seem to run through from surface to surface exactly as in *Phakellia*. Remains of a delicate, minutely reticulate, probably pore-bearing dermal membrane, closing the ends of these canals, are still visible. Similar minute, probably pore-bearing areas are recognisable on the other side also, but it is impossible to say which side was inhalant and which exhalant. The texture of the sponge is friable, crumb-of-bread-like, but towards the margin it tends to become radially fibrous in places owing to the presence of bundles of long oxea. Both surfaces, and also the margin, are slightly hispid from the projection of the ends of large spicules. The colour in spirit is light yellowish brown.

A second specimen (R. N. XLIX) is a plate-like fragment measuring about 22 by 14 mm. and about 2 mm. thick. The remainder of the description is taken from R. N. V 1.

There is no cortex but only a thin dermal membrane. The mesoglœa is gelatinous-looking and transparent, though coarsely granular on account of the numerous cells and nuclei irregularly scattered through it.

The canal system is lacunar and the flagellate chambers are subspherical and measure up to about 0·04 mm. in diameter; but they are often much smaller, probably owing to contraction. Their openings have not been made out but they are almost certainly eurypylous.

The skeleton is very confused and irregular, but it is easy to make out, in carefully cut sections, that the large triænes typically have their cladi extended paratangentially, at or near the surface, while the calthrops are characteristic of the interior, and the oxea tend to be directed towards the surface, singly or in bundles. This arrangement is especially distinct at the margin of the sponge-plate, where the triænes are most abundantly developed. Here also one finds, very irregularly arranged, loose bundles of very long and slender oxea, much more slender than the ordinary forms.

Spicules.—(1) Calthrops (*a*—*c*); regular or irregular; rays straight or bent, sometimes reduced to rounded stumps, rarely forked, measuring up to about 1·0 by 0·076 mm.

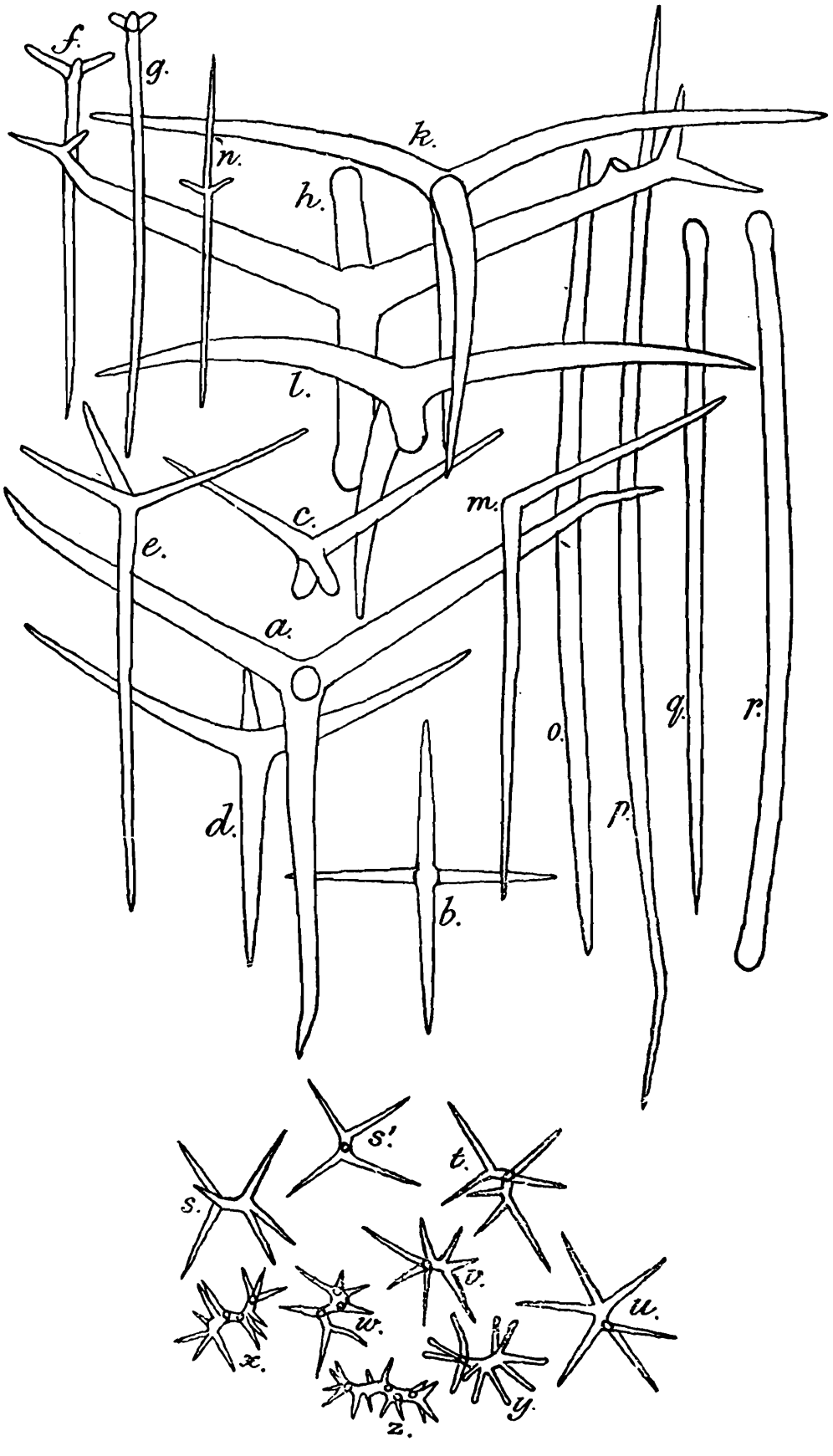
(2) Triænes (*d*—*l*); extremely variable in size and form; long or short-shafted, the long-shafted ones smaller; rays often reduced to rounded stumps, sometimes forked; cladi sometimes recurved; ranging in size up to about the same as the calthrops. Abnormalities such as a mesodiæne ( ) and a plagiomonæne (*m*), occasionally occur.

(3) Oxea (*o*, *p*); fully grown specimens measure up to about 4·2 by 0·055 mm.; they are more or less crooked and gradually and sharply pointed at each end. These are the typical and most abundant oxea, but from these we get a range of sizes down to about 0·42 by 0·013 mm. There are also the very long and much more slender oxea referred to in the description of the skeleton but these always seem to be broken off at one or both ends, so that it is impossible to obtain measurements of the length.

(4) Styli and Tylostyli (*q*), evidently abnormal derivatives of the large oxea, and only occasionally met with.

(5) Amphitylote (*r*); another abnormal derivative of the large-oxeote, only once observed.

(6) Plesiasters, passing into spirasters (*s*—*z*). In the plesiaster (*s*—*v*) the rays are long, slender, gradually and sharply pointed; in the spiras-



Text-Fig. 5.—*Pœcillastra eccentrica*. n. sp. *a*—*c*. Calthrops × 50; *d*—*l*. Triænes × 50; *o*—*p*. Oxea × 50; *q*. Styli and tylostyli × 50; *r*. Amphitylote × 50; *s*—*z*. Plesiasters passing to spirasters × 450.

ters (*w*—*z*) the rays are shorter and more numerous and may be truncated, or even slightly tylote. The plesiasters have a maximum total diameter of about 0·023 mm.; the spirasters are decidedly smaller.

This species differs from all other species of the genus known to me in the absence of the very characteristic microxea, unless, indeed, the smallest oxea observed (0·42 by 0·013 mm.) are to be regarded as such. These small oxea, however, are comparatively rare and do not exhibit any roughening of the surface.

Register Nos., Localities, etc., XLIX, Andamans, 130—250 fathoms; V, 1, Station 56, between N. and S. Sentinel Is., Andamans, 220—240 fathoms.

Stelletta trichotriæna, n. sp.

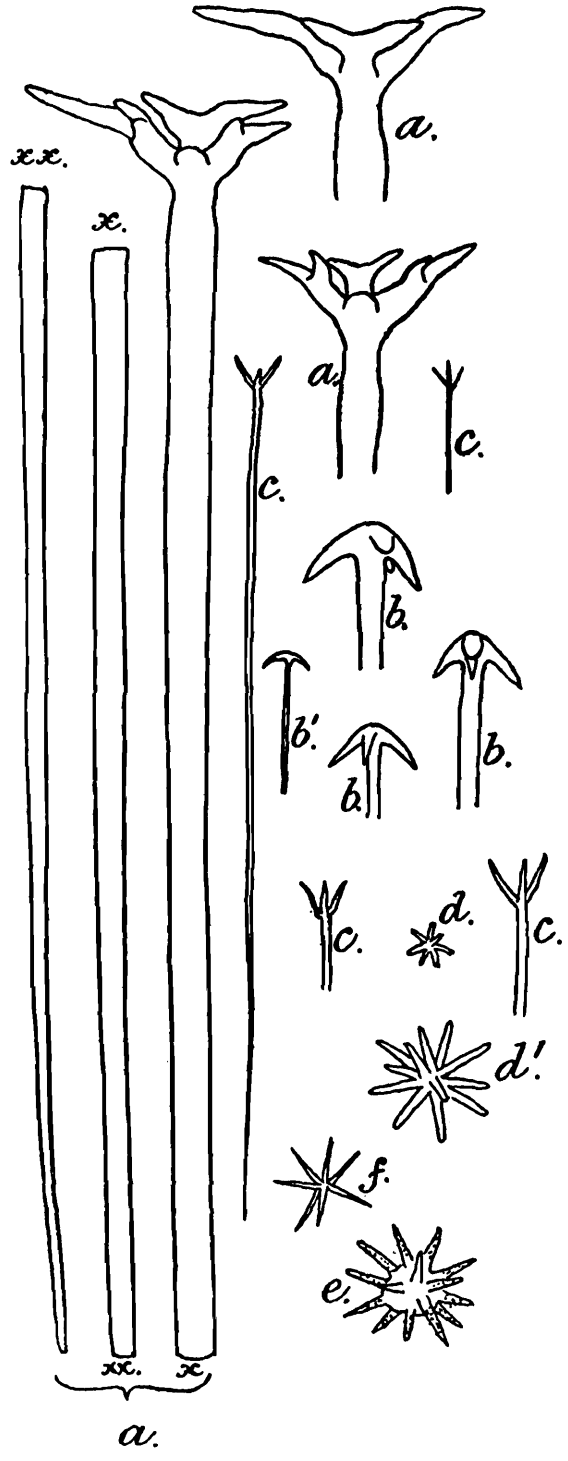
The sponge is spherical, or nearly so, the specimens varying in size from that of an ordinary pea to about 25 mm. in diameter. The surface appears characteristically smooth and naked to the eye, but under a lens looks as if it had been thickly peppered over with small dark specks. These specks are the optical sections of the shafts of the large dichotriænes, lying in the centres of the cladomes. They only appear dark when viewed along the axis of the shaft. The surface is characteristically harsh to the touch, but not visibly hispid. There are no visible openings that can be regarded as natural, but the sponge very readily splits in a radial direction. The texture is compact and hard, the colour in spirit pale greyish yellow.

The following description of the anatomy is taken from the largest specimen (R. N. XXVII, 1), which may be regarded as the type.

The ectosome is about 1·7 mm. thick. It is composed of a thin outer and a very thick inner layer, separated by a very thin and ill-defined fibrous layer. The outer layer, about 0·17 mm. thick, is little more than a system of radially arranged membranes separating the irregular sub-dermal cavities, and is bounded externally by the thin, pore-bearing dermal membrane supported by the cladomes of the dichotriænes. The inner layer, about 1·5 mm. in diameter, is collenchymatous, consisting of a gelatinous matrix containing numerous stellate cells, but it is reduced almost to a network by the very strongly developed system of large ectosomal canals, partially subdivided by numerous sphincter membranes. The choanosome contains similar large sphinctrate canals, arranged more or less radially.

The arrangement of the skeleton is perfectly typical. It consists of dense bundles of triænes and oxea radiating from the centre of the sponge to the surface. Nearly all the triænes have their cladomes either actually at or just beneath the surface, but those of the slender protriænes commonly project freely, though they are now nearly all broken off short, so that the surface is no longer hispid. The larger anatriænes are only moderately numerous and their cladomes lie just below the thin outer layer of the ectosome. The thin, hair-like anatriænes (trichotriænes) are so slender, and their cladomes are so minute, that they are quite inconspicuous even under moderately high powers of the microscope. In thin radial sections they may be seen running in wisps through the ectosome, with their cladomes lying near the surface.

Spicules.—(1) Dichotriænes (Text-fig. 6 *a*); with very long, straight or slightly curved shaft, tapering very gradually to a very slender apex and characteristically constricted just beneath the cladome. Primary cladi short, stout, forwardly directed; secondaries very variable, even in the same individual spicule; usually about the same length as the primaries, conical and more or less sharply pointed, but may be longer



Text-Fig. 6.—*Stelletta trichotriæna* n. sp. *a*. Dichotriænes × 65; *b*. Anatriænes × 65; *c*. Protriænes × 65; *d*, Minute strongylasters × 620; *e*. Sphæroxyasters × 620; *f*. Oxyasters × 620.

or shorter, rounded off at the end or reduced to mere knobs, more or less obsolete. A well-developed specimen has a shaft 6·6 mm. in length

by 0·068 mm. in diameter, just below the constriction, and a cladome only about 0·44 mm. across.

(2) Anatriænes :—

(*a*) of ordinary form and size (*b*) ; with stout fairly sharply recurved, sharply pointed cladi and long, slender shafts tapering very gradually to hair-like fineness. A typical example measures about 8·5 mm. in length, with the cladome 0·1 mm. across. Intermediate sizes (*b'*) between this and the trichotriænes occur.

(*b*) Trichotriænes; with very long and excessively slender shaft and very minute cladome, only about 0·004 mm. in diameter, or even smaller, sometimes reduced to a minute knob. In boiled out preparations these spicules may appear, even under a high power of the microscope, as a densely tangled mat of fine hairs.

(3) Protriænes (*c*) ; with long, slender shaft, tapering gradually to a finely pointed extremity, and three short, forwardly directed cladi. The shaft may measure about 5·4 by 0·017 mm. and the cladi about 0·085 mm. in length.

(4) Oxea. Straight or nearly so and gradually and sharply pointed at each end ; measuring about 5·0 by 0·068 mm.

(5) Minute stronglylasters (*d*); characteristic of the dermal membrane, where they are very abundant ; with about ten or twelve short truncated rays; total diameter about 0·006 mm. These pass through larger, many rayed strongylasters (*d'*) into (6).

(6) Sphæroxyasters (*e*) ; with distinct centrum and minutely roughened, sharply pointed rays ; total diameter about 0·02 mm. These are rare. I have found hem near the junction of the outer and inner layers of the ectosome.

(7) Oxyasters (*f*) ; without centrum ; with comparatively few, fairly long, slender, tapering, sharply pointed rays. Smaller than (6) ; measuring up to about 0·016 mm. in diameter. These occur in the inner portion of the ectosome and in the choanosome, but they are not abundant.

This species evidently comes very close indeed to Thiele's *Stelletta validissima* from Japan (1898). The agreement in spiculation is indeed remarkable. Both pecies have the characteristic trichotriænes but the sphæroxyasters arenot mentioned for the Japanese sponge, though it seems very probable that they might be discovered by further search. A much more striking difference seems to be the presence, in *S. validissima* of a thick investment of foreign matter entangled in the projecting ends of protriænes, but this seems to be easily stripped off and then the sponge apparently resembles our species in external appearance. It may be necessary to unite the two species when further evidence is forthcoming.

Register Nos., Locality, etc., XXVII, 1—4, Station 385, Arabian Sea, Lat. 16° 40′ N., Long. 74° 22′ E., 630 fathoms ; XLV, Andamans, 271 fathoms.

Stelletta longicladus, n. sp.

The single specimen is irregularly ovoid in shape, about 14 mm. in height by 10 mm. in transverse diameter. The surface is for the most part smooth, but slightly hispid in places, especially at one end, where the hispidity may possibly represent the remains of a root-tuft. The other (? upper) end is somewhat narrower and bears a small aperture which may represent a vent, but this is doubtful. The texture is firm and compact; the colour in spirit light brown.

The ectosome is about 0·76 mm. thick, extremely cavernous, with little if any fibrous tissue. The skeleton is typical, consisting of radially arranged bundles of triænes and oxea; not very dense. The cladomes of the large dichotriænes are spread out just beneath the dermal membrane, roofing over the large ectosomal cavities. The cladomes of a few large anatriænes lie at the same level, while hair-like trichotriænes project here and there from the surface.

Spicules.—(1) Dichotriænes (*a*, *a'*); with long and rather slender shaft, tapering gradually to a narrow but blunt apex; primary cladi short, secondaries very long and rather slender, gradually and sharply pointed; bent back from the forwardly turned primaries so as to lie in a plane at right angles to that of the shaft. In a typical example the shaft measures about 2·4 by 0·04 mm.; the primary cladi about 0·12 by 0·034 mm., and the secondaries up to 0·42 mm. in length, being more or less unequal among themselves.

(2) Anatriœnes (*a*); of ordinary form and size (*b*); with rather short stout, sharply pointed cladi, and long, slender shaft diminishing in size from the cladome to hair-like dimensions but gradually enlarging again towards the apex, which is bluntly rounded off. All the specimens in my boiled out preparations have the shaft broken, but both ends occur in abundance. The most complete has the cladome measuring 0·1 mm. across (rather small) and the shaft (broken off at the end) 4·0 mm. in length.

(*b*) Trichotriænes (*b'*); with very minute cladome, only about 0·017 mm. in diameter, and very slender, hair-like shaft.

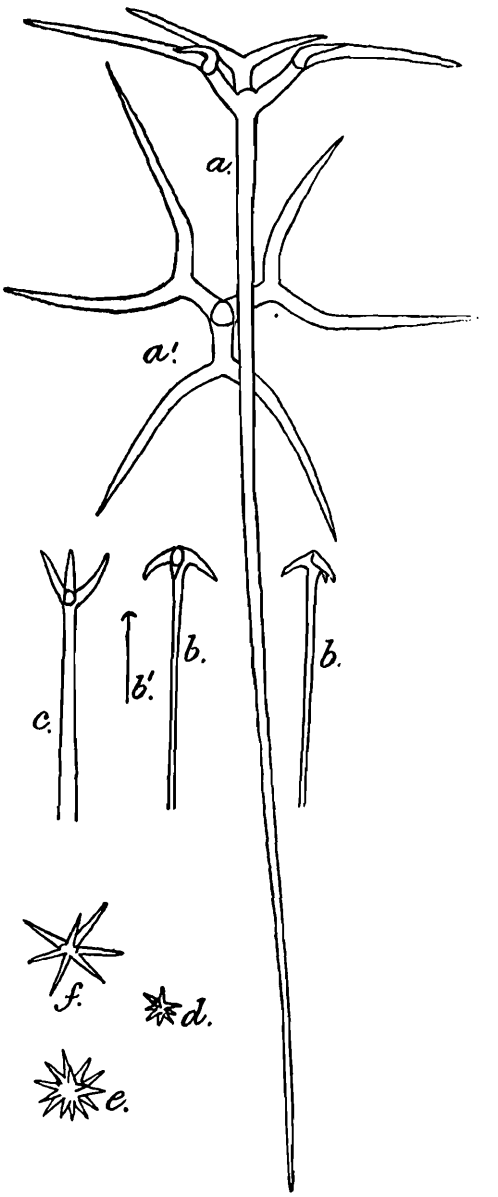
(3) Protriænes (*c*); these occur chiefly in the "root-tuft." The shaft is very much stouter than of the antriænes. The cladi are rather short and stout, gradually and sharply pointed. I have not been able to find a specimen with unbroken shaft; the most complete has a shaft measuring about 4·7 by 0·038 mm. (the thickest part being at a long distance from the cladome, after which it narrows again), and the cladi about 0·13 by 0·025 mm.

(4) Oxea; rather slender, slightly curved, fusiform, tapering very gradually to very narrow but not very sharp points, measuring, say, about 3·2 by 0·034 mm.

(5) Minute oxyasters or spheroxyasters (*d*); characteristic of the dermal membrane, where they are very abundant; with numerous short, sharply pointed rays; total diameter about 0·008 mm.

(6) Larger spheroxyasters (*e*); similar to the above but of about twice the diameter; characteristic of the ectosome and passing, by diminution in number and increase in length of rays into

(7) Large oxyasters (*f*); with no centrum and long, slender, sharply pointed rays varying greatly in number (usually about seven, but diminishing to as few as two); very abundant in the choanosome; total diameter about 0·024 mm. when there are about seven rays but up to 0·05 mm. when there are only three rays.



TEXT FIG. 7.—*Stelletta longicladus*, n. sp.

a, *a'*. Dichotriænes × 52; *b*. Anatriænes × 52;
b'. Trichotriæne × 52; *c*. Protriæne × 52;
d. Minute oxyaster or sphæroxyaster × 520;
e. Larger sphæroxyaster × 520; *f*. Large oxyaster × 520.

This species is evidently closely related to *Stelletta trichotriæna*, differing chiefly in the long, slender cladi of the dichotriænes, but also in the characters of the asters.

Register No., Locality, etc., XII., Station 217, Arabian Sea, Lat. 6° 56′ 56″ N., Long. 72° 53′ 30″ E., 459 fathoms.

Stelletta clavosa Ridley.

Stelletta clavosa Ridley (1884 B.)
Myriastra clavosa Sollas (1888 A)
Myriastra clavosa var. *quadrata* Sollas (1888 A)
Myriastra toxodonta Sollas (1888 A)
Myriastra clavosa Kieschnich (1896)
Myriastra clavosa Topsent (1897 A)
Myriastra clavosa Kieschnick (1898)
Stelletta clavosa Lindgren (1898)
Myriastra clavosa Dendy (1905)
Stelletta clavosa Lendenfeld (1903 B)
Stelletta clavosa Lendenfeld (1906)

This species is widely distributed in the Western Tropical Pacific and Eastern Indian Ocean as far as Ceylon. I have to record, in the present collection, a single typical specimen from the Andamans. The specimen is subspherical, about 10 mm. in maximum diameter, with a single oval vent in the middle of a concave depression on the upper surface.

Register No., Locality, etc., LV 3, off Cinque Island, Andamans, 170—120 fathoms.

Stelletta hæckeli (Sollas).

Pilochrota hæckeli Sollas (1888)
? *Stelletta ternatensis* Thiele (1900)
Stelletta hæckeli Lendenfeld (1903)
Pilochrota hæckeli Dendy (1905)
Myriastra (*Piloc'rota*) *hæckeli* Dendy (1916 A)

The single specimen is almost spherical, about 6 mm. in diameter, with no visible vent. There are a few small grains of sand attached to the surface at one pole. The surface is rather rough, almost like that of a *Dona'i* on a small scale. Texture firm and compact. Colour in spirit light grey. There is a tough, fibrous cortex and the skeleton arrangement is quite normal.

The spiculation differs in certain particulars from that of the Indian Ocean specimens previously examined and described by me. In the first place there are none of the curiously abnormal anatriænes with shortened rays, culminating in spheres, while, in the second place, there are some very remarkable monstrous forms resembling very closely those figured by Thiele (1900) in his *Stelletta ternatensis* (Pl. II, Fig. 5 *d-f*). These spicules have one end thickened and club-shaped and the other drawn out to a slender apex. On the thickened end are from one to three very irregularly developed hooks, resembling the cladi of an anatriæne. Thiele, indeed, regarded these spicules as abnormal anatriænes, but there are two reasons why I think it necessary to regard them as derived from oxea. In the first place the thickened end, bearing the hooks, is usually (but not always) turned inwards towards the centre of the sponge. In the second place I have found an oxeote spicule, fusiform and pointed at each end (though rather irregular in shape) with a similar hook-like projection in the middle.

Were it not that these spicules are, like the abbreviated anatriænes above referred to, obviously abnormal and at the same time very variable, I should be strongly inclined to regard them as specifically characteristic of *Stelletta ternatensis*, which in other respects closely resembles *S. hœckeli*. Such a view would be strengthened by the fact that they also occur in a specimen from Ceylon (Brit. Mus. Coll. 82,8,2,5) identified by Mr. Maurice Burton as *Stelletta hœckeli*, though I have been unable to find them in my own preparations of specimens from Ceylon and Okhamandal. It is certainly remarkable that such characteristic abnormalities should occur in specimens from localities as widely separated as Ternate, the Andamans and Ceylon.

The entire question of the relationships of *S. hœckeli* is a very difficult one and the available material is as yet by no means sufficient to settle it. Lendenfeld (1906) makes some suggestions on the subject that are worth consideration.

Register No., Locality, etc., XLVI, 7, eight miles West of Interview Island, Andamans, 45—270 fathoms.

Geodia ramodigitata Carter 1880.

Geodia ? ramo igitata Sollas 1888 B.

Geodia ramodigitata Dendy 1905.

The six specimens vary but little, except in shape and size, from those described by Dendy (l.c.). They are mostly spherical or nearly so. The spiculation agrees almost exactly.

Previously known distribution :—G. of Manaar, Ceylon (Carter ; Dendy).

Registered No., Locality, etc., XX, 1—6, Persian Gulf, Lat. 26° 20′ N. Long. 53° 54′ E, 53 fathoms.

Donatia repens (O. Schmidt).

(For synonymy *vide* Burton 1924.)

The two specimens consist of a spherical body, about 10 mm. in diameter, which is mounted on a slender stalk about 15 mm. long. This stalk is composed of a bundle of longitudinally-placed megascleres covered by a thin layer of tissue and does not exceed 1 mm. in thickness. The spiculation in both specimens exactly resembles that of Dendy's *D. stella-grandis*.

It is worth while emphasizing the presence of stalked Donatias in the collection, for such forms are of comparatively rare occurrence in the genus although rooting processes are often seen. I hold the opinion that the presence of a stalk is usually the result of special conditions of the environment and has little or no specific value, but this is a matter which calls for more detailed investigation.

Previously known distribution :—Florida, Indian Ocean, Australia (*vide* Burton l.c.).

Registered Nos., Locality, etc :—LIII, Andamans, 130—290 fathoms ; LX, W. Anadmans, 480 fathoms.

Donatia robusta (Bwk.)

(For synonymy *vide* Burton 1924.)

The single specimen is assigned to this species after some hesitation. Although like other members of the species in external form, structure of cortex, and shape and size of spicules, it differs in the paucity of megasters present in the cortex. Usually, the species has a very dense cortical layer of megasters but in this one specimen these spicules are not so abundant. However, such a small point, when all other characters agree, seems hardly worthy of special distinction.

Previously known distribution :—Australia, New Zealand, Indian Ocean, Red Sea.

Registered No., Locality, etc. :—XXXVI, Malay Arch., 160 fathoms.

Donatia andamanensis n. sp.

The single specimen affords several interesting points for consideration. It is irregularly sub-spherical, about 3 cms. at the greatest diameter and the surface presents a very uneven appearance. In its structure it bears a very striking resemblance to *Donatia magna* (Kirkpatrick) from the Natal Coast. The chief character by which the two species may be distinguished is the complete absence of megasters in the present species. For the rest, it has the same stout strongyloxea aggregated into stout bundles, the same two kinds of micraster, the cribriform pores, inter-cortical cavities, brown pigment cells and conulose surface as Kirkpatrick's species, features which as I have pointed out already (Burton 1926), mark that species off from all other known species. The pores in this species are microscopic as opposed to those of *D. magna* which are quite conspicuous to the naked eye and usually from ·5 to 1 mm. in diameter.

This sponge has compensated for the absence of megasters in the cortex by including in its substance a large number of sand grains and foraminiferal shells.

The most interesting point, in my opinion, is the finding of a species of *Donatia* in the Eastern Indian Ocean differing only in two slight details *viz.*:—the absence of megasters and the small size of the pores, from *D. magna*, a species well-characterised among the species of the genus and localised on the Natal Coast of S. Africa.

Registered No., Locality, etc., XLII, 2. Off Blair Point, Andamans, 112 fathoms.

(A detailed list of references to the literature will be published in the second and final part of this work.)