A REVISION OF THE CLASSIFICATION OF THE CALCAREOUS SPONGES

BRITISH MUSEUM (NATURAL HISTORY)

A REVISION OF THE CLASSIFICATION OF THE CALCAREOUS SPONGES

With a Catalogue of the specimens in the British Museum (Natural History)

by

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ERRATA

Page v. *Against* 'III A Systematic . . .' *amend* '152' *to read* '151'

Page 314. *In text-figure caption amend page reference* '309' *to read* '308'

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Introduction

The century represented approximately by 1770 to 1870 was a period of pioneering and experiment in taxonomy. So far as the Calcarea are concerned there were minor contributions by Grant, Johnston, Bowerbank and Schmidt, with scattered descriptions of species by a number of other authors. The work of all these was collated and amplified by Haeckel, particularly in his 3-volume monograph of 1872.

The next forty years saw attention focused strongly on the Calcarea. There were the excellent monographs on the Australian species by Dendy, the meticulous but inconclusive studies by Minchin, and numerous interesting but small publications by Bidder, Schulze, Maas, Poléjaeff and others. It was a period marked, moreover, by what might almost be described as an aesthetic approach. Authors delighted in the beauty and fragrance of the Calcareous sponges, paid much attention to the anatomy of the canal system, and discussed the orientation of the radiate spicules. The work of Dendy alone stands out as a major contribution to the taxonomy.

It may be that Haeckel's monograph *Die Kalkschwämme* (1872) must bear the major responsibility for this period of partial sterility. Although this publication has the merit of bringing all the known information about the Calcarea together in one work, it is so overloaded with a multiplicity of subgeneric names, and its illustrations so stylised and often so fanciful, that much of its merit is stultified. Later, Dendy and Row (1913) made a laborious effort to set the taxonomy on a firm basis. This was, however, vitiated mainly by two things. First, by grouping species within a genus on whether or no they possessed oxea or microxea they masked the true affinities of the species. It has become obvious that both oxea and microxea are very variable in their occurrence even within individuals of a species. The second drawback to this work was that it was little more than a check-list. For the diagnostic characters of the species listed it was still necessary to refer to the original works, where confusion was largely unrelieved.

This confusion can be exemplified by reference to *Sycon coronatum* and *S. ciliatum*. For nearly two centuries a distinction has been maintained between these two species. This was excusable in the early years when our knowledge was based upon occasional specimens, recorded by a few authors separated in time and space. It takes no more than a limited experience in the field, however, to realise that the sponges named respectively *S. coronatum* and *S. ciliatum* represent, at best, variations within a single species. Such was the influence of Haeckel's monograph that his undue emphasis upon the sizes of the oxea and certain morphological features has stifled a critical approach to their true affinities.

Then we have the remarkable fact that *Grantia compressa*, a widespread and familiar species, was for a long time always figured upside down. This has been rectified by a few authors in recent years, but only by a few. Such a point might seem too trivial for inclusion here except that it epitomises the attitude of most workers. A few, such as Maas, Schulze, Bidder, Topsent and, in recent years, de Laubenfels, have endeavoured to treat Porifera as living organisms. Too large a proportion of those whose names appear in the bibliography have had no other interest in them except as material upon which to base a thesis for a degree. The one great lack in all the writings, except for the later writings of Topsent and those of a newcomer, Sarà, is of any systematic attempt to estimate the range of variation within a species. The attempts by Topsent and, more especially, by Sarà to rectify this have been only partially successful due to a failure to disentangle past confusions before studying this aspect of the problem. A particular example will be given later.

Meanwhile, we may review the period from 1913 (Dendy and Row) until today. In this there have been three notable trends. First, there has been the tendency, already mentioned, towards making allowance for some variability in anatomical characters. Secondly, there has been a tendency to establish new species rather than revise our knowledge of the older species, presumably because the effort needed to revise the older species was too costly in time. Thirdly, there has been the production of magnificent descriptions by a group of Japanese workers, in which Hozawa is pre-eminent. Had all workers given us such lucid accounts, or had these workers dealt with all known species in the same way, our task today would be relatively simple. As it is, this Catalogue cannot aspire to being more than a preliminary survey from which future workers may proceed. It is for that reason that such detailed accounts (in Section III) are included of species now treated as synonyms of the few real species set forth in Section II.

The taxonomy of sponges, like that of any other group of organisms, has developed in a random manner; but whereas in some other groups it has been possible to place the study on an organised basis, in sponges it is still in its infancy. Far too many species are known from single specimens only, or from at best a few specimens. Too often, also, the true relationships of species are obscured by the great diversity in the methods used for their description. This last is especially true of the Calcarea. As in other classes of sponges some authors have expressed dimensions of spicules in terms of averages, others in minima and maxima, and it is not always made clear which method has been used. In addition the order in which spicules have been described has seldom been systematised, so that one is driven to relying upon illustrations for a better understanding of the species. This also has its difficulties, partly from the varied way in which spicules are orientated in the diagram, partly from the varying craftsmanship imparted to the drawings, but above all from the convention of filling a text-figure with a large number of spicules where the minimum could have been used to better advantage. In a class in which the range of spicule-forms is so small, the architecture of the skeleton assumes a relatively greater importance. It would have been an advantage therefore if all writers had so grouped the drawings of the spicules that the spicule-form and the architecture of the skeleton could be seen in one text-figure. Hozawa came near to doing this, and so did Dendy in some of his earlier works. Occasionally other workers used the method, but there are more examples of the reverse, the worst example being the crowded plates used by Haeckel.

Had it been possible to profit by experience from the start, no description of a species would have been considered adequate without a description of the holotype, together with an adequate illustration, as well as an account of the variations found in, say, fifty other specimens from the type-locality. Had, then, each record been accompanied by an account of how the new specimen or specimens differed from those previously described, the further range of variations could have been assessed until, in due course, the full range of those variations would have been documented. Such a course can be dismissed as ideal and therefore unattainable. It can also be taken to represent the antithesis of the actual methods adopted, and the results achieved, which by an irony has been labelled the 'Systematic Study' of Sponges. In fact, few things could have been more haphazard, and this is especially true of the Calcarea.

The only logical remedy for the present state of affairs would be to revise the species by having all holotypes, at least, assembled in one place for comparison. This is not practicable. To begin with some holotypes have been irretrievably lost. Even those still extant are scattered over the world and could never be brought together. It is almost useless to travel round the world to make examinations of types, separated in space and time. It can be done with a limited number of species, and might be done with the whole range of species if there were no limit on the period of time available for study.

The best we can do in the circumstances is therefore to prepare a survey of the characters of each species, as they appear to be from written descriptions and illustrations, then to check as many of these as possible by re-examination of the holotypes and authentically-named specimens. Such a survey is represented by Section III of this Catalogue. The next step is to make intensive studies of those species for which a long series of specimens can be obtained, in order to assess the limits of variability within species. This is best done with species having well-defined morphological characters and using series from such species obtained in one locality or a few adjacent localities. The results of some such attempts are included in Section IA. With the knowledge so obtained, the information contained in Section III can then be re-examined and a final list of species drawn up in systematic order. This is given in Section II. The three Sections thus represent three stages in this approach to a re-classification of the Calcarea.

Once the comprehensive survey (Section III) had been completed, and as soon as intensive studies of variations within a species had been concluded, it became evident that readjustments were necessary in regard to our ideas on: (*a*) the phylogenetic significance of the canal system; (*b*) the taxonomic value of the position of the nucleus of collared cells; (*c*) the diagnoses of genera and families. These will be dealt with in turn.

The contents of Section I, General studies of genera and species, can therefore be set forth as follows:

I

General Studies of Genera and Species hitherto recognised

A. Variations within Species

(i) *Grantia compressa*

It is remarkable not only that the spiculation of sponges varies widely but that we have been so long in recognising this. Dendy, in some of his early papers, hinted at the variability of the spicules. Vosmaer drew attention to it in *Leucandra aspera*, but his findings were contradicted by Breitfuss and Topsent. Minchin (1905) drew the lesson from his own studies on the Ascon sponges. I drew attention to it in a few species (1929, 1930). Topsent, in the last few papers to be published before his retirement, gave notice of it in species of *Leucosolenia* and *Leucandra*. The first systematic attempt, other than that by Vosmaer, to give the study a firm foundation, came from Sarà (1952). Yet it can readily be demonstrated beyond doubt merely by examining a series from the common species from any locality. For Britain, two of the commonest species are *Sycon ciliatum* and *Grantia compressa*. These can be collected, in favourable localities, by the hundreds between tidemarks.

It had long been apparent to me that both these species showed considerable fluctuations in the shape and size of the spicules and in their arrangement within the skeleton. When I came to examine closely a series of one hundred specimens of each, the specimens in both instances being drawn from one locality, the range of variation was found to be greater than I had supposed.

In (1947) I had already shown that in *Grantia compressa*, the average sizes of the mature individual may vary, from 1 to 150 mm. in length. The shape may vary from ubular and only a little compressed to the characteristic flattened form, with an apical, vent or with several dispersed vents. The form also varies on account of a peculiar asexual reproduction, details of which will be given elsewhere. The form is, however, sufficiently constant that the species can be readily recognised. Even so, there are occasional individuals which depart sufficiently from the typical form to make their recognition uncertain, even by the experienced eye.

This does, in fact, represent the pattern of variation in all the characters of *Grantia compressa*, namely, the fluctuation is within more narrow limits than has been found in other species of Calcarea investigated, but in a very small percentage, less than one per cent, there is an unexpectedly wide variation, usually in one character only. For example, *G. compressa* is ornamented with diacts set at right angles to the surface. These are usually slightly curved, and the shape varies from oxeote to club-shaped, with or without an ornamentation of spines or tubercles. These have been made the occasion in the past for establishing several varieties (see Haeckel, 1872), later elevated to specific rank (Dendy and Row, 1913). Neither action can be maintained, for the shape of the diacts not only varies from one to another individual growing in close proximity, but may vary from one part to another of the same individual. In many instances, these various forms of diacts may be seen intermingled or in adjacent groups within a single section of the body wall. The diacts also vary widely in the numbers present, being sometimes abundant and closely packed, at other times sparse. On infrequent occasions whole areas of the surface may be completely devoid of diacts or may be ornamented merely with one here and there. In a very few individuals, comprising the less than one per cent referred to, the curved anisoxeote or clavate diacts may be partially or wholly replaced by oxea, double the length.

The causes responsible for these wide differences are unknown. It is possible that there is a regular (periodic) or an irregular extrusion of these spicules, in a kind of moult. Such an extrusion has been demonstrated experimentally and empirically (Burton, 1931). It could readily be tested where facilities are available for keeping individuals alive over extended periods of time, but, at the moment, it remains for *G. compressa* a reasonable assumption.

The rest of the skeleton includes typically: (*a*) an ectosomal tangential layer of triradiates; (*b*) a skeleton of the chamber layer including subendosomal sagittal triradiates and a tubar skeleton of triradiates; and (*c*) a tangential endosomal layer of quadriradiates, with their apical rays projecting into the cloacal cavity. Each of these is subject to variation. Thus, the ectosomal triradiates are typically in two to four layers, but exceptionally this ectosomal skeleton may be sparse (one layer only) or it may be thicker (more than four layers). The skeleton of the chamber layer varies in composition with the thickness of the body wall. Typically, it includes the layer of subendosomal triradiates, with a regular series (the tubar skeleton) of triradiates beginning at the distal ends of the basal rays of the subendosomal triradiates and extending to the inner face of the ectosomal layer of triradiates. If the body wall is thin, however, there may be only one row of tubar triradiates. Further, the tubar triradiates may sometimes be irregularly arranged, instead of forming a regular series. The endosomal skeleton, like the ectosomal, may comprise one layer of spicules or several layers, but its most obvious variation lies in the length of the apical rays of the quadriradiates, which may range from a mere sharpened tubercle to a long slender ray. Often there is an admixture of triradiates, sometimes to the point where the triradiates predominate. When this occurs, it is usual to find that the triradiates, unlike the quadriradiates, are markedly sagittal, with very long basal rays.

Similar variations are found in the triradiates of the ectosomal skeleton and the tubar skeleton. In these they may be summarised as follows: the rays may fluctuate in length and in thickness; for a given layer they may all be much the same size or there may be a wide range between the smallest and the larger, which may occasionally result in an incomplete differentiation into spicules of two sizes; the spicules themselves may be irregular (all rays of equal length), subregular (each ray of a different length) or sagittal (with the basal ray longer or shorter than the paired rays); the rays may be straight, curved or bow-shaped and the paired rays set at varying angles to the basal ray; and in all, but less frequently in the ectosomal triradiates, there may be, exceptionally, a fourth ray, giving the quadriradiate. In view of this, there is little point in continuing the practice of seeking to establish species on the basis of small differences in spicular characters.

The canal system is fairly constant, consisting of elongated flagellated chambers with their distal ends roofed over by what is usually called a continuous ectosome supported by the tangential layer or layers of triradiates. Very infrequently, the ectosome may, in certain areas, become thin, with a tendency to break down between the distal ends of the flagellated chambers, which then protrude to give an appearance recalling that of *Sycon.*

The variations described here for *Grantia compressa* have been observed in series of individuals collected mainly at Plymouth and the Orkneys. There is therefore the probability that wider variations may later be recorded from more extensive studies of material collected outside the area of the British Isles.

Particular significance attaches to the occasional appearance of a syconoid condition in the canal system. More will be said on this point at a later stage. It is sufficient to emphasise here that this is one of many examples leading to the conclusion that the nature of the canal system has less value in taxonomy than has been previously supposed.

(ii) *Sycon ciliatum*

The variations found in *Sycon ciliatum* are even more remarkable than those already listed here for *Grantia compressa.* For the purpose of these studies, long series of specimens have been used. These include many hundreds of specimens examined by me *in situ*, in the littoral zone, at a number of points on the coasts of the British Isles. The main purpose of this was to ascertain what variations there might be in general appearance in groups of individuals which could be reasonably assumed to be conspecific. For example, *Sycon ciliatum* often grows in clusters, with each individual springing from a common base. In other instances, a group of individuals may be found growing close together but not actually joined, and growing in an isolated position with no sign of any other sponge within a quarter of a mile or so of them in any direction. These, although not joined together, can be reasonably assumed to be conspecific, if not from the same fall of spat. In addition, many others in all manners of situations were observed.

Sycon ciliatum is more or less cylindrical or fusiform, with a central tubular cloaca. It is attached at the base, and the vent opens at the apex. The surface is typically mammillate and hirsute, from the free ends of conical or thimble-shaped chambers ornamented distally by a brush of oxea. The vent is fringed, typically, with a crown of oxea. *S. coronatum* is similar in general form, but it has typically a horizontal corona of oxea in addition to the usual vertical fringe. Haeckel gives the impression that the two species can be separated on the dimensions of the spicules, but, as will be shown later, this cannot be maintained. A number of other species, having the same general appearance, have been diagnosed largely on the pattern made by the chambers at the surface. These include such species as *S. quadrangulatum*, *S. tesserarium*, etc.

The conclusion reached from my extensive studies in the field is that neither the ornamentation of the vent nor the pattern of the surface has a taxonomic value. In clusters of individuals joined at the base, and, indeed, in any large group of these *Sycon*, vents may be naked, may bear a vertical fringe, or may be decorated with both the vertical and the horizontal fringe. Where fringes are present they may be slight or conspicuous, with all stages between. The commonest is the vertical fringe alone, and often all members of a group or cluster may show this only, but the distribution of the three types of vent is so variable and erratic as to leave no doubt that they are without taxonomic value.

The flagellated chambers may be relatively widely spaced or densely packed, with all stages intermediate between the two, giving a markedly mammillate appearance, or a quadrangulate, hexagonal or octagonal pattern. Moreover, the transition from one to another of these patterns can often be seen on one individual. Although much significance has been attached to these patterns (cf. Haeckel, 1872, pl. 60), we must conclude that here also there is no basis for the definition of species.

Supporting evidence for these conclusions has been obtained from two other sources. The first was derived from the study of samples of *Sycon* taken at monthly intervals from a raft in Poole Harbour, kindly collected for me by Mr. F. Hawes. The other was supplied by sponges growing in the aquaria at the Plymouth Laboratory. These, which I have been able to study through the kindness of Dr. Douglas Wilson, represent almost certainly individuals from a single fall of spat. In any event, many of them were in clusters and joined at the base.

The study of microscope preparations, from the sponges obtained from these and other sources, clearly shows that the spicules of *Sycon ciliatum* (+*S. coronatum*) are as variable as those of *Grantia compressa*, and in the same ways. There is, therefore, no need to detail them. Two observations only need be added. The first concerns the endosomal sagittal triradiates. In *Sycon ciliatum* these are often indistinguishable from the tubar triradiates, so that they are then, for practical purposes, absent as a discrete category of spicules. The second observation is that the triradiates clustered at the apices of the flagellated chambers show a tendency to thickening and distortion of the rays. This feature has been used as the basis for the recognition of *S. humboldtii* and other species, which differ in no other way from *S. ciliatum*.

A far more important observation concerns the behaviour of the surface triradiates and the associated tissues. Where the flagellated chambers are closely packed, it not infrequently happens that the triradiates, which normally decorate the distal ends of the chambers, assume a tangential position. This is correlated with the development of a so-called 'dermal cortex' roofing over the spaces between the chambers. Such a condition is incipiently grantioid. That is, it represents the condition approaching that typical for *Grantia compressa*, the type-species of *Grantia*. Where the development of the dermal cortex has gone beyond the incipiently grantioid condition, the flagellated chambers tend to be smaller, to be spherical and scattered. The canal system becomes, in fact, leuconoid.

The transition between the syconoid, grantioid and leuconoid canal systems may be found within a single individual. On the other hand, we may have the situation such as existed in a group of individuals from Plymouth, growing closely together and all, judged by the naked eye, typical *Sycon ciliatum*, yet on being examined microscopically four were found to be typical *S. ciliatum*, four were typical *Leuconia fistulosa* and two showed a mixture of the characters of the two species. A number of other examples have come to my notice, but none more striking than this one.

Leuconia fistulosa has the same general appearance as *Sycon ciliatum* but differs in its canal system and in having a continuous dermal cortex. In spiculation the two are remarkably alike. It seems, therefore, that we have no choice but to regard the two species as one and the same; or, at best, varieties of one species. My own conviction is that we have to deal here with one species. This is based partly upon the direct examination of material collected off the coasts of Britain, and partly from the occurrence, in other parts of the world, of species of *Sycon* and *Leuconia* bearing the same relation to each other as do *Sycon ciliatum* and *Leuconia fistulosa.* This is best made clear by a study of the named forms included under *Scypha ciliata* in Section III.

(iii) *Leucosolenia* and *Clathrina*

The first systematic studies of the variations in spicule size and form, in the ascon sponges, were made by Minchin, and in his work for 1905 he demonstrated the difficulty in distinguishing between such species as *Leucosolenia complicata*, *L. botryoides* and *L. variabilis.* It seems clear from this work that Minchin realised the implications of his studies, namely, that these three are forms of a single species, but acted with caution and continued to recognise them as distinct. It is of interest, however, to read the quotation from a letter sent by Minchin to Topsent (1936:1): '. . . it is extremely difficult for anyone to identify these sponges correctly without examining a very large number, especially of type-specimens, as I have in many cases been able to do'. Following this quotation, Topsent, in the same work, sought to show that the number of Mediterranean species of *Leucosolenia* was no more than eleven as against the thirty-one listed a year before by Breitfuss (1935). The eleven species retained by Topsent were:

L. blanca
L. botryoides
L. cerebrum
L. clathrus
L. complicata
L. contorta
L. coriacea
L. falcata
L. lacunosa
L. lieberkühnii
L. reticulum

In 1953, Sarà made a further study of the variations in the genus *Leucosolenia*, using material collected in the Bay of Naples. He distributed these species, as follows:

L. blanca	=	*L. coriacea* forma *blanca*
L. lacunosa	=	*L. coriacea* forma *lacunosa*
L. cerebrum	=	*L. coriacea* forma *cerebrum*
L. clathrus	=	*L. coriacea* forma *clathrus*
L. coriacea	=	*L. coriacea* forma *coriacea*
L. contorta	=	*L. coriacea* forma *coriacea*
L. reticulum	=	*L. coriacea* forma *coriacea*
L. falcata	=	*L. coriacea* forma *falcata*

L. botryoides	=	*L. botryoides* forma *variabilis*
L. complicata	=	*L. botryoides* forma *variabilis*
L. lieberkühnii	=	*L. botryoides* forma *variabilis*

In addition, Sarà added another, forma *parthenopa.*

The history of the European species of ascon sponges is one of steady diminution in their numbers until, with Sarà's work, we have two. In the case of *L. coriacea* we have six 'forms' of one of these species within the Bay of Naples alone.

Sarà makes no claim to having made a comparative study of more than the ascons of the Bay of Naples. It is reasonable to suppose, however, that if his results are applied to a wider field we are likely to increase the number of 'forms' until their total comes near to the number of 'species' listed in Dendy and Row (1913). Moreover, with the increase in the number of biotopes the range of variation in spicule form and size as well as in the habitus of the sponges will be extended until a point is reached where even a division into 'forms' will be purely arbitrary. The result will be no less confusing than it was left by Dendy and Row, in which the multiplicity of 'species' made identification of individual specimens well-nigh impossible. My own view is that we are dealing here with two world-wide species (see Section III under *Leucosolenia botryoides* and *Clathrina coriacea*) and that any subdivision of these into 'forms' belongs more to the realm of experimental research than to practical taxonomy.

The illustrations included here are from Topsent (1936). They represent spicules from some of the eleven 'species' he recognised and which Sarà (1953) treated as 'forms'. The latter gives further series of drawings of spicules. If these are added to those of Topsent and those given by Minchin (1905), the total collection represents a range of variations in spiculation sufficient to include most, if not all, the 'species' included in the long list set forth by Dendy and Row.

(iv) *Leuconia solida*

Sarà (1953) in a most welcome attempt to demonstrate the variability in the taxonomic characters of sponges, has suggested that *Leuconia solida* (Schmidt), *L. nausicaae* (Schuffner) and *L. pumila* (Bowerbank) are synonymous. *Leuconia solida* was first described by Schmidt (1862, p. 18, pl. i, fig. 7) from Sebenico in 22 fathoms. The description is meagre and the characters of the species obscure. There is a microscope preparation (B.M.67.3.11.74) marked 'Adriatic' which may or may not be from the holotype, for Schmidt also recorded the species (1864, p. 23) from Porto Chiave. This, a very poor preparation as is usual with Schmidt's specimens, contains the so-called colossal triradiates and also smaller triradiates. There is one cruciform quadriradiate. Although these are no microdiactines, the section bears a marked resemblance to a comparable section of *Leuconia nivea.* Since this last species was not adequately illustrated until 1872 it is excusable that Schmidt should have failed to note the resemblance. Even so, there were good written descriptions of *L. nivea*, and, in any event, the spicules in Schmidt's preparation bear no resemblance to those of *Grantia*, the genus in which Schmidt first placed the species.

In his second record, Schmidt tells of finding *Grantia solida* between tide-marks in great numbers. He also refers to 'Eine Varietät der Art (von 55 Exemplaren 5) einfache Spindeln neben den dreistachligen Kalksternen'. This is something we must refer to again later.

The next reference to *G. solida* is by Haeckel (1870, p. 247) who included it in *Leuconia* beside *L. nivea*, *L. gossei* and other species. He also refers to '*Grantia solida* var. *socialis*, O.S.', but I can find no reference to this in Schmidt's works. It seems, however, that this must refer to Schmidt's (1864) second record of the species, for on p. 241 Haeckel has included '*Grantia solida*, var. *solitaria*, O.S.' under the genus *Dyssycum*. The reasons for this separation are not apparent, nor are they relevant since in 1872 (p. 151) both are brought together under *Leucaltis solidum*. The name *Dyssycum* is then stated by Haeckel to be obsolete, but in its place we have the following 'Generische Varietäten': *Dyssycus solidus*, *Dyssyconella solida*, *Lipostomella solida*, *Amphoriscus solidus*, *Amphorula solida*, *Aphroceras solidum* and *Leucometra solida*. These names indicate whether the specimen is 'solitary' or 'colonial', whether vents are present or absent, and if present whether the vent is fringed with spicules. Immediately following this Haeckel presents us with 'Connexive Varietäten': *Leuconia solida* and *Leucandra solida*.

In illustrating the spicules of *Grantia solida* Haeckel drew large triradiates with sinuous outlines. On the other hand, in illustrating *Leucandra nivea* he shows large triradiates with perfectly regular outlines. Yet the large triradiates of the typical *L. nivea* have outlines as sinuous as those seen in Schmidt's preparation of *Grantia solida*, but in neither is the outline so absurdly sinuous as Haeckel has shown it to be.

Haeckel claims (1872, p. 153) to have examined specimens of *Leucaltis solida* from Lesina, Messina and Naples. He also claims (1872, p. 213) to have examined large numbers of *Leucandra nivea*. Yet, not once does he give the slightest hint that he had at any time noticed a similarity between them. Nevertheless, and this is almost incredible, Haeckel included *Leuconia nivea* Gray (1867, p. 556) as a synonym of *Leucaltis solida*, although this reference by Gray is merely a catalogue entry to include '*Spongia nivea*, Grant, *Grantia nivea*, Fleming, *Calcispongia nivea*, Blainv. and *Grantia solida* O. Schmidt'. It is incredible because Gray has actually indicated that the species *nivea* and *solida* were identical. In other words, it was as if Gray had pointed the way and Haeckel had quite deliberately taken another route; or, rather, had deliberately created a maze in which to lose himself rather than follow a simple line.

Haeckel's action here—and it is repeated with variations throughout *Die Kalkschwämme*—must be described as illogical and almost past belief, even when we make allowance for the fact that he was writing 70 years ago. Even more remarkable is it that Dendy and Row (1913, p. 734) should have followed Haeckel faithfully except where, in departing from his classification, they commit further errors. For example, they have placed the species *solida*, of Schmidt, in the genus *Leucetta* (family Leucaltidae) and the species *nivea*, of Grant, in the genus *Leucandra* (family Grantiidae). Moreover, in their classification the families Leucaltidae and Grantiidae are placed widely apart.

Schmidt's figure of the external form of *Grantia solida* shows it to be, as has been already said, very like *Leuconia nivea*. In his preparation, now in the British Museum, meagre as it is, can be seen large triradiates and small triradiates typical of *L. nivea*. There is one cruciform quadriradiate, so characteristic of *L. nivea*. As to the microdiactines, in a series of preparations of *L. nivea* these are found to vary in number and distribution. They may be so scarce as to be absent except in patches, usually around the large canals. There can be no doubt that *Grantia solida*, is very closely related to *Leuconia nivea* and little doubt that it is synonymous with it. The extraordinary failure of Dendy and Row to appreciate this is the more remarkable from the claims made in the preface to their work. Thus, 'We have had access . . . to a large amount of material . . . chiefly of the collections in the Natural History Museum. . . . In addition, one of us (Row) visited Berlin and Jena in 1912, and obtained valuable information from the study of type specimens at those places.'

There are several other microscope preparations in the British Museum collection bearing these names. They include one made by von Lendenfeld from a specimen from Lesina. It comprises microtome sections heavily stained in haemotoxylin. In it only fragments of spicules can be found but these suggest that the specimen was from the kind of sponge Schmidt had called *Grantia solida*, but as no microdiactines can be seen we cannot say for certain that it should now be called *Leuconia nivea*.

The remaining six preparations, all presented by Canon A. M. Norman, are from Naples. They include three hand-sections and three spicule-preparations. All look remarkably like *Aphroceras cliarensis* Stephens, from Ireland.

It seems likely that a sponge was at one time being identified at Naples under the name *Grantia solida* which has no relation to that species. On the other hand, Sarà (1953) claims to have examined specimens at the Zoological Station at Naples, identified as *G. solida*, which are according to his analysis also identical with *Leuconia pumila* Bowerbank and *L. nausicaae* (Schuffner). Having examined Sarà's arguments and having compared his drawings and measurements of spicules with a preparation from Bowerbank's type and the published description of Schuffner's species, I have come to the conclusion that Sarà is probably correct. If so, then it seems possible that *L. nivea* and *L. solida* (sensu Sarà) are extremely closely related and may, in fact, be southern and northern races of the same species. This would then account for my difficulty in deciding, from Schmidt's meagre preparation of *Grantia solida*, whether it represented a specimen of *Leuconia nivea* or a separate species.

Sarà's findings were foreshadowed by Topsent (1937). Speaking of several species of *Leucandra* (= *Leuconia*) from the Mediterranean and adjacent areas, he writes: 'Ces espèces, il est vrai, ne sont pas toutes à maintenir. *Leucaltis Nausicaae* Schuffner se confond vraisemblablement avec *Leucetta solida* (Schmidt). *Leucandra Bolivari* et *L. Rodriguezi* ont été, l'année même de leur création, considerées par Lackschewitz comme varietés l'une l'autre, et il y aurait lieu de chercher si elles ne seraient pas des formes enoplotrophiques, sans grandes tétractines, de *L. nivea*, l'une à macrodiactines épaisses seulement, l'autre à soies fines en plus.'

Judging from Schuffner's figures, it would seem that we cannot doubt Topsent's suggestion that *Leucaltis nausicaae* is a synonym of *Leucetta solida* (Schmidt), especially because of the subsequent testimony from Sarà. Then we have an error. Topsent clearly meant *Leuconia balearica* of Lackschewitz, not *Leucandra bolivari* of Ferrer. Presumably Topsent had been considering the latter, for it proves from its author's figures to be related to *Grantia solida* Schmidt, and could justifiably be regarded as a synonym of it despite the absence of any mention of microdiactines. On an earlier page (1937, p. 11) Topsent has shown that *Leuconia johnstoni* is capable of producing macrodiactines. He has also suggested that *L. johnstoni* and *L. nivea* are synonymous. This explains why he should have linked *L. balearica* and *L. rodriguezi* with *L. nivea*.

Polejna telum Lendenfeld (1891) from Lesina appears from its author's descriptions to be very nearly related to *Grantia solida*. A preparation of stained microtomed sections in the British Museum shows sufficient resemblance to that species to justify accepting it tentatively as a synonym, any doubt being due to the presence of subendosomal sagittal triradiates. *Leucandra caminus* Haeckel (1872) also appears to have subendosomal sagittal triradiates, as well as macrodiactines, and to be closely related to *L. bolivari* and *L. rodriguezi* except in its external form, which is clathrate with chimney-like oscules. In the external form *L. caminus* might be close to Sarà's figures 3, 5, 6 of *Leuconia solida* if we assume, as we reasonably can, that Haeckel has stylised his drawings of the type of *Leucandra caminus*.

Leuconia prava Breitfuss (1898), misnamed *L. parva* by Topsent (1937), seems from its author's full illustrations to be merely a specimen of *L. nivea* with macrodiactines.

Leucandra sulcata Ferrer and *L. riojai* Ferrer are outwardly dissimilar but their skeletons come within the range of those species closely similar to *Leuconia nivea* and the range of external form they present falls within that of Sarà's specimens of *L. solida*. They are, also, so like *Leucandra balearica* Lackschewitsch as to be obvious synonyms of it.

The comments on these various species are based upon the somewhat shorter review given by Topsent (1937:12). The underlying concept is that all these may be synonyms of one species. If this goes beyond orthodox ideas so, too, do Topsent's remarks about *L. johnstoni* and *L. nivea*. He says of the first, it is important to note that it has the faculty of producing macrodiactines. On p. 13 of the same work he implies that the two are forms of a single species. Having myself had experience of specimens with the typical form of *L. nivea* and the skeleton of *L. johnstoni* I would agree with him.

After surveying the species here discussed, from the authors' original descriptions and, where possible, from type-preparations in the British Museum collection, I have re-examined preparations of *L. nivea* and *L. johnstoni* in the same collection. There are thirty of the former and five of the latter, all from the British Isles. In general characters all are recognisable as belonging to these two species, as they were originally understood. My comments, arising from this re-examination are:

1. Several specimens have the form of *L. nivea* with the spiculation of *L. johnstoni*, and in these the incidence of the large quadriradiates varies.
2. Macrodiactines were found in two specimens only: abundantly in a specimen from Sark, very sparingly in one from Plymouth. The presence of these spicules may therefore be associated with the southern areas of the range of the species.
3. The numbers and distribution of the microdiactines and the cruciform quadriradiates varies widely from one specimen to another. In several the microdiactines are very sparsely present; in others the cruciform quadriradiates seem to be replaced by small regular quadriradiates.
4. In two individuals the large triradiates are confined to the outer surface, and there are large subendosomal quadriradiates with the fourth ray directed towards the outer surface (very like the condition in *Polejna telum* Lendenfeld).

5. There is some variation in the maximum sizes of the large triradiates, but not as much as I had expected.

It is probable that a closer study of a larger number of specimens would reveal an even greater range of variation, but until that is forthcoming the synonymy of the species here discussed must remain, to some extent, a matter of opinion.

Accepting *L. nivea* and *L. johnstoni* as synonyms, I would include also *L. bolivari* and *L. rodriguezi* which, like the specimen from Sark, have macrodiactines.

It will be necessary now to revert to the question of the relationship between *L. nivea*, as understood here, and *L. solida*, as understood from the works of Sarà. In the northern areas, as typified by the seas around the British Isles, we have the encrustations and low-lying, irregularly massive growths of *L. nivea*. We have also the small symmetrical tubular forms known as *L. pumila*, which Sarà includes as a synonym of *L. solida*. Apart from the external form, the main difference between these lies in the greater tendency in *L. nivea* to produce microdiacts and small cruciform quadriradiates. Both *L. nivea* and *L. pumila* have been recorded from the Mediterranean, the typical area for *L. solida*, but as a rule neither of these two reaches the large size shown by Sarà for his own specimens of *L. solida* collected at Naples. If we allow that a wide variation in the spiculation makes possible the identity of the *L. nivea* and *L. pumila* forms with *L. solida*, there still remains this difference in maximum size. This could be accounted for by comparison with what is known in *Tethya aurantium*, in which specimens from the northern area seldom approach in size the maximum of those found at Naples, nor do specimens of the same species available to me for examination from other parts of the Mediterranean.

We can fairly safely assume that the total size of the individual sponge has no more than an ecological significance. This has been amply demonstrated for *Grantia compressa* and *Sycon ciliatum* (see Burton 1947). We can then take *Leuconia nivea* and *L. solida* to be synonymous; or, if we prefer to proceed with caution, as varieties of one species. Before coming to a conclusion, however, we should look at other species, from more distant parts of the world, having similar affinities.

There are nearly a dozen species of 'Leucandra' recorded for Japan which have much in common with *Leuconia solida*. There is, however, some doubt about the characters of these species and something must be said on this point as a preliminary. A number of these species were first described in Hozawa's (1929) beautiful work. The first of these is, by a coincidence, named *Leucandra solida* but of Hozawa, not Schmidt. Its ectosomal spicules are said to be of two sizes, the larger with rays measuring 0·32 to 0·65 by 0·04 to 0·1 mm., the smaller with basal rays measuring 0·13 to 0·25 by 0·012 to 0·024 mm. Then Hozawa continues: 'Triradiates of the chamber layer . . . exactly the same as the large dermal triradiates'. The text-figure accompanying the written description illustrates this precisely, yet in pl. xxi, fig. 60, which gives an excellent drawing of a section at right angles to the surface, all the triradiates in the distinct 'dermal' layer are of the smaller size, and those of the chamber layer are a mixture of small and large. This means that if we accept Hozawa's written description and his text-figure as correct, the species is markedly different from *Leuconia solida* (Schmidt). On the other hand, if we accept his illustration of the external form and of the section (that is, of the architecture of the skeleton) the species is synonymous with Schmidt's species.

There may be a possible explanation in Hozawa's words (p. 363): 'The dermal skeleton is made up of large and small triradiates placed tangentially in several confused layers'. When we look at the drawing on pl. xxi, fig. 60, we see portrayed a single layer of small triradiates, at best a double layer. When cutting hand-sections of the surface skeleton of a *Leuconia* it is impossible to avoid including a portion of the underlying skeleton of the chamber-layer. Seen from above, this can produce the illusion that all the spicules in view belong to the ectosomal skeleton. I would suggest this is what has happened in Hozawa's description of his *Leucandra solida*.

This is not the only difficulty in regard to this species. According to the legend, the rays of the 'dermal' triradiates shown in text-fig. 30 are enlarged ×100. This would make their maximum sizes 0·85 by 0·12 mm. for the larger and 0·4 by 0·6 mm. for the smaller, instead of 0·65 by 0·1 and 0·25 by 0·024 mm. respectively as stated in the text. This might be ascribed to a misunderstanding between author and artist, but, as we shall see later, worse is to come.

The next species in this same work is *Leucandra pacifica*. According to the text, this has larger and smaller triradiates 'tangentially placed in a thin layer' in the 'dermis', with the triradiates of the chamber layer 'exactly similar to the larger dermal triradiates'. The measurements given in the text for the rays of the large and small triradiates are 0·35 to 1·0 by 0·03 to 0·13 and 0·12 to 0·4 by 0·01 to 0·028 mm. respectively. These are portrayed in text-fig. 32, where the magnification is ×75, and the measurements of the text-figures accords fairly closely with those given in the text. When we turn to pl. xxi, fig. 64, we find a drawing of a section at right angles to the surface showing three layers of 'dermal' triradiates, although the 'dermal' layer is described as thin. Moreover, we find these layers contain small triradiates only, instead of a mixture of large and small triradiates as stated in the text; and we find that the largest ray shown for a large triradiate has the same length as the longest ray portrayed on the same plate for *L. solida* Hozawa, whereas, according to Hozawa's description, it should be half as long again. In this instance also, if we accept the written description and the text-figure as correct, the species is not closely related to *L. solida* (Schmidt) whereas if we are guided by the photograph of the external form and the drawing of the section vertical to the surface, *Leucandra pacifica* is synonymous with *Leuconia solida* (Schmidt).

Leucandra yuriagensis Hozawa (1933) seems to be a synonym of *L. pacifica*, and so does the next species, in the same work, *Leucandra dura*, according to Hozawa's written descriptions and text-figures. It is significant that *L. dura*, which is so very close to *L. pacifica*, was obtained from Misaki, the type-locality of *L. solida* Hozawa. In this species, again, the drawing on pl. xxii, figs. 67–68, shows the features of the 'dermal' skeleton to conform to the written description of them. On the other hand, the largest ray shown of the large triradiates is actually smaller than the largest depicted for *L. solida* Hozawa whereas, if we judge by the measurements Hozawa gives, it should have been half as long again. It is significant also that the specimen of *L. dura* illustrated by Tanita 1942 (pl. ii, fig. 20) is remarkably like Sarà's specimens of *Leuconia solida* (Schmidt) (pl. i, figs. 4–5), from the Mediterranean.

The remaining two species in this work, *L. onigaseana* and *L. okinoseana*, are more or less correctly portrayed and figured. They are clearly related to *L. solida* Hozawa, *L. pacifica* and *L. dura* but are chiefly distinguished from them by having the rays of the large triradiates half as long again as those of the last two of these species. The fact that *L. onigaseana* has microxea and *L. okinoseana* has not is unimportant, as Sarà has shown for *L. solida* (Schmidt). Moreover, Hozawa (p. 376) says of *L. onigaseana*: 'The number of dermal oxea are different in different specimens. They are fairly thickly distributed in the type specimen while in the Nijima specimen they are very sparse.'

How closely these species can be related to *Leuconia solida* (Schmidt) can best be seen in examining the characters of a species described earlier by Hozawa (1918). It is true that this particular species, *Leucandra poculiformis*, is from the Aleutian Islands, but if it can be shown to be identical with *Leuconia solida* (Schmidt) then we have evidence that that species is common to the North Atlantic (including the Mediterranean) and the North Pacific, and could therefore occur off Japan as well. The most striking feature for this comparison is the external form, which, on its own, would leave little doubt of an identity with the Mediterranean forms. The holotype of *Leucandra poculiformis* is said, however, to have ectosomal triradiates with rays 0·13 to 0·68 by 0·02 to 0·06 mm., and triradiates of the chamber layer with rays 0·28 to 0·64 by 0·04 to 0·06 mm. On the other hand, the relevant text-fig. 8 shows ectosomal triradiates much smaller than those of the chamber layer, with rays 0·13 by 0·02 to 0·23 by 0·03 mm. This means that if we assume Hozawa has made the same mistakes as have been described here in detail for *Leucandra solida* (Hozawa) and *L. pacifica*, then *L. poculiformis* conforms in all respects to *Leuconia solida* (Schmidt).

Moreover, if we make the same adjustments for *Leucandra tuba* Hozawa (1918) we have an even closer approximation to *Leuconia solida* (Schmidt). The spiculation is identical within the limits expounded by Sarà, and the sponge itself (see Hozawa 1918, pl. 84, fig. 3) is virtually identical with that in Sarà (1953, pl. i, fig. 2). *Leucandra tuba* is from near Okinoshima, Japan.

Leucandra glabra Hozawa (1940) and *L. fragilis* Hozawa (1940) are both so close to *Leuconia solida* (Schmidt) in spiculation that it is no surprise to find that their external forms also bear close comparison. The photograph of *Leucandra glabra* (Hozawa, 1940, pl. iv, fig. 5) is close to that given by Sarà (pl. i, fig. 6) and that of *L. fragilis* (Hozawa, 1940, pl. iv, fig. 6) is not unlike Sarà's pl. i, fig. 1. Then we have *L. oshimai* Tanita (1939) with spiculation virtually identical with *Leuconia solida* (Schmidt) and the external form indistinguishable (cf. Tanita 1939, text-fig. 3 and Sarà, 1953, pl. i, fig. 2).

Leucandra consolida Hozawa (1943) is said by its author to bear 'a marked resemblance to *Leucandra pumila* (Bowerbank)'. This is a statement with which we can have no quarrel. *L. amakusana* Hozawa (1943), also from Japan, said by its author to be 'very closely related to *Leucandra hentschelii* (from the Antarctic)' is clearly related to *Leuconia solida* (Schmidt) but not so obviously as some of the others. Here again there is the same criticism, of a disparity between the written dimensions for the ectosomal triradiates and the measurements as obtained from the text-figures. Even allowing an adjustment for these, however, it still remains the case that the minimum sizes are in excess of the maxima given by Sarà for the corresponding spicules in *L. solida* (Schmidt).

There are, therefore, a number of species from Japan that can with fair certainty be identified with *Leuconia solida* (Schmidt). There are, in addition, closely-related forms that differ in one particular and well-marked feature, as follows:

1. *Leucandra foliata* Hozawa, in its foliate external form;

2. *Leucandra solida* Hozawa and *L. rigida* Hozawa by the presence of large diacts; and
3. *L. amakusana* by having ectosomal triradiates which approach more nearly the dimensions of the triradiates of the chamber layer.

There is another group of species in the Mediterranean which have already been discussed but to which it is profitable now to return, in order to compare them with *Leuconia solida* (Schmidt) and with the species in the North Pacific related to it. The first of these is *Leucandra bolivari* Ferrer, from Port Mahon, which, from its original description could be a *Leuconia nivea* either lacking the characteristic small quadriradiates or in which Ferrer had failed to observe them. *L. rodriguezii* and *L. balearica*, both of Lackschewitsch, and *L. rodriguezi* var. *hernandezi* Topsent, all from the same locality as *Leucandra bolivari*, bear the same relation to *Leuconia solida* (Schmidt) that *Leucandra solida* Hozawa and *L. rigida* Hozawa bear to the remaining group of species from Japan, here regarded as synonyms of *Leuconia solida* Schmidt. The interpretation of this could be either that we are dealing with two closely related species both having representatives in the North Pacific and the Mediterranean, the one species having large diacts, the other lacking them, or that all are synonyms of a species which ordinarily has no large diacts but may possess them occasionally. A third interpretation, a compromise accepted for the moment, is that the specimens with large diacts constitute a var. *rodriguezii* of *Leuconia solida* (Schmidt).

A further species from Japan, *Leucandra globosa* Tanita (1943), possessing large diacts, seems to stand in a similar relationship to *L. amakusana*, which, as we have seen, appears to be characterised by having ectosomal triradiates approaching in size the triradiates of the chamber layer. So far as *L. globosa* is concerned, this would not appear to be the case at first sight, for in Tanita's text-fig. 21 the rays of the ectosomal triradiates are drawn longer than those of the triradiates of the chamber layer, yet the measurements given in the text are: ectosomal triradiates, basal rays 0·3 to 0·38 by 0·045 to 0·054 mm., paired rays 0·4 to 0·45 by 0·045 to 0·054 mm., and for the triradiates of the chamber layer, basal rays 0·36 to 0·4 by 0·022 to 0·033 mm., paired rays 0·35 to 0·5 by 0·022 to 0·033 mm. It is significant that the external form of *L. globosa* is very like that described for *L. rodriguezii* and *L. balearica*. It is, moreover, very like that described for *L. bolivari*, which gives rise to the suspicion that the latter might prove, on re-examination of the holotype, to be yet another synonym of *Leuconia solida* (Schmidt).

Passing now to other areas of the world, we find other species recalling *L. solida*. The first two, *Leucandra crosslandi* Thacker and *L. donnani* Dendy, from Cape Verde Islands and Ceylon respectively, have skeletons remarkably alike. Thacker gives the length of the rays of the triradiates as up to 0·25 mm. when in fact the maximum length is in excess of 0·4 mm. Dendy gives for the corresponding measurements in *L. donnani* 0·7 mm. but I have found in his preparations nothing longer than 0·6 mm. This brings the two species very close together so far as the main spicules of the skeleton are concerned. In 1915, Dendy described *L. donnani* var. *tenuiradiata* from Okhamandal. It was represented by five specimens but I have had one only for examination. Allowing for the more slender rays of the triradiates, there is no reason to separate this from the two species now being discussed, and all three come within the range of the var. *rodriguezii*.

The holotype of *L. donnani* is strongly reminiscent of Sarà's (1953, pl. i, fig. 5) specimen of *Leuconia solida* (Schmidt). Of the two types of *Leucandra donnani* var. *tenuiradiata*, one is like the holotype of *L. donnani*,* the other almost identical with the holotype of *L. globosa* Tanita. The holotype of *L. crosslandi* Thacker is, again, very like Sarà's pl. i, fig. 5; so although both *L. crosslandi* and *L. donnani* can, on the basis of their skeletons, be identified with the var. *rodriguezi*, their external forms range from that of the typical form of *Leuconia solida* (Schmidt) to that of the var. *rodriguezii.*

Sarà (1951) described two new species of *Leuconia* from Naples: *L. dentata* and *L. globosa.* The external form of the first recalls that of *L. solida* (Schmidt), as illustrated by Sarà (1953) and the external form of the second is singularly like that of *Leucandra globosa* Tanita, from Japan. The skeletons of Sarà's two species belong to the group represented by *Leucandra globosa* and *L. rigida*, from Japan, *L. donnani* from the Indian Ocean, *L. crosslandi* from the Cape Verde Islands, and, as Sarà himself writes (p. 10): '*Leuconia globosa* nostra come *L. dentata* affinità con *L. balearica*, *L. rodriguezi*, *L. rodriguezi hernandezi* del Mediterraneo occidentale e con l'atlantica *L. sulcata.*'

It becomes ever more certain that what I have accepted as the var. *rodriguezi* is a common variant of *Leuconia solida* (Schmidt) and that there is little need even for a varietal distinction. It also seems that forms closely related to and probably inseparable from *L. solida* occur not only in the Mediterranean and North Pacific, but off the Cape Verde Islands and Ceylon, as well as other coasts of the Indian peninsula.

From an adjacent locality we have support for this in *Leucandra innominata* Dendy and Row. This species presents a somewhat unusual problem, however. The name was proposed for *Leucilla crosslandi* Row because we already have a *Leucandra crosslandi* Thacker. In his original description, Row (1909, p. 209) describes the holotype as: 'A fragment of a single specimen . . . obtained at Suez'. There is a jar in the British Museum collection, labelled *Leucilla crosslandi* Row, containing four specimens. In it also is a slip of paper bearing, in Row's handwriting, the words: 'The large specimen is the type of this species'. Included also on the paper, in Row's handwriting, are the scientific name and the locality. There can be no doubt, therefore, that Row saw these four specimens and assigned them all to this one species, and that his description of the holotype as 'a fragment' is in error. Hand-sections had been made from all of them, but none of these preparations remains. Fresh preparations have been made and these show that the four specimens belong to one species, and that they have the spicules depicted by Row in his text-fig. 6. On the other hand, Row's description of the arrangement of the spicules in the skeleton does not agree with what one sees in the hand-sections. In particular, Row's remark (p. 209), that the 'Skeleton of the chamber layer . . . consists of a great mass of sagittal triradiates . . . ' with rays ranging from 0·14 to 0·3 mm., is not realised in any one of the sections now available. In fact, the whole skeleton resembles that of *Leuconia solida* (Schmidt) except that the larger spicules are quadriradiate instead of triradiate. Moreover, the largest specimen, the only one large enough to give a real idea of the external form, is an almost exact replica of the specimen figured by Sarà (1953, pl. i, fig. 2) for Schmidt's species. This suggests that individuals with large quadri-

* The *three* drawings given by Dendy (1915, pl. i, fig. 4) are much enlarged and difficult to equate with the *two* fragments of one specimen which form the holotype.

radiates in the chamber layer may occur as a variant in that species. In that event, we could interpret Ferrer's *Leucandra bolivari* as an instance of this particular variant.

A species which, from its treatment in the literature, would appear to qualify as a distinct North Atlantic species is *Leuconia caminus* Haeckel. From its original description it would appear to have affinities with *L. solida*, but our only knowledge of it must be derived from Haeckel's (1872) words and figures, for although subsequent authors (Arnesen, 1901; Dendy and Row, 1913; Breitfuss, 1927) have mentioned it they have done no more than refer to it on the authority of Haeckel. That author stated its distribution to be Norway, British Isles, Portugal, Labrador and Barbados. Most of this range would be covered by *L. solida*; and from the Gulf of Mexico (taken for this purpose to include the Barbados) we have *Medon imberbis* Duchassaing and Michelotti, which resembles *L. solida* in external form, and in its spiculation as judged from a preparation from the holotype in the British Museum collection. If this is correct, the range of *L. solida* must be carried from the Mediterranean, across the Atlantic waters of south-west Europe, and, by way of the Cape Verde Islands (e.g. *Leucandra crosslandi* Thacker), to the West Indian area, and *L. caminus* could very well be identified with it for similarity in range as well as in morphology and anatomy.

A well-known species, having a variable external form which recalls that of *L. solida*, and having a similar spiculation to it, is *Pericharax heteroraphis* Poléjaeff, and its synonym *P. peziza* Dendy, and this ranges from Tristan da Cunha to the Indian Ocean, Indonesia and Australia. Even a cursory examination of the series of specimens assigned to these two species by previous authors gives the impression that *L. solida* may indeed extend over a wide area of the southern hemisphere. Two species from Mauritius, *Leucandra falcigera* and *L. claviformis* described by Schuffner (1877), differ from *Pericharax heteroraphis* in one main respect only, namely, in the presence of oxea. This suggests that a southern form is present showing similar variations in spiculation to those already discussed in detail for the northern specimens of *L. solida*. Added to this we have *Leucandra pulvinar* (Haeckel), closely similar to Schuffner's species, and said by its author to range from the Red Sea, through the Indian Ocean to the west coast of Australia. With both this and *L. caminus* Haeckel, we can suppose that Haeckel had before him a series of sponges covering a wide geographical range yet closely alike in their morphology and anatomy. The only striking difference between *L. pulvinar* and *Pericharax heteroraphis* is that the endosomal skeleton consists of triradiates only, instead of quadriradiates. Finally, if *L. pulvinar* is to be associated with *Pericharax heteroraphis* it will be difficult to exclude *Leucascus simplex* and *L. clavatus*, both described by Dendy from the east coast of Australia, and later recorded by Row and Hozawa from the south-west coast of Australia. Both have an endosomal skeleton of triradiates, but it may also contain occasional quadriradiates; and while *L. simplex* is without oxea, *L. clavatus* has oxea 0·7 by 0·1 mm. Significantly, both recall Sarà's specimens of *L. solida* in their external form.

The most immediate danger lies in this, that the moment we relinquish the old rigid standards, accepting in their place the newer, more elastic standards, there comes a tendency to move faster and further from sheer momentum of the impulse itself. Finding ourselves led on to include more and more names as synonyms of one species, the difficulty lies in knowing where to stop. Traditionally, we have accepted all thin white incrustations as *Leuconia nivea*. Nearly-related but more massive specimens have been accepted as *L. johnstoni*. Tubular or erect specimens have been called *L. pumila*. Now, with the closer study of their spiculations, we find they are all one species, in which both external form and spicules are variable. We also find they are conspecific with *L. solida*, and, through comparison with Sarà's specimen, with a number of other forms ranging over most of the world.

The differences in size of the sponges themselves offer no great obstacle to accepting such conclusions. As I have shown elsewhere, *Sycon ciliatum* can reach a maximum size of 10 mm. in one locality, 50 mm. in an adjacent locality and (exceptionally) 150 mm. in another locality, so that mere size is clearly not important. It may be correlated with temperature, abundance of nutrients, depth and other factors, but whereas we are uninformed on the causes of differences in size, the fact of these differences is readily demonstrable. Then comes another point, that the differences in size in *Sycon* and *Grantia* are not linked with any noteworthy differences in the shape of the sponge. This is more especially true of *Grantia*. On the other hand, if our deductions concerning the *nivea-solida* group of *Leuconia* are correct, we have to assume that in some species there may be more radical changes in shape correlated with the increase in size. Even so, there are still similarities to guide us, in form as well as in texture, which suggest that all the individuals included in such a group as *L. solida* are, in fact, related, and that we are dealing with a species that is polymorphic.

A greater obstacle lies in the presence or absence of the microdiactines and the small cruciform quadriradiates. These are not invariably present, even in the typical *L. nivea*, as we have seen. They are, also, not invariably absent from the more typical *L. solida*. Even so, there does seem to be a greater tendency for them to be developed in the smaller, and especially the encrusting, individuals. It may be, therefore, that they are more a feature of the littoral members of the group.

As we have seen there are some indications that *L. solida* may have a wide range in both hemispheres, in both temperate and tropical seas. If these indications are trustworthy we should expect to find records of the typical *L. nivea* over that range also. Such records are, however, scanty, outside Arctic and European waters. *L. fernandensis* Breitfuss, from Juan Fernandez, may represent the *L. pumila*-form of it. In addition, *Leucaltis floridana* var. *australiensis* Carter (1886), renamed *Leucandra carteri* by Dendy (1892), appears to be very close to certain forms of *Leuconia nivea* from Britain in all respects, to judge from the written description, and from examination of the types, except the size of the sponge itself. The largest of Carter's specimens measures nearly 200 mm. across, which is well in excess of any *L. nivea* I have seen. On the other hand, the types of *Leucaltis floridana* from Florida, figured by Haeckel, come close to the *L. johnstoni*-form of *Leuconia nivea* in outward form but only large and small triradiates are figured for the spicules, which brings the species into the *primigenia* group (see below).

Leucetta chagosensis Dendy (1913), from the Indian Ocean compares well with *Leuconia johnstoni* in outward form but lacks the microxea and the cruciform quadriradiates, although the rest of the skeleton resembles that of the typical *L. nivea*. To a slightly lesser degree, the same can be said of *Leucetta pyriformis* Dendy (1913), from the same area. *Teichonella prolifera* Carter (1878), referred to as *Leucilla prolifera* by Dendy (1892) and as *Leucetta prolifera* by Dendy and Row (1913) is extremely close to

L. johnstoni in outward form and its skeleton merely lacks the microxea and the cruciform quadriradiates. It may be, therefore, that more extensive shore-collecting might reveal the presence of the *L. nivea*-form over a wide range outside the northern areas from which it has been previously recorded.

The indications are, then, that there may be a species, having almost cosmopolitan distribution, of which the littoral members are low-growing and those in deeper waters larger, more massive and ranging from tubular to sacciform, or even tubular and clathrate. In such a species, the typical skeleton would consist of an ectosomal layer of triradiates, with large and small triradiates in the chamber layer and an endosomal layer of quadriradiates. There would be a tendency towards the occasional presence of large diacts, small diacts (microxea) and small (possibly cruciform) quadriradiates, as well as a tendency to the larger triradiates developing an apical ray to form large quadriradiates.

In my first survey, I segregated two groups of species as distinct from *L. solida* but having characteristics similar to it. The one I had called *Leuconia barbata*, the other *L primigenia*. It will be convenient to consider them under these headings.

Leuconia barbata, first described from the West Indies under *Medon barbata* by Duchassaing and Michelotti (1864), is very like *Leuconia solida* in shape and in the primary features of its surface, but it lacks microxea, although the surface is hispid with long oxea. *Sycaltis perforata* Haeckel (1872), from Florida, appears to be closely related but has a non-hispid surface, being wholly without oxea. Related to these is *Leuconia multiformis* Poléjaeff (1883), from Bermuda, individuals of which may have a hispid surface or may be non-hispid, although all have oxea. *L. typica* Poléjaeff (1883), with microxea and without oxea, was recorded by its author also from Bermuda, as well as the Cape Verde Islands and Australia, and although on first examination I was inclined to separate his specimens into an Atlantic and an Australian species, further study suggested that Poléjaeff's action in creating one species was the more correct. *L. rudifera* Poléjaeff (1883) is clearly related to both *L. typica* and *L. multiformis*, but has both oxea and microxea. It was originally recorded for both Bermuda and the Cape Verde Islands. In Poléjaeff's three species we have, therefore, the tacit admission, by an author of conservative ideas, that species might extend from the eastern to the western Atlantic and thence to Australia.

Following this line of distribution, we have *Leucandra verdensis* Thacker (1908) which, while lacking both oxea and microxea, has much in common with Poléjaeff's species and with *Medon barbata*. In the same way, *Leucilla intermedia* Row (1909) and *L. bathybia* (Row nec Haeckel), both from the Red Sea, must be included in this series.

From Australia we have a group of nine species, with a surprising variety of generic designations, all obviously closely related if we ignore the canal system; and all showing affinities to *Leuconia barbata*: they are *Anamixilla torresi* Poléjaeff (1883), *Heteropia spissa* Carter (1886), *H. compressa* Carter (1886) and *H. erecta* Carter (1886), all lacking oxea and microxea; *Leucandra maeandrina* Lendenfeld (1885), having oxea only; *Leuconia lobata* and *L. multifida* Carter (1886), having microxea only; and *Leucandra conica* Lendenfeld (1885), having both oxea and microxea.

To these must be added *Leuconia multiformis* var. *capillata* Poléjaeff (1883), a variety from the Philippines of his Atlantic species already noted, and *L. ovata* Poléjaeff (1883) from Kerguelen, the first with short, stout oxea, the second with microxea. And, finally, there is *Leucandra dwarkaensis* Dendy, from Okhamandal, which is almost identical with *Anamixilla torresi*.

Had Poléjaeff been aware, as we are now, of the way the characters of the spiculation could vary from one individual to another, it is tolerably certain that he would not have created so many species. As it was, he felt bound to recognise strong affinities in sponges from places as far apart as the Philippines, Australia, the Cape Verde Islands and Bermuda.

It would be difficult to say in what way the *L. barbata* group differs from the *L. solida* group or to why I should have segregated them originally. Doubtless, reasons of geography had something to do with this, as well as the chronological sequence in my review of the species. There may have been also an element of doubt in my mind that *L. solida* could have so wide a range. I mention this to show that if I now accept a close relationship between the two groups of species, this is only after careful consideration.

The usual spiculation in all these species includes ectosomal triradiates, triradiates in the chamber layer and endosomal triradiates, modification to quadriradiates being rare in the ectosomal skeleton and not unusual in the chamber layer. The endosomal skeleton may, on the other hand, consist partially or (exceptionally) wholly of quadriradiates. It would be easy therefore for the further modification to occur in which the spicules of all three layers were triradiates. This we find in the group of species which I, at first, segregated under *L. primigenia*.

There is no simple means of describing what is understood by this group. Haeckel (1872) described *Leucetta primigenia*, and this appears to be the same as he named *Sycothamnus fruticosus* in 1870. Subsequently, Poléjaeff (1883) recorded it as *Leuconia fruticosa*, Urban (1909) recognised it as *Leucetta primigenia*, and Dendy and Row (1913), as well as subsequent authors, placed it in *Leucandra*. Moreover, Haeckel subdivided the species into three subspecies, giving us little idea of the characters by which the subdivision was made. The specimens upon which Haeckel based his species vary in form from tubular to clathrate with tubular oscules, or lobose. Their spicules are triradiates only, very variable in size. Subsequent authors appear to have placed their individual interpretations on Haeckel's words, although none is clear as to the basis for any particular interpretation, and, briefly, we arrive at the following situation: *Leucandra primigenia*, with triradiates having rays 0·1 to 0·2 by 0·009 to 0·014 mm., ranging from the Mediterranean, South Africa, Red Sea, Indian Ocean, Kerguelen and the Pacific Ocean; and *L. microraphis* (originally *Leucetta primigenia* var. *microraphis*), with two sizes of triradiates having rays 0·8 by 0·085 and 0·15 to 0·2 by 0·015 to 0·02 mm. respectively, ranging from the West Indies to Australia. Without being able to compare directly all specimens ever recorded under these two names, it is impossible to be more precise. There is enough here, however, in conjunction with what is now known of *L. solida* and *L. barbata*, to suggest that these specimens represent a further variation, with triradiates only, of the widespread species we are considering. There appear to be the same external form, the same variations in that form, similar variations in the size and shape of the spicules, and a similar geographical range.

Jenkin (1908) described another variety from the Antarctic, under *Leucandra primigenia* var. *leptoraphis*, having triradiates almost identical with those of *L. primigenia*, as set forth above, and this is clearly identical with *Leucetta antarctica* Dendy (1918), from

Macquarie Island. A fair series of specimens, identified as *Leucandra leptoraphis* (Burton, 1929), from the Antarctic, shows a range of external form strikingly similar to that of Sarà's figured specimens of *L. solida*, from the Mediterranean. Either there is complete confusion here, or we are in the presence of a variety of *L. solida*, with triradiates only, recorded more especially for the Southern Hemisphere.

This division is, however, by no means well-marked. There are, in fact, several species which appear to bridge the gap between *L. solida* and *L. leptoraphis*. There is, for example, a series of three, described by Jenkin (1908), from the same locality in the Antarctic, under *Leucandra frigida*, *L. brumalis* and *L. gelatinosa*. These, with *L. mawsoni* Dendy (1918), from Macquarie Island, I had already included in one species (Burton, 1929). In all these, the ectosomal and chamber layer skeletons consist of triradiates only, but the cloacal wall and the walls of the exhalant canals are lined with quadriradiates. The specimens themselves are subspherical to tuberose, and recall in general appearance *L. primigenia* var. *leptoraphis* and *L. antarctica*, from these same areas. Another link is provided by *Pericharax carteri* var. *homoraphis* Poléjaeff (1883), from Tristan da Cunha, which has some quadriradiates in the ectosomal and chamber layer skeletons, in addition to the triradiates, as well as the quadriradiates in the endosomal skeleton.

If all the specimens discussed here under *L. nivea*, *L. solida*, *L. barbata*, *L. primigenia* and *L. leptoraphis* are included under one species, the range of variation in their spicules alone would not be as great as that represented in Topsent's illustrations for the ascon sponges (see p. 160). On the other hand, there is a greater range, or, at least, an apparently greater range, in the architecture of the skeleton as a whole. This may be due to the greater sizes of the spicules, which tends to throw minor differences into bolder relief, as well as to their division into a greater number of categories, which alone would provide the larger number of permutations and combinations. At all events, one experiences less readiness to accept this wide range of *Leuconia*-forms as a single species than is the case with either the *Leucosolenia*, *Clathrina*, *Grantia* or *Sycon*. One factor alone is operative here to produce this different attitude of mind. It is very easy to collect a hundred individuals for any of these last four genera and to do so within a limited territory. Examples of *Leuconia* are, by contrast, more scattered, so that under ordinary circumstances a hundred individuals would be drawn from a wider area. As a result, those things that are readily recognisable as individual variations in, say, *Sycon ciliatum* could appear in a comprehensive species, *Leuconia nivea* (+*L. solida*+*L. barbata*+*L. primigenia*+*L. leptoraphis*), as ecological variations, or even as subspecific differences, when they are, in fact, only individual differences.

In the effort to resolve this problem, the following remarks may be helpful. They are, it is true, based upon impressions rather than precise analyses, but they are impressions gained from the comparative study of hundreds of preparations. If they could be later substantiated by experimental or biometrical studies they would go far in accounting for differences seen in the spiculations of apparently related forms. They suggest, at the least, that many of the differences are environmental rather than genetical. Briefly summarised, it appears probable that: (*a*) some or all categories of spicules may be extruded, either periodically or continuously; (*b*) the size, or even the shape, of spicules may be correlated with the amount of calcium carbonate available at the time of their development; and (*c*) the spicules may not necessarily be laid down *in situ*. These three points can now be amplified.

(a) Direct experiment with live specimens of a species of *Haliclona*, carried out by me some years ago, showed that spicules are extruded, and apparently continuously. Supporting evidence for this can also be found abundantly in preserved material (see Burton, 1931). The only feasible explanation of the distribution of the surface diacts in *Grantia compressa* seems to lie in the assumption that these spicules are subject to loss and replacement. When we find, for example, that in two individuals, otherwise alike, one has a dense palisade of diacts and the other has whole areas devoid of them, or that over the whole surface there are merely isolated diacts, it looks as if the second individual is in the final stages of shedding these particular spicules. In the same way, if in two similar individuals one possesses clavate diacts and the other a mixture of clavate and oxeote diacts, it could be that in the second the extrusion of a former uniform palisade of clavate diacts is taking place simultaneously with their replacement by the new set of oxeote diacts. When we remember the extraordinary degree to which the complement of diacts may vary, in numbers and in shape, from one part to another of the same sponge or from one sponge to another, in *Grantia compressa*, this suggestion is less remarkable than at first sight appears.

In *Sycon ciliatum*, the diacts ornamenting the distal ends of the flagellated chambers vary from sparse to numerous and from very thin (trichoxea) to thick (oxea), either within the one sponge or from one sponge to another. If we assume that extrusion of spicules may be periodic or, at other times, erratic, and that trichoxea are the initial stages in the development of oxea, then much that has hitherto been puzzling now becomes reasonably explained.

In *Leuconia fistulosa* the tangential triradiates of the surface skeleton may form a single layer or may be composed of several layers. There are also individuals in which, at least in parts of the surface, even the single layer of triradiates becomes so thin as to appear to be breaking down. Often the surface triradiates appear irregularly arranged with many set at right angles to the surface, whereas in others they are evenly and regularly tangential. It is ordinarily assumed that this is either a post-mortem effect, or a derangement arising in the course of cutting the section, when it is seen in a microscope preparation. Again, postulating an extrusion of the spicules is the more satisfactory means of explaining all these varying appearances.

So one could take one category of spicules after another, in one species after another, and demonstrate similar variations, in the numbers of a given spicule present, in the distribution and positioning of particular types of spicules, and in the mixture of shapes present. Where sufficient material is available it can always be reasonably suggested that the differences seen could be due to movements within the skeleton itself.

Apart from the possibility of continuous, periodic or erratic extrusion of spicules, we are too prone to overlook that a sponge is capable of limited spatial movement, of much internal reorganisation, and, as shown by studies on gemmules, of considerable transporting of spicules from one part of the body to another. Taken in conjunction, all these potentialities should lead us to expect wide limits for the types of spicules present, and for their distribution and arrangements, even within a group of related individuals, at any given moment in time.

(b) An alternative hypothesis to that of the extrusion of the spicules, to explain the presence or absence of, say, oxea or microxea, in otherwise similar individuals of a species, could be that the kinds of spicules produced are related to the supply of materials needed for their manufacture. Such an hypothesis would need to take into account that the capacity of the cells of any individual sponge for a spicule-secretion is likely to vary. Thus, of two sponges growing side by side, whether of the same or different parent-stock, one may produce larger spicules than the other. There seems to be evidence also that this same capacity may vary with time. It happens very frequently that, for a given category, some of the spicules appear larger than the rest. Careful measurement reveals, however, that the increase in size is concerned with the thickness of the rays, not of their length. Moreover, the outline of the rays is sinuous instead of straight, giving the appearance of superfluous material having been added, and of having been added in a random manner (fig. 152). It may be that the so-called silica 'pearls', seen in some Demospongiaria, which on occasion make up a high proportion of the total mass of skeleton, represent such superfluous material secreted independently of the elements responsible for shaping the spicule.

At all events, in the Calcarea, the number of occasions on which excessive ornamentation is seen to have been laid down on some spicules, at the same time as other spicules appear to have received excessive amounts of calcium carbonate in the form of thickened or lengthened rays, is too high to be disregarded. Above all, there is what may be called briefly the evidence of the quadriradiates. Whatever may be the place of the triradiate phylogenetically, it is the most common spicule today, taking the Calcarea as a whole. The triradiate undergoes, however, a ready modification to a quadriradiate, and this is especially true of the spicules laid down in the exhalant linings of the sponge. Next in succession, the triradiates of the chamber layer undergo this modification; and least often do the radiates of the ectosomal skeleton. If, in a given species, triradiates are typical for all three layers, the modification to quadriradiates will be the most frequent in the exhalant (cloacal) linings, followed by their occurrence in the chamber layer, and, least often, in the ectosomal layer. Moreover, the variation in the length of the apical rays will be greatest in the exhalant layers. Thus, in sections from a series of *Sycon ciliatum*, even while the remaining radiates remain relatively constant, those of the exhalant linings may vary from triradiates only (very rare) to a mixture of triradiates and quadriradiates or to quadriradiates only. In the latter event, the apical rays projecting into the exhalant linings may range from very short to very long and sinuous, and this is especially true of those lining the cloacal cavity. Correlated with this is the number and size (i.e. the total mass) of the diacts ornamenting the distal ends of the flagellated chambers. There appears to be a direct relation between the two: when the diacts have a large total mass the apical rays of the endosomal quadriradiates will be numerous and long. That is, an increase in the total mass of spicule-material in the ectosomal skeleton appears to be correlated with a comparable increase in the endosomal skeleton. In *Sycon*, this increase is normally manifested in an increase in the size of the diacts of the distal ends of the chambers, but sometimes these will remain small, while the triradiates associated with them will be thickened. In *Grantia compressa*, with large radial chambers, there appears to be a similar correlation between the ectosomal diacts and the apical rays of the endosomal quadriradiates. It appears as if those layers in contact with the greatest volume of water are most prone to produce the excess mass of spicules, in the form of large diacts, rich ornamentation, hypertrophied triradiates or excessive apical rays.

There is an interesting converse to this in such forms as *Leuconia nivea.* In them, the canal system consists of numerous small, scattered chambers, so that abundant inhalant and exhalant canals traverse the body wall. There, the hypertrophy of spicules is most marked in the chamber layer.

L. nivea occasionally, but not commonly, produces large diacts. It is conceivable that their occurrence is the result of a relative superfluity of spicule-forming material. This, and other suggestions made here, are worthy of more careful investigation than has been possible in conjunction with this work.

(c) A marked difference between the Demospongiaria and the Calcarea is that immature spicules can be frequently seen in the former but rarely in the latter. In the Demospongiaria it is possible, very easily, to follow the development of the spicules and, in many instances, to see how they are transported from their place of origin to their ultimate position within the skeleton. All this is visible in sections of preserved material. A possible explanation of the difference between the two classes may be that calcareous spicules develop much more rapidly than siliceous spicules. It could be, on the other hand, that there is no extrusion of spicules in Calcarea, and that what has been already written on this point is incorrect. Yet the signs are against the rejection of this. The manner in which coteries of microxea or of the cruciform quadriradiates appear in sections of *Leuconia nivea* has all the appearance of these spicules being formed in certain areas of the chamber layer, and thence dispersed. Even more striking is, perhaps, the appearance of the so-called colossal oxea in *Aphroceras.* In typical specimens they lie tangentially in the surface layers, but in some specimens a few protrude slightly, at an angle to the surface. In other specimens they are all set at right angles to the surface; and in a long series of individuals all intermediate conditions may be seen between the two extremes. The appearance is that the colossal oxea, laid tangentially at first, are later moved through 90 degrees to project from the surface. It is even possible that they are then extruded.

Most of the suggestions included under (*a*), (*b*) and (*c*) are hypothetical and founded upon random observations. To test any one of them would require special research. Yet, whether these suggestions are correct or incorrect, there can be little doubt that much of the observed variation in the skeletons of sponges can only be explained on the assumption that the sponge is a plastic organism, and that its skeleton is not necessarily static.

Mention may be made appropriately here of a study carried out by Sasaki (1941) on *Sycon okadai.* He found a surprisingly regular correlation between the diameter of the cloacal cavity, the length of the flagellated chambers and the size of the sponge itself. He also found a regular correlation between the sizes of the spicules and the size of the sponge. These results are at variance with my own observations, and I feel they need to be checked by measurements made on individuals not growing all together, as those investigated by Sasaki evidently were. There is one feature of his studies which is of particular interest here. This is, that he should have found the rays of the triradiates, in an otherwise remarkably homogeneous population, ranging from about 0·05 to 0·4 mm. in length.

B. The Phylogenetic Significance of the Canal-System

We have grown accustomed, during the last seventy years, to recognising a sequence of increasing specialisation in the canal-system, from the simple 'olynthus', through the ascon to the sycon and leucon types, with the sylleibid as an intermediate between the last two. The 'olynthus' is, at best, usually an early stage in the life-history of *Clathrina coriacea.* Whether it represents an early stage in the phylogeny of the Porifera is a matter of opinion. My own view is that the first sponges were simple aggregations of amoeboid cells which, at a subsequent stage, showed a differentiation into amoebocytes and choanocytes, comparable to the so-called rhagon of some of the Demospongiaria. The counterpart of this, in the Calcarea, would then approximate to the leucon-type. There is no palaeontological evidence to guide us in this, and the embryological evidence is conflicting. If we are to rely on criteria afforded by the spiculation, there is as much to be said for taking the view that recent leucon-types represent the closest approximation to the earliest sponges, and that the ascon represents a simplification, coupled, in so far as the whole internal surface is lined with collared cells, with a specialisation. Certainly, as will be shown abundantly later, the sycon, sylleibid and leucon canal systems occur as simple variations, either as between individuals of the same species or within a single individual.

It may still be that these types of canal-system represent stages in the phylogeny, in which event it would be difficult to say in which order they should be placed. As has already been said, for simplicity in teaching there is much to be said for retaining the older ideas. For purposes of classification I have compromised in placing the ascon-type (i.e. Homocoelidae) first, but I cannot with conviction do other than treat the sycon-type as more specialised than the leucon-type.

The importance given to the concept of the olynthus as the prototype also led to vain attempts to homologise the three layers in its body-wall with the ectoderm, mesoderm and endoderm of other Metazoa. Further, the fact that the central cavity of the olynthus is lined with collared cells, which have a digestive function, has resulted in the use of the term 'gastral cavity' for any centralised exhalant cavity, when, in fact, it is cloacal, as in the sycons and leucons. The exit from this so-called gastral cavity has been named an oscule, when it is, in fact, a vent. In the following pages, therefore, a revised terminology will be used:

vent, to signify an exhalant opening at the surface (the equivalent of 'oscule' as formerly used);
gastral cavity, for the true gaster of the ascons;
cloacal cavity, for the main exhalant cavity in all but the ascon sponges;
ectosome, to replace the terms 'dermis' or 'ectoderm';
choanosome, or chamber layer, to include all tissues lying between the ectosome and the endosome;
endosome, to include the tissues lining the main cloacal or exhalant cavities.

The use of some of these terms must be purely arbitrary since it is not always possible to say where one layer begins and ends, nor is it possible always to make a clear distinction between a main exhalant cavity and those cavities or canals subsidiary to them. In such plastic organisms as sponges, rigid definitions are seldom possible, but it is found that, for practical purposes, there is little objection or difficulty in recognising what is meant by the terms here proposed.

In their classification of the Calcarea, Dendy and Row (1913) were seeking a phylogenetic basis and to this end they laid a major emphasis on the anatomy, especially of the collared cells and of the flagellated chambers. This second feature seemed, by its very nature, unreliable and this is borne out by the diagnoses submitted by these two authors. Among the calcareous sponges outside the genera *Leucosolenia*, *Dendya*, *Ascute* and *Ascyssa*, constituting the family Homocoelidae, we find the canal system (based upon the form of the flagellated chambers) varying enormously within each family. Thus, in the Leucascidae Dendy and Row say: 'Flagellate chambers ranging from long and possibly branched . . . to small, approximately spherical, and scattered'. Nothing is said in the diagnosis of the Leucaltidae of the flagellate chambers, but of the two genera included in this family, *Leucaltis* has the chambers 'elongated and branched', while *Leucettusa* has 'Canal system leuconoid' (i.e. with chambers small, approximately spherical, and scattered). The Minchinellidae has the 'Canal system leuconoid (in all known forms and presumably always so)'. There are, however, only four species in this genus, far too few to justify such a generalization. For the Murrayonidae, with one known species, these joint authors are content with 'Canal system presumably always leuconoid'. The Sycettidae have 'Flagellate chambers elongated' apparently invariably; the Heteropiidae, Grantiidae and Amphoriscidae, have 'chambers varying from elongated . . . to spherical and irregularly scattered'. The Lelapiidae, comprising two species only, have a canal system ' . . . presumably always leuconoid'.

As we shall see under *Grantia hirsuta*, there are a number of forms from the Antarctic, having almost identical skeletons, which have been referred first to *Grantia* then to *Leucandra*, when in fact they all appear to be members of a single species. This was because Dendy and Row made the arbitrary division between *Grantia*, with elongated chambers (i.e. syconoid) and *Leucandra*, with chambers spherical and scattered (i.e. leuconoid). The answer to this was, in fact, given by Dendy himself (1893, p. 183). Writing of *Vosmaeropsis wilsoni* he says: 'The chambers vary to a remarkable extent in shape and size, from approximately spherical ones of about 0·072 mm. in diameter, to elongated sac-shaped ones of as much as 0·37 by 0·13 mm. It is right to state that the measurements were taken from different specimens, but the species is so well characterised that it would be difficult to make a mistake in identification, and we also find considerable variation in the chambers, even in the same section'.

It is very clear from this, as well as from other less strongly-established sources, that the flagellate chambers have a very limited value in taxonomy. One of the most striking examples of this is contained in a series of stained preparations of *Leuconia fistulosa*, from Plymouth, made by L. R. Crawshay, and now in the British Museum. In one of these the flagellated chambers are small and scattered, in another they are large and scattered, and in the rest they vary from sylleibid to syconoid (see p. 7). In the following pages, therefore, the spicules only will, with rare exceptions, be used in diagnoses.

C. The Taxonomic Value of the Position of the Nucleus in the Collared Cell

Minchin (1896) was the first to demonstrate two types of collared cells in the homocoel sponges: with the nucleus apical and basal respectively. On the basis of this, Bidder (1898), suggested dividing the whole of the sponges into two groups, Basinucleata and Apinucleata. Although he did not proceed with the idea he did, nevertheless, recognise two groups of Calcareous sponges, the Calcaronea, with apical nuclei, and the Calcinea, with basal nuclei.

Dendy and Row (1913) accepted these suggestions with modifications, and with some hesitation. Nevertheless, they used the underlying idea in expressing their phylogeny of the Calcarea. In support of this, they tabulated the names of species investigated by them to show whether there was present an apical or a basal nucleus. This list is reproduced here.

List of species of Calcarea, as given by Dendy and Row, showing the position of the nuclei of the collared cells

[The present equivalents of the species are given in the right-hand column.]

NUCLEI APICAL

Leucosolenia bella	*nom. nud.*
,, *complicata*	*Leucosolenia botryoides*
,, *lucasi*	,, ,,
Sycon boomerang	*Scypha laevigata*
,, *carteri*	,, *gelatinosa*
,, *gelatinosum*	,, ,,
,, *giganteum*	,, *laevigata*
,, *lendenfeldi*	,, *ciliata*
,, *ramsayi*	,, *ramsayi*
,, *raphanus*	,, *ciliata*
,, *setosum*	,, ,,
,, *verum*	,, *laevigata*
Grantessa erinaceus	*Scypha ramsayi*
,, *hastifera*	*Sycettusa bathybia*
,, *hispida*	*Scypha ramsayi*
,, *poculum*	*Sycettusa bathybia*
,, *polyperistomia*	,, ,,
,, *sacca*	*Scypha ramsayi*
,, *intusarticulata*	*Sycettusa glomerosa*
Heteropia glomerosa	*Sycettusa glomerosa*
,, *simplex*	,, ,,
Vosmaeropsis dendyi	*Sycettusa bathybia*
,, *depressa*	*Leuconia barbata*
,, *macera*	*Sycettusa bathybia*
,, *primitiva*	*nom. nud.*
,, *wilsoni*	*Leuconia barbata*

Grantia compressa	*Scypha compressa*
,, *genuina*	*nom. nud.*
,, *vosmaeri*	*Hypograntia infrequens*
,, *indica*	*Scypha ciliata*
Teichonopsis labyrinthica	,, *labyrinthica*
Grantiopsis infrequens	*Hypograntia infrequens*
Ute syconoides	*Aphroceras ensata*
,, *spiculosa*	,, ,,
Synute pulchella	*Aphroceras ensata*
Leucandra hispida	*Scypha ciliata*
,, *australiensis*	,, *ramsayi*
,, *echinata*	,, *ciliata*
,, *maeandrina*	*Leuconia barbata*
,, *minima*	,, ,,
,, *phillipensis*	*Scypha ciliata*
,, *thulakomorpha*	*Scypha ramsayi*
Aphroceras cataphracta	*Aphroceras ensata*
Amphoriscus oblatus	*nom. nud.*
Leucilla australiensis	*Amphoriscus cucumis*
,, *princeps*	*Scypha ramsayi*
Lelapia australis	*Lelapia australis*

NUCLEI BASAL

Leucosolenia falcata	*Clathrina coriacea*
,, *stolonifer*	*Leucosolenia asconoides*
,, *ventricosa*	*Dendya poterium*
,, *gardineri*	*Clathrina coriacea*
,, *coriacea*	,, ,,
,, *depressa*	*Dendya poterium*
,, *cavata*	,, ,,
,, *pelliculata*	,, ,,
,, *proxima*	,, ,,
,, *pulcherrima*	*Clathrina coriacea*
,, *vitraea*	*Dendya poterium*
Dendya tripodifera	*Dendya poterium*
Ascute uteoides	*Leucosolenia asconoides*
Leucascus simplex	*Leuconia barbata*
,, *insignis*	*nom. nud.*
,, *clavatus*	*Leuconia barbata*
Leucetta chagosensis	*Leuconia barbata*
,, *expansa*	,, ,,
,, *microraphis*	,, ,,
,, *prolifera*	,, ,,
,, *pyriformis*	,, ,,
Pericharax heteroraphis	*Leuconia barbata*
,, *peziza*	,, ,,
Leucaltis clathria	*Leucettusa corticata*
Leucettusa dictyogaster	,, *imperfecta*
Minchinella lamellosa	*Minchinella lamellosa*
Murrayona phanolepis	*Murrayona phanolepis*

The list originally proposed is convincing in that the species fall into convenient groups consistent with the classification used by Dendy and Row. There are, however, two objections. The first is that the number of species is 74, representing ten per cent of the total number of species they recognised. Unfortunately, of this 74 species examined, five were subsequently shown to be invalid. Even so, that percentage would be significant, if everything else is equal. The second objection is that the position of the names in the table given by Dendy and Row must, to some extent, have been influenced by their acceptance of the idea, and if a classification is based upon a certain premiss, it is inevitable that that classification will appear to support the premiss. This, one feels, may have happened in the classification proposed by Dendy and Row.

If the species in their table be now repeated using the equivalent of the names, as judged by the character of the spicules alone, we obtain the following result:

NUCLEI APICAL	NUCLEI BASAL
Leucosolenia botryoides	*Leucosolenia asconoides*
Leuconia barbata	*Clathrina coriacea*
Sycettusa bathybia	*Dendya poterium*
,, *glomerosa*	*Leuconia barbata*
Hypograntia infrequens	*Leucettusa corticata*
Amphoriscus cucumis	,, *imperfecta*
Scypha laevigata	*Minchinella lamellosa*
,, *gelatinosa*	*Murrayona phanolepis*
,, *ciliata*	
,, *ramsayi*	
,, *compressa*	
,, *capillosa*	
,, *labyrinthica*	
Aphroceras ensata	
Lelapia australis	

To a great extent this revised list still serves to uphold the ideas enunciated by Minchin and Bidder and adopted by Dendy and Row. It is, however, important to note that one species of *Leucosolenia* has an apical nucleus and another species a basal nucleus. In addition, a species of *Leuconia* has both apical nuclei and basal nuclei.

Were it possible to establish a genus on so simple a character, or to use that character as a guide to phylogeny, the task of classifying the Calcarea would be considerably reduced, and no criticism can be levelled at Dendy and Row for having attempted to use it. At the same time, on their own admission, they were working upon unsure foundations. On page 799 we read: 'It must, of course, be remembered that the real difference between the two types of collared cells concerns, as Minchin has shewn [1909], the relation of the flagellum, with its basal granule, to the nucleus. This relation has, of course, only been determined in a very few cases. In *Leucosolenia coriacea*, for example, the basal granule is situated at the apex of the cell and the nucleus at the base, while in *L. complicata* the flagellum appears to spring from the nucleus itself, which is apically situated. There can be no doubt that the actual position of the nucleus itself in the collared cell may vary temporarily under certain conditions, but in good spirit-preserved material it appears always to settle down into a characteristic position, which is either basal or apical, and which may be determined without resort to special methods of cytological investigation. We do not wish to lay undue stress upon this character at present, and we should not venture to use it were it not associated with other distinctive features, but we have been surprised, in view of our former opinion as to the systematic value of such a character, to find how constant the position of the nucleus is in the two lines of descent indicated.'

Clearly, the two authors felt uneasy about their use of this histological character. This is evident in the paragraph just quoted, which presumably was written after they had finished their work on the classification. When we turn to page 709, on which, presumably, are expressed the ideas from which they started, we read: 'Indeed, the acceptance of this principle [that is, the use of the position of the nucleus in the collared cell], if only in a tentative manner, constitutes the chief difference between our present views on the subject and those which we previously held; but in the present state of our knowledge it is a principle which must not be pushed too far, and we have only been able to make use of it as subsidiary to more easily determined characters.'

It cannot be said with complete confidence that using the characters of the spicules affords a more solid basis than the use of the position of the nucleus in the collared cells. The best we can say is that there is if anything less doubt about the value of their use. Until such time as very extensive research has proved or refuted the value of the position of the nucleus I propose to ignore it.

D. The Analysis of Genera recognised hitherto, with their present equivalents

The genera are discussed here in the order in which they were set forth by Dendy and Row (1913), and for guidance their list is repeated.

CLASS AND ORDER CALCAREA

Family Homocoelidae
Genus *Leucosolenia*
,, *Dendya*
,, *Ascute*
,, *Ascyssa*
Family Leucascidae
Genus *Leucascus*
,, *Ascoleucetta*
,, *Leucomalthe*
,, *Leucetta*
,, *Pericharax*
Family Leucaltidae
Genus *Leucaltis*
,, *Leucettusa*

Family Minchinellidae
Genus *Minchinella*
,, *Petrostroma*
,, *Plectroninia*
Family Murrayonidae
Genus *Murrayona*
Family Sycettidae
Genus *Sycetta*
,, *Sycon*
,, *Sycandra*
Family Heteropiidae
Genus *Grantessa*
,, *Heteropia*
,, *Amphiute*

Family Heteropiidae
  Genus *Vosmaeropsis*
  ,, *Grantilla*
Family Grantiidae
  Genus *Grantia*
  ,, *Paragrantia*
  ,, *Teichenopsis*
  ,, *Grantiopsis*
  ,, *Sycute*
  ,, *Ute*
  ,, *Synute*
  ,, *Sycodorus*
  ,, *Achramorpha*
  ,, *Uteopsis*
  ,, *Anamixilla*
  ,, *Sycyssa*
  ,, *Megapogon*
  ,, *Leucandra*
  ,, *Jenkina*
  ,, *Baeria*

Family Grantiidae
  Genus *Leucopsila*
  ,, *Aphroceras*
  ,, *Leucettaga*
  ,, *Paraleucilla*
  ,, *Lamontia*
  ,, *Leucyssa*
  ,, *Trichogypsia*
  ,, *Kuarrhaphis*
  ,, *Eilhardia*
Family Amphoriscidae
  Genus *Amphoriscus*
  ,, *Syculmis*
  ,, *Leucilla*
Family Lelapiidae
  Genus *Lelapia*
  ,, *Kebira*
Incertae Sedis
  Genus *Sycaltis*

Genus **Leucosolenia** Bowerbank

In a series of papers published in recent years, Sarà has drawn attention to the wide variations obtaining in the Calcareous sponges, in both their spiculation and their gross morphology. In two of these papers (1952, 1953) devoted more especially to the genus *Leucosolenia*, he gives more solid expansion to ideas tentatively proposed by Minchin (1905), Topsent (in several works but more especially that of 1936) and myself (1929). It is because Sarà's expressed views coincide so closely with my own, that I accept them without hesitation. Moreover, while Sarà contents himself with a survey of the Calcarea of the Mediterranean and adjacent areas, it is clear, when one applies his conclusion to the rest of the world, that we have two species of ascon sponges that are almost cosmopolitan, with a localised species in Australian waters, and another extending thence northwards to Japan and with one well-defined species off South Africa.

For the Mediterranean area, Sarà recognises two species, *Clathrina coriacea* and *Leucosolenia botryoides*. In the first he includes *L. blanca*, *L. lacunosa*, *L. cerebrum* and *L. falcata*, which he treats as forms. In the second, he includes two forms, the forma *variabilis* and the forma *parthenopea*. I would go further than this, however, and say that it is useless trying to recognise forms except as a matter of local convenience. Thus, in the Bay of Naples, where Sarà worked, it may be possible to recognise seven forms, but taking the world as a whole we should end with as many forms as we had species heretofore, and possibly more. For purposes of practical taxonomy we must treat of *Clathrina coriacea* and *Leucosolenia botryoides* as comprehensive species, ignoring their possible subdivision into forms.

In using this division, Sarà has reverted to the generic distinction favoured by Minchin and Bidder, but opposed by Dendy. It is proposed here to accept *Clathrina* and *Leucosolenia* as distinct genera.

In addition to the species (i.e. named forms) included under these two headings by Sarà, I would add the following:

Under **Clathrina coriacea**

As listed in Dendy and Row (1913) under *Leucosolenia*

atlantica Thacker
dictyoides (Haeckel)
canariensis (Maclay)
cancellata Verrill
contorta Bowerbank
convallaria (Haeckel)
falklandica Breitfuss
flexilis (Haeckel)
gracilis (Haeckel)
lamarcki (Haeckel)
macleayi (Lendenfeld)
minoricensis Lackschewitsch
panis (Haeckel)
phillipina Breitfuss
pulcherrima Dendy
sagittaria (Haeckel)
sceptrum (Haeckel)
spongiosa (Koelliker)
stipitata Dendy
tenuipilosa Dendy

Species described since 1913

feuerlandica Tanita
gardineri Dendy
izuensis Tanita
mutsu Hozawa
pyriformis Tanita
sagamiana Hozawa
ventosa Hozawa

Species regarded, but with hesitation, as synonyms of *Clathrina coriacea*

albatrossi Hozawa
dubia Dendy
laxa Kirk
psammophila Row and Hozawa

L. albatrossi is described as having a pseudogaster but it is so like *Clathrina coriacea* in outward form and in spiculation that it seems impossible to suppose it is not identical with it.

L. dubia, *L. laxa* and *L. psammophila* are very like *Clathrina coriacea* but may prove to be young forms of *Dendya poterium*.

Under **Leucosolenia botryoides**

As listed in Dendy and Row (1913)

complicata (Montagu)
discoveryi Jenkin
eleanor Urban
irregularis Jenkin
lucasi Dendy
sertularia (Haeckel)
tenuis (Schuffner)
thamnoides Haeckel

Described since 1913

aboralis Brøndsted
australis Brøndsted
hispida Brøndsted
kagoshimensis Hozawa
mollis Tanita
nautilia de Laubenfels
pilosella Brøndsted
primordialis var. *apicalis* Brøndsted
serica Tanita
solida Brøndsted
tenera Tanita

Species regarded, but with some hesitation, as synonyms of *Leucosolenia botryoides*. [In these instances it has not been possible to examine original material and the descriptions are not always adequate. There is, however, a general resemblance to *L. botryoides*.]

densa (Haeckel)
horrida (Schmidt in Haeckel)
incerta Urban
japonica (Haeckel)

L. clarkii (Verrill) might prove to be a synonym of *L. botryoides* if the type could be re-examined.

In addition to the species here distributed between *Clathrina coriacea* and *Leucosolenia botryoides*, there are three species of Homocoelidae, one from Australia, namely, *L. asconoides*, one from South Africa, namely, *L. cordata*, and *Dendya poterium*, ranging from Australia to Japan, which possesses auxiliary structures that have been called pseudoderm, pseudoscule, pseudogaster, etc.

Genus **Dendya** Bidder

In his redescription of the type-species, *Dendya tripodifera* (Carter), Dendy speaks of the 'dermal' (tripod) spicules as varying in the extent to which they are developed in different specimens. He also speaks of having had 'a good many specimens' for examination. Only four of these are represented in the British Museum collections and from these it is clear that, in addition to the tripods, the ectosome is supported by triradiates with rays stouter than those in the deeper tissues. This second category of ectosomal triradiates appears to have been completely overlooked by Dendy since it is not figured in the group of spicules shown in his pl. xi, fig. 5. They are similar to the dermal triradiates of *D. triradiata* Tanita, but whereas the rays of those measure 0·22 to 0·25 by 0·02 to 0·026 mm., the rays of the corresponding spicules in *D. tripodifera* measure up to 0·128 by 0·02 mm.

There are many intermediates between this second category of ectosomal triradiates and the tripod spicules. Moreover, the tripods themselves may vary in number, being very rare in Dendy's R.N.30, such as are present resembling more the ectosomal quadriradiates of *D. quadripodifera*, except in their smaller size and in the absence of the apical ray.

It is necessary here to draw attention to a most extraordinary line of action, first by Dendy and Row (1913) and later by Row and Hozawa (1931), in regard to *Leucetta clathrata* Carter. In 1891 (p. 68), Dendy accepted this as synonymous with *Leucosolenia tripodifera* but wrote: 'As the name *clathrus* has already been used for a species of *Leucosolenia* and as the original description of *Leucetta clathrata* was so imperfect we may perhaps with advantage retain Mr. Carter's later name *tripodifera* for the species under consideration, in preference to reverting to the name which seems to have a prior claim.'

Even if such action had been justified, there should have been a reversion to the trivial name *clathrata* when the species was made the type of the genus *Dendya*. In any case, a name '*clathrus*' cannot pre-empt the name '*clathrata*'. More remarkable still is the fact that in spite of Carter's imperfect description, Dendy and Row accepted the form, known as *clathrata*, as a valid species of *Leucosolenia*. But the original description was not so imperfect as to prevent Dendy and Row recognising *L. intermedia* Kirk as synonymous with it. In fact, the species proves to have been so well-delineated by Carter that they were able to add to its synonymy list '*Grantia cliftoni* Bowerbank MS, *fide* Row 1913 MS' about which nothing was known before and of which nothing has been heard since.

According to Carter (1886:508) and Dendy (1891:68) there is no significant difference between *Leucetta clathrata*, *Leucosolenia tripodifera* and *L. tripodifera* var. *gravida*.

Presumably it was on Row's suggestion that Dendy agreed to a reversal of this view, for in Row and Hozawa (1931:731) we read that 'between *Dendya tripodifera* and *Leucosolenia clathrata* there are a number of very important differences, the chief being the general shape of the sponge-colony and the type of canal system. The quotation from Carter's original description shows that his specimens were individuals of the ordinary 'Clathrinid' type, forming a low-lying reticulation of ascon-tubes, and totally different to the erect 'radiate' colony of *Dendya*, and that the two species have been long confounded must undoubtedly be put down to the fact that *Leucosolenia clathrata* has never been recognised since Carter first described it until now. The species is, however, represented by a considerable number of specimens of all sizes in the present collection, and we have been enabled to make a complete re-investigation of its character and in particular of the canal system, which presents certain very curious resemblances to that of *Dendya*, not referred to by Carter. We think, however, that the description of the canal system given below will show that these resemblances are not evidences of close relationships, but merely due to convergence.'

Quite certainly neither of these authors could have examined the specimens assigned to *Dendya tripodifera* or they could not have failed to notice that Dendy's drawing (1891: pl. v, fig. 3) is idealised, that whereas most of the surface is as he has shown it, there are considerable areas of it in which the radial tubes become 'Clathrinid'. There is no question that *Leucetta clathrata* Carter and *Dendya tripodifera* are two species owing their resemblance to convergent evolution. The more reasonable interpretation is that the first represents the young and the second the adult stages of one and the same species.

If now, we turn to other species from Australia, we find a decidedly curious situation. *Leucosolenia proxima* Dendy is represented in the British Museum collections by four specimens, together with the original preparations made from them by Dendy. Two of these specimens have the large ectosomal triradiates described by Dendy (1891); a third has, in addition to these, tripods and numerous intermediates, as in *L. intermedia* Kirk; and the fourth has the large triradiates and numerous tripods. Yet Dendy made no mention of the presence of the tripods or of the intermediates. All four specimens of *L. proxima* would appear from their external form to be conspecific, yet on their anatomy, if we are to attach importance to details of spiculation, they must belong to three distinct species, *L. clathrata*, *L. intermedia* and *Dendya tripodifera*. Even more astonishing is the fact that the triradiates of the first two specimens, said in the original description to have rays measuring 0·16 by 0·021 mm., have rays measuring up to 0·25 by 0·056 mm. Indeed, except for the slightly smaller size of these rays it is impossible to believe that there is any real distinction between the *Leucosolenia vitraea* described as new by Row and Hozawa, from south-west Australia and *L. proxima* as represented by the two specimens with the large ectosomal triradiates. Further, these two specimens of *L. proxima* have very nearly identical spicule characters with *Dendya triradiata* Tanita, from Japan.

For *Leucosolenia pelliculata* Dendy we have a series of five specimens in the British Museum collection all named by the original author. In his original description, the ectosomal triradiates in four of the specimens are said to have rays up to 0·3 by 0·035 mm. There is therefore a very close resemblance between this species also and *L. vitraea*.

Moreover, the fifth specimen, which was not mentioned in the original description, has ectosomal triradiates with rays up to 0·7 by 0·06 mm. Since in one specimen of *L. pelliculata* there may occasionally be apical rays on the large ectosomal triradiates, we are coming near to the condition found in *Dendya quadripodifera* Hozawa, from Japan. Further, in all five specimens of *L. pelliculata* the rays of the ectosomal triradiates may occasionally curve somewhat in the manner of the tripods seen in *Dendya tripodifera*.

The history of *Leucosolenia protogenes* (Haeckel) illustrates the ease with which we accept wide differences in spicule-size as normal for one species while establishing new species elsewhere on relatively negligible differences in spicule-size. For example, Dendy (1891) accepted *Ascetta primordialis* var. *protogenes* Haeckel (1872), the characters of which are not precisely determinable, and ascribed to it a specimen having, according to him, ectosomal triradiates with rays 0·14 by 0·0136 and triradiates of the deeper layers with rays 0·14 by 0·009 mm. In fact, the differences between them are sharper than this, the rays of the ectosomal triradiates being up to 0·2 by 0·016 mm. The Abrolhos Island specimen of this same supposed species, identified by Dendy and Frederick (1924), has the rays of the ectosomal triradiates commonly 0·28 by 0·024 mm. Even so, in 1891 Dendy had included *Ascetta procumbens* Lendenfeld as a synonym of *A. primordialis* var. *protogenes*, although its author states categorically that the rays of its triradiates measure 0·1 by 0·015 mm., and nothing is said about special ectosomal triradiates. Dendy states (1891:59) that he 'examined a fragment of one of his (Lendenfeld's) type specimens' sent to him from the British Museum, yet he does not mention that all the spicules are more than 0·1 mm. long. In fact, I have found that, in Lendenfeld's own preparations of *A. procumbens*, there are groups of the ectosomal triradiates with rays measuring 0·64 by 0·072 mm.

My examination of these leaves little doubt that Dendy's specimens of *Leucosolenia protogenes* are identical with *L. soyo* Hozawa from Japan, and that Lendenfeld's *Ascetta procumbens* is identical with *L. soyo* and also with *L. rosea* Kirk from New Zealand, according to which of his types he chose as the holotype. This choice is, however, a matter of minor importance for there is little question that all are conspecific.

There remain five more species to be considered: *L. loculosa* (Haeckel) with its synonym *L. wilsoni* Dendy, *L. laminoclathrata* (Carter), *L. cavata* (Carter), *L. depressa* Dendy and *L. grisea* Dendy and Frederick. All agree closely in external form and all have a special ectosomal layer (the so-called pseudoderm). *L. wilsoni* has ectosomal triradiates with rays 0·22 by 0·02 mm., although these have not been mentioned by previous authors. Similarly, I find that *L. cavata* has ectosomal triradiates with rays 0·24 by 0·02 mm. In *L. depressa* the rays of the ectosomal triradiates measure 0·26 by 0·028 mm. and have a strong tendency to curvature giving the intermediate shape between the normal triradiate and the tripod. In Kirkpatrick's Funafuti specimen the rays attain 0·3 by 0·036 mm. In one species only, *L. grisea*, is there no perceptible difference between the ectosomal triradiates and the spicules of the deeper layers. Since it agrees in all other respects with the other four species, this can only be accepted as representing the opposite extreme to that found in such species as *L. triradiata* Tanita. These extremes and their intermediates, as represented by the dimensions of their spicules, are shown in the table given below.

Meanwhile, it should be noted that Dendy describes 'oxeates . . . rare, small . . .

measuring 0·2 by 0·0083 mm.' for *L. cavata*. I have re-examined Dendy's preparations from his five specimens and find these spicules in one only of the specimens.

List of species here accepted as synonyms of *Dendya poterium*, with dimensions of the rays of dermal and body-wall radiates

Species	*Rays of dermal radiates*	*Rays of radiates in body wall*
L. grisea	140 × 13	140 × 13
L. cavata	240 × 20	160 × 14
L. depressa	260 × 28	140 × 8
L. depressa (Funafuti)	300 × 36	200 × 20
L. laminoclathrata	210 × 21	140 × 14
L. loculosa	220 × 30	140 × 14
L. proxima	160 × 21	120 × 10
L. pelliculata	300 × 35	150 × 14
L. protogenes (i)	200 × 16	140 × 9
L. protogenes (ii)	280 × 24	140 × 9
L. procumbens	640 × 72	140 × 9
L. rosea	300 × 70	200 × 18
L. soyo	190 × 18	120 × 10
Dendya clathrata	120 × 20 (+tripods)	100 × 8
Dendya quadripodifera	600 × 80 (+quadripods)	150 × 10
Dendya triradiata	250 × 26	125 × 10
L. vitraea	370 × 31	160 × 12
L. amitsbo	500 × 30	160 × 10
L. challengeri	800 × 60	180 × 10
L. poterium	300 × 35	180 × 10
L. ventricosa	350 × 56	170 × 14
Leucetta insignis	260 × 60 (+tripods)	130 × 16

Genus **Ascute** Dendy and Row

The authors of this genus remark: 'As the presence of a uteoid dermal skeleton is considered to form a good generic character in other families, we see no reason why it should not be used in the same way amongst the Homocoelidae, and therefore propose this genus for Dendy's *Leucosolenia uteoides*. . . .' As we shall see later, the genus *Ute* is now used for species in which there is a tendency, and no more, towards a uteoid ectosomal skeleton. That is, within individuals of the same species the large diacts may echinate the surface partially or may lie wholly longitudinally within the ectosome. This at once invalidates the excuse used by Dendy and Row for the establishment of a new genus. There is a second argument against their action, which can be exposed later.

Ascute asconoides (Carter) and *A. uteoides* (Dendy) are the only two species. Both are from Port Phillip Heads, in South Australia. The only difference between them is that the first has no microxea and the second has them. Otherwise they are so remarkably alike that there can be really no doubt that they represent a single species. Moreover, from the same locality Dendy described *Leucosolenia stolonifer*, which is identical with the two species of *Ascute* except in two ways. The first is that the oxea usually, but not always, project at an angle to the surface, so that in some of Dendy's specimens the ectosomal skeleton is uteoid in places only. The second is the incomplete differentiation of the quadriradiates in *L. stolonifer* into two sizes. The corresponding spicules in *Ascute* vary in size but not to the same degree. Even so, the remarkable similarity in external form, in locality and in the spicules, indeed, in all other respects than the two noted, makes it inconceivable that we have to do with more than one species, *Leucosolenia asconoides*, with *L. uteoides* and *L. stolonifer* as synonyms.

If *L. stolonifer* could be accepted as a genuine species of *Leucosolenia*, there seems no reason to remove *L. asconoides* from that genus.

Ascute becomes therefore a synonym of *Leucosolenia*.

Genus **Ascyssa** Haeckel

The first remark to be made on this genus is that there is a great resemblance between the external form of the single species, *A. acufera*, and certain individuals of *Leucosolenia botryoides*. The only practical difference is the absence of triradiates in *Ascyssa*. This appears, at first sight, a very important difference. On the other hand, such spicules as are present are large and small oxea coming within the range, in both size and shape, of the oxea in *Leucosolenia botryoides* as a whole. We know that the oxea in all calcareous sponges, and not least in *L. botryoides*, vary a great deal in the numbers present. They may be abundant, rare or even absent. The triradiates also vary in their abundance from individual to individual but are never, so far as we know, completely absent. The only known specimen of *Ascyssa acufera* may be an individual of *L. botryoides* which lacks triradiates, or it may represent a rare mutant of that species.

These same remarks can be made of the type-species *A. troglodytes*, except that the external form is not so strikingly reminiscent of *Leucosolenia botryoides*, but it could very well be a juvenile of that same species.

I would suggest that *Ascyssa troglodytes* and *A. acufera* are synonyms, and that both represent a rare variant or an occasional mutant of *Leucosolenia botryoides*.

It is of interest to note that according to Haeckel's figures the oxea in both species of *Ascyssa* are arranged in a uteoid manner, as in *Ascute*, which I have suggested must also be joined with *Leucosolenia*.

Genus **Leucascus** Dendy

The first two species of *Leucascus* (*L. simplex* and *L. clavatus*) were described by Dendy (1892). One comment only need be quoted. In speaking of *L. clavatus* Dendy remarked: 'It very closely resembles *L. simplex* in general appearance, canal system and skeleton, and the only point of distinction of any importance which I have been able to find consists in the presence in *L. clavatus* of large club-shaped oxea. . . . ' I have re-examined Dendy's specimens of *L. clavatus* and find the oxea varying in size, shape and numbers. They may be truly oxeote (R.N. 240), straight and fusiform, measuring 0·5 by 0·028 mm., straight, club-shaped and anisoxeote (R.N. 196) and measuring 0·34 to 0·8 by 0·048 to 0·09 mm., straight and oxeote, to straight and anisoxeote, or club-shaped with heavy and rounded distal ends (R.N. 241), measuring 0·32 to 0·64 by 0·048 to 0·1 mm. The oxea are rare to the point of disappearance in R.N. 240, and most abundant in R.N. 196. Even if it had not now been shown in other species that the presence or absence of oxea is of no taxonomic significance in the Calcarea I would have judged *L. clavatus* to be a synonym of *L. simplex.* The subsequent history of the two species confirms this.

Kirk (1898) found specimens of *L. simplex* in Cook Strait, New Zealand, and we have, in the British Museum collection, a specimen from Macquarie Island of *L. clavatus.* Brøndsted (1926) records this last species from Stewart Island. Row and Hozawa (1931) found both species from south-west Australia: *L. simplex* from Shark's Bay, Geraldton and Bunbury; and *L. clavatus* from Geraldton. Finally Dendy (1913) recorded *L. simplex* from the Indian Ocean.

We have therefore a similar geographical range for the two forms, in addition to the other similarities.

The next question to be settled is the generic position of the one species (*L. simplex*) they represent. So far as can be seen from the lengthy explanations given by Dendy and Row (pp. 730–3), *Leucascus* and *Leucetta* differ in no other respect than the one having 'flagellate chambers greatly elongated, tubular, and sometimes copiously branched' and the other 'small, spherical or sub-spherical flagellate chambers'. There is already enough evidence to show that no taxonomic significance can be attached to the canal system in the Hetercoela. Moreover, it is difficult to convince oneself, on re-examining stained microtome sections of Dendy's Australian specimens of *Leucascus*, that the flagellated chambers are always elongated and never small and spherical. Finally, there was included in Dendy and Row a *Leucascus insignis* Row [1913 MS], which in Row and Hozawa (1931) becomes *Leucetta insignis.*

There is yet another species which should be considered here. *Leucetta gausii* Brøndsted (1931) appears to be very close to, if not identical with, *Leucascus clavatus.*

There can be no question that *Leucascus* must be considered a synonym of *Leucetta*, and that *Leucascus simplex* and *L. clavatus* must be regarded as one species, having the external form of *Leucetta primigenia* and a very similar skeleton. One is left to wonder, therefore, why these things should not have presented themselves to Dendy and Row, and to other authors. Another aspect of the history of the two species may provide a partial explanation, at least. In the original description we learn that : 'The skeleton is extremely simple, consisting of small, regular triradiates, irregularly scattered in the walls of the chambers and exhalant canals and in the dermal membrane.' The picture thus conveyed is of spicules without any special arrangement. In their diagnosis of the family Leucascidae, Dendy and Row (1913) give no hint that there is anything but a random distribution of the spicules. After re-examining Dendy's type-material I am left with little doubt that there is a distinct ectosomal layer of triradiates, an endosomal layer of triradiates and quadriradiates and triradiates scattered in the chamber layer. This arrangement is not as obvious as in other species elsewhere simply because the radiates in all three layers are approximately equal in size. Nevertheless, in his second description of *L. simplex*, Dendy (1913) speaks of triradiates and quadriradiates 'irregularly scattered in the walls of the radial chambers and of the exhalant canals, and likewise in the dermal cortex, but nowhere forming more than a thin layer, though of course with overlapping rays'. There is implicit in this the idea of a weakly developed skeleton in which ectosomal, chamber layer and endosomal skeletons are discernible. It would, however, have been more nearly correct to describe the distribution of the quadriradiates as mainly, if not entirely, limited to the exhalant canals, where they are more numerous than the original description of them might suggest.

These observations suggest that authors may sometimes base their statements upon too little comparative study of related species. This would seem to apply also to the remarks by Row and Hozawa. Dendy spoke originally of *L. clavatus* closely resembling *L. simplex* in general appearance, canal system and skeleton, the only difference being the presence of oxea in the first of these two species. Row and Hozawa (1931) in recording *L. clavatus* from south-west Australia, however, remark that 'the oxea are . . . of very striking and peculiar shape, and no other species is known . . . with oxea exactly similar'. If for 'exactly similar' we read 'exactly alike' then the statement may stand, but the fact remains that the oxea of *L. clavatus* closely resemble those of *Grantia compressa* and show a similar range of variation in shape.

Returning once more to the skeleton as a whole, once we can recognise in *Leucascus* an ectosomal layer, a chamber layer and an endosomal layer, a close comparison with *Pericharax* becomes inescapable. Moreover, on comparing all the specimens of *Leucascus* in the British Museum collections with all the specimens of *Pericharax* a striking similarity in appearance and texture may be noted. Indeed, the main and possibly only difference between the two genera lies in the presence of large triradiates, in addition to the smaller triradiates, in the chamber layer of *Pericharax* and their absence from the chamber layer of *Leucascus*. On the other hand, *Pericharax canaliculata* Burton and Srinivasa Rao has a skeleton almost identical with that of *Leucascus* but with very occasional large triradiates. *Leucascus simplex* may, in fact, represent a modified form of a *Pericharax* species in which the larger triradiates have dropped out. In that event, *Leucascus*, like *Leucetta* and *Pericharax*, must be identified with the genus *Leuconia*.

Genus **Ascoleucetta** Dendy and Frederick

At first sight, *Ascoleucetta*, with its single species *A. compressa* Dendy and Frederick (1924), seems to be highly distinctive. Re-examination of the original preparations quickly reveals that it is closely related to *Leucetta prolifera* (Carter) and identical with *L. insignis* Row and Hozawa. The differences between it and the last-named species exist in the words and figures used by the authors to describe their respective 'species' and not in the holotypes themselves. Even the appearance of the surface of *Ascoleucetta compressa*, marked as it is with well-defined pores, is not characteristic. It occurs to a varying extent in specimens of *Leucetta chagosensis*, *L. microrhaphis*, *L. leptoraphis* and others, although it is not brought out in previous illustrations of these species.

I have suggested (p. 47) that *L. prolifera* and *L. insignis* must be regarded as synonymous of *L. primigenia* Haeckel, and so must *Ascoleucetta compressa*, also.

Genus **Leucomalthe** Haeckel

Dendy and Row (1913, p. 372) raised Haeckel's subgenus *Leucomalthe* to the rank of a genus, to include the single species *Leucandra* (*Leucomalthe*) *bomba* Haeckel. The genus was included in the family Leucascidae on account of its 'elongated, tubular, copiously branched' flagellate chambers, which are 'very different from the normal leuconoid canal system, and . . . fairly similar to that of *Leucascus*'. Nevertheless, these authors admit that they placed the species among the Leucascidae 'on somewhat doubtful grounds'. *L. bomba* is clearly related to the group of species which includes *Sycon caminatum* Thacker, from Cape Verde Island, *Grantia atlantica* Ridley, from Brazil, and *Leucandra heathi* Urban, from California. Whatever else we may say of it, *Leucandra bomba*, from Fiji, cannot be retained in the Leucascidae, nor can the genus *Leucomalthe* be retained.

Genus **Leucetta** Haeckel

The review of the genus *Leucetta* must begin with the analysis made by Dendy and Row (1913, pp. 732–3). These authors include the genus in the family Leucascidae which, by inference rather than by direct statement, they give us to understand is characterised by having triradiates only, never quadriradiates. Yet they include in the family species having quadriradiates. When, therefore, their diagnosis includes no reference to the characters of the skeleton, we are left with the feeling that such a diagnosis is inadequate. It reads: 'Canal system leuconoid, with small, spherical or sub-spherical flagellate chambers irregularly scattered through the chamber layer.' We have abundant evidence now that the canal system may vary, even within the species, from syconoid to leuconoid. Therefore, such a diagnosis is now completely useless, and we must seek a fresh diagnosis based upon the characters of the type-species.

According to Dendy and Row: 'Haeckel (1872) proposed the genus *Leucetta* for calcareous sponges with a leuconoid canal system and a skeleton composed of triradiate spicules only, taking *L. primigenia* for his type-species.' I have read Haeckel's work carefully and can find no justification for the last part of this statement, except that he includes the species as the first in his account of the genus *Leucetta*. Moreover, it was not Haeckel's practice to name type-species.

The next statement by Dendy and Row is that 'Poléjaeff (1883) abandoned Haeckel's classification, but retained the name *Leucetta* in an entirely different sense, equivalent to our *Leucettusa*, taking one of Haeckel's species, *L. corticata* for the type species of the genus'. At this point we may return once more to Haeckel's original work and examine it more closely. He diagnosed the genus as: 'Kalkschwämme mit Ast-Canälen, deren Skelet nur aus dreistahligen Nadeln besteht'. He regarded *Leucetta* 'als die Stammgattung der Leuconen'. He subdivided it into two subgenera, *Leucettaga* and *Leucettusa*, the first containing four species (*L. primigenia*, *L. trigona*, *L. sagittata* and *L. pandora*) and the second containing one species, *L. corticata*. Dendy and Row, raised both these subgenera to generic rank, placing the first in the family Grantiidae and the second in the family Leucaltidae, but they retained the genus *Leucetta*, as we have seen, in the Leucascidae. All the species included by Haeckel in his subgenus *Leucettaga* agree in having an ectosomal tangential layer of triradiates, and endosomal tangential layer of triradiates, and triradiates forming a confused skeleton in the chamber layer. That is, they are all Leuconid species with a simplified skeleton, simplified because there are no quadriradiates or diacts present. In fact, *sagitta* and *pandora* were transferred to *Leucandra* (=*Leuconia*) by Dendy and Row, who retained *primigenia* and *trigona* in *Leucetta*. Conversely, these same authors included in *Leucetta* the species *Grantia solida* Schmidt, which is an undoubted *Leuconia*, and here regarded as a synonym of the type-species of that genus.

I propose to deal in tabular form with the remainder of the summary given by Dendy and Row, in order to show how this confusion of ideas was continued.

DENDY AND ROW 1913, p. 733	MY OBSERVATION
'Von Lendenfeld (1891) used the genus *Leucetta* to include "Leuconidae with triacts or tetracts or both".'	Although Lendenfeld's action found no favour with Dendy and Row it is in line with modern views and with Dendy's earlier views.
'Dendy (1893A) included Haeckel's species of *Leucetta* in the genus *Leucandra*, on the ground that the mere absence of quadriradiate or oxeote spicules, or both, could not be regarded as of generic significance.'	It is difficult to understand why Dendy, after taking such a reasonable view should have been led to discard it for so unreasonable an action as that shown in Dendy and Row (1913).
'As a result of further study of the Calcarea, we are convinced that the genus *Leucandra*, as used hitherto by Dendy, is not a natural one, but must be subdivided, although on lines different from any that have been previously suggested.'	This raises the whole question of what constitutes a 'natural' genus. While not pursuing further this elusive topic it can be remarked that anything less 'natural' than the genus *Leucandra*, as diagnosed and subdivided by Dendy and Row, is difficult to imagine.
'It appears to us that certain species, namely those which we now assign to *Leucetta*, have originated, quite independently of the remainder, from the homocoel sponges through a leucascid ancestry, and have consequently never passed through a *Sycon* stage in their phylogeny.'	Nowhere do the joint authors give a clear idea of what is meant by a 'Leucascid ancestry'. The emptiness of this claim is revealed in at least one thing, that *Grantia solida* Schmidt, included by Dendy and Row as a species of *Leucetta*, is beyond question, as Sarà has shown, a true *Leuconia*.
'The species in question are characterised by their equiangular triradiates, and by the absence of any trace of the typical *Sycon* skeleton.'	This same remark could be made of the type-species of *Leuconia*, *L. nivea*.

DENDY AND ROW 1913, p. 733	MY OBSERVATION
'As regards the canal system, it appears that the same course of evolution, from a condition with elongated and more or less radially arranged flagellate chambers, to a condition with small scattered spherical chambers, has taken place in both cases, so that there has been a very complete convergence between the genera *Leucetta* and *Leucandra* as now understood by us.'	It is difficult to take this sentence seriously. Dendy (1893) himself had already shown how the canal system can vary from elongated and radially arranged chambers to small, spherical, scattered chambers within one species. Such a change cannot therefore be taken as an indication of a 'course of evolution'. Moreover, since it occurs in many genera of Calcarea, and since so many species of *Leucetta* (*sensu* Dendy and Row) were regarded by other authors as *Leucandra*, it is no wonder that Dendy and Row should see an appearance of convergence between *Leucetta* and *Leucandra*. They are, in fact, one and the same thing.
'The true Leucandras, however, are distinguished by more or less distinct traces of skeletal structure exhibited by their syconoid ancestors.'	The whole of this sentence is invalidated by the fact that the type-species of *Leucandra* (*L. nivea*) has no traces of the tubar articular skeleton, the supposed skeleton structure exhibited by presumed syconoid ancestors.
'This view (i.e. of the supposed convergence of *Leucetta* and *Leucandra*), so far as our information goes, is supported by histological evidence; for, as already indicated, the position of the nucleus of the collared cells in *Leucetta* is basal, while in typical Leucandras it appears to be apical.'	The correct statement should be that a basal nucleus had been demonstrated for 5 out of the 12 species listed by Dendy and Row for *Leucetta*, and an apical nucleus has been demonstrated for 7 out of 90 of their species of *Leucandra*; and in neither was the position of the nucleus in the type-species demonstrated.

It is difficult to understand precisely the lines of thought influencing the decisions arrived at by Dendy and Row, except perhaps that they were being misled by an attempt to use anatomical (flagellated chambers) and histological (position of nucleus in collared cell) characters for classification. As to the anatomical evidence, they were ignoring the clear findings of Dendy (1893) on the variability within a single species of the canal system. On the histological evidence they were using the results from inadequate material to establish a principle supposedly of fundamental importance in the phylogeny. An analysis of the total findings on this point is given on pp. 28–31.

Leucetta primigenia, the type-species of *Leucetta*, was established by Haeckel in 1872, but included in its synonymy were two species named by him in 1870, *Sycothamnus* *fruticosus* and *Lipostomella clausa*. Since no further mention is made of these two by Haeckel, they must remain *nomina nuda*. In any event, any attempt to relate them to *Leucetta primigenia* would be unsuccessful since that name itself represents a mixture of species, using this word in the orthodox sense.

A number of authors since Haeckel have claimed to have been able to recognise one or other of the varieties established by Haeckel for *L. primigenia*. Whether their identifications were correct cannot be determined until we have settled what Haeckel intended as the distinguishing characters of his varieties. This is less easy than might appear. Under the heading '*Leucetta primigenia*, H. (nova species)', Haeckel gives his diagnosis: 'Dermalfläche kahl. Gastralfläche kahl. Dreistrahler sämmtlich regulär, gleichwinkelig und gleichstrahlig, von sehr wechselnder Grösse. Schenkel gerade, schlank kegelförmig, oder innen cylindrisch, aussen halbspindelförmig, mit scharfer, stehender Spitze, 6–10 mal so long als dick.' Following this we have the usual division of the species into 'Generische Varietäten', and then its division into 'Specifische Varietäten'. The first of these can be ignored since they have never had a meaning except to Haeckel himself. Under the second heading, the species is divided into three varieties, the var. *isoraphis*, var. *microraphis* and var. *megaraphis*. Although one of the characters of the species as a whole is said to be that the rays of the triradiates are 6–10 times as long as they are thick, we find Haeckel stating that the proportions in var. *isoraphis* are 10–12, in var. *microraphis* are 5–10 and in var. *megaraphis* they are said to be 4–8. Illustrations are given for two only of these varieties, and based upon the spicules there depicted we arrive at the following proportions: for var. *isoraphis* 9–9·5, for var. *microraphis* 8–9 (smaller triradiates) and 12·75 (larger triradiates). Allowing that illustrations cannot always express precise measurements, the discrepancies in these three sets of figures are still remarkable.

Haeckel has given no indication of a holotype and his description of the species allows no possibility of discriminating between the characters intended to apply to var. *isoraphis*, var. *microraphis* and var. *megaraphis*. The geographical range is said to be the Mediterranean, Morocco, Cuba, St. Thomas, Cape of Good Hope, Red Sea, Ceylon, Java, S. Australia, Viti Island (Pacific) and Valparaiso. No indication is given of the ranges of the separate varieties. In such a situation as this we can either declare *Leucetta primigenia* unrecognisable and await its re-description from a lectotype, or we may accept Haeckel's figures as reasonably accurate and base the diagnoses of the varieties on these. In that event, since there are no illustrations for it, var. *megaraphis* must be set aside as unrecognisable. For the rest, it would appear, on Haeckel's description alone, and judging by orthodox standards, that var. *isorhaphis* and var. *microraphis* should be regarded as distinct and elevated to specific rank. Before doing so, a survey should be made of all the specimens associated with *L. primigenia* or its varieties by subsequent authors.

If, for the moment, we regard var. *isoraphis* and var. *microraphis* as separate, their diagnoses should be:

isoraphis: solitary or compound, tubular or clathrate with tubular vents, triradiates with rays 0·09 to 0·126 by 0·01 to 0·013 mm.

microraphis: irregularly massive or lobose: triradiates of two sizes, with rays 0·023 by 0·04 and 0·13 to 0·2 by 0·016 to 0·023 mm. respectively.

The differences between these two are, however, effectively bridged by later records.

The first record subsequently to Haeckel's monograph was by Poléjaeff (1883), under *Leuconia fruticosa* (= *Sycothamnus fruticosus*) Haeckel, for five specimens from Kerguelen and Heard Island. The external form is pyriform to massive, the rays of the triradiates 0·15 by 0·01 to 0·12 mm., with slightly larger spicules, 0·2 by 0·013 mm., occurring infrequently in one specimen.

The next record is by Lendenfeld (1885) for *Leucetta microraphis* from Australia. His specimens were 'all slightly ramified; 3–6 cylindrical pieces . . . grown together and meeting at sharp angles. These cylinders taper towards the dermal osculum. . . .' The external form is therefore nearer that of *L. isoraphis*. Lendenfeld describes the triradiates as 'spicules measuring 0·742 × 0·011, and rarer large ones of similar shape, measuring 0·8 × 0·085, very rare spicules of an intermediate size are also met with'. The figure of 0·742 is obviously an error. In a preparation (B.M. 86.6.7.80) made by Lendenfeld from a specimen from Port Jackson, the two kinds of triradiates have rays measuring 0·12 to 0·2 by 0·012 to 0·016 and 0·8 by 0·085 mm. respectively.

Leucetta pyriformis Dendy (1913), as its author remarks, 'comes closer to *Leucetta microraphis*, as represented by my Australian specimens, but again differs in the well-defined external form, consisting of only a single person of very definite shape'. Dendy then remarks: 'It may quite possibly be identical with one of the numerous forms included by Haeckel (1872) under his *Leucetta primigenia*, but I do not think it possible to disentangle all these forms from one another.' We can certainly agree with this last remark; and, also, we can treat *L. pyriformis* as a very close relative of Poléjaeff's *Leuconia fruticosa*, here regarded as a synonym of *Leucetta primigenia*.

The British Museum collections include five specimens from those described by Dendy (1892) under *L. microraphis*, and preparations from four others. In the first preparation I examined, the first spicules seen were quadriradiates, with very short apical rays, often a mere spine. In this preparation there was approximately five per cent of the spicules with this apical ray. In the last specimen examined, the cloacal cavity and the exhalant canals were lined with quadriradiates, their apical rays, up to 0·16 mm. long, projecting into the cavities. The rest of the spicules were triradiates of two sizes. Over the whole range of the nine preparations the measurements were: small triradiates, 0·12 to 0·24 by 0·012 to 0·028 mm., large triradiates, 0·28 to 1·2 by 0·032 to 0·16 mm. The two sizes tend therefore to grade one into the other. The external form of these nine specimens from Australia is lobate, up to 60 mm. high, the smaller being very like those figured by Haeckel (1872, pl. xxi, figs. 10–15).

Urban (1909) recorded four specimens from Kerguelen, not unlike Haeckel's specimens just referred to, having triradiates with rays measuring 0·112 to 0·2 by 0·009 to 0·014 mm. In these we have the reverse of Lendenfeld's (1885) Australia specimens since they have the outward form of var. *microraphis* and the spiculation of var. *isoraphis*.

Row (1909) recorded *Leucandra primigenia* from the Red Sea, and Dendy and Frederick (1924) recorded *Leucetta microraphis* from Abrolhos Island, the latter having triradiates with rays measuring 1·1 by 0·23 and 0·18 by 0·013 mm. respectively. My own (1926) *Leucetta primigenia* from the Suez Canal is, in fact, identical with *Grantilla quadriradiata* Row. The specimens of *Leucetta chagosensis* recorded from Abrolhos Island by Dendy and Frederick (1924) have a spiculation typical of var. *isoraphis* and external form intermediate between that variety and var. *microraphis*. The claim of these joint authors, that the Abrolhos Island specimens 'agree closely with the type' is not correct. Those specimens lack the large triradiates of the typical *L. chagosensis*. Even so, the typical *L. chagosensis* itself cannot be dissociated from the var. *microraphis* especially as Dendy's (1913) claim, that the larger triradiates are confined to the 'dermal' membrane, is only partly true.

Leucetta floridana (Haeckel), from Florida, is like *L. microraphis* in all respects other than the presence, occasionally, of an apical ray on the small and the larger triradiates. Two of Dendy's Australian specimens of var. *microraphis* have apical rays on some of the small triradiates. The presence of such apical rays on the larger spicules is almost to be expected sooner or later. I would regard *L. floridana* as fulfilling this condition and therefore synonymous with var. *microraphis*. Poléjaeff's *Pericharax carteri* var. *homoraphis*, from Tristan da Cunha, is too like Dendy's Australian specimens with small quadriradiates to be left out of var. *microraphis*.

Leucandra primigenia var. *leptoraphis* Jenkin (1908), *Leucetta antarctica* Dendy (1918) and *L. leptoraphis* Burton (1929) have the external form of Dendy's Australian specimens of var. *microraphis* and the spiculation of var. *isoraphis*.

From the evidence of these specimens it would appear that Haeckel was correct in two things: that the species they represent is widespread, and that the spiculation may include one size of triradiate only or two distinct sizes connected by intermediates. The pity is that he did not give the evidence for this more clearly from the beginning. In any event, we can confidently retain the name *Leucetta primigenia*, to include all the specimens discussed so far. On the other hand, we cannot retain the varietal names to any good purpose, unless we use them solely to express differences in the spiculation and ignore the external form. My own preference would be to ignore completely the varietal names, for my examination of a range of specimens suggests that in time we shall assemble all gradations from the typical var. *isoraphis* to the most distinctive forms of var. *microraphis*.

Leucetta prolifera (Carter) from Australia has the spiculation typical of var. *isoraphis* but has scattered large triradiates and larger quadriradiates mainly restricted to a surface layer. It is to all appearances, therefore, a species distinct from *L. primigenia*. Even so, both the large triradiates and the ectosomal quadriradiates can be lacking in parts of the body. This could result in a section made from one part of a specimen having the characters of the var. *isoraphis*, a section from another part having the characters of the var. *microraphis*, and other sections having the full characters of *Leucetta prolifera*. We must therefore look for collateral evidence bearing on this, and it may be found in the report by Row and Hozawa (1931) on a collection from south-west Australia. In this, the authors list five species of *Leucetta*, three being new. Apart from any other consideration, a total of five species for one small area, when the total for the whole world, as listed by Dendy and Row in 1913, is only twice this number, seems disproportionate. Moreover, as shown here, most of the species listed by Dendy and Row should be reduced to one species.

Row and Hozawa record *L. microraphis* (Haeckel), represented by numerous specimens, from Shark's Bay, Geraldton and Bunbury. They have four specimens of *L. prolifera* (Carter) from Geraldton and Fremantle. Their one specimen of *L. insignis*, from Geraldton, has large dermal triradiates, and the rest of the skeleton contains smaller triradiates, many of which have an apical ray modifying them to quadriradiates. The external form differs not at all from that of Dendy's specimens of *L. microraphis* from south-east Australia. Therefore we can say that *L. insignis* has the morphology of *L. microraphis*, the main skeleton agreeing with some specimens of *L. isoraphis* (i.e. those containing some quadriradiates) and large triradiates which because they are restricted to the dermal layer cause the species to stand mid-way between *L. microraphis* and *L. prolifera*.

The second of the new species described by Row and Hozawa is *L. infrequens*, from Fremantle. Although its authors compare it with *L. chagosensis* from the Indian Ocean, it has the external form closely like Haeckel's specimens of *L. microraphis*, it has the skeleton of *L. microraphis* and it differs from that species at the most in minor details of its histology.

L. expansa, the third new species, from Shark's Bay, has the external form similar to *L. microraphis*, as illustrated by Haeckel, the skeleton of *L. microraphis* as exemplified by Dendy's specimens containing quadriradiates lining the exhalant canals, but it possesses ectosomal microxea. In all respects it resembles *L. carteri* (Dendy), except in the size of the microxea, which could hardly be significant.

Taking all the specimens recorded by Row and Hozawa from south-west Australia, there can be really little doubt that they express variations within a single species rather than separate species.

Partial confirmation of the wide range of variations, in the spicules at least, can be seen in Brøndsted (1931). On p. 18, under the heading '*Leucetta* "*primigenia*" H., *L. isoraphis* H. und *L. megaraphis* H.', he lists the dimensions of the triradiates in 45 specimens from the Antarctic, showing how these grade evenly from 0·145 to 1·5 mm. On p. 21, under '*Leucetta isoraphis* var. *apicalis* nov. var.', he lists the dimensions of the spicules in another 9 specimens, from the same area, all possessing quadriradiates. And he ends his account with the words: '*Leucetta floridana* H. nimmt zu *L. microraphis* eine ganz analoge Stellung ein wie die var. *Apicalis* zu *L. isoraphis*', a partial admission of the lack of significance attaching to the presence or absence of quadriradiates.

Finally, *Leuconia spissa* Urban (1909) seems to be nothing more than *Leucetta primigenia* with the external form of Poléjaeff's *Leuconia fruticosa*, the triradiates (with occasional quadriradiates) of var. *microraphis* and the microxea of *Leucetta expansa* Row and Hozawa.

Summary.—It looks as if there are two species of *Leucetta* only, *L. primigenia* Haeckel, with widespread distribution and numerous variations in the size and form of the spicules, and *L. trigona* Haeckel, with a specialised skeleton and restricted to South Africa. All other species hitherto included in the genus *Leucetta* can be distributed between *Leuconia* and *Leucettusa*.

If this view is correct then in *Leucetta primigenia* the skeleton may consist in different individuals, of (*a*) small triradiates only, (*b*) small triradiates with an admixture of small quadriradiates, and (*c*) small triradiates with microxea added; and to each of these may be added large triradiates, large quadriradiates and/or oxea (=large microxea). In other words, by the addition of a sort of gigantism in any one of the three basic spicule-forms may be produced varieties superficially unlike yet connected by intermediates.

Assuming *L. primigenia* can show these permutations and combinations, it can no longer be diagnosed as having a simple skeleton of triradiates only. Moreover, it becomes difficult to see how the species can be excluded from the genus *Leuconia*. Indeed, as we have already seen (p. 21), it must be accepted as a synonym of *L. nivea*.

A similar state exists for another species of *Leucetta*. When preparations of *Leucetta antarctica* Dendy and *Leucandra mawsoni* Dendy are compared side by side and also with a fair range of specimens of *Leucetta leptoraphis* (Jenkin), it becomes clear that all belong to a single species. This is true notwithstanding the apparently striking differences brought out by Dendy in his original descriptions. Direct comparisons show these three to have the same range of variations as are found in the various specimens recorded for *Leucandra frigida* Jenkin, *L. brumalis* Jenkin and *L. gelatinosa* Jenkin, all of which are identical with the three species of *Leucetta* under discussion.

Genus **Pericharax** Poléjaeff

'This genus was proposed by Poléjaeff (1883) for a species *Pericharax carteri*, from Tristan da Cunha, but recent authors, for the most part, have not accepted it.' So wrote Dendy and Row in reviving the use of the genus. They diagnose it as follows:

'Sponge colony individualised, with central cavity (probably a pseudogaster) opening by a wide vent and surrounded by a very thick wall. Canal system leuconoid, with subspherical, scattered, flagellate chambers, and with subdermal cavities whose walls are supported by a special skeleton derived partly from the inturned rays of tangential dermal triradiates. Skeleton of the chamber layer confused, composed of equiangular triradiates of two very different sizes.'

The first item in the diagnosis can have little value since the individualised colony with a central cavity is of common occurrence among calcareous sponges. The canal system has little diagnostic value. It is, in any event, leuconoid, a fact not without significance when we find the skeleton is that typical of *Leuconia*, and especially of *L. solida* (Schmidt). This is wholly obscured in the words used by Dendy and Row to describe the structure of the skeleton.

The two characters especially used by these authors to justify the retention of *Pericharax* are the basal position of the nucleus in the collared cells which, as we have seen, can probably be ignored, and the nature of the ectosomal triradiates. These triradiates are said to be 'very curious spicules, with a strong tendency to irregular curvature of the rays, often resulting in one or more of them dipping down deeply between the subdermal cavities'. The ectosomal triradiates of *Leuconia nivea*, the type-species of *Leuconia*, also show these characteristics, so do the corresponding spicules of *L. solida*, to which I suggest the species of *Pericharax* are more nearly related.

I would further suggest that *P. heteroraphis* and *P. peziza*, the only other species mentioned by Dendy and Row, cannot be separated, and that both are synonyms of *Medon imberbis* Duchassaing and Michelotti, which, as de Laubenfels (1936:196) has rightly shown, is a *Leuconia*.

Pericharax heteroraphis, *P. peziza* and *Medon imberbis* are so obviously close relatives of *Grantia solida* Schmidt, accepted by all recent writers as a *Leuconia*, that the synonymy of *Pericharax* with *Leuconia* can be established beyond doubt, whatever may be the position of the nucleus of the collared cell.

Genus **Leucaltis** Haeckel

The distinction between *Leucaltis* and *Leucettusa* (see p. 50) is, according to the diagnosis given by Dendy and Row (1913:737 and 738), that in the former the body is 'tubular, ramified and anastomosing, with many oscula' and the flagellate chambers 'elongated and branched, more or less radially arranged round the central gastral cavities of the tubes', while in the latter the colony is 'individualised, with definite external form and a large central cavity opening by a single osculum' and with a leuconoid canal system. The type-species of *Leucaltis* is *L. clathria* Haeckel, that of *Leucettusa* is *Leucetta corticata* Haeckel. The holotype of *Leucaltis clathria* is from Florida, that of *Leucetta corticata* is from Cuba. Haeckel (1872:130) remarks, however, that the external form of *L. corticata* is virtually identical with that of *Leucaltis clathria.* Further, on comparing his description of *Leucetta corticata* and his description of *Leucaltis clathria*, we find that the two species differ only in the canal system and in the presence in *Leucetta corticata* of large quadriradiates in the cortex in addition to the large triradiates.

We may ignore the differences in the canal system, especially when we find that over the range of specimens assigned by various authors, since Haeckel, to *Leucaltis clathria*, the flagellated chambers are not always elongated and branched (i.e. sylleibid) but may also be small and spherical (i.e. leuconoid). As to the large radiates in the cortex, we find in this same series of specimens, recorded since Haeckel, that they may be triradiates only, or triradiates with a varying admixture of quadriradiates. The sizes, also, of these large radiates is subject to considerable variation. Moreover, the small radiates of the inner layer of the body wall may at times be quadriradiates although they are mainly, and usually, triradiate. The form of the rays of the small radiates, as well as the angles their paired rays make with the basal, is also subject to much variation. There may even be two sizes of these small radiates. From every point of view, therefore, the distinction between the genera *Leucaltis* and *Leucettusa*, as expressed by Dendy and Row, breaks down, and there is no ground even for maintaining a specific distinction between their type-species.

Having re-examined much of the material representing this recorded series of *Leucaltis clathria*, and having thereby gained a comprehensive survey of the manner in which all the spicules vary, it has been easy to see also that in the majority of species of *Leucettusa* hitherto recognised we have a comparable series of variations. These so-called species number ten, and I have little hesitation in suggesting that they represent one species only, to be known as *Leucettusa imperfecta*, distributed over a more southerly range than that occupied by *Leucaltis clathria.*

Leucaltis tenuis Hozawa (1929) is so remarkably like *L. clathria*, except for the possession of large endosomal triradiates, that it is difficult to distinguish between them.

The only remaining species, *L. gastrorhabdifera* Burton (1932) is aberrant and is here doubtfully assigned to *Amphoriscus.*

Summary.—*Leucaltis* is synonymous with *Leucettusa*, which has priority, and the species which must go to *Leucettusa* number no more than two, *L. clathria* and *L. imperfecta.* The first of these, as we shall see, is identical with the type-species of *Leucettusa*, *L. corticata*, which has priority over it.

Genus **Leucettusa**

Apart from the type-species, *L. corticata* Haeckel, which is found in the West Indies, the species so far ascribed to this genus are:

L. haeckeliana (Poléjaeff)	Port Jackson, Australia; Falkland Islands
L. vera (Poléjaeff)	Kerguelen
L. imperfecta (Poléjaeff)	Port Jackson, Australia
L. lancifer Dendy	New Zealand; McMurdo Sound, Antarctic
L. sambucus (Preiwisch)	Chatham Islands
L. pyriformis Brøndsted	New Zealand
L. mariae Brøndsted	New Zealand
L. tubulosa Dendy	New Zealand
L. simplicissima Burton	Falkland Islands
L. dictyogaster Row and Hozawa	South-west Australia
L. usa de Laubenfels	Baffinland

The original description of the last of these, *L. usa*, suggests that de Laubenfels had before him a specimen of *Leuconia nivea*. The description is, however, inadequate. All the other species occur south of 30° south latitude, and there is a familiar pattern in their distribution. For example, *L. haeckeliana* is found at Port Jackson and again at the Falkland Islands, yet between these two places, whether we travel east or west from Port Jackson, is found a group of other species. Secondly, all these species are known from one specimen only or from a very few specimens. These facts, coupled with the great similarity in external form and skeleton between all the specimens, lead inevitably to the suspicion that the ten so-called species represent varieties of one species rather than so many true species.

The first two species to be dealt with most conveniently are *L. haeckeliana* and *L. imperfecta*. These are both from Challenger Station 163A (Port Jackson). Both are tubular and closely alike in external appearance. They also have a considerable similarity in the architecture of the skeleton. In both there is a thick ectosomal cortex supported by tangential layers of large triradiates. Each possesses large quadriradiates in addition, but whereas in the first species these are confined to the cortex, in the second they may also protrude into the chamber layer. This can hardly be considered a matter of specific importance. The spicules proper to the chamber layer are very small radiates, usually characterised as minute. In the first species these are quadriradiates only, and a mixture of quadriradiates and triradiates in the second. These, again, afford little justification for a specific distinction. The one difference between the two species which might have a greater significance is that the facial rays of the quadriradiates lining the cloacal cavity and exhalant canals in *L. imperfecta* are longer than in the radiates of the chamber layer, whereas in *L. haeckeliana* they are the same length. They have one noteworthy feature in common, however: that in the radiates of the chamber layer, in both species, the rays are often bent or otherwise deformed, giving the general impression that these spicules are small because they are vestigial.

My own view is that we cannot separate *L. imperfecta* and *L. haeckeliana*.

L. haeckeliana has been recorded once since Poléjaeff's original description, when I (1932) reported on five specimens from adjacent localities off the Falkland Islands.

Four of these are from Stn. W.S. 84, and one from Stn. W.S. 243. Of the first four, B.M.28.2.15.847 has large triradiates in the cortex, minute triradiates, quadriradiates and radiates reduced almost to diacts in the chamber layer, and endosomal quadriradiates with apical rays 0·08 mm. long. Two others from this same station, B.M.28.2.15.711 and 714, have large triradiates in the cortex, as well as large quadriradiates with the long apical ray projecting into the chamber layer, and the minute radiates very much as in B.M.28.2.15.847. There are, of course, as usual, differences in the measurements of the various types of spicules from one individual to another, but more important here is the gross architecture of the skeleton. In this there is a marked difference between B.M.28.2.15.847 and the rest in the numbers of the large quadriradiates obtruding into the chamber layer. Yet all three specimens are so alike in external form, and sufficiently alike in their skeleton, that they can reasonably be accepted as representatives of single species. The specimen from Stn. 243 is practically identical with B.M.28.2.15.711 and 714, and all three are very like *Leucettusa vera* (Poléjaeff), the only significant difference being that in the latter the minute radiates are concentrated in the tissue bordering the cloacal cavity, leaving most of the chamber layer free of them.

The last of the Falkland Islands specimens is B.M.28.2.15.712, also from Stn. W.S. 84. This has large triradiates in the cortex, large quadriradiates obtruding into the chamber layer and minute radiates similar to those found in B.M.28.2.15.711, 713 and 714 but confined to the chamber layer, so that there is no special endosomal layer of small quadriradiates.

Using orthodox methods of identification, there are in the four specimens from Stn. W.S. 84, three representatives of *Leucettusa vera*, one of *L. haeckeliana* and one which differs from them both in having no large cortical quadriradiates. Moreover, if the main difference between *L. haeckeliana* and *L. imperfecta* lies in the degree to which the cortical quadriradiates obtrude into the chamber layer, then we have in the Falkland Island sponges a good series of transitions between these two species. Added to this, B.M.28.2.15.847 forms an intermediate link between *L. haeckeliana* and my *L. simplicissima*, which is also from Stn. W.S. 84.

The result of comparing more closely the Falkland Island specimens is to give us a choice of two interpretations: either to suppose that the spicular characters in *Leucettusa* are very variable, or that at one station (W.S. 84) there were obtained four distinct species and two races. The last interpretation is, of course, the more unlikely.

Turning now to New Zealand, we have four specimens of *L. lancifer* described by Dendy. Of these, R.N.XLIII differs from *L. dictyogaster* Row and Hozawa, from south-west Australia, in the absence of microxea only, and the second (R.N.XIV.2) agrees almost precisely with a specimen from South Africa, kindly lent me by the late Dr. Th. Mortensen. The four specimens of *L. tubulosa* Dendy, also from New Zealand, show between themselves variations in the architecture of the skeleton similar to those discussed for *L. haeckeliana*, but all show a general resemblance to *L. lancifer* and a close approach to *L. imperfecta* from Port Jackson, except in one feature, the club-shaped rays to the minute radiates. Even this, supposedly characteristic, feature shows many variations, for not all the minute radiates have club-shaped rays, the numbers possessing them varying from individual to individual, and in all specimens we find sections of the chamber layer with normal radiates only and other sections containing club-ended radiates.

The two other species from New Zealand were described by Brøndsted (1926). That author says of his *L. mariae* that it differs from *L. tubulosa* 'in outer shape, relative thickness of body wall, and in not having the characteristic club-shaped rays of pigmy tetracts'. It is, in fact, almost a typical example of *L. haeckeliana*, yet Brøndsted thought it nearly related to *L. tubulosa*. *L. pyriformis* Brøndsted, from the same locality as *L. mariae*, is very near B.M.28.2.15.847, from the Falkland Islands, except for lacking minute quadriradiates.

We have therefore ten closely-related species distributed mainly within an area which, from the evidence of other species, is known to comprise a more or less discrete zoogeographical unit. Not only are the ten species closely related but in all instances where several specimens of one of these so-called species are known the main characters are found to be variable. This suggests that if a sufficient number of specimens were available for comparison it could be set beyond doubt that all belong to a single species. At the moment, however, it remains a matter of opinion whether we should continue to recognise the ten so-called species, or to group them all under one name. My preference is for the second course, for the following reasons. First, it is not possible readily to define the species as they now stand. Secondly, as matters are now, an author tends either to describe each fresh specimen as a new species or to identify it with the species he knows best. Both of these produce results which are far from being satisfactory. Finally, our present knowledge of how much spicule characters may vary in other species of Calcarea justifies the assumption that all these ten so-called species are no more than fluctuating variations within a single true species.

In addition to this comprehensive species, *L. imperfecta* (Poléjaeff), the genus *Leucettusa* includes one other. This is the type-species, *L. corticata* (Haeckel), from Porto Rico and the Barbados. For its characters we must rely on Haeckel since the species has not again been seen since that author described it. We know from experience, however, that the finer details from Haeckel's descriptions are apt to be untrustworthy, and although *L. corticata* is clearly linked generically with *L. imperfecta* it has the external form of *Leucettusa* (*Leucaltis*) *clathria*, over which it has priority in nomenclature. *L. sambucus* (Preiwisch), although from the Chatham Islands, appears to belong to the same species.

The families **Minchinellidae, Murrayonidae** and **Lelapiidae**

Within these three families are included six genera and eight species. The six genera are all characterised by the possession of tuning-fork spicules but they fall naturally into two groups: those with the radiates of the main skeleton cemented together and those with the radiates of the main skeleton free. To the first group belong *Minchinella*, *Petrostroma*, *Plectroninia* and *Murrayona*, the first three genera forming the family Minchinellidae, the last genus forming the Murrayonidae. The remaining two genera, *Lelapia* and *Kebira* form the family Lelapiidae. Dendy and Row placed the family Lelapiidae widely apart from the families Minchinellidae and Murrayonidae on the grounds that, apart from the tuning-fork spicules, their skeletons were markedly different. Certainly they were justified in keeping the segregation into three families. How far they were justified in their wide separation of them is a matter of opinion. For the sake of convenience, and because I can find no strong argument against it, I propose to abandon these three families and to group all the genera together in the family Homocoelidae.

Family **Sycettidae**

The family Sycettidae as understood by Dendy and Row (1913: 742–749) includes three genera: *Sycetta*, with three species, *Sycon*, with sixty-seven species, and *Sycandra*, with one species. Since 1913, four species have been added to *Sycetta* and several to *Sycon*.

Sycetta primitiva Haeckel was designated the type-species of *Sycetta* by Dendy and Row, who retained the use of the genus on the grounds that its members lacked tufts of oxea at the distal ends of the radial chambers and that the radial chambers were always completely separate from one another. The absence of tufts of oxea is, in my opinion, without significance. As to the second point, it can so often happen in species of *Sycon*, especially in the juvenile stage, for the chambers to be completely separate that there must be strong doubt indeed as to the validity of a genus founded on such a character.

The next remarkable thing about *Sycetta* is that of the three species included by Dendy and Row, two have not been seen again since Haeckel described them. Yet *S. primitiva* was found off the Australian coast and *S. sagittifera* off Ceylon, areas which have been very fully worked since Haeckel's time. The third species, *S. conifera*, was first described from the Mediterranean and was recorded in 1929 from Japan by Hozawa. As the Mediterranean has been so thoroughly investigated by a succession of specialists in the Calcarea, and by others, it is quite remarkable that the species should not have been found again there.

The type of *S. primitiva* is 3·5 mm. high, of which over 1·5 mm. is occupied by a stalk. This immediately suggests it is a young individual. On the other hand, the types of *S. sagittifera* and *S. conifera* are 15–20 and 17 mm. high, including stalks, which for Calcarea may represent adult size. Hozawa's Japanese specimen of *S. conifera* is 7 mm. high and the holotype, and only specimen, of *S. quadriradiata* described by him from Japan is 15 mm. high.

I find it difficult to believe that *Sycetta* is a natural genus and suspect that the sponges assigned to it are either juvenile or abnormal members of better-known species of *Sycon*. Moreover, I find it hard to believe that the holotypes of the species of *Sycetta* are anything more than unusual individuals of *Sycon ciliatum*. To suppose otherwise is to imagine a species almost cosmopolitan which is found only very rarely and then only as a single specimen at a time. On the grounds of probability alone, it is much more likely that such specimens represent slightly unusual individuals of a more common species.

Genus **Sycon** Risso

Of all genera of Calcarea, the genus *Sycon* has probably appeared to be the most clearly defined. Its outstanding characteristics were believed to be a canal system with large radial chambers free at their distal ends, so that the surface layers were devoid of a cortex or continuous ectosomal skeleton. Even so, there are wide divergences from the usual text-book diagram of this canal system. Individuals may have radial chambers widely spaced or these chambers may be tightly packed giving the appearance of an almost unbroken surface, and all these differences may even be found within a single individual. Further, on a number of occasions, in describing new species of *Sycon* authors have been constrained to remark that their specimens had some sort of ectosomal skeleton or even an ill-developed cortex. As I have endeavoured to show on page 7 certain specimens can now be demonstrated to include transitional forms from the typical *Sycon*, through *Grantia* to *Leuconia*. The name *Sycon* must, therefore, be more appropriately seen as an expression of a single phase in a variable condition of the canal system rather than as a taxonomic unit.

The same radical change in ideas must be developed in dealing with the species themselves. Dendy and Row (1913) recognised 67 species of *Sycon*. Since then, another 19 species have been described. After re-examining these 86 species, in many instances by direct comparison of the type material, I would suggest that 65 of these are synonymous of the common *Sycon ciliatum*, the type-species of the genus. For the most part, their identity with that species is so obvious that it passes my comprehension why one author after another should have established fresh species. It can only be supposed that their field experience was negligible. I have already (pp. 7–8) dealt at some length with the synonymy of *S. ciliatum* and *S. coronatum*. It remains, therefore, to examine critically the other species of the genus.

When Schmidt (1868) first described *Sycon quadrangulatum* he assumed he had to do with a new genus, *Syconella*. He gives few details of the spiculation or of the anatomy and seems to have founded this genus solely on the characters of the oscular fringe. One thing is very obvious, that in the figure he gives of the external form of the type, and that showing the flagellated chambers, we can see a strong likeness to the general run of *Sycon ciliatum*. One is often led to suppose that, since they were contemporaries, Haeckel must have had access to Schmidt's specimens. Had that been so, and had Haeckel's (1872) re-description of *S. quadrangulatum* been a faithful record of the characters of that species, we could have accepted it without further ado. As it is, Haeckel gives eight figures to illustrate the species and only three of these have any value for us. His fig. 10 tells us little more than his fig. 4, and fig. 4 conflicts with what is shown in fig. 3. Added to this, the oxea shown in fig. 3 bear little relation to those seen in Schmidt's original figure. They are a different shape and they are thicker. Moreover, although Schmidt gave no measurements for the oxea he shows them to be almost as long as the flagellated chambers. Those shown by Haeckel are barely half as long. Haeckel indicates also that the endosomal spicules are triradiates only, but if we ignore this and assume they might sometimes bear apical rays, and if we look more at Schmidt's figures than at Haeckel's, we shall have fairly solid ground for declaring that *Sycon quadrangulatum* represented nothing more than a further representative of *S. ciliatum*.

Let us now see what later authors, working from this unsure foundation, made of the species. Keller (1876) merely makes a passing reference to it. Norman, in Bowerbank (1882), claims to have found it at Guernsey, but gives no other details. Poléjaeff (1883) includes it in a list of the known species of *Sycon*, without further comment. Lendenfeld

(1891) seems to have done no more than summarise Haeckel's description. That is, his writing conveys the impression that he has himself examined specimens of this species, yet he adds nothing new, and, by way of illustration, includes a somewhat artistic and quite useless figure taken from Haeckel. Topsent (1890, p. 56 and 1890, p. 201) lists *Sycortis quadrangulatum* from Luc and *Sycon quadrangulatum* from the English Channel, without further comment on both occasions. Knipowitsch (1893) lists the species for the White Sea, Stieren (1895) and Derjugin (1915, 1928) do the same, none of these authors giving any reason for doing so. Breitfuss (1898) merely lists the species for the Arctic, presumably on the authority of Knipowitsch. Thacker (1908) records the species for Cape Verde Islands, adding little to our knowledge of the species except this further extension of its range. Dendy and Row (1913) list as good species of *Sycon* both *S. quadrangulatum* and *S. tesserarium*, the latter based on one of the three varieties established by Haeckel. Breitfuss (1927) lists *S. quadrangulatum* var. *tesseraria*, but this is merely a repetition of Levinsen's (1893) record for the Baltic, to which we shall return later. In 1932, Breitfuss again lists the var. *tesseraria*, this time based on Haeckel, and gives a new record, Spitzbergen, for the species itself. And in 1935 he lists it for the Adriatic, again a mere repetition of the records of Schmidt and Haeckel. Meanwhile, Rezvoi (1928) found the species at Novaya Zemlya. Finally, Topsent (1934) repeats the old records for the Adriatic.

Returning to Levinsen (1893), we find he recognises *S. quadrangulatum* var. *tesseraria* and it is worth while to enquire into the value of this variety. Haeckel (1872, p. 281) established three varieties: *quadrata*, *tetragona* and *tesseraria*. His diagnostic characters for these are:

quadrata: endosomal triradiates all regular; a single oxeote at the apex of each flagellated chamber; oxea 4–5 times as thick as the triradiates.
tetragona: endosomal triradiates regular to sagittal; 3–6 oxea at the apex of a chamber; oxea 3–4 times as thick as the triradiates.
tesseraria: endosomal triradiates regular to sub-regular; 8–24 oxea at the apex of a chamber; oxea 2–3 times as thick as the triradiates.

Nothing could bring out so vividly the tenuous basis upon which much of the taxonomy of the Calcarea is based. Further, we have here illustrated the manner in which the taxonomist can so readily recognise variations within a species, yet write as if the characters of the species were fixed and immutable.

Looking generally at the history of *S. quadrangulatum*, we have the fact that its original characters, as vested in the holotype, are largely unknown, yet more than a dozen authors have either made identifications or, by implication, accepted identifications made upon this insecure basis, and have extended the range of this imperfectly known species over a wide area. Levinsen (1893) alone gives us a clue to the characters accepted for the species, although he, admittedly, confines his attention to one variety only, the var. *tesserarium*. On his pages 405–6, he gives a key to two species: for *quadrangulatum* he gives us 'Spicula trestraalede og enkelte: kamrene prismatiske'. For *ciliatum* he gives: 'Spicula trestraalede, firstraalede og enkelte: kamrene frie'. Thus, it is clear that he is following Haeckel's interpretation of the two outstanding features, and we may assume that all other writers have done the same.

S. quadrangulatum is therefore based upon individuals of *S. ciliatum* with prismatic and closely-packed flagellated chambers, instead of having these chambers free, and with triradiates only in the endosomal layer, instead of quadriradiates, or a mixture of triradiates and quadriradiates. Such individuals are not unknown in any extensive batch of *Sycon ciliatum* from typical habitats.

Sycon raphanus was established in 1862 (p. 14) by Schmidt for a sponge collected 'im mittleren Theile des Dalmatinischen Meeres'. Its author recognised its close affinity to *S. ciliatum* but distinguished between the two species by the bulbous form of *S. raphanus*, its short but definite stalk, the more pronounced crown of oxea around the oscule, the less numerous oxea on the surface of the body, and the very small size of the sponge itself. None of these characters would be acceptable today as having a taxonomic significance. As to the spicules, about which Schmidt tells us little, it seems that some of them had club-shaped endings to some of the rays (Schmidt 1862, pl. i, fig. 2*d*). If this could be shown to be a constant feature, it might constitute a good specific character.

In 1868 Schmidt refers again to *S. raphanus*, having found it at Cette and after a brief reference to it ends with: 'Es wird sich bei einer Revision dieser Gattung auch darum handeln, ob *Sycon ciliatum* Lieberkühn nicht etwa in den Kreis derselben Art gehört.' The specimens referred to here were described by Lieberkühn (1859, p. 373) from Heligoland. From his remarks one would have thought he had before him typical examples of *S. ciliatum*. The description of the habitat, the size and shape of the sponges, all fit that species. There is no detailed account of the spicules, but Lieberkühn's figures show typical spicules of *S. ciliatum*—if, indeed, we can speak of typical spicules in a species so variable. Certainly he figures none with club-shaped ends to the rays. The only justification for Schmidt's suggestion is that in Lieberkühn's specimens, at the apical end, ' . . . ein fast wie Asbest glänzender Kranz von Nadeln, welcher weit über das Körperparenchym hinausragen.'

Haeckel, less cautious than Schmidt, included Lieberkühn's *S. ciliatum* categorically as a synonym of *S. raphanus*. Moreover, he figures spicules 'typical' of *S. ciliatum*, having the shape, dimensions and arrangement that can be found in any batch of *S. ciliatum*. And, ranging the world with giant strides as he was wont to do, he finds *Sycon raphanus* Schmidt not merely in the Dalmatian Sea, at Cette and possibly at Heligoland, but from Trieste, Naples, Messina and many other places in the Mediterranean, from the Red Sea, Indian Ocean, Australia, Philippines and Japan. As we shall later see, Haeckel was probably correct in recognising this very wide distribution, but not in maintaining *S. raphanus* as a species.

Up to this point, then, the only possible distinguishing mark of *S. raphanus* are the club-shaped endings to some of the spicules, and Schmidt alone has mentioned it.

The further history of the species includes more than a dozen references. The first of these is by Poléjaeff (1883) who recorded *S. raphanus* from Tristan da Cunha and the Phillipines. The only comment he makes is that the subendosomal triradiates are slender by comparison with the other triradiates and that they sometimes have an apical ray. It may be worth mentioning here that I have examined a number of other specimens of *Sycon* from Tristan da Cunha and find no reason to separate them from *S. ciliatum*. Certainly there is no club-shaped end to the rays in Poléjaeff's specimens, nor in those referred to the same species by Lendenfeld (1885), Lackschewitsch (1886), Dendy (1892), Breitfuss (1896, 1896, 1898, 1898, 1911, 1927), Arnesen (1901, 1901), Dendy and

Row (1913), Ferrer (1918) and Topsent (1934). The specimens reported upon by these authors came from all parts of the Arctic, from Greenland to the Murmansk coast, as well as from Norway, France, Minorca, Majorca, Chile, Ternate and Australia. None of these authors gives any details of the spicules, so we may assume all are basing their identifications on the external form. They do show, by their comments, that there is a variation in that form, as there is in *Sycon ciliatum*, and we may assume there were variations in the spicules, as in *S. ciliatum*. If then I say that in my experience there is seldom a cluster of *S. ciliatum* that has not one individual having the form which characterises the type of *S. raphanus*, it is going to be difficult to distinguish between that species and *S. ciliatum*.

It seems fairly clear therefore that *S. raphanus* as set forth by Haeckel (1872) is widespread, and the most striking thing about its distribution is that it should have been recorded so persistently from Australia. It is, then, even more remarkable that specimens so closely akin to it should have been made the types of two new species by Dendy (1892), namely *S. minutum* and *S. ensiferum*. Of the second of these, Dendy remarks: '. . . closely resembling *S. raphanus*; with very naked conulose surface and little or no oscular fringe. The two specimens are rather larger and especially stouter than most Australian specimens of *S. raphanus* which I have seen.' The type of *S. minutum* also had no oscular fringe, but was small. There can be little doubt that if Dendy had then been familiar with the wide variations that can be seen in, say, *S. ciliatum*, he would never have established two new species for these specimens that are so like his Australian examples of *S. raphanus*.

Sycon setosum Schmidt (1862), as with so many of Schmidt's species, is known from a picture of the external form published by the original author and a description of the skeleton by Haeckel (1872) and Lendenfeld (1891). Judged by these, the holotype is nothing but a small specimen of *S. ciliatum* with the radial chambers fairly closely packed together, but not remarkably so, and with rather long (0·3 to 0·6 mm.) apical rays to the endosomal quadriradiates. Since it is not unusual for these rays to vary from about 0·01 to 0·36 in a batch of specimens from a single locality, the slightly extra length for *S. setosum* seems relatively trivial. Lackschewitsch (1886) recorded specimens from Minorca, and Stephens (1912) found the species represented by 'several small specimens' from Blacksod Bay, Western Ireland, between tide-marks, where she also collected sponges which she identified as *Sycon ciliatum*, *Sycon raphanus* and *Sycon coronatum*. Four distinct species of *Sycon* in one stretch of beach partakes of overcrowding, and gives supporting evidence that they are all likely to be simple varieties of one species. I would suggest, therefore, that *S. setosum* should be regarded as yet another synonym of *S. ciliatum*.

Sycon schmidtii Haeckel (1872) seems to be nothing but a fairly normal *S. ciliatum* with radial chambers closely packed, as in *S. tessellatum*, and having somewhat unusual triradiates at the apices of the chambers. Both these points are shown elsewhere to have no taxonomic significance, and I accept this species as a synonym of *S. ciliatum*. Lendenfeld (1891) is the only other author who claims to have found this species. One of his preparations is in the British Museum, and having examined this I feel even more confident that Lendenfeld was looking at fairly normal examples of *S. ciliatum*.

Sycon elegans was first described, under the name *Dunstervillia elegans* by Bowerbank

(1864) from Algoa Bay. In 1864, the same author described *Grantia tessellata*, from Guernsey. Haeckel (1872) regarded the two as synonyms and claimed to have found *Sycandra elegans*, as he then called it, off the Canaries and the Barbados, off Portugal and in the Mediterranean, and to have examined additional specimens from two further localities on the coast of South Africa. In 1876 Keller described the anatomy and life-history of *Sycandra elegans* from the Mediterranean. Lackschewitsch (1886) recorded fifteen specimens of the same species from Minorca. Lendenfeld (1891) re-described the species from the Mediterranean, from 'nicht gut konservirtes Material'. All references to *Sycon* (*Sycandra*) *elegans* subsequent to this date are merely repetitions of knowledge or records from previous authors. In short, practically all we know of this species is contained in Haeckel's account of it, and from this it appears that *S. elegans* is mainly differentiated from *S. ciliatum* by the presence, at the apices of the flagellated chambers, of stout triradiates with thickened and flexuous basal rays and short conical paired rays.

Ignoring the smaller details of the spiculation in this species, the following salient points emerge: (1) the species has a sporadic distribution over part of the range occupied by *S. ciliatum*, as understood by all authors; (2) its habitat appears to be the same as that of *S. ciliatum*; (3) Bowerbank's specimens of *Grantia tessellata* were from the Guliot Caves, and they bear a striking resemblance to his specimens of *Sycon ciliatum* from the same caves (*cf.* Bowerbank, 1874, pl. 2); (4) the spiculation generally of both *S. ciliatum* and *S. elegans* is very similar; (5) there is a tendency in occasional individuals of *S. ciliatum* to develop a variable number of the stout-rayed triradiates at the apices of the chambers. This could mean that the so-called *S. elegans* represents nothing more than individuals of *S. ciliatum* in which the development of stout-rayed triradiates is more pronounced than usual.

There is another species that carries this same type of modified triradiate at the apices of the chambers, namely, *S. humboldtii*. Originally described by Risso (1826), it was also figured by Lieberkühn (1859) and fully described by Haeckel (1872), after which there is the customary re-description by Lendenfeld (1891), a record for Minorca by Lackschewitsch (1886) and nothing more subsequently apart from references to earlier authors. *S. humboldtii* is very closely related to *S. elegans* and, like it, must be regarded as no more than a sporadic variant of *S. ciliatum*.

Sycon arcticum was first mentioned by Haeckel in 1870 but the description of the species was not given until 1872, when it was called '*Sycandra arctica* nova species'. Although on both occasions Haeckel indicated that Schmidt's *Sycon raphanus* from Greenland was the equivalent of *Sycandra arctica*, he based his description of the species upon: 'Die mir vorliegenden zahlreichen Exemplare . . . aus dem nordlichen Eismeere, theils von Grönland, theils von Spitzbergen'. Presumably therefore one of these specimens will be the holotype, and so far as I am aware no holotype has been named. We have in the British Museum a specimen presented by Canon Norman (B.M.10.1.1.624) which is labelled, in Haeckel's handwriting, 'Sycon arcticum Haeckel, Proeven, Grönland'. Proeven is one of the localities mentioned by Haeckel in 1872, and I suggest this be taken as the type-locality and B.M.10.1.1.624 as the holotype.

The specimen here selected as the holotype agrees with Haeckel's written description of the species. Its skeleton accords closely with the written description, except in one particular, that the flagellated chambers are so closely packed that the skeleton of radiates at the apices of the chambers appear to constitute a continuous layer. In other words, the skeleton appears at first sight to be that of a *Grantia*. More careful inspection shows, however, that the layer is not continuous but consists of groups of triradiates concentrated at the ends of the chambers and tightly adjacent to each other. Furthermore, these apical triradiates usually have one ray bent, so that they and also the skeleton as a whole are clearly identifiable with those of *Sycon protectum* Lambe (1896) from Bonaventure Island, Gaspé, and later specimens recorded by Lambe (1900) from Belle Isle as well as Greenland. Indeed, fig. 4, pl. i, from Lambe (1900) could easily serve to illustrate the characters of B.M.10.1.1.624, the holotype of *Sycon arcticum*.

Before proceeding, it may be worth while examining the history of this species. First, it may be noted that Haeckel recognised two varieties of it: *polaris* and *maxima*. He tells us that *polaris* is characterised by having tubar triradiates and rudimentary apical rays to the endosomal quadriradiates and that *maxima* has occasional tubar quadriradiates in addition to the triradiates, and weakly curved apical rays to the endosomal quadriradiates. He makes no mention of the characters of the typical form. When, therefore, Dendy and Row recognised three species, *Sycon arcticum*, *S. polare* and *S. maximum*, they could only leave us in doubt as to the characteristics of *S. arcticum*. Since Haeckel in establishing his two varieties was doing no more than acknowledging a variability in the spicules, we can readily accept *S. polare* and *S. maximum* as straightforward synonyms of *S. arcticum*.

There have been nine other references to *S. arcticum* since 1872. All are mere faunal records or else they comprise the most meagre references to the specimens concerned. The one exception is that by Poléjaeff (1883) whose fig. 5, pl. 3, shows a skeleton arrangement very close to that of B.M.10.1.1.624. That author has failed to say whether his drawing represented the skeleton of his specimen from the Bermudas or of his specimen from the Philippines. Although the sponges themselves are in the British Museum collection, none of Poléjaeff's preparations is there, so it is not possible to identify precisely from which one the drawing was made. From fresh sections made recently, however, there can be little doubt that the fig. 5 was taken from the Philippines specimen.

When Poléjaeff was writing, in 1883, the only specimens previously recorded had been from Greenland and Spitzbergen. It is not particularly remarkable that he should have found another specimen from the Bermudas, but it is surprising that the second should have come from as far away as the Philippines. Yet the Philippines specimen is more nearly like B.M.10.1.1.624, or Haeckel's own description, than the Bermudas specimen. From this alone we should expect the species to have a wide range.

There are a few more details to be recorded for Poléjaeff's specimens. First, although that author's fig. 5 shows oxea and trichoxea at the surface, in my section, made from the same specimen, there are no trichoxea. In the Bermudas specimen, on the other hand, there are oxea and microxea. The Bermudas specimen also shows more frequent quadriradiates in the tubar skeleton.

Already we know from Haeckel's own works that he had found some variation in the spicules, as shown in his var. *polaris* and var. *maxima*. Poléjaeff's specimens suggest even more striking variations. At the same time, neither of these authors has made any mention of the triradiates with one ray crooked, as in *Sycon protectum* and B.M.10.1.1.624. These spicules are not to be seen in Poléjaeff's specimens and the question arises: Were they present in all Haeckel's specimens or only in the one he gave to Norman? If they were not, then is my action in choosing this specimen as holotype justified? My answer to this last question would be that Haeckel did make sections from this specimen. Certainly he gave it a name. The specimen has been cut and if Norman had to cut it to make sections these would now be in the British Museum with the rest of his collections. They are not to be found there, so we may reasonably suppose that Haeckel cut the specimen, examined the sections and gave the name *Sycon arcticum*. If he could overlook triradiates with crooked rays in this specimen, he could fail to see them in the rest. Therefore I shall assume that B.M.10.1.1.624 is representative of the species and that the triradiates at the apices of the chambers may or may not have one ray crooked.

At this point we can summarise the range of *Sycon arcticum* as including the Arctic from the Atlantic coast of Canada to the coast of northern Siberia, Bermuda and the Philippines. The skeleton consists of ectosomal diacts which may be oxea, trichoxea and microxea, in varying combinations, tubar radiates which may be tri- or quadriradiates, and endosomal radiates, which may have apical rays from rudimentary to fairly long.

Our knowledge of *Sycon villosum* depends entirely upon the description given by Haeckel (1872). In that work, under *Sycandra villosa*, Haeckel gives us a picture of a longitudinal section of a sub-ovate specimen. This is 6 mm. high by 5 mm. diameter, the diameter including the brushes of oxea at the surface. So far as the gross morphology is concerned, this specimen, when entire, must have presented an appearance very like that of *Sycon arcticum*, and it is not without significance that there should be included under the synonyms of *Sycandra villosa* the following: *Sycon ciliatum* (quarundum collectionum) and *Grantia coronata* (quarundum collectionum). We may assume, although Haeckel does not stress this point, that the sole distinguishing feature of this species is the great length of the apical ray of the endosomal quadriradiates. At all events, he divides the species into three varieties, *hirsuta*, *clavata* and *impleta*, characterised by having these apical rays 2–3, 3–4 and 4–5 times as long as the other rays of the endosomal quadriradiates. Exactly what value such a subdivision may have we are left to judge for ourselves. The situation is made less clear by his subsequent comments. Thus, in a single line on p. 326, he refers to the 'Varietät *impleta*' and also '*S*(*ycandra*) *impleta*'. He also declares the length of the apical rays of the endosomal quadriradiates to vary from 0·5 to 1·5 mm. long yet the diameter of the cloacal cavity itself is but 1·5 mm. diameter at the most and is usually less.

The spicules of *Sycon villosum*, apart from these large apical rays, are slightly larger than those given by Haeckel for *Sycon ciliatum*, but the measurements he gives are not outside the range for that species as shown by subsequent investigation. The geographical range he gives for *S. villosum* includes Norway, British Isles, France, Florida, Antilles and Venezuela. If it could be shown that the larger sizes of the spicules, as well as the unusual lengths of the endosomal apical rays, remained constant over so wide a geographical range there might be some justification for supposing we were dealing with a well-defined species. As it is, there is the suspicion that Haeckel has picked out specimens from other people's collections, and which they had regarded as belonging to *S. ciliatum* (+*S. coronatum*), and has emphasised one character only, namely, the length of the apical rays, without seeking to evaluate the remaining characters or to relate them to those of other species.

Briefly, *S. villosum* seems to be a variety of *S. ciliatum* with unusually long apical rays to the endosomal quadriradiates, and it becomes very much a matter of opinion how far even a varietal distinction can be maintained.

Sycon lingua Haeckel (1872: 278), from Newfoundland, has the appearance, so far as can be judged from inadequate illustrations and a scanty description, of a specimen of *S. ciliatum* slightly compressed laterally. Two other supposed peculiarities are the small size of the tubar triradiates and the presence of triradiates only in the endosomal skeleton. The last of these can be discounted because, exceptionally, specimens of *S. ciliatum* are found with endosomal triradiates only. As to the size of the tubar triradiates there is, as so often, a disparity between the dimensions given in the text and those shown in the drawings. The paired rays are stated to measure 0·05 to 0·08 mm., but according to the illustration (pl. xlviii, fig. 1) they measure 0·1 mm. or more except towards the apex of the radial chamber. It is usual to find the paired rays diminishing in this way as the apex is reached, and we are left to suppose that the dimensions stated in the text are not those of the average tubar triradiate. This would make *S. lingua* approximate much more closely to *S. ciliatum*, and we can assume reasonably that the compressed shape is no more than is often found in the larger preserved specimens of *S. ciliatum*, say 40 mm. or more high; and Haeckel's largest specimen of *S. lingua* was 90 mm. high.

Sycon ampulla (Haeckel) is a very small stalked sponge with a skeleton markedly reminiscent of *S. ciliatum*. In fact, but for the presence of a stalk, I would have no hesitation in declaring it to represent a juvenile stage of that species. The original specimens were from Venezuela and Brazil, as were those of *Sycum alopecurus* Haeckel and *S. petiolatum* Haeckel, which must be regarded as synonyms of it. There have been several widely dispersed records of this species since it was first described. Topsent (1892: 22) recorded it from the Azores, giving no other details of his specimens. Jenkin (1908) found it in a collection from Zanzibar, but does not say it was stalked, and from his preparations the specimen looks very like *S. ciliatum*. Stephens (1912) found it on the Irish coast, from 50 m., the ratio of stalk to body, in her three specimens, being 4·5 : 4·5 and 2·5 : 2·5 mm. respectively. I have examined several others from South Africa, collected by Professor T. A. Stephenson, in which the ratios were 4 : 4 and 3 : 3 mm. respectively. The ratios in Haeckel's figured specimens range from 4 : 7 to 5 : 5 mm. Certain features of Haeckel's drawings make it doubtful, however, whether it is a faithful representation.

There is a further difficulty in assessing the value of this species. Haeckel speaks of his specimens as sessile or stalked, and, as we have seen, Jenkin's specimen may have been sessile. It is the largest yet recorded, measuring 11 mm. by 5 mm. and, since one of Jenkin's preparations is of a longitudinal section 8 mm. long that does not go the full length of the sponge, there can be no doubt that it was sessile or had but the barest length of stalk. Either we can divide all recorded specimens into two species, the sessile and the stalked, or we can assume that all belong to one species, which may or may not be stalked. In the second case, it would be difficult to separate it from *S. ciliatum*.

Typical specimens of *S. ciliatum* sometimes have a short stalk, but among the many young forms collected from the aquaria at Plymouth there were a few showing a stalk, but this was shorter relatively to the body than in the stipitate specimens of *S. ampulla*. On the other hand, Haeckel's fig. 6, pl. 58 is reminiscent of the manner of growth of young *S. ciliatum*.

The characters and measurements of the spicules in all recorded specimens of *S. ampulla* show a fair measure of variation. This is true also of Haeckel's original specimens. These variations agree closely in range and kind with those found in *S. ciliatum*. It is noticeable also that typical *S. ciliatum* have been recorded from most of the localities yielding *S. ampulla*. Finally, from Tristan da Cunha, I have examined many small Sycons, stalked and unstalked, which had appeared to me to be *S. ciliatum*, but which could also be equated with *S. ampulla*.

It is also worth pointing out that *S. yatsui* Hozawa (1929), from Japan, is stalked (6:11), and its spicules agree closely with some of the specimens described by Haeckel, and other authors since, under *S. ampulla*, but its nearest relative appears to be *S. compactum* Lambe, from Vancouver Island, which is sessile.

From the evidence available there is fairly good reason for regarding *S. ampulla* as a stipitate form of *S. ciliatum* which is of sporadic and occasional occurrence.

Returning to *S. yatsui*, there is such a strong similarity between it and *S. compactum* Lambe that it is surprising Hozawa made no mention of this fact. Both are tubular, with papillose surface, and both look externally very like *S. ciliatum*. One is sessile and the other stipitate; one has short apical rays to the endosomal quadriradiates and in the other these apical rays are very long. Neither of these differences has any real significance, and we can with confidence regard the two species as synonymous. Indeed, they are nothing more than *S. ciliatum* with microxea only at the apices of the chambers instead of oxea.

Sycum ovatum Haeckel (1870 : 239), recognised by Dendy and Row as a distinct species of *Sycon* is, again, one of the many forms in which the common *S. ciliatum* may be met.

Four species of *Sycon* have been recorded from the Indian Ocean: *S. proboscideum* (Haeckel), *S. tabulatum* (Schuffner), *S. raphanus* Schmidt and *S. munitum* Jenkin. The first of these appeared originally as *S. raphanus* var. *proboscidea*, one of three varieties of *S. raphanus* proposed by Haeckel, which was raised to specific rank by Dendy and Row (1913). *S. raphanus* was recorded by Row from the Red Sea and his specimen is probably the equivalent of Haeckel's var. *proboscidea*. *S. tabulatum* from Mauritius is clearly very closely related to *S. ciliatum* and also to *S. munitum*. As to this last named, it is known from three specimens dredged in seven fathoms in Zanzibar Channel, in company with two other sponges identified by Jenkin as *S. ciliatum*. He says of *S. munitum*: 'In external appearance they resemble small specimens of *Sycon ciliatum*. . . . The peculiarity of the species is the presence of quadriradiates in the articulated tubar skeleton . . . the new species is differentiated by having two sorts of gastral quadriradiates, viz., small quadriradiates with short apical rays and larger ones with very large apical rays.' Such a difference in the endosomal quadriradiates is by no means unknown, nor are quadriradiates in the tubar skeleton unknown, in otherwise normal *S. ciliatum*, to which species there can be little doubt Jenkin's specimens really belong. And if they do, so does Schuffner's specimen of *Sycandra tabulata*, from Mauritius. We have seen that *S. raphanus* is almost certainly a synonym of *S. ciliatum* and I would regard Row's

Red Sea specimen, as well as Haeckel's supposed variety of *S. raphanus*, as merely further examples of *S. ciliatum*.

The description by Schuffner (1877) of *Sycon boreale*, from Norway, reads very like an account of *Sycon ciliatum*. The only features that might make this doubtful are the dimensions of the tubar triradiates: 'Die beiden lateralen Schenkel messen 0·5 mm., der basale 0·18 Mm.' Schuffner figures five of these spicules (pl. xxvi, fig. 13) and the average lengths of the rays as published is 30 and 35 mm. for the lateral and basal rays respectively. Since the magnification is ×220 this gives average lengths of 0·14 and 0·15 mm. respectively, not 0·5 and 0·18 mm. as given in Schuffner's text. The tubar triradiates of *Sycon boreale* are therefore typical of *S. ciliatum*, if we accept the drawings as correct. The fact that no subendosomal sagittal triradiates are recorded may be because these are indistinguishable from the tubar triradiates, which is not unusual in *S. ciliatum*.

Sycandra quadrata Schuffner (1877), from Norway, is known to us from a written description as well as from drawings of spicules. Although no endosomal triradiates are mentioned, and the diacts are short oxea of two thicknesses (0·22 by 0·001 and 0·22 by 0·004 mm. respectively), there is the very strong suspicion, amounting almost to a certainty, that Schuffner had specimens of *Sycon ciliatum* before him. In addition, it is difficult to see in *Sycon barbadense* Schuffner (1877) anything but a straightforward example of *S. ciliatum*.

The types of *Homoderma sycandra* Lendenfeld (1885), from Australia, lavishly illustrated by its author, seem to be nothing more than a series of young *Sycon ciliatum*, comparable to those I have already mentioned from Plymouth. *Sycandra inconspicua* Lendenfeld (1885), from New Zealand, is tolerably well described but is not figured. There is no part of the holotype in the British Museum nor does Fell (1955) mention it among the New Zealand collections. From Lendenfeld's account it could easily be *Sycon ciliatum*.

Sycandra asperum Gibson (1886 : 365) was transferred to the genus *Sycon* by Dendy and Row, yet there is nothing in the original description or the figures to justify this. On the contrary, we have here a very ordinary specimen of *Grantia compressa* illustrated in an extremely crude manner. Its identity is, for me, beyond question, however, and Gibson's comment that the club-shaped diacts are 'generally in pairs' supports this, for this arrangement can so commonly be seen in *G. compressa*.

I have compared the type of *Sycon subhispidum* Carter (1886), from Australia, with specimens of *S. ciliatum* from the British Isles. Its spiculation comes well within the normal range of variation for *S. ciliatum* and specimens looking exactly like it are easy to find. In short, had the type of this species been found on our own coasts no taxonomist would have interpreted it as other than *S. ciliatum*.

There are in the British Museum collection two preparations from the holotype of *Sycandra helleri* Lendenfeld (1891). In his original description of this species the author gives several figures of the spicules. Comparing these with the actual preparation makes clear immediately that the drawings are slightly inaccurate. The oxea, for example, are more irregular in outline and slightly curved, the relative sizes of the oxea and the triradiates are not correctly shown, and the shape of the triradiates is not accurately shown. Each of these defects is small, and so are the inaccuracies in the measurements given for the spicules, but added together they are very misleading. In fact, *Sycandra helleri* has a skeleton almost identical with that of *Sycon globulatum* Hozawa (1929) as shown in fig. 27 of the original description. The only point of difference worth mentioning is that in the Mediterranean species there is only one oxeote at the end of each flagellated chamber and in Hozawa's Japanese specimens the oxea are smaller and there are several to each chamber. It is noteworthy also that although Lendenfeld did not illustrate the morphology of his holotype a comparison of his written description with Hozawa's fig. 26 leaves no doubt of the identity of these two species. And both have a similar form to *S. ciliatum*.

Sycon caminatum Thacker (1908) from Cape Verde Islands has the external form of *S. ciliatum* and spicules, apart from a few differences, of *S. helleri*. Thacker summarises these differences: 'This Sycon (i.e. *S. caminatum*) is most nearly allied to *Sycandra* (*Sycon*) *helleri* Lendenfeld. . . . The species differ, however, in a number of points, perhaps the most important of which is the presence in my species of the remarkably well-developed peristome. . . . *S. caminatum* is further distinguished by the presence of more than one oxea at the distal ends of the radial chambers, by the absence from the radial chambers of sagittal triradiates with the concave curves of their paired rays turned towards the basal rays, and lastly by the merely sporadic occurrence of quadriradiates in the tubar skeleton, these spicules being numerous in that region in *S. helleri*.' As to these details, I have examined the preparations of Lendenfeld's holotype and of Thacker's holotype side by side. There is no significant difference in the proportion of quadriradiates in the tubar skeletons of the two specimens and as to the sagittal triradiates, these are identical in both specimens. The sole differences between them are concerned with the oxea of the radial chambers and the presence or absence of spicules around the vent. In the present state of our knowledge, we cannot accept these as specific characters and I see no alternative to regarding *S. caminatum* as a synonym of *S. helleri*.

Two fortuitous observations were made while examining Thacker's preparations. One is that the tubar radiates tend to differ in shape from one chamber to another. The second is that at the apices of a few of the chambers could be seen one or a few triradiates with much shortened paired rays and curving basal rays, the whole thicker than the normal tubar radiates. These spicules recall corresponding spicules in *S. elegans* and *S. humboldtii*.

A fourth species merits consideration at this point, namely, *S. coactum* (Urban) from California. The holotype is 6 mm. high by 5 mm. diameter, with an oscular fringe. The spicules are very like those of *S. globulatum* from Japan, except for the diacts at the ends of the chambers, and these being oxea and microxea recall the spicules of *S. caminatus* Thacker.

The dimensions of the diacts in these four species may be tabulated as follows:

	Oxea	*Microxea*
S. helleri	1120 × 56	—
S. globulatum	460–700 × 10–28	—
S. caminatum	800 × 50	up to 250 × 10
S. coactum	1000 × 35	30–50 × 1–3

(Figures in microns)

Sycon ramsayi Lendenfeld (1885 : 1097) is chiefly remarkable for the strongly hispid surface, in which it resembles closely *Grantia capillosa* of the northern hemisphere. Undoubtedly synonymous with it are *Grantia gracilis* Lendenfeld, *Grantessa hirsuta*

(Carter) and *Leuconia australiensis* (Carter). Moreover, *L. villosa* (Lendenfeld) differs only in the larger size of the radiates, in which respect it has the same relation to *Sycon ramsayi* that the usual *Leuconia fistulosa* bears to *Sycon ciliatum* (see p. 104). *Grantessa erinaceus* (Carter), also from Australia, appears at first to be distinguished by the distinct bundles of long oxea, with shorter and stouter oxea between them, but one specimen of *G. hirsuta*, more especially, comes very near it in this respect. Added to this, the general characters of *G. erinaceus* bring it very near to *Sycon ramsayi*.

There are two comments to be made here. If Dendy (1892), in his revision of the Australian species of Calcarea, had not been influenced by the supposed generic distinctions represented by different types of canal system, he must surely have suspected the close relationship of these four species. The second comment is that the recorded specimens of these four species are all very alike in outward form, as well as in the general features of their spiculations. The only significant differences are in the diacts, and, *Grantessa erinaceus* apart, these are less than those established for any group of *Sycon ciliatum* taken at random. As we have seen, the diacts of *Grantessa erinaceus* are connected by intermediates with the more typical diacts of *Sycon ramsayi*, so that there can be little objection to its inclusion with the rest under one specific name.

Sycon asperum Lambe (1896: 205), from the Atlantic coast of Canada, later renamed *S. lambei* by Dendy and Row (1913 : 746) has the spiculation of *S. ciliatum* and, so far as can be judged from the drawing, the external appearance of *Leuconia fistulosa*.

Sycon karajakense Breitfuss (1897) is from East Greenland, the type-locality of *S. ciliatum*. The original description leaves much to be desired and the text-figure is diagrammatic to the point of being crude. It is difficult to avoid the conviction that this is none other than a fairly ordinary specimen of *S. ciliatum*.

There are two species of *Sycon* from New Zealand described by Kirk (1898). These are *S. pedicellatum* and *S. ornatum*. Judging from Kirk's figures (pl. xxxi, figs. 1*a*, 2*a*) of the external form both of these could belong more properly to *S. ciliatum*. Certainly, in view of the general resemblance they bear to each other, as well as the relatively close proximity of their type-localities, there is little reason to suppose that two real species are involved. If we compare Kirk's spicule-drawings with the measurements he gives, there are many discrepancies which can only be reconciled by re-examination of the types. If that were done our conception of these species might be altered. In the meanwhile I prefer to regard both as synonyms of *S. ciliatum*, this being based upon a gross assessment of their characters. This view is supported by the fact that Hozawa (1940) and Tanita (1941 (*bis*), 1942), record typical specimens of *S. ornatum* from the northerly areas of Japan, where *S. ciliatum* has also been recorded by them.

In recording *Sycandra coronatum* var. *commutatum* from Chile, Breitfuss (1898: 459) clearly endeavoured to associate the characters of his specimen with Haeckel's account of the variety. It is also very clear that the characters Haeckel chose to distinguish this variety are trivial and represent no more than ordinary variations within the species here called *Sycon ciliatum*. The action by Dendy and Row in raising the variety to the rank of a species must have been based upon inadequate knowledge of *S. ciliatum*. Since this last species is known to occur off Australia, New Zealand and Tristan da Cunha, there should be nothing remarkable in its occurrence off Chile.

Sycon ciliatum var. *polaris* Breitfuss (1898), later renamed *S. hozawai* Breitfuss (1932) is a *Sycon* with the flattened form of a large *Grantia compressa* but in all other features is so like the ordinary *Sycon ciliatum* that it can only be taken to represent an individual of that species which exhibits an unusual mode of growth.

Once one is used to looking at large numbers of *Sycon ciliatum*, *S. mundulum* Lambe (1900 : 28), from Davis Strait, is so obviously a specimen of it that nothing more need be said. The same applies to *S. tuba* Lendenfeld (1891 : 244) from the Adriatic, of which I have been able to examine the type.

Sycon eglintonensis Lambe (1900:29) has spicules coming within the range of those of *S. ciliatum* except in one particular, that the apical rays of the endosomal quadriradiates measure 0·75 mm. long. The external form of the type recalls that of *Leuconia fistulosa* and Lambe's drawing of a section vertical to the surface suggests that this is a specimen of *L. fistulosa* with a syconoid canal-system and weakly developed ectosomal layer of triradiates.

Sycon parvulum Preiwisch (1904) is moderately well-described but the illustrations, presumably drawn by the author himself, suggest that Preiwisch was not used to examining or identifying sponges. He shows no appreciation of the shape and form of spicules although the drawings are made with evident care. Until the type can be redescribed we can only say that the original description gives the impression of a species nearly related to *S. ciliatum.*

It is difficult to relate *Sycandra staurifera* Preiwisch (1904: 17), from Hawaii, to any other species of *Sycon*; but the description seems to suggest *S. ciliatum.* Since Haeckel also recorded this last species from this area, under *Sycandra coronata*, it is highly probable that Preiwisch's specimens belong also to *Sycon ciliatum.* At all events, in so far as one can recognise anything from Preiwisch's description, *S. ciliatum* is suggested.

The type of *Sycon coactum* Urban (1905), from California, is 6 mm. high by 5 mm. diameter. It has the general form and spiculation of the *quadrangulatum* type of *Sycon ciliatum*, with some quadriradiates in the tubar skeleton and microxea in the distal tufts of the radial chambers. There seems no strong reason for supposing it to be other than *S. ciliatum.*

Sycon kerguelensis Urban (1908 : 5) differs a little from the ordinary *S. ciliatum* in outward form; and otherwise makes a close approximation to it. Without having examined the original specimens one cannot be positive but the published description suggests that this is another synonym of *S. ciliatum.*

Sycon grantioides Dendy (1915 : 79) was admitted to be not a typical *Sycon.* It is, in fact, a synonym of a better-known species of *Grantia* from the Indian Ocean.

Sycon schuffneri Dendy and Row (new name for *Sycandra quadrata* Schuffner) is an obvious example of *Sycon ciliatum.*

Sycon globulatum Hozawa (1929:312) is so patently a synonym of *S. ciliatum* that nothing more need be said about it.

Sycon okadai Hozawa (1929) is, externally, very like the usual form of *S. ciliatum* found between tide-marks on the coasts of the British Isles. Its skeleton agrees with that of the usual form of *S. ciliatum* except that the oxea are slightly shorter and the paired and basal rays of the endosomal quadriradiates are slightly longer. In fact, it is difficult to avoid including *S. okadai* as a synonym of *S. ciliatum*. *Sycon misakiensis* Hozawa (1929) has the external form of *S. quadrangulatum*. The spicules agree closely in size with those of this older species except for the presence of trichoxea in addition to the oxea. As we have seen, it is doubtful if a distinction can be maintained between this last species and *S. ciliatum*. Indeed, for the remaining species of *Sycon* described by Hozawa (1929), namely, *S. calcar-avis*, *S. digitiformis* and *S. satsumensis*, there are sufficient reasons for including them all in *S. ciliatum*, since in outward form and spiculation they represent similar variations and differences to those one may find in any batch of European individuals of that species. Moreover, *S. simushirensis* Hozawa (1918) belongs to the same series, and must also be included in *S. ciliatum*.

Sycon lendenfeldi Row and Hozawa (1931 : 757) seems to be nothing but a stalked *S. ciliatum*, as is *S. urugamii* Tanita (1940 : 171).

Sycon mexico Hozawa (1940:137) is a *Sycon ciliatum* with subendosomal quadriradiates. It has 'a feebly developed dermal cortex which is provided with its proper skeleton', so that it represents a condition intermediate between *S. ciliatum* and *Leuconia fistulosa* (see p. 7).

Sycon plumosum Tanita (1943: 404) has much in common with *S. ramsayi*. It, also, has a feebly developed 'dermal cortex'.

Sycon pulchrum Tanita (1943: 409) is a *S. ciliatum* that has occasional apical rays to the tubar radiates and long apical rays to the endosomal quadriradiates. The spicules of the vent, which Tanita also suggests as a diagnostic feature, can be ignored (see p. 7). There is nothing remarkable in the first two features, and *S. pulchrum* can be accepted as a synonym of *S. ciliatum*.

Sycon rotundum Tanita (1941:270) is merely a *S. ciliatum* with quadriradiates included in the tubar skeleton.

Sycon album Tanita (1942:28) appears, from its external form and the size of its oxea, to be intermediate between *S. ciliatum* and *S. caminatum* (see p. 64). It is interesting also that Tanita refers to one of the outstanding features as being the 'repeatedly branched flagellate chambers'. This indicates a sylleibid canal system. Two more species are described, in this same work, which approximate to *S. album* and, indeed, cannot be separated specifically from it. They are *S. cylindricum* and *S. luteolum* and it is significant that Tanita should say of the latter that 'its flagellate chambers are divided . . . a feebly developed dermal cortex is present'. This means that *S. luteolum* is more properly a *Grantia*, yet is very obviously a *Sycon ciliatum*.

Sycon gelatinosum is a well-marked species having *S. carteri* as a synonym.

When I first came to examine a microscope preparation of *Sycon caminatum* Thacker, its general features seemed strongly familiar. Although I could not then recall why this was, it struck me, on subsequently looking again at Lambe's illustrations of *Leucandra taylori*, that I was immediately reminded of *Sycon caminatum*. On comparing the two, I found them to be remarkably similar. Yet in the one instance we are dealing with a *Sycon* from Cape Verde Islands and in the other with a *Leucandra* from Vancouver Island.

Comparing these two we find, if we ignore the canal-system and the modifications in the arrangement of the spicules that go with it, two very similar sponges. The radiates are similar in the two, there are in both the large oxea set singly at right angles to the surface, and the same microxea at the surface. The differences are that the endosomal spicules of *Sycon caminatum* are quadriradiates and those of *Leucandra taylori* are triradiates, and there are slight differences in external form. As to the differences in the endosomal spicules, there is a specimen from West Africa, in the Atlantide Collection, which agrees closely in all other respects with *Sycon caminatum* but has endosomal triradiates as in *Leucandra taylori.*

Sycon caminatum and *Leucandra taylori* are of particular interest because they are located in widely different parts of the world and resemble each other closely in spiculation. Moreover, in external form *Sycon caminatum* looks like an ordinary *S. ciliatum* and *Leucandra taylori* looks like a young *L. fistulosa.*

We can carry this comparison further, for among Urban's species from California there is *Sycon coactum* looking very like *Leucandra taylori* and having a very similar spiculation, and from the same area we have *Leucandra apicalis* and *L. heathi* having the same external form as *L. taylori* and a spiculation very similar to it. From the Cape Verde Islands, also, we have *Grantia tuberosa* Poléjaeff (1883), which is so absolutely identical with *Sycon caminatum* that it is difficult to understand how Thacker could have missed seeing it.

In these comparisons there is, again, the implicit suggestion that certain species of *Sycon* may, in fact, be conspecific with certain species of *Leuconia.* The further suggestion is that all the species now under discussion, whether from Vancouver, California or Cape Verde Islands, may belong to one species. This receives support from another of Thacker's species from Cape Verde Islands, *Grantia intermedia.* This has the outward form of *Leucandra taylori*, a spiculation approximating to *Sycon coactum*, and Thacker says the canal system '. . . is really intermediate between the form typical of the genus *Grantia* on the one hand and that of the genus *Leucandra* on the other'.

Grantia atlantica Ridley, taken off Brazil, has an external form reminiscent of a *Sycon ciliatum* with little or no peristomial fringe. Its skeleton is practically identical in appearance with that of *Sycon caminatum*, although all spicules are slightly smaller. *Sycon incrustans* Breitfuss, from Chile, is very similar to *S. coactum*, from California, but the holotype is of unusual shape, suggesting an abnormal growth.

If we can imagine a species extending from West Africa, across the Cape Verde Islands to Brazil, California and Vancouver, that species could reasonably be taken to include *Sycon caminatum*, *Grantia atlantica*, *G. intermedia*, *Sycon coactum*, *Leucandra apicalis*, *L. heathi* and *L. taylori.* Moreover, such a species would tend to be a link between *Sycon ciliatum* and *Leuconia fistulosa.* Into this same series must come *Leucomalthe bomba* (Haeckel), from Viti Island, in the Pacific.

All these forms are so closely related to *Sycon ciliatum* and *Leuconia fistulosa* as to be reasonably included as synonyms. The only feature which may possibly distinguish them is that the dermal oxea are, usually, stouter and fewer in number. It may be, therefore, that we have to do here with a subspecies, ranging from West Africa to California, Vancouver and Viti Island. On the other hand, through forms like *Leuconia ananas* var. and others, we have intermediate conditions for the oxea, and it may well prove, ultimately, that there is no way of separating them. For the time being, at all events, all are treated here as synonyms of *Sycon ciliatum*, with which, as we shall shortly see, *Leuconia fistulosa* must be held to be synonymous.

Genus '**Sycantha**' Lendenfeld

Sycantha Lendenfeld, 1891:235

On his return from Australia, Lendenfeld sold to the British Museum a large number of types. Many of these bore manuscript names and Lendenfeld doubtless intended publishing his descriptions of them at a later date, but failed to do so. One of these is labelled '*Sycandra tenella* M.S. Type. Port Jackson'. It bears the Museum number 86.6.7.25. Later, Lendenfeld (1891) published a description of a *Sycantha tenella* from Trieste. A comparison of these two shows that they represent two different specimens. They have, however, been confused in a somewhat unusual manner. A portion of the first of these was sent to Dendy, while he was in Australia, and eventually the preparations he made from this came to the Museum after his death, labelled '*Sycon tenellum* Lendenfeld'. It was presumably on these preparations that '*Sycon tenellum* von Lendenfeld' was accepted as a valid species by Dendy and Row (1913). Evidence, that it was this so-called 'M.S. type' to which Dendy and Row referred lies in two things. *Sycantha tenella* Lendenfeld (1891) is merely a specimen of *Sycon ciliatum*. The second piece of evidence is contained in Jenkin's (1908:4) brief reference to *S. tenella* and a figure (pl. 38, fig. 137) of a transverse section through the chamber layer. This section could not have been taken from Lendenfeld's holotype of *Sycantha tenella* from Trieste: (*a*) because the shape of the chambers is wrong for it; (*b*) because there is no reason to suppose Jenkin ever had access to that specimen. On the other hand, Jenkin could, and probably did, examine *Sycandra tenella* 'M.S. type'. The more remarkable thing is, perhaps, that fifteen years before the proposed revision by Dendy and Row, Breitfuss (1898:216) had shown *Sycandra tenella* Lendenfeld to be synonymous with *Sycon carteri* Dendy.

The only further reference to *Sycon tenellum* is in Topsent (1934, p. 10), who merely lists the species for Trieste on the basis of Lendenfeld's (1891) description. We can therefore ignore this in our present discussion.

It seems, then, that we have two 'species' of *Sycon* with synonymies as follows:

Sycon tenellum (Lendenfeld)
Syn. *Sycantha tenella* Lendenfeld, 1891
Sycon tenellum Topsent, 1934
Sycon ciliatum (Fabricius)
Syn. *Sycandra tenella* Lendenfeld MS.
Sycon tenellum Dendy and Row, 1913

Sycon tenellum (Lendenfeld), first described for the Adriatic in 1891, has not been recorded since. Its spicules are identical with those of many specimens of *S. ciliatum*, it has the tubular form of that species also, and the supposedly unusual form and arrangement of the flagellated chambers can be found fairly often in specimens growing among more typical *Sycon ciliatum* and normally identifiable with that species. In other words, *S. tenellum* represents a normal variation for *S. ciliatum*.

Genus **Sycandra** Haeckel

Schmidt (1870: 74) described, under *Ute utriculus*, four specimens which contained so-called endogastric septa. He stated that the development of this character varied with the individual. The general description of these four sponges is reminiscent of the features seen in *Grantia compressa*. Moreover, two, at least, of the sponges figured look very like this well-known species. Then, at the end of his account Schmidt comments: 'Ich habe . . . auf die Beziehungen der *Ute utriculus* und *Grantia compressa* Jhnstn hingeweisen enthalte mich aber hier im Hinblick auf Haeckel's Werk aller weitern Reflexionen.' Haeckel's work is, presumably, his Prodromus. In this (p. 238) we see, under the genus *Sycarium*, '*S. utriculus*, H. (*Ute utriculus*, O. Schmidt, Var. A); under *Artynas* (p. 246): '*A. utriculus*, H. (*Ute utriculus*, O.S., Var.)'; under *Sycocystis* (p. 248); *S. utriculus* (*Ute utriculus*, Var., O.S.); and under *Artynella* (p. 249): '*A. utriculus*, H. (*Ute utriculus*, Var. O.S.)'.

By 1872, Haeckel had had further reflections also. On p. 370, under *Sycandra utriculus*, he lists these various names in the synonymy then divides the species into two 'Generische Varietäten', namely, *Sycurus utriculus* and *Sycocystis utriculus*, the first with a naked vent, the second without a visible vent. In neither his specific diagnosis nor in the diagnoses of the generic varieties, does Haeckel mention the endogastric septa. His next step was to subdivide the species into 'Specifische Varietäten', as follows: *Sycandra monodora*, *S. polydora*, *S. monothalama* and *S. polythama*, the first and third of these possessing endogastric septa, the second and fourth being without them.

The description of the species, as a whole, bears a very close similarity to that of *Sycon ciliatum*, and nowhere does Haeckel make clear what are the distinguishing features of *Sycandra utriculus* or in what way the species differs from related species, such as *Sycon ciliatum*. It would appear, however, that Haeckel attached little importance to the endogastric septa. When Dendy and Row revived the use of the name *Sycandra* they selected *S. utriculus* as the type-species and remarked that it 'is sufficiently sharply distinguished by its skeletogenous endogastric network'. This, despite Schmidt's assertion that the network varies with the individual, and the implication in Haeckel's writings that half the specimens are without it. The only possible means of setting matters on an orderly footing would be to select a type for *Ute utriculus*, upon which a diagnosis of the species could be based. Meanwhile, I can offer the opinion that *Sycandra* (*sensu* Dendy and Row) is a composite species, my evidence for this being based on six specimens in the British Museum collections. Three of these are in the general collection, one identified by Crawshay, from Plymouth, two identified by myself at widely separated times, one being from Norway, the other from the north-west Pacific; each of these three has endogastric septa, and this feature obviously influenced the determinations. The real identities of these three specimens are *Sycon ciliatum*, *Grantia compressa* and *Leuconia fistulosa* respectively. The next three are in the Norman collection. The first bears a label in Bowerbank's handwriting: '*Grantia compressa* abnormal'. The other two are labelled in Haeckel's handwriting: '*Sycandra utriculus*, H, Shetlands'. The three specimens can be properly identified as *Grantia compressa*, *Sycon ciliatum* and *Leuconia fistulosa* respectively.

It seems very clear that Bowerbank's words must be the nearest to the truth, that the specimens are abnormal. Whether they are teratological or pathological must remain in question. It is, however, certain that the genus *Sycandra*, *sensu* Dendy and Row, rests wholly upon an abnormality in structure.

The family **Heteropiidae**

Within the family Heteropiidae Dendy and Row (1913) included the genera *Grantessa*, *Heteropia*, *Amphiute*, *Vosmaeropsis* and *Grantilla*. As we shall see later, there was no justification for the retention of *Grantilla*, which is a pure synonym of *Grantessa*. If we ignore the canal system, as we must, then there is nothing separating *Vosmaeropsis* from *Grantessa*, as understood by Dendy and Row. When we examine the characters of these genera as represented by their type-species, however, the whole picture changes. Thus, the type-species of *Grantessa* is *G. sacca* Lendenfeld. In this there is no ectosomal tangential layer of triradiates, the ectosome being supported by the paired rays of the subectosomal pseudo-sagittal triradiates. This appears to be a constant feature in the species since it obtains in Lendenfeld's holotype and in the specimens later identified with it by Dendy. Whether it is generically significant must be a matter of opinion, but for the moment I propose to treat it as such. As the remaining species accepted for *Grantessa* by Dendy and Row all have an ectosomal layer of triradiates they must then be removed from this genus. If we were to abide by the nomenclature used by Dendy and Row, then we should need to transfer all species of *Grantessa* to *Vosmaeropsis*. The position of this last genus would then be rendered untenable by the presence in it of *Grantessa stauridia* which, as *Sycetta stauridia*, was the sole species assigned by Haeckel to his subgenus *Sycettusa*. The species itself is, as we shall see, common in the Red Sea and resembles so closely the type-species of *Vosmaeropsis*, namely *V. macera* (Carter), that there is always the possibility that the two may eventually be shown to be identical. Certainly, *Sycettusa* must be elevated to generic rank and used to include all species of *Vosmaeropsis* and of *Grantessa*, excepting *G. sacca*.

The first mention of the name *Heteropia* is in an appendix by Carter to a paper by Higgin (1886). After describing a new species, *Aphroceras ramosa*, he remarks (p. 94) that its structure is Syconid, that this species 'belongs to a genus which I have named "*Heteropia*" in my forthcoming description of the Calcareous sponges from the neighbourhood of Port Phillip Heads'. This species is accepted by Dendy and Row as the type-species of *Heteropia* and it appears, at first sight, to be distinguished from all species of *Grantessa* and *Vosmaeropsis* (= *Sycettusa*) by the presence of 'colossal longitudinal oxea' in the ectosome. I shall show later, however, that a nearly related species, *Heteropia glomerosa* (Bowerbank) must include as a synonym *Grantessa intusarticulata* (Carter), and that the 'colossal longitudinal oxea' may be present in or absent from individuals otherwise identical. *Heteropia* is, therefore, an artificial genus. Moreover, the type-species, *H. ramosa*, is known from the holotype only, which was deposited in the Liverpool Free Museum (No. 22.4.74.7). Nothing was recorded of its ecology, and the original description is meagre. From such information as we have, it would appear to be a specimen of *Ute ensata*. Provisionally, at least, it is so treated and *Heteropia* included as a synonym of *Aphroceras*.

The fifth genus of the Heteropiidae, namely, *Amphiute*, has 'colossal longitudinal oxea' in both ectosomal and endosomal layers. There is no guarantee that here again we may not be dealing with variable features having little or no taxonomic value, and I prefer therefore to regard them as having no more than a specific significance. In that event, *Amphiute* must also be included as a synonym of *Sycettusa*.

Genus **Grantessa** von Lendenfeld

As understood by Dendy and Row, this genus included twenty-six species. Of these, six appear to belong to *Leuconia*, one to *Sycon*, one (*G. murmanensis*) to *Sycettusa glacialis*, and the rest differ from the type-species in possessing a tangential ectosomal layer of triradiates, whereas in the type-species the facial rays of the subectosomal quadriradiates lie immediately under the dermis. It may be questionable, at this stage of our knowledge, how far the presence or absence of the ectosomal layer of triradiates can be confidently used as a means of generic separation. There are, however, other details of the structure which might suggest a generic separation between *G. sacca*, the type-species, and the rest; so for the moment, *Grantessa* is accepted as monotypic.

The remaining species clearly fall into six natural groupings, and these are here treated as representing six species. One of these was originally assigned to the subgenus *Sycettusa* of the genus *Sycetta*. *Sycettusa* is, accordingly, raised here to generic rank, with *S. stauridia Haeckel* (1872 : 245) as the type-species. This is, however, synonymous with *Leucaltis bathybia* Haeckel (1872 : 146).

Details of the redistribution of the species of *Grantessa* may begin with *Grantessa simplex* Jenkin (1908), from Zanzibar, which is so patently a synonym of *G. stauridia* (Haeckel), from the Red Sea, that we can only suppose Jenkin overlooked Haeckel's account of it. Both species are closely related to a group of specimens from the Red Sea described by Row (1909) under *Grantilla quadriradiata*, *G. hastifera* and *Grantessa glabra*. The only differences are that in Row's specimens the spicules are somewhat larger and oxea are present to a varying degree, either sparsely present or in abundance. Even so, the spicules in *G. glabra* make a very close approach to those of *G. stauridia* and *G. simplex*. If any doubt existed that all five supposed species represented more than variations within a single natural species, the evidence from Dendy's (1913) three specimens of *G. hastifera*, from Providence, in the Indian Ocean, would be sufficient to set that doubt at rest. These show clearly, if such demonstration were necessary, that the sizes of all spicules vary both absolutely and relatively to each other.

Another species which comes within the same grouping is *G. zanzibaris* Jenkin (1908). According to the measurements given in the original descriptions, the spicules of this species are markedly smaller than those of *G. simplex* Jenkin, from the same locality (i.e. Zanzibar, 6–8 fathoms). When preparations from the two are compared under the microscope, the only difference between them worthy of mention is that *G. zanzibaris* has gastral quadriradiates instead of triradiates. As we have seen elsewhere, this can be disregarded for taxonomic purposes. The marked resemblance between the spicules of the two supposed species is further emphasised by comparing the drawings supplied by Jenkin (1908). This becomes even more remarkable when we realise that the magnification for his text-figure 97 should be ' × 150' and not ' × 100' as stated.

The mere cursory examination of the original figures and descriptions suffices to raise the suspicion that *Grantilla quadriradiata* Row and *Grantessa glabra* Row are very closely related. When, furthermore, we see how remarkably alike the two are in their external features, it becomes clear that they are separated by negligible differences in the spicules. These differences may have been invested with a greater significance forty years ago, but even then they could hardly have justified the placing of the two species in separate families. Dendy and Row (1913) appear to have been aware of this. They then wrote: 'This genus (i.e. *Grantilla*) was originally proposed by Row for two species, *G. quadriradiata* and *G. hastifera*, which were supposed to possess certain features that necessitated the provision of a new family, Grantillidae. We now consider, however, that the characters in question do not represent any fundamental peculiarities of structure, and we have therefore abandoned the family. . . . One of the two species originally assigned to *Grantilla*, *G. quadriradiata*, however, presents an association of subdermal quadriradiates with subdermal pseudosagittal triradiates, which is not known in any other species of calcareous sponge, and we therefore retain the name *Grantilla* for this species, with an emended diagnosis. The development of subdermal quadriradiates has evidently taken place repeatedly in the phylogeny of the Calcarea. We have seen it already, for example, in *Leucetta*, *Leucaltis* and *Leucettusa*, and have not in those cases considered the presence of such spicules as of generic value. In *Grantilla*, however, they seem to assume more importance, and to take a large share in the formation of the skeleton of the chamber layer. Nevertheless, had the genus not been already in existence, we should have hesitated to propose it on this character alone.'

These words are a remarkable confession. Either the quadriradiates have a taxonomic importance or they have not, and it should have been possible to decide this. In any event, the decision to retain the generic name merely because it had been established is the lamest possible excuse. Two more points emerge, however, of greater significance. The first is that our present knowledge of the way in which triradiates and quadriradiates can occur in combination or can replace each other in the skeletons of calcareous sponges suggests that this is all that has happened as between the supposed species *G. quadriradiata* and *G. glabra*. If this is so, and the remarkable similarity between them in all other features leads us inevitably to this end, then the supposed morphological and phylogenetic differences between 'subdermal sagittal triradiates' and 'subdermal pseudosagittal triradiates' are little better than mythical. The second point is even more serious. In this joint work, published in 1913, Row apparently did most of the work involving re-examination of types. Since he was capable of establishing a new species, genus and family for one specimen and another species, genus and family for another specimen almost identical with it and in the same collection, and if on revising this classification he failed to rectify more than a small, and the most obvious, part of his mistake, little reliance can be placed on the rest of his work. To say, as these authors do in their introduction, that one of them (Row) had been to Berlin and Jena to examine types, and leave us to take his findings on trust, as they do, is bad enough. To indulge in taxonomic quibbles to obscure an obvious error is distinctly disquieting.

The differences between *G. quadriradiata* and *G. hastifera* are the smaller size of all spicules in *G. hastifera*, as well as the absence of apical rays to the subectosomal radiates and the greater abundance of the oxea. In view of their strong resemblance to each other in all other respects, these differences assume a trivial importance and, in view of our findings in other species, can be wholly neglected.

A closely-related species which must be included in *Sycettusa* is *Vosmaeropsis macera* (Carter) with its synonym *V. mackinnoni* Dendy and Frederick. Although oxea and microxea are included among the spicules in both species, these are very variable in distribution. The oxea appear sometimes to be absent completely; sometimes they occur in widely scattered groups, with considerable areas between free of them; and in all instances their occurrence is more especially noticeable just below the margin of the vent. The microxea are not commonly present, and they may occur in the ectosomal layer or in the endosomal lining.

The most striking differences are seen in the sizes of the subectosomal and the subendosomal triradiates. Not only do these vary in size from one individual to another, but their relative sizes vary. Sometimes the ectosomals are noticeably larger than the subendosomals and at other times the relation is reversed. There is, in the British Museum, material from more than a dozen specimens identified by Dendy. The range of spicule-variation these exhibit makes it impossible to recognise *V. mackinnoni* and *V. dendyi* as distinct species. Indeed, in its triradiates, the holotype of the latter is nearer the holotype of *V. mackinnoni* than any other specimen I have examined.

Row and Hozawa, in describing *V. dendyi*, figure a separate category of tubar triradiates. Dendy and Row, in their diagnosis of the genus, imply that such spicules may be present. For the most part, the skeleton of the chamber layer includes only the long rays of the subectosomals and the subendosomals. Where the body wall is thicker than usual, however, separate tubar triradiates are to be seen. Their occurrence is, nevertheless, too variable to be used in diagnosis.

By direct comparison of their types, *V. macera* and *Grantessa polyperistomia* (Carter) can be shown to belong to the same species. The same is true, although less markedly, of *G. pluriosculifera* (Carter), but in this instance we have to rely on a written description since the whereabouts of the type-material is unknown. These three species are all from Australia; and from the same region we have *Leucandra helena* (Lendenfeld), from Australia, and *L. anguinea* (Ridley), from the Indian Ocean (Mascarenes), which cannot be separated from *Vosmaeropsis macera*.

The next species, *Grantessa poculum* (Poléjaeff), is less evidently a synonym of *V. macera*, but it agrees with that species except in having the lanceolate oxea of *Sycettusa stauridia*. *Grantessa mitsukurii* Hozawa, from Japan, has slightly larger spicules than *Vosmaeropsis macera*, but otherwise it agrees closely with it, except in having lanceolate oxea.

The position now is that we have *Sycettusa stauridia* (with its synonyms), from the Red Sea, and *S.* (*Vosmaeropsis*) *macera*, from Australia, closely similar except that the one has typically lanceolate oxea and the other has typically fusiform or club-shaped oxea. On the other hand we have *Grantessa mitsukurii*, from Japan, with lanceolate oxea like the Red Sea forms, *Leucandra anguinea*, from the Indian Ocean, with oxea typical of the Australian forms, and a specimen from South Africa (see Section III, under *Sycettusa stauridia*: B.M.1938.3.26.85), which has a spiculation, and especially the oxea, intermediate between the two. If we equate the differences between all these specimens with what is now known of variations in the spicules of *Grantia compressa*, *Leuconia solida*, etc., we have no alternative but to see them as individuals of one species.

If any doubt is felt about the possibility of a species ranging from Japan to Australia and thence to South Africa and the Indian Ocean, it can be set at rest by examining the range of the next species to be included in *Sycettusa*. This is *Heteropia glomerosa* (Bowerbank), of the Indian Ocean and South Africa. It is a species easy to recognise; and beyond doubt must be included, as synonyms of it, *Grantessa intusarticulata* (Carter), of Australia and Japan, as well as *G. shimeji* Hozawa and *Heteropia striata* Hozawa, both of Japan.

Once that range can be accepted for *Sycettusa glomerosa*, then four more species must be included in it. These are *Grantessa sycilloides*, *G. basipapillata*, *G. preiwischi* and *G. sibogae*. The first and fourth of these, from Mauritius and Indonesia respectively, are characterised by the robust nature of the ectosomal and subendosomal triradiates and by the relatively large ectosomal triradiates. In these respects especially, and also in the general dimensions of its spicules as well as in external form, *G. basipapillata* Hozawa makes a close approach to *G. sycilloides*. The only difference between them is the presence of quadriradiates in the endosomal skeleton of *G. basipapillata* and their absence from *G. sycilloides*. In view of our findings in other species this difference can be regarded as negligible. The other species having evident affinities with this group of three, namely, *G. preiwischi*, from Chatham Islands, has the robust ectosomal and subendosomal triradiates and the mixture of triradiates and quadriradiates in the endosomal skeleton. The ectosomal triradiates are, however, markedly smaller. On the other hand, there are evident similarities in the external form of its holotype and that of *G. basipapillata*.

G. ampullae Hozawa, from Japan, also has the robust ectosomal and endosomal triradiates and quadriradiates, and is, in fact, closer in all respects to *G. sycilloides* than is *G. basipapillata*.

Bowerbank's holotype of *Leuconia glomerosa* is a group of erect, fusiform individuals, each with stout walls enclosing a central cloaca of narrow bore opening through an apical vent. The other specimens here identified with the species all have the same robust form and texture. This is true even for *Grantessa papillata* Hozawa, although the written description of it would suggest otherwise. Even more misleading is the original description of *G. preiwischi*. When its form, said to be foliate, is embodied in a drawing, it is evident that the holotype of that species is probably a sub-adult individual having similar characters to those of Bowerbank's holotype.

There appears to be a northern species of *Sycettusa* showing a wide range similar to that of *S. stauridia*, for unless we are to continue to regard trivial differences in the shape and size of spicules as important, a comparison of the illustrations given by their respective authors readily indicates that *Grantessa thompsoni* (Lambe), *G. sagamiana* Hozawa and *G. nemurensis* Hozawa are identical. This would be true even by the standards accepted twenty years or more ago. It is even more true now that we have evidence of the very wide variations in spicular characters within a species. *G. nitida* (Arnesen) is not so obviously identical with these three, yet, even here, a careful examination leaves little doubt that it also must be included. Finally, we have *G. glacialis* (Haeckel), from Spitzbergen and Greenland, which closely resembles the four species already listed. Its chief difference lies in the absence from its skeleton of both oxea and microxea. On the other hand, I have examined a sponge from the Trondjhem Museum which resembles *G. nitida*, also from Norway, very closely except for the absence of oxea and microxea. Taking all things into consideration, therefore, I have little hesitation in assuming that *G. glacialis*, *G. nitida*, *G. thompsoni*, *G. sagamiana* and *G. nemurensis* represent a single species.

G. bifida Tanita has an evident affinity with *G. sagamiana* Hozawa, also from Japan. Its author draws attention to its chief peculiarity, the presence of endosomal microxea. We have, however, other instances in which one individual of a species may have ectosomal microxea and another may have endosomal microxea. I am inclined, therefore, to treat *G. bifida* as yet another synonym of *G. glacialis*.

Tanita also described *G. shimoda*, from Japan, having a remarkable likeness to *G. sagamiana* but differing in having subendosomal and endosomal quadriradiates, instead of triradiates, and in having no microxea. The same author recorded the species a year later, and this time speaks of having seven specimens. It would be interesting to know whether all seven show no variation from the holotype or whether, as is usually the case, one specimen was examined microscopically by Tanita and the identification of the remainder influenced by their similarity with it in external form. At all events, although the variations shown by *G. shimoda* and *G. sagamiana* are wider than any discussed so far for the *glacialis* group, they are not particularly remarkable when compared with the range of variations revealed in studies of other species.

There is further evidence of *G. glacialis* ranging as far as Japan, for *G. parva* Tanita is almost identical with Haeckel's original description of the species.

Grantessa lanceolata (Breitfuss) would seem to be a fairly typical example of this same *Sycettusa glacialis*. It is, however, necessary to make a correction in the figs. 24 and 25, on pl. iv (Breitfuss, 1898). In these the rays of the ectosomal triradiates are shown as no more than a third of the length of the paired rays of the ectosomal triradiates. In the text, however, the dimensions are given as 0·08 to 0·12 and 0·04 to 0·06 mm. respectively. This is not the only remarkable discrepancy between the written description and the illustrations.

Grantessa murmanensis (Breitfuss), described in this same work, is even more puzzling. The holotype is like that of *G. lanceolata*, but larger. The spiculation is illustrated by the author's figs. 20 and 21 on pl. iii, the first showing the separate spicules, the second showing a section across the body wall. According to Breitfuss (1898: 27), the ectosomal skeleton consists of two layers, a layer of tangential quadriradiates 'mit ihrem Apicalstrahl die Dermalmembran durchbrechen und frei nach aussen hervorragen', and a layer of sagittal triradiates. The illustration shows an outer layer of sagittal triradiates and, well below them, a scattered layer of nine smaller radiates, of which only three are shown as quadriradiates. Moreover, nowhere is an apical ray shown piercing the surface. The group of spicules in fig. 20 affords little help, for although each is lettered the author nowhere refers to these letters, and we are left to judge the characters of the species largely by the fig. 21. According to this, and the written description, no special endosomal spicules were present, a condition which must be unique in this type of sponge. It is my considered opinion that the surface he has labelled 'Dermalfläche', in fig. 21, is, in fact, the endosomal surface; and that, allowing for other inaccuracies besides, we could regard the holotype as a further example of *Sycettusa glacialis*. Should it be shown, by re-examination of the type, that the characters as drawn by Breitfuss are correct, a new genus would be needed for *Grantessa murmanensis*. Until then, I prefer to regard it as a synonym of *Sycettusa glacialis*.

Whereas these two species were from the White Sea, Breitfuss (1898: 112) described a third species from Spitzbergen, which he had first recorded in 1896. This, *Grantessa kuekenthali* (Breitfuss), is outwardly very like both *G. lanceolata* and *G. murmanensis*. The skeleton also bears much resemblance, expecially in the types of spicules. Here, figs. 11 to 20 on pl. 12 show the separate spicules, and on pl. 13, fig. 53, we are given a section of the body wall showing the spicules *in situ*. If, from the figures of the separate spicules, we omit the oxea and microxea, the drawings could then be said to be an almost exact replica of the fig. 20 illustrating the spicules of *G. murmanensis*. Included among them are dermal triradiates, but in the drawing of the section (fig. 53, pl. 13) no dermal skeleton is shown. Had these been included, the drawing would have shown this species to be, beyond question, a typical *Sycettusa glacialis*. The main point to be emphasised is, however, how little reliance can be placed on the figures Breitfuss has provided in his early works.

Finally, there is a group of three species described for the western South Atlantic, which seem to represent a single species for that area. These are *Vosmaeropsis sericatum* (Ridley) and *Grantessa pelagica* (Ridley), from Brazil, and *Grantessa flamma* (Poléjaeff), from Bahia. There are half-a-dozen specimens of the first, labelled in Ridley's handwriting, in the British Museum collections. They show the usual variations in spicule-characters and comparing them with preparations from the holotypes of *Grantessa pelagica* and *G. flamma* leaves no doubt that all represent one species. Breitfuss' *Leuconia sericatum* may or may not belong here, but the *Leucandra sericatum* reported by Thacker from Cape Verde Islands has nothing in common with Ridley's specimens except the possession of calcareous spicules.

Genus **Heteropia** Carter

Among those hitherto accepted as species of *Heteropia*, apart from the type-species (see p. 71), *H. rodgeri* Lambe and *H. medioarticulata* Hozawa are so nearly alike, except for minor differences in spiculation, that their identity with a single species is hardly in doubt. These two, also, are characterised by the absence of an ectosomal layer of triradiates, which marks them off from other species of the genus. Except for this one character they cannot be distinguished from *Sycettusa glacialis*.

The remaining species of *Heteropia*, other than the type-species, are *H. glomerosa* (Bowerbank), from South Africa, Indian Ocean and Australia, and *H. striata* (Hozawa), from Japan. The spiculation in these two is not significantly different and the external form of *H. striata* is like that of some of the specimens of *H. glomerosa* in the British Museum collection, although it is not like the typical form. There need be little hesitation, therefore, in accepting *H. striata* as a synonym of *H. glomerosa*.

Now follows a most surprising sequence. The two specimens of *H. glomerosa* recorded by me (1933) from South Africa are both typical in external form. One more especially is so like the holotype in external form that it could easily be mistaken for it, yet this specimen lacks entirely the 'colossal longitudinal oxea' and has instead ectosomal microxea. The other specimen is typical not only in its external form but also in its spiculation. According to previously accepted ideas, the first specimen should be placed in *Grantessa*, the second in *Heteropia*. For two specimens living virtually side-by-side, and so alike in everything except the size and disposition of the ectosomal diacts, such a distinction is impossible. We are compelled to assume therefore that the diacts are not diagnostic and that no distinction can be maintained between *Heteropia* and *Grantessa*, as these two names are used by Dendy and Row, and by later authors. Support for this view comes from a work by Hozawa (1916) in which he has described, from Japan, the species *Heteropia striata* and *Grantessa shimeji*. The first of these, as we have seen, is a synonym of *Heteropia glomerosa*: the holotype of the second is identical in every particular with my South African specimen of *H. glomerosa* which lacks the large longitudinal oxea. In other words, the situation found in South African sponges finds an exact parallel in Japanese sponges.

Whereas Hozawa had assigned his specimens to two distinct genera, in which he was justified by the current views on the classification of the Calcarea, I had assigned my two specimens, having the characters respectively of these two genera, to the one species. Had I not been struck by the remarkable similarity between the two specimens, from which I assumed them to be conspecific, I should have felt obliged to assign the one without large longitudinal oxea to a species of *Grantessa*. In that event, it would have followed naturally to compare it with the species it most closely resembled, namely, *G. intusarticulata* (Carter). This species has been recorded on three occasions, from Australia, by Carter and Dendy, and from Japan, by Hozawa. It has been figured once only, by Hozawa, and from those illustrations there could have been only slight differences from my South African sponge.

Hozawa (1916) had sixteen specimens of *G. intusarticulata* in front of him but he appears to have given details from one only of them. Dendy (1892) had eleven specimens, and after examining these he made the comment: 'The minute details of spiculation vary considerably in different specimens. . . .' The preparations from these eleven specimens are in the British Museum and I have examined them closely, together with Carter's holotype. Although Carter gave the barest details of the spiculation, it is noteworthy that the dimensions of the spicules given by Hozawa are very close to those of the holotype, and his figure shows the architecture of the skeleton differing in minor details only from that of the holotype. Indeed, this one specimen from Japan more nearly resembles the holotype than do Dendy's specimens taken in the type-locality.

The variations seen in Dendy's preparations are of three kinds: (*a*) those concerned with the dimensions of the spicules, (*b*) those connected with the arrangement of the spicules in the tubar skeleton and (*c*) those that have to do with what may best be called the balance between the various categories of spicules. Under (*a*) we have the usual variations in the lengths and thicknesses of the rays of the radiates, both within the individual sponge and, more markedly, as from one individual to another. We also have the variations in the shapes of the rays and whether the spicules are regular, subregular or sagittal. These can be illustrated by the dimensions of the rays of the tubar triradiates which, from all sources, are found to vary in length from 0·06 to 0·16 mm. for the paired rays and from 0·12 to 0·4 mm. for the basal ray, the diameter ranging from

0·008 to 0·028 mm. If, within a given specimen, the spicules have mainly the minimum dimensions and within a second specimen they have mainly maximum dimensions then the appearance of sections from the two will differ appreciably. The difference in appearance will, in fact, be greater than would be expected from a mere table of comparative measurements. In other words, to be able to look at a specimen is more valuable than studying a table of figures.

This difference is enhanced by the variations under (*b*), which include differences in the number of layers of triradiates in either the ectosomal or the endosomal skeletons or both, but above all in the distribution of the tubar triradiates. In the first place, the numbers of these present varies with the thickness of the wall of the sponge. Where this is thin, and in every specimen this condition obtains just below the oscule but in some specimens it is more general, the skeleton of the chamber layer consists of no more than the basal rays of the subectosomal and subendosomal triradiates. The thicker the wall the greater is the tendency for more layers of tubar triradiates to be found between the ends of these basal rays. Even here the trend is by no means regular. Sometimes the rows of tubar triradiates are closely packed, at other times they are spread out. Sometimes the tubar triradiates are regularly arranged so that their paired rays are more or less parallel, at other times these spicules are irregularly scattered.

The greater differences are, however, found under (*c*). First of all, the subectosomal triradiates may be about the same size as the subendosomal triradiates, and from this there are all intermediates to the condition in which the subendosomal triradiates are not only markedly smaller than the subectosomal triradiates but are hardly to be distinguished from the tubar triradiates. The second variation under heading (*c*) is that in which a category of spicules may be subdivided into two sizes. In R.N. 91 the ectosomal triradiates are of two sizes with rays measuring 0·22 by 0·02 and 0·32 by 0·036 mm. respectively. In this same specimen, the tubar triradiates measure 0·024 mm. diameter, but exceptionally one is found measuring 0·028 mm. in diameter. In R.N. 183 there is a similar subdivision of the ectosomal triradiates but the rays measure only 0·1 by 0·008 and 0·2 by 0·02 mm. respectively. There is also a wide variation in the endosomal spicules, from the condition in which only triradiates are present to one in which a variable number, from a few to many, quadriradiates are found. Moreover, the apical rays of these quadriradiates may range from a mere stump, as in R.N. 78, to stout rays 0·4 by 0·04 mm., as in R.N. 215. In R.N. 73 the ectosomal triradiates are all large, with rays 0·33 by 0·036 mm., and sometimes these spicules are incipiently quadriradiate. In R.N. 181 the ectosomal triradiates are of two sizes, with paired and basal rays measuring 0·14 by 0·016 and 0·32 by 0·016 mm. respectively in the smaller and 0·16 by 0·028 and 0·4 by 0·027 mm. in the larger. R.N. 81 has large ectosomal triradiates, some with incipient apical rays, as in R.N. 73, large and small subectosomal triradiates as in R.N. 181, and unusually large endosomal quadriradiates as in R.N. 215. So throughout these eleven specimens recorded by Dendy in 1892 there is, besides a general resemblance to each other, a wide series of differences.

The external form is not easy to assess because so many of the specimens are now mere fragments. This shows, however, that all were small to begin with. The fragments of the holotype look very like fragments of one of the tubes of *Heteropia glomerosa*. The best preserved of Dendy's specimens recall the external form of Hozawa's (1916, pl. i, figs. 4–5) *Grantessa intusarticulata* or portions of the second specimen originally recorded, but not figured, for *Heteropia glomerosa.*

Heteropia glomerosa, with its synonyms *H. striata* Hozawa and *Grantessa shimeji* Hozawa, ranges from Australia to Japan and South Africa. *G. intusarticulata* also ranges from Australia to Japan, and to South Africa if my second specimen of *Heteropia glomerosa* be treated as a *Grantessa.* Clearly, the two species have so much in common that it is difficult to see how they can be separated.

Genus **Amphiute** Hanitsch

Two species only are known, of which one has been recorded on a single occasion. Moreover, the structure of the skeleton recalls that of *Sycettusa* except for the presence of large oxea in both ectosomal and endosomal layers. The two species are *Amphiute paulini* Hanitsch, which has been found on three separate occasions, and *A. ijimai*, found on one occasion but then represented by three specimens.

Ignoring the large oxea, it is possible to see resemblances between *A. ijimai* and another species, *Grantessa sagamiana*, described at the same time by Hozawa, both species being from Japan. Since it has now been shown repeatedly that the presence or absence of oxea is of no taxonomic significance, the logical course here would be to assume that *A. ijimai* is an individual of *Sycettusa glacialis* (of which *Grantessa sagamiana* is a synonym), possessing large oxea in the ectosomal and endosomal surfaces. It would be feasible then to correlate *Amphiute paulini* with another species of *Sycettusa.* Unfortunately for this procedure, *A. paulini* has been each time recorded from the coast of Portugal, which of itself is significant, and there is no species of *Sycettusa* commonly recorded for that or adjacent areas. When a close comparison is made of the two species of *Amphiute*, however, the only differences between them are small details of spicule measurements, negligible differences in the sizes of the holotypes and the fact that one species is recorded for Japan and the other for Portugal. Between these two places, however, we have had recorded a number of specimens, here included under one species, the *Sycettusa glacialis* already mentioned. This has a skeleton, apart from the large tangential oxea, so like those of *Amphiute paulini* and *A. ijimai* that we can hardly ignore the resemblance. It seems reasonable to suppose, therefore, that the two species of *Amphiute* are merely uteoid specimens of *Sycettusa*, and that we have a similar situation to that seen in *Aphroceras* (*q.v.*).

It cannot be overlooked that *Sycettusa glacialis* is mainly found in the Arctic and Sub-Arctic, while the two *Amphiute* forms have been recorded further south, from Japan and Portugal. If we ignore, for the moment, the Portugal specimens, we could say of it that *S. glacialis*, as now understood, is an Arctic species which extends also to Japan, and that on the Japanese coasts both the *Grantessa* and the *Amphiute* forms have been recorded. It would then be possible to say, not unreasonably, that the finding of the only *Amphiute* forms off Japan, and nowhere else, was a coincidence, and that we could expect *Amphiute* to turn up sooner or later over the rest of the range. Such a view is not easy to hold for *A. paulini*, for which there are two records from Portugal and none further south than Norway for *Sycettusa glacialis.* This geographical discontinuity may be bridged in due time. For the moment I propose to anticipate such discoveries and treat the two species of *Amphiute* as synonyms of *Sycettusa glacialis.*

Genus **Vosmaeropsis** Dendy

The type-species is *Heteropia macera* Carter. This has a clear affinity to *Sycettusa stauridia* Haeckel and must be included as a member of the genus *Sycettusa*. Its relation to other species of *Sycettusa* is discussed under *Grantessa* (p. 74).

I have shown on p. 74 that the genus *Vosmaeropsis*, as understood by Dendy and Row (1913:755) can be subdivided into five groups of species: (1) *V. macera* (Carter), the type-species, *V. connexiva* Poléjaeff, and *V. sericatum* (Ridley); (2) *V. depressa*, which is a *Leuconia*; (3) *V. cyathus* (Verrill) which must be relegated to the list of *species inquirendae*; (4) *V. wilsoni* Dendy, which is identical with *Anamixilla torresi*; and (5) *V. dendyi* Row and *V. primitiva* Row which are *nomina nuda*. [*V. dendyi* as subsequently described by Row and Hozawa (1931) is a synonym of *Sycettusa bathybia*.]

Species assigned to *Vosmaeropsis* subsequently to 1913 include: *V. hispanica* Ferrer, *V. gardineri* Ferrer, *V. japonica* Hozawa, *V. mackinnoni* Dendy and Frederick, *V. maculata* Hozawa, *V. dendyi* Row and Hozawa, *V. oruetai* Ferrer, *V. sasakii* Hozawa, *V. simplex* Hozawa, *V. levis* Hozawa, *V. triradiata* Hozawa, *V. inflata* Tanita, *V. ovata* Tanita, *V. griseus* Tanita and *V. spinosa* Tanita. Their present distribution is:

V. hispanica = *Scypha ciliata*
V. gardineri = *Leuconia barbata*
V. japonica = *Scypha ciliate*
V. mackinnoni = *Sycettusa bathybia*

(*V. mackinnoni* possesses microxea, although these are not mentioned by Dendy and Frederick, and in every other way is very like *V. macera* (=*Sycettusa bathybia*).)

V. maculata = *Scypha ciliata*

(The species is like *L. fistulosa* (=*S. ciliata*) in spiculation except that no oxea are present: the external form is slightly different, also.)

V. dendyi = *Sycettusa bathybia*
V. oruetai = *Aphroceras ensata*

(This is based on the fact that Ferrer's description suggests it has the skeleton of a *Leuconia*. Its author says the external form is like that of *L. aspera*, and the spicules do not differ materially from those of *L. aspera* (=*Aphroceras alcicornis*).)

V. sasakii = *Sycettusa connexiva*
V. simplex = *Leuconia barbata*
V. levis = *Leuconia barbata*
V. triradiata = *Leuconia barbata*
V. inflata = *Aphroceras ensata*
V. ovata = *Aphroceras ensata*

(This has strong affinities with *Leucandra topsenti* Breitfuss, from the Bay of Biscay, and also with Tanita's (1942) specimen of *Leuconia compacta* Carter, from the Straits of Magellan. From the first it differs mainly in having microxea, and from the second in having no large oxea. It has been included in error on p. 279, under *Leuconia barbata* whereas it should be included in Section III under *Aphroceras ensata*.)

V. griseus = *Scypha ciliata*
V. spinosa = *Scypha ciliata*

Genus **Grantilla** Row

Originally two species, *G. quadriradiata* and *G. hastifera* were assigned by Row (1909) to the genus. In 1913, however, the second of these was transferred to *Grantessa* by Dendy and Row. There is little doubt that both are synonymous with *Sycettusa bathybia* (see p. 72).

Genus **Grantia**

The type-species of *Grantia* is *G. compressa* (Fabricius), originally described in 1780 under *Spongia compressa*, from Greenland. The diagnosis was in Latin and the specimen was not figured. The diagnosis is such that we can recognise tolerably well in it the species accepted by all European writers on sponges as *Grantia compressa* and exemplified in Haeckel's (1872) series of extraordinary pictures (his pl. 57). His fig. 1 represents what is usually taken as the typical form of the species, although it is less commonly found in nature than is supposed. Let us, without more ado, accept this as representative of the species named by Fabricius as *Spongia compressa*, accepted by generations of zoologists, and figured in all text-books of zoology.

In 1818 Montagu figured a group of sponges, from Devon, under the name *Spongia foliacea*. This picture is even more like the *Grantia compressa* accepted by generations of zoologists and figured in all the text-books. And it is almost incomprehensible that Dendy and Row should have recognised two species, *Grantia compressa* (Fabricius) and *Grantia foliacea* (Montagu). The only possible explanation is that either these two authors had never consulted Montagu's original description and figure, or that they allowed themselves to be misled by Haeckel and, later, Breitfuss.

Haeckel (1872) established a number of varieties of *G. compressa*, based quite arbitrarily on the form of the diacts. In passing, we can say categorically that had he examined even a few specimens critically, or even carefully, he could never have taken this action, for the shape of the diacts even within a section of the surface from one individual varies considerably. He fixed as the diagnostic character of his var. *foliacea* the presence of diacts having the form of curved oxea. Breitfuss (1898), in describing sponges of the White Sea, records three species of *Grantia*, *G. pennigera*, *G. foliacea* and *G. monstruosa*. *G. pennigera* is merely Haeckel's *G. compressa* var. *pennigera* arbitrarily defined as possessing club-shaped diacts, and having no more taxonomic value than his var. *foliacea*, or any other of his varieties. Under *G. pennigera* Breitfuss includes a photograph of a sponge with slightly atypical shape but one which recurs frequently in any large batch of *Grantia compressa* growing on the shore. *G. pennigera* is, then, without question, *G. compressa*. *G. monstruosa*, described by Breitfuss as a new species, is clearly seen, from the photograph he reproduces, to be a *G. compressa* somewhat larger than usual but one often seen on the shore in company with more typical individuals. On the other hand, his *G. foliacea* (Montagu) bears so little resemblance to Montagu's excellent figure that there is immediately a doubt as to what it might be. Moreover, whereas Haeckel described for his var. *foliacea* curved oxea up to 0·3 mm. long, Breitfuss' *G. foliacea* has straight oxea up to 0·7 mm. long.

The specimen identified by Breitfuss as *G. foliacea* has a form seldom seen in the southern areas of the range of *G. compressa.* It has a somewhat coarser surface also, but its spicules compare closely with those of *G. compressa* from the British Isles. I have, however, several specimens from Norway and these can be divided into two groups: those like the *G. compressa* with which I am very familiar on the British coasts, and those which, while having the form of the familiar *G. compressa,* have the coarser surface seen in *G. foliacea.* In this second group, the diacts are long oxea, up to 0·7 mm. long. In them, also, the skeleton differs slightly in that the subendosomal triradiates are less obvious. These two features may have little significance, for one finds in a range of *G. compressa* that the diacts vary from club-shaped to lanceolate or oxeote and up to 0·4 mm. long. The subendosomal triradiates also vary in number and conspicuousness. My interpretation is that in the northern part of its range, *G. compressa* has a greater tendency to produce longer diacts and, correlated with this, a coarser surface and texture. I see no reason, therefore, for not regarding Breitfuss' (1898) specimen as an individual of *Grantia compressa.* Certainly it is not to be named *G. foliacea* which cannot be other than a synonym of *G. compressa.*

After having had a close experience of *Grantia compressa* over a number of years, I have recently examined purposely a hundred specimens from the British Isles. These were from various localities, collected in different years, but their number included several batches taken at the same time and in the same place. The sample was designed therefore to give an estimate of possible variations with locality, the seasons, age and the rest, as well as possible variations at one time and in one place. On the whole the spicule characters are fairly constant in this species. There are differences in the sizes of the radiates, of course, and there is often an apical ray added to what are otherwise typical triradiates. The diacts at the surface, on the other hand, vary enormously in shape, size and distribution. These will be dealt with later. One variation met, which is highly significant, concerns the canal system.

The normal canal system includes radial flagellated chambers running from the cloacal cavity to the surface. They are, on the whole, closely packed and their walls adjacent if not contiguous. At the surface, their outer ends are covered with a tangential surface layer of triradiates. The whole forms what has been termed a grantioid canal-system. In the main the surface is even and has none of the papillate character typical of the genus *Sycon,* in which the distal ends of the chambers, and sometimes the whole of the chambers, lie free. Even so, some two per cent of the specimens examined showed a papillate surface. Sections through their walls showed the distal ends of the chambers free of those of their neighbours, and the tangential layer of triradiates, weakly developed under normal circumstances, tended to break down. That is, in a small number of specimens of the type-species of *Grantia,* the typical genus of the family Grantiidae, the canal-system, and its associated skeleton, makes a close approach to the syconoid condition seen in *Sycon ciliatum,* the type-species of *Sycon,* the typical genus of the family Sycettidae.

If this were all, we could perhaps dismiss this two per cent as aberrant and insignificant. There have been specimens recorded from Australia, however, in which this condition is normal, and these suggest that the boundary between *Grantia* and *Sycon,* and therefore between the Grantiidae and the Sycettidae, will be difficult to maintain.

Grantia compressa, Carter (1886: 37) and *G. compressa,* var. *fistulata* Carter (l.c.), both from Australia, are very like the two per cent of *G. compressa* found in my specimens from Britain. Indeed, they are so alike in every respect that if we had only these specimens by which to judge we should regard them as members of a single species. It so happens that Lendenfeld (1886: 1106) also records specimens as *Sycandra compressa* var. *lobata* from Australia. These 'are all cylindrical, solitary persons and must be referred to Haeckel's variety "lobata".' Because of this Lendenfeld raised the variety to the rank of a species and called it *Grantia lobata*.

This var. *lobata* was originally named by Haeckel (1870: 250) *Sycophyllum lobatum*. It was based on a specimen from Norway, where Haeckel recorded his first specimens of *Grantia compressa*, which species he also placed in *Sycophyllum*. Later, Haeckel (1872: 360) placed *S. lobatum* into synonymy with *Sycandra compressa*, and the circumstantial evidence is overwhelming for the view that *Sycophyllum lobatum* is merely a normal *Grantia compressa* bearing the lobes associated with reproduction by fragmentation.

Clearly, Lendenfeld knew little of the *Grantia compressa* of European waters and in using the name *lobata* he was uncritical of Haeckel's purpose in first employing it. This much is certain when he tells us all his specimens were cylindrical. Yet even that is a misstatement for the specimen Lendenfeld sold to the British Museum has the typical leaf-shape of the European *G. compressa*.

Both Carter's and Lendenfeld's Australian specimens are so remarkably like the true *G. compressa*, except in the slightly papillate surface, that we should have little hesitation in identifying them as such but for one other circumstance. There have been described from Australia other species closely allied to *G. compressa*. *Sycon giganteum* Dendy (1892: 84) is solitary, stipitate, with the surface smooth and tessellated in part, and tubular with the body compressed in places. Its skeleton is very like that of the true *Grantia compressa*. Moreover, it has an ectosomal layer of triradiates, incomplete in parts, but sufficiently definite to make it difficult to understand why the species was retained in the genus *Sycon* by Dendy and Row. The second species is *Sycon boomerang*. This also is solitary, stipitate, smooth with a characteristic porous appearance, ovoid in shape and compressed. Its skeleton, also, is like that of *Grantia compressa* and it also has an incomplete ectosomal layer of triradiates. In fact, the very name, *boomerang*, given because of the shape of the ectosomal diacts, recalls the usual appearance of the ectosomal diacts in *G. compressa*.

It is highly probable that these Australian sponges represent a species distinct from *G. compressa*, distinguished in the adult by the thicker walls to the body. They may, on the other hand, represent no more than an Australian race of the species. There is the further uncertainty whether they should be assigned to *Sycon* or to *Grantia*, as previously understood. But there is no doubt that these two genera are less completely distinct than has been thought hitherto.

Grantia compressa is present all round the British Isles, in the littoral zone between high-water and low-water neaps, except on sandy or muddy beaches. In places it may be found in vast numbers, but in all instances it is found in situations shielded from the direct rays of the sun and for the most part in semi-cave conditions (e.g. under overhanging rocks). Compared with the vast numbers that can be collected in suitable spots between tide-marks, the number of records of this sponge from offshore waters is very small. This may be because, even in deeper waters, the sponge grows in conditions simulating those in the littoral zone so that the trawl or even the dredge fails to catch them. Even so, there are a few scattered records from depths down to 288 m. These relatively few records also show that its ranges includes the Arctic and the Atlantic coasts of Europe as far south as the Channel Islands. That being so, it could have been reasonably anticipated that it might have been found elsewhere north of 40° N. latitude. The only other record which might be of this species is contained in a description of *Grantia nipponica* Hozawa, from Japan. This is a laterally compressed sponge, the outward form of which, and also the spicules, recall strongly those of *G. compressa*. The three specimens were taken from depths of 275 and 419 fathoms, the latter being well below the previous maximum of 288 m. Nevertheless, I feel we are justified in regarding *G. nipponica* as a synonym of *G. compressa*.

There is another species from Japan, *G. harai* Hozawa, which closely resembles *G. compressa* in external form and in the form and dimensions of the spicules. The only exception to this statement concerns the oxea, which are said to be up to 0·9 by 0·003 mm. This does not agree with the sizes of the oxea shown in Hozawa's text-figure 19 or with his figs. 36 and 37 on plate vi. It may be yet another error in setting down measurements, and I would suggest that this species is also a synonym of *G. compressa*.

The next species, in chronological order, accepted by Dendy and Row as belonging to the genus *Grantia* is *G. capillosa* (Schmidt). For this we have somewhat disconnected information which, when summarised, suggests we are dealing with a species having a wide distribution in the seas of the northern hemisphere and in parts of the southern hemisphere, and having the spicular characters of *Leuconia fistulosa* and something of its external form. This wide distribution immediately raises the suspicion that other so-called species of *Grantia* described for the northern hemisphere may be identical with *G. capillosa*.

The first of these, *G. comoxensis* Lambe, from Vancouver, seems to be a small specimen of *G. capillosa*, the identity with which has probably been obscured by the relatively inadequate original description. *G. beringiana* Hozawa, from the north-west Pacific, is quite remarkably near to *G. capillosa* in external form and in spiculation except for the presence of occasional apical rays on the subendosomal radiates. Its author points out that it resembles *G. comoxensis* but he could with greater justification have said that it is practically identical with *G. capillosa*, for, although Hozawa could not have known it, there are occasional subendosomal quadriradiates in Lendenfeld's (1891) specimen from Rovigno.

The description of the spiculation of *G. canadensis* Lambe (1896), from the Atlantic coast of Canada, leaves much to be desired. If we make allowances for Lambe's methods of figuring and describing the individual spicules then we can see that his species is nearly related to *G. capillosa*. Certainly the dimensions of the spicules and the external form of the holotype make a very close approach to Schmidt's species.

Schmidt's (1862) original description of *Ute capillosa*, from Sebenico, is valuable for little more than a figure of the external form of the holotype, and when, two years later, he recorded a further two specimens from Lesina, he added little more to our knowledge of the species he then called *Sycon capillosa*. In 1870 Haeckel transferred the species to *Sycum* and in 1872 to *Sycandra*, and on this second occasion he gave us a detailed description of the spiculation. He also recognised two varieties, *brevipilis* and *longipilis*, based almost entirely upon the lengths of the oxea projecting at the surface. Lendenfeld (1891) also re-described the species but said nothing about the varieties.

There is, in the British Museum collection, four preparations presented by Schmidt to Norman, but whether these are from the holotypes or from the Lesina specimens there is no means of knowing. It is possible from them, however, to see that both Haeckel and Lendenfeld gave us re-descriptions which accord closely with Schmidt's own idea on the species. It is to be noted that Haeckel (p. 421) says of *S. capillosa*: 'Im Ganzen ist das Skelet sehr ähnlich demjenigen von *Leucandra fistulosa.*'

Following Lendenfeld, we have ten references to the species. Breitfuss (1894) recorded it from Ternate. In 1898 the same author recorded it from the Murman Coast and said of the disposition of its oxea: 'Hierin liegt ebenfalls ein Grund, welcher in diesen Exemplaren eine transitorische Form zwischen *Gr. capillosa* und *Syc. raphanus* erblicken lässt'. In the same year Breitfuss, in an analysis of Arctic sponges, gave the distribution of *Grantia capillosa* as Arctic, North Pacific, Mediterranean and Antarctic, but made no mention of Ternate. Presumably, therefore, when he indicated North Pacific he meant South Pacific. Again in 1898 (p. 302) Breitfuss referred to the species, giving its distribution as follows: 'Arctic (Murman Coast), Atlantic (Mediterranean), Pacific (Ternate) and Antarctic (Kerguelen and "Heads Ins." (Royal Sound, Betsy Cove)).' His authority for Kerguelen is Pfeffer (1890). Pfeffer's authority is Carter, but we are not told from which of Carter's publications it was obtained.

Lundbeck (1909) found five specimens in a collection from the Arctic, namely, from East Greenland and Jan Mayen. Of these, he remarked: 'I determine the species as *capillosa*, but I must remark, that the dermal rhabds are not straight but generally somewhat curved.' Stephens (1912) examined thirteen specimens from the west coast of Ireland, some of them having been found in company with *Leucandra fistulosa*. The next year Dendy and Row not only revived the two varieties *brevipilis* and *longipilis*, elevating them to specific rank, but accepted in addition *Grantia capillosa* itself, making three species in all. They gave no reasons for doing this and it would be impossible to say what they intended should be the distinguishing characters. In 1930 Breitfuss recorded the species from the Jugor Strait, Siberia, without further comment. In 1934 Topsent gave the distribution of the species as the Adriatic, Naples, Gulf of Gabès, Porquerolles, Étang de Thau, Clare Island (Stephens), Arctic (Lundbeck, Breitfuss), Ternate (Breitfuss), and also Vigo (Carter) and Kerguelen (Carter, Studer). Unfortunately, Topsent gives no reference in his bibliography to these last two, thus denying us the opportunity of checking something which has appeared several times in the literature but in inadequate terms for reference. It might be the one Pfeffer had, but there is nothing to prove or disprove this.

G. mirabilis (Fristedt) is the next to claim our attention. There are, in the British Museum, a dozen preparations from sponges obtained from Greenland, Spitzbergen and Leninland by the Hoels-Greenland Expedition and the Zoological Institute in Leningrad. These I had named *G. mirabilis* (Fristedt) many years ago, and on re-examining them find no reason to suppose that they do not correspond to Fristedt's holotype. On the other hand, comparing them with preparations from specimens of *G. capillosa*, identified by Schmidt and Lendenfeld, I find a remarkable similarity. There are, of course, individual differences between them and the most obvious are in the thickness and length of the oxea, and the presence in some specimens of more than one size of oxea. Similar variations in size, as well as in their shape and their arrangement within the skeleton, are found in the radiates. Even so, the general appearance of the sections leaves little doubt that the specimens from which they were made all belong to one species.

Grantia kujiensis Hozawa looks very like *G. capillosa* in its outward form as well as in its spicules except for the greater thickness of the oxea, which have a diameter up to 0·07 mm. whereas the thickest oxea I have found in specimens of *G. capillosa* is 0·04 mm. There is also the ingrowth of the endosomal layer into the cloacal cavity, which has been fully discussed under *Sycandra* (p. 70).

All the evidence, vague though it be, goes to suggest that the many authors that were recording supposed examples of *G. capillosa*, including Schmidt himself, were, in fact, looking at specimens of the better-known *Leuconia fistulosa* which were intermediate between it and *Sycon ciliatum* so far as the canal system and ectosomal skeleton are concerned. It will be shown later, as has been hinted at earlier in this work, that *Leuconia fistulosa* and *Sycon ciliatum* represent variations within a single species, which is nearly world-wide. It would not be unreasonable, therefore, to accept *Grantia capillosa* as representing yet another variation within that same species.

With *G. capillosa* must be included *G. mirabilis*, *G. canadensis*, *G. coxomensis*, *G. beringiana* and *G. kujiensis*. The only possible distinction that could be made between *Sycon ciliatum*, in the comprehensive sense in which it is understood here, and *Grantia capillosa* would rest in the greater maximum sizes of the oxea in the latter. To accept such a distinction would, however, be contrary to the findings set forth in Section I(a). In order to make this clear there are set forth below the dimensions of the spicules in *Sycon ciliatum*, as finally understood in this work, and those of *Grantia capillosa* assuming the species here discussed to be closely related to Schmidt's holotype. The two sets of figures, in mm., are:

	ciliata	*capillosa*
Rays of ectosomal triradiates	0·058 to 0·4 by 0·002 to 0·04	0·08 to 0·35 by 0·006 to 0·02
oxea	0·05 to 3·0 by 0·0015 to 0·15	0·2 to 10·0 by 0·002 to 0·04
microxea	0·065 to 0·1 by 0·003 to 0·007	—
Rays of tubar triradiates	0·048 to 0·52 by 0·003 to 0·04	0·04 to 0·4 by 0·005 to 0·028
Subendosomal sagittal triradiates		
paired rays	0·03 to 0·4 by 0·004 to 0·036	0·1 to 0·25 by 0·006 to 0·02
basal ray	0·04 to 0·5 by 0·004 to 0·036	0·15 to 0·39 by 0·008 to 0·016

Endosomal radiates		
facial rays	0·04 to 0·54 by 0·004 to 0·02	0·08 to 0·3 by 0·008 to 0·016
apical ray	0·02 to 0·73 by 0·006 to 0·025	0·1 to 0·2 by 0·01 mm.

There are seven remaining species of *Grantia* which agree in being small, most of them being stipitate. The spiculations of all seven are sufficiently close that if their holotypes had been collected from one locality the differences between them would have been regarded as normal variations within a species. The seven species are: *Grantia cupula* (Haeckel), from Japan, *G. strobilus* (Haeckel), from Honolulu, *G. asconoides* (Breitfuss), from Spitzbergen, *G. phillipsii* Lambe, from Davis Strait, *G. invenusta* Lambe, from Davis Strait, *G. stylata* Hozawa and *G. glabra* Hozawa, both from Japan. Of these, *G. asconoides* looks very like *Sycon ciliatum*, except for its lack of diacts. Row (in Dendy and Row, 1913) found that it had an incipient dermal skeleton and accordingly removed it from *Sycetta*, in which it was originally placed. The species presents, therefore, an intermediate condition between *Sycon ciliatum* and *Leuconia fistulosa*, which are regarded, in this work, as variations within a single species. *Grantia asconoides* may be reasonably regarded as a juvenile, or possibly aberrant, individual of *Leuconia fistulosa*. *Grantia invenusta* and *G. stylata* may also, with little hesitation, be included in that species. Three more of the seven, that cover the same geographical range as the first three, namely, from Davis Strait to Japan, differ in one respect, that the ectosomal triradiates are larger than those of the chamber layer, and in one of these the endosomal spicules are also larger. Such a condition is not unknown in *Sycon ciliatum* and may be expected to occur in *Leuconia fistulosa*. The last species, *Grantia strobilus* from Honolulu, is too like *G. cupula*, from Japan, to be excluded from this series. So it seems that these species bear the same relation to *Leuconia fistulosa* as the species of *Sycetta* bear to *Sycon ciliatum* (see p. 53).

Three species of *Grantia* have been recorded for Australia, *G. laevigata* (Haeckel), *G. gracilis* (Lendenfeld) and *G. extusarticulata* (Carter). The holotype of the third of these is practically identical in shape and size with the holotype of *G. laevigata*, as figured by Haeckel, and the spiculation is identical except for the diacts and the endosomal radiates. In the holotype of *G. extusarticulata* the endosomal skeleton is of quadriradiates only and the diacts include large oxea and microxea. In Dendy's (1892) specimen of this species, the endosomal skeleton is of a mixture of quadriradiates and triradiates and the diacts are microxea and 'occasionally a large oxeote spicule is found around the margin of the osculum'. In the holotype of *G. laevigata* Haeckel records endosomal triradiates only and microxea only. Comparing specimens and descriptions of *G. extusarticulata* and *G. laevigata* leaves no doubt that they represent a single species, with the usual slight variations especially in the endosomal radiates and the diacts.

There is a microscope preparation of *G. gracilis* (Lendenfeld), B.M.86.6.7.37, and from a close examination of this I judge the species to be identical with *Sycon ramsayi*.

Genus **Teichenopsis** Dendy and Row

The single species, *T. labyrinthica*, was originally placed in the genus *Teichonella* by Carter (1878) and transferred to *Grantia* by Dendy (1891). Dendy and Row 'consider that the very peculiar external form is of sufficient importance to justify generic separation' from *Grantia*.

The young stages of this sponge show nothing that is unusual. It is only in the large individuals that the much-folded appearance is seen. If, however, this could be taken as a criterion of generic distinction then other species, for example, *G. compressa*, in which large specimens are often much-folded, would require new genera for their reception.

In my opinion, this species should have been retained in *Grantia*, in which event it would become congeneric with *G. compressa*. Since this last-named species is included in *Scypha*, in Section III of this work, *Teichonopsis labyrinthica* must also be transferred to that genus.

Genus **Grantiopsis** Dendy

The genus *Grantiopsis* Dendy (1892) was retained in the revision carried out by Dendy and Row (1913). In this, the authors drew attention to the similarity between this genus and *Hypograntia* Carter (1886) but comment: 'As neither Mr. Carter's *Hypograntia* nor the species *H. infrequens* were ever recognisably diagnosed, we do not consider it necessary to abandon the generic name *Grantiopsis*.' Since Carter's type is still available and can be shown to be identical with *G. cylindrica*, the type-species of *Grantiopsis*, that name must give place to *Hypograntia*.

In their diagnosis of *Grantiopsis*, Dendy and Row start with the words: 'Canal-system syconoid.' Since we have good reason to doubt the diagnostic value of the canal-system, this can be discarded. The next part of the diagnosis reads: 'Dermal cortex as thick as the chamber layer.' This is almost true of the specimens of *G. cylindrica*, known to Dendy prior to 1913, but in one of the specimens (R.N. 111.4) recorded by Dendy and Frederick from Abrolhos Island in 1924, the cortex averages not more than a third of the thickness of the chamber layer, and is often less than a quarter as thick. We should, of course, accept such variation, and the most we can say of this specimen is that it has a well-marked cortex. The next point to note is that a diagnostic feature is made of the vestigial rays of the tubar triradiates. This is not admissible. The diagnosis of this genus, now to be known as *Hypograntia*, would better read: 'Grantiidae with a well-defined ectosomal cortex supported by several layers of triradiates appreciably larger than those in the tubar skeleton.' The larger size of the ectosomal triradiates is, in fact, the chief diagnostic feature, the so-called cortex being merely an extension of the ectosome to contain these triradiates.

With this revised diagnosis, it is possible to bring in other species having obvious affinities with *Hypograntia infrequens*. One of these is *Grantia vosmaeri* Dendy, from Port Jackson, Australia. Dendy (1892) says of this: 'The dermal cortex is very strongly developed, about 0·08 mm. thick; the gastral cortex is two or three times as thick, but less dense and not so well-defined.' The second of these additional species is *G. indica* Dendy, also with a well-defined endosomal cortex. Then follow *G. atlantica* Ridley, from Brazil, with a moderately thick endosomal cortex and a specimen of *Hypograntia* from South Africa, with an endosomal cortex not appreciably well-developed but, even so, containing several layers of radiates.

Genus **Sycute** Dendy and Row

The genus was established for a single species, *Sycon dendyi* Kirk, which Dendy and Row remark 'is curiously intermediate in character between *Sycon* and *Ute*, retaining the well-defined tufts of oxea which are characteristic of *Sycon* and at the same time possessing the colossal longitudinal oxea characteristic of *Ute*'. The history of *Ute ensata*, as shown in the synonymy list (see *Aphroceras ensata*, p. 505) is one of misunderstanding. When it has been appreciated that the colossal longitudinal oxea can also be set at right angles to the surface, the true significance of the so-called uteoid character can be understood. It appears to be a phase and no more in a fluctuating variation. As *Sycon dendyi* is known from a single specimen we have no guarantee that its peculiar uteoid feature is constant. I would favour the view that it represents a syconoid individual of a better-known species of *Ute* (=*Aphroceras*). I have compared preparations made by Kirk, and now in the British Museum collection, from the holotype of *Sycon dendyi* with Dendy's preparations of *Ute syconoides*. From these the two species appear to be strikingly similar. In fact, the only significant difference is in the absence of ectosomal triradiates in the former. As both species are virtually identical in all other respects, the most feasible interpretation of this is that *Sycon dendyi* bears the same relation to *Ute syconoides* as *Sycon ciliatum* bears to *Leuconia fistulosa*. I propose therefore to regard *Sycon dendyi* as a synonym of *Ute* (now *Aphroceras*) *syconoides*, which is itself a synonym of *Aphroceras ensata*.

Genus **Ute** Schmidt

According to Dendy and Row (1913:764), the type-species of *Ute* is *U. glabra* Schmidt. The earliest mention of this genus is, however, in Schmidt (1862) where on p. 16 we read 'Ute. Novum genus', and at the top of p. 17 we read 'Ute capillosa. Nova species'. There is no further mention of the genus until 1864 when Schmidt on p. 22 gives us '*Sycon capillosus* Schmidt' and includes as a synonym '*Ute capillosa* Schmidt 1862'. Below this, on the same page, we find 'Ute Schmidt (charactere reformato)', together with Schmidt's explanation: 'Obschon soeben die Art, mit welcher die Gattung begründet wurde, zu einer anderen bekannten Gattung verwiesen werden musste, bleibt die Gattung *Ute* doch bestehn, da ihre Diagnose mit einigen sehr geringen Abänderungen auf zwei neue Species passt.' Then follows the new diagnosis and the description of two new species, the first of which is *Ute glabra*. Nothing of this can alter the fact that the genus *Ute* was established in 1862 for a single species *U. capillosa*, and if this species is now recognised as a *Grantia* (*vide* Dendy and Row l.c.) then *Ute*, like *Grantia*, becomes a synonym of *Scypha* (=*Sycon*).

The species hitherto assigned to *Ute* are *U. armata* Hozawa (Japan), *U. ensata* (Bowerbank), with *U. glabra* Schmidt as a synonym (Arctic and western coasts of Europe), *U. pedunculata* Hozawa (Japan), *U. spenceri* Dendy (Australia), *U. spiculosa* Dendy (Australia) and *U. syconoides* (Carter) (Australia). Dendy's specimens of these last three species were all obtained from Watson's Bay, New South Wales, but Carter's type of *U. spiculosa* came from Port Phillip Heads, Victoria. All specimens are similar in appearance and their skeletons do not differ in any significant detail. Even *U. syconoides*, put into another section by Dendy and Row because it had no microxea, has now been found to possess microxea. There can be little doubt that all three represent a single species.

U. armata Hozawa is very obviously a typical *U. ensata* in external form and skeleton, and *U. pedunculata* Hozawa is merely a young specimen of the same species. We have then, for the present, two species, a northern, *U. ensata* (Bowerbank), and a southern, *U. syconoides* (Carter). The only question remaining is to what genus they shall be allocated. This presents little difficulty, for there is a closely-related genus *Aphroceras*. This was founded by Gray (1858) for *A. alcicornis*. Dendy and Row list the following species for this genus: *A. alcicornis* Gray, *A. cataphracta* (Haeckel), *A. cliarensis* (Stephens), *A. corticata* (Lendenfeld), *A. elongata* (Schuffner) and *A. caespitosa* (Haeckel). We can dismiss the last of these without more ado, for although Haeckel (1872, p. 185) records it and Ferrer (1921, p. 161) and Topsent (1934, p. 11), claim to have seen it in Mediterranean collections, it is, in fact, a variety of *A. alcicornis* established by Haeckel for specimens from somewhere between Honolulu and South Africa (see below). Of the remaining species, *A. cataphracta* has the external form and skeleton of *Ute syconoides*, and since it also is from Port Jackson there need be little hesitation in accepting the two as synonymous. This leaves three species only to be dealt with.

Of these three *Aphroceras cliarensis* is clearly and adequately described by Stephens (1912), and has the appearance of being a well-defined species. On examining a preparation (B.M.10.1.1.1593) from Lendenfeld's holotype of *Vosmaeria corticata*, it is immediately clear that this and Stephen's specimens are conspecific. This would never be suspected from Lendenfeld's figures, but after having examined this preparation I have no hesitation in describing figs. 124–126, pl. xv, as quite fantastic. His figs. 127 *a–g* are, however, correctly drawn and these include the endosomal quadriradiates with the club-shaped apical ray identical with those figured by Stephens.

The species represented by these two names is common in the rock-pools at Wembury Bay (Plymouth). From specimens collected there it is found that the apical rays of the endosomal quadriradiates vary from short and pointed, usually curved, to long and straight, and pointed as well as club-shaped. One specimen, for example, has a mixture of the club-shaped rays with short and curved rays as well as straight and pointed. A study of these variations leaves no doubt that Schuffner's *Leucandra elongata* is also identical with the holotypes established by Stephens and Lendenfeld.

A preparation from Hanitsch's *Leucaltis impressa* was brought to light recently, in the Museum collections, by the persistence of my assistant, Miss Shirley Stone. Hanitsch's original figures of the external form show a sponge very like that figured by Stephens (pl. i, fig. 7) and even more like dozens of others I have collected at Plymouth. Its anatomy, as shown in his fig. 1, pl. xv, is strikingly like that of *Vosmaeria corticata* Lendenfeld as seen in Lendenfeld's own preparation (but not in his illustrations). Although large oxea are missing, ectosomal microxea are present but in restricted numbers. Taking all things into consideration, therefore, Hanitsch's sponge cannot be regarded as representing other than a variety of the same species. Already, as far back as 1930, my doubts had been laid as to the validity of the 'colossal longitudinal oxea' for taxonomic purposes. In describing *Anamixilla irregularis*, the holotype of which differs from *A. torresi* in trivial details only, I wrote: 'The finding of a species in which colossal longitudinal oxea are present in a restricted area of the sponge makes it doubtful whether the presence or absence of these spicules has the taxonomic significance ascribed to it by Dendy and Row (1913). Actually, these authors emphasise the absence of longitudinal oxea in their diagnosis of the genus *Anamixilla*, so that, with the discovery of the present species this diagnosis must be altered accordingly.'

According to Dendy and Row (1913, p. 763), *Ute* has the 'Canal system syconoid. Tubar skeleton articulate. Dermal cortex well-developed, containing colossal longitudinal oxea. No tufts of oxea at the distal ends of the flagellate chambers.' For *Aphroceras* they give (p. 776): 'Canal system sylleibid or leuconoid. Skeleton of the chamber layer more or less confused, but frequently with vestiges of an articulate tubar skeleton in the form of subgastral or other sagittal radiates. Dermal skeleton of longitudinally placed triradiates supplemented by colossal oxea placed longitudinally and not projecting from the surface sufficiently to render it hispid.' Taking these two diagnoses as they stand, there would appear to be vast differences between *Ute* and *Aphroceras*, yet if we compare side-by-side the holotype of *Ute ensata* (the type-species of *Ute* according to Dendy and Row) and the holotype of *Aphroceras cliarensis*, they are quite obviously representatives of a single species, except for one character: the canal system in *Ute ensata* is syconoid, and that of *Aphroceras cliarensis* is leuconoid. So we have yet another example of the nature of the canal system having misled the taxonomist, for these two species are so alike in external form, spiculation, habitat and geographical range that there can be no question of their identity. There is something almost humorous in the remark by Dendy and Row (1913:776) that '. . . we do not consider *Aphroceras* to have been derived from *Ute* or a *Ute*-like form, but directly from an ancestral *Leucandra*'. At least, this remark serves to emphasise how misleading has been the effect of giving taxonomic values to a variable feature of the anatomy.

The genus *Aphroceras* must now be taken to include both *Ute* and *Aphroceras*, as understood by Dendy and Row, and its known species will include, at most: *A. alcicornis* Gray, *A. ensata* (Bowerbank) and *A. syconoides* (Carter) instead of the twelve species recognised by Dendy and Row.

In his account of *A. alcicornis*, Haeckel claimed to have seen specimens which extended the range of the species from Hong Kong (the type-locality) to Honolulu, the Philippines, South Australia, Indian Ocean and South Africa. In addition, he recognised two varieties: var. *cladocora* and var. *caespitosa*. The only information we have on the distinction between these two varieties is that in the first the body is cylindrical and the oxea lie tangentially in the ectosome, and that in the second the body is more or less flattened and its surface is hispid. To this extent, therefore, Haeckel was aware of the possibility that the uteoid condition could be modified within the one species. The fact that Ferrer (1912) should have recorded *Leucandra caespitosa* from Santander (Spain) suggests a further extension to the range, and all these details support the views put forward on p. 90, that *Aphroceras alcicornis*, *A. ensata* and *A. syconoides* constitute a single species.

Genus **Synute** Dendy

Since the only known specimen of the single species, *S. pulchella*, agrees so closely in its skeleton with *Aphroceras syconoides*, from the same area, I find it difficult to believe in the need for a generic separation. The principal feature upon which the genus *Synute* is founded is the complete fusion of the 'Ute-like individuals . . . invested in a common cortex'. In this respect, it must resemble the specimen of *Leucandra cliarensis* (= *Aphroceras ensata*) figured by Stephens (1912, pl. i, fig. 8). In other words, just as Stephens' specimen represents an unusual example of one 'species', Dendy's specimen represents an unusual specimen of another related 'species'. In my opinion *Synute pulchella* is synonymous with *Aphroceras syconoides*, which, as we have just seen, must be regarded as synonymous with *A. alcicornis*.

Genus **Achramorpha** Jenkin

The genus *Achramorpha* was established by Jenkin (1908) with the following diagnosis: '. . . the elongated flagellated chambers are arranged radially around the central gastral cavity; they are covered over by a dermal cortex composed principally of triradiate spicules, and without longitudinally disposed oxea. The tubar skeleton is articulate, the first (and sometimes only) joint being formed of chiactines.'

In the same work we find the new genus *Megapogon* diagnosed: '. . . the flagellated chambers are spherical or sac-shaped, never arranged radially around the central gastral cavity. . . . The skeleton of the chamber layer is largely composed of irregularly scattered radiate spicules, *but it always has regularly placed subgastral chiactines*.'

Judged purely by the wording of these two diagnoses, we have to do here with two markedly different genera. It can be demonstrated, however, that the diagnoses refer to the same type of sponge and the generic distinctions exist in the wording chosen and not in fact. To begin with, the word 'chiactine' must be explained. Jenkin (l.c., p. 3) defines a chiactine as 'a quadriradiate spicule lying with its basal ray directed radially outwards (centrifugally) and its apical ray, which is bent at its base so as to lie almost in line with the basal ray, directed radially inwards (centripetally) and projecting into the gastral cavity'. It is, in fact, a subendosomal sagittal quadriradiate with its apical ray bent at an unusual angle. The more remarkable thing is, however, that although the chiactine is present in both genera this fact is mentioned casually in the diagnosis of *Achramorpha* and is given in italics in the diagnosis of *Megapogon*. So, until the two diagnoses are placed side by side, and this difference in emphasis appreciated, one has the impression that the chiactine is highly characteristic of *Megapogon*. In fact, this spicule is present in both genera.

There is, then, another point. Jenkin says of *Megapogon* that 'the skeleton of the chamber layer is largely composed of irregularly scattered radiate spicules. . . . ' This is true of one species only, namely *Leuconia crucifera* Poléjaeff, which Jenkin included in the genus in addition to his four new species, and which Dendy and Row made the type-species. *L. crucifera* is, in my opinion, correctly placed in the genus to which Poléjaeff first referred it. The other four species of *Megapogon* (*M. villosus*, *M. raripilis*, *M. pollicaris* and *M. crispatus*), I have already suggested (1929:403), are simple varieties of a single species. In view of what we now know of the variations in spicular-characters that can occur within species of Calcarea, I see no reason to change this view.

In the same place, I have suggested that the four species of *Achramorpha* (*A. glacialis* Jenkin, *A. grandinis* Jenkin, *A. nivalis* Jenkin and *A. truncata* (Topsent)) also represent simple variations of a single species. The suggestion was then tentative, but I am now confirmed in this view. We are left, therefore, with two Antarctic species *Achramorpha grandinis* and *Megapogon villosus*, and when all representatives of these two are examined side by side, it becomes readily apparent that all have the same type of skeleton and that only the smaller details of the spicule-measurements differ. Since these two species belong to the same locality, have a similar external form and the same type of skeleton, the only thing separating them is, allegedly, their canal-system. *Achramorpha* is said to have a syconoid canal-system (i.e. elongated flagellated chambers) and *Megapogon* is said to have the chambers small, spherical and scattered (i.e. leuconoid). Yet, Jenkin (l.c., p. 36), writing of *Megapogon*, says, 'The size and shape of the flagellated chambers is very variable; they are sometimes so long as to resemble the radial chambers typical of *Grantia* or *Achramorpha*, and at other times they are spherical.'

Very obviously, as re-examination of Jenkin's types clearly shows, all his Antarctic sponges assigned to *Megapogon* and *Achramorpha* belong to a single species, by priority, *Achramorpha grandinis*.

Two species have been added to the genus *Achramorpha* since 1908. These are *Ebnerella schulzei* Breitfuss, transferred to the genus by Dendy and Row (1913), and *Achramorpha diomediae* Hozawa (1918). These two are so alike, in external form and skeleton, apart from the presence of microxea in the first and their absence from the second, that it is surprising Hozawa should have failed to make mention of Breitfuss' species. That they represent a single species there can be little doubt. Breitfuss' species is from Spitzbergen and Hozawa's from the Kuriles. Neither of these is related to the Antarctic sponge described by Jenkin. Both are conspecific, and it would appear that they are related to *Sycettusa glacialis*, from which both differ in the absence of subectosomal triradiates. There is good reason to believe that the presence or absence of the subectosomal radiates (i.e. the subdermal pseudosagittals of Dendy and Row) does not constitute a diagnostic feature.

Genus **Anamixilla** Poléjaeff

This genus, with its single species, *Anamixilla torresi*, is synonymous with *Leuconia*, as shown on p. 21.

Genus **Sycyssa** Haeckel

The genus contains a single species, *S. huxleyi*, the skeleton of which is made up entirely of oxea but arranged in such a way that any affinity with other genera is obscured. The genus must be accepted as representing an extreme specialisation, and treated *incertae sedis*.

Genus **Megapogon** Jenkin

The genus *Megapogon* was established by Jenkin (1908) with the type-species *Leuconia crucifera* Poléjaeff from the Cape Verde Islands. Jenkins established a new family to include both *Megapogon* and *Achramorpha* but, in fact, the four species he assigned to *Megapogon*, other than the type-species, are very clearly synonyms of the single species now recognised for *Achramorpha* (see p. 93). The type-species proves on re-examination to be nothing more than an ordinary specimen of the common *Leuconia fistulosa*, now to be recognised as a synonym of *Sycon ciliatum*, with occasional endosomal quadriradiates that are markedly cruciform. This feature of the quadriradiates is unusual but is not sufficient to merit varietal or specific distinction, the rest of the characters of *Leuconia crucifera* being overwhelmingly those of *L. fistulosa*. As a consequence, *Megapogon* falls into the synonymy with *Scypha*.

Genus **Leucandra** Haeckel

In 1870 Miklucho-Maclay published his description of *Baeria ochotensis*. This shows an ovate sponge, thick-walled and with a papillate surface very like Schmidt's *Sycinula penicillata* and also very like Montagu's figs. 1 and 2 of the type of *Spongia ananas*, although much larger. Miklucho-Maclay figures the spicules as large and small triradiates, and long diacts, these last being shown as incomplete spicules. He also figures one quadriradiate. In his written description he states: 'In der übrigen Körpermasse finden sich meistens dreistrahlige Spiculae, die zum Theil von sehr bedeutender Grösse sind, so dass man mit blossem Auge ihre Form unterscheiden kann. (Die Arme einzelner Spiculae zeigen eine Länge von 2 Mm.) Ausser diesen grossen drei- und vierstrahligen Spiculae finden sich noch andere von sehr mannigfaltiger Grösse und Form. (Fig. 35).' Nothing is said here of microxea, and we get the impression that the long diacts are confined to the region of the oscule and the surface papillae, but nothing is said of the size or shape of oxea, merely that they are 'langgestreckten Spiculus'.

Although this description is so inadequate there is collateral evidence from which we can reconstruct the characters of the types and, through these, of the species. The external form of the two types of *Baeria ochotensis* is practically identical with one of the five specimens described by Hozawa (1918) as *Leucopsila stilifera* (Schmidt). These specimens, from the north-west Pacific (i.e. near the type-locality of *Baeria ochotensis*), are said to have ectosomal triradiates, quadriradiates of the chamber layer, microxea and oxea, the latter in the margin of the vent. Although Hozawa did not figure the spicules, and gave only the barest notes on them, he did give excellent photographs of the external form. One of these shows a sponge remarkably like the types of *Baeria ochotensis*. There can be little doubt that the types of *Baeria ochotensis* and Hozawa's specimens of *Leucopsila stilifera* (Schmidt) belong to one species in spite of the discrepancies between the two descriptions. The gaps can be filled in from two specimens from the Okhotsk Sea identified by me from the collections of the Leningrad Institute. Both of these have an external form like that of the one specimen described by Hozawa under *Leucopsila stilifera*; and while one has the spiculation described by Hozawa the other has a spiculation very near to that figured by Miklucho-Maclay. This means that in the north-west Pacific there is a species ovate in form and with a papillate surface, with the skeleton consisting of ectosomal triradiates, large and small triradiates and quadriradiates in the chamber layer, microxea, and long slender styliform diacts confined mainly to the surface papillae and the margin of the vent. Judging from the two specimens I have examined, the large spicules of the chamber layer may be all or mainly triradiates, or they may be mainly quadriradiates.

Up to a point all is straightforward enough, until we find that Haeckel, who implies that he examined Miklucho-Maclay's type, figures for it spicules which, except for the long diacts, are more appropriate to *Leuconia johnstoni.* I have not found in the two specimens from the Leningrad Institute either the small quadriradiates figured by Haeckel in his 3*c*, plate 34, or those figured in 3*d* on the same plate. Otherwise these drawings could serve as a faithful portrayal of the spicules found in one of the Leningrad specimens, or of the spiculation described by Hozawa for his specimens. Ignoring the small quadriradiates figured by Haeckel, it is a reasonable assumption that, of the two specimens originally referred to *Baeria ochotensis*, one contained mainly triradiates and was the one from which Miklucho-Maclay drew the spicules illustrated in his fig. 35, pl. 2, and the other contained mainly quadriradiates and was the one from which Haeckel took his drawings (in his pl. 34). This would mean that specimens of this species are very prone to vary in their spicular characters but not in their external form. This is borne out by Hozawa's specimens and those I have examined. Whether specimens ever have the small quadriradiates included by Haeckel (pl. 34, fig. 3*c*) is problematic. Their inclusion may be merely one of Haeckel's errors. It now remains to be determined whether the species belongs to *Baeria*, *Leucopsila* or *Leuconia*. From Haeckel's drawings, as we have seen, there is a close relationship to *Leuconia johnstoni.* On the other hand, Dendy and Row retained the genus *Baeria* on account of what they thought to be its characteristic microxea, the so-called 'needle-eye' spicules. However, the fact that Row (see Dendy and Row (1913: 775)) examined 'a microscopical preparation of the species (i.e. *Baeria ochotensis*) preserved at Jena' and found the 'needle-eye' microxea signifies nothing for these also occur in *Leuconia nivea* and *L. johnstoni.* The genus *Baeria* must become therefore a synonym of *Leuconia.*

It remains to be seen now whether Hozawa was correct in identifying his specimens as *Leucopsila stilifera.* If so, *Leucopsila* will become a synonym of *Leuconia* and the species will be synonymous with *Baeria ochotensis.* Miklucho-Maclay's description of *Baeria ochotensis* was published in January, 1870. The Preface to Schmidt's paper is dated May, 1870, so presumably the publication of the paper was subsequent to this date. It should be noted also that the first publication of the specific name *stilifera* was in Haeckel's Prodromus, under *Leuconia.* The Prodromus is sometimes quoted as 1869 but the date on the title page of the volume is 1870. In any event, Haeckel published no description or diagnosis, so that *Leuconia stilifera* Schmidt in Haeckel, *nec* Schmidt 1870, is a *nomen nudum.*

There remains yet another difficult point. In 1870 Schmidt published the name *Sycinula penicillata.* He gave a good drawing of the external form of the type, and from this it is clearly a sponge having a close outward appearance to the specimens from the north-west Pacific which we have just been discussing. No details of its spiculation are given, but Haeckel (1872) included the name as a synonym of *Leuconia ananas.* On the other hand, Schmidt said nothing about the outward form of the type of *Leuconia stilifera* except that the specimens are 'Stücken von 50 mm. Lange und 30 mm. Hohe'. The only clue we have is that in his preceding paragraph he tells us that *Leuconia* includes 'die unregelmässig massigen oder knolligen Kalkschwämme'. Having studied this question, with the aid of appropriate specimens, I find it impossible to believe that the specimen from Greenland described as *Sycinula penicillata* could be so like *Baeria* *ochotensis* in morphology and yet have the spicules attributed to it by Haeckel (1872, pl. xxxii, fig. 5). Equally impossible is it to believe that another from Greenland, described by Schmidt, namely, *Leuconia stilifera*, should have the spiculation of *Baeria ochotensis* and at the same time an irregularly massive outward form. The mystery is increased when we find that Dendy and Row established a new genus, *Leucopsila*, for *Leuconia stilifera* because that species has the endosomal wall supported by a layer of *microxea*. Judging from the topotype material I have examined, this is precisely a character of *Baeria ochotensis*, which these same two authors recognised as the type-species of an entirely distinct genus.

As *Sycinula penicillata* has been included by Haeckel as a synonym of *Leuconia ananas*, it will be necessary to study the characters of this species to see whether or no *Baeria ochotensis* and *Leuconia ananas* are synonyms. *L. ananas* was first described by Montagu (1818, p. 96) under *Spongia ananas*, and all trace of the type has been lost. The original diagnosis reads as follows: 'Ovate, rugous, tubular, the summit crowned with spines surrounding the aperture'. Montagu compares his specimen with *Spongia coronata* (= *Sycon ciliatum*), but says it is 'very different in shape and texture. . . .' Nothing is said of its spicules except for the brief reference to those surrounding the oscule. It is interesting to read Montagu's further note on this species having in mind the external form of *Baeria ochotensis*: ' . . . the surface is not covered with spiculae . . . but is apparently vesicular or scaly. . . '. At the same time, Montagu figured a second sponge, which he called *Spongia ananas* var. ?, and this had the surface bristling with long spicules. Both Montagu's specimens were from Devon. It looks, therefore, as if *Leuconia ananas* and *Baeria ochotensis* might be related species, but that *Spongia ananas* var. ? belongs to a different species.

In 1826 (p. 170), Grant described another species, *Spongia pulverulenta*. All we know from the original description is that it has 'a triradiate spiculum with long and very slender rays diverging at equal angles; the other is a very long straight needle-shaped spiculum, pointed acutely at one end and obtusely at the other'. Fleming (1828) gave the locality of the specimen, which in fact he had presented to Grant, as the Shetlands. He also identified it with *Spongia ananas* var. ?, of Montagu. The one outstanding feature of of *S. pulverulenta* is, however, the possession of styliform diacts. These are also present, as we have seen, in *Baeria ochotensis*. On the other hand, if *S. pulverulenta* were to be identified with *S. ananas* var., ? as Fleming suggests, it would need to have the surface strongly hispid with large projecting diacts. All that Fleming gives by way of description is: 'Ovate, thick, pulverulent, villose.'

Before Fleming, Gray (1821, p. 358) had recorded *Scypha ovata*, which was also regarded by subsequent authors as a synonym of *Leuconia ananas*, but so little is known of it that its identity must remain in doubt.

Subsequently to Fleming, Blainville and Bellamy referred again to *Spongia pulverulenta* but under different generic names, and in 1842 Johnston brought *Spongia pulverulenta*, *Scypha ovata* and another species, *Spongia inflata* Chiaje, all together under *Grantia pulverulenta*, without in any way increasing our knowledge of the species. On the contrary, Johnston actually used the words Montagu had applied to *Spongia ananas* to describe the species he now referred to as *Grantia pulverulenta*. Moreover, Johnston failed to include the species *ananas* in his list of British sponges. By this action he managed to submerge the name *ananas*. To make matters more difficult neither *ananas* nor *pulverulenta* receives mention in the first three volumes of Bowerbank's 'British Spongiadae', and it is only in the fourth volume (edited by Norman) that *Leucandra ananas* is included at all, and then only in an appendix.

It was left to Haeckel (1872:200) to give a full description of the species, under *Leucandra ananas*. In this he makes no distinction between Montagu's two specimens which formed respectively the types of *Spongia ananas* and *S. ananas* var. ?, he ignored *Spongia inflata* and included *Sycinula penicillata* Schmidt as a further synonym. Schmidt describes the spiculation in this last species in the following terms: 'In der Wandung selbst liegen nur Drei- und Vierstrahler, und zwar sind an der Innerfläche die Vierstrahler so geschichtet, dass ein abweichend geformter, an der Spitze gekrümmter Basalstrahl in die Körperhöhle hineinragt.' As we have seen, Schmidt's first reference to this species was published in May 1870 and Haeckel's first reference to it was published in the same year. Moreover, Schmidt heads his description to the species (p. 73) as follows:

Sycinula penicillata Sdt.
Dyssycum penicillatum H.

Haeckel, on the other hand, gives us (p. 241):

D. penicillatum H. (Sycinula penicillata O.S.).

Very clearly Haeckel must have consulted with Schmidt before either of them published the works in question. This probably explains why Haeckel's (1872, pl. 32, fig. 5) figures agree so closely with Schmidt's written description of the spicules, for Schmidt did not himself illustrate the spicules. We may assume, then, that Haeckel had access to the type of *Sycinula penicillata* and we may be equally certain that he saw nothing of the types of *Spongia ananas*, *S. ananas* var. ?, *S. pulverulenta*, or *Scypha ovata*, for by 1870 the remains of the Montagu, Grant and Johnston types had been incorporated into the Bowerbank Collection and these are now in the British Museum. They include no representatives of these three species.

This assumption seems the more likely to be correct from the singular fact that Haeckel's description of the external form of '*Leucandra ananas*, H.', as he now calls it, includes the characters of both *Spongia ananas* and *Spongia ananas* var.? He explains this as follows: 'Uebrigens ist buschelhaarige Form (*L. penicillata*) durch alle Uebergänge mit der Gleichmässig stachelig behaarten Form (*L. pulverulenta*) verbunden.' In this remark, and elsewhere in his account, Haeckel gives indications that he is basing his knowledge of *Leucandra ananas* on first-hand-knowledge of *Sycinula penicillata* and what little he can glean of *Spongia pulverulenta* from Montagu's original illustration of *L. ananas* var.?

Later authors contributed little more to our knowledge of *L. ananas* than alleged faunal records. Knipowitsch (1892) mentions *Leucandra ananas* from the White Sea without further comment. Breitfuss (1896) recorded 14 individuals of *Leuconia ananas* from Spitzbergen, adding only that their height ranged from 5 to 20 mm. and their diameter from 2 to 5 mm. Vanhöffen (1897) mentioned the occurrence of '*Leucandra ananas* (= *Sicinula penicillata* Schmidt)' off Greenland. This is presumably a repetition of Schmidt's (1870) record. Breitfuss (1898: 13 (24)) mentions *Leucandra ananas* from the White Sea and also 'de la mer de Mourman ou Barents'. His next note (1898: 305) repeats previous records under *Leuconia ananas*, *L. ananas* var. *pulverulenta* and *L. ananas* var. *penicillata*. His further notes (1898: 115) appear to be an amplification of his previous record for Spitzbergen, with remarks added on the sizes of the flagellated chambers. This same author (1927: 30) lists *Leuconia ananas* from the North Sea (referring to Fleming's specimens from the Shetlands) and later (1932: 240) includes *Leucandra ananas* in the Arctic fauna. Meanwhile, Arnesen (1901: 25 and 1901: 71) had recorded the species from Norway and Dendy and Row (1913: 769) had included it in their classification among the species 'with large, usually radially-arranged oxea, but without microxea'. From what we now know, all these identifications must have been based on external form alone, the rest being guesswork.

Up to this point we have the following:

1. That the spicular characters of Montagu's type are unknown;
2. That, for all we know to the contrary, *Spongia pulverulenta* possessed triradiates and styliform diacts only;
3. That a species accepted by all authors since 1870 as *Leuconia* (*Leucandra*) *ananas* has triradiates, quadriradiates and oxea and that the characters of this species are based, following Haeckel, on the type of Schmidt's *Sycinula penicillata*;
4. That our knowledge of *Leuconia ananas*, *Grantia pulverulenta*, *Sycinula penicillata* and *Leucopsila stilifera* is based on the most unreliable information;
5. That the species accepted as *Leuconia ananas* has been found on the Devon coast (Montagu), off the Hebrides (Norman), off the Shetlands (Fleming), off the Faroes (Randropp), off Norway (Haeckel, Arnesen), off Greenland (Andersen, Schmidt), off Spitzbergen, White Sea, Murman or Barents Sea (Breitfuss). There is also a record for the coast of Normandy (Duthiers *teste* Haeckel).

As to the external form, we have the following dimensions: 7 mm. high by 4 mm. diameter (Montagu); 40 by 24 mm. (Schmidt); and 5 to 20 by 2 to 5 mm. (Breitfuss). According to these figures, the specimens recorded by Breitfuss must have had the shape characteristic of *Leuconia fistulosa* Bowerbank.

If we assume a species, accepted for the moment as *L. ananas* (*sensu auttorum*), to have this wide distribution in the Arctic and also along the western coast of Europe, we may reasonably expect to find it also in adjacent areas. From Vancouver Island, Lambe (1900) described *Leucandra taylori*. This measures 7 mm. high by 4 mm. diameter and in its outward appearance, also, is practically identical with Montagu's drawing of the type of *Spongia ananas* var. Its skeleton consists of triradiates and oxea. Tanita (1940: 174) has described *Leucandra tomentosa* from Matsushima Bay. The type is very like Montagu's fig. 3, measures 20 mm. high by 26 mm. diameter and has triradiates and oxea only. That is, the skeleton consists of ectosomal triradiates, triradiates in the chamber layer and endosomal triradiates, with large oxea protruding at the surface. *L. mediocanellata* Hozawa (1929: 54), from Oshima, recorded also by Tanita (1941: 274), from Enoshima, differs from *L. tomentosa* in having endosomal quadriradiates as well as triradiates and ectosomal microxea as well as oxea. Its outward appearance is very like the sponge in Montagu's fig. 3 and is practically identical in size. *L. spinosa* Hozawa

(1940:48), from Wagu, has a similar spiculation to *L. mediocanellata* except that it has endosomal microxea in addition.

So it would appear that sponges having the appearance of *L. ananas* var. are widespread throughout the Arctic and northern seas.

The point to be decided is how far these represent one species or several.

There is also another series of specimens from Japan very like this supposed *L. ananas* in external form, which have been made the types of *Leucandra odawarensis* Hozawa (1929: 347), *L. vermiformis* Tanita (1941: 278) and *L. sagamiana* Hozawa (1929: 353). *L. vermiformis* differs from the accepted idea of *Leuconia ananas* mainly in possessing subendosomal triradiates. *Leucandra odawarensis* has subendosomal quadriradiates and trichoxea in addition to oxea. *L. sagamiana* has endosomal triradiates, subendosomal triradiates and quadriradiates, trichoxea in addition to oxea and endosomal microxea. These species agree therefore with the *taylori* group except that they possess subendosomal radiates, but they show the same kinds of variations in the other spicules.

Putting these three Japanese species, together with the *taylori* group, alongside the *L. ananas* var. Montagu (=*L. ananas auttorum*), we have either to assume all are synonyms and that the differences in their skeletons are negligible, or that the species everyone has called *L. ananas* is a widely spread, relatively stable species and that Japan is the centre of half-a-dozen related species separated by small differences in spicules. If we accept the second explanation we have to assume a phenomenally rich Japanese fauna with seven species having the *ananas* external form against one ('*ananas*' itself) for the whole of the Arctic and north-eastern Atlantic. Clearly the logical course is to accept the view that all represent one species with a variable spiculation. This would be in line with our experience in other species. Indeed, Tanita (1941:276) goes some way to admitting this, by implication, for he records a specimen of *L. valida* Lambe, from Onagawa Bay, the holotype having been obtained from Davis Strait. But whereas the holotype has subendosomal quadriradiates, Tanita's specimen has subendosomal triradiates. Both come very near, in their skeleton, to Haeckel's conception of *L. ananas*, but although Tanita's specimen is remarkably like Montagu's fig. 3, Lambe's holotype is more like *L. fistulosa* Bowerbank, an appearance which may be misleading or may indicate that his specimen has nothing to do with that seen by Tanita. On the other hand, it may be guiding us to the truth, that *Spongia ananas* var., *Leuconia ananas* (Auttorum *nec* Montagu) and all related forms are identical with *L. fistulosa*.

We now have the conception of two species ranging across the northern seas of the northern hemisphere. The one, represented by *Leuconia ananas* and *Baeria ochotensis* and related to *L. nivea*, and the other represented by *L. ananas* var. and *L. taylori* and more nearly related to *L. fistulosa*.

This discussion can now be summarised as follows:

1. *Leuconia ananas* (Montagu *nec* Auttorum) has as synonyms: *Baeria ochotensis* Miklucho-Maclay, *Leucopsila stilifera* (Schmidt), *Sycinula penicillata* Schmidt, *Dyssycum penicillatum* Haeckel and *Leucandra splendens* Hozawa;
2. *Scypha ovata* Gray and *Spongia inflata* Chiaje are species inquirendae;
3. *Spongia ananas* var. ? Montagu is identical with *S. pulverulenta* Grant, *Leucandra ananas* Haeckel et Auttorum, *L. taylori* (Lambe), *L. mediocanellata* Hozawa, *L.*

spinosa Hozawa, *L. tomentosa* Tanita, *L. odawarensis* Hozawa, *L. vermiformis* Tanita, *L. sagamiana* Hozawa and *L. valida* Lambe; and that all are very closely related to, and probably synonymous with, *L. fistulosa* Bowerbank. (As we shall later see, *L. fistulosa* is a synonym of *Scypha ciliata*.)

The fauna of these northern seas is sufficiently well known to make it improbable that there are other species with which these two might be confused. On this assumption we can reasonably accept *L. ananas* (Montagu) and *L. ananas* var. (Montagu) as representing the two species even although it is not possible to confirm this by reference to the original specimens. The external characters of the two seem to be repeated in the original descriptions of *Baeria ochotensis* and *Leucandra taylori* respectively. Their spicular characters can also be represented by those of these two species, with the usual qualification that the characters are variable. If this action is accepted we have to decide the value of all records of *L. ananas* and *L. ananas* var. since the days of Montagu. This is relatively easy since practically all are subsequent to 1872, the year in which Haeckel's *Die Kalkschwämme* was published. It is a fair assumption, in view of the almost complete lack of knowledge prior to 1872, that the records made subsequently to it are based exclusively upon Haeckel's writings and illustrations. For his description of the external form Haeckel includes characters of both *L. ananas* and *L. ananas* var. as well as those of *Sycinula penicillata* and *Spongia pulverulenta*. His drawings of spicules are, however, those of the group of species here associated with *Leucandra taylori*. Presumably writers subsequent to Haeckel were influenced by the drawings, and especially by those of the spicules, so that little harm can be done by including them all under whatever heading is ultimately given for *L. ananas* var. (As will be shown later, this must be *Scypha ciliata*.)

Leuconia fistulosa was originally described by Johnston (1842: 18) under *Grantia fistulosa* but was later recorded under *Leuconia* by McAndrew (1861), Bowerbank (1866), Gray (1867) and Wright (1868), and in 1870 Haeckel listed it under *Dyssycum fistulosa*. Up to this point our knowledge of the species is scanty. Johnston gave a very poor drawing of the external form and little information about its spicules, and the only additional data are contained in Bowerbank's (1874, pl. v, figs. 9–16) figures of spicules from his Plymouth specimen, the type having been obtained from Portaferry in Ireland.

From this brief summary of the history of the species several significant points arise. In the first place, although Johnston's type passed into the British Museum collection (B.M.47.9.7.78), Bowerbank did not figure it in his Monograph, nor does he seem to have taken note of it. Yet a section made from the type is among the microscope preparations bequeathed by Bowerbank to the British Museum. It is important to speculate whether he saw Johnston's type before writing his Monograph or not. The only clue to aid us in this is contained in Bowerbank's own register of specimens (now in the British Museum). The slide in question bears Bowerbank's number R.1805. The entry in the Bowerbank register against this number is: 'Grantia fistulosa Johnston. Section from the type specimen Brit. Mus. 49.7.7.78.' This last number clearly should read 49.9.7.78. Few of Bowerbank's entries are dated. The last one before R.1805 to be dated is R.1656, which reads: 'Lithic Acid. From J. S. Bowerbank 20.8.66. while under medical care.' The next entry having anything in the nature of a date is R.1865 which refers to specimens of quartz received from Mr. de la Rue in February 1859. It seems certain from this and other signs that Bowerbank did not always register his specimens in the order in which they were received. One can imagine, however, the alacrity with which he might register a sample of 'Lithic Acid' from himself and would probably do so without loss of time. In that event we should have good reason to suppose that Bowerbank did not register the preparation from Johnston's type until after October 20, 1866. He may, of course, have obtained it before that date. Had this been so, he would hardly have written (1866: 39): 'From the description given by Dr. Johnston, in page 181 of his *History of British sponges*, of *Grantia fistulosa*, there is little room to doubt that the sponge sent to him by Mr. William Thompson, and those found by my friends Mr. Stewart and Professor Forbes are of the same species. . . .' This leaves very little doubt that Bowerbank did not identify his specimens of *Leuconia fistulosa* by direct comparison with the type-material but by reference to Johnston's original description. And since no further mention is made in the 1874 and 1882 volumes of the Monograph to Johnston's actual type it may be presumed that Bowerbank used his preparation R.1805 merely to confirm the earlier identifications of his own specimens. This would mean that Bowerbank was able to recognise the salient features of the species from Johnston's written description.

At about the time that Bowerbank was doing this work, Haeckel was writing his monograph (*Die Kalkschwämme*, 1872). In this, he gives no indication that he has examined either Johnston's type or the other material available to Bowerbank, nor can there be any reason to suppose that he did so. Indeed, it seems clear from Haeckel's figures and written descriptions that he did not. This means that Haeckel, like Bowerbank, was able to recognise the salient features of the species from Johnston's written description.

Now we have the important fact that Johnston's only figure of this species, his fig. 1, pl. xx, bears little if any resemblance to the true appearance of the sponge. The main points in the written description are: 'Sponge forming a long simple tube . . . surface not porous nor muricated but shortly villose . . . spicula triradiate, very unequal in size, the rays diverging also at various angles, often very long and even flexuous.' By modern standards this description is hopelessly inadequate, yet, once one has such a sponge from the coasts of Britain to examine, this description serves to identify the species.

The spicules in Johnston's type of *Grantia fistulosa* are triradiates, with some quadriradiates, and oxea. This is the simplest description of them. We can then elaborate this statement and say that the chamber layer is filled with triradiates and some quadriradiates, the cloacal wall supported by a layer of triradiates and quadriradiates, and the ectosome is traversed by oxea set at right angles to it. If now we proceed to set on paper the dimensions of the spicules, the variations in these dimensions as well as the variations in the shapes of the spicules, the description of these will occupy many pages since the spicules in this species are extremely variable. The rays of the triradiates may be of approximately equal length, or the paired rays may be longer than the basal ray, or the basal may be several times longer than the paired rays. In the same way, when a fourth ray is added to form the quadriradiate the length of this may be equally variable. All these things may be seen in one individual. To seek to express them in descriptive sentences, in measurements and in text-figures leads to the kind of complex description that is nowadays fashionable. Even then the full range of variation in the spicules cannot be shown, even for a single individual; and always, in my experience, any group of specimens, not least those from a single locality and collected in the same season, shows individual differences.

Returning to *Leuconia fistulosa* more particularly, we find that there need be little hesitation in accepting Johnston's type, Bowerbank's specimens and Haeckel's description as representative of a single species. Even so, the following observations, previously not recorded, can be established as the result of my re-examination of available material. Johnston's type has no ectosomal layer of spicules, the surface of the sponge being coated instead with sand-grains; Bowerbank's Guernsey specimens have no ectosomal triradiates, nor does Haeckel mention them; but in a Bowerbank specimen from Larna Lough there is no special layer of triradiates on some parts of the surface, in other parts there is, and in some parts the layer may be several spicules thick. Similarly, some specimens have stout oxea only; and the Guernsey specimen has trichoxea in addition. In some specimens all the endosomal spicules are quadriradiates, in others they comprise a mixture of triradiates and quadriradiates, and in yet others, the holotype being one of these, they may be almost wholly triradiates, with just occasional quadriradiates.

Another character showing a marked variability is in certain quadriradiates of the chamber layer. In the holotype I have found these to have markedly shorter paired and apical rays as compared with the length of the basal ray. In Bowerbank's Guernsey specimen I have found that a few of these quadriradiates have all but the basal rays so small as to be almost vestigial.

Since the time of Haeckel and Bowerbank a number of authors have recorded *Leuconia fistulosa* from Norway, the British Isles, France and Portugal. In 1900, Lambe described *Leucandra cumberlandensis* from Davis Strait. The external form of the figured specimen is remarkably like that of *Leuconia fistulosa*. The skeleton consists of spicules very like those of *L. fistulosa* but the following points can be noted: there are both stout oxea and trichoxea, the surface tissues are supported by several layers of triradiates, there are in the chamber layer quadriradiates of peculiar structure with long basal rays and the other three rays very short. The specimen can therefore be described in these alternative terms: external form typical of *L. fistulosa*, ectosomal skeleton is partly that of the Larna Lough specimen of *L. fistulosa*, oxea and trichoxea as in the Guernsey specimen and modified quadriradiates as in the Guernsey specimen, and to a lesser extent as in Johnson's holotype. It seems hardly possible, therefore, to exclude *Leucandra cumberlandensis* from synonymy with *Leuconia fistulosa*.

Lambe (l.c.) mentions having obtained seven specimens but he gives a description of one only. It would have been of interest to know whether the other six showed variations on the features described for the holotype of *Leucandra cumberlandensis*. That being denied us we can but seek alternative evidence. There is such evidence in the specimen described by Fristedt (1887) under *Leucandra cylindrica* from Pitlekai, off the coast of Siberia. This has the external form of *Leuconia fistulosa* and spicules strongly reminiscent of those described for this same species by Bowerbank and Haeckel. It has, however, in addition to stout oxea, not only trichoxea, but also microxea. Ignoring for the moment the microxea, we have in *Leucandra cylindrica* a sponge so like the various specimens of *Leuconia fistulosa* that we may reasonably suspect this latter species to range beyond the coasts of western Europe into the Arctic, where both *Leucandra cumberlandensis* and *L. cylindrica* are found.

In 1929, Hozawa described *Leucandra kagoshimensis* with an external form very similar to the typical form of *Leuconia fistulosa* and a skeleton very close to that of Bowerbank's Guernsey specimen except that it lacks the modified quadriradiates of the chamber layer. In the same work, Hozawa describes a *Leucandra paucispina.* This is more ovate and therefore atypical in external appearance. Its skeleton is very like that of the holotype of *Leuconia fistulosa*, but it has microxea in the endosomal surface. The skeleton resembles closely therefore that of *Leucandra cylindrica* from Pitlekai.

There appears to be a further representative of *Leuconia fistulosa* from Japan. Tanita (1939) has described *Vosmaeropsis griseus.* This has the external form atypical of *Leuconia fistulosa* and the spicules of *Leucandra cylindrica* from Pitlekai, except that microxea are missing. Tanita says that his species seems to be closely related to Ridley's *Vosmaeropsis sericatum.* It is difficult to see why this should be, especially as the skeleton of *Vosmaeropsis griseus* does not resemble that of a typical *Vosmaeropsis.* Tanita may have been misled by the action of Hozawa, who in 1929 described *V. japonica*, which has a skeleton very like that of *Leuconia fistulosa.* Indeed, but for its somewhat atypical external appearance, this specimen could be accepted as a true representative of Johnston's species with microxea in the ectosomal tissues.

The mistakes made by Tanita and Hozawa are, however, illuminating. The diagnosis given by Dendy and Row for *Vosmaeropsis* is: Skeleton of the chamber layer composed of the centrifugally directed rays of subgastral sagittal triradiates and the centripetally directed rays of subdermal pseudosagittal triradiates, which may be supplemented or partially replaced by confused triradiates. This definition is most misleading for two reasons. To begin with the species of the genus *Vosmaeropsis*, as accepted by Dendy and Row (1913), can be subdivided into four groups: (1) The type-species, *V. macera* Carter and *V. sericatum* (Ridley), having a similar structure; (2) *V. depressa* Dendy, which is related to certain Australian species of *Leucandra*; (3) *V. cyathus* (Verrill), which is difficult to recognise; and (4) *V. wilsoni* Dendy and *V. connexiva* (Poléjaeff) which are more nearly related to *Anamaxilla.* I have ignored here the *nomina nuda V. dendyi* Row and *V. primitiva* Row.

Were we to accept *V. depressa* as a true *Vosmaeropsis*, which it is not, then the actions of Tanita and Hozawa would be correct. There is, therefore, some excuse for their errors. Indeed, I have myself recorded *Leucandra japonica* as *Vosmaeropsis japonica.* The explanation is as follows. In the true *Vosmaeropsis* the skeleton of the chamber layer is supported by the rays of large ectosomal and endosomal radiates and when other triradiates occur in this layer they are few and inconspicuous; in fact, they are incidental. In certain species of *Leuconia*, in which the chamber layer is supported by triradiates (or quadriradiates) there may occur subendosomal and sometimes subectosomal radiates, but these are somewhat incidental. Thus, in *Leuconia fistulosa*, there are usually subendosomal triradiates but these may be few in number or even difficult to distinguish from the radiates of the chamber layer. In most individuals there are no subectosomal triradiates but occasionally these do occur and are then, very obviously, modified (and probably fortuitous) forms of the normal radiates of the chamber layer.

The score or so specimens of *Leuconia fistulosa* from the British Isles, which I have been able to examine, show a skeleton composed of the same elements as are found in the skeleton of *Sycon ciliatum*. The difference between these two species lies entirely in the continuous ectosomal skeleton of *Leuconia*. As I have shown elsewhere, it is possible to find transitions between the typical *Sycon* condition and the typical *Leuconia* condition. It is very certain, therefore, that *Leuconia fistulosa* and *Sycon ciliatum* have so much in common that we may suspect a close relationship between them. This is amply supported by a study of the variations in the different categories of spicules in *Leuconia fistulosa*. For this study I had at my disposal the score or so specimens, already mentioned, which have been identified by a number of different authors: Bowerbank, Norman, Row, Crawshay, etc. In these the oxea show the same variations from slender to stout as in *Sycon ciliatum*, and they vary in length. The apical rays of the endosomal quadriradiates vary from extremely short to very long, often with an admixture of triradiates, and exceptionally the whole endosomal skeleton may be composed entirely of triradiates. The same remark can be made of the tubar triradiates, so that not only is the skeleton of *Leuconia fistulosa* basically similar to that of *Sycon ciliatum*, but its variations are strictly comparable, the only qualifying remark needed is that on the whole the spicules of the *Leuconia* tend to be slightly more robust. This is not invariable, however, and a significant proportion of the individuals examined had spicules as slender as anything seen in *Sycon ciliatum*. Even so, there does seem to be a correlation between the presence of the continuous ectosomal skeleton and a slightly more robust nature of all the spicules. This generalisation, however, needs to be tested by more extensive research. For the moment, it is sufficient to say that *Leuconia fistulosa* appears to be no more than a fluctuating variation of *Sycon ciliatum*.

The typical canal-system of *Leuconia fistulosa* is that known as the leuconoid, with small scattered flagellated chambers. The typical canal-system of *Sycon ciliatum* is that composed of large thimble-shaped flagellated chambers arranged radially about the central cloacal cavity and extending to the outer surface. There is a series of stained microtome sections made by Crawshay from five specimens collected by him at Plymouth, the preparations now being in the British Museum collection. He had identified them all as *Leuconia fistulosa*. Presumably these stained sections were made from individuals chosen at random by Crawshay. At all events, one shows the typical leuconoid canal system with small scattered chambers, another shows the leuconoid system with large scattered chambers, a third shows the sylleibid canal-system normally accepted as intermediate between the leuconoid and syconoid, a fourth shows the elongated and slightly branching chambers associated with the genus *Grantia*, and a fifth shows the typical thimble-shaped chambers of a *Sycon* (but with a continuous ectosomal membrane). No more remarkable proof that *Sycon ciliatum* and *Leuconia fistulosa* represent variations within a single species, with all the intermediate conditions between the leuconoid and syconoid canal-systems, could be found than is contained in Crawshay's preparations.

In *Leucandra crambessa* we have a somewhat different problem. When he first described it, Haeckel (1872) gave his usual 'specifische Varietäten'. Under this heading he included two species, quoted in the following manner: '*Leucandra cristata*, H. (*Leucandra crambessa*, var. *cristata*) and *Leucandra callaea*, H. (*Leucandra crambessa*, var. *callaea*).' The first was diagnosed: 'Dermalfläche ganz nackt; keine senkrecht darauf stechenden borstenförmigen Stabnadeln. Peristomkranz kurz.' The second was diagnosed: 'Dermalfläche sammetartig, dicht bedeckt mit senkrecht darauf stehenden borstenförmigen sehr feinen Stabnadeln. Peristomkranz lang.' Comparing these two diagnoses, the only important point to emerge is that *Leucandra callaea* differs from *Leucandra cristata* in the presence of trichoxea in the ectosomal skeleton. The length of the peristomial fringe and the so-called naked surface are trivial features having no taxonomic value. Moreover, there is nothing in the rest of Haeckel's description to suggest that there is any more difference between the two supposed species than is contained in the presence or absence of these trichoxea. In the many specimens from Naples in the British Museum collection, the distribution of the trichoxea is seen to be variable, from completely absent to abundantly present, and there is no correlation between this and the size of the peristomial fringe or the degree to which the large oxea lie flat on or at an angle to the surface. *L. callaea* and *L. cristata* must therefore be regarded as pure synonyms of *L. crambessa.*

There has been confusion on the relationship between *L. crambessa* Haeckel and *L. aspera* (Schmidt). Vosmaer (1884) has endeavoured to show that the two are synonymous. It has been possible, from the British Museum collection, to examine specimens comparable to Haeckel's types and others not significantly different from those figured by Vosmaer, together with many intermediates. All are from Naples, the locality from which Haeckel and Vosmaer obtained their material, and all seem to be conspecific. These specimens show the species they represent to belong to *Ute* and the only real difference between *Ute ensata* and *Ute crambessa* is that some individuals belonging to the second species attain a greater size. Small specimens from Naples are indistinguishable from *Ute ensata* and the larger specimens bear the same relation to the smaller ones that the giant specimens of *Grantia compressa* and *Sycon ciliatum* bear to the smaller. There seems no particular reason why *Leucandra crambessa* should not be regarded as a synonym of *Ute ensata.*

From the examination of a wide range of '*Leucandra crambessa*' from Naples the following variations may be noted: (1) The large oxea may vary in number, from sparse to abundantly present; (2) the large oxea may lie wholly in the ectosome or a varying percentage of them may project at a slight angle from it; (3) there may be two sizes of large oxea, the 'normal' and the smaller club-shaped spicules; (4) trichoxea may be present in varying quantities. The numbers and positioning of the oxea affect perceptibly the consistency and appearance of the various individuals. Further, some individuals show a varying number of ectosomal pseudosagittal triradiates. These do not form a constant feature and are best interpreted as ectosomal triradiates slightly out of place.

The specimens from Naples referred to here are from the Dendy Collection and were purchased by Dendy from the Zoological station. They are labelled '*Leucandra aspera*' although they agree closely with Haeckel's description of *Leucandra crambessa.* They agree even more closely with the specimens figured by Vosmaer (1884, pl. xxviii) and there can be no doubt that they are comparable in every way with the materials upon which Vosmaer based his studies that led him to suggest that these two species were identical.

The question now arises whether Vosmaer was correct in seeking to identify *Leucandra aspera* with *L. crambessa.* The history of *L. aspera* starts with Schmidt's (1862:

15) description of *Sycon asperum*. This description and the figures relating to it tell us no more than that the species was represented by an ovate specimen with a hispid surface. Very few details are given of the spiculation, and the figures he gives are useless for present purposes. Haeckel (1872) redescribed the species and figured the spicules. There are in the British Museum collection two preparations labelled in Schmidt's handwriting from specimens identified by him from the Adriatic. Presumably these can be accepted as two of his types. Examination of these shows that Haeckel's illustrations of the spicules of this species are reasonably correct. On the other hand, his illustrations of the external form show a variety of individuals, but they all have a hispid surface. In Schmidt's two specimens already mentioned the large oxea are set at right-angles to the surface for the most part, but in his preparations they are arranged tangentially on the surface as in *Ute*.

It is abundantly clear that *Leucandra crambessa* and *L. aspera* have spiculations remarkably alike if not identical, the only substantial difference being that in the former the large oxea typically lie tangential and in the latter they are usually set at an angle to the surface, but may lie tangentially at times. Another difference between them is that the surface in the former is smooth and glistening from the tangential layer of large oxea, and in the latter it is hispid from the projecting large oxea. It was doubtless these circumstances that caused Topsent to declare that the two could always be recognised apart in the field. On the other hand, I have examined carefully all the specimens and preparations of these two species in the British Museum collection, and I am under no doubt that they represent phases within the same species. The specimens examined include typical examples of *L. crambessa*, typical examples of *L. aspera* and others that show intermediate conditions. The third group is in the majority, which would suggest that in the field one would be likely to see specimens which can be assigned to one or other species quite readily, provided one ignores the occasional intermediates.

Because it was Topsent who made this confident assertion, and because he was so experienced in the field and in the laboratory, I have examined with more than usual care all the evidence from the literature, from whole specimens and from preparations and have done so three times, and I personally have no doubt that Vosmaer was right and shall accordingly treat *L. crambessa* and *L. aspera* as synonyms, both being identical with *Ute ensata*. In addition, there is a group of three specimens each of which has formed the holotype of a species. It includes *Leucandra bulbosa* Hanitsch, from Sines, Portugal, *Leuconia coimbrae* Breitfuss, from the west coast of Portugal, and *Vosmaeropsis oruetai* Ferrer, from the coast of Asturias, Spain. All agree closely in external form, as well as in the details of spiculation. When Hanitsch described for his species large club-shaped oxea he was, presumably, examining in it the kind of oxea commonly found in *Leucandra aspera*, which are stout in the distal third becoming markedly attentuated in the proximal third. It is to be noted, also, that both Breitfuss and Ferrer make the comment that the external form of their respective species is like that of *L. aspera*. Indeed, the only difference between the three Iberian species and the common Mediterranean species lies in the greater size of the triradiates of the chamber layer in the former. In these three species, their rays range from 0·24 mm. long (in *Vosmaeropsis oruetai*), to 0·35 to 0·45 mm. long (in *Leuconia coimbrae*) and 0·39 to 0·45 mm. long (in *Leucandra bulbosa*). In *Leuconia aspera* the accepted range is 0·12 to 0·25 mm.; that is to say, these are the only figures available in the literature, namely those given by Haeckel (1872). In fact, in the two preparations identified by Schmidt from the Adriatic, the rays of the triradiates reach 0·32 and 0·35 mm. respectively. It is difficult to believe, therefore, that we are dealing here with anything more than ecological differences at most.

Leuconia gossei (=*Leucogypsia gossei* (Bowerbank 1862 : 1092)) seems to present a similar problem to that of *L. crambessa.* The holotype is an irregularly oval specimen, 2 cm. high, with two vents at the apex and one situated laterally. The skeleton consists of an ectosomal layer of triradiates, with a regularly reticulate skeleton of triradiates in the chamber layer, and an endosomal layer of quadriradiates. There are also numerous large diacts scattered throughout the chamber layer. The triradiates of the chamber layer may be regular, subregular or sagittal, but they are mainly subregular, and the length of the rays varies from 0·07 to 0·2 mm. long and from 0·016 to 0·028 mm. diameter. Occasionally an apical ray is present. The ectosomal triradiates are slightly smaller than those of the chamber layer. The endosomal quadriradiates are about the same size as the spicules of the chamber layer, but they bear apical rays which range in length from 0·1 to 0·2 mm., and may be straight or curved, hook-shaped or sabre-like. The large diacts are up to 1·2 mm. long. There are also ectosomal microxea.

If we compare the external form of the holotype of *L. gossei* with *L. cliarensis* Stephens (1912, pl. i, figs. 7–8) we see a considerable likeness. In addition, we know that the colour in both these species is white, both are found in the littoral zone, and both usually occur under pebbles or rocks. These very close similarities are continued in the skeleton, so much so that if sections of the two holotypes are examined side-by-side there is little to choose between them. Indeed, the only difference that could carry any significance is that the large diacts are scattered throughout the chamber layer in *Leuconia gossei* and are arranged in a tangential ectosomal layer in *Leucandra cliarensis*. Apart from this one feature, the two species would be accepted without the slightest hesitation as identical.

Dendy and Row included *L. cliarensis* under the genus *Aphroceras*, which is characterised by an ectosomal tangential layer of large diacts. If then it can be shown, as may be suspected from my previous remarks, that the layer of longitudinally-placed oxea in the ectosomal layer is without taxonomic significance, then *Leucandra cliarensis* must be accepted as a synonym of *Leuconia gossei.* On examining the half-dozen specimens labelled by Bowerbank as *Leuconia gossei*, I found that in all it was possible to see, with a hand-lens, large diacts lying longitudinally at some point or other in the surface tissues. Usually they were few and widely scattered but in places they were abundant, and in occasional patches they were sufficiently densely-packed to give the appearance of the typical surface of *Aphroceras*, as represented by *Leucandra cliarensis*. This species is, as I have shown elsewhere, synonymous with *Ute ensata*, the type-species of *Ute.*

A possible interpretation of these differences in the position of the large diacts is given later. Meanwhile, it is necessary to examine the other aspects of the characters of *Leuconia gossei.* The triradiates are variable in size and shape, within the individual and also from one individual to another. Sometimes there appear to be two distinct sizes of triradiates in the chamber layer. This illusion is created by a number of the spicules having markedly stouter rays. The sizes and shapes of the endosomal radiates vary in a comparable manner, perhaps even more than do the radiates of the chamber layer.

Usually the endosomal radiates are triradiate with many quadriradiates. At times, they may be triradiates with relatively few quadriradiates. The apical rays of the quadriradiates may vary from short and almost non-existent to 0·3 mm. long. They may be curved or straight, gradually sharply-pointed or sword-shaped or of medium length with lanceolate ends. The permutations and combinations of these, if studied in close and minute detail, are apt to give the appearance of several distinct species, yet they have so much in common that there is a strong general resemblance in spite of the trivial differences.

I have shown elsewhere that *Ute ensata* and *U. glabra* are synonymous, and that *Aphroceras cliarensis* is a further synonym. The distribution of the species they represent includes the Arctic, the Atlantic coasts of Europe and the Mediterranean. There are two species from Japan which represent almost extremes in the variation found in *Leuconia gossei*. These are *Leucandra abratsbo* and *Leucandra multituba*, both of Hozawa. The second of these is remarkably like Bowerbank's specimens in external form, leaving no doubt whatever of its identity with *Leuconia gossei*. The first is not so closely like them but has, nevertheless, a sufficiently close resemblance, apart from having more diacts projecting from the surface, to leave little doubt as to its identity also with Bowerbank's species.

When we go to the southern hemisphere we find a series of species clearly recalling the external form and the structure found in *Leuconia gossei*. The oldest of these, and the only one of which I have been able to make a direct study is *Leuconia compacta* Carter, from Australia. In this the diacts are slightly more club-shaped and the endosomal skeleton consists of triradiates and relatively few quadriradiates, and the apical rays of the latter are always short. Otherwise there is no difference between *L. gossei* and *L. compacta*. It appears, however, that one of these characters, namely, the short apical rays of the endosomal quadriradiates, is constant for these southern forms, while the character of the large diacts is more variable and often approximates closely to that of *L. gossei*. These remarks are based upon the study in the literature of *Leucandra haurakii* Brøndsted, from New Zealand, and *Leucandra australiensis* (Tanita *nec* Carter), *L. compacta*, *L. haurakii*, *L. reniformis* and *L. uschuariensis* recorded by Tanita (1942) from South Georgia and the area of the Magellan Straits. So far as one can see from the written descriptions and the text-figures given by Brøndsted and Tanita, all these are undoubted synonyms of *Leuconia compacta*, and therefore it would seem of *Ute ensata*.

Before leaving the discussion centred on the two forms of *L. ananas*, notice can be taken of two other species having much in common. These are *Leucandra polejaevi* (Breitfuss), from Spitzbergen, and *Leuconia pyriformis* Lambe, from Vancouver Island. The second of these could be readily identified with *L. ochotensis* except that it lacks oxea, and no mention is made in the original description of surface papillae. Otherwise, it could be accepted as a member of that species with triradiates in the chamber layer instead of quadriradiates. *Leucandra polejaevi* is very like *Leuconia pyriformis* in most features but it has slender oxea which, from fig. 17, pl. 12 (Breitfuss, 1898), might be styliform. There is, however, another obstacle. The ectosomal triradiates are said to have rays only 0·08 to 0·1 by 0·01 mm., whereas those of *L. pyriformis* are 0·59 by 0·061 mm., which is much nearer the typical size for *L. ochotensis*. I have drawn attention elsewhere to the unreliable nature of Breitfuss' text-figures. In the one he gives in this instance, of a section through the body wall, his fig. 33, large triradiates are shown just beneath the surface, but these are shown in his fig. 22 as 'Riesiges Mesodermaltriaenen'. In the text we find that the spicule shown in fig. 22 is described as follows: 'Seltener sind im Innern des Schwammes grössere, schlanke sagittale Triactine'. There is an evident contradiction here. If it could be resolved, by re-examination of the holotype, the probability is that these spicules would be found to be part of the ectosomal skeleton: and their rays measure 0·35 to 0·4 by 0·18 mm., so that they would have nearly the length if not the thickness typical of *L. ochotensis*.

L. polejaevi and *L. pyriformis* have sufficient in common to be accepted as synonyms, and it is difficult to see how they can be separated from *L. ochotensis*.

It has been suggested, in the preceding pages, that *L. crambessa*, *L. aspera* and *L. gossei*, together with others of the same genus, must be regarded as synonyms of *Ute ensata*. These synonyms include also *L. vaginata* (Lendenfeld) and *L. lendenfeldi* Breitfuss, both from Australia, whereas practically all others are from the northern hemisphere. At the same time, *L. gemmipara* Thacker, from the Cape Verde Islands, is a pure synonym of *Ute ensata*, and Row (1909) has recorded *Leucandra aspera* from the Red Sea, his specimen being a typical *Ute ensata*. As to *L. gemmipara*, Thacker's remark of the oxea, that 'fully half the length of the spicule is usually projecting', is incorrect. A few oxea do project, but not more so than in any other specimen of *Aphroceras ensata*.

Whether *Leucandra vaginata* and *L. lendenfeldi* carry the range of this northern species to Australia, or whether their similarity with it is delusory, can best be judged by the following observation. After examining Dendy's specimens, from Australia, of *Leucandra cataphracta*, some time ago, I wrote the following note: 'These agree closely with the description of the holotype. They are so like *L. elongata* Schuffner as to be considered almost a variety of it. The main differences are in small details of the spicules. Dendy's specimens have dermal microxea, which increases the resemblance.'

If, on comparing them with European specimens, the impression is gained that two Australian species, *L. vaginata* and *L. lendenfeldi*, are conspecific with them, and if later, and independently, a comparison of Australian specimens with a European species, *L. elongata*, suggests the same idea, it is reasonable to suspect that there is a species common to both regions.

Leucandra cataphracta Haeckel can be shown to be conspecific with *Aphroceras syconoides* (Carter), and also with *Ute spenceri* Dendy and *U. spiculosa* Dendy, all from South Australia. In addition, *Sycute dendyi* (Kirk) from New Zealand (see p. 90) and *Synute pulchella* Dendy, from Australia, also appear to be synonyms.

When the range of variation in the dimensions of the spicules in European forms of *Aphroceras ensata* is plotted, it is found that those for the Australian forms come well within them. There is only one exception. The dermal microxea in *U. spiculosa* measure 0·24 by 0·008 mm., whereas the greatest size of the comparable spicules in all others is 0·18 by 0·003 mm. This may or may not be significant; it is treated here as of little importance in view of the general similarity in form of the holotype with *A. ensata*.

It may be noted that the New Zealand species included here was first assigned to *Sycon*, and this, with the fact that Carter's species is called *syconoides*, must be set against the generally leuconoid nature of *A. ensata*. This point is referred to again on p. 92.

If *A. syconoides* is also to be identified with *A. ensata*, there remains one other species only, namely, *A. alcicornis* Gray. The holotype of this one was collected at Hong Kong, but Dendy recorded it also for Australia, and Haeckel for Honolulu and the Indian Ocean. Haeckel describes its external form as clathrate, which is one of the forms in which he recorded *Leucandra crambessa* (= *Aphroceras ensata*). Its spicules are similar in form and dimensions to those of *A. ensata*, so that it is difficult to see how it can be retained as a separate species. In that event, it will be difficult to know which name has priority. Although both names were published in 1858, the paper, in which Gray described *A. alcicornis*, was read before the Zoological Society of London on February 2nd, 1858. Bowerbank's paper, containing the name *Grantia ensata*, was read before the Royal Society on June 18th, 1857. In default of precise evidence as to the actual dates of publication, it is reasonable to give Bowerbank's specific name priority.

In 1909 Urban described three species, established by him a year earlier. These are *Leuconia spissa*, from the Agulhas Bank, *L. armata*, from Francis Bay (34° S., 24° E.), and *L. cirrhosa* from Kerguelen. In 1931, Brøndsted gave us a second record of *L. armata* from Simonstown, and added a fourth species from the same locality, *L. hentschelii*. The Agulhas Bank, Simonstown and Francis Bay are all within an area which, from the evidence of other sponges, forms a recognisable faunal region. When, therefore, we find that two of Urban's species from this region, judged by his descriptions and illustrations of them, differ in minor details only, it seems reasonable to suppose that they represent normal variations within a species. This view is supported by Brøndsted finding one of the species at Simonstown, which is at the other end of the region from Francis Bay. Added to this, it is also noteworthy that the new species recorded by Brøndsted from Simonstown, namely, *L. hentschelii*, is also remarkably like the others, except for the absence of oxea; and the presence or absence of oxea or microxea have been shown repeatedly to have little taxonomic value. There seems no reason, therefore, why these four species should continue to be recognised as separate.

If any doubt be felt that in this action too great a latitude is allowed, we have but to examine the illustrations Brøndsted himself gives of the spicules of two specimens of *L. armata* from the same locality. These are reproduced here. Former writers, seeing these two figures, would have separated the two sponges specifically, if not generically.

The third of Urban's species, *L. cirrhosa*, is from Kerguelen, which is a thousand miles from the South African area under discussion, and is within the Subantarctic. Yet it is so like *L. spissa* as to make it virtually impossible to separate the two except on the old principle of 'baptising each specimen'.

There is a specimen from Bat's Cave Rocks, South Africa, in the British Museum collection (Reg. 1938.3.26.92), which I had originally described in manuscript as a new species. This I would now also identify with the specimens named by Urban and Brøndsted, as forming no more than a single species ranging from the southern coast of Africa into the Subantarctic. Going further south, however, it seems there are further representatives of this species in the Antarctic.

Leuconia anfracta Urban (1908), from Kerguelen, and *Leucandra hiberna* Jenkin (1908), from the Antarctic, are very closely similar. The differences between them are as follows: (1) the oxea in the first are club-shaped, those of the second, although also curved, are slightly lanceolate; (2) the endosomal spicules described by Jenkin occur also in the chamber layer of his specimen and are the counterpart of the tubar triradiates of Urban's description, the differences being correlated with the thinner body-wall of Jenkin's species; (3) the triradiates of the chamber layer are sagittal in *Leucandra hiberna* and subregular in *Leuconia anfracta*; (4) ectosomal microxea are present in *L. anfracta* but not in *Leucandra hiberna*. From our knowledge now of the variations in spicules none of these can be accepted as significant. Moreover, a specimen from the collections made by 'Discovery Investigations' is practically identical with Urban's holotype yet it lacks the ectosomal microxea. Furthermore, its 'oxea' are a mixture of club-shaped and lanceolate diacts.

The holotype of *Leucandra cirrata* Jenkin, also from the Antarctic, is merely an individual of this same species with all spicules slightly larger. This results in long curving oxea which protrude conspicuously from the surface, but the effect produced is only one of degree when compared with that seen in related individuals.

In the year before that in which Urban described his three species, Topsent had published his descriptions of *L. hirsuta* and *L. joubini*. Unfortunately, no illustrations were included and few measurements of spicules. From reading the descriptions closely it would appear that the two species are identical except for the presence in *L. joubini* of ectosomal microxea. Since the holotypes of both species were collected on Booth Wandel Isle on December 10th, 1904, in the littoral zone, it is unlikely from their strong general resemblance that they represent other than one species having a similar relation to each other that *L. anfracta* has to *L. hiberna*.

In 1931, Brøndsted erected the genus *Jenkina* to include *Leucandra cirrata* and *L. hiberna*, together with two new species, *Jenkina articulata* and *J. glabra*. On the other hand, he placed *Leuconia anfracta* into *Leucandra*, although his own fig. 28 shows that his specimen of that species must have been very close to the holotype of *L. cirrata*. In addition, he described and figured *Grantia transgrediens*, a new species having a spiculation intermediate between his own specimens of *Jenkina articulata* and *Leucandra anfracta*. Finally, he described and figured a new species, *Leucetta gausii*, which clearly is related to his own *Jenkina articulata*.

There are two aspects to this work by Brøndsted. The first is that he must have been influenced by the canal-system in deciding between *Leucetta*, *Grantia*, *Jenkina* and *Leucandra*, in which event we can say that he was using criteria now known to be unreliable. Indeed, Brøndsted's own identifications give us supporting evidence for supposing this to be so, for he assigned specimens with more or less identical anatomy, apart from the canal system, to three distinct families and genera. The second aspect of Brøndsted's work is concerned with the author's own attitude to the variations in spiculation. It is an attitude with which we are familiar in other authors but usually not in such a striking manner. Thus, on p. 39, Brøndsted gives two text-figures (29 and 30) of the spicules in two individuals of *Leucandra armata* (Urban) to show how different they are. On pp. 44 and 45 he gives comparable text-figures for two individuals of *Leucandra comata* Brøndsted, which show an even greater divergence. On p. 34 he gives measurements of the spicules in four individuals of *Jenkina hiberna* (Jenkin), to emphasise the range in size within a species. Yet it is clear from his other descriptions that, in other parts of the same work, he attaches importance to relatively small differences in these characters in his assessments of species.

In establishing the genus *Jenkina*, Brøndsted admitted he was influenced by Jenkin's (1908) comment: 'The genus *Leucandra*, as defined by Dendy, is too comprehensive and needs subdivision.' Brøndsted's action in founding the new genus was a praiseworthy but uninformed attempt to meet this need. In 1929, I had already suggested that *Leucandra cirrata*, together with its variety *aurorae*, and also *Grantia tenuis* Urban, must be considered synonyms of *G. hirsuta* Topsent, and I retained the species in the genus *Grantia*. As to the generic placing of the species, it is worth pointing out that Dendy and Row, in 1913, retained *Leucandra cirrata* Jenkin in *Leucandra*, but Dendy, in 1924, in describing its variety *aurorae*, placed it in *Grantia*. *Leucandra* (now called *Leuconia*) and *Grantia* both belong to the Grantiidae, and the manner in which related species are moved from one to the other alone suggests a need for revision of our ideas on the characters on which the two genera are founded.

My action, in 1929, in including *Leucandra cirrata*, *Grantia tenuis* and *G. cirrata* var. *aurorae* as synonyms of *G. hirsuta* was based on the strong resemblance they bear to each other in their external features as well as the details of their skeletons, despite the differences in their canal-systems. I have looked again at the preparations from these and far from altering my previous opinion, I would add *Leucandra hiberna* to this list of synonyms.

Brøndsted (1931) not only records *Jenkina cirrata* and *J. hiberna* from the Antarctic, but from the same locality describes a new species, *J. articulata* having the same kind of skeleton and a similar external form. The evidence we have now from other sources is overwhelmingly in favour of expecting a fairly wide degree of variation in the dimensions of the spicules in any given species of calcareous sponge. When the illustrations given by the various authors for the species here discussed are laid out side by side, they are strikingly similar, and it seems reasonable to suppose, since all these so-called species come from the Antarctic and the Subantarctic, that they represent one species only.

Leucandra gausapata Brøndsted (1931) also bears a strong resemblance to these forms, so does *Leucandra anfracta* Urban, except that it possesses microxea, but if these can be ignored for general taxonomic purposes (see p. 12), then it, too, must be lined up with the species I had in 1929 treated as synonyms of *Grantia hirsuta*. Similarly, if the presence or absence of oxea can be devoid of taxonomic importance, *Jenkina glabra* cannot be excluded.

There are two reasons for the remarkable backward and forward movement of species between *Grantia* and *Leucandra* (= *Leuconia*): one is connected with the canal-system, the other with the spicules. *Leucandra* is known to include both leuconoid and sylleibid canal-systems. In *Grantia* the canal-system is stated by Dendy and Row to be syconoid. If we find, in the same geographical range, sponges having similar morphology and similar spicules but some having a syconoid canal-system, some leuconoid and others sylleibid canal-systems, then it would appear that the canal-system cannot be regarded as a stable character. The only alternative is to presume an evolutionary convergence in the skeleton in sponges living in the same area but belonging to closely related genera. This is highly unlikely and, as is shown so repeatedly here, there can no longer be any doubt that a system of classification based on the canal-system must be wholly artificial.

The second reason for the movement is that, while the skeleton of the chamber-layer is formed basically of the rays of the subendosomal triradiates and the inner ends of the oxea, in some individuals of these Antarctic Calcarea there may be a varying number of triradiates forming more or less of an articulate tubar skeleton. If these are numerous, the skeleton approaches that of a typical *Grantia*; if they are few it recalls the skeleton of certain species that used to be included in *Leucandra*. It is clear, however, that there is here variation comparable with that shown for *Leucilla australiensis* (see p. 122).

The three groups of species, discussed here in relation to *Leuconia spissa*, *L. anfracta* and *Grantia hirsuta*, are all sufficiently alike to be linked within a single species, ranging through the Antarctic and Subantarctic to South Africa. Another species described from the last of these three regions, namely, *Leucandra lunulata* Haeckel, must also be included, and will, by priority, give its name to the species. The generic affinities are, however, with *Sycon ciliatum*, in the genus *Scypha*.

Genus **Jenkina** Brøndsted

The genus is discussed under *Leucandra* (p. 112).

Genus **Baeria** Miklucho-Maclay

The genus is discussed under *Leucandra* (p. 95).

Genus **Leucopsila** Dendy and Row

The discussion of the type-species, *Leuconia stilifera* Schmidt, is included under *Leucandra* (q.v.).

Genus **Aphroceras** Gray

For discussion of this genus see under *Ute* (p. 90).

Genus **Leucettaga** Haeckel

This genus was listed by Dendy and Row as one of the family Grantiidae with the following diagnosis: 'Canal system leuconoid. Skeleton almost entirely composed of a confused mass of triradiates, which are mostly irregular and which form a cortical skeleton as well as the skeleton of the chamber layer. Gastral cavity traversed by numerous endogastric septa, which possess a special skeleton of their own in the form of minute radiates.' Taken as it stands, the only diagnostic feature here is the presence of the 'numerous endogastric septa'. This feature has appeared in specimens belonging to other families, and I have already (p. 70) expressed the view that it has no taxonomic value. If, then, this supposed generic diagnosis given by Dendy and Row is useless, it will be necessary to see whether Haeckel's original description, which is our sole source of information, will afford a clearer understanding.

The type of *Leucettaga* was selected by Dendy and Row, who 'proposed [it] for the reception of Haeckel's *Leucetta pandora* var. *loculifera*, which is the only known species'.

Leucettaga was a subgenus of *Leucetta*, proposed by Haeckel (1872: 117) for the species *primigenia*, *trigona*, *sagittata* and *pandora*. *Leucetta pandora* was described by Haeckel (1872 : 127) from twenty-one specimens collected in Bass Strait and the Gulf of St. Vincent, both on the south Australian coast. These specimens Haeckel divided between four varieties, *omnibus*, *intermedia*, *anomala* and *loculifera*. At no point in his description of the species does Haeckel suggest that the spicules of any one of the twenty-one specimens differ markedly from those of the rest. We may take it, then, that he was expressing in these varietal names something that has now become common knowledge, namely, that there can be marked variations from one individual to another. He gives us little idea what these variations may be and the medley of spicules figured on his pl. xxiii does not help in determining either the variations, or the varietal characters, or even the specific characters of *L. pandora* itself.

Out of this series of doubtful evidence some items may be selected. In the first place, all specimens of *L. pandora* appear to have been remarkably similar in form, colour and general appearance. Secondly, the two localities from which they were obtained are relatively adjacent and are faunistically similar. Thirdly, all the specimens appear to have similar spiculations. Fourthly, three out of the twenty-one contained 'endogastric' septa. There is, therefore, no particular reason for supposing that any of the specimens are not specifically identical with the rest. Certainly, there is no ground for a generic distinction.

The generic position of *L. pandora* must also be a matter for doubt, in view of the inadequacy of the original description. Two points emerge from the drawings on Haeckel's pl. xxiii. The first is that the triradiates represented in it are remarkably like those of *Lelapia australis*, even to the tuning-fork spicules. Moreover, this species has been found in the same locality, and the external form of the smaller individuals recorded is like that of *Leucetta pandora*. The main, if not the only, difference between the two is the presence of large oxea in *Lelapia australis* and their absence from *Leucetta pandora*. It is highly likely, therefore, that if Haeckel's specimens could be re-examined they would be found to be *Lelapia australis* devoid of oxea.

It is appropriate here to compare the situation in regard to another species, *Leucortis pulvinar* Haeckel. This was based upon specimens from Western Australia, Indian Ocean, Ceylon and the Red Sea. The triradiates and oxea figured by Haeckel (pl. xxix) recall similar spicules in *Lelapia australis*. The only specimen figured (pl. xxix, fig. 1) could be a young form of the figured specimens of *Leucetta pandora*, and Haeckel remarks (p. 166) on the presence, in some specimens, of tuning-fork spicules in the region of the vent 'gemischt mit den longitudinalen Stäbchen derselben'. He says that these spicules recall the tuning-fork spicules figured by Bowerbank (1862: pl. x, fig. 237), and that they are found only in examples of the 'indischen Varietät'. This is, presumably, his var. *indica*, which includes all except the Red Sea specimens.

A more thorough examination than the one Row appears to have made of the several specimens of *Leucortis pulvinar* might show that they include examples of *Kebira uteoides* Row and *Lelapia australis* Gray.

Haeckel speaks of compound specimens of *Leucortis pulvinar*, irregularly massive in form, often with tubercles on the surface, with an opening ('nackte Mundöffnung') on the apex of each. There is a large specimen of *Lelapia australis* (B.M.87.7.12.30), from the south coast of Australia, tubular, 90 mm. high, with an apical vent. Its surface bears numerous tubercles, some of which have an opening at the summit.

Summary.—Leucetta pandora, and with it *Leucettaga loculifera*, and probably *Leucortis pulvinar* var. *indica*, are variations of *Lelapia australis*.

Leucortis pulvinar var. *semitica* may prove to be synonymous with *Kebira uteoides*.

Genus **Paraleucilla** Dendy

The type-species, *Leucandra cucumis*, has not been seen since Haeckel first recorded it, from St. Vincent Gulf and Bass Strait, in Australia, and from Ceylon. Both areas have been extensively worked since 1872, and the fact that the species has not again been brought to light alone suggests that it may be synonymous with another and better-known species. The skeleton, as figured by Haeckel (pl. xxxvi, fig. 3), is peculiar but the external form (pl. xxxvi, figs. 1–2) is familiar. It recalls that of *Leucilla saccharata*, from Australia. Indeed, the specimen of *Leucandra cucumis* on Haeckel's pl. xxxvi, fig. 2 is almost identical in every way with the specimen of *Leucilla saccharata* from Maria Island, Tasmania, except for details in the skeleton. When the dozen or more specimens of this latter species, available in the British Museum collection, are compared, it becomes clear that the structure of the skeleton varies within wide limits. In several the skeleton departs markedly from the typical structure and approaches closely that figured by Haeckel for *Leucandra cucumis*. This suggests that Haeckel's pl. xxxvi, fig. 3 is a slightly idealised version of a condition not infrequently found in *Leucilla saccharata*. We could, therefore, say with confidence that the two species are synonymous but for two things. The first is the presence in *Leucandra cucumis* of large oxea, and the second is the finding of *L. cucumis* off Ceylon as well as around Australia.

On the first point, it can be remarked that Haeckel divided his species into two subspecies (or varieties ?). The first, '*Leucandra bassensis*, H. (*Leucandra cucumis*, var. *bassensis*)', from Australia, had 'Stabnadeln dazwischen sehr spärlich oder bisweilen ganz fehland'. He does not say how many specimens he had for examination, upon which to make this general statement, but since occasional oxea (which may or may not be foreign inclusions) are also found in *Leucilla saccharata*, there seems to be no further obstacle to regarding *Leucandra cucumis* (*sensu L. bassensis*) as a synonym of *Leucilla saccharata*.

As to the second point, '*Leucandra palcensis*, H. (*Leucandra cucumis*, var. *palcensis*)' has 'Dermal-Decke mit zahlreichen longitudinalen Stabnadeln zwischen den Dreistrahlern'. This, and the fact of its distribution off Ceylon, makes it fairly certain that it represents a separate species, the characters of which are not known for certain.

Summary.—Leucandra cucumis represents two distinct species, the one being synonymous with *Leucilla* (now *Amphoriscus*) *saccharata*, the other (the so-called *Leucandra palcensis*) being *species inquirendae*.

Paraleucilla is synonymous with *Amphoriscus*.

Genus **Lamontia** Kirk

The single species, *L. zona* Kirk, is sufficiently strongly characterised to call for no further comment.

Genus **Leucyssa** Haeckel

The only known species is *L. spongilla*, of which Dendy and Row suggest that it 'owes its peculiar skeleton to the complete suppression of ancestral radiates'. The holotype shows so marked a resemblance to the stipitate forms of *Clathrina coriacea* (e.g. '*Leucosolenia lacunosa*' and '*Leucosolenia nanseni*') that there arises the suspicion whether it is not such a form which, like the *Ascyssa*-forms of *Leucosolenia botryoides*, has lost all but the diacts. On the other hand, Haeckel describes for it a branching canal-system while Dendy and Row describe its canal-system as leuconoid. Although Row is described (see Dendy and Row, 1913 : 707) as having 'visited Berlin and Jena in 1912, and obtained valuable information from the study of type-specimens at those places', we read (*op. cit.*: 779) 'that this genus (i.e. *Leucyssa*) has only been observed by Haeckel'. The type-specimen is from Japan and, in spite of the work of Hozawa and Tanita on the sponge fauna of that country, has not been seen again. Whether Row actually examined the holotype seems doubtful. If not, then the only evidence of the canal-system is contained in Haeckel's words: 'Das verästelte Canalsystem innerhalb der dünnen Röhrenwand ist sehr eng und mündet auf der glatten Gastralfläche durch vielfeine Poren aus.' The holotype is so atypical of Leuconoid sponges and so typical (except for the alleged leuconoid canal-system) of the Homocoelidae, that one is tempted to ask whether Haeckel may not have made a mistake about its canal-system. The holotype should be re-examined for this. In the meanwhile, I propose to treat *L. spongilla* as *species inquirendae.*

Genus **Trichogypsia** Carter

This name must be replaced by *Sycolepis* Haeckel (see p. 357), a genus of extremely specialised skeleton with no obvious affinities to other genera of Calcarea.

Genus **Kuarrhaphis** Dendy and Row

The genus was established by Dendy and Row (1913: 780) for *Leucyssa cretacea* Haeckel, from Kamkatcha. The holotype of this species is a thin white encrustation agreeing closely in form with certain individuals, commonly found, of *Leuconia nivea.* It also has a strong resemblance to *Baeria ochotensis*, from the Okhotsk Sea. Comparing it with the last-named we find a closely similar external form, the same geographical location (if such vague geographical terms as Kamkatcha and Okhotsk Sea can be called 'the same') and the same kind of needle-eye spicules. It would be possible therefore to derive *Leucyssa cretacea* from either *Leuconia nivea* or *L. ochotensis* by the loss of the radiates and large oxea, without altering any other circumstance. This suggests that these species bear the same relation to each other as do the species of *Ascyssa* to *Leucosolenia* (see p. 38). I propose, therefore, to regard *Leucyssa cretacea* as a variation (possibly a mutant) of *Baeria ochotensis* or *Leuconia nivea*, and the greater likelihood is that it is more nearly related to the second of these.

We may presume that, in establishing their new genus, Dendy and Row overlooked

Haeckel's (1872: 393) subgenus *Lipostomyssa*, the first species in which is *Leucyssa cretacea*, the only other species mentioned being *L. incrustans* (= *Sycolepis incrustans*). If a separate generic name were, for any reason in the future, needed for *L. cretacea*, it would surely have to be *Lipostomyssa*.

Genus **Eilhardia** Poléjaeff

In addition to *E. schulzei*, the type-species, *Leuconia loricata* Poléjaeff and *Leucandra gladiator* Dendy must also be referred to this genus. The spiculation in all three is so similar that there is little doubt they represent one species. This is not so obvious from the published descriptions as from the direct comparison of the holotype. For example, Poléjaeff figures a number of microxea for *Eilhardia schulzei*, but although microxea abound in the tissues and forms such as Poléjaeff illustrates can occasionally be found, the typical microxeote is, in fact, not figured by him. On the other hand, Dendy describes trichodragmata in *Leucandra gladiator* but these prove to be identical with the typical microxea of *Eilhardia schulzei*, densely packed. They are not trichodragmata in the accepted sense.

Again, Dendy describes endosomal quadriradiates for *Leucandra gladiator* with rays ranging from 0·02 to 0·08 by 0·006 to 0·007 mm. In fact, these dimensions are far too small as re-examination of the holotype has shown.

If we allow for errors in original descriptions and also some real variation in dimensions of spicules, then *Leucandra gladiator* and *Leuconia loricata* are clearly synonyms of *Eilhardia schulzei*.

Genus **Amphoriscus**

If we apply the lessons learned from the study of other species of Calcarea, then it is difficult to believe that the five species of *Amphoriscus* from the Mediterranean represent more than simple variations of a single species, to be known as *A. chrysalis* (Schmidt). The distribution of this species can be extended to the English Channel by two specimens, one in the collection of the Plymouth Laboratory and one in the British Museum collections. Further, *A. kryptoraphis* Urban, from South Africa, differs in nothing but the smallest details from this series, and the same is true for *A. elongatus* from Prince Edward Island. Across the Atlantic from the Mediterranean we have *A. testiparus* (Haeckel), from Cuba, and *A. urna* (Haeckel), from Venezuela. As will be shown later, two other species by Haeckel, one from the Barbados and one from Venezuela, formerly placed in the genus *Leucilla*, should also be included here. In addition, *Medon barbata* de Laubenfels (*nec* Duchassaing and Michelotti) is also an *Amphoriscus*, and these five give us for the Gulf of Mexico an exactly comparable series to that furnished by the Mediterranean specimens. This supports the idea that we are dealing not with species but with conspecific individuals showing the usual fluctuating variations.

Assuming these conclusions to be correct, we have *A. chrysalis* distributed over the English Channel, the Mediterranean, the Gulf of Mexico, South Africa and the Sub-Antarctic. By analogy with other species having this distribution, we should expect to find representatives of this same species in Australasia. That proves to be so, for *A. semoni* (Breitfuss) and *A. cyathiscus* Haeckel, from Amboina and South Australia respectively, are practically identical in all respects and, moreover, in addition to having the same external form as *A. chrysalis*, have the skeleton almost identical with the holotype of that species.

Although Schuffner devotes some space to comparing his *Leucaltis curva* with Haeckel's *L. bathybia*, it would seem that the first of these species has more in common with Haeckel's *L. crustacea*. Moreover, *L. curva* was taken at the Barbados and *L. crustacea* off Venezuela, which are faunistically neighbouring areas.

The distinctive features of *L. crustacea* are the stout ectosomal quadriradiates, smaller triradiates in the chamber layer and small triradiates in the endosomal layer. According to the measurements given in Schuffner's text (l.c. p. 410) the rays of the ectosomal quadriradiates in *L. curva* measure 0·45 to 0·6 by 0·058 mm., and those of the triradiates of the chamber layer measure 0·41 to 0·8 by 0·025 mm. (that is, paired rays 0·41 and basal ray 0·8 mm. long respectively). On his pl. 24, fig. 2, Schuffner figures ectosomal quadriates with rays much more slender than those of the 'parenchymatische Dreistrahler', instead of being over twice as thick. Moreover, he figures no rays measuring 0·8 mm. Clearly re-examination of the holotype of *L. curva* is desirable, when it will probably be found to approximate very closely to that of *L. crustacea*.

Although Schuffner describes *L. curva* as tubular, it measures but 6 mm. high, 2 mm. at the base and 3 mm. at the summit. The type of *L. crustacea*, on the other hand, is a white incrustation. Then we find, in Haeckel's original account, that *L. crustacea* was taken from the carapace of a Brachyuren, where it was living in company with *Sycilla urna*. This last-named species has already been transferred to *Amphoriscus* and is here regarded as a synonym of *A. chrysalis* (see p. 544). It has the external form also of *Leucaltis crustacea*, and the skeleton very similar except for the larger size of the spicules. If we allow that external form can be radically altered when a sponge grows on the carapace of a crab, then we have in *L. crustacea* and *L. curva* two further representatives of *Amphoriscus chrysalis*, from the Gulf of Mexico.

In addition to this one species, the genus *Amphoriscus* contains three more: *Leucilla echinus* (Haeckel), *L. capsula* (Haeckel), and *L. saccharata* (Haeckel) which with *L. australiensis* (Carter) and *L. proteus* Dendy is a synonym of *Amphoriscus cucumis*.

In this discussion on *Amphoriscus* no attention has been given to the presence or absence of the ectosomal skeleton. The Mediterranean and Central American species have been regarded as synonymous, on the basis of all characters other than this. By including *Leucilla proteus* doubt has been cast on its value for taxonomic purposes, for that species lacks the customary layer of ectosomal triradiates. The doubt can be reinforced from other sources. Thus, an ectosomal layer of triradiates is present in *Amphoriscus oviparus*, *A. testiparus*, *A. elongatus* and *Leucilla curva*, although all four on every other ground are inseparable from the comprehensive species, *Amphoriscus chrysalis*. Moreover, of two specimens from the English Channel, from relatively adjacent localities, one (1949.10.19.44) has a layer of ectosomal triradiates and the other (1954.8.12.195) has no ectosomal triradiates but has microxea set at right angles to the surface. On every other ground the two could be regarded as identical, yet the one ought to be assigned to *A. oviparus* and the other to *Rhabdodermella nuttingi*, from California. Finally, of two specimens from West Africa, from the 'Atlantide' collection, one has a tangential layer of triradiates at the surface and the other has none, yet otherwise the two specimens are practically identical.

Once we can say that the ectosomal skeleton of triradiates is of no taxonomic value, then it becomes impossible to make a generic distinction between *Amphoriscus chrysalis* and a form such as *A. saccharata*, which at first sight appears to be generically distinct (but see p. 121).

Genus **Syculmis** Haeckel

Dendy and Row (1913: 783) comment: 'This is a highly specialised genus of a single species, but had it not already been proposed by Haeckel, we should hardly have felt justified in distinguishing a special genus on the characters available.' My comment is that the type-species, *S. synapta*, is not a highly specialised species. It is a typical individual of *Amphoriscus chrysalis*, except that it has a periostial fringe and an anchoring root-tuft, neither of which is unknown in other calcareous sponges, the fringe being of common if sporadic occurrence and the root-tuft occurring equally sporadically but less commonly.

Genus **Leucilla** Haeckel

The type-species of *Leucilla*, according to Dendy and Row (1913 : 783) is *L. amphora*. From Haeckel's description and figures the main skeleton is composed of large ectosomal quadriradiates and similar endosomal quadriradiates, with the apical rays of the two sets of spicules overlapping across the chamber layer. The main skeleton is, therefore, the same as that in *Amphoriscus*. Haeckel also speaks of endosomal quadriradiates and figures them as isolated spicules (pl. xxiv, figs. 14–15), but does not include them in his idealised section of the body wall (pl. xxiv, fig. 8). Assuming these endosomal quadriradiates to be present, the skeleton of *Leucilla* is even more like that of an *Amphoriscus*. Haeckel also figures, in his idealised section, endosomal triradiates, as in *Amphoriscus*, although he makes no mention of these in the text. He also describes, and figures, irregular quadriradiates of the chamber layer, but omits these also from his idealised section. He speaks of these spicules as 'ähnlichen feinen Vierstrahlen' to those found in the linings of the large canals and in the cloacal lining. Presumably, it was these spicules to which Dendy and Row were referring when they included in the diagnosis of the Amphoriscidae the sentence: 'No articulate tubar skeleton, but sometimes, in the Leuconoid forms, a confused skeleton of quadriradiates in the chamber layer.'

Two things stand out after a close study of Haeckel's description and illustrations of *Leucilla amphora*. The first is that Haeckel left us with several important gaps in the information he provided. The second is that *L. amphora* is very like *Amphoriscus chrysalis*, the type-species of *Amphoriscus*, in external form, distribution and the main architecture of the skeleton. The two differ in their canal-system, a point which we can now ignore, and in the presence of this alleged layer of irregular quadriradiates. I have re-examined a number of specimens of *A. chrysalis* and find similar spicules occasionally present in very small numbers in the chamber layer of several of them. I have also found that if the section has not been carefully cut and mounted, portions of the endosomal layer of 'ähnlichen feinen Vierstrahlen' will be pushed into the chamber layer to give the impression of 'a confused skeleton of quadriradiates in the chamber layer'. Taking all things into consideration, I have little hesitation in regarding the holotype of *Leucilla amphora* as an individual of *Amphoriscus chrysalis* which may, or may not, have an unusual number of fine-rayed quadriradiates in the chamber layer, which may have reached there naturally or artificially. At the very least, there can be no generic distinction between these two species.

We can, in *Leucilla uter* Poléjaeff, glean something of the fallacy of trying to reduce the skeleton to simple terms. That author's illustration of a section through the body wall (Poléjaeff, pl. vi, fig. 2) is not incorrect yet is misleading. It represents a condition that can be seen at chosen points in certain sections. If we examine the whole length of one section, or, better still, several sections, we find that where the wall is thin the skeleton is as shown for *L. amphora* in Haeckel, pl. xxiv, fig. 8. Where the body wall is thick, however, the large quadriradiates tend to migrate into the chamber layer, leaving mainly triradiates as the subendosomal skeleton, but not entirely so. Moreover, in some places small quadriradiates are also found in the chamber layer. It would be tedious, if not impossible, to convey in words all the variations and combinations found in the skeleton within one section. It must suffice to say that in *L. uter* we find ample justification for taking a wide view of the variability of the skeleton within a single species of *Leucilla*.

There are other reasons for taking a flexible view of the variability within this species. The types of *L. uter* are from the Bermudas and the Philippines, two very widely separated localities. That from the Philippines is much nearer to *L. amphora* in external form, that from the Bermudas is more like it in skeleton. Yet, very clearly, as Poléjaeff thought, it is not possible to believe that they represent more than one species. We are forced, then, to suggest *L. amphora* and *L. uter* are synonymous, and that the species they represent must have a wide distribution. Furthermore, the types of *L. uter* possess, in addition, slender ectosomal oxea 0·4 mm. long. These are not present in *L. amphora* but microxea less than 0·4 mm. long are present in a specimen from Plymouth I have identified with *Amphoriscus chrysalis*, and slender oxea 0·1 mm. or more long are in a very similar specimen from Plymouth which Row (ms) had identified with *Amphoriscus elongatus* Poléjaeff (= *A. chrysalis*).

Certainly, *Leucilla* and *Amphoriscus* are synonymous, with the latter having priority. *Leucilla amphora* and *L. uter* are synonyms of *L. chrysalis*. There remain eleven species of *Leucilla*, of which *L. oxeodragmifera* Dendy and Row is a *nomen nudum*, *L. echinus* (Haeckel) and *L. capsula* (Haeckel) are good species of *Amphoriscus*, and *L. hirsuta* Tanita becomes synonymous with *Sycettusa macera*. *L. lanceolata* and *L. princips*, both of Row and Hozawa, are also transferred to *Sycettusa*. *L. nuttingi* is transferred to *Amphoriscus*. This leaves *L. saccharata*, with which *L. australiensis* and *L. oblata* must be considered synonymous.

The question now is, to what genus should *L. saccharata* be assigned. It differs from the typical *Amphoriscus* in one feature only, the presence of an ectosomal tangential layer of triradiates. At first sight this appears a sound basis for generic distinction, but then we find that in a series of specimens of *Leucilla proteus* Dendy, from Amirante, the smaller specimens have a skeleton typical of *Amphoriscus* and the larger specimens have the same but with the addition of an ectosomal tangential layer of triradiates. Presumably, therefore, the presence of this layer cannot be regarded as a valid basis for generic distinction.

The types of *L. saccharata* and *Leucandra johnstoni* var. *australiensis* came from Bass Strait and Port Philip Heads respectively. Carter describes his specimen as globoconical. Haeckel described his specimens as 'kegelförmige oder cylindrische oder unregelmässig rundliche, bisweilen zusammengedrückte . . . '. Certainly, Haeckel figures (pl. xxxviii, figs. 7–10) four individuals that Carter would probably have called globoconical, and this, with the similarity in their skeletons and their similar distributions, suggests a very close relationship between the two.

Following the original descriptions of these two forms, Dendy has given us practically all our subsequent records. Of the two, he describes *Leucilla saccharata* as a ' . . . remarkable species [which] exhibits a singular irregularity in external form, varying from compressed, irregularly-folded plates to elongated cylindrical tubes, and often attaining a large size. . . '. Of *L. australiensis* the same author says: '. . . small, ovoid, sessile. . . . One very large specimen in the collection, however, is conical in shape and has a very irregular surface. . . .' Thus, his description of *L. australiensis* closely approximates to Haeckel's description and, more especially, his figures of *L. saccharata*.

Dendy was doubtless influenced in distinguishing between the two species by the differences in their skeletons. The skeleton of the holotype of *L. saccharata* included:

1. ectosomal triradiates
2. ectosomal microxea
3. subectosomal quadriradiates
4. small quadriradiates and triradiates of the chamber layer
5. subendosomal triradiates
6. endosomal triradiates

The skeleton of the holotype of *L. australiensis* was said to include:

1. ectosomal triradiates
2. subectosomal quadriradiates
3. small quadriradiates of the chamber layer
4. subendosomal quadriradiates
5. endosomal quadriradiates

The first thing I found on re-examining the materials previously recorded was that the type of *L. australiensis* has triradiates, in addition to quadriradiates, in both the chamber layer and the endosomal skeleton. The next was that Ridley's specimen of *L. saccharata*, from Port Jackson, has microxea in both ectosomal and endosomal surfaces, and it also has endosomal quadriradiates. Already, therefore, the narrow gap between the two species is being bridged.

In 1892, Dendy recorded a number of specimens, from South Australia, belonging to the two species. Of those referred to *L. australiensis*, his R.N. 97 has some triradiates in the chamber layer and the endosomal layer is composed mainly of triradiates; his R.N. 204 has some triradiates in the chamber layer and the subendosomal spicules are often triradiate; and R.N. 202 also has some triradiates in the chamber layer. Moreover, his R.N. 207, which he assigned to *L. saccharata*, has subendosomal quadriradiates and endosomal triradiates and quadriradiates.

It is very clear, without going into further details, that the two so-called species represent variations within a single species. Moreover, bearing in mind the variations in the spicules given here, it is clearly impossible to exclude *L. proteus* Dendy, from Amirante, from the same species.

Leucilla crosslandi Row (later renamed *Leucandra innominata* Dendy and Row) appears also to be a synonym of this species. There are discrepancies in the original descriptions and direct comparison with the Australian forms show strong similarities. The large subectosomal quadriradiates are matched by smaller subendosomal quadriradiates, and, in addition, the choanosome is filled with large quadriradiates. This same condition sometimes obtains in the Australian forms also.

Genus **Lelapia** Gray

In view of the discussions under *Leucettaga*, it is difficult to see the genus *Lelapia* as a representative of a separate family rather than a modification of a *Leuconia*. The mere fact that it is possible to see in a species previously assigned to *Leucandra* (=*Leuconia*) a near relative of *Lelapia australis* suggests this. Moreover, if the paired rays of the tuning-fork spicules were more divergent and the spicules themselves more scattered, the characters of *Lelapia* would make a close approach to those of *Ute*. I would propose abandoning the family Lelapiidae.

Of the three species of *Lelapia* known, *L. australis* and *L. antiqua* are distinguished mainly by the presence of microxea in the former and the absence of these spicules from the latter. In view of recent findings (see p. 12), it becomes probable that the two are identical. The third species, *L. nipponica*, is closely related and largely distinguished by the possession of endosomal quadriradiates instead of triradiates, again a feature which is taxonomically unimportant.

Genus **Kebira** Row

The only species of *Kebira* recalls in its external form and spiculation the Australian specimens of *Lelapia australis*. Indeed, so similar are they that it is something of a surprise to find that, in the three specimens available, the character of the 'nail-spicules' is constant. All other characters being so remarkably similar, it is difficult to accept Row's opinion that the nail-spicules have not been derived from the tuning-fork spicules. Rather I should expect that, sooner or later, typical forms of *Lelapia australis* will be found in the Red Sea. If not that, then I should expect to find intermediate forms confirming the close relationship between these two spicule-forms.

At the least, I would accept *Kebira* as a synonym of *Lelapia*.

Genus **Sycaltis** Haeckel

Dendy and Row treated the genus *Sycaltis* as 'Incertae Sedis'. Certainly, when we consider the discrepancies in the text as well as those in the illustrations, their action is understandable. The several specimens of *S. perforata* were taken at 125 fathoms off the coast of Florida. This is a slightly unusual depth for Calcareous sponges; and the drawings given by Haeckel in his figs. 7 and 8, on pl. xlvi, are extraordinary. It was, in all probability, the difficulty of reconciling these with any comparable structure in other species of Calcarea that defeated Dendy and Row.

The first point to emerge from examination of the original description is that the details of the skeleton accord, in a general sense, with those of *Leuconia imberbis* from the same area. The form of *Sycaltis perforata* agrees closely, also, with that of *Leuconia imberbis*. The only obstacle to regarding the two species as synonymous is the description of the skeleton, and especially of the endosomal quadriradiates, implicit in Haeckel's figs. 7 and 8. The obstacle is, I believe, non-existent, and for the following reasons. On p. 267, Haeckel states that 'Alle Personen . . . haben eine nackte kreisrunde Mundöffnung von circa 2 Mm. Durchmesser'. He further states that all the specimens are 5–15 mm. long and 3–6 mm. diameter. His drawings of longitudinal sections (in his figs. 2 and 4) show a body-wall of 0·6 to 1·0 mm. Yet his figs. 7 and 8 show us, however, sections of sponges with a diameter of 0·3 mm. and a body-wall of 0·02 mm. thick. These two drawings must, therefore, be regarded as diagrammatic. Since it is in these figs. 7 and 8 alone that apical rays on the endosomal quadriradiates are figured, we have either to believe them to be disproportionately long, or to assume that the figures are misleading. If we ignore them, or assume the rays are shorter than shown, then there is no reason to regard *Sycaltis perforata* as other than a synonym of *Leuconia imberbis*.

E. List of species of Calcarea recognised hitherto according to the classification of Dendy and Row (1913), with their present status

For purposes of more easy reference the species of Calcarea accepted hitherto are listed here in an order consistent with the only comprehensive work on classification previously published. In the left-hand column are given the older names and in the right-hand column are shown the names under which they will appear in Part II: Systematic of this present work, and under the enumerated species in Section III. Except for *Leucandra* (now replaced by *Leuconia*), the generic names are those used by Dendy and Row.

Genus **Leucosolenia**

aboralis	= *Leucosolenia botryoides*	*australis*	= *Leucosolenia botryoides*
agassizii	= *sp. inq.*	*bella*	= *nom. nud.*
albatrossi	= *Clathrina coriacea*	*blanca*	= *Clathrina coriacea*
amitsbo	= *Dendya poterium*	*botryoides*	= *Leucosolenia botryoides*
angulata	= *Clathrina coriacea*	*canariensis*	= *Clathrina coriacea*
arachnoides	= *Leucosolenia botryoides*	*cancellata*	= *Clathrina coriacea*
atlantica	= *Leucosolenia botryoides*	*caroli*	= *Clathrina coriacea*

cavata	=	*Dendya poterium*
cerebrum	=	*Clathrina coriacea*
cervicornis	=	*Leucosolenia botryoides*
challengeri	=	*Dendy poterium*
charybdaea	=	*Clathrina coriacea*
clarkii	=	? *Leucosolenia botryoides*
clathrata	=	*Dendya poterium*
clathrus	=	*Clathrina coriacea*
complicata	=	*Leucosolenia botryoides*
confervicola	=	*Leucosolenia botryoides*
contorta	=	*Clathrina coriacea*
convallaria	=	*Clathrina coriacea*
corallorhiza	=	*Leucosolenia botryoides*
cordata	=	*Leucosolenia cordata*
coriacea	=	*Clathrina coriacea*
darwinii	=	*Clathrina coriacea*
decipiens	=	*Clathrina coriacea*
densa	=	? *Leucosolenia botryoides*
depressa	=	*Dendya poterium*
dictyoides	=	*Clathrina coriacea*
discoveryi	=	*Leucosolenia botryoides*
dubia	=	? *Clathrina coriacea*
echinata	=	*Leucosolenia botryoides*
echinoides	=	*sp. inq.*
eleanor	=	*Leucosolenia botryoides*
fabricii	=	*Leucosolenia botryoides*
falcata	=	*Clathrina coriacea*
falklandica	=	*Clathrina coriacea*
feuerlandica	=	*Clathrina coriacea*
flexilis	=	*Clathrina coriacea*
fragilis	=	*Leucosolenia botryoides*
gardineri et var. *vergensis*	=	*Clathrina coriacea*
gegenbauri	=	*Clathrina coriacea*
goethei	=	*Leucosolenia botryoides*
gracilis	=	*Clathrina coriacea*
grantii	=	*Leucosolenia botryoides*
grisea	=	*Dendya poterium*
hermesi	=	*Clathrina coriacea*
himantia	=	*Clathrina coriacea*
hispida	=	*Leucosolenia botryoides*
hispidissima	=	*Leucosolenia botryoides*
horrida	=	*Leucosolenia botryoides*
incerta	=	*Leucosolenia botryoides*
intermedia	=	*Dendya poterium*
irregularis	=	*Leucosolenia botryoides*
izuensis	=	*Clathrina coriacea*
japonica	=	*Leucosolenia botryoides*
kagoshimensis	=	*Leucosolenia botryoides*
lacunosa	=	*Clathrina coriacea*
lamarkii	=	*Clathrina coriacea*
laminoclathrata	=	*Dendya poterium*
laxa	=	*Clathrina coriacea*
lieberkühnii	=	*Leucosolenia botryoides*
loculosa	=	*Dendya poterium*
lucasi	=	*Leucosolenia botryoides*
macleayi	=	*Clathrina coriacea*
minchini	=	*Leucosolenia botryoides*
minoricensis	=	*Clathrina coriacea*
minuta	=	*Dendy poterium*
mollis	=	*Leucosolenia botryoides*
multiformis	=	*Leucosolenia botryoides*
mutsu	=	*Clathrina coriacea*
nanseni	=	*Clathrina coriacea*
nautilia	=	*Leucosolenia botryoides*
nitida	=	*Leucosolenia botryoides*
osculum	=	*Dendya poterium*
panis	=	*Clathrina coriacea*
pedunculata	=	*Clathrina coriacea*
pelliculata	=	*Dendya poterium*
phillipina	=	*Clathrina coriacea*
pilosella	=	*Leucosolenia botryoides*
poterium Haeckel	=	*Dendya poterium*
poterium Ridley	=	*Clathrina coriacea*
primordialis	=	*Clathrina coriacea*
primordialis var. *apicalis*	=	*Leucosolenia botryoides*
protogenes	=	*Dendya poterium*
proxima	=	*Dendya poterium*
psammophila	=	? *Clathrina coriacea*
pulcherrima	=	*Clathrina coriacea*
pulchra	=	? *Leucosolenia botryoides*
pyriformis	=	*Clathrina coriacea*
reticulata	=	*Clathrina coriacea*
reticulum	=	*Clathrina coriacea*
rosea	=	*Dendya poterium*
sagamiana	=	*Clathrina coriacea*
sagittaria	=	*Clathrina coriacea*
sceptrum	=	*Clathrina coriacea*
serica	=	*Leucosolenia botryoides*
sertularia	=	*Leucosolenia botryoides*
solida	=	*Leucosolenia botryoides*
soyo	=	*Dendya poterium*
spinosa	=	*Clathrina coriacea*
spongiosa	=	*Clathrina coriacea*
stipitata	=	*Clathrina coriacea*
stolonifer	=	*Leucosolenia asconoides*
sulphurea	=	*Clathrina coriacea*
tenera	=	*Leucosolenia botryoides*
tenuipilosa	=	*Clathrina coriacea*

tenuis	= *Leucosolenia botryoides*	*ventricosa*	= *Dendya poterium*
thamnoides	= *Leucosolenia botryoides*	*vesicula*	= *sp. inq.*
variabilis	= *Leucosolenia botryoides*	*vitraea*	= *Dendya poterium*
ventosa	= *Clathrina coriacea*	*wilsoni*	= *Dendya poterium*

Genus **Dendya**

prolifera	= *Dendya prolifera*
quadripodifera	= *Dendya poterium*
tripodifera	= *Dendya poterium*
triradiata	= *Dendya poterium*

Genus **Ascute**

asconoides	= *Leucosolenia asconoides*
uteoides	= *Leucosolenia asconoides*

Genus **Ascyssa**

acufera	= *Leucosolenia botryoides*
troglodytes	= *Leucosolenia botryoides*

Genus **Leucascus**

clavatus	= *Leuconia barbata*
insignis	= *nom. nud.*
simplex	= *Leuconia barbata*

Genus **Ascoleucetta**

compressa	= *Leuconia barbata*

Genus **Leucomalthe**

bomba	= *Scypha ciliata*

Genus **Leucetta**

antarctica	= *Leuconia barbata*	*leptoraphis*	= *Leuconia barbata*
carteri	= *Leuconia barbata*	*losangelensis*	= *Leuconia barbata*
chagosensis	= *Leuconia barbata*	*macquariensis*	= *Scypha lunulata*
expansa	= *Leuconia barbata*	*megaraphis*	= *Leuconia barbata*
floridana	= *Leuconia barbata*	*microraphis*	= *Leuconia barbata*
gaussii	= *Leuconia barbata*	*primigenia*	= *Leuconia barbata*
homoraphis	= *Leuconia barbata*	*prolifera*	= *Leuconia barbata*
infrequens	= *Leuconia barbata*	*pyriformis*	= *Leuconia barbata*
insignis	= *Dendya poterium*	*solida*	= *Leuconia barbata*
isoraphis	= *Leuconia barbata*	*trigona*	= *Leuconia trigona*
isoraphis var. *apicalis*	= *Leuconia barbata*		

Genus **Pericharax**

canaliculata	= *Leuconia barbata*
heteroraphis	= *Leuconia barbata*
imberbis (=*Medon imberbis*)	= *Leuconia barbata*
peziza	= *Leuconia barbata*

Genus **Leucaltis**

bathybia, var. *mascarenica* = *Leucettusa imperfecta*
clathria = *Leucettusa corticata*
gastrorhabdifera = *Amphoriscus* ? *gastrorhabdifera*
tenuis = *Leucettusa corticata*

Genus **Leucettusa**

corticata = *Leucettusa corticata*
dictyogaster = *Leucettusa imperfecta*
haeckeliana = *Leucettusa imperfecta*
imperfecta = *Leucettusa imperfecta*
lancifer = *Leucettusa imperfecta*
mariae = *Leucettusa imperfecta*
pyriformis = *Leucettusa imperfecta*
sambucus = *Leucettusa corticata*
simplicissima = *Leucettusa imperfecta*
usa = (? *Leuconia barbata*, but treated here as *sp. inq.*)
vera = *Leucettusa imperfecta*

Genus **Minchinella**

lamellosa = *Minchinella lamellosa*

Genus **Petrostroma**

schulzei = *Petrostroma schulzei*

Genus **Plectroninia**

deansii = *Plectroninia deansii*
hindei = *Plectroninia hindei*

Genus **Murrayona**

phanolepis = *Murrayona phanolepis*

Genus **Sycetta**

antarctica = *Scypha ciliata*
conifera = *Scypha ciliata*
primitiva = *Scypha ciliata*
quadriradiata = *Scypha ciliata*
sagittata = *Scypha ciliata*
sagittifera = *Scypha ciliata*

Genus **Sycon**

album = *Scypha ciliata*
alopecurus = *Scypha ciliata*
ampulla = *Scypha ciliata*
antarcticum = *Scypha antarctica*
arboreum = *Scypha gelatinosa*
arcticum = *Scypha ciliata*
asperum = *Scypha compressa*
australe = *Scypha antarctica*
barbadense = *Scypha ciliata*
boomerang = *Scypha laevigata*
boreale = *Scypha ciliata*
calcar-avis = *Scypha ciliata*
caminatum = *Scypha ciliata*
carteri = *Scypha gelatinosa*
ciliatum = *Scypha ciliata*
ciliatum var. *lanceolata* = *Scypha ciliata*
ciliatum var. *ovata* = *Scypha ciliata*
ciliatum var. *spinispiculum* = *Scypha ciliata*
coactum = *Scypha ciliata*
commutatum = *Scypha ciliata*
compactum = *Scypha ciliata*
coronatum = *Scypha ciliata*
cylindricum = *Scypha ciliata*
digitiformis = *Scypha ciliata*
eglintonensis = *Scypha ciliata*
elegans = *Scypha ciliata*
ensiferum = *Scypha ciliata*

formosum	=	*Scypha ciliata*
gelatinosum	=	*Scypha gelatinosa*
giganteum	=	*Scypha laevigata*
globulatum	=	*Scypha ciliata*
grantioides	=	*Scypha ciliata*
helleri	=	*Scypha ciliata*
hozawai	=	*Scypha ciliata*
humboldti	=	*Scypha ciliata*
impletum	=	*Scypha ciliata*
inconspicuum	=	*Scypha ciliata*
inscrustans	=	*Scypha ciliata*
karajakense	=	*Scypha ciliata*
keguelensis	=	*Scypha ciliata*
lambei	=	*Scypha ciliata*
lanceolatum	=	*Scypha ciliata*
lendenfeldi	=	*Scypha ciliata*
lingua	=	*Scypha ciliata*
longstaffi	=	*Scypha antarctica*
luteolum	=	*Scypha ciliata*
matsushimense	=	*Scypha ciliata*
maximum	=	*Scypha ciliata*
mexico	=	*Scypha ciliata*
minutum	=	*Scypha ciliata*
misakiensis	=	*Scypha ciliata*
mundulum	=	*Scypha ciliata*
munitum	=	*Scypha ciliata*
okadai	=	*Scypha ciliata*
ornatum	=	*Scypha ciliata*
ovatum	=	*Scypha ciliata*
parvulum	=	*Scypha ciliata*
pedicellatum	=	*Scypha ciliata*
petiolatum	=	*Scypha ciliata*
plumosum	=	*Scypha ramsayi*
polare	=	*Scypha ciliata*
proboscideum	=	*Scypha ciliata*
procumbens	=	*Scypha ciliata*
protectum	=	*Scypha ciliata*
pulchrum	=	*Scypha ciliata*
quadrangulatum	=	*Scypha ciliata*
quadrangulatum var. *tessararia*	=	*Scypha ciliata*
ramosum	=	*Scypha ramosa*
ramsayi	=	*Scypha ramsayi*
raphanus	=	*Scypha ciliata*
raphanus var. *tergestina*	=	*Scypha ciliata*
rotundum	=	*Scypha ciliata*
satsumensis	=	*Scypha ciliata*
schmidtii	=	*Scypha ciliata*
schuffneri	=	*Scypha ciliata*
setosum	=	*Scypha ciliata*
simushirensis	=	*Scypha ciliata*
stauriferum	=	*Scypha ciliata*
subhispidum	=	*Scypha ciliata*
sycandra	=	*Scypha ciliata*
tabulatum	=	*Scypha ciliata*
tenellum	=	*Scypha ciliata*
tergestinum	=	*Scypha ciliata*
tessellatum	=	*Scypha ciliata*
tesserarium	=	*Scypha ciliata*
tuba	=	*Scypha ciliata*
tubulosum	=	*Scypha ciliata*
urugamii	=	*Scypha ciliata*
verum	=	*nom. nud.*
villosum	=	*Scypha ciliata*
virgultosum	=	*Scypha gelatinosa*
yatsui	=	*Scypha ciliata*

Genus **Tenthrenodes**

[Revived by Brøndsted, 1931.]

primitivus = *Scypha ciliata* (see under *Sycetta antarctica*)

Genus **Sycandra**

utriculus = *Scypha compressa*

Genus **Grantessa**

ampullae	=	*Sycettusa glomerosa*
basipapillata	=	*Sycettusa glomerosa*
bifida	=	*Sycettusa glacialis*
compressa	=	*Leuconia barbata*
erecta	=	*Leuconia barbata*
erinaceus	=	*Scypha ramsayi*
flamma	=	*Sycettusa pelagica*
glabra	=	*Sycettusa bathybia*
glacialis	=	*Sycettusa glacialis*
hastifera	=	*Sycettusa bathybia*
hirsuta	=	*Scypha ramsayi*
hispida	=	*Scypha ramsayi*
intusarticulata	=	*Sycettusa glomerosa*
kükenthali	=	*Sycettusa glacialis*

lanceolata = *Sycettusa glacialis*
mitsukurii = *Sycettusa bathybia*
murmanensis = *Sycettusa glacialis*
nemurensis = *Sycettusa glacialis*
nitida = *Sycettusa glacialis*
parva = *Sycettusa glacialis*
pelagica = *Sycettusa pelagica*
pluriosculifera = *Sycettusa bathybia*
poculum = *Sycettusa bathybia*
polyperistomia = *Sycettusa bathybia*
preiwischi = *Sycettusa glomerosa*
sacca = *Scypha ramsayi*
sagamiana = *Sycettusa glacialis*
shimeji = *Sycettusa glomerosa*
shimoda = *Sycettusa glacialis*
sibogae = *Sycettusa glomerosa*
simplex = *Sycettusa bathybia*
spissa = *Leuconia barbata*
stauridia = *Sycettusa bathybia*
sycilloides = *Sycettusa glomerosa*
thompsoni = *Sycettusa glacialis*
zanzibaris = *Sycettusa bathybia*

Genus **Heteropia**

glomerosa = *Sycettusa glomerosa*
medioarticulata = *Sycettusa glacialis*
ramosa = *Aphroceras ensata*
rodgeri = *Sycettusa glacialis*
simplex = *Sycettusa glomerosa*
striata et var. *minor* = *Sycettusa glomerosa*

Genus **Amphiute**

ijimai = *Sycettusa glacialis*
paulini = *Sycettusa glacialis*

Genus **Vosmaeropsis**

connexiva = *Sycettusa connexiva*
cyathus = *sp. inq.*
dendyi = *Sycettusa bathybia*
depressa = *Leuconia barbata*
gardineri = *Leuconia barbata*
griseus = *Scypha ciliata*
hispanica = *Scypha ciliata*
inflata = *Aphroceras ensata*
japonica = *Scypha ciliata*
levis = *Leuconia barbata*
macera = *Sycettusa bathybia*
maculata = *Scypha ciliata*
mackinnoni = *Sycettusa bathybia*
oruetai = *Aphroceras ensata*
ovata = *Aphroceras ensata*
primitiva = *nom. nud.*
sasakii = *Sycettusa connexiva*
sericatum = *Sycettusa pelagica*
simplex = *Leuconia barbata*
spinosa = *Scypha ciliata*
triradiata = *Leuconia barbata*
wilsoni = *Leuconia barbata*

Genus **Grantilla**

quadriradiata = *Sycettusa bathybia*

Genus **Paragrantia**

waguensis = *Scypha compressa*

Genus **Grantia**

aculeata = *Scypha lunulata*
asconoides = *Scypha ciliata*
atlantica = *Scypha ciliata*
beringiana = *Scypha capillosa*
canadensis = *Scypha capillosa*
capillosa = *Scypha capillosa*
comoxensis = *Scypha capillosa*
compressa = *Scypha compressa*
cupula = *Scypha ciliata*
extusarticulata = *Scypha laevigata*
foliacea = *Scypha compressa*
genuina = *Scypha ramsayi*

glabra	=	*Scypha ciliata*	*phillipsii*	=	*Scypha ciliata*
gracilis	=	*Scypha ramsayi*	*primitiva*	=	*Scypha ciliata*
harai	=	*Scypha compressa*	*scotti*	=	*Scypha hirsuta*
indica	=	*Scypha capillosa*	*singularis*	=	*Scypha laevigata*
intermedia	=	*Scypha ciliata*	*strobilus*	=	*Scypha ciliata*
invenusta	=	*Scypha ciliata*	*stylata*	=	*Scypha ciliata*
kujiensis	=	*Scypha capillosa*	*tenuis*	=	*Scypha antarctica*
laevigata	=	*Scypha laevigata*	*transgrediens*	=	*Scypha antarctica*
mexico	=	*Scypha capillosa*	*tuberosa*	=	*Scypha ciliata*
mirabilis	=	*Scypha capillosa*	*vitiosa*	=	*Scypha antarctica*
monstruosa	=	*Scypha compressa*	*vosmaeri*	=	*Hypograntia infrequens*
nipponica	=	*Scypha compressa*			

Genus **Teichenopsis**

labyrinthica = *Scypha labyrinthica*

Genus **Grantiopsis**

cylindrica = *Hypograntia infrequens*
infrequens = *Hypograntia infrequens*

Genus **Sycute**

dendyi = *Aphroceras ensata*

Genus **Ute**

armata	=	*Aphroceras ensata*	*rigida*	=	*Aphroceras ensata*
ensata	=	*Aphroceras ensata*	*spenceri*	=	*Aphroceras ensata*
glabra	=	*Aphroceras ensata*	*spiculosa*	=	*Aphroceras ensata*
pedunculata	=	*Aphroceras ensata*	*syconoides*	=	*Aphroceras ensata*

Genus **Synute**

pulchella = *Aphroceras ensata*

Genus **Sycodorus**

hystrix = *Sycodorus hystrix*

Genus **Achramorpha**

diomediae	=	*Sycettusa glacilis*	*nivalis*	=	*Achramorpha truncata*
glacialis	=	*Achramorpha truncata*	*schulzei*	=	*Sycettusa glacialis*
grandinis	=	*Achramorpha truncata*	*truncata*	=	*Achramorpha truncata*

Genus **Uteopsis**

argentea = *Uteopsis argentea*

Genus **Anamixilla**

irregularis = *Leuconia barbata*
torresi = *Leuconia barbata*

Genus **Sycyssa**

huxleyi = *Sycyssa huxleyi*

Genus **Megapogon**

crispatus	=	*Achramorpha truncata*
cruciferus	=	*Scypha ciliata*
pollicaris	=	*Achramorpha truncata*
raripilis	=	*Achramorpha truncata*
villosus	=	*Achramorpha truncata*

Genus **Leucandra** (=**Leuconia**)

abratsbo	=	*Aphroceras ensata*
amakusana	=	*Leuconia barbata*
amorpha	=	*Leuconia barbata*
ananas	=	*Leuconia ananas*
ananas var.	=	*Scypha ciliata*
anfracta	=	*Scypha lunulata*
anguinea	=	*Sycettusa bathybia*
anomala	=	*Lelapia australis*
apicalis	=	*Scypha ciliata*
armata	=	*Scypha lunulata*
aspera	=	*Aphroceras ensata*
astricta	=	*Aphroceras ensata*
australiensis Dendy	=	*Scypha ramsayi*
australiensis Tanita	=	*Aphroceras ensata*
balearica	=	*Leuconia barbata*
barbata	=	*Leuconia barbata*
bathybia	=	*Sycettusa bathybia*
bolivari	=	*Leuconia barbata*
brumalis	=	*Leuconia barbata*
bulbosa	=	*Aphroceras ensata*
callaea	=	*Aphroceras ensata*
caminus	=	*Leuconia barbata*
capillata	=	*Leuconia barbata*
cerebrum	=	*sp. inq.*
cirrata	=	*Scypha antarctica*
cirrhosa	=	*Scypha lunulata*
claviformis	=	*Sycettusa bathybia*
coimbrae	=	*Aphroceras ensata*
comata	=	*Scypha ciliata*
compacta	=	*Aphroceras ensata*
conica	=	*Leuconia barbata*
connectens	=	*Leucettusa corticata*
consolida	=	*Leuconia barbata*
crambessa	=	*Aphroceras ensata*
crosslandi	=	*Leuconia barbata*
crustacea	=	*Amphoriscus chrysalis*
cumberlandensis	=	*Scypha ciliata*
curva	=	*Amphoriscus chrysalis*
cylindrica	=	*Scypha ciliata*
dentata	=	*Leuconia barbata*
donnani	=	*Leuconia barbata*
dura	=	*Leuconia barbata*
dwarkaensis	=	*Leuconia barbata*
echinata	=	*Scypha ciliata*
egedii	=	*Scypha ciliata*
fernandensis	=	? *Leuconia barbata*
fistulosa	=	*Scypha ciliata*
foliata	=	*Leuconia barbata*
fragilis	=	*Leuconia barbata*
frigida	=	*Leuconia barbata*
falcigera	=	*Leuconia barbata*
gausapata	=	*Scypha antarctica*
gelatinosa	=	*Leuconia barbata*
gemmipara	=	*Leuconia barbata*
glabra	=	*Leuconia barbata*
gladiator	=	*Eilhardia schulzei*
globosa Tanita	=	*Leuconia barbata*
globosa Sarà	=	*Leuconia barbata*
gossei	=	*Aphroceras ensata*
haurakii	=	*Aphroceras ensata*
heathi	=	*Scypha ciliata*
helena	=	*Sycettusa bathybia*
hentschelii	=	*Scypha lunulata*
hiberna	=	*Scypha lunulata*
hirsuta	=	*Scypha antarctica*
hispida	=	*Scypha ciliata*
hozawai	=	*Aphroceras ensata*
impigra	=	*Aphroceras ensata*
impressa	=	*Aphroceras ensata*
infesta	=	*Leuconia barbata*
inflata	=	? *Aphroceras ensata*
innominata	=	*Amphoriscus cucumis*
intermedia	=	*Lelapia australis*
johnstoni	=	*Leuconia barbata*
joubini	=	*Scypha lunulata*
kagoshimensis	=	*Scypha ciliata*
kaiana	=	*Leuconia barbata*
kerguelensis	=	*Scypha lunulata*
kurilensis	=	*Scypha ciliata*
lendenfeldi	=	*Aphroceras ensata*
levis	=	*Scypha lunulata*
lobata	=	*Leuconia barbata*

loricata	=	*Eilhardia schulzei*
losangelensis	=	*Leuconia barbata*
lunulata	=	*Scypha lunulata*
masatierrae	=	*Scypha lunulata*
magna	=	*Scypha ciliata*
mawsoni	=	*Leuconia barbata*
meandrina	=	*Leuconia barbata*
mediocanellata	=	*Scypha ciliata*
microraphis	=	*Leuconia barbata*
minima	=	*Leuconia barbata*
minor	=	*Scypha lunulata*
mitsukurii	=	*Aphroceras ensata*
multifida	=	*Leuconia barbata*
multiformis	=	*Leuconia barbata*
multituba	=	*Aphroceras ensata*
nakamurai	=	*Aphroceras ensata*
nausicaae	=	*Leuconia barbata*
nivea	=	*Leuconia barbata*
odowarensis	=	*Scypha ciliata*
ohshimai	=	*Leuconia barbata*
okinoseana	=	*Leuconia barbata*
onigaseana	=	*Leuconia barbata*
ovata	=	*Leuconia barbata*
pacifica	=	*Leuconia barbata*
palaoensis	=	*Leuconia barbata*
pallida	=	*Leuconia barbata*
pandora	=	*Lelapia australis*
panicea	=	*Aphroceras ensata*
paucispina	=	*Scypha ciliata*
phillipensis	=	*Scypha ramsayi*
platei	=	*Leuconia barbata*
poculiformis	=	*Leuconia barbata*
polejaevi	=	*Leuconia ananas*
prava	=	*Leuconia barbata*
primigenia	=	*Leuconia barbata*
pulvinar var. *indica*	=	*Lelapia australis*
pulvinar var. *semitica*	=	*Lelapia australis*
pumila	=	*Leuconia barbata*
pyriformis Lambe	=	*Leuconia ananas*
ramosa	=	? *Leuconia barbata*
regina	=	*Leuconia barbata*
regina var. *regularis*	=	*Leuconia barbata*
reniformis	=	*Aphroceras ensata*
rigida	=	*Leuconia barbata*
riojai	=	*Leuconia barbata*
rodriguezii	=	*Leuconia barbata*
rudifera	=	*Leuconia barbata*
sagmiana	=	*Scypha ciliata*
sagittata	=	*Leuconia barbata*
schauinslandi	=	*Leucettusa imperfecta*
secutor	=	*Eilhardia schulzei*
seychellensis	=	*Aphroceras ensata*
sola	=	*Aphroceras ensata*
solida	=	*Leuconia barbata*
spinosa	=	*Scypha ciliata*
spissa	=	*Leuconia lunulata*
splendens	=	*Leuconia ananas*
taylori	=	*Scypha ciliata*
telum	=	*Leuconia barbata*
thulakomorpha	=	*Scypha ramsayi*
tomentosa	=	*Scypha ciliata*
topsenti	=	*Aphroceras ensata*
tropica	=	*Leuconia barbata*
tuba	=	*Leuconia barbata*
tuberculata	=	*Leucettusa imperfecta*
typica	=	*Leuconia barbata*
uschuarensis	=	*Aphroceras ensata*
vaginata	=	*Aphroceras ensata*
valida	=	*Scypha ciliata*
verdensis	=	*Leuconia barbata*
vermiformis	=	*Scypha ciliata*
vesicularis	=	*Leuconia barbata*
villosa	=	*Scypha ramsayi*
vitraea	=	*Scypha ciliata*
wasinensis	=	*Leuconia barbata*
yuriagensis	=	*Leuconia barbata*

Genus **Jenkina**

articulata	=	*Scypha antarctica*
glabra	=	*Scypha antarctica*

Genus **Baeria**

ochotensis	=	*Leuconia ananas*

Genus **Leucopsila**

stylifera	=	*Leuconia ananas*

Genus **Aphroceras**

alcicornis	= *Aphroceras ensata*	*corticata*	= *Aphroceras ensata*
caespitosa	= *sp. inq.*	*elongata*	= *Aphroceras ensata*
caminus	= *Leuconia barbata*	*oruetai*	= *Aphroceras ensata*
cataphracta	= *Aphroceras ensata*	*sericatum*	= *Sycettusa pelagica*
cliarensis	= *Aphroceras ensata*	*syconoides*	= *Aphroceras ensata*

Genus **Leucettaga**

loculifera = *Lelapia australis*

Genus **Paraleucilla**

cucumis = *Amphoriscus cucumis*

Genus **Lamontia**

zona = *Lamontia zona*

Genus **Leucyssa**

spongilla = *Leucyssa spongilla*

Genus **Trichogypsia**

incrustans = *Sycolepis incrustans*
villosa = *Sycolepis incrustans*

Genus **Kuarrhaphis**

cretacea = *Leuconia barbata*

Genus **Eilhardia**

schulzei = *Eilhardia schulzei*

Genus **Amphoriscus**

buccichii	= *Amphoriscus chrysalis*	*oblatus*	= *nom. nud.*
chrysalis	= *Amphoriscus chrysalis*	*oviparus*	= *Amphoriscus chrysalis*
cyathiscus	= *Amphoriscus chrysalis*	*salfii*	= *Amphoriscus chrysalis*
cylindricus	= *Amphoriscus chrysalis*	*semoni*	= *Amphoriscus chrysalis*
elongatus	= *Amphoriscus chrysalis*	*testipara*	= *Amphoriscus chrysalis*
gregorii	= *Amphoriscus chrysalis*	*urna*	= *Amphoriscus chrysalis*
kryptoraphis	= *Amphoriscus chrysalis*		

Genus **Syculmis**

synapta = *Amphoriscus chrysalis*

Genus **Leucilla**

amphora	= *Amphoriscus chrysalis*	*nuttingi*	= *Amphoriscus chrysalis*
australiensis	= *Amphoriscus cucumis*	*oblata*	= *Amphoriscus cucumis*
capsula	= *Amphoriscus capsula*	*oxeodragmifera*	= *nom. nud.*
echinus	= *Amphoriscus echinus*	*princeps*	= *Scypha ramsayi*
hirsuta	= *Sycettusa bathybia*	*proteus*	= *Amphoriscus cucumis*
lanceolata	= *Scypha ramsayi*	*saccharata*	= *Amphoriscus cucumis*
minuta	= *Scypha ciliata*	*uter*	= *Amphoriscus chrysalis*

Genus **Lelapia**

antiqua	=	*Lelapia australis*
australis	=	*Lelapia australis*
nipponica	=	*Lelapia australis*

Genus **Kebira**

uteoides	=	*Lelapia uteoides*

Genus **Sycaltis**

perforata	=	*Leuconia barbata*

II

Systematic account of the Calcarea as now understood

The Calcarea, as here constituted, includes forty-eight species only. Six of these fall naturally into the family Homocoelidae. The rest belong to the Calcarea Heterocoela, which Dendy and Row subdivided into nine families, based largely upon the recognition of the syconoid, sylleibid and leuconoid canal-systems as phylogenetically significant. Such a practice can no longer be maintained. Moreover, there is sufficiently easy transition between the twenty genera now retained to make a subdivision into families difficult. It is proposed here to include them all in a single family, the Heterocoelidae, in contrast to the only other family, the Homocoelidae.

The list of genera and species now recognised is as follows:

Family **Homocoelidae**

Leucosolenia Bowerbank
- *botryoides* (Ellis and Solander)
- *cordata* (Haeckel)
- *asconoides* (Carter)

Clathrina Gray
- *coriacea* (Montagu)

Dendya Bidder
- *poterium* (Haeckel)
- *prolifera* Dendy

Family **Heterocoelidae**

Leuconia Grant
- *barbata* (Duchassaing and Michelotti)
- *ananas* (Montagu)
- *trigona* (Haeckel)

Eilhardia Poléjaeff
- *schulzei* Poléjaeff

Sycettusa
- *bathybia* (Haeckel)
- *glacialis* (Haeckel)
- *glomerosa* (Bowerbank)
- *pelagica* (Ridley)
- *connexiva* (Haeckel)

Sycolepis Haeckel
- *incrustans* Haeckel

Scypha Gray
- *ciliata* (Fabricius)
- *compressa* (Fabricius)
- *antarctica* (Jenkin)
- *labyrinthica* (Carter)
- *gelatinosa* (Blainville)
- *ramsayi* (Lendenfeld)
- *ramosa* (Smith)
- *laevigata* (Haeckel)
- *singularis* (Breitfuss)
- *lunulata* (Haeckel)

Aphroceras Gray
- *ensata* (Bowerbank)

Achramorpha Jenkin
truncata (Topsent)
Uteopsis Dendy and Row
argentea (Poléjaeff)
Hypograntia Carter
infrequens Carter
Amphoriscus Haeckel
chrysalis (Schmidt)
capsula (Haeckel)
cucumis (Haeckel)
echinus (Haeckel)
gastrorhadifera (Burton)
Leucettusa Haeckel
corticata (Haeckel)
imperfecta (Poléjaeff)
Lamontia Kirk
zona Kirk
Lelapia Gray
australis Gray
uteoides (Row)
Minchinella Kirkpatrick
lamellosa Kirkpatrick
Petrostroma Döderlein
schulzei Döderlein
Plectroninia Hinde
deansii Kirkpatrick
hindei Kirkpatrick
Murrayona Kirkpatrick
phanolepis Kirkpatrick
Sycodorus Haeckel
hystrix Haeckel
Sycyssa Haeckel
huxleyi Haeckel

Order **Calcarea***

Porifera with a calcareous skeleton

Family **Homocoelidae**

Diagnosis: Calcarea having the whole endosomal cavity (or cloaca) and its outgrowths lined by collared cells; without special endosomal skeleton and rarely with special ectosomal spicules.

Genus **Leucosolenia** Bowerbank

(For synonymy see p. 151)

Diagnosis: Homocoelidae composed of more or less erect tubes which may branch, or throw out lateral diverticula, but seldom anastomose, except occasionally at base of main tubes; radiate spicules alate.

Remarks: The distinguishing features used by Minchin to separate *Leucosolenia* and *Clathrina* are the external form and the shape of the spicules (as given above), and the form of the larva. Since only one species of *Clathrina* is recognised here, and three species of *Leucosolenia*, of which larvae are known from one only, this character tends to lose its value.

Leucosolenia botryoides (Ellis and Solander)

Spongia botryoides Ellis and Solander, 1786: 190.

Diagnosis: Composed of one or more vertical tubes, sometimes bearing lateral diverticula, connected at base by stolonoid tubes (spongorhiza) which may at times form a substantial network; spicules typically triradiates and quadriradiates to which oxea may be added, but may be quadriradiates only, in one or two sizes, or oxea only, in one, two or three sizes; rays of radiates 0·03 to 0·26 by 0·004 to 0·015 mm., oxea 0·06 to 0·8 by 0·003 to 0·04 mm.

Distribution: Probably cosmopolitan.

* The descriptions of spicule categories as well as the measurements of the spicules are, in many instances, given for typical specimens, or for a few specimens, only. Because of the erratic variations in atypical specimens, and the permutations and combinations found over a range of specimens, to do otherwise would often make the diagnosis unwieldy. The summaried diagnoses given on pp. 136 to 150 are intended as an approximate survey of valid species. For a more comprehensive understanding the reader should study the series of Named Forms under each species in Section III (p. 151 ff).

Leucosolenia cordata (Haeckel)

Ascandra cordata Haeckel, 1872: 82.

Diagnosis: Single or groups of erect heart-shaped tubes; spicules typically triradiates, quadriradiates and oxea; rays of radiates 0·05 to 0·07 by 0·002 to 0·003 mm., oxea 0·05 to 0·07 by 0·002 to 0·003 mm.

Distribution: South Africa.

Leucosolenia asconoides (Carter)

Aphroceras asconoides Carter, 1886: 134.

Diagnosis: Compound tubular; spicules quadriradiates and oxea in one or two sizes; rays of radiates 0·18 to 0·38 by 0·004 to 0·035 mm., oxea 0·22 to 2·0 by 0·008 to 0·1 mm.

Distribution: Australia.

Genus **Clathrina Gray**

Clathrina Gray, 1867: 557.

Diagnosis: Homocoelidae composed typically of a clathrate mass of anastomosing tubes, with vents never markedly tubular.

Clathrina coriacea (Montagu)

Spongia coriacea Montagu, 1818: 116.

Diagnosis: Simple erect tubes (in early stages) to clathrate masses of simple tubes, often forming large colonies, which may be stipitate; spicules typically triradiates, quadriradiates and oxea, but may be triradiates only, of two sizes, or quadriradiates only, of two sizes; rays of radiates 0·03 to 0·06* by 0·02 to 0·025 mm., oxea 0·1 to 0·8 by 0·002 to 0·04 mm.

Distribution: Cosmopolitan, the Antarctic excepted.

Genus **Dendya** Bidder

Dendya Bidder, 1898: 74.

Diagnosis: Homocoelidae composed typically of centralised individuals lined by collared cells, from which are given off radially-arranged diverticula.

Remarks: This diagnosis, a modification of that given by Dendy (1913: 6), is not wholly satisfactory. The typical form, upon which it is based, is realised only in well-grown specimens, but in smaller, presumably young, specimens this is masked and it is often difficult to distinguish such specimens from examples of *Clathrina*.

Dendya poterium (Haeckel)

Ascetta primordialis var. *poterium* Haeckel, 1872: 17.

Diagnosis: Clathrate incrustations or irregular masses, often lobose, or pyriform, sometimes sub-stipitate; spicules triradiates and quadriradiates, often in two sizes, frequently with tripods in surface layer; oxea exceptionally present; rays of radiates 0·06 to 0·25 by 0·004 to 0·021 mm., of tripods (rarely with fourth ray) 0·09 to 0·8 by 0·01 to 0·08 mm.; oxea 0·16 to 0·2 by 0·003 to 0·008 mm.

Distribution: Japan; Australia; New Zealand.

Dendya prolifera Dendy

Dendya prolifera Dendy, 1913: 6.

Diagnosis: Thin-walled sac with elongated diverticula; spicules triradiates and quadriradiates; rays 0·07 to 0·12 by 0·008 mm. (in diverticula), up to 0·27 by 0·01 mm. (in central body).

Distribution: Indian Ocean; Indonesia.

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* Lengths above 0·2 mm. occur only in basal rays of sagittal triradiates, and these exceptionally.

Family **Heterocoelidae**

Diagnosis: Calcarea in which no collared cells are found lining the endosomal cavity (or cloaca); special endosomal and special ectosomal spicules usually present.

Genus **Leuconia** Grant

(For synonymy see p. 232)

Diagnosis: Heterocoelidae with tangential ectosomal and endosomal skeletons, with a chamber layer supported by large, irregularly scattered radiates, to which small radiates and diacts may be added.

Leuconia barbata (Duchassaing and Michelotti)

Medon barbata Duchassaing and Michelotti, 1864: 111, pl. xxiv, figs. 9–10.

Diagnosis: Massive, clathrate, ovoid, lobose, tubular to sacciform; ectosomal radiates occasionally quadriradiate, rarely in several layers; choanosomal radiates rarely of two sizes, usually triradiate but occasionally with quadriradiates; endosomal radiates often quadriradiates; subendosomal tri- or quadriradiates sometimes present, less often subectosomal triradiates present; diacts commonly large ectosomal oxea, to which microxea, smooth or spined, may be added.

Dimensions of spicules:

ectosomal radiates: rays 0·05 to 0·64 by 0·007 to 0·05 mm.,
oxea: 0·9 to 3·0 by 0·032 to 0·06 mm.,
choanosomal radiates: rays 0·1 to 1·0 by 0·01 to 0·125 mm.,
endosomal radiates: rays 0·028 to 0·6 by 0·004 to 0·024 mm.
[when present
microxea: 0·052 to 0·3 by 0·002 to 0·006 mm.,
subendosomal radiates: paired rays 0·16 to 0·8 by 0·02 to 0·086 mm., basal ray 0·25 to 0·9, by 0·02 by 0·086 mm., apical ray 0·07 to 0·1 by 0·002 to 0·006 mm.,
subectosomal radiates: similar to choanosomal radiates].

Distribution: Cosmopolitan.

Remarks: The spiculation varies from complex, including the many forms of spicules listed here, to simple, with triradiates only or even nothing more than microxea.

Leuconia ananas (Montagu)

Spongia ananas Montagu, 1818: 96.

Diagnosis: Tubular to sacciform, surface villose, with scattered conuli; ectosomal triradiates, quadriradiates in chamber layer and endosomal skeletons, with oxea, usually styliform, and microxea.

Dimensions of spicules:

ectosomal radiates: rays 0·27 to 0·6 (? up to 1·5) by 0·02 to 0·05 (? up to 0·07) mm.,
choanosomal radiates: rays 0·2 to 2·0 by 0·032 to 0·15 mm.,
endosomal radiates: rays 0·04 to 0·44 by 0·008 to 0·28 mm.,
oxea: 1·0 to 2·0 by 0·05 to 0·2 mm.,
microxea: 0·05 to 0·4 by 0·002 to 0·005 mm.

Distribution: Arctic; eastern North Atlantic (as far south as Portugal); north-west Pacific.

Leuconia trigona (Haeckel)

Leucetta trigona Haeckel, 1872: 123.

Diagnosis: Ovate, stipitate.

Dimensions of spicules:

triradiates of all three body layers similar in form and size, with rays 0·2 to 0·25 by 0·12 to 0·16 mm.

Distribution: Algoa Bay, S. Africa.

Remarks: This is a most unusual species characterised as much by the extraordinary triradiates, with very short thickened rays, as by the external form. It has not been seen by anyone except Haeckel.

Genus **Eilhardia** Poléjaeff

Eilhardia Poléjaeff, 1883: 70.

Diagnosis: Heterocoelidae with large triradiates irregularly arranged in chamber layer, large triradiates and oxea in ectosomal layer, with a tangential layer of smaller radiates, and with microxea or trichodragmata scattered in one or other of principal layers.

Eilhardia schulzei Poléjaeff

Eilhardia schulzei Poléjaeff, 1883: 70.

Diagnosis: Calyciform (tubular or even encrusting in young stages) with pores on inner and vents on outer surfaces of cup.

Dimensions of spicules:

oxea: 0·4 to 1·0 by 0·01 to 0·12 mm.,
trichoxea: 0·3 to 1·1 by 0·0025 to 0·004 mm.,
microxea (or trichodragmata): 0·025 to 0·1 by 0·002 mm.,
ectosomal triradiates: rays 0·3 to 1·2 by 0·02 to 0·06 mm.,
triradiates of chamber layer: rays 0·015 to 1·8 by 0·015 to 0·15 mm.,
endosomal quadriradiates and triradiates: rays 0·02 to 0·8 by 0·006 to 0·05 mm.

Distribution: Australia.

Genus **Sycettusa** Haeckel

(For synonymy see p. 318)

Diagnosis: Heterocoelidae with ectosomal skeleton; a distinct layer of triradiates; skeleton of chamber layer composed of centrifugally directed rays of sagittal triradiates and centripetally directed rays of subectosomal pseudosagittal triradiates, supplemented or partially replaced by confused triradiates; endosomal skeleton a tangential layer of tri- or quadriradiates.

Sycettusa bathybia (Haeckel)

Leucaltis bathybia Haeckel, 1872: 156.

Diagnosis: Tubular or clathrate.

Dimensions of spicules:

ectosomal triradiates: rays 0·2 to 0·7 by 0·01 to 0·065 mm.,
oxea: 1·0 to 1·3 by 0·03 to 0·06 mm.,
microxea: 0·05 to 0·16 by 0·003 to 0·006 mm.,
subectosomal pseudosagittal triradiates: paired rays 0·1 to 0·5 by 0·012 to 0·009 mm., basal rays 0·24 to 0·8 by 0·034 to 0·09 mm.,
subectosomal pseudosagittal quadriradiates: similar to triradiates, with apical rays 0·18 to 0·25 by 0·015 to 0·035 mm.,
subendosomal sagittal triradiates: similar to subectosomal triradiates,
endosomal triradiates: rays 0·15 by 0·5 by 0·01 to 0·02 mm.

Distribution: Indian Ocean.

Sycettusa glacialis (Haeckel)

Sycaltis glacialis Haeckel, 1872: 269.

Diagnosis: Typically solitary erect tubes, rarely in groups.

Dimensions of spicules:

ectosomal triradiates: rays 0·06 to 0·6 by 0·008 to 0·028 mm.,
oxea: 0·21 to 1·8 by 0·007 to 0·05 mm.,
microxea: 0·098 mm. long,
subectosomal pseudosagittal triradiates: paired rays 0·045 to 0·24 by 0·005 to 0·02 mm., basal ray 0·075 to 0·6 by 0·005 to 0·02 mm.,
subendosomal sagittal triradiates: paired rays 0·07 to 0·33 by 0·008 to 0·03 mm., basal ray 0·09 to 1·12 by 0·006 to 0·03 mm.,
endosomal quadriradiates (rarely triradiates): rays 0·09 to 0·4 by 0·006 to 0·016 mm.

Distribution: Arctic; north-eastern Canada; Norway; Japan.

Sycettusa glomerosa (Bowerbank)

Leuconia glomerosa Bowerbank, 1873: 17.

Diagnosis: Typically a group of tightly-packed tubes with thick walls.

Dimensions of spicules:

ectosomal triradiates: rays 0·06 to 0·4 by 0·008 to 0·036 mm.,
oxea: 0·49 to 2·0 by 0·03 to 0·09 mm.,
microxea: 0·05 to 0·092 by 0·002 to 0·004 mm.,
subectosomal pseudosagittal triradiates: paired rays 0·05 to 0·24 by 0·01 to 0·035 mm., basal ray 0·12 to 0·5 by 0·01 to 0·04 mm.,
subendosomal sagittal triradiates: paired rays 0·03 to 0·3 by 0·01 to 0·027 mm., basal ray 0·15 to 0·5 (? 1·0) by 0·01 to 0·08 mm.,
endosomal triradiates (rarely quadriradiates): rays 0·06 to 0·44 by 0·008 to 0·025 mm.

Distribution: Australia; Chatham Islands; Japan; Indian Ocean; South Africa.

Sycettusa pelagica (Ridley)

Nardoa pelagica Ridley, 1881: 133.

Diagnosis: Solitary or grouped, tubular, erect.

Dimensions of spicules:

ectosomal triradiates: rays 0·1 to 0·5 by 0·017 to 0·03 mm.,
oxea: 1·0 to 2·0 by 0·06 to 0·1 mm.,
subectosomal pseudosagittal triradiates: paired rays 0·14 to 0·5 by 0·011 to 0·03 mm., basal ray 0·28 to 0·42 by 0·016 to 0·03 mm.,
subendosomal triradiates (rarely quadriradiates): paired rays 0·29 to 0·36 by 0·019 to 0·045 mm., basal ray 0·35 to 0·7 by 0·019 to 0·045 mm.,
endosomal quadriradiates: rays 0·1 to 0·45 by 0·01 to 0·012 mm.

Distribution: Brazil.

Sycettusa connexiva (Poléjaeff)

Leucilla connexiva Poléjaeff, 1883: 51.

Diagnosis: Solitary, tubular.

Dimensions of spicules:

ectosomal triradiates: rays 0·16 to 0·8 by 0·016 to 0·07 mm.,
subectosomal pseudosagittal triradiates: paired rays 0·15 to 0·4 by 0·015 to 0·04 mm., basal ray 0·18 to 0·55 by 0·02 to 0·04 mm.,
subendosomal sagittal triradiates: paired rays 0·25 to 0·4 by 0·024 to 0·04 mm., basal ray 0·36 to 0·6 by 0·02 to 0·04 mm.,
endosomal triradiates and quadriradiates: rays 0·11 to 0·32 by 0·01 to 0·02 mm.

Distribution: Japan; Philippines.

Genus **Sycolepis** Haeckel

(For synonymy see p. 357)

Diagnosis: Heterocoelidae of encrusting form, with skeleton composed entirely of spined oxea.

Sycolepis incrustans Haeckel

Sycolepis incrustans Haeckel, 1870: 251.

Diagnosis: Encrusting to irregularly massive.

Dimensions of spicules:

oxea, distally-spined: 0·2 to 0·5 by 0·01 to 0·02 mm.

Distribution: Norway; British Isles.

Genus **Scypha** Gray

(For synonymy, see p. 358)

Diagnosis: Heterocoelidae with skeleton of chamber layer typically articulate, and showing no marked differences in size between radiates of ectosome, chamber layer and endosome, except where tubar skeleton is reduced to sagittal subendosomal radiates.

[An *articulate* skeleton is composed of regular or subregular rows of radiates, overlapping, and with basal rays directed distally.]

Scypha ciliata (Fabricius)

[On p. 465 *et seq.*, *S. capillosa* is treated provisionally as a distinct species; see also p. 129.]

Spongia ciliata Fabricius, 1780: 448.

Diagnosis: Tubular, sometimes stipitate.

Dimensions of spicules:

ectosomal triradiates, rarely quadriradiates (which may be absent): rays 0·058 to 0·4 by 0·002 to 0·04 mm.,

oxea: 0·05 to 3·0 by 0·0015 to 0·15 mm.,

microxea: 0·065 to 0·1 by 0·003 to 0·007 mm.,

tubar triradiates (rarely quadriradiates): rays 0·048 to 0·52 by 0·003 to 0·04 mm.,

subendosomal sagittal triradiates (rarely quadriradiates): paired rays (exceptionally 0·008 to 0·011) 0·03 to 0·4 by 0·004 to 0·036 mm., basal ray 0·04 to 0·5 by 0·004 to 0·036 mm.,

endosomal quadriradiates (rarely triradiates): facial rays 0·04 to 0·54 by 0·004 to 0·02 mm., apical ray 0·02 to 0·73 by 0·006 to 0·025 mm.

Distribution: Cosmopolitan (except for the Antarctic).

Taking the range of specimens here included in *Scypha ciliata*, there is in most of them a relatively small degree of fluctuation in the size of the rays of the radiates, which, for the most part, fall between 0·1 and 0·2 mm. in length and 0·005 and 0·01 mm. in thickness. Dimensions less than or in excess of these are less common, and extremes are reached, on the one hand, in forms with reduced spiculation (those species assigned hitherto to *Sycetta*) and, on the other hand, to the noticeably larger spicules of those assigned to *Sycon caminatum*, *Leuconia ananas* var., *Leucandra taylori* and *L. apicalis*. The extreme of great size is reached in *L. heathi*, in which all rays are noticeably thicker (up to 0·04 mm. diameter). There are, however, individuals showing intermediate measurements, and these do not appear to be linked with any particular habitat or geographical locality. A noticeable feature is that increases in size are associated more especially with the oxea and with the apical rays of the endosomal quadriradiates. There is, however, an exception to this, namely, the appearance of stout radiates at the apices of the flagellated chambers in the *Sycon*-forms (e.g. *S. humboldtii*, *S. elegans*). Their counterpart can be seen in the hypertrophied ectosomal triradiates in certain *Leuconia*-forms (e.g. *L. heathi*). Here again, there appears to be no special correlation with habitat or geographical range. These enlarged ectosomal radiates would appear to be comparable with the enlarged radiates (tripods) of *Dendya poterium* and of *Clathrina coriacea*, which, like the enlarged radiates of *Scypha ciliata* occur sporadically throughout the geographical range of the species. The hypertrophy of the ectosomal radiates in *Scypha ciliata* reaches a peak in the form named *Vosmaeropsis maculata*, in which increased size is accompanied by the formation of several layers of ectosomal radiates.

Scypha compressa (Fabricius)

Spongia compressa Fabricus, 1780: 488.

Diagnosis: Compressed sacciform, foliaceous.

Dimensions of spicules:

ectosomal triradiates: rays 0·08 to 0·16 by 0·008 to 0·016 mm.,
oxea: 0·1 to 0·7 by 0·008 to 0·028 mm.,
tubar triradiates (rarely quadriradiates): rays 0·07 to 0·3 by 0·008 to 0·012 mm.,
subendosomal sagittal triradiates (rarely quadriradiates): paired rays 0·08 to 0·19 by 0·008 to 0·012 mm., basal ray 0·2 to 0·5 by 0·008 to 0·012 mm.,
endosomal quadriradiates (sometimes triradiates): facial rays 0·09 to 0·5 by 0·007 to 0·008 mm., apical ray 0·04 to 0·7 by 0·008 to 0·016 mm.

Distribution: Arctic; Atlantic coasts of Europe (and Canada ?); Mediterranean; Kuriles; Japan; principal habitat, littoral zone.

Scypha antarctica (Jenkin)

Tenthrenodes antarcticus Jenkin, 1908: 12.

Diagnosis: Tubular to subspherical.

Dimensions of spicules:

tubar triradiates: rays 0·05 to 0·15 by 0·003 to 0·01 mm.,
oxea: 0·008 to 1·25 by 0·006 to 0·026 mm.,
subendosomal sagittal triradiates, sometimes quadriradiates: paired rays 0·07 to 0·215 by 0·005 to 0·01 mm., basal ray 0·16 to 0·43 by 0·006 to 0·008 mm.,
endosomal triradiates, occasionally quadriradiate: rays 0·16 to 1·0 by 0·01 to 0·016 mm.

Distribution: Antarctic.

Scypha labyrinthica (Carter)

Teichonella labyrinthica Carter, 1878: 37.

Diagnosis: Caliculate to infundibular, or lamellar and much folded.

Dimensions of spicules:

ectosomal triradiates, rays 0·07 to 0·38 by 0·01 mm.,
microxea: 0·07 to 0·15 by 0·003 to 0·008 mm.,
tubar triradiates: rays 0·03 to 0·19 by 0·005 to 0·012 mm.,
subendosomal sagittal triradiates: paired rays 0·24 by 0·008 mm., basal ray 0·47 by 0·008 mm.,
endosomal quadriradiates: paired rays 0·12 by 0·006 mm., basal ray 0·05 by 0·006 mm., apical ray 0·04 by 0·006 mm.

Distribution: Australia.

Scypha gelatinosa (Blainville)

Alcyoncellum gelatinosum Blainville, 1834: 529.

Diagnosis: Tubular, a mass of tightly-packed individuals.

Dimensions of spicules:

tubar triradiates: rays 0·04 to 0·15 by 0·007 to 0·016 mm.,
oxea: 0·08 to 0·15 by 0·004 to 0·01 mm.,
subendosomal sagittal triradiates: similar to tubar triradiates,
endosomal triradiates (and quadriradiates): facial rays 0·08 to 0·2 by 0·007 to 0·009 mm., apical ray 0·077 to 0·18 by 0·01 to 0·02 mm.

Distribution: South Africa; Malaysia; Australia.

Scypha ramsayi (Lendenfeld)

Sycandra ramsayi Lendenfeld, 1885: 1097.

Diagnosis: Tubular to sacciform, surface strongly hispid.

Dimensions of spicules:

ectosomal triradiates (when present): rays 0·09 to 0·21 by 0·006 to 0·018 mm.,
[subectosomal pseudosagittal radiates, when present, similar to tubar triradiates],
oxea (often of two sizes): 0·8 to 3·5 by 0·005 to 0·035 mm.,
tubar triradiates (sometimes quadriradiate): rays 0·1 to 0·52 by 0·002 to 0·068 mm.,
endosomal quadriradiates (or triradiates): facial rays 0·1 to 0·28 by 0·008 to 0·02, apical ray 0·035 to 0·25 by 0·01 mm.

Distribution: Australia.

Scypha ramosa (Smith)

Grantia ramosa Smith [in] Haeckel, 1872: 358.

Diagnosis: Ramose, without visible vents.

Dimensions of spicules:

tubar triradiates: rays 0·04 to 0·15 by 0·006 to ? 0·008 mm.,
oxea: 0·6 to 0·8 by 0·01 mm.,
endosomal sagittal triradiates: paired rays 0·05 to 0·08 by 0·006 to 0·008 mm.,
endosomal triradiates and quadriradiates: facial rays 0·05 to 0·12 by 0·006 to 0·008 mm., apical ray 0·02 to 0·03 by 0·008 mm.

Distribution: South Africa.

Scypha laevigata (Haeckel)

Sycortis laevigata Haeckel, 1872: 285.

Diagnosis: Tubular, compressed, sub-stipitate.

Dimensions of spicules:

tubar triradiates (rarely quadriradiates): rays 0·084 to 0·25 by 0·007 to 0·014 mm.,
oxea: 0·05 to 0·17 by 0·002 to 0·008 mm.,
subendosomal sagittal triradiates (occasionally quadriradiate), often indistinguishable from tubar triradiates: rays 0·084 to 0·35 by 0·007 to 0·014 mm.,
endosomal triradiates and quadriradiates: facial rays 0·03 to 0·3 by 0·005 to 0·012, apical ray 0·05 to 0·17 by 0·005 to 0·028 (at thickest point).

Distribution: Australia.

Remarks: The species is nearly related to *S. compressa* from which it is chiefly distinguished by its more robust growth. It may eventually prove to be a subspecies of the northern species.

Scypha singularis (Breitfuss)

Sphenophorus singularis Breitfuss, 1898: 4.

Diagnosis: Tubular.

Dimensions of spicules:

ectosomal triradiates: paired rays 0·02 to 0·03 by 0·007 mm., basal ray 0·07 to 0·09 by 0·01 mm.,
subendosomal sagittal triradiates: similar to ectosomal triradiates,
endosomal quadriradiates: facial rays 0·015 by 0·005 mm., apical ray 0·3 to 0·4 by 0·007 mm.

Distribution: Arctic (White Sea).

Remarks: This is an unsatisfactory species. The holotype is a fragment only. It is probable that it represents an individual of a better-known species (perhaps *Scypha compressa*) with a reduced spiculation.

Scypha lunulata (Haeckel)

Leucandra lunulata Haeckel, 1872: 189.

Diagnosis: Tubular to subspherical or ovate.

Dimensions of spicules:

ectosomal triradiates: rays 0·04 to 0·54 by 0·007 to 0·049 mm.,
oxea: 0·13 to 3·5 by 0·03 to 0·1 mm.,
microxea: 0·08 to 0·17 by 0·001 to 0·006 mm.,
subectosomal pseudosagittal triradiates, rare, similar to tubar triradiates,
tubar triradiates, rarely quadriradiates: rays 0·13 to 0·6 by 0·007 to 0·056 mm.,
subendosomal sagittal triradiates: paired rays 0·08 to 0·22 by 0·006 to 0·032 mm., basal ray 0·068 to 0·7 by 0·006 to 0·032 mm.,
endosomal quadriradiates (rarely triradiates): facial rays 0·068 to 0·5 by 0·008 to 0·032 mm., apical ray 0·04 to 0·49 by 0·007 to 0·012 mm.

Distribution: South Africa; South America (Juan Fernandez); Subantarctic; Antarctic.

Genus **Aphroceras** Gray

(For synonymy, see p. 490)

Diagnosis: Heterocoelidae with skeleton of chamber layer ranging from more or less confused to articulate, with subendosomal or other sagittal radiates; ectosomal skeleton of tangentially placed triradiates supplemented typically by colossal oxea placed longitudinally, or, less commonly, projecting from the surface.

Remarks: Typically *Aphroceras*, is characterised by the uteoid skeleton of longitudinally placed colossal oxea. Often these are disposed radially, or irregularly in the choanosome, when it is difficult to avoid seeing a very close resemblance to typical species of *Scypha*. It may be that, in fact, no generic distinction can be maintained between *Aphroceras* and *Scypha*.

Aphroceras ensata (Bowerbank)

Grantia ensata Bowerbank, 1858: 295.

Diagnosis: Solitary and tubular, to ramose or clathrate, or massive and lobate; surface smooth or strongly hispid.

Dimensions of spicules:

ectosomal triradiates: rays 0·03 to 0·3 by 0·006 to 0·036 mm.,
oxea: 0·45 to 5·0 by 0·01 to 0·2 mm.,
trichoxea: 0·1 to 1·0 by 0·001 to 0·004 mm.,
microxea (usually ectosomal only, rarely endosomal also): 0·042 to 0·18 by 0·001 to 0·003 mm.,
triradiates (occasionally quadriradiates) of chamber layer: rays 0·048 to 0·52 by 0·005 to 0·038 mm.,
subendosomal sagittal triradiates (occasionally quadriradiates): paired rays 0·05 to 0·11 by 0·06 to 0·012 mm., basal ray 0·08 to 0·24 by 0·006 to 0·012 mm.,
endosomal quadriradiates (rarely triradiates only): facial rays 0·04 to 0·3 by 0·005 to 0·02 mm., apical ray 0·042 to 0·4 by 0·002 to 0·02 mm.

(Subectosomal pseudosagittal triradiates have occasionally been recorded, but these appear to be ectosomal triradiates orientated so that one ray projects into the chamber layer.)

Distribution: Atlantic coasts of Europe; Mediterranean; Cape Verde Islands; Japan; Red Sea; ? Indian Ocean; Australia; Hong Kong; Honolulu.

Genus **Achramorpha** Jenkin

(For synonymy, see p. 523)

Achramorpha Jenkin 1908: 30.

Diagnosis: Heterocoelidae with skeleton of chamber layer composed of basal rays of endosomal radiates and, usually, proximal parts of radial oxea; endosomal skeleton of paired and apical rays of subendosomal triradiates and quadriradiates, with sometimes a tangential layer of quadriradiates (or triradiates); ectosomal skeleton, when present, a tangential layer of triradiates or quadriradiates.

Achramorpha truncata (Topsent)

Grantia truncata Topsent, 1907: 540.

Diagnosis: Thin-walled tube, wider below, or sacciform.

Dimensions of spicules:

ectosomal triradiates: rays 0·09 to 0·7 by 0·008 to 0·016 mm.,

subendosomal quadriradiates: paired rays 0·12 to 0·28 by 0·008 to 0·02 mm., basal ray 0·25 to 1·12 by 0·008 to 0·018 mm., apical ray 0·05 to 0·22 by 0·008 to 0·016 mm.,

oxea: 0·28 to 15·0 by 0·012 to 0·043 mm.,

trichoxea: 0·4 to 0·5 by 0·001 mm.,

microxea: 0·035 to 0·4 by 0·001 to 0·025 mm.

Distribution: Antarctic.

Genus **Uteopsis** Dendy and Row

Uteopsis Dendy and Row, 1913: 766.

Diagnosis: Heterocoelidae with tubar skeleton reduced to basal rays of subendosomal sagittal triradiates supplemented distally by radially-arranged oxea; ectosomal cortex well-developed and containing colossal oxea arranged tangentially.

Uteopsis argentea (Poléjaeff)

Ute argentea Poléjaeff, 1833: 43.

Diagnosis: Tubular, sub-stipitate, solitary or branching.

Dimensions of spicules:

ectosomal triradiates: rays 0·025 to 0·75 by 0·005 mm.,

oxea: 1·0 to 3·0 by 0·005 to 0·012 mm.,

oxea of chamber layer: 0·3 by 0·005 mm.,

microxea: 0·15 by 0·003 mm.,

tubar quadriradiates: paired rays 0·05 by 0·002 mm., basal ray 0·03 by 0·003 mm., apical ray 0·14 by 0·002 mm.,

endosomal quadriradiates and triradiates: rays 0·15 to 0·5 by 0·01 to 0·013 mm.

Distribution: Australia.

Genus **Hypograntia** Carter

(For synonymy, see p. 530)

Diagnosis: Heterocoelidae with ectosomal cortex as thick as the chamber layer, with many layers of tangential triradiates; tubar skeleton articulate, composed of the basal rays of subendosomal quadriradiates with which are associated sagittal triradiates practically reduced to the basal ray by suppression of the paired rays; endosomal skeleton of the paired and apical rays of the subendosomal quadriradiates together with a tangential layer of endosomal quadriradiates; without colossal longitudinal oxea.

Hypograntia infrequens Carter

Hypograntia infrequens Carter, 1886: 37.

Diagnosis: Tubular, sessile.

Dimensions of spicules:

ectosomal triradiates: rays 0·35 to 0·5 by 0·01 to 0·07 mm.,

oxea: 0·1 by 0·004 to 0·006 mm.,

tubar triradiates: paired rays 0·003 mm. long, basal ray 0·3 by 0·008 mm.,

subendosomal sagittal quadriradiates: facial rays 0·004 to 0·01 by 0·007 to 0·015 mm., basal ray 0·17 to 0·28 by 0·007 to 0·01 mm.,

endosomal triradiates and quadriradiates: rays 0·04 to 0·25 by 0·007 to 0·025 mm.

Distribution: Australia.

Genus **Amphoriscus** Haeckel

(For synonymy, see p. 532)

Diagnosis: Heterocoelidae with skeleton of the chamber layer typically composed of the centripetally and centrifugally directed apical rays of subectosomal and subendosomal quadriradiates, but endosomal sagittal triradiates and confused chamber-layer quadriradiates may be present, while endosomal quadriradiates may be absent.

Amphoriscus chrysalis (Schmidt)

Ute chrysalis Schmidt, 1864: 23.

Diagnosis: Typically tubular, may be ovate or even encrusting.

Dimensions of spicules:

- ectosomal triradiates (when present): rays 0·15 to 0·6 by 0·01 to 0·06 mm.,
- microxea: 0·025 to 0·4 by 0·001 to 0·005 mm.,
- subectosomal quadriradiates (known as ectosomal quadriradiates when outer layer of triradiates is absent): facial rays 0·1 to 0·8 by 0·015 to 0·07 mm., apical ray 0·1 to 1·6 by 0·014 to 0·07 mm.,
- choanosomal triradiates or quadriradiates (occasionally present): rays 0·1 to 0·8 by 0·01 to 0·025 mm.,
- subendosomal quadriradiates (rarely triradiates): rays 0·07 to 0·8 by 0·007 to 0·04 mm.,
- endosomal quadriradiates: facial rays 0·1 to 0·45 by 0·004 to 0·06 mm., apical ray 0·03 to 1·2 by 0·004 to 0·03 mm.

Distribution: World-wide between latitudes 40° N and 40° S.

Amphoriscus capsula (Haeckel)

Lipostomella capsula Haeckel, 1870: 249.

Diagnosis: Irregularly massive.

Dimensions of spicules:

- ectosomal quadriradiates: rays 0·2 to 0·4 by 0·03 to 0·04 mm.,
- endosomal quadriradiates: rays 0·2 to 0·4 by 0·01 to 0·013 mm.

Distribution: South Africa.

Amphoriscus cucumis (Haeckel)

Leucandra cucumis Haeckel, 1872: 205.

Diagnosis: Ovate.

Dimensions of spicules:

- ectosomal triradiates: rays 0·1 to 0·32 by 0·01 to 0·02 mm.,
- oxea: 0·1 to 1·5 by 0·01 to 0·06 mm.,
- microxea: 0·06 by 0·004 mm.,
- subectosomal quadriradiates: rays 0·18 to 0·9 by 0·02 to 0·1 mm.,
- choanosomal triradiates or quadriradiates: rays 0·16 to 0·8 by 0·02 to 0·1 mm.,
- subendosomal sagittal triradiates: rays 0·12 to 0·64 by 0·01 to 0·024 mm.,
- endosomal triradiates and quadriradiates: facial rays 0·16 to 0·5 by 0·015 to 0·03 mm., apical ray 0·035 to 0·14 by 0·006 mm.

Distribution: Australia; Malay; Indian Ocean; Red Sea.

Amphoriscus echinus (Haeckel)

Leuculmis echinus Haeckel, 1872: 167.

Diagnosis: Spherical, unattached, surface markedly hispid.

Dimensions of spicules:
ectosomal quadriradiates: facial rays 0·4 to 0·5 by 0·05 to 0·07 mm., apical ray 0·6 to 0·8 by 0·05 to 0·07 mm.,
oxea: 1·0 to 3·0 by 0·06 to 0·08 mm.,
choanosomal quadriradiates: rays 0·1 to 0·2 by 0·01 to 0·012 mm.,
subendosomal quadriradiates: rays 0·4 to 0·8 by 0·05 to 0·07 mm.

Distribution: Norway.

Amphoriscus ? gastrorhabdifera (Burton)

Leucaltis gastrorhabdifera Burton, 1932: 259, figs. 4–5.

Diagnosis: Tubular; endosomal skeleton of diacts in place of usual radiates.

Dimensions of spicules:
ectosomal triradiates: rays 0·18 by 0·01 mm.,
subectosomal quadriradiates, apical rays 0·18 by 0·02 mm., basal rays 0·28 to 0·42 by 0·024 mm.,
diacts: 0·59 by 0·022 mm.

Distribution: Tristan da Cunha.

Genus **Leucettusa** Haeckel

(For synonymy, see p. 549)

Type-species: Leucettusa corticata Haeckel, 1872: 129, pl. xxii, figs. 4–8.

Diagnosis: Heterocoelidae with skeleton of chamber layer reduced to almost vestigial triaenes; usually without endosomal skeleton; ectosomal skeleton of tangential triradiates, often reinforced by large subectosomal quadriradiates with fourth ray projecting into chamber layer.

Leucettusa corticata (Haeckel)

Leucetta corticata Haeckel, 1872: 129.

Diagnosis: Clathrate, a mass of anastomosing tubes.

Dimensions of spicules:
ectosomal triradiates: rays 0·085 to 0·6 by 0·004 to 0·06 mm.,
subectosomal quadriradiates: rays 0·25 to 1·2 by 0·03 to 0·15 mm.,
quadriradiates (sometimes triradiates) of chamber layer: rays 0·01 to 0·16 by 0·002 to 0·021 mm.,
endosomal quadriradiates similar to those of chamber layer.

Distribution: West Indies; Florida; Bermuda; Portugal; Indian Ocean; Australia; Chatham Islands; Japan.

Leucettusa imperfecta (Poléjaeff)

Leucetta imperfecta Poléjaeff, 1883: 67.

Diagnosis: Tubular to spherical, often sub-stipitate;

Dimensions of spicules:
ectosomal triradiates: rays 0·45 to 1·0 by 0·03 to 0·062 mm.,
subectosomal quadriradiates: rays 0·3 to 1·0 by 0·03 to 0·1 mm.,
quadriradiates (rarely triradiates) of chamber layer: rays 0·02 to 0·18 by 0·005 to 0·01 mm.,
endosomal quadriradiates similar to those of chamber layer.

Distribution: Japan; New Zealand; Australia; Kerguelen; Falkland Islands.

Genus **Lamontia** Kirk

Lamontia Kirk, 1894: 289.

Type species: Lamontia zona Kirk, 1894: 289, pl. xxv, figs. 1–8, pl. xxvi, figs. 1–8.

Diagnosis: Heterocoelidae with skeleton of chamber layer consisting of small scattered oxea; ectosomal cortex with triradiates in addition to oxea; endosomal quadriradiates present; sponge consisting of a single person with a specialised pore-zone below the terminal vent.

Lamontia zona Kirk

Lamontia zona Kirk, 1894: 289.

Diagnosis: Tubular, with hispid surface.

Dimensions of spicules:

ectosomal triradiates: rays 0·35 by 0·035 mm.,
oxea: 0·9 by 0·051 mm.,
ectosomal microxea: 0·28 by 0·01 mm.,
choanosomal microxea: 0·07 to 0·1 by 0·005 to 0·01 mm.,
endosomal quadriradiates: rays 0·02 by 0·008 mm.

Distribution: New Zealand.

Genus **Lelapia** Gray

(For synonymy, see p. 558)

Diagnosis: Heterocoelidae with skeleton of the chamber layer composed of large scattered oxea and loose fibres of nail-spicules or 'tuning-fork' spicules; ectosomal skeleton of tangential triradiates and microxea; endosomal skeleton of tangential triradiates and quadriradiates.

Lelapia australis Gray

Lelapia australis Gray, 1867: 557.

Diagnosis: Tubular.

Dimensions of spicules:

ectosomal triradiates: rays 0·09 to 0·47 by 0·006 to 0·014 mm.,
oxea: 1·0 to 3·2 by 0·007 to 0·09 mm.,
microxea: 0·07 to 0·21 by 0·003 to 0·008 mm.,
'tuning-fork' spicules: 0·1 to 0·8 mm. long,
subendosomal triradiates: paired rays 0·12 to 0·26 by 0·01 to 0·024 mm., basal ray 0·26 to 0·5 by 0·012 to 0·024 mm.,
endosomal radiates: paired rays 0·1 to 0·59 by 0·008 to 0·03 mm., basal and apical rays 0·012 to 0·1 by 0·008 to 0·03 mm.

Distribution: Japan; Australia.

Lelapia uteoides (Row)

Kebira uteoides Row, 1909: 210.

Diagnosis: Tubular, flask-shaped.

Dimensions of spicules:

ectosomal triradiates: rays 0·091 to 0·24 by 0·015 mm.,
oxea: up to 4·0 by 0·015 to 0·018 mm.,
radiates of chamber layer: paired rays 0·02 mm. long, basal ray 0·18 to 0·22 by 0·003 to 0·004 mm.,
endosomal triradiates: rays 0·13 to 0·6 by 0·016 to 0·03 mm.

Distribution: Red Sea.

Genus **Minchinella** Kirkpatrick

Minchinella Kirkpatrick, 1908: 504.

Type-species: Minchinella lamellosa Kirkpatrick, 1908: 505, pl. xiii, figs. 1–13, pl. xiv. figs. 1-16, pl. xv, figs. 1–9.

Diagnosis: Heterocoelidae with main skeleton of fused quadriradiates; ectosomal skeleton a palisade of microxea, with microxea, triradiates, quadriradiates and 'tuning-fork' spicules in poral and oscular processes.

Minchinella lamellosa Kirkpatrick

Minchinella lamellosa Kirkpatrick, 1908: 504.

Diagnosis: Flabellate with separate vent- and pore-bearing surfaces.

Dimensions of spicules (other than main skeleton):

radiates: rays 0·05 to 0·17 by 0·005 to 0·01 mm.,

microxea: of various sizes, ranging from 0·087 to 0·3 by 0·001 to 0·008 mm.,

'tuning-fork' spicules: 0·16 mm. long.

Distribution: New Hebrides.

Genus **Petrostroma** Döderlein

Petrostroma Döderlein, 1892: 15.

Diagnosis: Heterocoelidae with quadriradiates of the chamber layer fused together laterally by calcareous cement into a network; ectosomal skeleton of separate quadriradiates and triradiates and bunches of 'tuning-fork' spicules.

Petrostroma schulzei Döderlein

Petrostroma schulzei Döderlein, 1892: 143.

Diagnosis: Digitate, stony texture.

Dimensions of free spicules:

radiates: rays 0·13 to 0·26 by 0·008 to 0·01 mm.,

'tuning-fork' spicules: 0·23 to 0·37 mm. long.

Distribution: Japan.

Genus **Plectroninia** Hinde

Plectroninia Hinde, 1900: 51.

Diagnosis: Heterocoelidae having quadriradiates of the main skeleton with their facial rays truncated or expanded terminally and fused at the end with facial rays of adjacent spicules, while the apical rays remain free and pointed; ectosomal skeleton of separate radiates, including tuning-fork spicules, and oxea.

Plectroninia deansii Kirkpatrick

Plectroninia deansii Kirkpatrick, 1911: 177.

Diagnosis: Encrusting.

Dimensions of free spicules:

microxea and triradiates with vestigial paired rays, 0·12 by 0·004 mm.

Distribution: Indian Ocean (Christmas Island).

Plectroninia hindei Kirkpatrick

Plectroninia hindei Kirkpatrick, 1900: 347.

Diagnosis: Encrusting.

Dimensions of free spicules:

radiates: rays ranging from 0·018 to 0·2 by 0·007 to 0·015 mm.,

microxea: 'tuning-fork' spicules and 'pin-shaped' spicules, 0·2 to 0·5 by 0·006 to 0·007 mm.

Distribution: Funafuti.

Genus **Murrayona** Kirkpatrick

Murrayona Kirkpatrick, 1910: 127.

Type-species: Murrayona phanolepis Kirkpatrick, 1910: 127, pl. x, figs. 1–9, pl. xi, figs. 1–26.

Diagnosis: Heterocoelidae with a definite pore-zone in which ectosomal skeleton consists of small triradiates; 'tuning-fork' spicules present beneath ectosomal scales.

Murrayona phanolepis Kirkpatrick

Murrayona phanolepis Kirkpatrick, 1910: 127.

Diagnosis: Subspherical to pyriform.

Dimensions of free spicules:

ectosomal scales: 0·37 to 0·53 mm. diameter,

radiates: rays 0·055 by 0·01 mm., 'tuning-fork' spicules: 0·09 mm. long.

Distribution: Christmas Island (Indian Ocean).

Genus **Sycodorus** Haeckel

(For synonymy, see p. 569)

Diagnosis: Heterocoelidae with articulate tubar skeleton, with endosomal cortex strengthened by large oxea arranged tangentially, but with tangential oxea in the ectosome.

Sycodorus hystrix Haeckel

Sycodorus hystrix Haeckel, 1872: 375.

Diagnosis: Tubular, sessile.

Dimensions of spicules:

ectosomal triradiates: rays 0·1 to 0·12 by 0·01 to 0·02 mm.,

ectosomal oxea: of two sizes, 1·0 to 1·5 by 0·004 and 4·0 to 5·0 by 0·07 to 0·1 mm., respectively,

tubar radiates: rays 0·1 to 0·5 by 0·015 mm.,

subendosomal sagittal radiates: paired rays 0·2 by 0·015 mm., basal ray 0·4 by 0·015 mm.,

endosomal oxea: 3·0 to 5·0 by 0·06 to 0·1 mm.,

endosomal radiates: rays 0·1 to 0·8 by 0·008 to 0·02 mm.

Distribution: South Africa.

Genus **Sycyssa** Haeckel

(For synonymy, see p. 570)

Type-species: Sycyssa huxleyi Haeckel, 1872: 260, pl. xliv, figs. 1–16.

Diagnosis: Heterocoelidae with skeleton composed entirely of oxea; ectosomal skeleton a tangential layer of oxea, with a palisade of oxea set at right angles to surface, and with large oxea projecting beyond; skeleton of chamber layer of proximal parts of large oxea; endosomal skeleton a tangential layer of oxea, with a subendosomal layer of larger oxea.

Sycyssa huxleyi Haeckel

Sycyssa huxleyi Haeckel, 1872: 260.

Diagnosis: Oval, sessile.

Dimensions of spicules:

ectosomal oxea: 0·4 to 0·6 by 0·002 to 0·004 mm., 0·1 to 0·3 by 0·002 to 0·005 mm., 2·0 to 3·0 by 0·04 to 0·07 mm. respectively,

endosomal oxea: 0·2 to 0·4 by 0·002 to 0·004 mm. and 1·0 to 3·0 by 0·04 to 0·06 mm. respectively.

Distribution: Mediterranean.

III

A Systematic List of Named Forms grouped under the Species retained in Section II

In this section the species listed in Section II (Systematic list of species with diagnoses) are given in full. The method employed is to include under the name of each species now recognised as valid, the species now included as synonyms. Each of these last has been kept separate in the form in which it was understood prior to the publication of this work. For each of them is given a full synonymy as well as a detailed description of the species. Thus in Section II is given in brief the list of species recognised by me, with a summary of characters. In Section III is given the evidence upon which the results in Section II were achieved.

It has been usual in the past for authors to include careful descriptions of the spicules supporting the oscular margin. These are, however, so variable as to be without diagnostic value. All mention of oscular spicules has been omitted therefore.

Genus **Leucosolenia** Bowerbank*

Leucosolenia Bowerbank, 1861: 236; *Guancha* Miklucho-Maclay, 1868: 221; *Nardosa* Wright, 1868: 223; *Olynthium* Haeckel, 1870: 237; *Olynthus* Haeckel, 1870: 237; *Prosycum* Haeckel, 1870: 237; *Leucaria* Haeckel, 1870: 243; *Leucelia* Haeckel, 1870: 243; *Leuceria* Haeckel, 1870: 243; *Leucilia* Haeckel, 1870: 243; *Leuciria* Haeckel, 1870: 243; *Leucoria* Haeckel, 1870: 243; *Soleniscus* Haeckel, 1870: 244; *Tarroma* Haeckel, 1870: 244; *Tarrus* Haeckel, 1870: 244; *Nardopsis* Haeckel, 1870: 246; *Clystolynthus* Haeckel, 1870: 248; *Sycorrhiza* Haeckel, 1870: 249; *Auloplegma* Haeckel, 1870: 250; *Aulorrhiza* Haeckel, 1870: 250; *Thecometra* Haeckel, 1870: 254; *Ascetta* Haeckel, 1872: 14; *Ascettaga* Haeckel, 1872: 15; *Ascettopa* Haeckel, 1872: 15; *Ascettusa* Haeckel, 1872: 15; *Ascometra* Haeckel, 1872: 16; *Nardorus* Haeckel, 1872: 16; *Solenula* Haeckel, 1872: 24; *Tarropsis* Haeckel, 1872: 25; *Ascilla* Haeckel, 1872: 44; *Ascillaga* Haeckel, 1872: 44; *Ascillopa* Haeckel, 1872: 44; *Ascaltaga* Haeckel, 1872: 51; *Ascaltis* Haeckel, 1872, 51; *Ascaltopa* Haeckel, 1872: 51; *Ascuris* Haeckel, 1872, 52; *Ascortaga* Haeckel, 1872: 68; *Ascortopa* Haeckel, 1872: 68; *Ascortusa* Haeckel, 1872: 68; *Asculmis* Haeckel, 1872: 77; *Ascandra* Haeckel, 1872: 80; *Ascandraga* Haeckel, 1872: 81; *Ascandropa* Haeckel, 1872: 81; *Olynthella* Haeckel, 1872: 82; *Nardoma*

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* It is still a matter for doubt whether *Leucosolenia* and *Clathrina* can be effectively separated. Added to this, there is in many instances doubt whether the many names proposed by Haeckel belong to the one genus or the other. Consequently, it has been thought expedient to include all synonyms of them as under *Leucosolenia*, thereby largely maintaining the position found in Dendy and Row (1913).

Haeckel, 1872; 103; *Solenidium* Haeckel, 1872: 103; *Olynthaltus* Haeckel, 1872: 384; *Olynthandrus* Haeckel, 1872: 384; *Olynthettus* Haeckel, 1872: 384; *Olynthortus* Haeckel, 1872: 384; *Olynthillus* Haeckel, 1872: 384; *Olynthulmus* Haeckel, 1872: 384; *Olynthandrium* Haeckel, 1872: 385; *Olynthellandra* Haeckel, 1872: 385; *Olynthelletta* Haeckel, 1872: 385; *Clistolynthus* Haeckel, 1872: 391; *Clistolynthaltis* Haeckel, 1872: 392; *Clistolynthandra* Haeckel, 1872: 392; *Clistolynthetta* Haeckel, 1872: 392; *Clistolynthilla* Haeckel, 1872: 392; *Soleniscetta* Haeckel, 1872: 395; *Soleniscilla* Haeckel, 1872: 395; *Soleniscyssa* Haeckel, 1872: 395; *Solenicaltis* Haeckel, 1872: 396; *Solenicortis* Haeckel, 1872: 396; *Soleniculmis* Haeckel, 1872: 396; *Soleniscandra* Haeckel, 1872: 396; *Solenidandra* Haeckel, 1872: 397; *Solenulandra* Haeckel, 1872: 397; *Solenuletta* Haeckel, 1872; 397; *Nardoraltis* Haeckel 1872: 401; *Nardoranda* Haeckel, 1872: 401; *Nardoretta* Haeckel, 1872: 401; *Nardorilla* Haeckel, 1872: 401; *Nardorortis* Haeckel, 1872: 401; *Nardomandrum* Haeckel, 1872: 402; *Nardopsandra* Haeckel, 1872: 402; *Nardopsetta* Haeckel, 1872: 402; *Nardopsortis* Haeckel, 1872: 402; *Tarraltis* Haeckel, 1872: 404; *Tarrandra* Haeckel, 1872: 404; *Tarretta* Haeckel, 1872: 404; *Tarrilla* Haeckel, 1872: 404; *Tarromandra* Haeckel, 1872: 405; *Tarropsandra* Haeckel, 1872: 405; *Tarropsetta* Haeckel, 1872: 405; *Auloplegmaltis* Haeckel, 1872: 407; *Auloplegmetta* Haeckel, 1872: 407; *Auloplegmilla* Haeckel, 1872: 407; *Auloplegmandra* Haeckel, 1872: 408; *Auloplegmortis* Haeckel, 1872: 408; *Ascaltometra* Haeckel, 1872: 411; *Ascandrometra* Haeckel, 1872: 411; *Ascettometra* Haeckel, 1872: 411; *Leucopsis* Lendenfeld, 1885: 1089; *Homandra* Lendenfeld, 1891: 229; *Nardoris*, Delage, 1899: 235; *Aulorhiza*, Dendy & Row, 1913: 788.

Type-species: Spongia botryoides Ellis and Solander, 1786: 190, pl. lviii, figs. 1–4.

1 **Leucosolenia botryoides** (Ellis and Solander)

Minchin (1904, 1905) has demonstrated a fair range of variability in the spicules of *Leucosolenia botryoides*, *L. complicata* and *L. variabilis*. As a result of his studies he suggests, with considerable caution, that these three species may be more closely related than had been supposed up to that time. In 1936, Topsent took this a step further and recognised *L. complicata*, *L. botryoides* and *L. botryoides* var. *variabilis*. Finally, Sarà (1953) recognised one species, *L. botryoides*, 'with the form *variabilis* for individuals with intermediate characters between *L. complicata* and *L. botryoides* . . . and form *parthenopea* with new characters'.

Whether we use the word 'form' or the word 'variety', it is clear that these authors recognise a variability within a species which is wider than that normally accepted for species of Calcarea. It is possible to argue for the acceptance of an even wider range. Thus, while it is impossible to know precisely the numbers of specimens examined by each of these authors, there is nothing to indicate that either of them has examined a long series, of 50–100 individuals, which is the length of the series needed for an adequate survey. I have not examined such a series for this species, nor is there the opportunity to do so at this moment, but by comparison with similar series in other species, which I have examined, I would expect a wider range of variability in the spicules of *L. botryoides* than either Minchin, Topsent or Sarà have recorded.

Meanwhile, there is another way in which this problem can be examined. We find that *L. variabilis* has been recorded for the North Atlantic, Mediterranean, South Africa, New Zealand, the Antarctic and the south and west coasts of South America, *L. botryoides* for the North Atlantic, Mediterranean, New Zealand and Antarctic, and *L. complicata* for the North Atlantic, Mediterranean and the Antarctic. Thus, two things emerge: that the full range of these three forms is closely comparable; and that all three have wide distribution.

Another feature which should be recalled is that the external form in the specimens hitherto recorded is by no means constant. Haeckel (1872: pl. 18) gives a series of fifteen growth forms. To these we must add the growth (pl. 19) which he calls *Ascandra pinus* and which has long been recognised as a synonym of *L. variabilis*. It is highly probable that some of Haeckel's figures on pl. 18 are imaginative. It may be, on the other hand, that they represent a faithful portrayal of individuals having a typical *L. variabilis* skeleton. Yet, even if we limit our acceptance of Haeckel's figures to his figs. 1, 4 and 5 (which are probably young stages) and his figs. 6, 7, 8 and 9, together with the arborescent growth named *Ascandra pinus*, there is evidence of a wide range in the external form also. Haeckel assures us, in his explanation to pl. 18, that: 'Alle auf dieser Tafel abgebildeten Formen sind von mir selbst in der Goethe-Bucht bei Brandesund auf der norwegischen Insel Gies-Oe gesammelt; sie stellen nur eine kleine Auswahl aus dem Formen-Reichstum dar, der dort zu finden ist.' Unfortunately, Haeckel gives (pl. 16) merely one set of spicules for each of *Ascandra variabilis* and *A. pinus*, and although these show perceptible differences from the many figures given by Minchin (1904) for *Leucosolenia variabilis*, one is left to suspect that if Haeckel had given the same attention to the variations in the spicules that he gave to the external form, a very illuminating set of figures would have resulted.

I would suspect that Haeckel examined the skeleton of a few of his specimens from Gies-Oe and, finding they showed a general similarity in the form of the spicules, assumed the form of the spicules to be constant within narrow limits, and made his drawings from the skeletons of two specimens only. I have found in examining long series of specimens from one locality that the majority show more or less constant features in the spiculation, and it is only by being persistent and examining all specimens diligently that the extremes of variation are revealed.

So far, then, we have for *L. botryoides* a limited evidence of variation in the spicules, with supporting evidence for suspecting that the limits of variation may be greater than those illustrated by Haeckel, Minchin, Topsent and Sarà. As to the external form, the variations shown by Haeckel's figs. 1, 4, 5, 6, 7, 8 and 9 can be matched among specimens from the British Isles, in the British Museum collection, identified by Bowerbank, Norman and others. It may be, therefore, that these represent the normal variations, and that the remaining figures given by Haeckel on his pl. 18 represent rarer and more extreme variations.

If we now examine species, named by a variety of authors, having apparent affinities with *L. botryoides*, we have the following results. There are twenty-one such species, of which ten are from some point within the range of *L. botryoides*, as already stated. These are:

aboralis Brøndsted	Antarctic
atlantica Thacker	Cape Verde Islands
discoveryi Jenkin	Antarctic
goethei Haeckel	Mediterranean
hispida Brøndsted	Antarctic
lucasi Dendy	New Zealand

pilosella Brøndsted	St. Paul
solida Brøndsted	Antarctic
tenuis Schuffner	Norway
thamnoides Haeckel	Norway, North Sea, Atlantic coasts of America

Taking these in order, their characteristics may be briefly expressed as follows:

L. aboralis has triradiates and quadriradiates not perceptibly different from those of *L. botryoides*. It lacks oxea, and the holotype is a fragment of a tube 15 mm. long by 2 mm. diameter, and differs in no important respect from a portion of vertical tube taken from a typical *L. botryoides*.

L. atlantica has triradiates and quadriradiates almost, if not quite, equiangular, but the external form is such that it could be a fragment of the specimen illustrated in Haeckel's fig. 5 (see text-fig. 2).

L. discoveryi spicules not markedly unlike those of *L. botryoides* and the external form is identical with Haeckel's figs. 4, 5 (see text-fig. 8).

L. goethei lacks oxea, but is otherwise not unlike *L. botryoides* in spiculation. Its external form is close to that in Haeckel's fig. 11 (see text-fig. 10).

L. hispida has radiates similar to those of *L. botryoides* but more equiangular, and has the external form similar to that in Haeckel's fig. 1 (see text-fig. 11).

L. lucasi has spicules not markedly dissimilar from those of *L. botryoides* and an external form like that in Haeckel's figs. 4, 5 (see text-fig. 15).

L. pilosella has spicules still more nearly like those of *L. botryoides* and the external form suggests a fragment from a specimen such as that depicted by Haeckel for *L. pinus* (see text-fig. 18).

L. solida is somewhat atypical of *L. botryoides* in spicules and external form, but the latter can be justifiably compared with Haeckel's fig. 5 (see text-fig. 21).

L. tenuis is so clearly an example of the kind represented by Haeckel's fig. 6 that little more need be said (see text-fig. 23).

L. thamnoides has the external form of *L. botryoides* but the spicules are aberrant. Since Haeckel found this type off Norway, in the North Sea and on the Atlantic coast of America, we are either in the presence of a distinct and extraordinarily rare species or a form of *L. botryoides* which has aberrant spicules but which occurs every now and then over part of the range of that species.

It is possible, therefore, to see in the ten species listed and discussed here nothing more than fairly typical specimens (or fragments) of *L. botryoides*, with occasional examples of slightly atypical spiculation.

On the fringes of the accepted range of *L. botryoides* we have:

multiformis Breitfuss	White Sea
australis Brøndsted	Kerguelen
cancellata Verrill	Atlantic coast of U.S.A.
irregularis Jenkin	East Africa

Of these, the following comments can be made:

L. multiformis has an external form typical of low-growing *L. botryoides* in the intertidal zone, and its spicules, allowing for the crudity of the drawings, are not markedly atypical except for the absence of oxea.

L. australis is a typical *L. botryoides* in external form and its spicules are nearly alike to those figured by Minchin for that species.

L. cancellata is difficult to recognise from the original description. It could be *L. botryoides* and the specimen designated the neotype by de Laubenfels is a typical *L. botryoides.*

L. irregularis is a larger edition of Haeckel's fig. 5 (see text-fig. 13) with slightly aberrant spicules.

If *L. lucasi* is truly an example of *L. botryoides*, its occurrence in Australian waters (*teste* Dendy) carries the range of that species near to Java whence *L. sertularia* (Haeckel) was obtained. This is so obviously like *L. pinus* that we must discount the aberrant nature of its spicules.

Having disposed of these species we are left with two groups: (1) four species from Japan (*L. kagoshimensis* Hozawa, *L. mollis* Tanita, *L. serica* Tanita and *L. tenera* Tanita); (2) two species from California (*L. eleanor* Urban and *L. nautilia* de Laubenfels).

L. kagoshimensis appears to be nothing more than a long oscular tube detached from the rest of the sponge, with spiculation fairly typical of *L. botryoides.*

L. mollis is fairly typical of *L. botryoides* in all respects.

L. serica is a fairly typical *L. botryoides*, with equiangular radiates.

L. tenera seems to be a typical low-growing *L. botryoides* with fairly typical spiculation.

Of the next two species, from California,

L. eleanor is without question *L. botryoides* as portrayed in Haeckel's figs. 5 and 9 (see text-fig. 9);

L. nautilia is even more certainly *L. botryoides.*

Named form: **Leucosolenia aboralis** Brøndsted

(text-fig. 1)

Leucosolenia aboralis Brøndsted, 1931: 15, fig. 14; Tanita, 1943: 79.

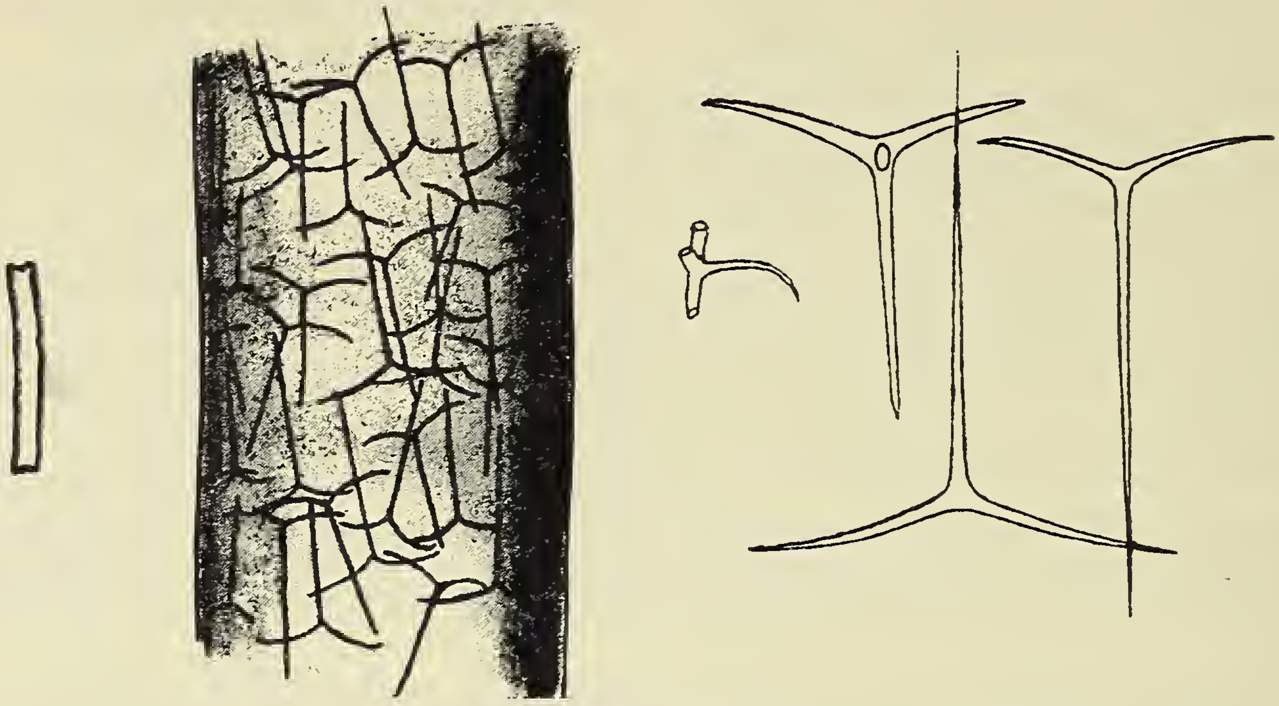
Description: Sponge tubular (incomplete ?) (other details of external form not recorded); skeleton of triradiates and quadriradiates.

Spicules: triradiates, sagittal, paired rays 0·06 to 0·16 by 0·006 to 0·01 mm., basal ray 0·1 to 0·14 by 0·006 to 0·008 mm.,
quadriradiates, similar to triradiates, with apical ray 0·04 to 0·05 by 0·004 mm.

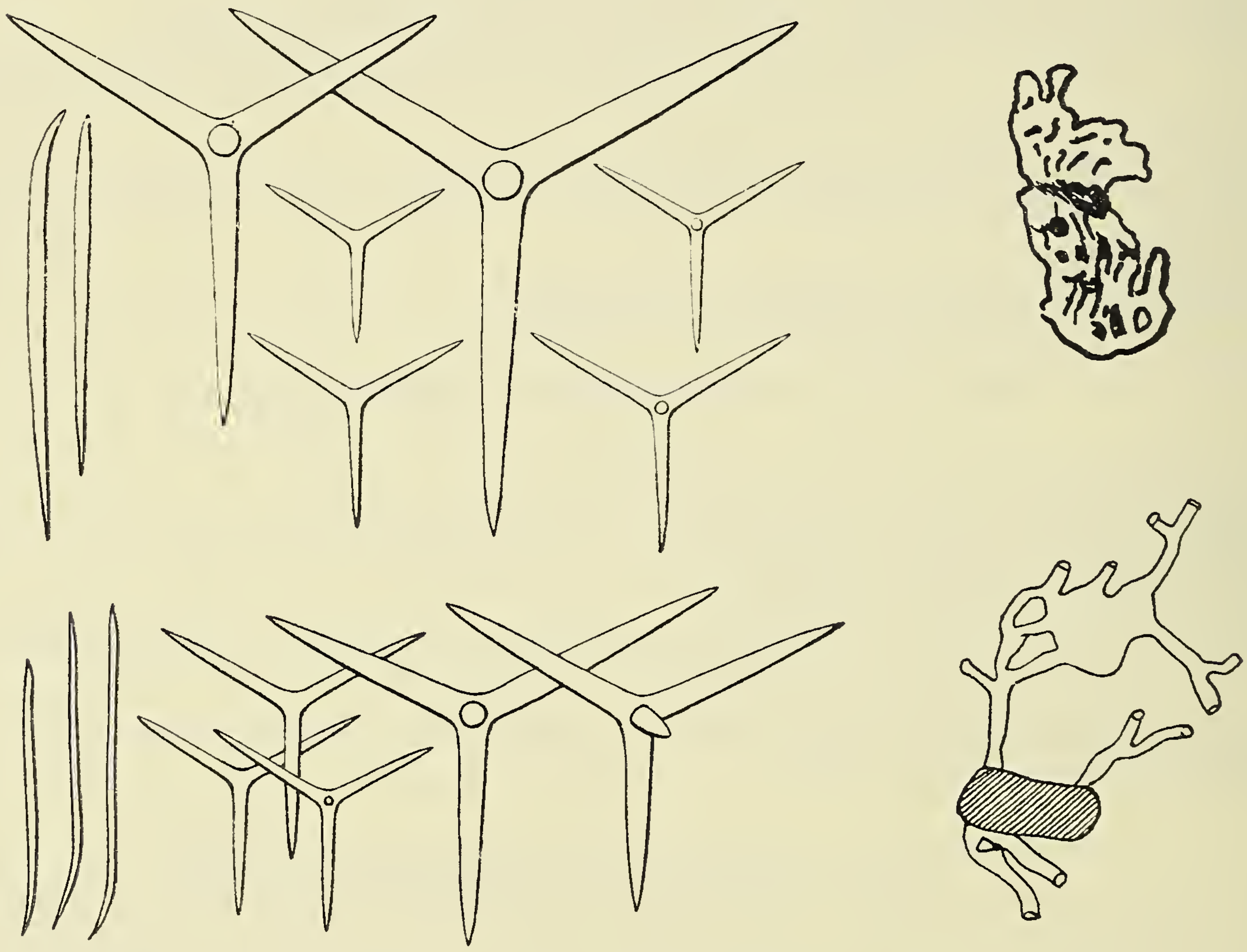
Distribution: Antarctic, 350–385 m.

Named form: **Leucosolenia arachnoides** (Haeckel)

This was one of four 'specifische Varietäten' of *L. variabilis* recognised by Haeckel, elevated to specific rank by Dendy and Row (1913), their example being followed by Breitfuss (1932) and Tanita (1942). Minchin (1905) ignored it in publishing the results of his extensive studies on *L. variabilis*; and Topsent, who worked over most of the range given by Haeckel for *L. variabilis*, has not mentioned it, although he many times recorded *L. variabilis* itself. Careful reading of Haeckel's account gives us no clue as to the further distinctive characters or geographical location of the *Ascandra arachnoides* mentioned on his p. 108 (1872). It seems fairly evident that Haeckel considered this as an intermediate form of *L. variabilis*, which today would be counted as a normal variation on the typical form.



Text-fig. 1. *Leucosolenia aboralis* after Brøndsted: fragment of tube (left) representing lectotype, × 5; portion of same (centre), × 70; triradiates and a quadriradiate from body wall, with (on their left) side view of apical ray of a quadriradiate, × 250.



Text-fig. 2. *Leucosolenia atlantica*: spicules and external form of Thacker's type-specimen (below), from Cape Verde Is., and Tanita's specimen (above), from Japan, to show remarkable similarity in spicules from specimens growing in widely-separated localities and belonging to two distinct species. Spicules of Thacker's specimen, × 200, of Tanita's specimen, × 150. Drawings of entire sponges, natural size. Tanita's specimen of *L. atlantica* belongs to *Clathrina coriacea* (see p. 191).

Named form: **Leucosolenia atlantica** Thacker

(text-fig. 2)

Leucosolenia atlantica Thacker, 1908: 760, pl. xl, fig. 2, text-fig. 156; Dendy and Row, 1913: 721; *nec* Tanita, 1942: 81; (?) Tanita, 1943: 380, pl. xii, fig. 16, text-fig. 4.

Description: Sponge a series of branching ascon tubes, widely separated from each other, and dilating at certain points into irregular masses; surface minutely hispid; vents terminal; texture (?); colour, in spirit, 'straw-yellow'; skeleton of triradiates, quadriradiates of two sizes, and oxea.

Spicules: triradiates, regular, rays 0·12 by 0·01 mm.,
quadriradiates, small, regular, facial rays 0·12 by 0·01 mm., apical rays 0·03 by 0·007 mm.,
quadriradiates, large, regular, facial rays 0·2 by 0·035 mm., apical rays 0·1 by 0·025 mm.,
oxea, 0·3 by 0·009 mm.

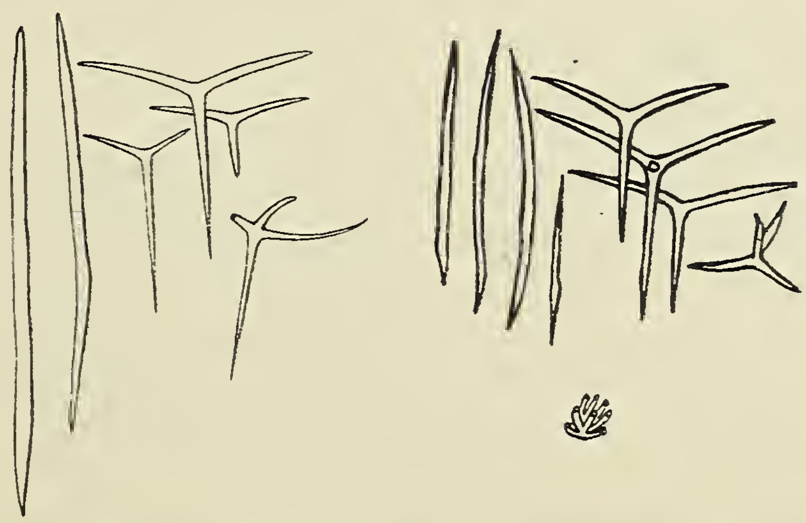
Distribution: Cape Verde Islands.

Remarks: Leucosolenia atlantica has been recorded on two occasions only: originally by Thacker (1908) from the Cape Verde Islands, and the second time by Tanita (1943) from Japan. Thacker gave us drawings of the spicules and a line drawing of the complete specimen. These are reproduced here (fig. 2). Tanita gave us drawings of the spicules, which are remarkably like those of the type of *L. atlantica* except in size. The external form of Tanita's specimen is, however, illustrated by a photograph which lacks detail in its published form, and a line drawing of it is reproduced here. Comparing these two sets of illustrations we have a striking example of the difficulty of identifying isolated and, especially, small specimens of calcareous sponges. In this instance there can be little doubt that the holotype of *L. atlantica* belongs to *L. botryoides* and that Tanita's specimen of *L. atlantica* belongs to *Clathrina coriacea*. Therefore, although all specimens recorded as *Clathrina* (*Leucosolenia*) *coriacea* are included under that name in this work, there is no guarantee that some of them may not belong more properly to *Leucosolenia botryoides*. There may be similar doubts about specimens assigned to *L. botryoides*. Short of performing the well-nigh impossible task of seeking out all such specimens and re-examining them, we can only accept such identifications at their face value.

Named form: **Leucosolenia australis** Brøndsted

(text-fig. 3)

Leucosolenia australis Brøndsted, 1931: 15, figs. 15–16; Tanita, 1942: 84; Tanita, 1942: 107; Tanita, 1943: 382, pl. xii, fig. 17.



Text-fig. 3. *Leucosolenia australis* after Brøndsted: spicules from two of the types (53b, on left, 324 on right), × 100; external form reconstructed from Brøndsted's description, natural size.

Description: Sponge composed of thin-walled tubes; surface hispid; vent apical (?); texture (?); colour, in spirit, white; skeleton of triradiates, quadriradiates and oxea.

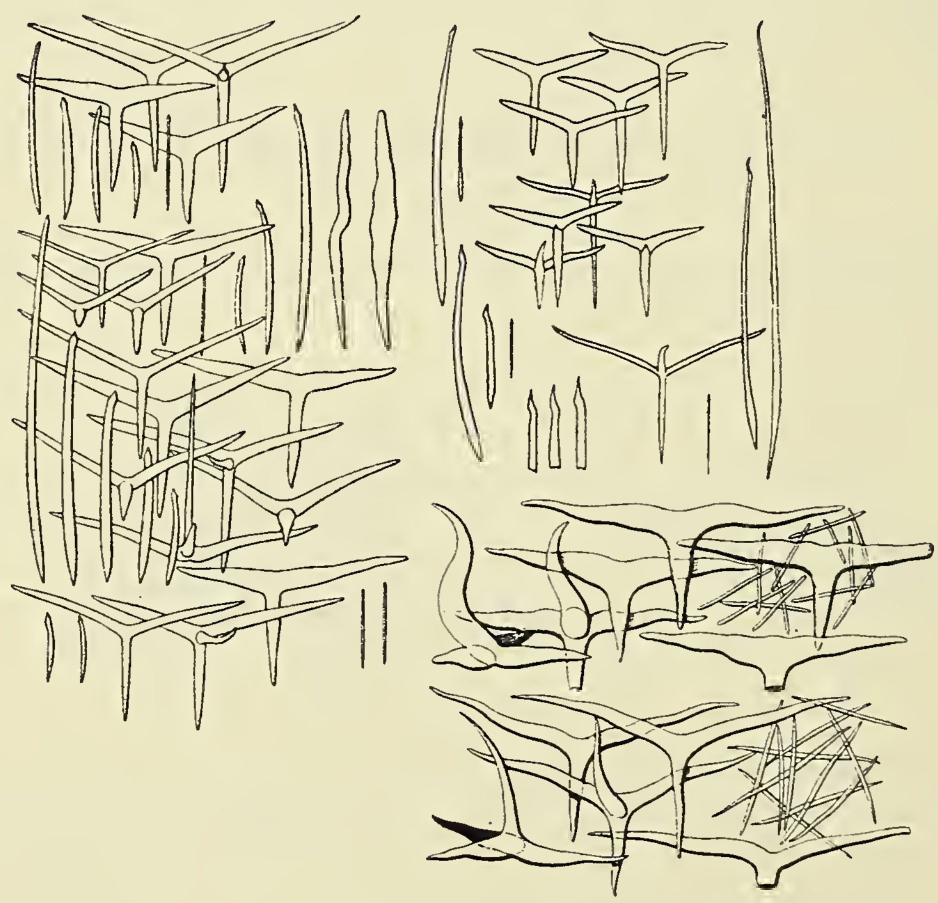
Spicules: triradiates, sagittal, paired rays 0·075 to 0·11 by 0·06 to 0·01 mm., basal ray 0·08 to 0·12 by 0·06 to 0·1 mm.,
quadriradiates, similar to triradiates, with apical ray 0·025 to 0·08 mm. long,
oxea, 0·15 to 0·4 by 0·008 to 0·012 mm.

Distribution: Kerguelen; Straits of Magellan.

Named form: **Leucosolenia botryoides** (Ellis & Solander)

(text-figs. 4–5)

Spongia botryoides Ellis & Solander, 1786: 190, pl. lviii, figs. 1–4; Montagu, 1812: 89; *Scypha botryoide*, Gray, 1821: 357; *Spongia botryoides* (pars), Grant, 1826: 339; Grant, 1826: 169; Grant, 1827: 135; *Grantia botryoides* (pars), Fleming, 1828: 525; *Calcispongia botryoides*, de Blainville, 1836: 531; *Grantia botryoides* (pars), Johnston, 1842: 178; *Leucosolenia botryoides*, Bowerbank, 1864; 164, pl. xxvi, figs. 347, 348; Bowerbank, 1866: 28; *Grantia lieberkühnii* Schmidt, 1866: 8, 20; *Leucosolenia botryoides*, Gray, 1867: 555; Schmidt, 1868: 31; *Olynthium nitidum*, Haeckel, 1870: 237; *O. splendidum*, Haeckel, 1872: 237; *Leucosolenia* (*Leuceria*) *botryoides*, Haeckel, 1872: 243; *L. granti* Haeckel, 1872: 243; *Ascaltis botryoides*, Haeckel, 1872: 65, pl. ix, fig. 10, pl. x, fig. 7; *Soleniscus botryoides*, Haeckel, 1872: 65; *Ascaltis ellisii* Haeckel, 1872: 65; *A. solanderii* Haeckel, 1872: 65; *Ascandra botryoides*, Haeckel, 1872: 65; *A. botrys* Haeckel 1872: 101, pl. xvi, fig. 1; *Soleniscus botrys* Haeckel, 1872: 102; *Ascandra nitida* Haeckel, 1872: 103, pl. xvi, fig. 2, pl. xvii, figs. 3, 7, 10, 13; ? *Leucosolenia botryoides*, Verrill, 1874: 393; *Ascandra botryoides*, Fristedt, 1885: 9; *Ascaltis botryoides*, Hanitsch, 1890: 233; *Leucosolenia botryoides*, Minchin, 1896: 359; Breitfuss, 1898: 210; *Ascandra botrys*, Breitfuss, 1898: 213; *Leucosolenia botryoides*, Rousseau, 1903: 5, fig. 1; Allen, 1904: 185; Minchin, 1904: 386, figs. 97–98; Dendy and Row, 1913: 721; *L. botrys*, Dendy and Row, 1913: 721; *L. nitida*, Dendy and Row, 1913: 723; *L. botryoides*, var.



Text-figs. 4–5. *Leucosolenia botryoides*: spicules (left) after Minchin, × 100; (top right) after Topsent, × 100; and (bottom right) after Haeckel, × 130.

macquariensis Dendy, 1918: 5, pl. i, figs. 1, 6; *L. botryoides*, Breitfuss, 1927; 27; *L. botrys*, Breitfuss, 1927: 27; *L. botryoides*, Arndt, 1928: 20, text-figs. 11–13; Burton, 1929: 401; Renouf, 1931: 427, 433; Breitfuss, 1932: 240; Arndt, 1935: 4, fig. i; Topsent, 1936: 33, text-fig. 17; Bassindale, 1940: 145; Tanita, 1942: 85; *L nitida*, Tanita, 1942: 86; *L. botryoides*, Brøndsted, 1943: 2; Cutcliffe, 1946: 175; Tuzet, 1948: 103; Lévi, 1950: 2; Pavans de Seccatty, 1953: 8; *L. botryoides* forma *parthenopea* Sarà, 1953: 96, pl. iii, fig. 6.

Description: Sponge composed of an encrusting network of ascon tubes, with erect tubes arising therefrom to end in terminal vents; surface minutely hispid; texture soft; colour, alive and in spirit, white; skeleton of triradiates and quadriradiates, with apical rays projecting into cloacal cavity, and oxea.

Spicules: triradiates, sagittal, paired rays 0·08 to 0·1 by 0·006 to 0·014 mm., basal rays 0·03 to 0·08 by 0·01 to 0·14 mm.,
quadriradiates, similar to triradiates, with apical rays 0·03 to 0·14 by 0·06 to 0·14 mm.,
oxea, lanceolate at distal ends, 0·06 to 0·8 by 0·006 to 0·01 mm.

Distribution: Atlantic coasts of Europe; Mediterranean; New Zealand; Antarctic; littoral to 18 m.

Leucosolenia cervicornis (Haeckel)

Remarks: Dendy and Row (1913) elevated to specific rank the var. *cervicornis* of *L. variabilis*. It is here included as a simple synonym of *L. variabilis* (*q.v.*).

[*Leucosolenia cancellata* Verrill, de Laubenfels, 1949: 28, figs. 29–31.

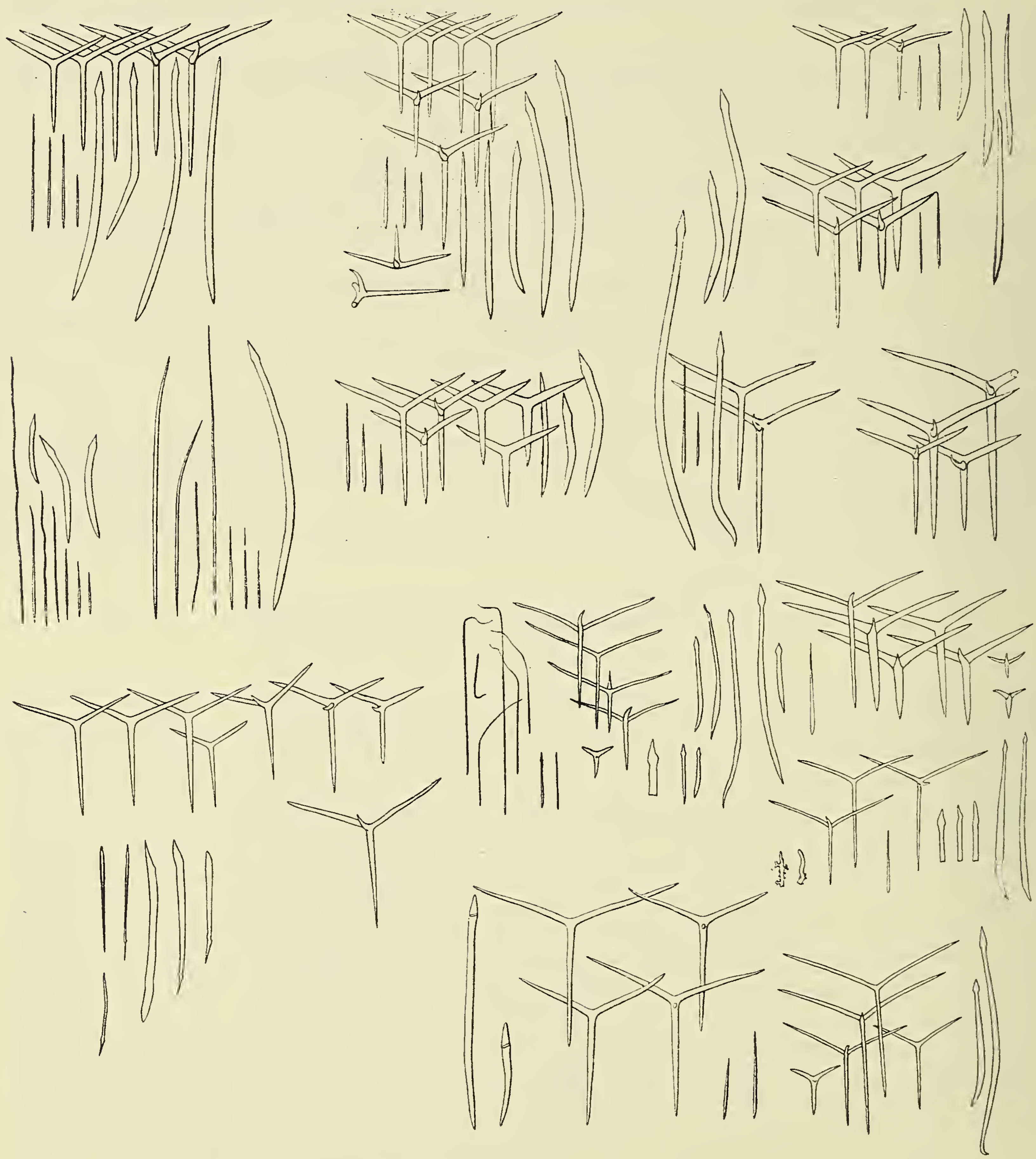
Under this name de Laubenfels has figured a typical *L. botryoides*, whereas *L. cancellata* as originally described by Verrill is unquestionably better represented by the figure given by Lambe (see *L. cancellata* under *Clathrina coriacea*).

It is unfortunate that de Laubenfels should have designated a neotype from material so patently not conspecific with Verrill's original.]

Named form: **Leucosolenia complicata** (Montagu)
(text-fig. 6)

Spongia complicata Montagu, 1818: 97, pl. ix, figs. 2, 3; *S. botryoides* (pars.), Grant, 1826: 169; *Grantia botryoides* (pars), Fleming, 1828: 525; (pars) Johnston, 1842: 178; *Leucosolenia contorta* (pars), Bowerbank, 1866: 9; *L. botryoides*, Gray, 1867: 555; *L. fabricii* Schmidt, 1869: 91; Schmidt, 1870: 73; *Olynthus hispidus* Haeckel, 1870: 237; *O. pocillum* Haeckel, 1870: 237; *Leucosolenia amoeboides* Haeckel, 1870: 243; *L.* (*Leucelia*) *complicata*, Haeckel, 1870: 243, *L. fabricii* Haeckel, 1870: 243; *Ascortis fabricii*, Haeckel, 1872: 71, pl. xi, fig. 3, pl. xii, fig. 3; *Soleniscus fabricii*, Haeckel, 1872: 72; *Ascandra fabricii*, Haeckel, 1872: 72; *Asculmis armata* Haeckel, 1872: 77, pl. xiii; *Olynthus armatus* Haeckel, 1872: 78; *Soleniscus armatus* Haeckel, 1872: 78; *Asculmis norvegica* (=*A. armata*, var. *norvegica*) Haeckel, 1872: 78; *A. pocillum* (=*A. armata* var. *pocillum*) Haeckel, 1872: 78; *Ascandra armata* Haeckel, 1872: 78; *A. complicata*, Haeckel, 1872: 93, pl. xv, fig. 1; *Olynthus complicatus*, Haeckel, 1872: 93; *Soleniscus complicatus*, Haeckel, 1872: 93; *Tarrus complicatus*, Haeckel, 1872: 93; *Ascandra hispida* (=*A. complicata*, var. *hispida*) Haeckel, 1872: 94; *A. amoeboides* (=*A. complicata*, var. *amoeboides*) Haeckel, 1872: 94; *A. pinus Haeckel*, 1872: 105, pl. xvi, fig. 3, pl. xix; *Soleniscus pinus*, Haeckel, 1872: 105; *Leucosolenia contorta* (pars), Bowerbank, 1874: 7, pl. iii, figs. 5–10; *A. contorta* Barrois, 1876: 36; *A. complicata*, Bowerbank, 1882: 226; Fristedt, 1887: 406; *Leucosolenia pinus*, Topsent, 1891: 525; *L. complicata*, Levinsen, 1893: 424; Weltner, 1894: 325; Minchin, 1896: 359; Bidder, 1898: 69; *Ascandra complicata*, Breitfuss, 1898: 213; *A. contorta*, Breitfuss, 1898: 214; *A. fabricii*, Breitfuss, 1898: 214; Breitfuss, 1898: 7; *A. contorta*, Breitfuss, 1898: 15, pl. i, fig. 1; *A. fabricii*, Breitfuss, 1898: 285; *A. contorta*

Breitfuss, 1898: 285; *A. complicata*, Breitfuss, 1898: 285; *A. fabricii*, Breitfuss, 1898: 17; *A. complicata*, Breitfuss, 1898: 27; *A. contorta*, Breitfuss, 1898: 27; *A. complicata* et varr. *amoeboides, hispida*, Breitfuss, 1898: 22; *A. fabricii*, Breitfuss, 1898: 22; *Leucosolenia complicata*, Minchin, 1900: 5, fig. 5; *Ascandra complicata*, Arnesen, 1901: 13; *A. armata*, Arnesen, 1901: 13; *Leucosolenia complicata*, Rousseau, 1903: 7, fig. 3; *L. fabricii*, Rousseau, 1903: 6, fig. 2; *L. complicata*, Allen, 1904: 185; Minchin, 1904: 360, figs. 91–93; Jenkin, 1908: 6; *Ascandra complicata*, Lundbeck, 1909: 458; *A. fabricii*, Lundbeck, 1909: 458; *L. amoeboides*, Dendy and Row, 1913: 720; *L. armata*, Dendy and Row, 1913: 721; *L. complicata*, Dendy and Row, 1913: 721; *L. fabricii*, Dendy and Row, 1913: 722; *L. pinus*, Dendy and Row, 1913: 723;



Text-fig. 6. *Leucosolenia complicata*: spicules, after Minchin, Topsent and Hozawa, to show variations, × 100.

L. complicata, Breitfuss, 1927: 26; *L. complicata*, var. *norvagica*, Breitfuss, 1927: 27; *L. fabricii*, Breitfuss, 1927: 28; *L. complicata*, Arndt, 1928: 22, text-figs. 16–17; *L. amoeboides*, Breitfuss, 1932: 239; *L. complicata*, Breitfuss, 1932: 240: *L. fabricii*, Breitfuss, 1932: 241; *L. complicata*, Topsent, 1932: 1; Topsent, 1936: 8; Topsent, 1936: 27, text-figs. 14-16; Breitfuss, 1936: 5; *L. fabricii*, Breitfuss, 1936: 6; *L. complicata*, Hozawa, 1940: 132, pl. vi, fig. 1, text-fig. 1; *L. fabricii*, Tanita, 1942: 80; *L. armata*, Tanita, 1942: 81; *L. pinus*, Tanita, 1942: 83; *L. amoeboides*, Tanita, 1942: 84; *L. complicata*, Tanita, 1942: 84; Topsent and Olivier, 1943: 1; Burton, 1948: 73; Levi, 1951: 2; Sarà, 1953: 109.

Description: Sponge composed of a basal reticulation of ascon tubes, from which arise erect oscular tubes bearing lateral diverticula; surface minutely hispid; vents terminal; texture soft; colour, alive and in spirit, white; skeleton of triradiates, quadriradiates with apical rays projecting into cloacal cavity, and oxea.

Spicules: triradiates, sagittal, paired rays 0·075 to 0·09 by 0·007 to 0·01 mm., basal rays 0·1 to 0·12 by 0·007 to 0·01 mm.,
oxea, with distal ends occasionally lanceolate, of two sizes, 0·07 to 0·14 by 0·003 mm., and 0·19 to 0·28 by 0·009 to 0·01 mm.

Distribution: Arctic; Atlantic coasts of Europe; Mediterranean; Antarctic; littoral to 93 m.

Text-fig. 7. *Leucosolenia complicata*: External form (left) after Montagu's original figure (×2), with (centre and right) figures after Arndt and Breitfuss respectively (natural size).

Named form: **Leucosolenia confervicola** (Haeckel)

Remarks: Dendy and Row (1913) elevated the var. *confervicola* of *L. variabilis* to specific rank. It is here regarded as a simple synonym of *L. variabilis* (*q.v.*).

Named form: **Leucosolenia corallorhiza** (Haeckel)

Remarks: The position of this species is the same as for *L. confervicola*.

Named form: **Leucosolenia discoveryi** Jenkin

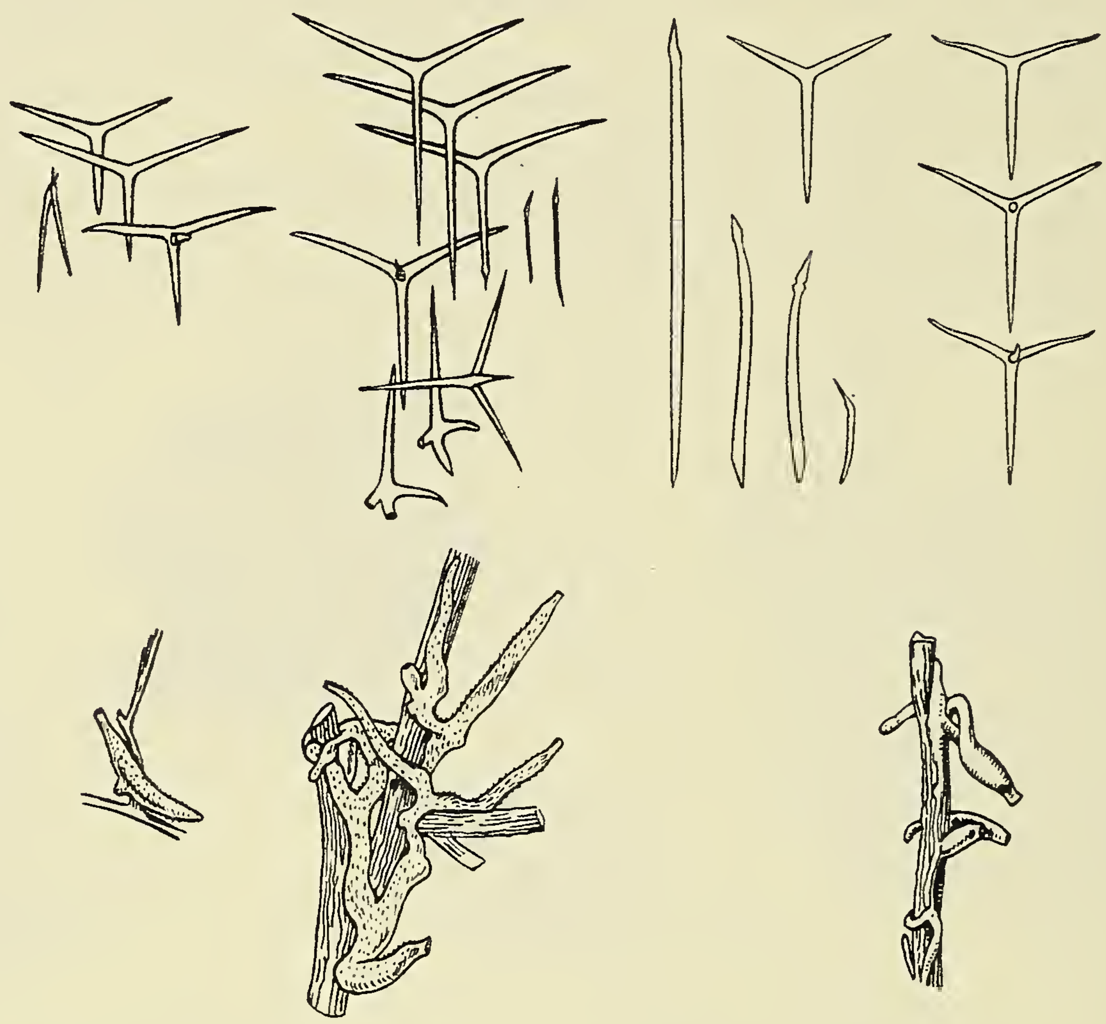
(text-fig. 8)

Leucosolenia discoveryi Jenkin, 1908: 6, pl. xxviii, figs. 12, 13; *L. minchini* Jenkin, 1908: 8, pl. xxviii, figs. 14, 15; *L. discoveryi*, Dendy and Row, 1913: 722; *L. minchini*, Dendy and Row, 1913: 723; Brøndsted, 1931: 14, text-figs. 12–13; *L. discoveryi*, Burton, 1932: 258; Tanita, 1942: 84; *L. minchini*, Tanita, 1942: 84.

Description: Sponge composed of a stolonoid tube, sparingly branched, with sub-erect tubes arising from it; surface hispid; vents terminal, with marginal fringe; texture soft; colour, in spirit, white; skeleton of body wall of triradiates, quadriradiates and oxea, of two sorts.

Spicules: triradiates, sagittal, paired rays 0·05 to 0·145 by 0·005 to 0·01 mm., basal rays 0·09 to 0·185 by 0·005 to 0·01 mm.,
quadriradiates, similar to triradiates, with curved apical rays,
oxea, ordinary, 0·06 to 0·45 by 0·003 to 0·016 mm.,
oxea, refringent, similar in size to ordinary oxea.

Distribution: Antarctic.



Text-fig. 8. *Leucosolenia discoveryi*: spicules (top left and top centre) from two of Brøndsted's (1931) specimens and (top right) from holotype, × 100; external form of types of *L. discoveryi* (bottom left and centre), × 3 and *L. minchini* (bottom right), × 5.

Named form: **Leucosolenia echinata** Kirk

(See *L. lucasi*)

Named form: **Leucosolenia eleanor** Urban

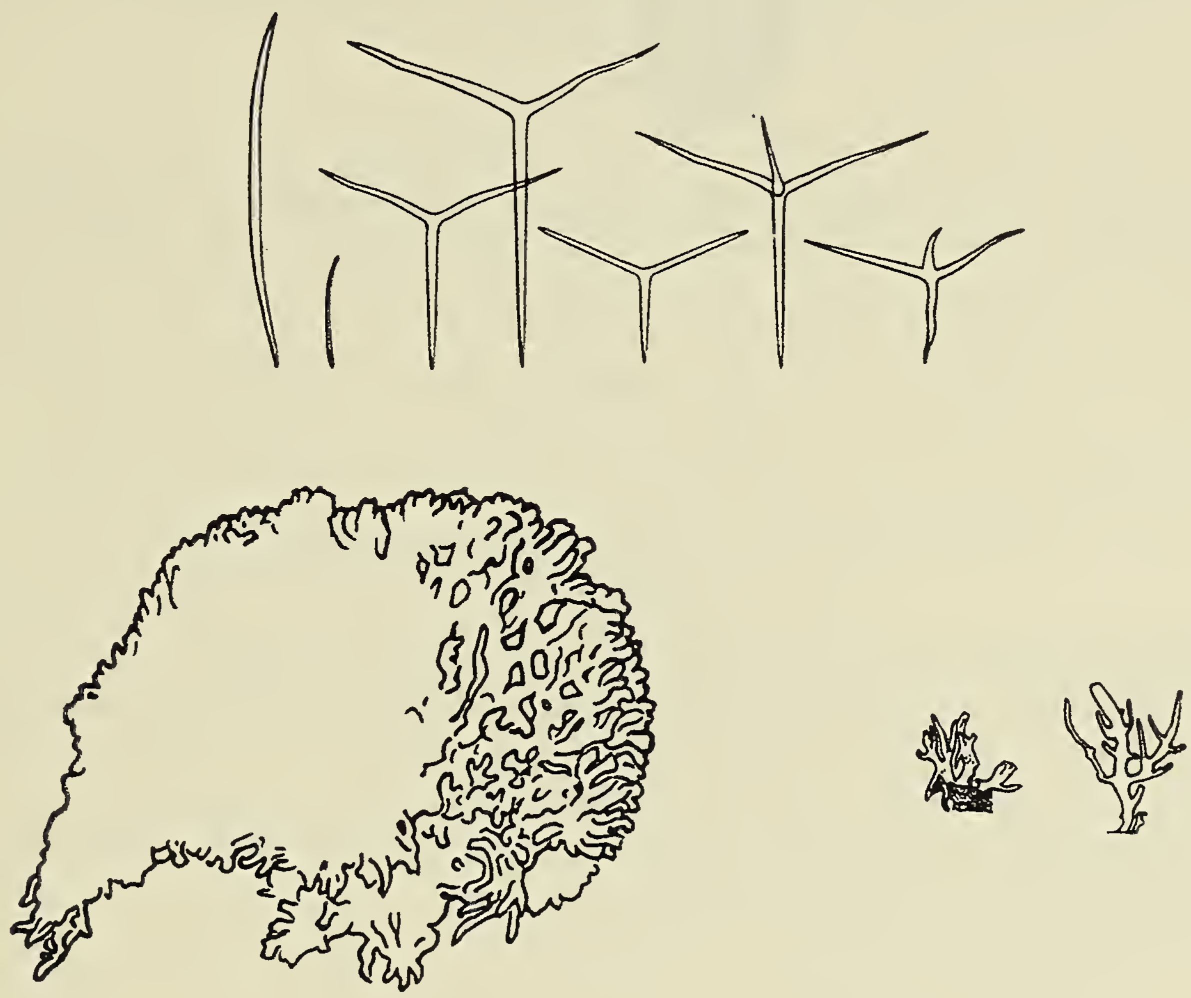
(text-fig. 9)

Leucosolenia eleanor Urban, 1905: 36, pl. vi, figs. 1–62, pl. vii, figs. 63–68; Dendy and Row, 1913: 722; de Laubenfels, 1932: 8, fig. 3; Tanita, 1942: 84; Tanita, 1943: 382, pl. xii, fig. 18.

Description: Sponge a clathrate mass of ascon tubes (0·3 to 1·7 mm. diameter) rising more or less vertically from a common base, and branching and anastomosing; surface minutely hispid; vents terminal; texture fragile, spongy; colour, alive and in spirit, white; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, regular to sagittal, rays 0·08 to 0·18 by 0·007 mm.,
quadriradiates, regular, facial rays 0·08 to 0·15 by 0·009 mm., apical rays 0·1 to 0·175 mm. long,
oxea, 0·1 to 0·434 by 0·004 to 0·009 mm.

Distribution: California; Japan (Kôti); littoral.



Text-fig. 9. *Leucosolenia eleanor* after Urban: spicules, ×100; external form (bottom left) a large colony in outline, and two small colonies, all about natural size.

Named form: **Leucosolenia fabricii** Schmidt

(See *L. complicata*)

Named form: **Leucosolenia fragilis** (Haeckel)

(See *L. thamnoides*)

Named form: **Leucosolenia goethei** Haeckel

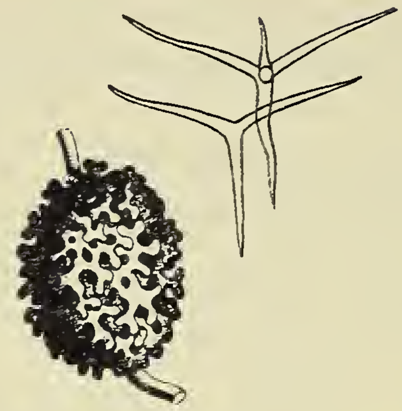
(text-fig. 10)

Leucosolenia goethei Haeckel, 1870: 243; *Ascaltis goethei* Haeckel, 1872: 64, pl. ix, fig. 9, pl. x, fig. 6; *Auloplegma goethei* Haeckel, 1872: 64; *Ascetta goethei*, Lendenfeld, 1891: 220, pl. viii, figs. 6, 17–20; *Leucosolenia goethei*, Dendy and Row, 1913: 725; Topsent, 1934: 8; Breitfuss, 1935: 10; Breitfuss, 1939: 182; Tanita, 1942: 79.

Description: Sponge a subspherical mass of anastomosing tubes; surface smooth; vents, when present, tubular; texture soft; colour, in spirit, purple-red; skeleton of triradiates and quadriradiates.

Spicules: triradiates, sagittal, paired rays 0·12 by 0·008 mm., basal rays 0·1 by 0·008 mm.,
quadriradiates, similar to triradiates, with apical rays 0·03 to 0·04 by 0·008 mm.

Distribution: Mediterranean (Naples, Rovigno),



Text-fig. 10. *Leucosolenia goethei* after Haeckel: spicules, × 100; external form, × 2.

Named form: **Leucosolenia granti** (Haeckel)

(See *L. botryoides*)

Named form: **Leucosolenia hispida** Brøndsted

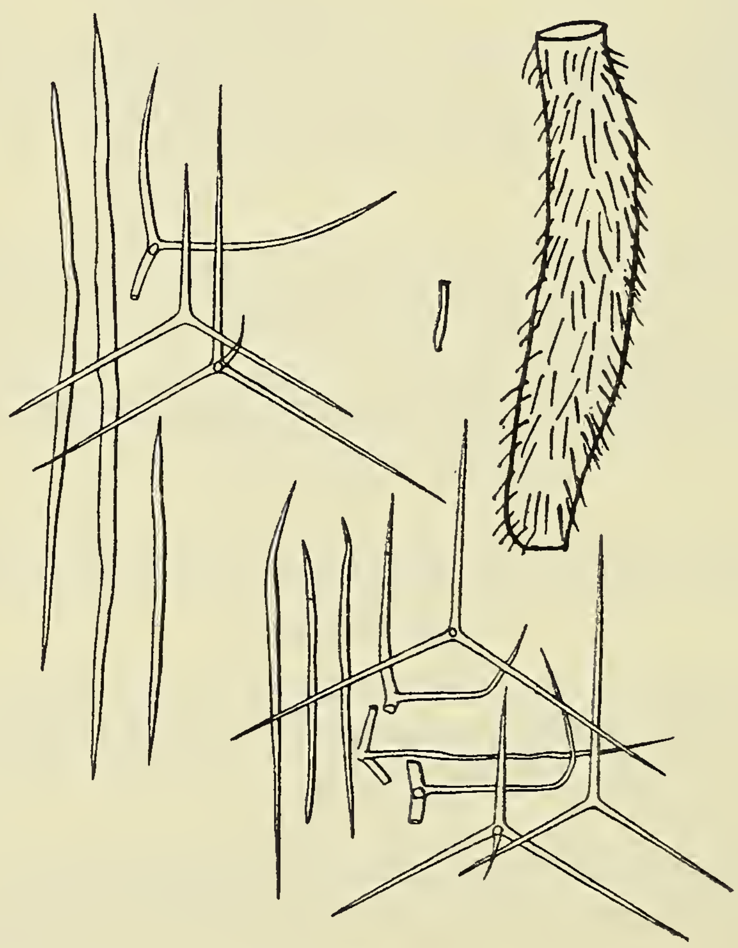
(text-fig. 11)

Leucosolenia hispida Brøndsted, 1931: 12, figs. 9–11; Tanita, 1942: 86.

Description: Sponge (incomplete?) a short narrow tube; surface hispid; vent apical; texture (?); colour (?); skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, subregular, rays 0·12 to 0·2 by 0·006 to 0·009 mm.,
quadriradiates, similar to triradiates, with apical ray 0·07 to 0·28 mm. long,
oxea, 0·25 to 0·6 by 0·008 to 0·015 mm.

Distribution: Antarctic, 350–385 m.



Text-fig. 11. *Leucosolenia hispida* after Brøndsted: groups of spicules from two of the types, to show variation, × 100; external form, to the right, × 7, immediately to its left, natural size.

Named form: **Leucosolenia hispidissima** (Haeckel)

(See *L. variabilis*)

Named form: **Leucosolenia irregularis** Jenkin

(text-figs. 12–13)

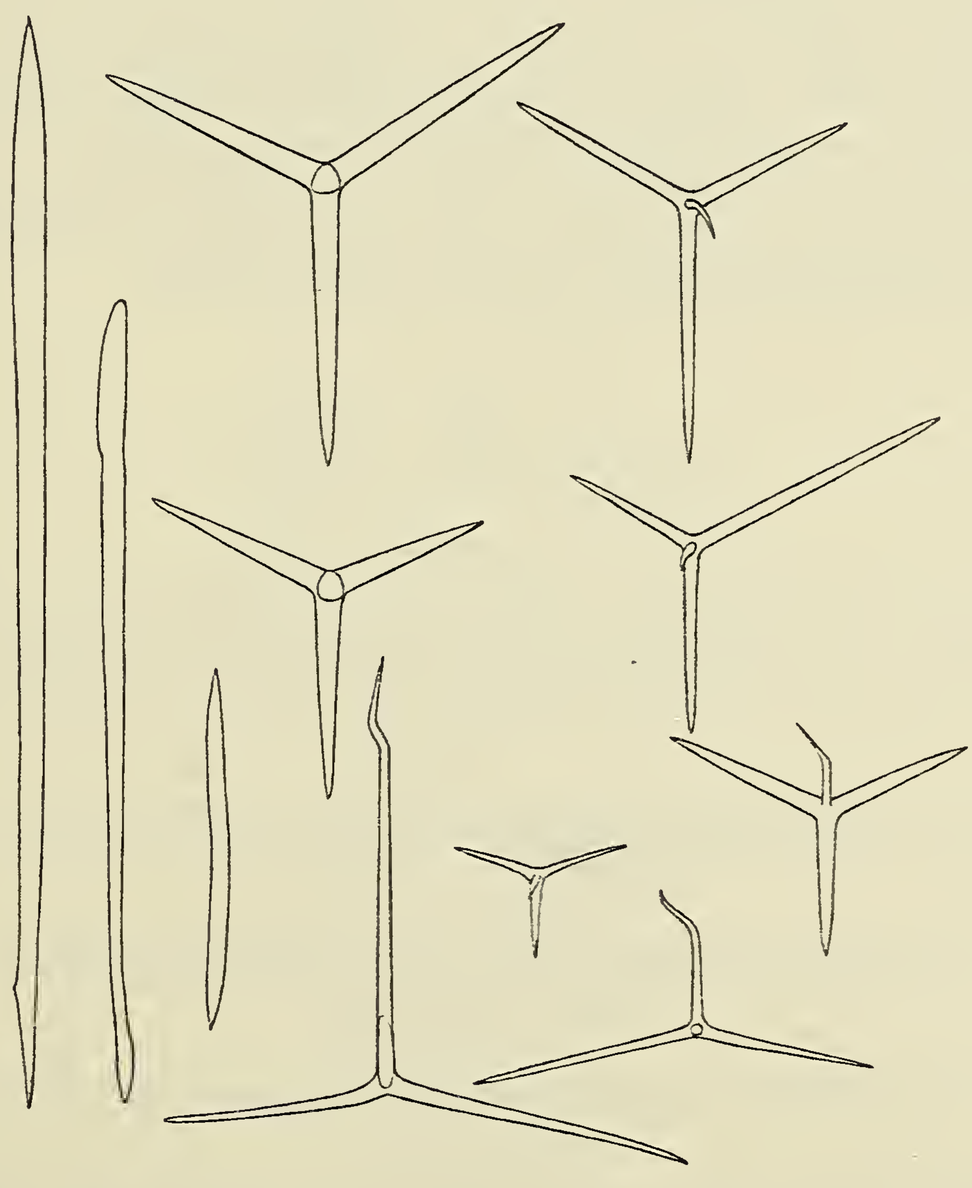
Leucosolenia irregularis Jenkin, 1908: 440, figs. 88–90; Dendy and Row, 1913: 722; Tanita, 1942: 81; Dickinson, 1946: 48, pl. xcvi, fig. 192.

Description: Sponge composed of simple erect tubes with a short rooting process; surface smooth, hispid; vent terminal; texture (?); colour, in spirit, white; skeleton of quadriradiates, of two sorts, and oxea.

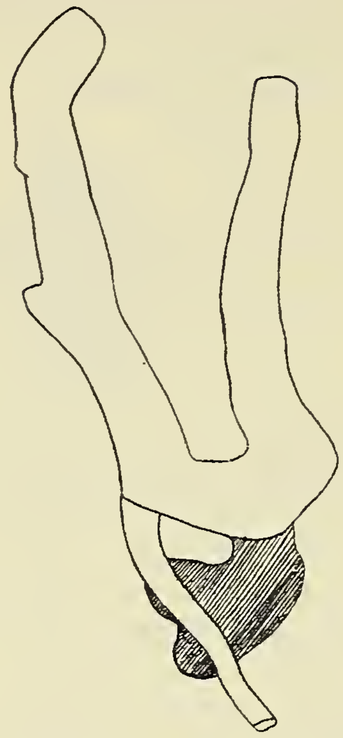
Spicules: large quadriradiates, facial rays 0·15 to 0·22 by 0·02 mm., apical rays 0·21 to 0·26 by 0·016 to 0·02 mm.,
small quadriradiates, facial rays 0·1 to 0·2 by 0·01 to 0·016 mm., apical rays 0·12 to 0·15 by 0·007 mm.,
oxea, 0·3 to 0·8 by 0·016 to 0·028 mm.

Distribution: East Africa (Wasin); California; littoral to 14 m.

Remarks: Dickinson gives the dimensions of the spicules in his Californian specimen as: triradiates, with rays 0·6 by 0·04 mm., oxea, 0·7 by 0·027 mm. The external form is, however, like that of the holotype.



Text-fig. 12. *Leucosolenia irregularis* after Jenkin: spicules, × 100.



Text-fig. 13. *Leucosolenia irregularis* after Jenkin: external form, natural size.

Named form: **Leucosolenia kagoshimensis** Hozawa

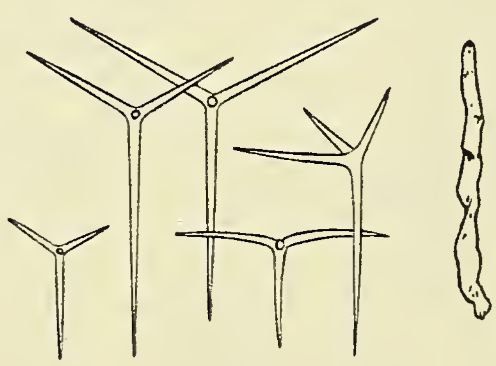
(text-fig. 14)

Leucosolenia kagoshimensis Hozawa, 1929: 285, pl. xii, figs. 6, 7, text-fig. 3; Tanita, 1942: 77; Tanita, 1943: 374, pl. xi, fig. 91.

Description: Sponge a single thin-walled tube (2 mm. greatest diameter); surface even, smooth; vent (?); texture soft, delicate; colour, in spirit, white; walls of tube supported by one or two layers of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: quadriradiates, sagittal, paired rays 0·08 to 0·13 by 0·06 to 0·008 mm., basal ray 0·13 to 0·2 by 0·006 to 0·008 mm., apical ray 0·07 to 0·12 by 0·004 to 0·006 mm.

Distribution: Japan (Kagoshima Bay; Hyata-ura); 128–165 m.



Text-fig. 14. *Leucosolenia kagoshimensis* after Hozawa: spicules, × 100, external form, natural size.

Named form: **Leucosolenia lieberkühnii** (Schmidt)

(See *L. botryoides*)

Named form: **Leucosolenia lucasi** Dendy

(text-fig. 15)

Leucosolenia lucasi Dendy, 1891: 45, pl. i, fig. 1, pl. iv, fig. 1, pl. ix, fig. 1; *L. echinata* Kirk, 1894; 177, pl. xxii, fig. 1; *L. lucasi*, Kirk, 1894: 178, pl. xxii, fig. 2; Topsent, 1907: 5; Kirk, 1909: 339;

L. echinata, Dendy and Row, 1913: 722; *L. lucasi*, Dendy and Row, 1913: 723; *L. lucasi*, Brøndsted, 1926: 298, fig. 1; *L. echinata*, Brøndsted, 1926: 299, fig. 2; *L. lucasi*, Row and Hozawa, 1931: 729; Tanita, 1942: 85; *L. echinata*, Tanita, 1942: 86; *L. lucasi*, Tanita, 1942: 109, pl. vi, fig. 3; *L. echinata*, Fell, 1950: 5; *L. lucasi*, Fell, 1950: 6.

Description: Sponge composed of ascon persons, more or less erect, connected at their bases by a slender, hollow spongorhiza; surface strongly hispid; vents terminal; texture soft; colour, in spirit, white or brownish-white; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, regular or sagittal, paired rays 0·1 by 0·005 to 0·01 mm., basal rays 0·1 to 0·13 by 0·005 to 0·01 mm.,
quadriradiates, regular or sagittal, paired rays 0·1 to 0·13 by 0·005 to 0·015 mm., basal rays 0·1 to 0·15 by 0·005 to 0·015 mm., apical rays 0·07 mm. long,
oxea, 0·16 to 0·73 by 0·005 to 0·01 mm.

Distribution: Australia (Port Phillip Heads); New Zealand (Cook Strait; Stewart Island); Straits of Magellan; littoral.

Text-fig. 15. *Leucosolenia lucasi*: spicules, ×100; external form (top) of Tanita's (1943) specimen, natural size, of Kirk's specimen (centre left), ×4, of holotype (centre right), ×3, with the same shown above it in natural size.

Named form: **Leucosolenia minchini** Jenkin

(See *L. discoveryi*)

Named form: **Leucosolenia mollis** Tanita

(text-fig. 16)

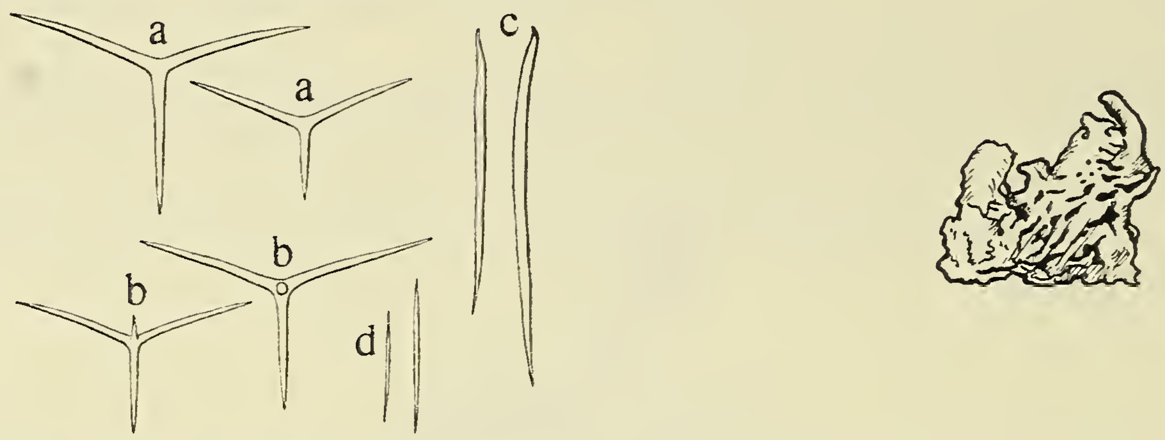
Leucosolenia mollis Tanita, 1941: 265, pl. xvii, fig. 2, text-fig. 1; Tanita, 1942: 84; Tanita, 1943: 384.

Description: Sponge composed of a network of ascon tubes with long stouter tubes rising vertically from it and bearing vents at their apices; surface minutely hispid; texture soft, fragile;

colour, in spirit, greyish-white; skeleton composed of triradiates and quadriradiates, with oxea and microxea.

Spicules: triradiates, slightly sagittal, rays 0·07 to 0·14 by 0·006 to 0·008 mm.,
quadriradiates similar to triradiates, with apical ray 0·035 to 0·055 by 0·006 mm.,
oxea, 0·23 to 0·4 by 0·007 to 0·01 mm.,
microxea, 0·035 to 0·08 by 0·002 mm.

Distribution: Japan (Onagawa Bay); 15 m.



Text-fig. 16. *Leucosolenia mollis* after Tanita: spicules, × 100 (except d, which is × 160); external form, natural size.

a. triradiates; b. quadriradiates; c. large oxea; d. microxea.

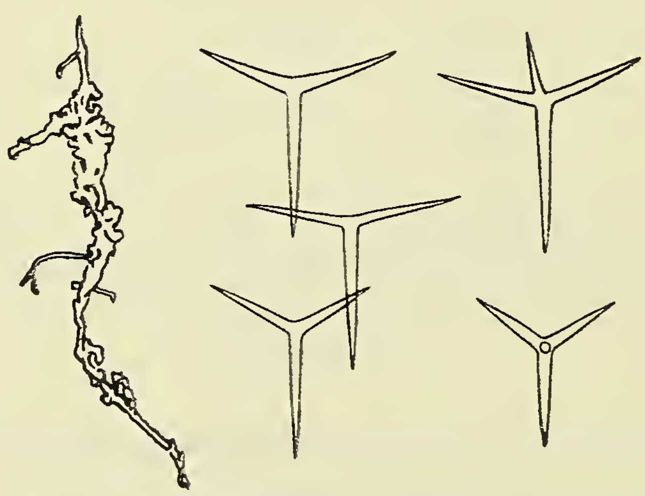
Named form: **Leucosolenia multiformis** Breitfuss

(text-fig. 17)

Leucosolenia multiformis Breitfuss, 1898: 15, pl. i, fig. 2, pl. iv, fig. 26; Breitfuss, 1898: 297; Dendy and Row, 1913: 726; Breitfuss, 1932: 242; Tanita, 1942: 79.

Description: Sponge composed of low, erect tubes, sparsely-scattered and connected by a stolon-like network; vents at apices of erect tubes; texture (?); colour, in spirit, white; skeleton of regular or sub-sagittal triradiates and quadriradiates, facial rays 0·075 to 0·095 by 0·008 to 0·01 mm., apical ray of quadriradiates 0·04 by 0·008 mm.

Distribution: White sea; littoral.



Text-fig. 17. *Leucosolenia multiformis* after Breitfuss: spicules, × 100; external form, slightly more than natural size.

Named form: **Leucosolenia nautilia** de Laubenfels

Leucosolenia nautilia de Laubenfels, 1930: 25; de Laubenfels, 1932: 9, fig. 4.

Description: Sponge comprising a basal reticulation with long tubes rising from it; surface minutely hispid; vents apical on tubes; texture fragile; colour, in life, white; skeleton of oxea, microxea, triradiates and quadriradiates.

Spicules: oxea, 0·4 to 1·0 by 0·01 to 0·02 mm.,
microxea, 0·14 by 0·004 mm.,
triradiates, subregular, rays 0·14 by 0·009 mm.,
quadriradiates, similar to triradiates, with apical ray 0·03 by 0·008 mm.

Distribution: California (growing on an introduced *Mytilus edulis* on the bottom of a boat).

Named form: **Leucosolenia nitida** (Haeckel)

(See *L. botryoides*)

Named form: **Leucosolenia pilosella** Brøndsted

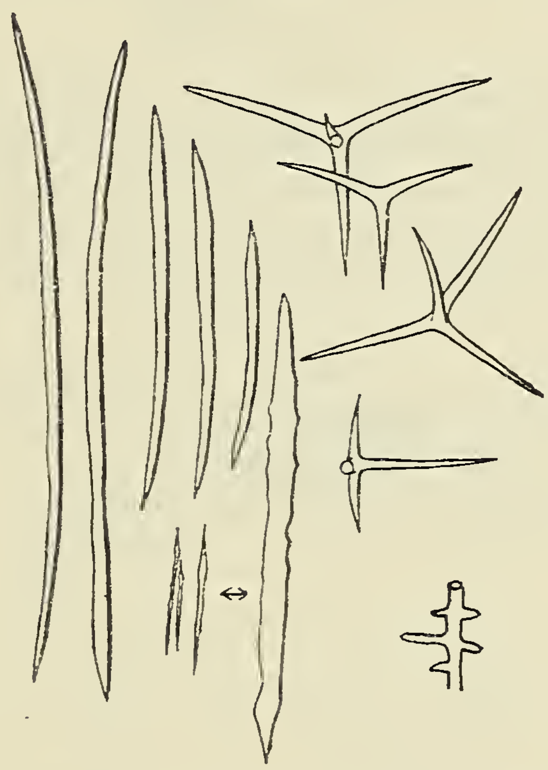
(text-fig. 18)

Leucosolenia pilosella Brøndsted, 1931: 17, fig. 18; Tanita, 1942: 84.

Description: Sponge a thin-walled tube with short lateral branches; surface hispid; vent apical, naked; texture (?); colour (?); skeleton of triradiates, quadriradiates, oxea and microxea.

Spicules: triradiates, subregular, rays 0·07 by 0·007 to 0·008 mm.,
quadriradiates, similar to triradiates, with apical ray 0·05 mm. or more long and 0·006 to 0·007 mm. thick,
oxea, 0·14 to 0·4 by 0·006 to 0·008 mm.,
microxea, 0·045 to 0·055 by 0·002 to 0·003 mm.

Distribution: St. Paul.



Text-fig. 18. *Leucosolenia pilosella* after Brøndsted: spicules, ×200; holotype (a fragment: bottom right) reconstructed from the original description, ×$\frac{3}{2}$.

Named form: **Leucosolenia primordialis**, var. **apicalis** Brøndsted

Leucosolenia primordialis var. *apicalis* Brøndsted, 1931: 9, figs. 2–6.

Remarks: This appears to be a form of *L. botryoides*.

Named form: **Leucosolenia serica** Tanita

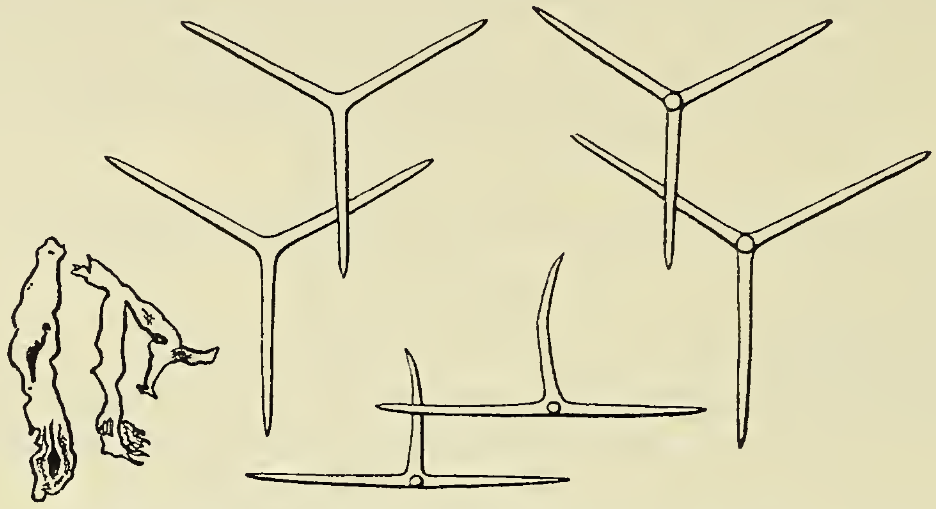
(text-fig. 19)

Leucosolenia serica Tanita, 1942: 25, pl. ii, fig. 4, text-fig. 2; Tanita, 1942: 78; Tanita, 1943: 380.

Description: Sponge composed of thin-walled elongated tubes; surface smooth; vent apical; texture soft, delicate; colour, in spirit, white; skeleton of triradiates and quadriradiates.

Spicules: triradiates, regular, rays 0·14 to 0·21 by 0·007 to 0·008 mm.,
quadriradiates, similar to triradiates, with apical rays 0·09 to 0·135 by 0·008 to 0·01 mm.

Distribution: Japan (Sagami Sea), 183–366 m.



Text-fig. 19. *Leucosolenia serica* after Tanita: spicules, $\times 100$; external form, $\times \frac{4}{3}$.

Named form: **Leucosolenia sertularia** (Haeckel)

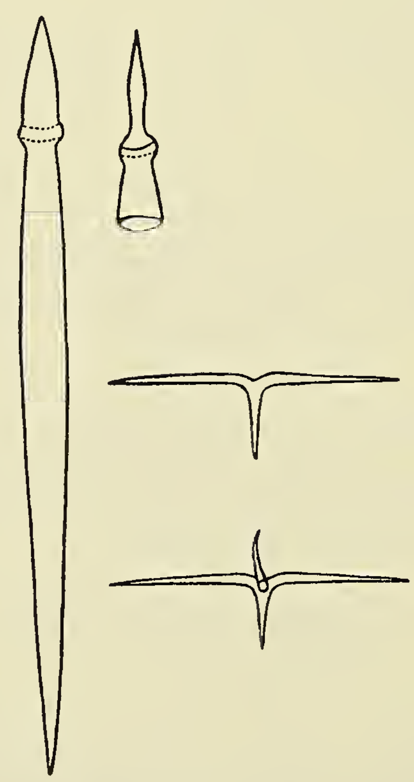
(text-fig. 20)

Ascandra sertularia Haeckel, 1872: 100, pl. xv, fig. 4, pl. xvii, fig. 5; *Soleniscus sertularia* Haeckel, 1872: 100; *Leucosolenia sertularia*, Dendy and Row, 1913: 723; Tanita, 1942: 85.

Description: Sponge sub-penniform, composed of a central, tubular axis bearing lateral branches which in turn bear smaller lateral branches; surface minutely hispid; vents terminal, on secondary lateral branches; texture (?); colour, in spirit, brown (?); skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, sagittal, paired rays 0·12 by 0·01 mm., basal rays 0·06 by 0·005 mm.,
quadriradiates, similar to triradiates, with apical rays 0·06 mm. long,
oxea, 0·5 to 0·6 by 0·03 to 0·04 mm.

Distribution: Java.



Text-fig. 20. *Leucosolenia sertularia* after Haeckel: spicules, $\times 100$.

Named form: **Leucosolenia solida** Brøndsted

(text-fig. 21)

Leucosolenia solida Brøndsted, 1931: 17, fig. 17; Tanita, 1942: 79.

Description: Sponge a branching tube; surface smooth; vents not apparent; texture (?); colour, in spirit, whitish; skeleton of triradiates and quadriradiates.

Spicules: triradiates, sagittal, paired rays 0·08 to 0·09 by 0·009 to 0·01 mm., basal ray 0·06 to 0·08 by 0·009 to 0·011 mm.,

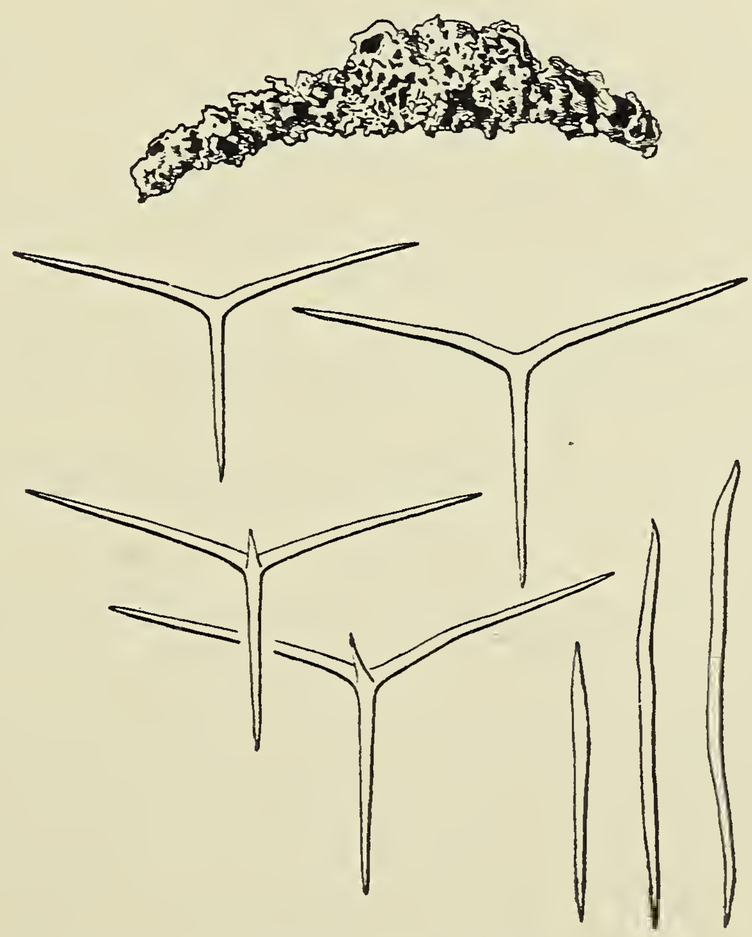
quadriradiates, similar to triradiates, with apical ray 0·03 to 0·04 by 0·008 mm.

Distribution: Antarctic, 350–385 m.

Text-fig. 21. *Leucosolenia solida* after Brøndsted: spicules, ×100; external form shown as published originally (approximately ×20), natural size of specimen shown to its right.

Named form: **Leucosolenia tenera** Tanita

(text-fig. 22)



Text-fig. 22. *Leucosolenia tenera* after Tanita: spicules, ×100; external form, natural size.

Leucosolenia tenera Tanita, 1940: 166, pl. viii, fig. 2, text-fig. 1; Tanita, 1941: 2, pl. i, fig. 2; Tanita, 1941: 267; Tanita, 1942: 27; Tanita, 1942: 85; Tanita, 1943: 387, pl. xiii, fig. 22.

Description: Sponge a branching mass of ascon-tubes; surface minutely hispid; vents at apices of erect (?) tubes; texture soft, brittle; colour, in spirit, nearly white; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, subregular, rays 0·08 to 0·21 by 0·007 to 0·01 mm.,
quadriradiates, similar to triradiates, with apical ray 0·03 to 0·07 by 0·006 to 0·008 mm.,
oxea, 0·2 to 0·35 by 0·008 to 0·012 mm.

Distribution: Japan (Mutsu Bay, Onagawa Bay, Mahanashi-jima, Matsushima Bay), littoral to 15 m.

Named form: **Leucosolenia tenuis** (Schuffner)

(text-fig. 23)

Ascandra tenuis Schuffner, 1877: 406, pl. xxv, fig. 8; *Leucosolenia tenuis*, Dendy and Row, 1913: 732; Tanita, 1942: 85.

Description: Sponge an erect, branching ascon tube; surface minutely hispid; vent apical, naked; texture (?); colour, in spirit, yellowish; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, sagittal, paired rays 0·13 by 0·011 mm., basal rays 0·09 by 0·006 mm.,
quadriradiates, similar to triradiates, with apical rays 0·045 mm. long,
oxea, 0·14 by 0·006 mm.

Distribution: Norway.

Text-fig. 23. *Leucosolenia tenuis* after Schuffner: spicules, ×100; external form, natural size.

Named form: **Leucosolenia thamnoides** Haeckel

(text-fig. 24)

Leucosolenia botryoides, James-Clark, 1867: 324, pl. ix, fig. 40, pl. x, fig. 64; *L. thamnoides* Haeckel, 1870: 243; *Ascortis fragilis* Haeckel, 1872: 74, pl. xi, figs. 5–9, pl. xii, fig. 5; *Olynthus fragilis* Haeckel, 1872: 75, pl. xi, figs. 6–9; *Soleniscus fragilis* Haeckel, 1872: 75, pl. xi, fig. 5; *Ascortis bifida* Haeckel, 1872: 75; *A. thamnoides* Haeckel, 1872: 75; *Ascandra fragilis* Arnesen, 1901: 68; Arnesen, 1901: 15; *Leucosolenia fragilis*, Dendy and Row, 1913: 722; Breitfuss 1927: 28; Arndt, 1928: 21, figs. 14–15; Burton, 1930: 488; Arndt, 1935: 8, fig. 6; Tanita, 1942: 80.

Description: Sponge composed of a basal reticulation of ascon tubes, with low tubes bearing vents arising vertically from it, or of a single erect, much-branched tube; surface minutely hispid; vents terminal; texture soft; colour, alive and in spirit, yellowish to white; skeleton of triradiates and oxea.

Spicules: triradiates, subregular, with irregular, curved rays, 0·08 to 0·16 by 0·003 to 0·01 mm.,

oxea, irregularly curved, 0·17 to 0·23 by 0·007 to 0·01 mm.

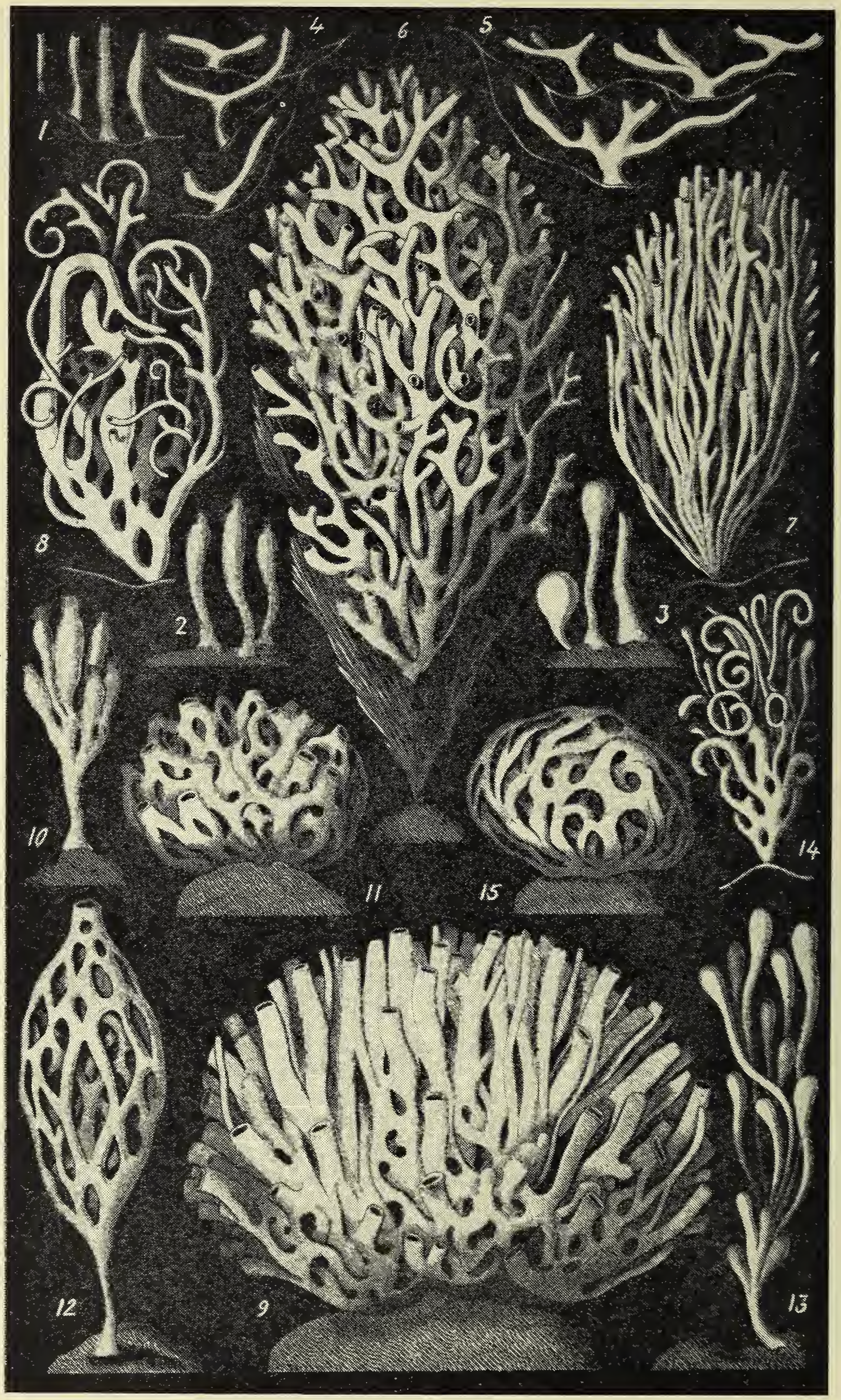
Distribution: Norway; North Sea; Atlantic coasts of North America.

Text-fig. 24. *Leucosolenia thamnoides*: spicules, as figured by Haeckel (1872), ×200; specimens (top right) originally figured by James-Clark (1869) under *L. botryoides*, renamed *L. thamnoides* by Haeckel (1870) and, later, *L. fragilis* by Haeckel (1872), with (below) Haeckel's figure of *L. fragilis*, ×4.

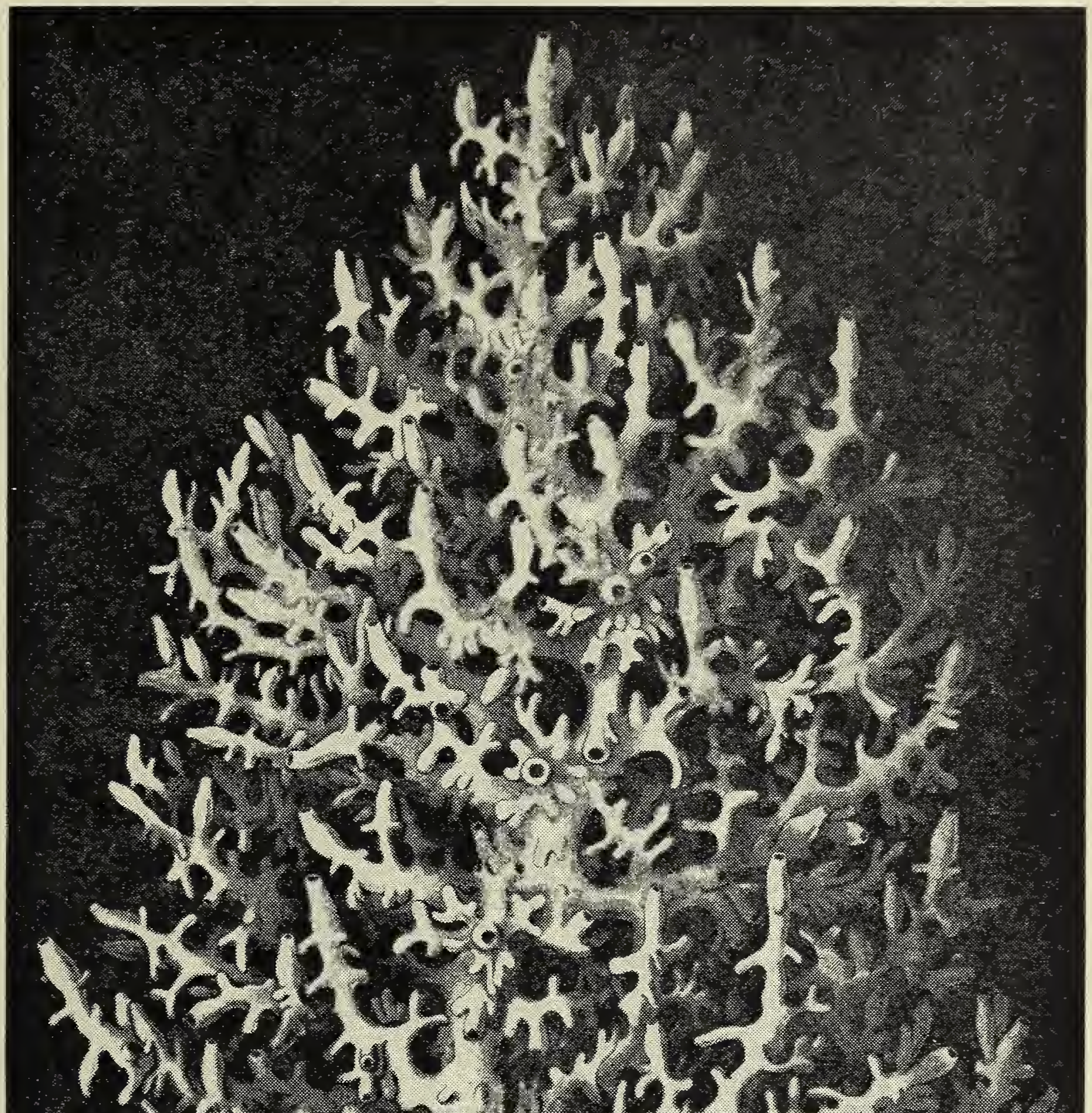
Named form: **Leucosolenia variabilis** Haeckel

(text-figs. 25–27)

? *Spongia confervicola* Templeton, 1836: 470, fig. 67; *Grantia botryoides*, var. *himantia* Johnston, 1842: 179, pl. xxi, fig. 3; *Leucosolenia* (*Leuciria*) *variabilis* Haeckel, 1870: 243; *Sycorrhiza corallorrhiza* Haeckel, 1870: 250; *Ascortis corallorrhiza* Haeckel, 1872: 73, pl. xi, fig. 4, pl. xii, fig. 4; *Auloplegma corallorrhiza* Haeckel, 1872: 73; *Ascandra corallorrhiza* Haeckel, 1872: 73; *Ascandra variabilis* Haeckel, 1872: 106, pl. xvi, fig. 4, pl. xviii; *Olynthus variabilis* Haeckel, 1872: 107, pl. xviii, fig. 1; *Olynthium variabile* Haeckel, 1872: 107, pl. xviii, fig. 2; *Clistolynthus variabilis* Haeckel, 1872: 107, pl. xviii, fig. 3; *Soleniscus variabilis* Haeckel, 1872: 107, pl. xviii, figs. 4–8; *Solenidium variabile* Haeckel, 1872: 107, pl. xviii, fig. 10; *Nardorus variabilis* Haeckel, 1872: 107, pl. xviii, fig. 12; *Nardoma variabile* Haeckel, 1872: 107; *Tarrus variabilis* Haeckel, 1872: 107, pl. xviii, fig. 11; *Tarroma variabile* Haeckel, 1872: 107; *Auloplegma variabile* Haeckel, 1872: 107, pl. xviii, figs. 13–15; *Ascometra variabilis* Haeckel, 1872: 107, pl. xviii, fig. 9; *Ascandra cervicornis* (*Ascandra variabilis* var. *cervicornis*) Haeckel, 1872: 108; *Ascandra confervicola* (*Ascandra variabilis* var. *confervicola*) Haeckel, 1872: 108; *Ascandra arachnoides* (*Ascandra variabilis* var. *arachnoides*) Haeckel, 1872: 108; *Ascandra hispidissima* (*Ascandra variabilis* var. *hispidissima*) Haeckel, 1872: 108; *Ascaltis variabilis* Haeckel, 1872: 108; *Ascortis variabilis* Haeckel, 1872: 108; *Asculmis variabilis* Haeckel, 1872: 108; *Ascyssa variabilis* Haeckel, 1872: 108; *Leucosolenia botryoides*, Bowerbank, 1874: 7, pl. iii, figs. 1–4; *Leuconia somesii* Bowerbank, 1874: 334, pl. xci, figs. 6–17; *Ascandra tenuis* Schuffner, 1877: 406, pl. xxv, fig. 8; *Ascandra variabilis*, Bowerbank, 1882: 227; *A. botryoides*, Fristedt, 1885: 9; *Leucosolenia varriablis*, Topsent, 1891: 525; Topsent, 1894: 7;



Text-fig. 25. *Leucosolenia variabilis*: showing variation in form, according to Haeckel.



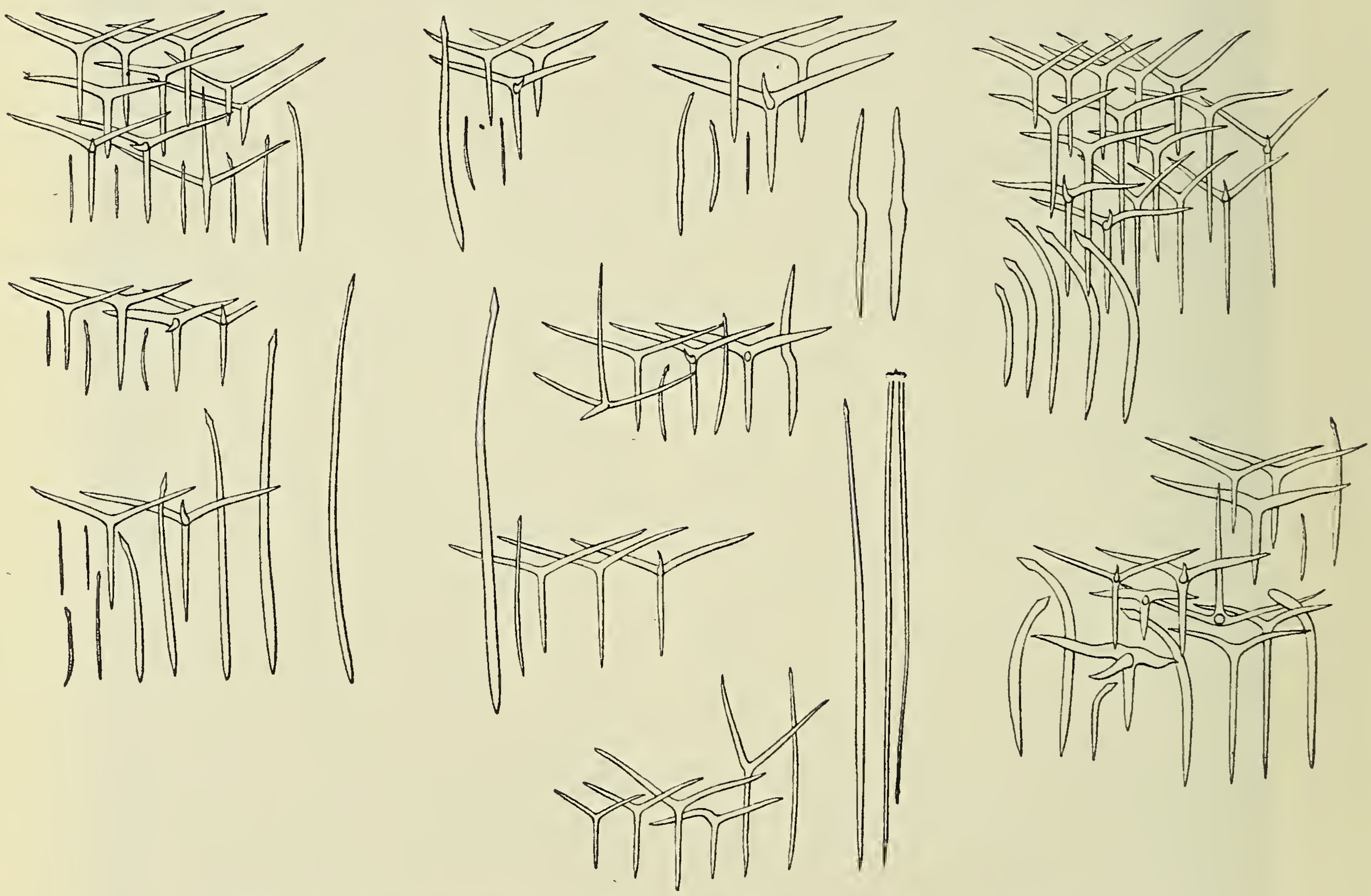
Text-fig. 26. *Leucosolenia variabilis* after Haeckel: showing the *pinus*-form.

Minchin, 1896: 359; *Ascandra variabilis*, Breitfuss, 1898: 215; Breitfuss, 1898, 286; *A. corallorrhiza*, Breitfuss, 1898: 285; *A. variabilis*, Breitfuss, 1898: 16; *A. corallorrhiza*, Breitfuss, 1898: 9; *A. variabilis*, Breitfuss, 1898: 28; *A. corallorrhiza*, Breitfuss, 1898: 17; *Leucosolenia variabilis*, Minchin, 1900: 5, fig. 5; *Ascandra variabilis*, Arnesen, 1901: 5; *A. corallorrhiza*, Arnesen, 1901: 14; *Leucosolenia variabilis*, Rousseau, 1902: 8, fig. 4; Allen, 1904: 185; Minchin, 1905: 373, text-figs. 94–96; *Ascandra variabilis*, Lundbeck, 1909: 459; *Leucosolenia arachnoides*, Dendy and Row, 1913: 721; *L. cervicornis*, Dendy and Row, 1913: 721; *L. hispidissima*, Dendy and Row, 1913: 722; *L. variabilis*, Dendy and Row, 1913: 723; Topsent, 1925: 4; Breitfuss, 1927: 28; Topsent, 1932: 1; *L. himantia*, Breitfuss, 1932: 243; *L. arachnoides*, Breitfuss, 1932: 240; *L. cervicornis*, Breitfuss, 1932: 240; *L. confervicola*, Breitfuss, 1932: 240; *L. hispidissima*, Breitfuss, 1932: 241; *L. variabilis*, Breitfuss, 1932: 243; Arndt, 1935: 9; *L. botryoides*, var. *variabilis*, Topsent, 1936: 35; *L. arachnoides*, Tanita, 1942: 83; *L. cervicornis*, Tanita, 1942: 83; *L. confervicola*, Tanita, 1942: 83; *L. hispidissima*, Tanita, 1942: 83; *L. variabilis*, Tanita, 1942: 83; Tanita, 1942: 109; Burton, 1948: 753; *L. botryoides*, var. *variabilis*, Levi, 1950: 20 Sarà, 1953: 83, pl. iii, figs. 3–5.

Description: Sponge composed typically of a basal reticulation of ascon tubes, from which arise erect tubular vents bearing lateral diverticula; surface minutely hispid; vents terminal; texture soft; colour, alive and in spirit, white, yellow or grey; skeleton of triradiates, quadriradiates with apical rays projecting into cloacal cavity, and oxea.

Spicules: triradiates, sagittal, paired rays 0·08 to 0·1 by 0·006 to 0·007 mm., basal rays 0·065 to 0·083 by 0·007 to 0·008 mm.,
quadriradiates similar to triradiates, with apical rays up to 0·08 mm. long,
oxea, of three sizes, 0·08 to 0·32 by 0·002 to 0·009 mm., 0·07 to 0·11 mm. long, and 0·2 by 0·007 to 0·01 mm.

Distribution: Arctic; Atlantic coasts of Europe; Mediterranean; Morocco; South Africa (Chalk Bay); Straits of Magellan; Chile (Iquique); littoral.



Text-fig. 27. *Leucosolenia variabilis*: various drawings of spicules, after Minchin and Topsent, with one after Hozawa, to show variations.

[The next two species are like **L. botryoides** *except in the complete absence of radiates; they may perhaps be classed as recurrent mutants.]*

Named form: **Ascyssa acufera** Haeckel

(text-fig. 28)

Ascyssa acufera Haeckel, 1872: 50, pl. vii, figs. 4–10; *Soleniscus acufer* Haeckel, 1872: 50; *Ascyssa acufera*, Breitfuss, 1898: 299; Dendy and Row, 1913: 729; Breitfuss, 1932: 243.

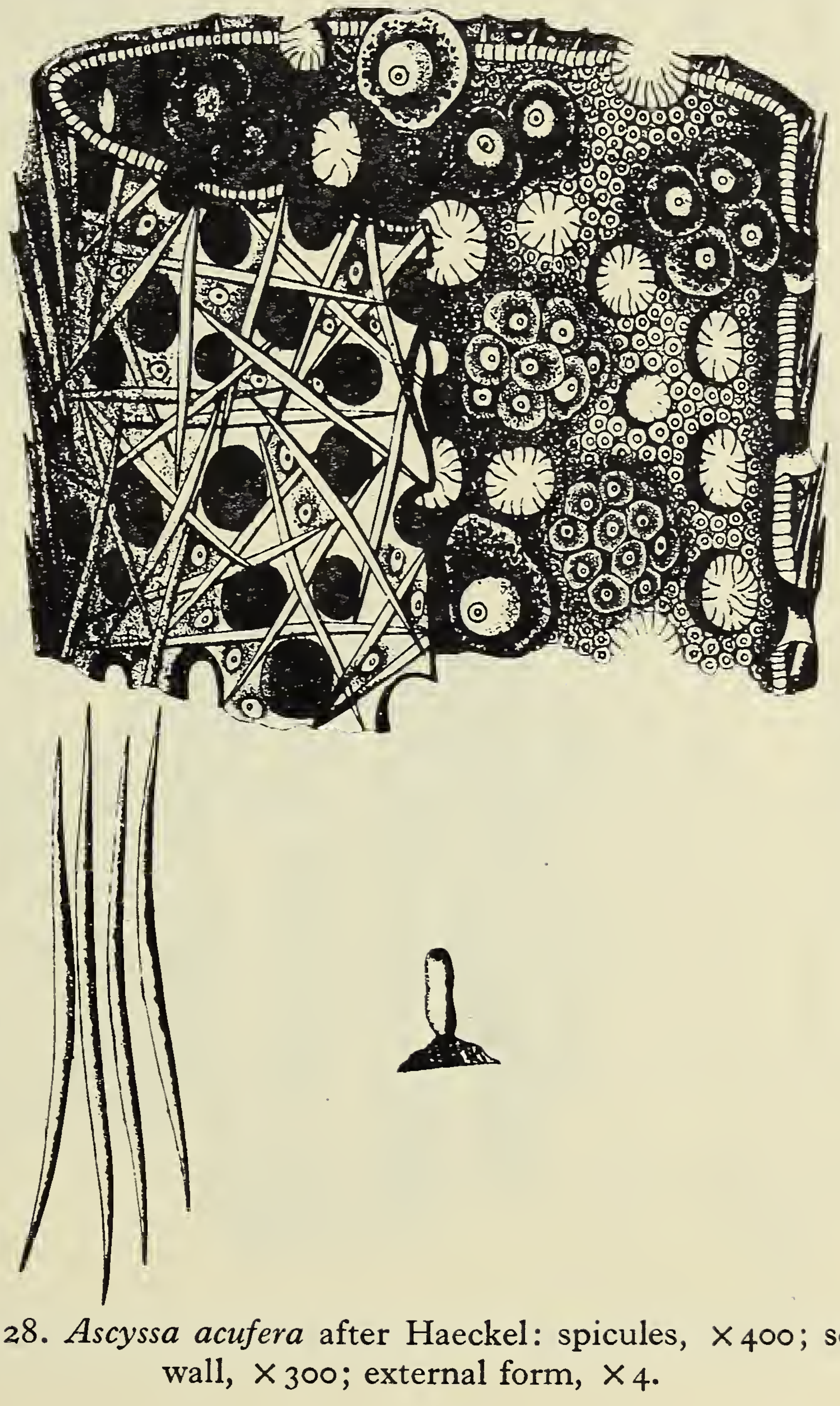
Description: Sponge tubular, colonial; surface smooth; vents terminal, naked; texture (?); colour, in spirit, brown; skeleton a tangential layer of irregularly-arranged oxea, 0·4 to 0·6 by 0·015 mm., and microxea, 0·08 to 0·1 by 0·002 mm.

Distribution: Arctic (Spitzbergen).

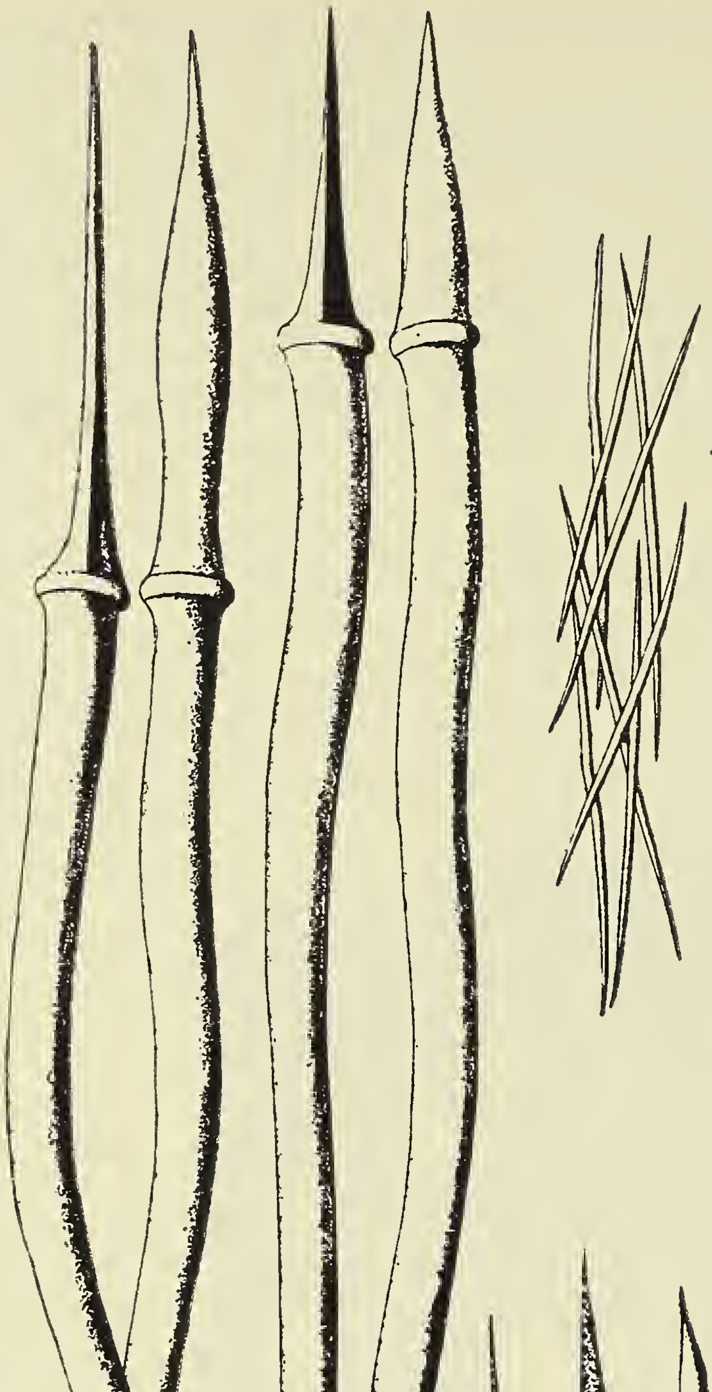
Named form: **Ascyssa troglodytes** (Haeckel)

(text-fig. 29)

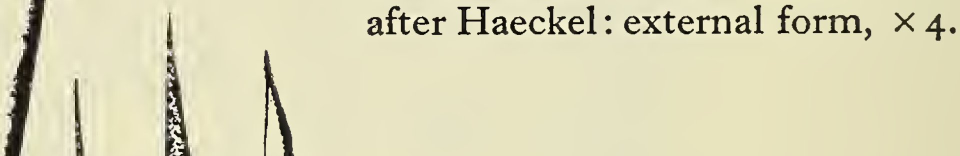
? *Leucosolenia coralloides* Haeckel, 1870: 243; *L. troglodytes* Haeckel, 1870: 243; *Ascyssa troglodytes* Haeckel, 1872: 48, pl. vii, figs. 1–3; *Olynthus troglodytes* Haeckel, 1872: 48, pl. vii, fig. 1; *Soleniscus troglodytes* Haeckel, 1872: 48; *Ascyssa troglodytes*, Dendy and Row, 1913: 729.



Text-fig. 28. *Ascyssa acufera* after Haeckel: spicules, ×400; section of wall, ×300; external form, ×4.



Text-fig. 29A *Ascyssa troglodytes* after Haeckel: external form, ×4.



Text-fig. 29. *Ascyssa troglodytes* after Haeckel: spicules, ×400; section of wall, ×300.

Description: Sponge tubular, solitary or compound, sessile; vent terminal, naked; surface smooth; texture (?); colour, in spirit, brown; skeleton a tangential layer of irregularly-arranged oxea, 0·1 to 0·15 by 0·004 mm.

Distribution: Mediterranean (Capri).

[*The next two species, although atypical, are difficult to exclude from* **L. botryoides**]

Named form: **Leucosolenia densa** (Haeckel)

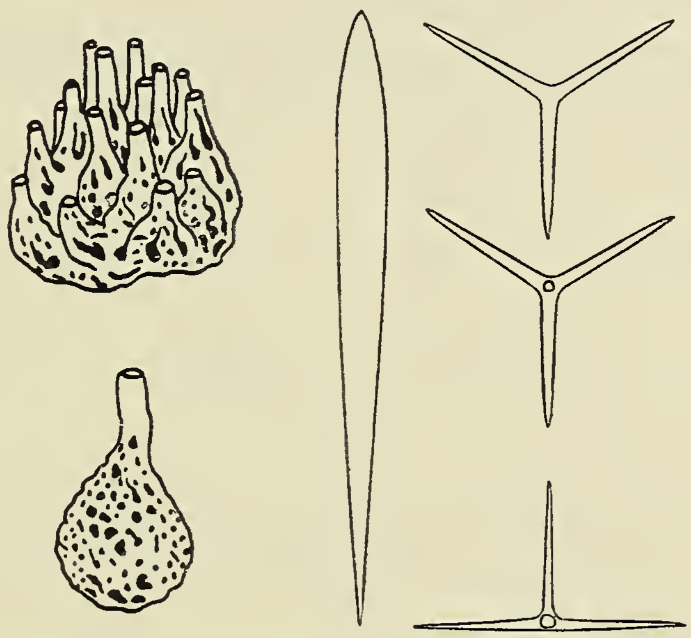
(text-fig. 30)

Tarrus densus Haeckel, 1870: 244; *Nardopsis gracilis*, 1870: 247; *Ascandra densa* Haeckel, 1872: 85, pl. xiv, fig. 2, pl. xvii, figs. 9, 12; *Nardopsis densa* Haeckel, 1872: 85, pl. xvii, fig. 9; *Tarropsis densa* Haeckel, 1872: 85, pl. xvii, fig. 12; *Auloplegma densum* Haeckel, 1872: 85; *Ascandra densa*, Lendenfeld, 1885: 1088; *Leucosolenia densa*, Dendy and Row, 1913: 721; Tanita, 1942: 82.

Description: Sponge irregularly massive to subspherical, sessile, with erect tubular vents; surface minutely hispid; texture (?); colour, in spirit, white; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, regular, rays 0·1 to 0·12 to 0·006 to 0·008 mm.,
quadriradiates, similar to triradiates, with apical rays 0·1 to 0·12 by 0·003 to 0·004 mm.,
oxea, 0·5 to 0·6 by 0·03 to 0·04 mm.

Distribution: Australia (south coast).



Text-fig. 30. *Leucosolenia densa* after Haeckel: spicules, × 100, external form, × 2.

Named form: **Leucosolenia japonica** (Haeckel)

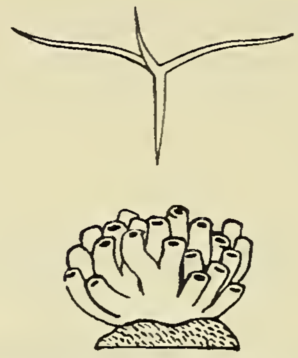
(text-fig. 31)

Ascilla japonica Haeckel, 1872: 47, pl. vi, figs. 8, 9; *Soleniscus japonicus* Haeckel, 1872: 47, pl. vi, fig. 8; *Leucosolenia japonica*, Dendy and Row, 1913: 726; Hozawa, 1929: 285; Tanita, 1942: 77; Tanita, 1943: 374.

Description: Sponge a colony of tubular individuals; surface smooth; vents terminal, naked; texture soft; colour, in spirit, white; skeleton of tangentially arranged quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: quadriradiates, sagittal, paired rays 0·12 by 0·005 mm., basal rays 0·08 by 0·005 mm., apical rays 0·06 by 0·005 mm.

Distribution: Japan ('Jeddo-Tokyo').



Text-fig. 31. *Leucosolenia japonica* after Haeckel: spicule ×100, external form, ×2.

[*The following may belong to* **L. botryoides** *but the holotype is too fragmentary to be sure of this*]

Named form: **Leucosolenia incerta** Urban

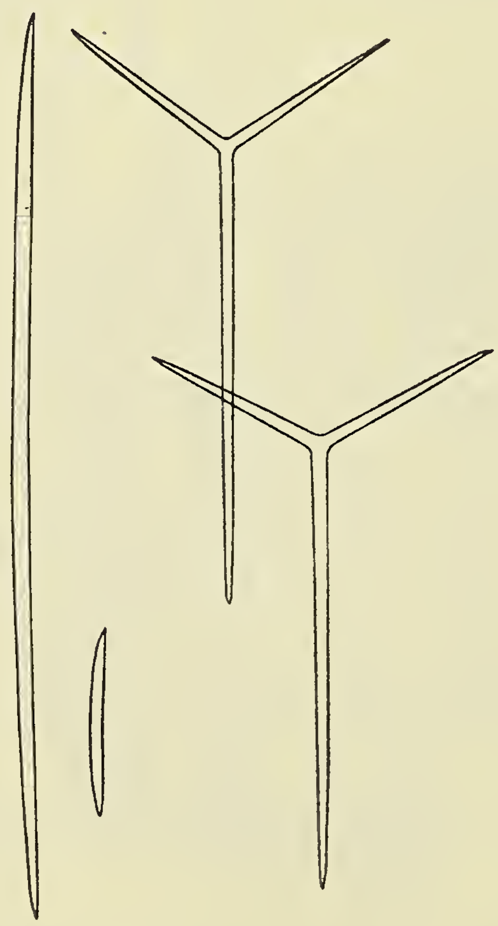
(text-fig. 32)

Leucosolenia incerta Urban, 1908: 247; Urban, 1909: 5, pl. i, fig. 1; Dendy and Row, 1913: 722; Tanita, 1942: 84.

Description: Sponge fragmentary (?), composed of two short pieces of ascon tube; surface minutely hispid; vent terminal, with fringe (?); texture (?); colour, in spirit, white; skeleton of oxea, of two (or more?) sorts, triradiates and quadriradiates.

Spicules: triradiates, sagittal, paired rays 0·14 to 0·2 by 0·009 to 0·011 mm., basal rays 0·25 to 0·42 by 0·009 to 0·011 mm.,
quadriradiates, similar to triradiates but with curved apical rays,
oxea, 0·4 to 0·7 by 0·008 to 0·013 mm.,
oxea, 0·006 to 0·15 mm. long,
trichoxea (?).

Distribution: Kerguelen, 88 m.



Text-fig. 32. *Leucosolenia incerta* after Urban: spicules, ×100; holotype was too fragmentary to give evidence of external form.

[*The holotype of the following is minute and has unusually large oxea. It may represent a juvenile* **L. botryoides**]

Named form: **Leucosolenia horrida** (Schmidt in Haeckel)

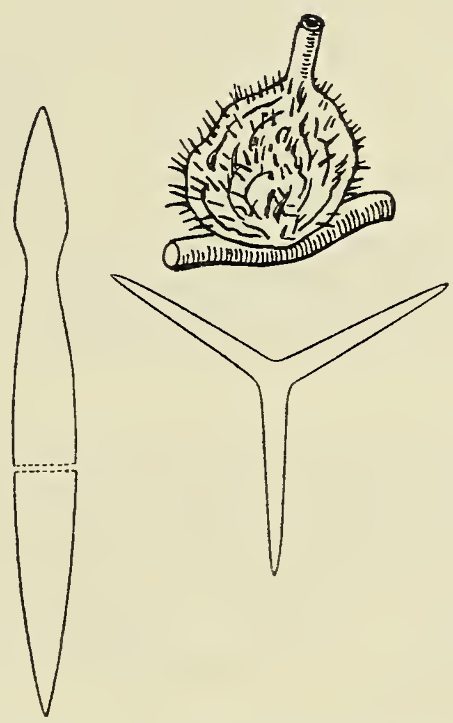
(text-fig. 33)

Nardopsis horrida Schmidt [in] Haeckel, 1872: 69; *Ascortis horrida* Haeckel, 1872: 69, pl. xi, fig. 1, pl. xii, fig. 1; *Nardopsis horrida* Haeckel, 1872: 69; *Leucosolenia horrida*, Dendy and Row, 1913: 722; Tanita, 1943: 80.

Description: Sponge a subspherical, clathrate mass of ascon tubes, sessile; surface strongly hispid; vent apical, fistular; texture firm (?); colour, in spirit, white; skeleton of triradiates and oxea.

Spicules: triradiates, regular, rays 0·12 to 0·16 by 0·016 to 0·02 mm.,
oxea, 1·0 to 1·5 by 0·05 to 0·07 mm.

Distribution: Florida.



Text-fig. 33. *Leucosolenia horrida* after Haeckel; spicules, × 100, external form, × 4.

[*The following species might prove to be* **L. botryoides** *if more details of its spiculation could be obtained*]

Named form: **Leucosolenia clarkii** (Verrill)

Ascortis clarkii Verrill, 1873: 392; *Leucosolenia clarkii*, Dendy and Row, 1913: 392; Tanita, 1943: 80.

Description: Sponge composed of long, subcylindrical tubes (0·6 to 0·8 mm. diameter), simple or sparingly branched; surface even, minutely hispid (?); vents at ends of tubes, with short fringe; texture 'delicate'; colour, alive, 'translucent'; skeleton of triradiates, regular or subregular, and microxea.

(Dimensions of spicules not given.)

Distribution: U.S.A. (Atlantic Coast).

2. **Leucosolenia cordata** (Haeckel)

Named form: **Leucosolenia cordata** (Haeckel)

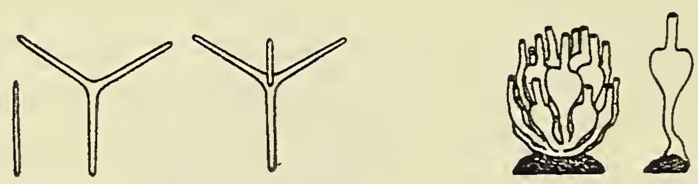
(text-fig. 34)

Ascandra cordata Haeckel, 1872: 82, pl. xiv, fig. 1, pl. xvii, figs. 2, 6; *Olynthella cordata* Haeckel, 1872: 82, pl. xvii, fig. 2; *Solenula cordata* Haeckel 1872: 82, pl. xvii, fig. 6; *Leucosolenia cordata*, Dendy and Row, 1913: 721; Tanita, 1942: 82.

Description: Sponge solitary or colonial, heart-shaped and laterally-compressed, stipitate, with prominent vent at summit; surface partly smooth, partly minutely-hispid (?); vents apical; texture (?); colour, in spirit, white; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, regular, rays cylindrical with strongylote ends, 0·05 to 0·07 by 0·002 to 0·003 mm.,
quadriradiates, similar to triradiates, apical rays of same size and dimensions as facial rays,
oxea (confined to vent?) of same dimensions as rays of radiates.

Distribution: South Africa (near Cape Town).



Text-fig. 34. *Leucosolenia cordata* after Haeckel: spicules, × 100; external form, natural size.

3. **Leucosolenia asconoides** (Carter)

Named form: **Ascute asconoides** (Carter)

Aphroceras asconoides Carter, 1886: 134; *Leucosolenia asconoides*, Dendy, 1891: 48; *Ascute asconoides*, Dendy and Row, 1913: 729.

Description: Sponge compound, tubular, sessile; surface even, striated; vents apical, naked; texture firm; colour, in spirit, yellowish-white; skeleton of quadriradiates and oxea.

Spicules: quadriradiates, sagittal, paired rays 0·18 by 0·004 mm., basal rays 0·38 by 0·004 mm., apical rays 0·38 by 0·004 mm.,
oxea, 2·0 by 0·1 mm.

Distribution: Australia (Port Phillip Heads).

Named form: **Leucosolenia stolonifer** Dendy

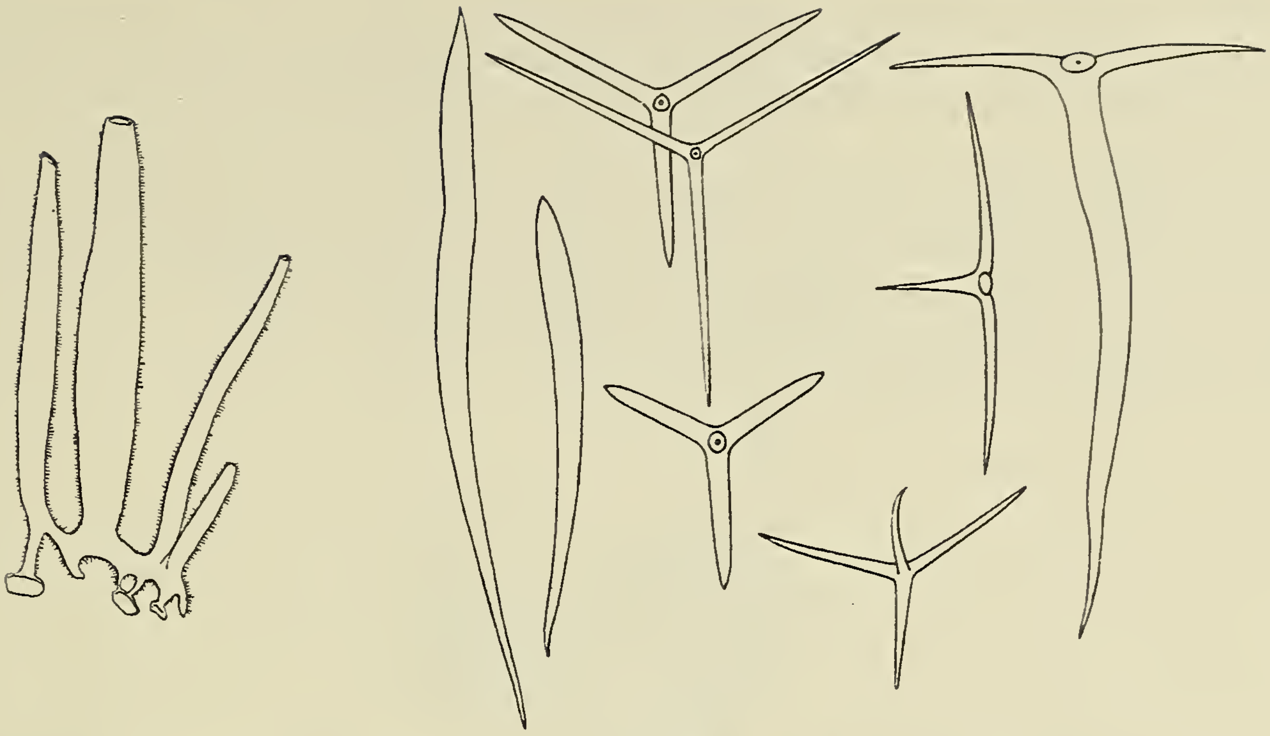
(text-fig. 35)

Leucosolenia stolonifer Dendy, 1891: 46, pl. i, fig. 2, pl. vi, figs. 1–3; pl. ix, fig. 2; Dendy and Row, 1913: 723; Dendy, 1924: 275; Tanita, 1942: 81.

Description: Sponge composed of erect ascon persons connected at their bases by a slender, tubular spongorhiza; surface hispid; vents terminal; texture firm; colour, in spirit, white; skeleton of quadriradiates and oxea.

Spicules: quadriradiates, regular to slightly sagittal, facial rays 0·2 by 0·012 mm., apical rays 0·16 to 0·6 by 0·01 to 0·035 mm.,
oxea, up to 0·7 by 0·03 mm.

Distribution: Australia (Port Phillip Heads); New Zealand (Three Kings Islands); 183 m.



Text-fig. 35. *Leucosolenia stolonifer* after Dendy: spicules, × 100; external form, natural size.

Named form: **Ascute uteoides** (Dendy)

Leucosolenia uteoides Dendy, 1893: 178; *Ascute uteoides*, Dendy and Row, 1913: 729.

Description: Sponge compound, tubular, sessile; surface even, minutely hispid, striated; vents apical, naked; texture firm; colour, in spirit, yellowish-white; skeleton of quadriradiates and oxea of two sizes.

Spicules: quadriradiates, sagittal, paired rays 0·19 by 0·008 mm., basal rays 0·3 by 0·006 mm., apical rays 0·15 to 0·3 by 0·006 mm.,
oxea, in tangential dermal layer, 1·1 by 0·065 mm.,
oxea, echinating surface, 0·22 by 0·008 mm.

Distribution: Australia (Port Phillip Heads).

Genus **Clathrina** Gray

Clathrina Gray, 1867: 557.

Type-species: Grantia clathrus Schmidt, 1864: 24, pl. iii, fig. 3.

4. **Clathrina coriacea** (Montagu)

Named form: **Leucosolenia blanca** (Miklucho-Maclay)

(text-figs. 36–37)

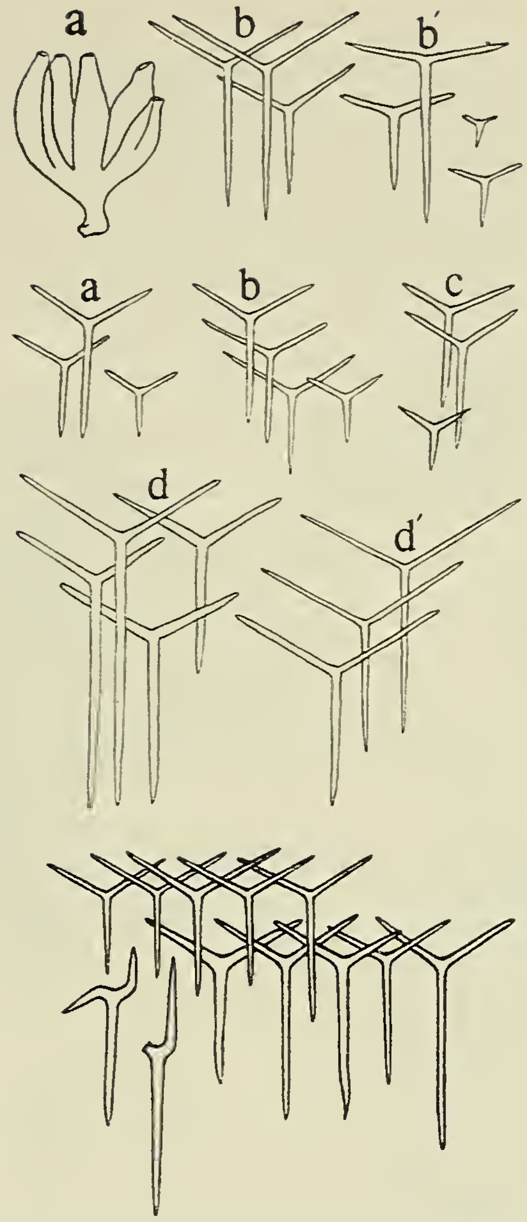
Guancha blanca Miklucho-Maclay, 1868: 221, pl. iv, figs. 1 A, B, 2 (pars), figs. 4, 8, 9, pl. v, fig. 16; *Olynthus guancha*, Haeckel, 1872: 237; *Leucosolenia guancha*, Haeckel, 1872: 243; *Tarrus guancha*, Haeckel, 1872: 244; *Nardoa guancha*, Haeckel, 1872: 247; *Guancha blanca*, Haeckel, 1872: 254; *Ascetta coriacea* (pars), Haeckel, 1872: pl. iii, figs. 1, 2, 3, 4 (pars), 6, 7, 8; *Ascetta blanca* (pars), Vosmaer 1881: 5; *Leucosolenia blanca*, Lackschewitsch, 1886: 300; Vosmaer, 1887: 370; *Ascetta blanca*, Lendenfeld, 1891: 219; *Leucosolenia blanca*, Breitfuss, 1896: 1; *Clathrina blanca*, Minchin, 1896: 359; *Leucosolenia blanca*, Breitfuss, 1898: 210; Breitfuss, 1898: 13;

Clathrina blanca, Jenkin, 1908: 438, figs. 85–87; *Leucosolenia blanca*, Dendy and Row, 1913; 724; Arndt, 1928: 19, figs. 9–10; Hozawa, 1929: 282; Burton, 1930: 13, fig. 7; Brøndsted, 1931: 12, figs. 7–8; Breitfuss, 1932: 240; Breitfuss, 1935: 7; Topsent, 1936: 9, figs. 4–5; Arndt, 1941: 45; Tanita, 1943: 75.

Description: Sponge small, tubular, stipitate, often giving rise, by budding, to small colonies of tubular individuals seldom exceeding 3 mm. in height; spicules equiangular, sagittal triradiates, basal rays 0·075 to 0·09 mm. long, paired rays 0·03 to 0·045 mm. long.

Distribution: Arctic; Eastern North Atlantic; Mediterranean; Azores; Canary Islands; Japan; Indian Ocean; Antarctic; 13–820 m.

Text-fig. 36. *Leucosolenia blanca*: (left) external form as originally illustrated by Miklucho-Maclay showing the var. *brevicaulis*, and also a stalked clathroid form and an encrusting clathroid variety apparently growing in continuity, all ×25; (top right) a strikingly atypical flabellate specimen (yet having typical spicules), from Zanzibar, natural size, with a portion of it (below) enlarged ×5 (both after Jenkin).



Text-fig. 37. *Leucosolenia blanca*: top group: a. external form of *L. blanca* var. *brevicaulis* Topsent, × 3, b. triradiates from body, and b′ triradiates from margins of vents; centre group: showing spicules from various specimens with clathroid body, a. from a specimen from Villefranche, b. from a specimen from Banyuls, c. from a second specimen from Banyuls, d. and d′ from a specimen from the Azores (d = spicules from stalk, d′ = spicules from body); bottom group: spicules from a specimen from Zanzibar.
All after Topsent, except bottom group which is after Jenkin. All spicules × 100.

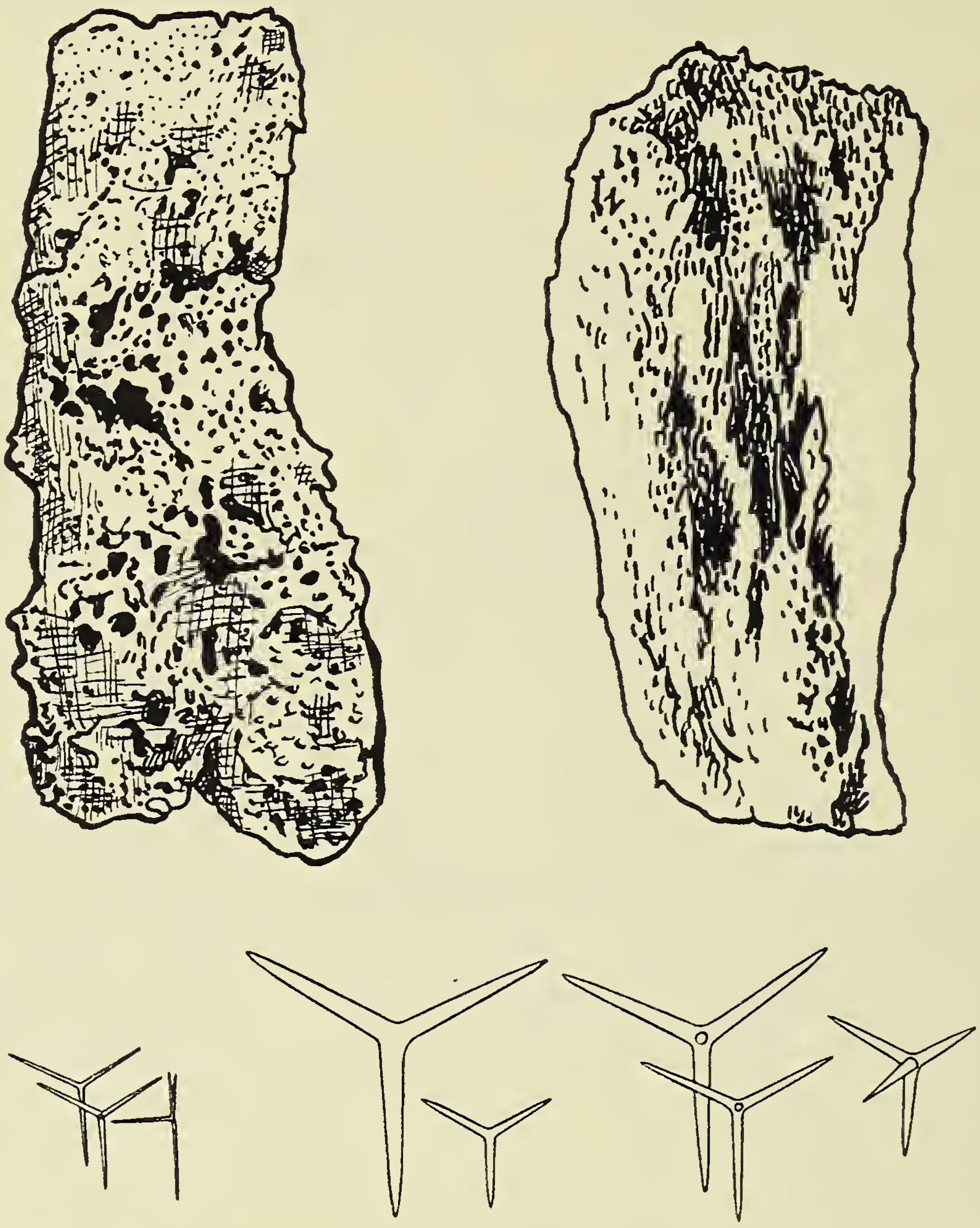
Named form: **Leucosolenia canariensis** (Miklucho-Maclay)

(text-fig. 38)

Nardoa canariensis Miklucho-Maclay, 1868: 230; *N. sulphurea* Miklucho-Maclay, 1868: 230; *N. rubra* Miklucho-Maclay, 1868: 230; *Tarroma canariense*, Haeckel, 1870: 244; *T. rubrum*, Haeckel, 1870: 245; *T. sulphureum*, Haeckel, 1870: 245; *Ascaltis canariensis*, Haeckel, 1872: 52, pl. ix, figs. 1–3, pl. x, fig. 1; *Auloplegma canariense* Haeckel, 1872: 52; *Ascuris arrecifae* Haeckel, 1872: 52; *A. papillata* Haeckel, 1872: 52; *Ascaltis compacta* Schuffner, 1877: 404, pl. xxv, fig. 9; *Leucosolenia canariensis*, Lackschewitsch, 1886: 300, pl. vii, fig. 1; *L. nanseni* Breitfuss, 1896: 427; Breitfuss, 1898: 106, pl. xii, figs. 1–9; Breitfuss, 1898: 13; Breitfuss, 1898: 21; *L. canariensis* (pars), Thacker, 1908: 762, pl. xl, fig. 3, text-figs. 157–160; *L. nanseni*, Lundbeck, 1909: 458; *Clathrina canariensis* var. *compacta*, Row, 1909: 184; *Leucosolenia canariensis*, Dendy and Row, 1913: 724; Hozawa, 1918: 528, pl. lxxxiv, fig. 2; Breitfuss, 1932: 240; Hozawa, 1933: 2, pl. i, fig. 1; Hozawa, 1940: 134, pl. vi, fig. 2, text-fig. 2; Tanita, 1941: 264, pl. xvii, fig. 1; Tanita, 1942: 77; Tanita, 1943: 376, pl. xii, figs. 11–12.

Description: Sponge a cushion-shaped mass of anastomosing tubes, up to 6 cm. across, with a few pseudoscula on upper surface, and an incipient stalk at base; texture soft, delicate; colour, alive, white, yellow or red, in spirit, white to brown; skeleton of triradiates, regular, with rays 0·04 to 0·14 by 0·003 to 0·012 mm., and quadriradiates, of similar dimensions, with apical ray, 0·03 by 0·002 mm., projecting into cloacal cavity.

Distribution: Arctic; Atlantic coasts of Europe; Mediterranean; Cape Verde and Canary Islands; Mexico; Mauritius; Red Sea; N.W. Pacific (Commandorski Islands); Japan; littoral to 165 m.

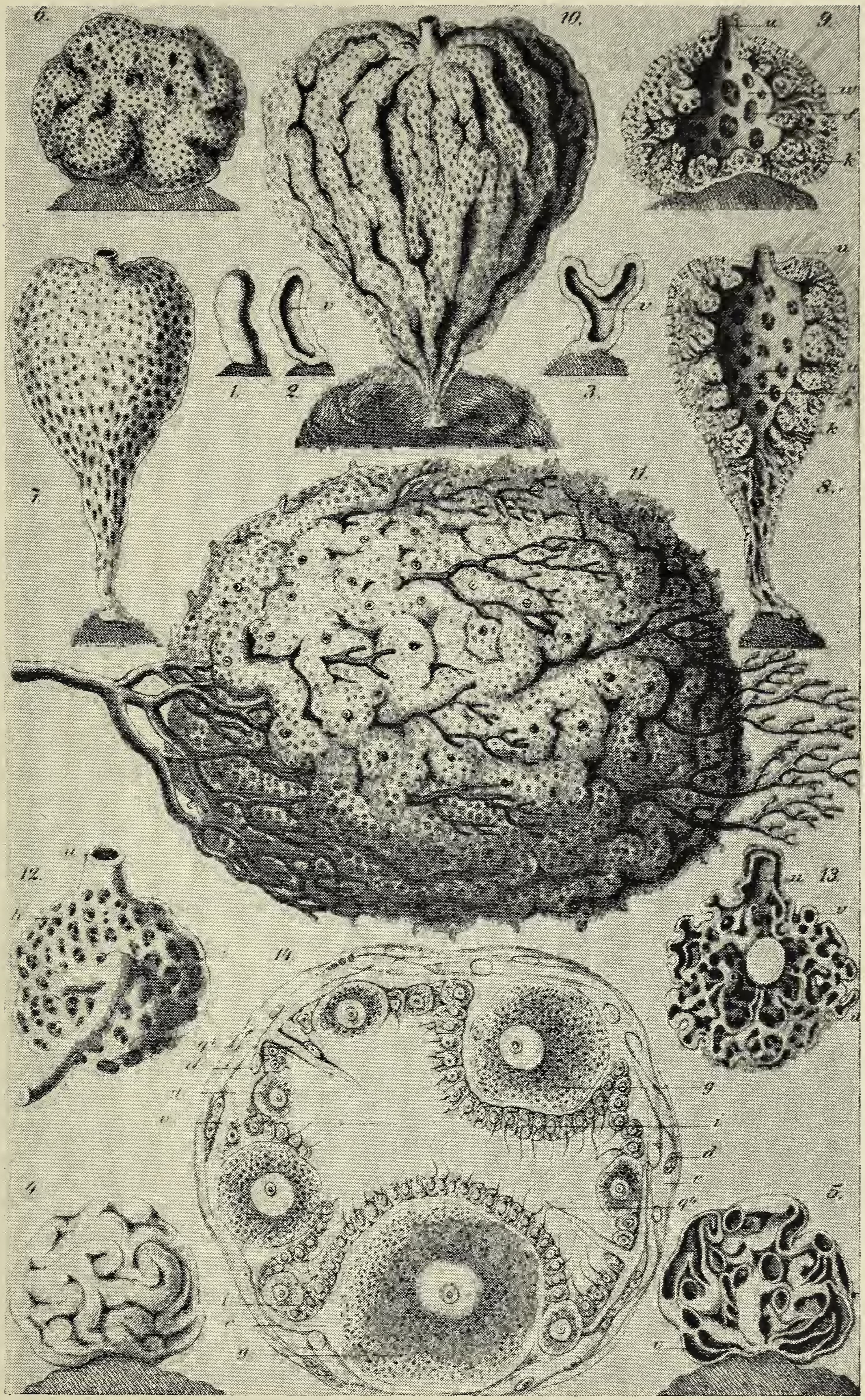


Text-fig. 38. *Leucosolenia canariensis* (after Miklucho-Maclay): external form of Tanita's specimen (top left: natural size), Hozawa's (1933) specimen (top right: natural size); spicules (left) as drawn by Haeckel (1872), the rest belonging to four specimens identified by Thacker (1908), showing ranges in size for triradiates and quadriradiates, all × 100.

Named form: **Leucosolenia cerebrum** (Haeckel)

(text-figs. 39–40)

Ascaltis cerebrum Haeckel, 1872: 54, pl. viii, figs. 1–14, pl. x, fig. 2; *Auloplegma cerebrum* Haeckel, 1872: 55, pl. viii; *Ascaltis gyrosa* Haeckel, 1872: 55; *Ascetta cerebrum*, Lo Bianco, 1888: 386; Lendenfeld, 1891: 206, pl. viii, fig. 3, pl. ix, figs. 38–44; Bidder, 1891: 682; *L. cerebrum*, Kirk, 1895: 207; *Clathrina cerebrum*, Minchin, 1896: 359; *Leucosolenia cerebrum*, Breitfuss, 1896: 515; Breitfuss, 1896: 434; Breitfuss, 1898: 210; Dendy and Row, 1913: 724; Burton, 1933: 236; Topsent, 1934: 7; Breitfuss, 1935: 8; Topsent, 1936: 17, figs. 8–9.

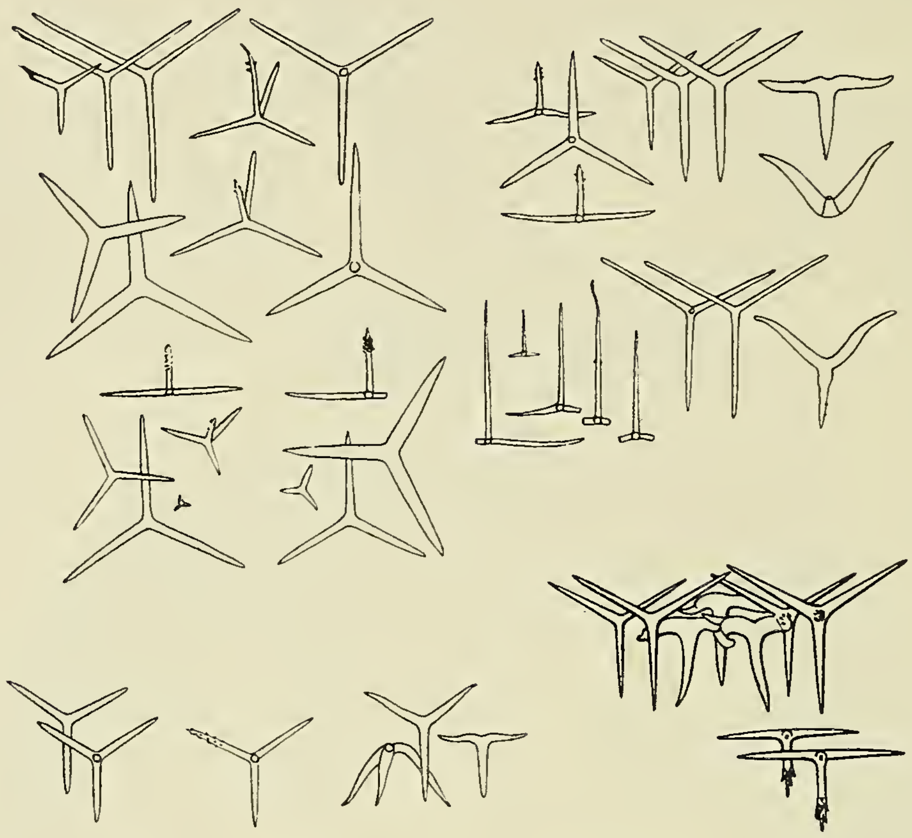


Text-fig. 39. *Leucosolenia cerebrum* after Haeckel: showing that author's ideas on the morphological variations within the species.
(Figs. 1–3, ×40, 4–5, ×30, 6–10, ×2, 11 natural size, 12–13, ×4.)

Description: Sponge massive to pyriform, sessile to sub-stipitate; surface convoluted, smooth; pseudoscula spout-like, small and scattered or single and apical; texture firm; colour, in spirit, white, yellow or reddish; skeleton of triradiates and quadriradiates.

Spicules: triradiates, regular, rays 0·08 to 0·09 by 0·008 to 0·012 mm.,
quadriradiates, similar to triradiates, with apical rays spined, 0·08 to 0·09 by 0·006 to 0·01 mm.

Distribution: Mediterranean; South Africa; Ternate; New Zealand, 0–50 m.



Text-fig. 40. *Leucosolenia cerebrum*: groups of spicules to show variation: (above) after Topsent, ×80, and (below and to left) original drawing from a specimen in the British Museum, ×60, with (bottom right) Haeckel's original drawings, ×130, to show variation.

Named form: **Leucosolenia charybdaea** (Haeckel)

(See *L. gegenbauri*)

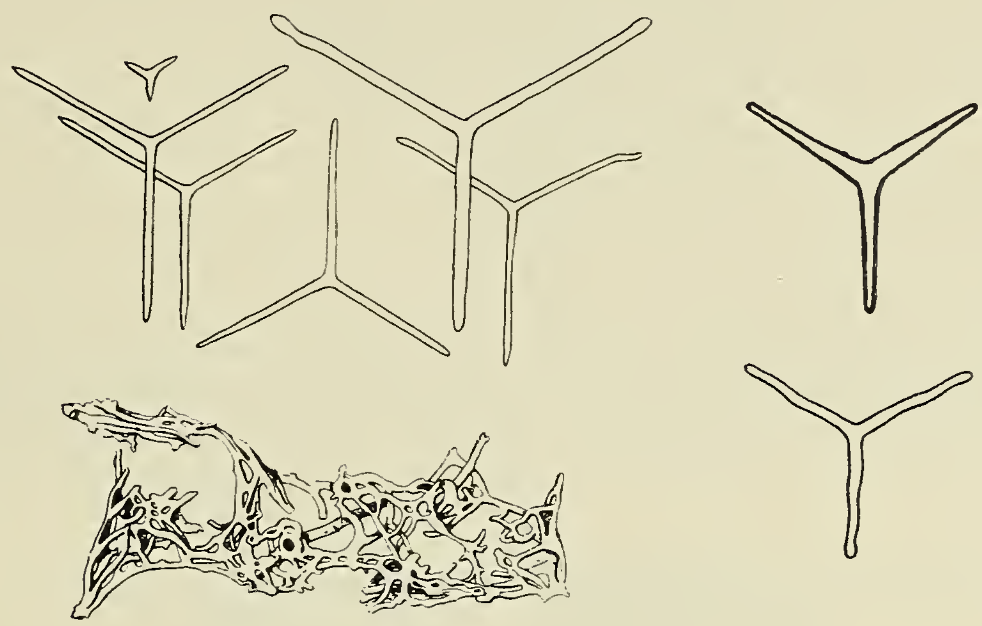
Named form: **Leucosolenia clathrus** (Schmidt)

(text-fig. 41)

Grantia clathrus Schmidt, 1864: 24, pl. iii, fig. 3; ? *Clathrina sulphurea* Gray, 1867: 557; *Tarrus labyrinthus* Haeckel, 1870: 244; *Clathrina sulphurea*, Haeckel, 1870: 245; *Ascetta clathrus*, Haeckel, 1872: 30, pl. iv, figs. 1–7, pl. v, fig. 3; *Clathrina clathrus* Schmidt in Haeckel, 1872: 30, *Nardoa labyrinthus* Schmidt in Haeckel, 1872: 30; *Auloplegma clathrus*, Haeckel, 1872: 31; *Ascetta labyrinthus* Haeckel, 1872: 31, pl. iv, fig. 1; *A. maeandrina* Haeckel, 1872: 31; *A. clathrina*, Haeckel, 1872: 31, pl. iv, fig. 2; *A. mirabilis* Haeckel, 1872: 31, pl. iv, fig. 3; *A. clathrus*, Vosmaer, 1881: 5; *Leucosolenia clathrus*, Lackschewitsch, 1886: 299; *Clathrina clathrus*, Priest, 1887: 8; *Ascetta clathrus*, Bianco, 1888: 386; Lendenfeld, 1891: 210, pl. viii, fig. 4, pl. ix, figs. 27–37; Bidder, 1891: 628; *Leucosolenia clathrus*, Topsent, 1894: 34; Kirk, 1896: 206; *Clathrina clathrus*, Minchin, 1896: 359; *Leucosolenia clathrus*, Breitfuss, 1896: 434; Breitfuss, 1896: 515; Breitfuss, 1898: 211; Dendy and Row, 1913: 725; Ferrer, 1916: 6; Ferrer, 1918: 9, fig. 1; Ferrer, 1922: 260; Topsent, 1934: 7; Breitfuss, 1935: 9; Burton, 1935: 64; Topsent, 1936: 7, fig. 3.

Description: Sponge an irregular mass formed of a reticulation of tubes, sessile, usually encrusting or low-growing; surface smooth; vents not apparent; texture soft; colour, in spirit, white, yellow, brown or reddish; skeleton of triradiates, regular, with rays 0·08 to 0·1 by 0·006 to 0·007 mm.

Distribution: Mediterranean (Adriatic to Minorca); British Isles; Spain (Asturias); Ternate; New Zealand (Cook Strait); 0–50 m.



Text-fig. 41. *Leucosolenia clathrus*: spicules, × 100, as figured by Topsent (top left), and single spicules from Schmidt (right, above) and Haeckel (right, below); external form of Schmidt's holotype of *L. clathrus*, natural size.

Named form: **Leucosolenia contorta** Bowerbank

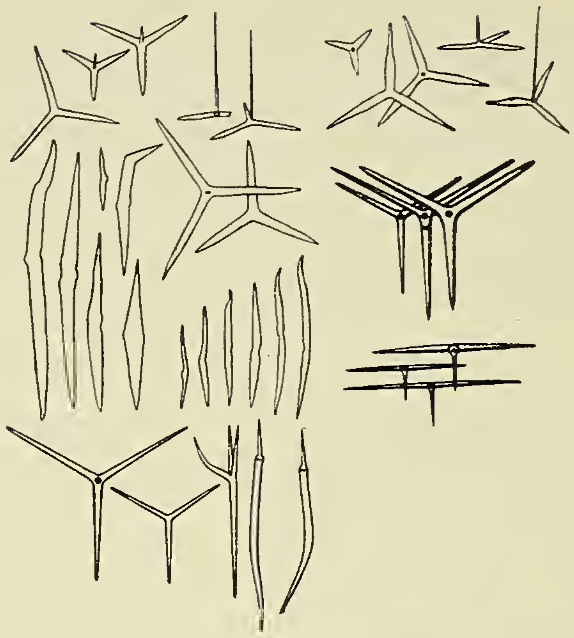
(text-fig. 42)

? *Nardoa spongiosa* Kölliker, 1864: 63, pl. vii, fig. 10, pl. ix, figs. 6–8; *Leucosolenia contorta* Bowerbank, 1866: 29; *L.* (*Nardoa*) *contorta*, Gray, 1867: 555; *L.* (*Leuciria*) *contorta*, Haeckel, 1870: 243; *Ascandra contorta*, Haeckel, 1872: 91, pl. xiv, fig. 6; *Soleniscus contortus*, Haeckel, 1872: 91; *Tarrus contortus*, Haeckel, 1872: 91; *Auloplegma contortum*, Haeckel, 1872: 91; *L. contorta* Bowerbank, 1874: 7, pl. iii, figs. 5–10; ? *Ascaltis contorta*, Hanitsch, 1890: 195; *Ascetta spinosa* Lendenfeld, 1891: 203, pl. viii, figs. 2, 16, 21, 22; *Leucosolenia contorta*, Topsent, 1891: 525; Topsent, 1891: 128; Topsent, 1892: 22; Topsent, 1894: 7; *Clathrina contorta*, Minchin, 1896: 359; *C. spinosa*, Minchin, 1896: 359; *Leucosolenia spinosa*, Breitfuss, 1898: 213; *Ascandra contorta*, Breitfuss, 1898: 214; Breitfuss, 1898: 15, pl. i, fig. 2; *Clathrina contorta*, var. *spinosa*, Minchin, 1905: 3, pl. i, text-figs. 2–6; Jenkin, 1908: 437, figs. 83–84; *Leucosolenia contorta*, Dendy and Row, 1913: 721; *L. spinosa*, Dendy and Row, 1913: 727; *L. contorta*, Breitfuss, 1927, 28; Breitfuss, 1932: 241; Arndt, 1935: 6, fig. 3; *L. spinosa*, Breitfuss, 1935: 15; *L. contorta*, Topsent, 1936: 25, figs. 12–13; Arndt, 1941: 45; Tanita, 1942: 83.

Description: Sponge composed of irregular clathrate masses of ascon tubes, with tubular vents ascending more or less vertically from upper surface; surface smooth, or minutely hispid; texture soft; colour, in spirit, white; skeleton of triradiates, quadriradiates and oxea (which may often be scarce or completely absent).

Spicules: triradiates, regular rays, 0·08 to 0·09 by 0·005 mm.,
quadriradiates, similar to triradiates, with apical rays 0·04 by 0·005 mm.,
oxea, 0·1 to 0·16 by 0·01 mm.

Distribution: Arctic; Atlantic coasts of Europe; Mediterranean; Zanzibar; littoral to 95 m.



Text-fig. 42. *Leucosolenia contorta*: variation in spicules as shown by Topsent (top left and top right), Lendenfeld (centre right), and Haeckel (bottom left), × 100; external form (after Haeckel), natural size.

Named form: **Leucosolenia convallaria** (Haeckel)

(See *L. gracilis*)

Named form: **Leucosolenia coriacea** (Montagu)

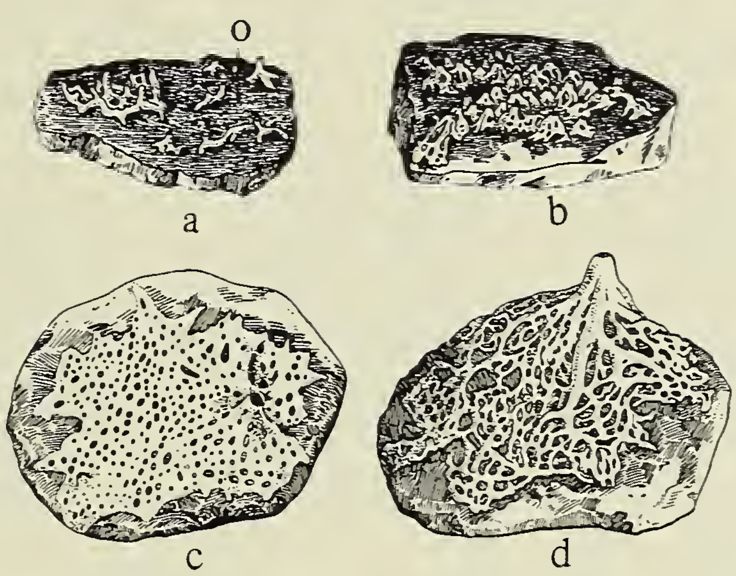
(text-figs. 43–45)

Spongia coriacea Montagu, 1818: 116; Gray, 1821: 361; Fleming, 1828: 526; *Grantia coriacea* Johnston, 1842: 183, pl. xxi, fig. 9; *G. multicavata* Bean MS (in) Johnston, 1842: 183; *Leucosolenia coriacea*, Bowerbank, 1866: 34; Gray, 1867: 556; Wright, 1870: 223; *Clathrina sulphurea* Carter, 1871: 278; *Leucosolenia himantia* Haeckel, 1869, p. 243; *Sycorrhiza coriacea*, Haeckel, 1869: 250; *Ascetta coriacea*, Haeckel, 1872: 24, pl. iii, pl. v. fig. 2; *Olynthus coriaceus* Haeckel, 1872: 24, pl. iii, fig. 1; *Olynthella coriacea*, Haeckel, 1872: 24, pl. iii, fig. 2; *Clistolynthus coriaceus*, Haeckel, 1872: 24, pl. iii, fig. 3; *Soleniscus coriaceus*, Haeckel, 1872: 24, pl. iii, figs. 4–8; *Solenula coriacea*, Haeckel, 1872: 24, pl. iii, fig. 20; *Nardorus coriaceus*, Haeckel, 1872: 24, pl. iii, figs. 21–24; *Nardopsis coriacea*, Haeckel, 1872: 24, pl. iii, figs. 25, 26; *Tarrus coriaceus*, Haeckel, 1872: 24, pl. iii, figs. 9–14; *Tarropsis coriacea*, Haeckel, 1872: 25, pl. iii, figs. 15–18; *Auloplegma coriaceum*, Haeckel, 1872: 25, pl. iii, figs. 27-33; *Ascometra coriacea*, Haeckel, 1872: 25, pl. iii, fig. 19; *Ascetta membranacea* (= *Ascetta coriacea* var. *membranacea*) Haeckel, 1872: 25; *A. multicavata*, Haeckel, 1872: 25; *A. himantia* Haeckel, 1872: 25; *Leucosolenia coriacea*, Bowerbank, 1874: 8, pl. iii, figs. 11–14; Carter, 1877: 38; *Ascetta coriacea*, Marenzeller, 1877: 371; Vosmaer, 1881: 5; *Clathrina coriacea*, Ridley, 1881: 132; *Leucosolenia coriacea*, Bowerbank, 1882: 26; *Ascetta coriacea*, Fristedt, 1885: 8; Fristedt, 1887: 405, pl. xxii, figs. 1–2; Vosmaer, 1887: pl. i, figs. 4–7; Stuxberg, 1887: 165, 186; Hanitsch, 1890: 232; *Leucosolenia coriacea*, Topsent, 1891: 530; Topsent, 1891: 128; Topsent, 1891: 11; Grentzenberg, 1891: 40; *Ascetta coriacea* var. *osculata* Hanitsch, 1891: 213; *Leucosolenia coriacea*, Topsent, 1892: 21; *Ascetta cariacea* (*sic*), Knipowitsch, 1893: 66; *Leucosolenia coriacea*, Topsent, 1894: 7; Hanitsch, 1895: 206; *Clathrina coriacea*, Minchin, 1896: 359; *Leucosolenia coriacea*, Breitfuss, 1898: 12; *L. coriacea*, et varr. *membranacea*, *multicavata*, *himantia*, Breitfuss, 1898: 20; Breitfuss, 1898: 211; Arnesen, 1901: 10; Arnesen, 1901: 67; *L. coriacea*, *ceylonensis*, Dendy, 1905: 226, pl. xiii, fig. 8; *Clathrina coriacea*, Jenkin, 1908: 6; Lundbeck, 1909: 725; *Ascetta coriacea*, Row, 1909: 184; *Leucosolenia coriacea*, Dendy and Row, 1913: 725; *L. himantia*, Dendy and Row, 1913: 726; *L. coriacea*, Ferrer, 1918: 9; *Clathrina coriacea*, Prenant, 1925: 6; *Leucosolenia coriacea*, Burton, 1926: 71; Breitfuss, 1927: 28; Arndt, 1928: 18, figs. 5–6; Burton, 1929: 402; Burton, 1930: 2; Row and Hozawa, 1931: 735; Burton and Srinivasa Rao, 1932: 303; Breitfuss, 1932: 241; Burton, 1933: 235; Arndt, 1935: 7, fig. 4; Breitfuss, 1935: 7; Topsent, 1936: 2, figs. 1–2; Breitfuss, 1936: 6; Renouf, 1936: 835; Renouf, 1937: 53; Arndt, 1941: 45; Tanita, 1942: 20; Tanita, 1942: 74; Tanita, 1943: 368, pl. xi, fig. 2; *L. atlantica*, Tanita (*nec* Thacker), 1943: 381, pl. xii, fig. 16, text-fig. 4.

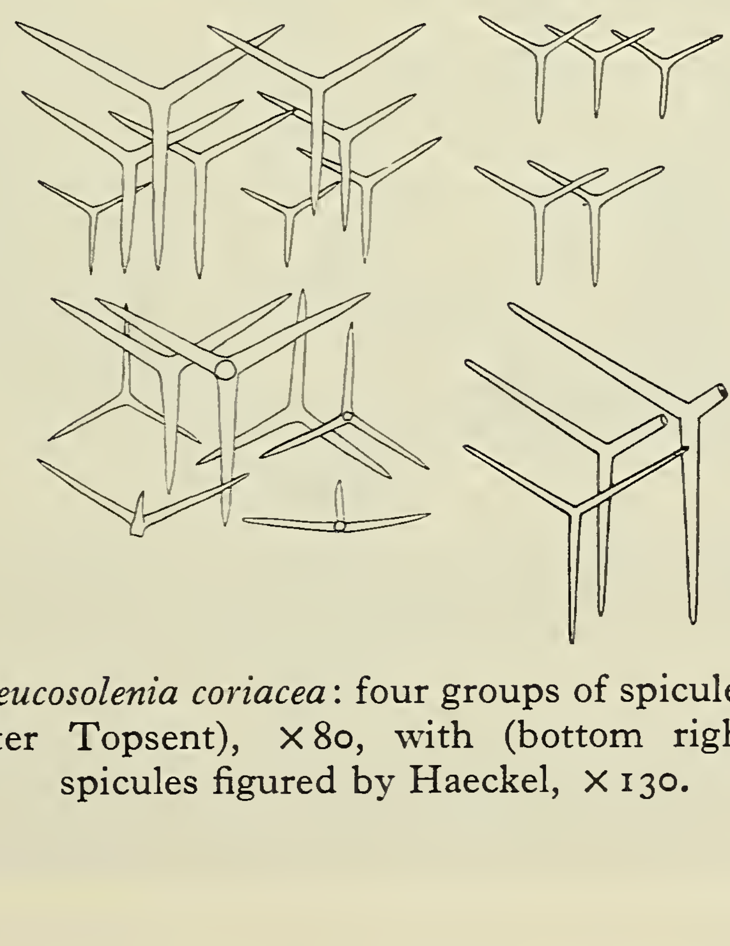
Description: Sponge composed of a mass of anastomosing tubes, either encrusting or in low-lying, dorso-ventrally flattened masses; with vents scattered over surface (?); texture soft, fragile; colour, alive, white, rose, brick-red, green, sulphur yellow, bright-red, lilac, violet, in spirit, usually white; skeleton of triradiates only, with regular rays, 0·06 to 0·12 by 0·006 to 0·012 mm.

Distribution: Arctic; West coast of Europe; Mediterranean; Japan; Red Sea; West Indies; Indian Ocean; Indonesia; S.W. Australia; Antarctic; littoral to 650 m.

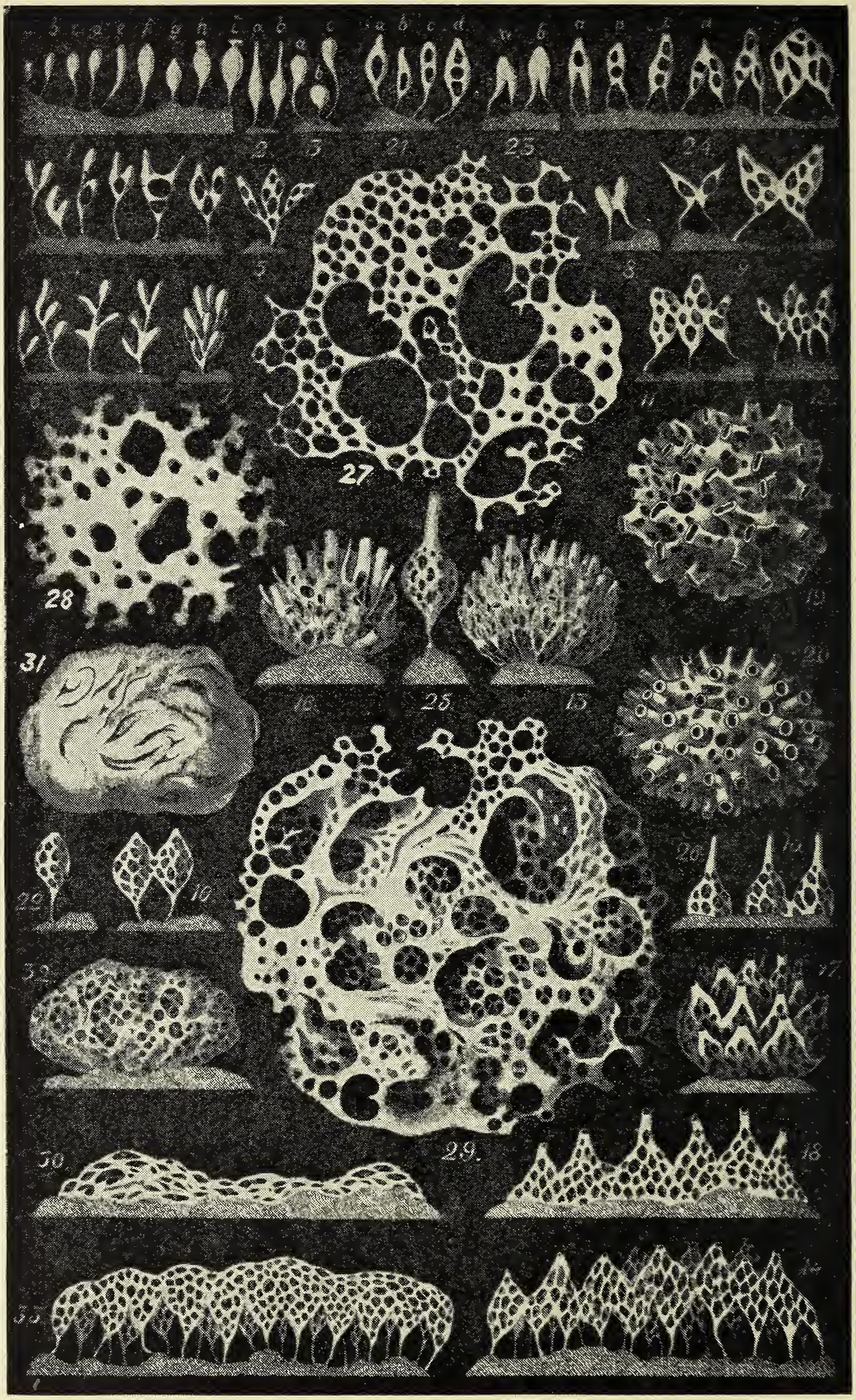
Remarks: With regard to *Leucosolenia himantia* (*vide* Dendy and Row 1913: 726), it may be remarked that Johnston (1842: 179), in referring to his specimen of *Leucosolenia botryoides*, says: 'It reminds one . . . of the analogous growths of some agarics . . . which some botanists have described under the name of Himantia.' On this slender ground Haeckel (l.c., pp. 24–5) has included *Leucosolenia himantia* (=*Ascetta himantia*=*A. coriacea* var. *himantia*) as a synonym of *L. coriacea*. The name *himantia* (or Himantia) has, in fact, no standing, except that given it by Haeckel's action, which has been repeated by Dendy and Row.



Text-fig. 43. *Leucosolenia coriacea*: external form (a–c. ×2, d. natural size), after Minchin (o=an Olynthus-form).



Text-fig. 44. *Leucosolenia coriacea*: four groups of spicules from different specimens (after Topsent), ×80, with (bottom right-hand corner) spicules figured by Haeckel, ×130.



Text-fig. 45. *Leucosolenia coriacea*: Haeckel's plate 3 in *Die Kalkschwämme*, showing his ideas of the range of form in the species. [Figs. 27, 28, 31 are probably unfinished; cf. Haeckel, 1872, in note opposite pl. 3.] All figures, ×4.

Named form: **Leucosolenia darwinii** Haeckel

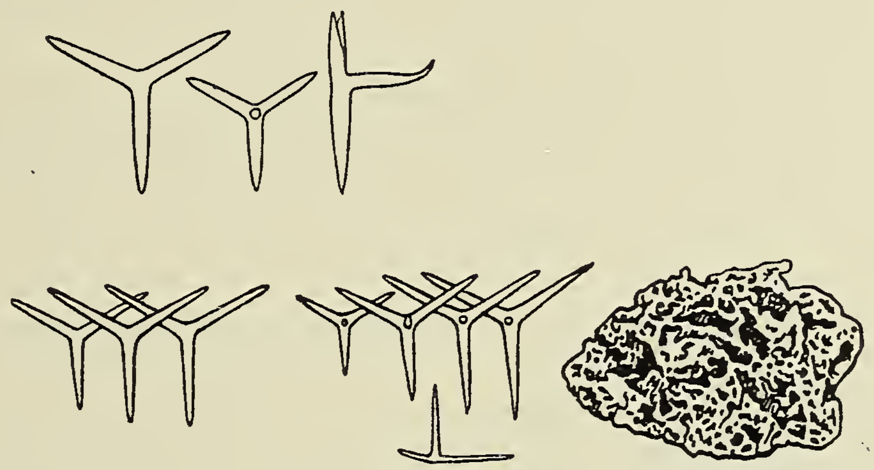
(text-fig. 46)

Leucosolenia darwinii Haeckel, 1870: 243; *Ascaltis darwinii* Haeckel 1872: 57, pl. ix, fig. 4, pl. x, fig. 3; *Olynthus darwinii* Haeckel, 1872: 57; *Clistolynthus darwinii* Haeckel, 1872: 57; *Soleniscus darwinii* Haeckel, 1872: 58; *Nardorus darwinii* Haeckel, 1872: 58; *Tarrus darwinii* Haeckel, 1872: 58; *Auloplegma darwinii* Haeckel, 1872: 58; *Ascometra darwinii* Haeckel, 1872: 58, pl. ix, fig. 4; *Ascaltis erasmi* Haeckel, 1872: 58; *A. caroli* Haeckel, 1872: 58; *Ascetta darwinii* Haeckel, 1872: 58; *Ascilla darwinii* Haeckel, 1872: 58; ? *Ascaltis darwini*, Vosmaer, 1881: 5; *Clathrina darwinii*, Jenkin, 1908: 436, text-figs. 81–82; *Leucosolenia caroli* Dendy and Row, 1913: 724; *L. darwinii*, Dendy and Row, 1913: 725; *L. darwini*, Topsent, 1934: 8; *L. caroli*, Tanita, 1943: 77; *L. darwinii*, Tanita, 1943: 77.

Description: Sponge composed of a mass of erect tubes or sub-clathrate individuals; surface smooth; vents terminal, naked; texture (?); colour, in spirit, light brown; skeleton of triradiates and quadriradiates.

Spicules: triradiates, regular, rays 0·08 to 0·1 by 0·01 to 0·012 mm.,
quadriradiates, similar to triradiates, with apical rays 0·08 to 0·1 by 0·005 mm.

Distribution: Red Sea; Zanzibar; Indian Ocean; Indonesia; 6 m.



Text-fig. 46. *Leucosolenia darwinii* after Haeckel: spicules (above) after Haeckel, ×100, and (below) after Jenkin, × 65; external form after Jenkin, natural size.

Named form: **Leucosolenia decipiens** (Haeckel)

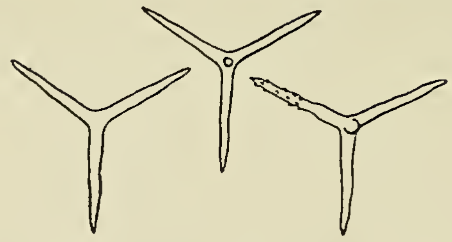
(text-fig. 47)

Ascaltis decipiens (= *A. cerebrum* var. *decipiens*) Haeckel, 1872: 55; *Ascetta cerebrum* (pars), Lendenfeld, 1891: 206; *Leucosolenia decipiens*, Dendy and Row, 1913: 725; Ferrer, 1918: 9; Breitfuss, 1935: 9; Tanita, 1943: 78.

Description: Sponge massive to pyriform, sessile to stipitate; surface convoluted, smooth; vents spout-like, small and scattered or single and apical; texture firm; colour, in spirit, white, yellow or reddish; skeleton of triradiates and quadriradiates.

Spicules: triradiates, of ectosomal layer, subregular, rays irregular in outline, 0·04 to 0·07 by 0·014 mm.,
triradiates, of inner tissues, regular, rays 0·08 to 0·09 by 0·008 to 0·012 mm.,
quadriradiates, similar to triradiates, with apical rays spined, 0·08 to 0·09 by 0·006 to 0·01 mm.

Distribution: Adriatic; Spain (Asturias); littoral.



Text-fig. 47. *Leucosolenia decipiens*: neither spicules nor external form of Haeckel's *Ascaltis decipiens* (=*Ascaltis cerebrum* var. *decipiens*) were published. The locality was given as Mediterranean, for the same localities as *Leucosolenia cerebrum*. The spicules shown here are from a South African specimen and they show how little difference there is between these and the spicules from Mediterranean specimens (see *L. cerebrum*, fig. 40).

Named form: **Leucosolenia dictyoides** Haeckel

(text-fig. 48)

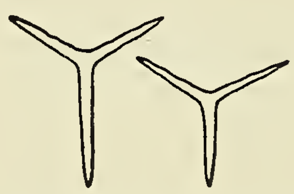
Leucosolenia dictyoides Haeckel, 1870: 243; *Ascetta primordialis* var. *dictyoides* Haeckel, 1872: 17, pl. ii, figs. 5–7 (?); *A. dictyoides*, Lendenfeld, 1885: 1084; *Leucosolenia dictyoides*, Lackschewitsch, 1886: 299; Breitfuss, 1898: 211; Dendy and Row, 1913: 725; Breitfuss, 1932: 241; Breitfuss, 1935: 10; Tanita, 1943: 73; *nec* Breitfuss, 1898.

Description: Sponge pyriform, stipitate, solitary; surface smooth; vents apical; texture soft; colour, in spirit, white; skeleton of triradiates of two sizes, larger in ectosome.

Spicules: ectosomal triradiates, regular to sagittal, paired rays 0·05 to 0·07 by 0·01 mm., basal rays 0·07 to 0·1 by 0·01 mm.,
subectosomal triradiates, regular, rays 0·07 by 0·007 mm.

Distribution: Australia (Gulf of St. Vincent); South Africa (Cape of Good Hope); Mediterranean (Minorca); 37–55 m.

Remarks: The description of this species is obtained by assuming figs. 5–7 on pl. ii of Haeckel's description to represent *Ascetta primordialis* var. *dictyoides*, and by taking the description and measurements of the spicules from Stephenson's specimens from South Africa.



Text-fig. 48. *Leucosolenia dictyoides*: spicules, ×100, from a South African specimen which appears to agree in external form with that figured by Haeckel.

Named form: **Leucosolenia falcata** (Haeckel)

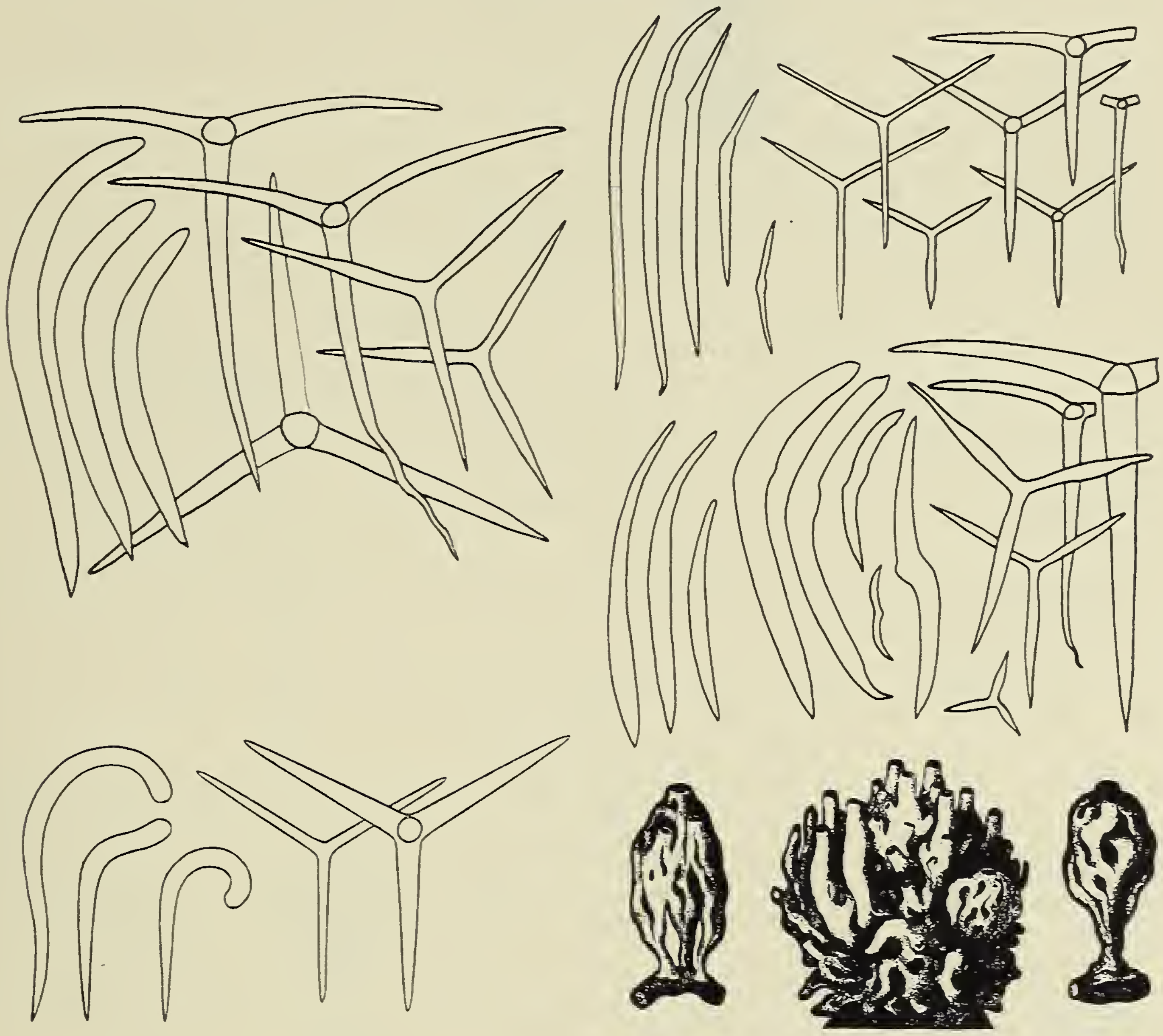
(text-fig. 49)

Ascandra falcata Haeckel, 1872: 83, pl. xiv, fig. 5, pl. xvii, figs. 8, 11, 15; *Olynthus falcatus* Haeckel, 1872: 83; *Clistolynthus falcatus* Haeckel, 1872: 83; *Soleniscus falcatus* Haeckel, 1872: 83; *Nardorus falcatus* Haeckel, 1872: 83, pl. xvii, fig. 8; *Tarrus falcatus* Haeckel, 1872: 83, pl. xvii, fig. 11; *Auloplegma falcatum* Haeckel, 1872: 83; *Ascometra falcata* Haeckel, 1872: 83, pl. xvii, fig. 15; *Grantia lieberkühnii* Graeffe, 1882: 321; *Ascandra lieberkühnii*, Lendenfeld, 1889: 417, pl. xxvi; *Homandra falcata*, Lendenfeld, 1891: 229, pl. x, figs. 45–51; *Leucosolenia falcata*, Dendy and Row, 1913: 722; Ferrer, 1918: 10; Topsent, 1934: 8; Breitfuss, 1935: 10; Topsent, 1936: 37, figs. 19–20; Tanita, 1942: 81

Description: Sponge solitary or compound, sub-pyriform, clathrate, sub-stipitate; surface minutely hispid; vent apical, naked; texture soft; colour, in spirit, yellowish-brown; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, regular, rays 0·12 to 0·15 by 0·01 mm.,
quadriradiates, regular, all rays 0·18 to 0·2 by 0·02 mm.,
oxea, sickle-shaped, 0·18 to 0·4 by 0·02 mm.

Distribution: Mediterranean; Spain (Asturias, Santander); littoral.



Text-fig. 49. *Leucosolenia falcata*: spicules after Haeckel (bottom left), × 100, the rest after Topsent × 120, those of Topsent showing variations in form and size in three different specimens; external forms, (bottom right) after Haeckel, natural size.

Named form: **Leucosolenia gegenbauri** Haeckel

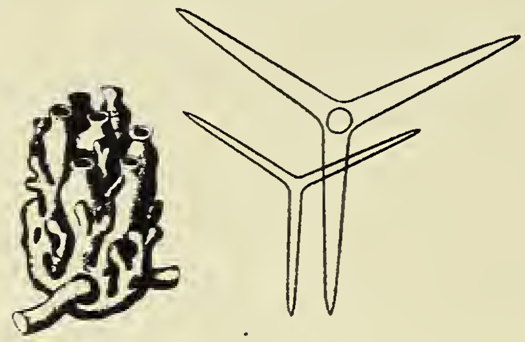
(text-fig. 50)

Leucosolenia gegenbauri Haeckel, 1870: 243; *Ascaltis gegenbauri* Haeckel, 1872: 62, pl. ix, figs. 6–8, pl. x, fig. 5; *Soleniscus gegenbauri* Haeckel, 1872: 62; *Tarrus gegenbauri* Haeckel, 1872: 62; *Aulo-plegma gegenbauri* Haeckel, 1872: 62; *Ascaltis scillaea* Haeckel, 1872: 62; *A. charybdaea* Haeckel, 1872: 62; *Leucosolenia gegenbauri*, Topsent, 1892: 22; *L. charybdaea* Dendy and Row, 1913: 724; *L. gegenbauri*, Dendy and Row, 1913: 725; Topsent, 1934: 8; *L. charybdea*, Tanita, 1942: 78.

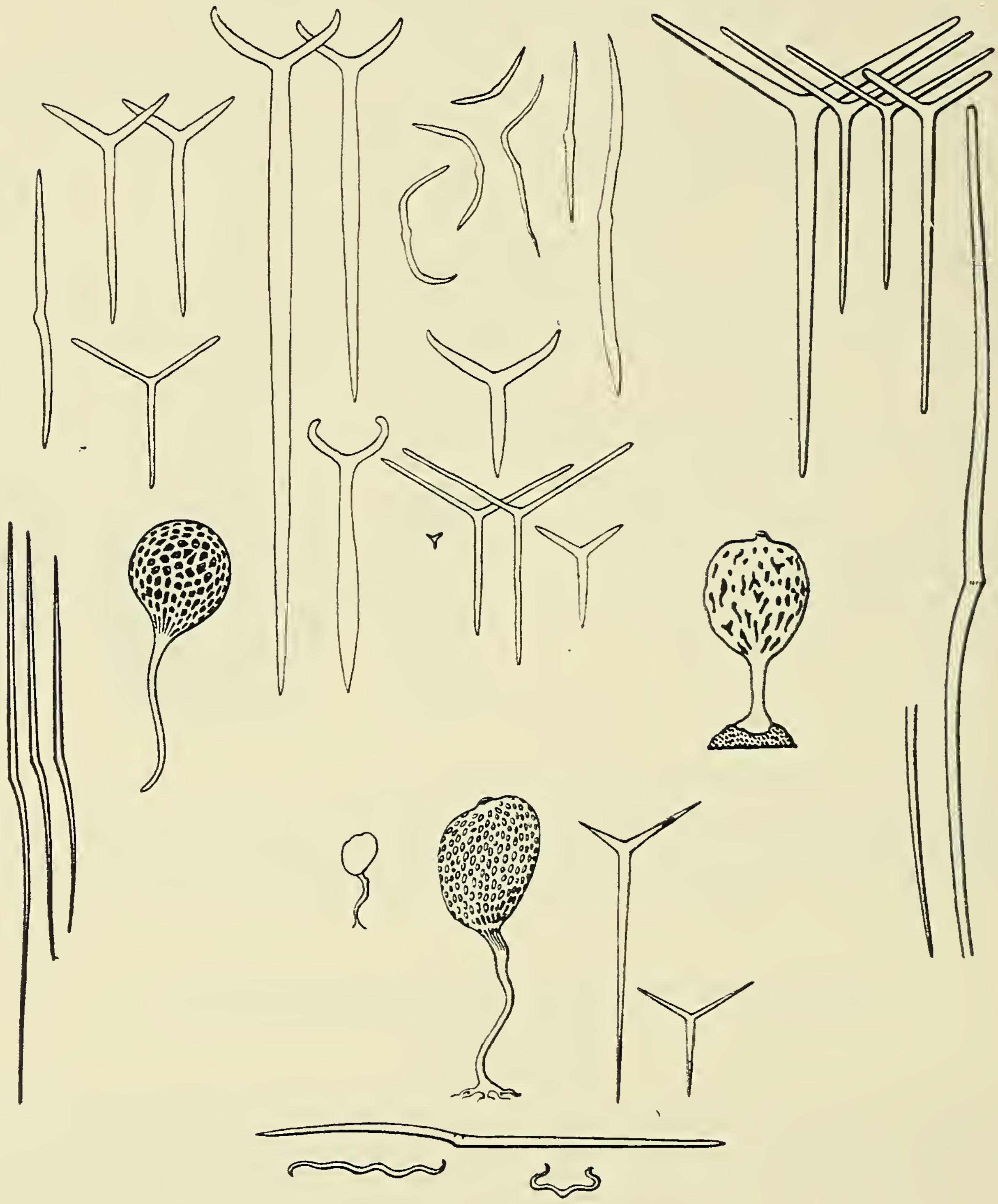
Description: Sponge composed of a basal reticulation of ascon tubes, with tubular vents arising vertically from it; surface smooth; vents terminal on vertical tubes, naked; texture soft; colour, in spirit, brown; skeleton of triradiates and quadriradiates.

Spicules: triradiates, regular, rays 0·1 to 0·12 by 0·006 to 0·008 mm.,
quadriradiates, regular, facial rays 0·16 to 0·2 by 0·02 to 0·025 mm., apical rays 0·1 to 0·14 by 0·02 to 0·025 mm.

Distribution: Mediterranean; Azores; 130–861 m.



Text-fig. 50. *Leucosolenia gegenbauri* after Haeckel: spicules, × 100; external form, × 2.



Text-fig. 51. *Leucosolenia lacunosa*: spicules, after Topsent (top left and top centre), × 120, after Lendenfeld (extreme top right, × 150, and bottom left, × 50) and after Carter (bottom), × 120; external form after Lendenfeld (left centre), × ½, after Haeckel (right centre), × 2, after Carter (bottom), smaller × ½, larger by ³⁄₂.

Named form: **Leucosolenia himantia** (Johnston)

(See *L. coriacea*)

Named form: **Leucosolenia lacunosa** (Bean)

(text-fig. 51)

Grantia lacunosa Bean [in] Johnston, 1842: 176, pl. xx, figs. 2–3; *G. striatula* Bowerbank, 1864: 233, figs. 38–39; *Leucosolenia lacunosa*, Bowerbank, 1866: 32; *Nardoa lacunosa*, Schmidt, 1866: 8; *Leucosolenia lacunosa*, Haeckel, 1869: 247; *Leucosolenia lacunosa*, Wright, 1870: 51; *Nardoa lacunosa*, Haeckel, 1872: 70, pl. xi, fig. 2, pl. xii, fig. 2; *Nardorus lacunosus*, Haeckel, 1872: 70; *Leucosolenia lacunosa*, Bowerbank, 1874: 9, pl. iv, figs. 1–8; *L. lacunosa*, var. *hilliari* Carter, 1884: 24, pl. i, figs. 1–5; *Ascetta blanca*, Hansen, 1885: 20; *Leucosolenia blanca*, Levinsen, 1886: 342; *Ascetta primordialis*, Hanitsch, 1889: 172; *Ascortis lacunosa*, Hanitsch, 1890: 233; *Ascandra angulata* Lendenfeld, 1891: 226, pl. viii, figs. 9–14; *Leucosolenia lacunosa*, Topsent, 1894: 7; *Ascandra angulata*, Arnesen, 1901: 13; Arnesen, 1901: 68; *Leucosolenia angulata*, Dendy and Row, 1913: 721; *L. lacunosa*, Dendy and Row, 1913: 722; *L. angulata*, Breitfuss, 1927: 27; *L. lacunosa*, Breitfuss, 1927: 28; *L. lacunosa*, Burton, 1930: 14; Breitfuss, 1932: 241; Arndt, 1935: 8, fig. 7; Breitfuss, 1935: 11; Topsent, 1936: 14, figs. 6–7; Tanita, 1943: 80.

Description: Sponge stipitate, with ovoid body composed of a reticulation of tubes; surface smooth or slightly roughened; vents (?); texture firm to soft; colour, in spirit, white to pale brown; spicules sagittal triradiates, basal rays, 0·21 to 0·6 mm. long, oral rays 0·12 to 0·3 mm. long, and oxea, found at base of body or in stalk, 0·3 to 0·08 mm. long.

Distribution: Arctic; Atlantic coast of Europe; Mediterranean; littoral to 220 m.

Named form: **Leucosolenia minoricensis** Lackschewitz

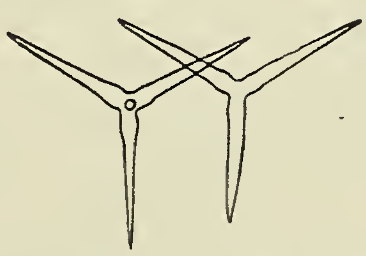
(text-fig. 52)

Leucosolenia minoricensis Lackschewitz, 1886: 301, pl. vii, figs. 2–3; Dendy and Row, 1913: 726; Topsent, 1934: 9; Tanita, 1943: 78.

Description: Sponge an irregular, low-growing mass of anastomosing tubes, sessile (?); surface smooth; vents, when present, few, tubular; texture soft (?); colour, in spirit, white or brown; skeleton of triradiates and quadriradiates.

Spicules: triradiates, regular, rays 0·1 to 0·11 by 0·007 to 0·01 mm.,
quadriradiates, similar to triradiates, with apical rays 0·08 to 0·11 by 0·007 to 0·01 mm.

Distribution: Mediterranean (Minorca).



Text-fig. 52. *Leucosolenia minoricensis* after Lackschewitz: spicules, × 100; external form, not figured by Lackschewitz, said to be like that of *L. canariensis*.

Named form: **Leucosolenia primordialis** Haeckel

(text-figs. 53–55)

? *Grantia pulchra* Schmidt, 1862: 18; ? *Leucosolenia pulchra* Schmidt, 1866: 8; *Prosycum primordiale* Haeckel, 1870: 237; *Olynthus simplex* Haeckel, 1870: 237; *Nardoa arabica* Miklucho (in) Haeckel, 1872: 16; *Ascetta primordialis* Haeckel, 1872: 16, pl. i, figs. 1–12, pl. ii, figs. 1–3, 17, pl. v, fig. 1; *Olynthus primordialis* Haeckel, 1872: 16, pl. i, figs. 1–12 (?), pl. v, fig. 1; *Clistolynthus primordialis* Haeckel, 1872: 16, pl. ii, fig. 2; *Soleniscus primordialis* Haeckel, 1872: 16, pl. ii, fig. 3; *Ascometra primordialis* Haeckel, 1872: 16, pl. ii, fig. 17; ?? *Ascaltis primordialis* Haeckel, 1872: 17; ?? *Ascortis primordialis* Haeckel, 1872: 17; ?? *Ascandra primordialis* Haeckel, 1872: 18; *Ascetta primordialis*, Lendenfeld, 1885: 897; *Clathrina primordialis*, Carter, 1886: 510; *Leucosolenia primordialis*, Lackschewitsch, 1886: 299; *Ascetta primordialis*, Lendenfeld, 1891: 195, pl. viii, fig. 1, pl. ix, figs. 23–26; *Clathrina primordialis*, Minchin, 1896: 359; *Leucosolenia primordialis*, Breitfuss, 1898: 12; Breitfuss, 1898: 21; Breitfuss, 1898: 91; *Ascetta primordialis*, Arnesen, 1901: 12; *Clathrina primordialis*, Jenkin, 1908: 6; Jenkin, 1908: 436; Row, 1909: 184; *Leucosolenia primordialis*, Dendy and Row, 1913: 726; Ferrer, 1918: 10; Burton, 1926: 71; *L. primordialis* et var. *apicalis* Brøndsted, 1931: 9, fig. 1; *L. primordialis*, Row and Hozawa, 1931: 736; Breitfuss, 1932: 242; Breitfuss, 1935: 12; Arndt, 1941: 45; Tanita, 1942: 73; Tanita, 1943: 370.

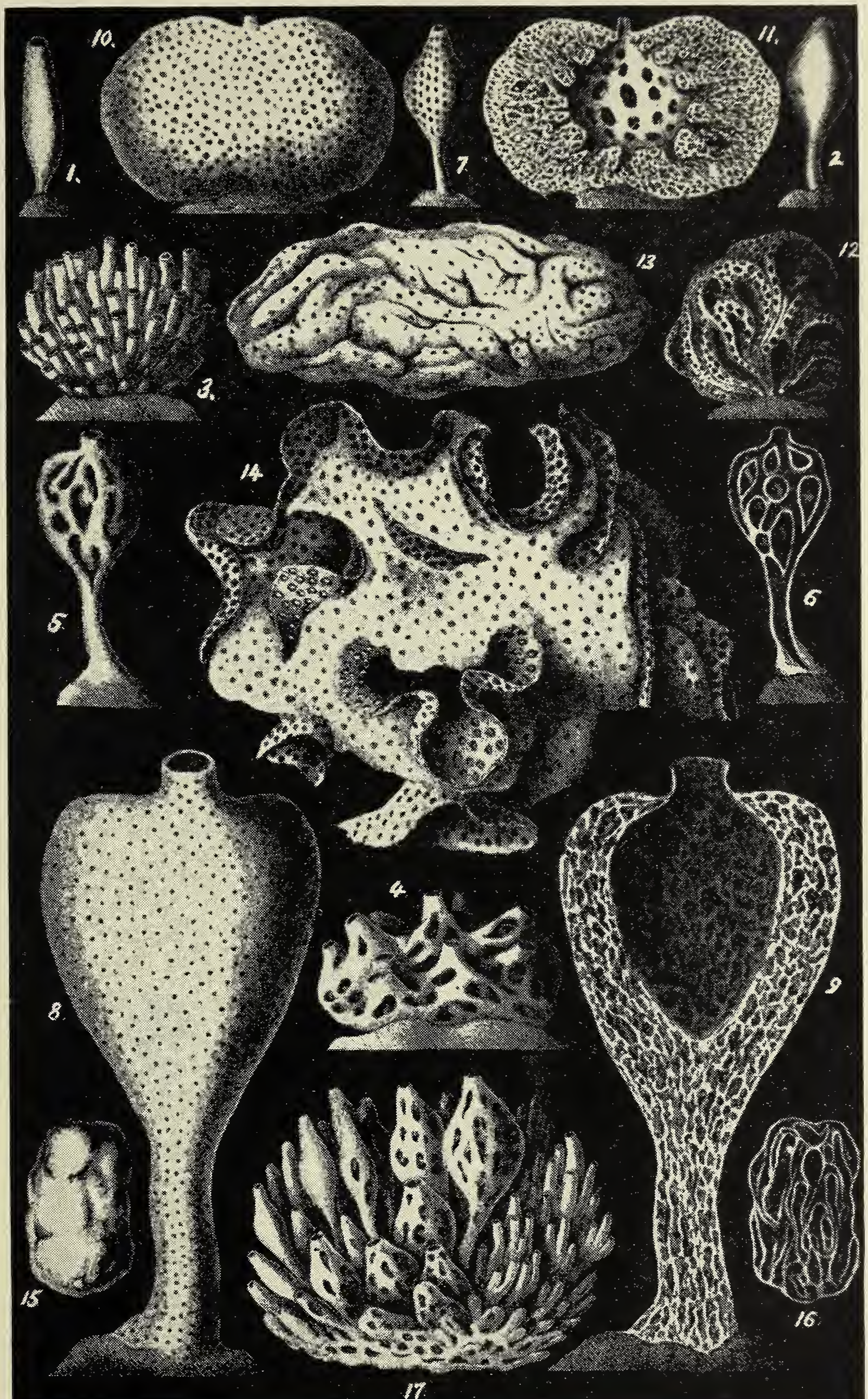
Description: Sponge a small, erect, substipitate tube, or a group of such tubes springing from a common base, rarely becoming clathrate (?); surface smooth; vents terminal, naked; texture (?); colour, in spirit, white; skeleton of triradiates only, regular, rays 0·06 to 0·09 by 0·008 to 0·01 mm.

Distribution: Atlantic coasts of Europe; Mediterranean; Red Sea; Indian Ocean; Japan; Australia.

The original limits for the species *Leucosolenia primordialis* (Haeckel), as illustrated in pls. i and ii of *Die Kalkschwämme* (1872), are sufficiently broad to embrace many species of *Leucosolenia*. Indeed, *L. primordialis* has since been divided into at least five distinct species, including *L. protogenes*, *L. dictyoides*, *L. loculosa* and *L. poterium*. All of these were recognised by Haeckel himself as varieties but unfortunately he did not indicate which figures on his pl. ii were applicable to these varieties; and to make matters worse his descriptions of the skeletal characters are sufficiently generalised to include all these species. The natural result of this has been that all records of *L. primordialis* since 1872 have been unreliable. The only possible way in which the original confusion could be cleared up would be by selecting one of Haeckel's figures as a holotype and basing all considerations of the species upon this. In choosing the holotype we must be influenced by the first name Haeckel used for the species, namely *Prosycum primordiale*, described as a simple tubular sponge with a simple apical oscule. The figure that best agrees with this is that illustrated on pl. i, fig. 1 as *Olynthus primordialis*, and this is here chosen as the holotype. The description given above is based upon this holotype.

Leucosolenia primordialis (Haeckel) has been referred to in the literature frequently. Some of these references will be found under *L. dictyoides*, *L. protogenes*, *L. loculosa* and *L. poterium*. The following require special mention here:

1. *Clathrina primordialis*, Row, 1909: 184 = *L. coriacea*.
2. *Leucosolenia primordialis*, Breitfuss, 1898: 212 and 1898: 297, has no value being merely a reference to the records of other authors.
3. *Ascetta primordialis*, Keller, 1889: 313, refers to the fact that Haeckel had recorded the species from the Red Sea.
4. *Ascetta primordialis*, Hanitsch, 1889: 172, almost certainly refers to a specimen of *Leucosolenia coriacea*.
5. *Leucosolenia primordialis*, Breitfuss, 1898: 91, may refer to specimens of *L. clathrus*.



Text-fig. 53. *Leucosolenia primordialis*: variability in form as illustrated by Haeckel 1–2, ×8, 10–16, ×2, the rest, ×4.

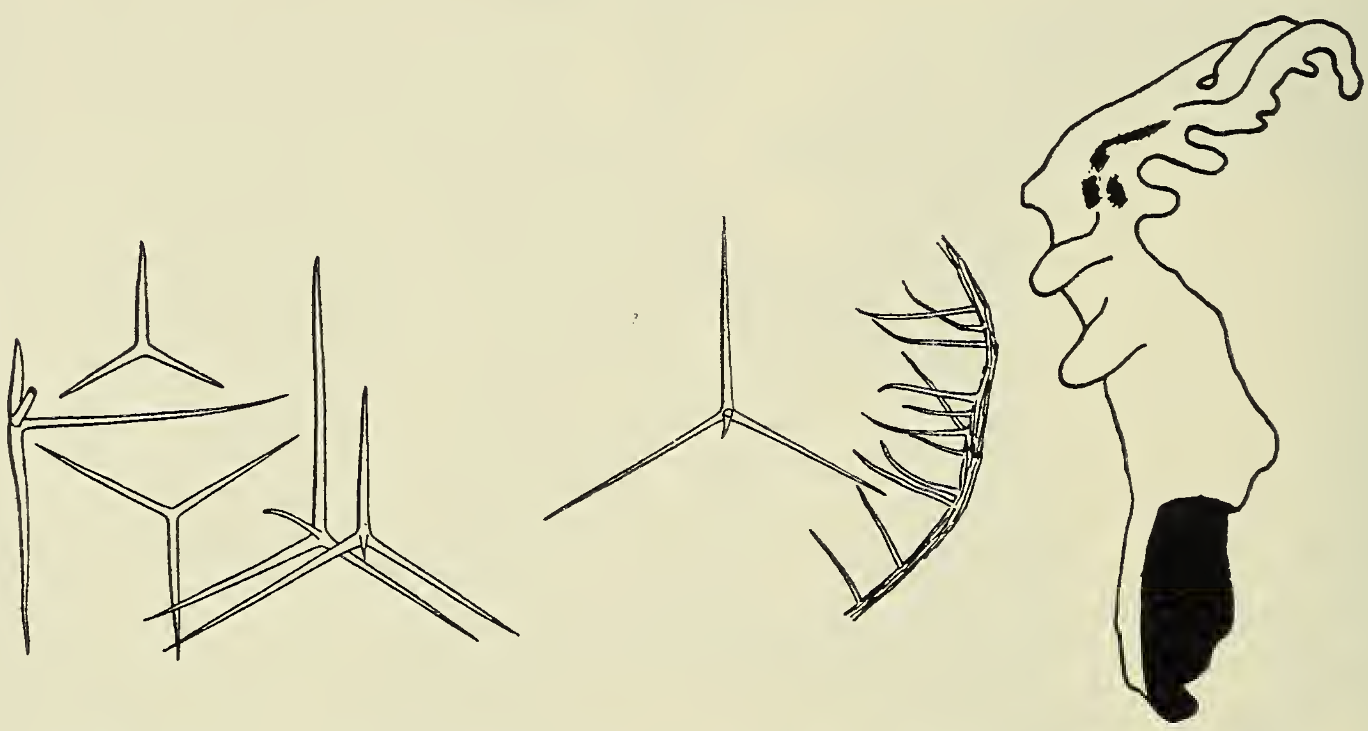
6. *Ascetta primordialis*, Arnessen, 1901 : 12, is without value, being merely a reference back to Haeckel 1872.
7. *Ascetta primordialis*, Hansen, 1885: 20, may include two species, *Leucosolenia blanca* from Station 35 and *L. macleayi* from Station 275.

Turning now to actual material in the British Museum labelled under *Leucosolenia primordialis* the disposition of the specimens is as follows:

1. Of five specimens from Naples three belong to *L. clathrus*, one to *L. goethei* and one to *L. decipiens*.
2. Lendenfeld's material described by him in 1891 belongs to *L. clathrus*.
3. Of four specimens described by Carter from Port Phillip Heads, Australia, three probably belong to *L. psammophila* and one to *L. depressa*.

Sufficient has been said to show the confused state of our knowledge of the species *Leucosolenia primordialis* (Haeckel) and reference to other identified material and to records in the literature will be found in the synonymy of the various species of *Leucosolenia*.

Text-fig. 54. *Leucosolenia primordialis*: spicules, as illustrated by Lendenfeld (1891), ×100.



Text-fig. 55. *Leucosolenia primordialis* var. *apicalis* after Brøndsted: spicules ×100; external form, ×6.

Named form: **Leucosolenia reticulum** (Schmidt)

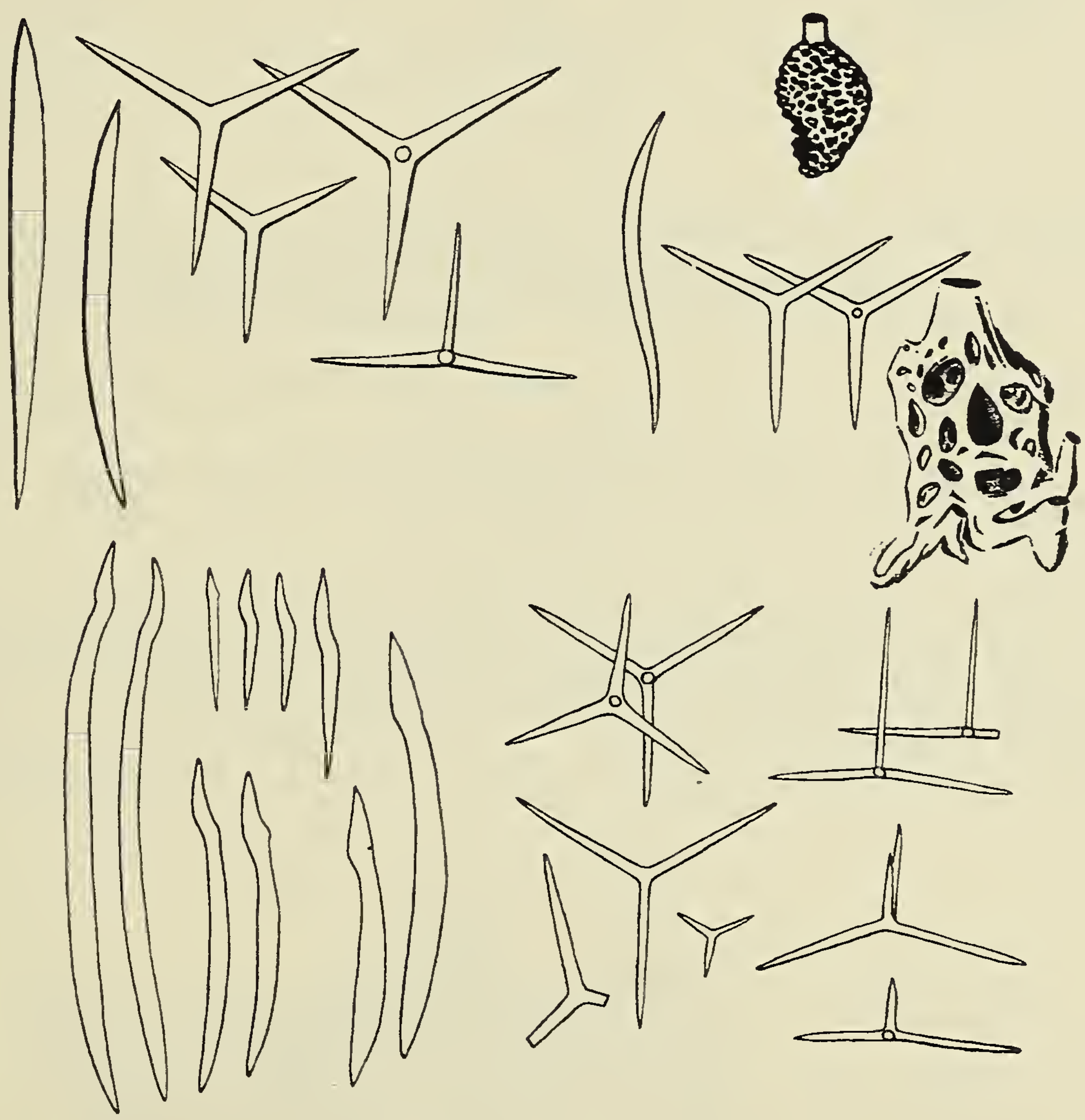
(text-fig. 56)

Nardoa reticulum Schmidt, 1862: 18, pl. i, fig. 8; Schmidt, 1869: 91; Schmidt, 1870: 73; *Tarrus reticulatus*, Haeckel, 1870: 244; *Nardopsis reticulum*, Haeckel, 1870: 247; *Ascandra reticulum*, Haeckel, 1872: 87, pl. xiv, fig. 4, pl. xx; *Olynthus reticulum*, Haeckel, 1872: 88, pl. xx, fig. 3; *Clistolynthus reticulum*, Haeckel, 1872: 88, pl. xx, figs. 4–5; *Soleniscus reticulum*, Haeckel, 1872: 88, pl. xx, figs. 6–10; *Nardorus reticulum*, Haeckel, 1872: 88, pl. xx, figs. 11–14; *Tarrus reticulum*, Haeckel, 1872: 88; *Auloplegma reticulum*, Haeckel, 1872: 88, pl. xx, figs. 15–30; *Ascometra reticulum*, Haeckel, 1872: 88; *Ascandra retiformis*, Haeckel, 1872: 88; *A. reticulata*, Haeckel, 1872: 88; *A. reticulum*, Vosmaer, 1881: 5; Lendenfeld, 1891: 39, pl. viii, figs. 7, 15; *Clathrina reticulum*, Minchin, 1896: 359; *Ascandra hermesi* Breitfuss, 1897: 39, figs. 1–2; *A. reticulum*, Breitfuss, 1898: 23; Breitfuss, 1898: 214; Breitfuss, 1898: 92; *Leucosolenia hermesi*, Dendy and Row, 1913: 722; *L. reticulata*, Dendy and Row, 1913: 723; *L. reticulum*, Dendy and Row, 1913: 723; *Ascandra reticulum*, Brøndsted, 1914: 530; *Leucosolenia reticulum*, Breitfuss, 1930: 275; *L. reticulata*, Breitfuss, 1932: 243; *L. reticulum*, Breitfuss, 1932: 243; Topsent, 1934: 9; Breitfuss, 1935: 14; Topsent, 1936, 22, figs. 10–11; Hozawa, 1940: 32, fig. 2; Arndt, 1940: 4; Arndt, 1941: 46; Tanita, 1942: 82; *L. hermesi*, Tanita, 1942: 82; *L. reticulum*, Tanita, 1943: 386.

Description: Sponge an irregularly subspherical, clathrate mass of ascon tubes; surface minutely hispid; vent apical, tubular; texture soft; colour, in spirit (and alive?), white, yellowish and reddish; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, regular, rays 0·09 to 0·12 by 0·007 to 0·008 mm.,
quadriradiates, similar to triradiates, with apical rays 0·09 to 0·12 by 0·003 mm.,
oxea, 0·16 to 0·3 by 0·012 to 0·016 mm.

Distribution: Arctic; North Atlantic; Mediterranean; Japan; 5–171 m.



Text-fig. 56. *Leucosolenia reticulum*: spicules as figured by Haeckel (top right) × 100, by Tanita (from Japan: top left), × 100 and by Topsent (from Mediterranean: bottom), × 120; external form, as figured originally by Schmidt (top right) and in 1870 (right centre), both about natural size.

[The following species are included under **Clathrina coriacea** *because, if we accept the range of variations known to occur in European examples of the species, these are difficult to exclude]*

Named form: **Leucosolenia cancellata** Verrill

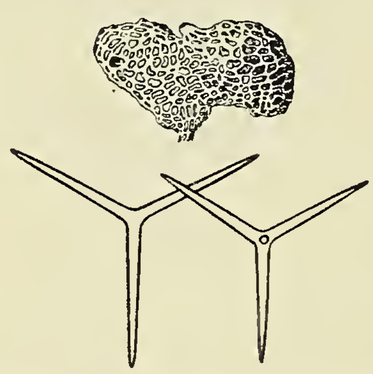
(text-fig. 57)

Leucosolenia (*Ascaltis*) *cancellata* Verrill, 1873: 393; Lambe, 1896: 203, pl. iii, fig. 5; Lambe, 1900: 27, pl. ii, fig. 5; Lambe, 1900: 165; Dendy and Row, 1913: 724; Breitfuss, 1943: 240; Tanita, 1943: 77; *nec* de Laubenfels, 1949: 41.

Description: Sponge massive, irregular, pyriform, hemispherical or subglobular, composed of anastomosing tubes (0·5 to 1·0 mm. diameter); surface even, smooth; pseudoscula few, scattered; texture (?); colour, alive, yellowish-white to brownish-yellow; skeleton of triradiates and quadriradiates of about equal size.

Spicules: triradiates, sagittal, paired rays 0·11 by 0·009 mm., basal rays 0·13 by 0·009 mm., quadriradiates, sagittal, paired rays 0·104 by 0·009 mm., basal rays 0·124 by 0·009 mm., apical rays 0·09 by 0·006 mm.

Distribution: Eastern coast of North America; Arctic; 18–110 m.



Text-fig. 57. *Leucosolenia cancellata*: spicules, ×100; external form, natural size. All figures after Lambe (1909).

Named form: **Leucosolenia dictyoides** (Breitfuss *nec* Haeckel)

(text-fig. 58)

Leucosolenia dictyoides Breitfuss, 1898: 458, pl. xxvii, fig. 2; Breitfuss, 1898: 211; *nec L. dictyoides* (Haeckel), Dendy and Row, 1913: 725.

Description: Sponge a low-growing mass of anastomosing tubes (0·2 to 0·5 mm. diameter); surface smooth; vents not apparent; texture (?); colour, alive, light green to yellow, in spirit, white; skeleton of regular triradiates, rays 0·081 to 0·089 by 0·006 mm.

Distribution: Juan Fernandez, 40–55 m.

Remarks: The external form is practically identical with that of *L. falklandica* (q.v.) from the same area.

Text-fig. 58. *Leucosolenia dictyoides* (Breitfuss *nec* Haeckel): spicule, ×100; external form, natural size.

Named form: **Leucosolenia falklandica** Breitfuss

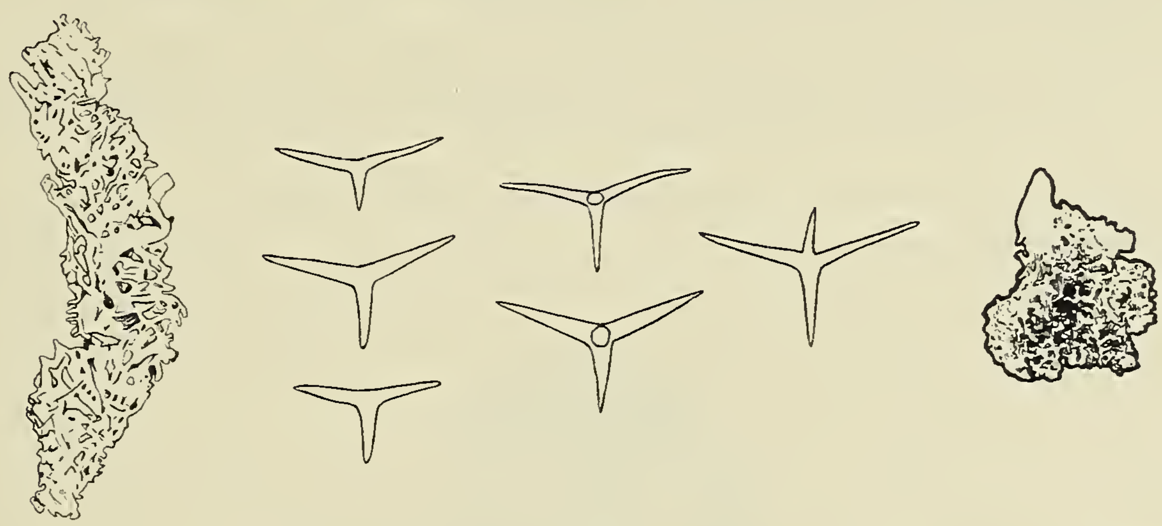
(text-fig. 59)

Leucosolenia falklandica Breitfuss, 1898: 458, pl. xxvii, figs. 3–4; Breitfuss, 1898: 211; Dendy and Row, 1913: 725; Burton, 1934: 8; Tanita, 1942: 79; Tanita, 1942: 107, pl. vi, fig. 1.

Description: Sponge an irregular, low-lying mass of anastomosing tubes, with erect, tubular vents; surface smooth; texture (?); colour, in spirit, white; skeleton of tangential layers of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: triradiates, sagittal, paired rays 0·075 to 0·094 by 0·006 to 0·008 mm., basal rays 0·063 by 0·007 mm.,
quadriradiates, sagittal, paired rays 0·08 to 0·1 by 0·008 to 0·013 mm., basal rays 0·064 by 0·007 mm., apical rays 0·05 by 0·005 mm.

Distribution: Falkland Islands; Straits of Magellan; littoral.



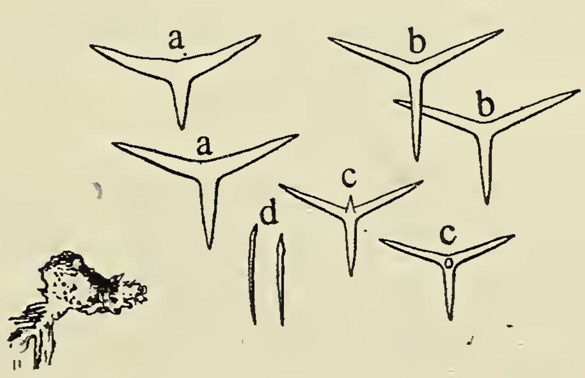
Text-fig. 59. *Leucosolenia falklandica*: spicules, ×100; and external form of holotype (left) after Breitfuss; and to right, external form drawn from a photograph published by Tanita, both natural size.

Named form: **Leucosolenia feuerlandica** Tanita

(text-fig. 60)

Leucosolenia feuerlandica Tanita, 1942: 107, pl. vi, fig. 2, text-fig. 1.

Description: Sponge a cushion-shaped mass of anastomosing tubes; surface slightly hispid; pseudopores scattered over surface; texture (?); colour, in spirit, white; skeleton of triradiates, quadriradiates and microxea.



Text-fig. 60. *Leucosolenia feuerlandica* after Tanita: spicules, ×100; external form, $\times\frac{2}{3}$.
a. ectosomal triradiates; b. triradiates of deeper layers; c. quadriradiates of deeper layers; d. microxea.

Spicules: ectosomal triradiates (tripods), paired rays 0·07 to 0·095 by 0·012 to 0·018 mm., basal ray 0·05 to 0·07 by 0·012 to 0·018 mm.,
triradiates of deeper tissues, subregular, 0·06 to 0·09 by 0·008 to 0·01 mm.,
quadriradiates similar to smaller triradiates, with apical ray 0·04 to 0·05 by 0·006 to 0·008 mm.,
microxea, 0·07 to 0·09 by 0·004 to 0·006 mm.

Distribution: Tierra del Fuego.

Named form: **Leucosolenia flexilis** (Haeckel)

(text-fig. 61)

Ascetta flexilis Haeckel, 1872: 43, pl. v, fig. 8; *Auloplegma flexile* Haeckel, 1872: 43; *Leucosolenia flexilis*, Dendy and Row, 1913: 725; Tanita, 1943: 75.

Description: Sponge an encrusting reticulation of anastomosing tubes (0·2 to 0·5 mm. diameter); surface smooth; texture soft; vents not apparent; colour, in spirit, white; skeleton of triradiates only.

Spicules: triradiates, subregular, rays slightly sinuous or irregularly curved, 0·12 by 0·12 mm.

Distribution: Singapore.

Text-fig. 61. *Leucosolenia flexilis*: spicules, after Haeckel, ×100; external form, reconstructed from Haeckel's description, ×2.

Named form: **Leucosolenia gardineri** Dendy

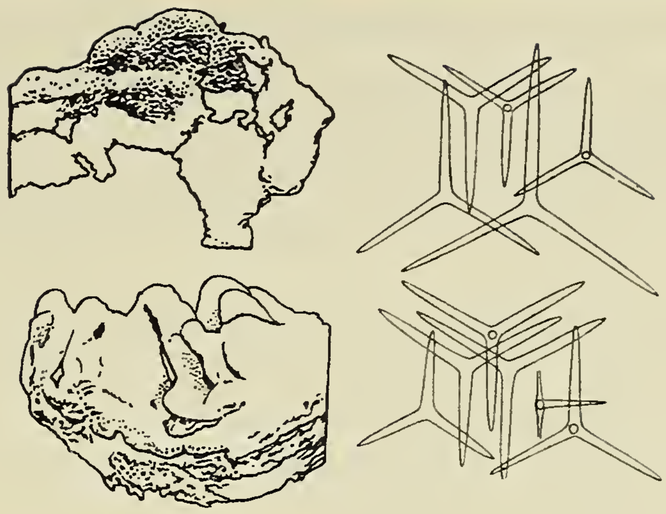
(text-fig. 62)

Leucosolenia gardineri Dendy, 1913: 2, pl. i, figs. 1–2, pl. iii, figs. 1–3; Dendy and Row, 1913: 725; *L. gardeneri* (*sic*), var. *vergensis* Kumar, 1924: 21; *L. gardineri*, Hozawa, 1950: 35; Tanita, 1942: 21; Tanita, 1942: 78; Tanita, 1943: 377, pl. xii, fig. 14.

Description: Sponge irregularly massive and lobose; surface smooth; vents not apparent; texture soft; colour, in spirit, white; skeleton of triradiates and quadriradiates.

Spicules: triradiates, of ectosomal layer, regular, rays 0·14 by 0·012 mm.,
triradiates, of inner tissues, regular, rays 0·074 by 0·007 mm.,
quadriradiates, regular, facial rays 0·074 by 0·007 mm., apical rays 0·05 mm. long.

Distribution: Indian Ocean (Salomon); Japan; 18–26 m.



Text-fig. 62. *Leucosolenia gardineri* after Dendy: spicules, from the two co-types, × 100; external form of co-types, natural size.

Named form: **Leucosolenia gracilis** (Haeckel)

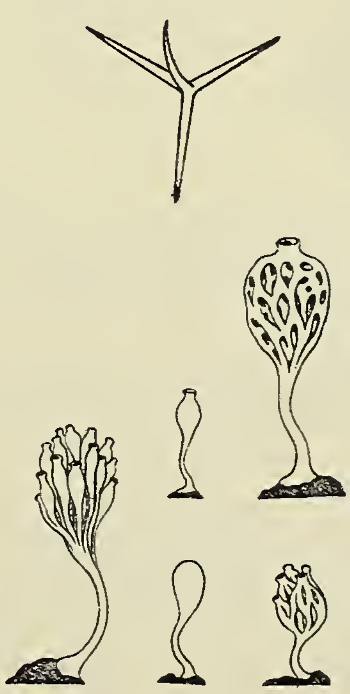
(text-fig. 63)

Ascilla gracilis Haeckel, 1872: 44, pl. vi, figs. 1-7; *Olynthus gracilis* Haeckel, 1872: 45, pl. vi, fig. 1; *Clistolynthus gracilis* Haeckel, 1872: 45, pl. vi, fig. 2; *Soleniscus gracilis* Haeckel, 1872: 45, pl. vi, fig. 3; *Nardorus gracilis* Haeckel, 1872: 45, pl. vi, fig. 5; *Tarrus gracilis* Haeckel, 1872: 45, pl. vi, fig. 4; *Auloplegma gracile* Haeckel, 1872: 45, pl. vi, fig. 6; *Ascilla gracillima* Haeckel, 1872: 45; *A. convallaria* Haeckel, 1872: 45; *Leucosolenia gracilis* var. *gracillima*, Breitfuss, 1898: 211; *L. convallaria*, Dendy and Row, 1913: 725; *L. gracilis*, Dendy and Row, 1913: 725; *L. convallaria*, de Laubenfels, 1932: 6; Tanita, 1943: 76; *L. gracilis*, Tanita, 1943: 76; *L. convallaria*, de Laubenfels, 1932: 6.

Description: Sponge either tubular and solitary or composed of a group of tubes springing from a common stalk, or clathrate with one or more vents, sessile or stipitate; surface smooth; vents terminal, naked; texture soft; colour, in spirit, white; skeleton of quadriradiates only.

Spicules: quadriradiates, regular, facial rays 0·08 by 0·005 to 0·007 mm., apical rays 0·04 to 0·08 by 0·005 to 0·007 mm.

Distribution: California.



Text-fig. 63. *Leucosolenia gracilis* after Haeckel: spicule, × 100; external form, all × 4 except one (bottom right) which is × 2.

Named form: **Leucosolenia izuensis** Tanita

Leucosolenia izuensis Tanita, 1942: 21, pl. ii, fig. 1, text-fig. 1; Tanita, 1942: 21, pl. ii, fig. 1, text-fig. 1; Tanita, 1942: 81; Tanita, 1943: 383, pl. xii, fig. 19.

Description: Sponge a compact mass of anastomosing ascon-tubes; surface hispid; vent (?); texture (?); colour, in spirit, yellowish-white; skeleton of triradiates, large and small quadriradiates and oxea.

Spicules: triradiates, regular, rays 0·05 to 0·12 by 0·008 to 0·014 mm.,
quadriradiates, regular, facial rays 0·12 to 0·165 by 0·014 to 0·018 mm., apical ray 0·14 to 0·19 by 0·01 to 0·014 mm.,
quadriradiates, regular, facial rays 0·06 to 0·095 by 0·008 to 0·01 mm., apical ray 0·07 to 0·1 by 0·006 to 0·008 mm.,
oxea, 0·27 to 0·55 by 0·017 to 0·033 mm.

Distribution: Japan.

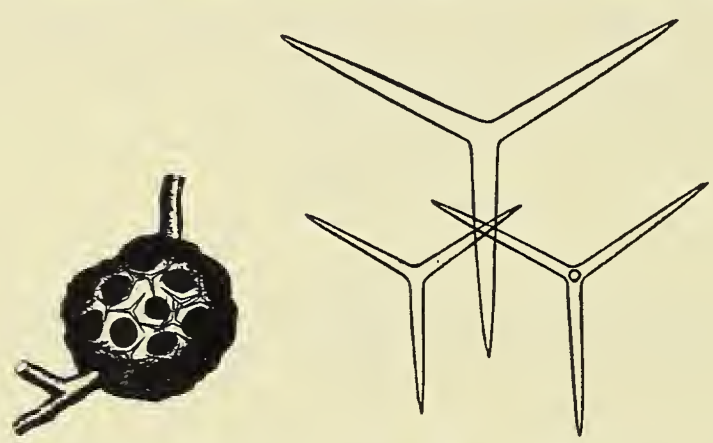
Named form: **Leucosolenia lamarckii** Haeckel

(text-fig. 64)

Leucosolenia lamarckii Haeckel, 1869: 243; *Aulorrhiza intestinalis* Haeckel, 1869: 250; *Ascalti lamarckii* Haeckel, 1872: 60, pl. ix, fig. 5, pl. x, fig. 4; *Auloplegma lamarckii* Haeckel, 1872: 60; *Ascaltis intestinalis* Haeckel, 1872: 60; *A. lamarckii* Lendenfeld, 1885: 1087; *A. lamarki*, Breitfuss, 1898: 212; Breitfuss, 1898: 14; *Leucosolenia lamarcki*, Breitfuss, 1898: 20; Arnesen, 1901: 11; *L. lamarcki* var. *intestinalis*, Arnesen, 1901: 21; *L. lamarckii*, Lundbeck, 1909: 457; Dendy and Row, 1913: 726; Breitfuss, 1932: 242; Tanita, 1943: 78.

Description: Sponge composed of rounded masses of anastomosing tubes; without vents (?); texture (?); colour, alive and in spirit (?), white or red; skeleton of triradiates, with regular rays, 0·08 to 0·3 by 0·004 to 0·02 mm., and quadriradiates, with regular facial rays, 0·08 to 0·12 by 0·004 to 0·006 mm.

Distribution: Greenland; Barents Sea; White Sea; Morocco; Gibraltar; Australia; 60–70 m.

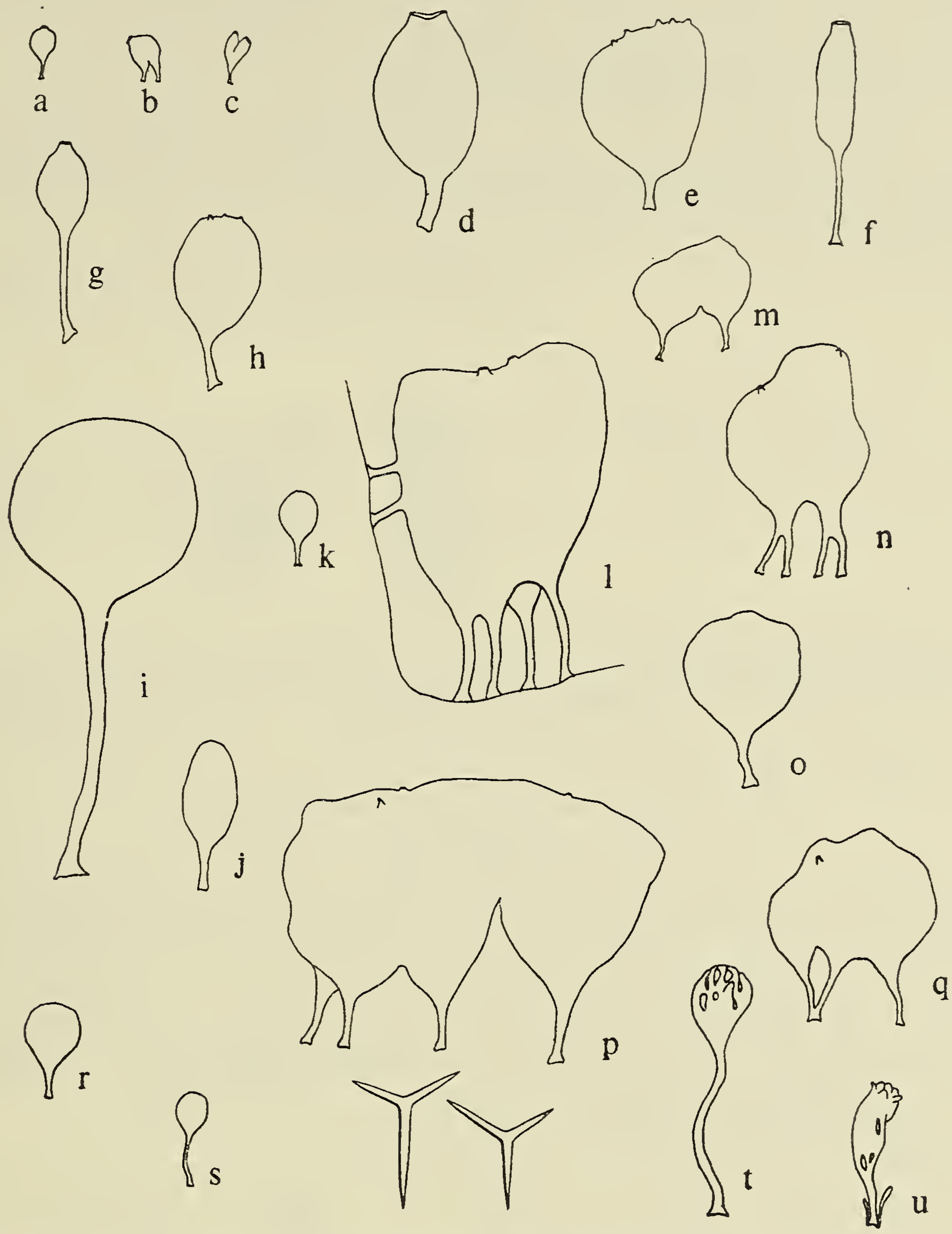


Text-fig. 64. *Leucosolenia lamarckii* after Haeckel: spicules, ×100; external form, ×2.

Named form: **Leucosolenia macleayi** (Lendenfeld)

(text-fig. 65)

Guancha blanca (pars) Miklucho-Maclay, 1868: 221, pl. iv, fig. 1c, 2 (pars), 3 (pars); ? *Ascetta coriacea* (pars), Haeckel, 1872: pl. iii, figs. 4 (pars), 9–14, 21–24, 33; ? *Ascilla gracilis* (i.e. *Nardorus gracilis*) Haeckel, 1872: pl. vi, fig. 5; *Ascetta blanca* (pars), Haeckel, 1872: 38; *Ascetta blanca* (pars), Vosmaer, 1881: 5; *Leucosolenia blanca* var. *bathybia* Poléjaeff, 1883: 37, pl. 1, fig. 2, pl. iii, fig. 3; Topsent, 1892: 22, pl. v, fig. 3; *Ascetta macleayi* Lendenfeld, 1885: 1086, figs. 7–13; *Ascetta blanca* (pars), Lendenfeld, 1891: 218; *Leucosolenia stipitata* Dendy, 1891: 51, pl. i, figs. 4–6, pl. iv, fig. 2, pl. ix, fig. 5; *Leucosolenia pulcherrima* Dendy, 1891: 52, pl. i, fig. 7, pl. iv, fig. 3, pl. x, fig. 3; *Leucosolenia blanca* et varr. *guancha, philippina, bathybia*, Breitfuss, 1896: 1; *L. blanca*, Breitfuss, 1898: 19–20; Breitfuss, 1898: 210; Breitfuss, 1898: 16; *Ascetta blanca*, Arnesen, 1901: 9; *Ascandra lacunosa*, Breitfuss, 1911: 224; *L. blanca*, Breitfuss, 1911: 224; Breitfuss, 1912: 72; *Leucosolenia blanca* (pars), Dendy and Row, 1913: 724; ? *L. gracilis*, Dendy and Row, 1913: 725;

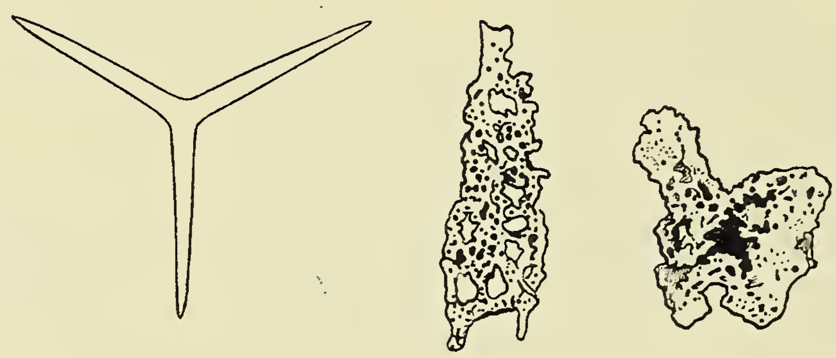


Text-fig. 65. *Leucosolenia macleayi*, as understood by Burton (1930). Outline-drawings to show the variation in external form in the species. a–c. Three specimens described by Miklucho-Maclay under *Guancha blanca*. d. The holotype of *Leucosolenia stipitata* Dendy. e. The holotype of *L. pulcherrima* Dendy. f. A co-type of *L. stipitata*. g. The holotype of *L. macleayi*. h. A specimen from California collected by Dr. M. W. de Laubenfels. i–j. The Challenger specimens of *L. blanca* var. *bathybia*. k–q. Specimens from Naples, showing various growth-forms and several cases of the coalescence of neighbouring individuals; l. shows the production of lateral peduncles in a specimen growing in an angle of the rock. r. A specimen from South Georgia in the British Museum collection. s. The Siboga specimen. t. A young specimen from Norway showing the manner of growth of the body. u. The smallest known specimens of the species, from Naples. Fig. a.–s., ×2, figs. t., u., ×$3\frac{1}{2}$.

L. macleayi, Dendy and Row, 1913: 726; *L. philippina*, Dendy and Row, 1913: 726; *L. pulcherrima*, Dendy and Row, 1913: 727; *L. stipitata*, Dendy and Row, 1913: 727; *L. blanca*, Breitfuss, 1927: 27; *Leucosolenia macleayi*, Burton, 1930: 14, fig. 8; *L. stipitata*, Row and Hozawa, 1931: 739; *L. macleayi*, Burton, 1932: 258; *L. philippina*, Breitfuss, 1932: 242; *L. macleayi*, Breitfuss, 1932: 242; de Laubenfels, 1932: 6, fig. 2; Burton, 1934: 4; *L. stipitata*, Tanita, 1942: 26, pl. ii, fig. 5; *L. macleayi*, Tanita, 1942: 75; *L. stipitata*, Tanita, 1943: 273, pl. xi, figs. 5–7; *L. macleayi*, de Laubenfels, 1932: 6, fig. 2; de Laubenfels, 1942: 268.

Description: Sponge stipitate, with clathrate body which may be spherical, subspherical, or laterally compressed and foliate; vents, when present, situated at upper surface and may be single or numerous; spicules equiangular, sagittal triradiates, with ends of rays acute or obtuse, basal rays measuring 0·09 to 0·2 mm., and oral rays 0·03 to 0·1 mm. long.

Distribution: Arctic; West coast of Europe; California; Japan; Azores; Indonesia; Australia; littoral to 823 m.



Text-fig. 66. *Leucosolenia mutsu*: spicule, ×100; external form, drawn from photographs of holotype, after Hozawa (middle); and Tanita's (1942) specimen, natural size.

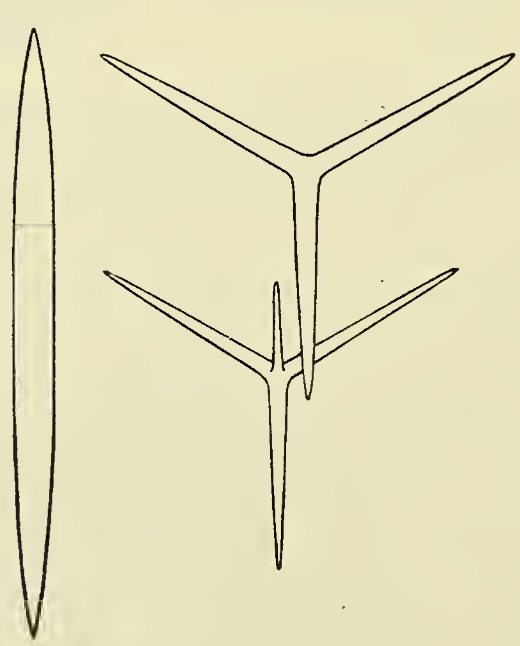
Named form: **Leucosolenia mutsu** Hozawa

(text-fig. 66)

Leucosolenia mutsu Hozawa, 1928: 219, pl. i, figs. 1–3; Hozawa, 1940: 35; Tanita, 1940: 165, pl. viii, fig. 1; Tanita, 1941: 267; Tanita, 1942: 23, pl. ii, fig. 2; 1942: 73; Tanita, 1943: 369.

Description: Sponge forming irregular, spreading masses (5–12 mm. across) of a loose network of tubes; surface of tubes smooth; vents small, scattered, without perceptibly raised margins; texture (?); colour, in spirit, brownish-white; walls of tubes lined with a few layers of regular triradiates, rays 0·06 to 0·15 by 0·008 to 0·014 mm.

Distribution: Japan (many localities in northern Japan); littoral.



Text-fig. 67. *Leucosolenia panis* after Haeckel: spicules, ×100.

Named form: **Leucosolenia panis** (Haeckel)

(text-fig. 67)

Ascandra panis Haeckel, 1872: 86, pl. xiv, fig. 3, pl. xvii, fig. 14; *Auloplegma panis* Haeckel, 1872: 86, pl. xvii, fig. 14; *Leucosolenia panis*, Thacker, 1908: 759, pl. xi, fig. 1, text-fig. 155; Dendy and Row, 1913: 723; Tanita, 1942: 82.

Description: Sponge an irregular or hemispherical mass formed by a reticulation of ascon tubes; surface minutely hispid; vents small, scattered; texture soft; colour, in spirit, brown; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, regular, rays 0·12 to 0·2 by 0·011 to 0·016 mm.,
quadriradiates, similar to triradiates, with apical rays 0·12 to 0·2 by 0·005 to 0·008 mm.,
oxea, 0·35 to 0·8 by 0·025 to 0·04 mm.

Distribution: Florida; Cape Verde Islands; 37 m.

Named form: **Leucosolenia pedunculata** (Lendenfeld)

Ascetta pedunculata Lendenfeld, 1885: 62, pl. lxii, fig. 34; *Leucosolenia pedunculata*, Dendy and Row, 1913: 720.

Remarks: This is indistinguishable from *L. macleayi* in its wider sense (see p. 206).

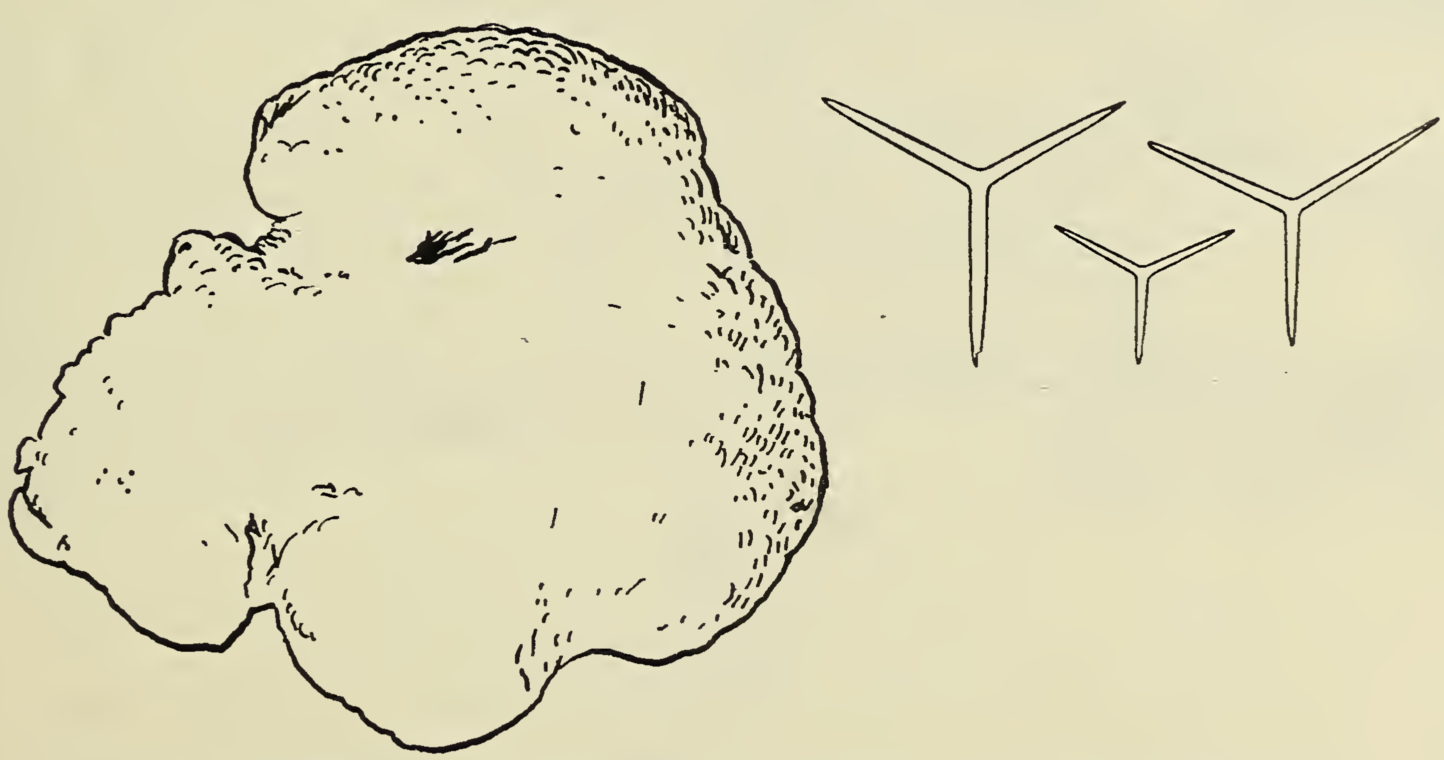
Named form: **Leucosolenia poterium** (Ridley *nec* Haeckel)

Clathrina poterium Ridley, 1881: 133; *Leucosolenia poterium*, Breitfuss, 1898: 457, pl. xxvii, fig. 1; *nec L. poterium* (Haeckel).

Description: Sponge a low-growing mass of anastomosing tubes; surface smooth; vents (?); texture firm, friable; colour, in spirit, yellowish-white, alive, pure white; skeleton of triradiates of two sizes, larger ectosomal, smaller subectosomal.

Spicules: subectosomal triradiates, regular, rays 0·118 to 0·127 by 0·01 mm.,
ectosomal triradiates, regular, rays 0·14 to 0·18 by 0·019 to 0·022 mm.

Distribution: Chile (Tom Bay); 0–55 m.



Text-fig. 68. *Leucosolenia psammophila*: spicules, after Row and Hozawa, ×100; external form, drawn from the original published photograph, natural size.

Named form: **Leucosolenia psammophila** Row and Hozawa

(text-fig. 68)

Leucosolenia psammophila Row and Hozawa, 1931: 736, pl. xix, fig. 1, text-fig. 1; Tanita, 1942: 74.

Description: Sponge massive, spreading, biscuit-shaped, composed of a reticulate mass of tubes, sessile; surface smooth; vents not apparent; texture firm, friable (owing to inclusion of sand); colour, in spirit, yellowish-grey; skeleton of triradiates only, regular, with rays 0·14 to 0·16 by 0·013 mm.

Distribution: South-west Australia (Fremantle).

Named form: **Leucosolenia pyriformis** Tanita

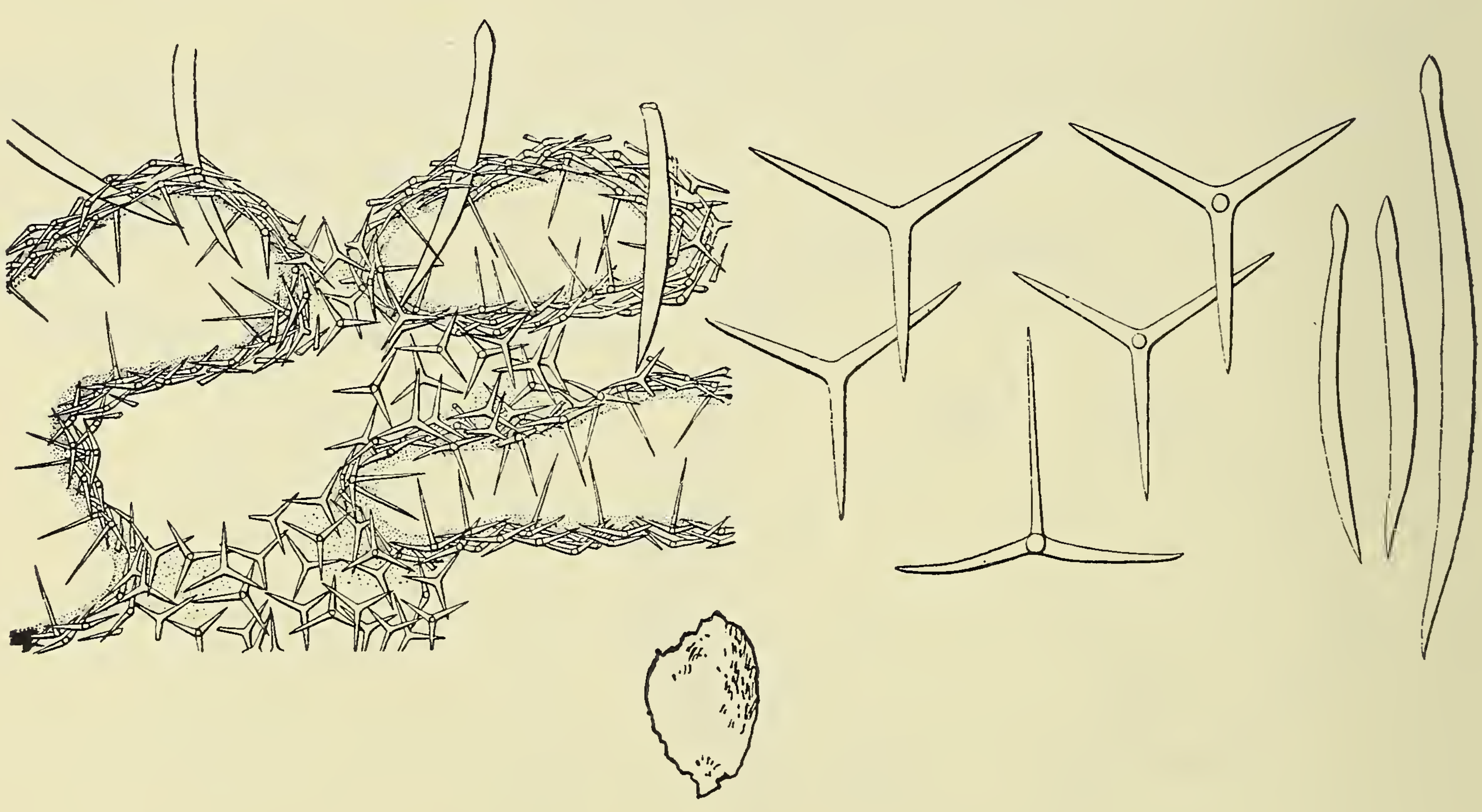
(text-fig. 69)

Leucosolenia pyriformis Tanita, 1943: 384, pl. xii, fig. 21, text-figs. 5–6.

Description: Sponge a pyriform mass of anastomosing ascon-tubes; surface hispid; vent apical, naked; texture soft, elastic; colour, in spirit, white; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, regular, 0·1 to 0·19 by 0·012 to 0·018 mm.,
quadriradiates, similar to triradiates, with apical ray 0·15 to 0·26 by 0·008 to 0·015 mm.,
oxea, lanceolate, 0·63 to 0·8 by 0·04 to 0·055 mm.

Distribution: Japan (Miye Prefecture); 128–165 m.



Text-fig. 69. *Leucosolenia pyriformis* after Tanita: spicules, ×100; section across body, about ×50; external form, slightly above natural size.

Named form: **Leucosolenia sagamiana** Hozawa

(text-fig. 70)

Leucosolenia sagamiana Hozawa, 1929: 281, pl. xii, figs. 1–2, text-fig. 1; Tanita, 1942: 82; Tanita, 387.

Description: Sponge irregular, composed of branching and anastomosing tubes (0·5 to 1·5 mm. diameter); surface minutely hispid; vent at end of largest tube; texture soft; colour, in spirit, white; wall of tubes supported by a few layers of triradiates and quadriradiates, with apical ray projecting into cloacal cavity, and oxea projecting beyond ectosomal surface.

Spicules: triradiates, regular, rays 0·08 to 0·14 by 0·006 to 0·008 mm.,
quadriradiates, regular, facial rays 0·08 to 0·15 by 0·006 to 0·012 mm., apical rays 0·12 to 0·38 by 0·004 to 0·008 mm.,
oxea, regularly fusiform, slightly curved, 0·31 to 0·6 by 0·01 to 0·024 mm.

Distribution: Japan (Sagami Sea); 171 m.

Text-fig. 70. *Leucosolenia sagamiana* after Hozawa: external form, natural size.

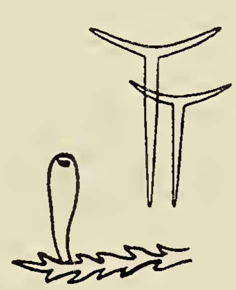
Named form: **Leucosolenia sagittaria** (Haeckel)

(text-fig. 71)

Ascetta sagittaria Haeckel, 1872: 42, pl. v, fig. 7; *Olynthus sagittarius* Haeckel, 1872: 42; *Leucosolenia sagittaria*, Grentzenberg, 1891: 41; Breitfuss, 1898: 28; Breitfuss, 1898: 21; Dendy and Row, 1913: 727; Arndt, 1928: 18, figs. 7–8; Breitfuss, 1932: 243; Arndt, 1935: 9, fig. 10; Tanita, 1943: 75.

Description: Sponge small, tubular to oviform, sessile, solitary; surface smooth; vent apical, naked; texture soft; colour, in spirit, white; skeleton of triradiates only, sagittal, paired rays 0·05 to 0·06 by 0·005 mm., basal rays 0·1 to 0·12 by 0·005 mm.

Distribution: North Sea.



Text-fig. 71. *Leucosolenia sagittaria* after Arndt: spicules, ×100, external form, ×2.

Named form: **Leucosolenia sceptrum** (Haeckel)

(text-fig. 72)

Ascetta sceptrum Haeckel, 1872: 37, pl. v, fig. 4; *Auloplegma sceptrum* Haeckel, 1872: 37; *Leucosolenia sceptrum*, Dendy and Row, 1913: 727; Ferrer, 1918: 11; Tanita, 1942: 74.

Description: Sponge a subspherical mass of anastomosing tubes; surface smooth; vents not apparent; texture soft (?); colour, in spirit, yellow or white (?); skeleton of triradiates only, with rays regular and spined at ends, 0·1 to 0·12 by 0·01 mm.

Distribution: Newfoundland; Spain (Asturias); littoral.

Text-fig. 72. *Leucosolenia sceptrum* after Haeckel: spicule, × 100; external form, reconstructed on the basis of Haeckel's written description, natural size.

Named form: **Leucosolenia spongiosa** (Kölliker)

(text-fig. 73)

Nardoa spongiosa Kölliker, 1864: 63, pl. vii, fig. 10, pl. ix, figs. 6–8; *Tarrus spongiosa*, Haeckel, 1870: 244; *Leucosolenia spongiosa*, Dendy and Row, 1913: 727.

Remarks: Insufficiently described; may be identical with *L. gegenbauri* (Haeckel).

Distribution: Mediterranean (Messina).

Text-fig. 73. *Nardoa spongiosa* after Kölliker: section through sponge magnified several times (precise magnification not stated in original publication).

Named form: **Leucosolenia tenuipilosa** Dendy

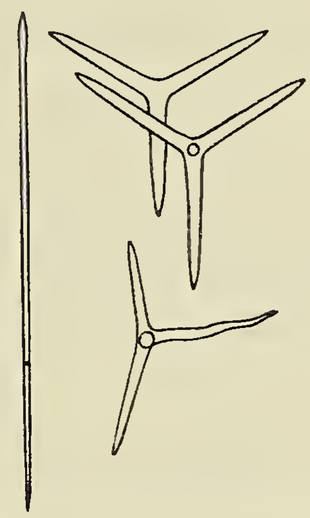
(text-fig. 74)

Leucosolenia (*Clathrina*) *tenuipilosa* Dendy, 1905: 277, pl. xiii, fig. 9; *L. canariensis*, Thacker, (pars) 1908: 762; *Clathrina tenuipilosa*, Row, 1909: 185; *Leucosolenia tenuipilosa*, Dendy and Row, 1913: 723; Tanita, 1942: 82; Burton, 1952: 163.

Description: Sponge forming massive, reticulate colonies of tubes (0·5 mm. diameter); surface minutely hispid; vents prominent, scattered; texture soft; colour, in spirit, pale grey; skeleton of quadriradiates, triradiates and oxea.

Spicules: triradiates, regular, rays 0·1 by 0·012 mm., quadriradiates, similar to triradiates but with apical rays 0·14 mm. long,
oxea, 0·4 by 0·002 mm.

Distribution: Indian Ocean (Ceylon); Red Sea; Cape Verde Islands; littoral to 8 m.



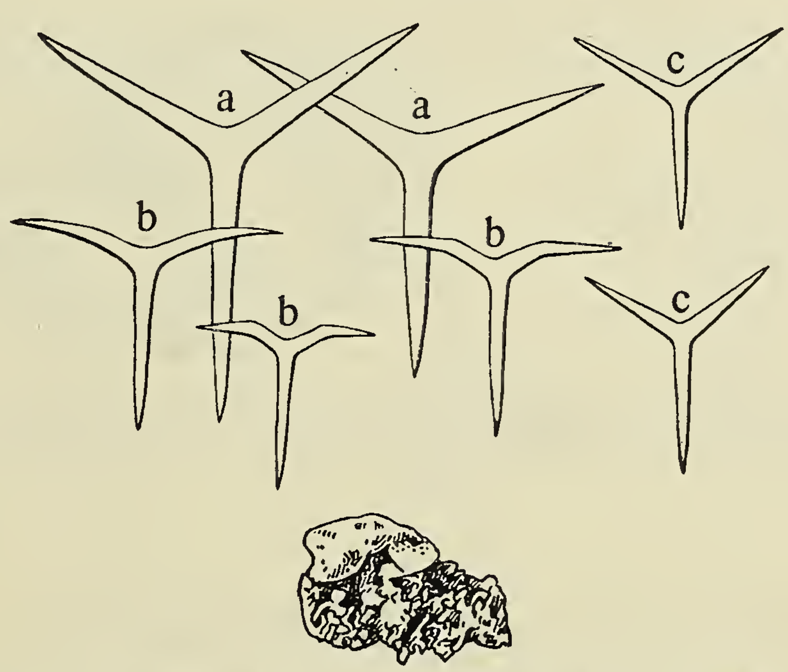
Text-fig. 74. *Leucosolenia tenuipilosa* after Dendy: spicules, × 100.

Named form: **Leucosolenia ventosa** Hozawa

(text-fig. 75)

Leucosolonia (*sic*) *ventosa* Hozawa, 1940: 31, pl. iv, fig. 1, text-fig. 1; Tanita, 1942: 75; Tanita, 1943: 374.

Description: Sponge a clathrate mass of anastomosing ascon tubes; surface smooth; vents small; texture rigid; colour, in spirit, white; skeleton of triradiates only, of two sizes, larger spicules in ectosome.



Text-fig. 75. *Leucosolenia ventosa* after Hozawa: spicules, × 100; external form, natural size.
a. and b. Large and small triradiates of pseudoderm; c. triradiates of axon tubes.

Spicules: large triradiates, sagittal, paired rays 0·14 to 0·15 by 0·02 to 0·025 mm., basal ray 0·15 to 0·18 by 0·02 to 0·025 mm.
small triradiates, of ectosome, sagittal, paired rays 0·07 to 0·09 by 0·01 to 0·014 mm., basal ray 0·1 to 0·12 by 0·01 to 0·014 mm.
small triradiates, of ascon tubes, sagittal, paired rays, 0·085 to 0·1 by 0·01 mm., basal ray 0·1 to 0·12 by 0·01 mm.

Distribution: Japan (Miye Prefecture).

[*In the original descriptions of the next three species the words 'pseudoscule' or 'pseudogaster' appear. If we ignore these then the species conform to* ***Clathrina coriacea*** *in general features as well as geographical range.*]

Named form: **Leucosolenia albatrossi** Hozawa

(text-fig. 76)

Leucosolenia albatrossi Hozawa, 1918: 526, pl. lxxxiv, fig. 1, text-fig. 1; Tanita, 1942: 85.

Description: Sponge an irregular mass of proliferous lobes formed of folded lamellae, each lobe enclosing a pseudogaster; pseudoscula few in number, up to 7 mm. diameter; texture fragile; colour, in spirit, pale yellowish white; skeleton of walls of tubes triradiates and quadriradiates, with a sparse tangential layer of oxea on outer walls; pseudogaster lined with a dense layer of triradiates and quadriradiates.

Spicules: triradiates, of tubes, paired rays 0·08 to 0·09 by 0·008 mm., basal ray, 0·07 to 0·09 by 0·008 mm.,
quadriradiates, of tubes, of same dimensions as triradiates, with apical ray 0·04 to 0·06 by 0·006 mm.,
triradiates, of pseudogaster, paired rays 0·13 to 0·24 by 0·008 to 0·012 mm., basal ray 0·06 to 0·09 by 0·008 mm.,
quadriradiates, of pseudogaster, of same dimensions as triradiates, apical ray 0·04 to 0·06 to 0·008 mm.,
oxea, lanceolate, 0·07 to 0·09 by 0·008 mm.

Distribution: N.W. Pacific (Commandorski Islands); 52–53 m.

Text-fig. 76. *Leucosolenia albatrossi* after Hozawa: spicules, × 100 except for two enlarged microxea (left), which are × 200; external form, natural size.

Named form: **Leucosolenia dubia** Dendy

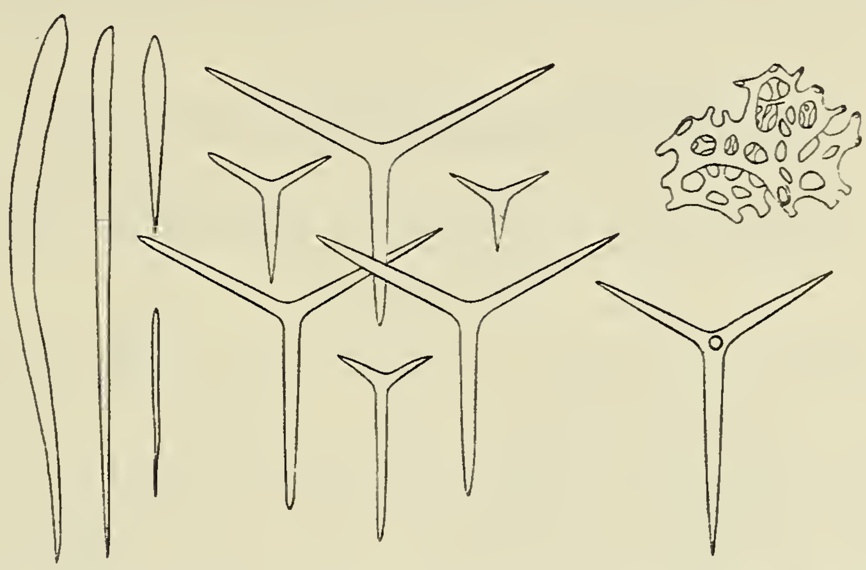
(text-fig. 77)

Leucosolenia dubia Dendy, 1891: 50, pl. i, fig. 3, pl. ix, fig. 3; Dendy and Row, 1913: 722.

Description: Sponge an irregular, low-growing mass of branching and anastomosing ascon tubes; surface smooth, in places hispid; vents scattered, on apices of small papillae; texture firm, fragile; colour, alive and in spirit, white; skeleton of triradiates and oxea.

Spicules: triradiates, regular, rays 0·18 by 0·014 mm.,
oxea, of sporadic and variable occurrence, 0·43 by 0·02 mm.

Distribution: Australia (Port Phillip Heads).



Text-fig. 77. *Leucosolenia dubia* after Dendy: spicules, ×100; external form, natural size.

Named form: **Leucosolenia laxa** Kirk

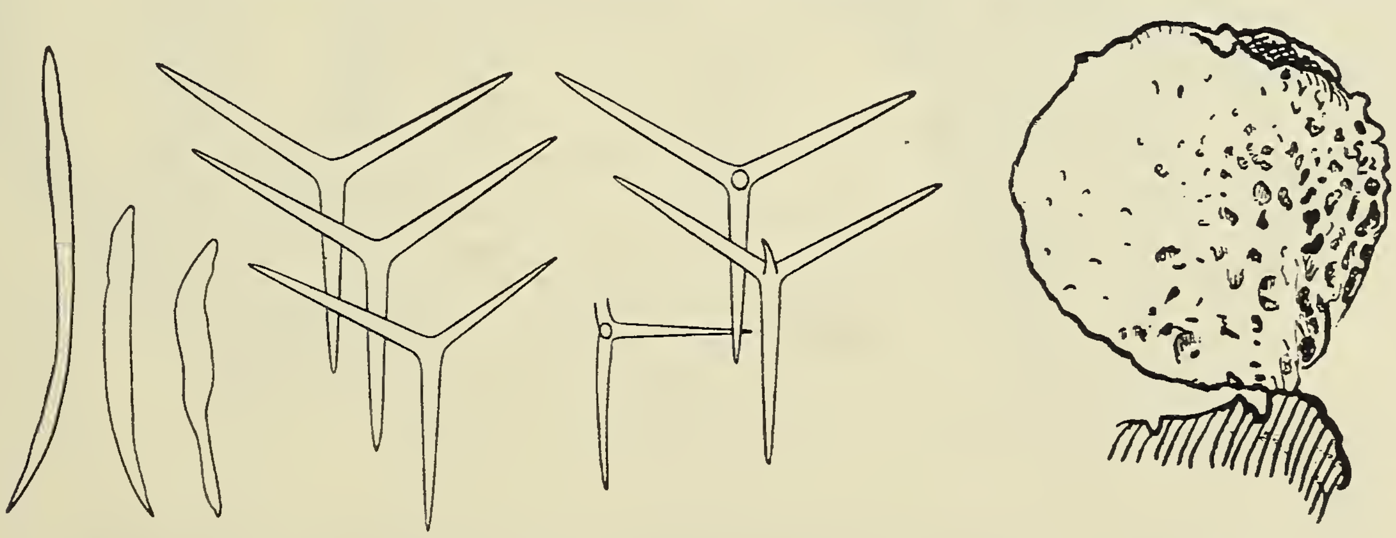
(text-fig. 78)

Leucosolenia laxa Kirk, 1895: 208, pl. iv, fig. 1; Dendy and Row, 1913: 722; Hozawa 1928: 220, pl. i, figs. 4–5; Hozawa, 1940: 35; Tanita, 1941: 2, pl. i, fig. 1; Tanita, 1941: 265; Tanita, 1942: 23; Tanita, 1943: 83; Tanita, 1943: 384, pl. xii, fig. 20.

Description: Sponge an irregularly oval mass of anastomosing tubes; surface of tubes even, minutely hispid; without vent; texture (?); colour, in spirit, white with brownish tinge; walls of tubes supported by a few layers of triradiates and quadriradiates, with oxea set vertically or obliquely to surface.

Spicules: triradiates, regular, rays 0·11 to 0·17 by 0·01 to 0·016 mm.,
quadriradiates, similar to triradiates, apical rays 0·13 by 0·008 mm.,
oxea, fusiform, slightly bent, anisoactinate, 0·25 to 0·32 by 0·016 to 0·02 mm.

Distribution: New Zealand; Japan (Mutsu Bay, Onagawa, Wajima, Oshima); 15 m.



Text-fig. 78. *Leucosolenia laxa*: spicules after Kirk, ×100; external form not figured in original description and drawing shown here is from published photograph of Tanita's (1941) specimen from Japan, natural size.

Genus **Dendya** Bidder

Dendya Bidder, 1898: 74.

Type-species: Clathrina tripodifera Carter, 1886: 505.

Description: Sponge colony consisting of a large central individual lined by collared cells, from which radially arranged diverticula are given off; skeleton composed of triradiates often modified to quadriradiates. Subendosomal sagittal radiates never present.

5. **Dendya poterium** (Haeckel)

Named form: **Leucosolenia amitsbo** Hozawa

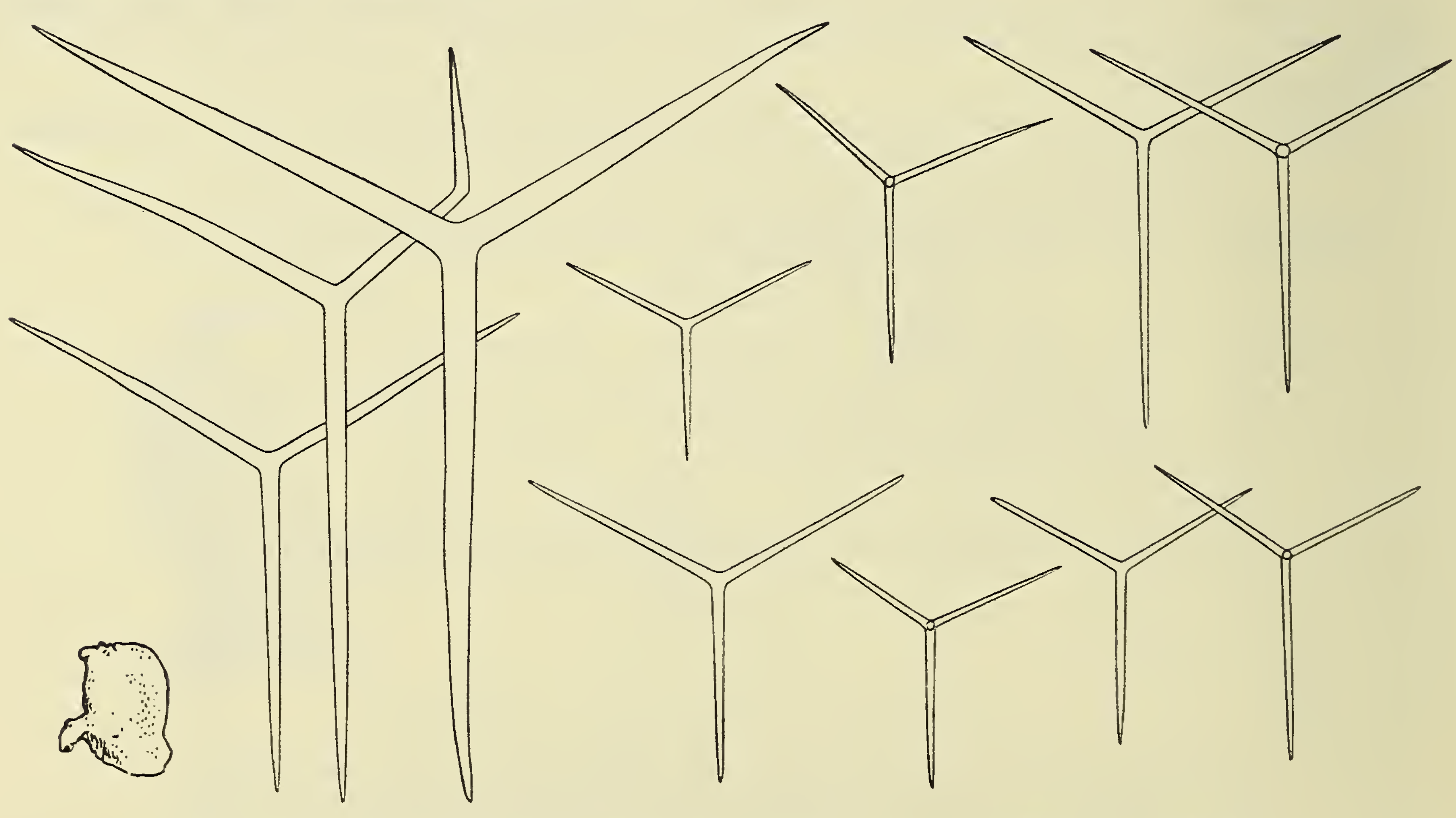
(text-fig. 79)

Leucosolenia amitsbo Hozawa, 1929: 283, pl. xii, figs. 3–5, text-fig. 2; Tanita, 1942: 79; Tanita, 1943: 375, pl. xi, fig. 10.

Description: Sponge irregularly ovoid, with incipient rooting processes at base and a single, apical pseudoscule; surface covered by a pseudoderm; surface smooth; pseudoscule with membranous margin; texture compact, rigid; colour, in spirit, white; skeleton: of ascon tubes a thin layer of triradiates and quadriradiates, with apical rays projecting into cloacal cavity; of pseudoderm a few layers of triradiates; of pseudogastral lining a single layer of triradiates and quadriradiates.

Spicules: triradiates of ascon tubes, regular, 0·1 to 0·16 by 0·008 to 0·01 mm.,
quadriradiates of ascon tubes, similar to triradiates, apical ray 0·06 to 0·15 by 0·004 to 0·006 mm.,
ectosomal triradiates, mostly regular, rays 0·22 to 0·5 by 0·02 to 0·03 mm.,
triradiates of pseudogaster lining, regular, rays 0·14 to 0·24 by 0·006 to 0·008 mm.,
quadriradiates of pseudogaster lining, similar to triradiates but with short apical ray.

Distribution: Japan (Sagami Sea); 92–732 m.

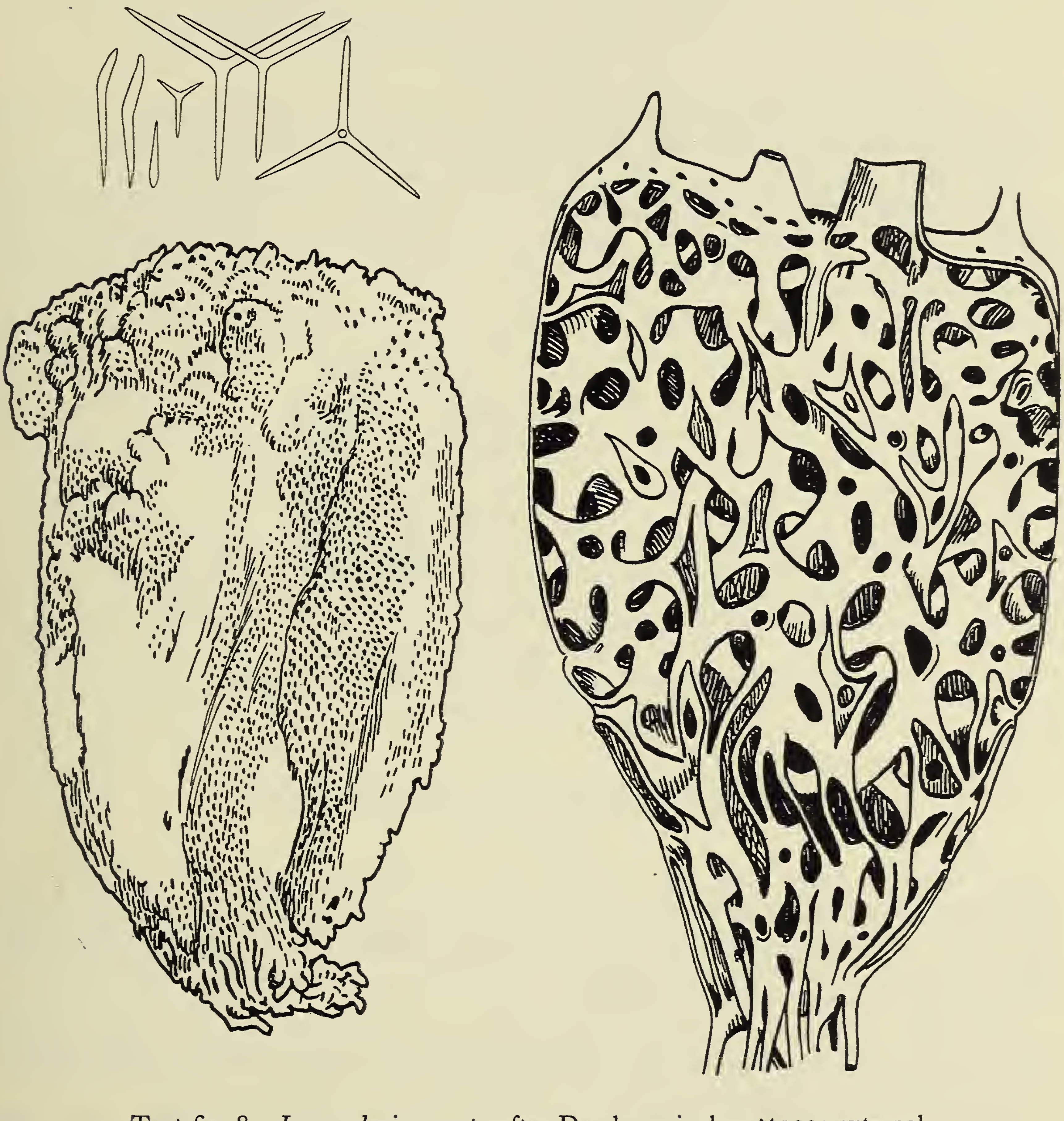


Text-fig. 79. *Leucosolenia amitsbo* after Hozawa: spicules ×100, external form, ×$\frac{1}{2}$.

Named form: **Leucosolenia cavata** (Carter)

(text-fig. 80)

Clathrina cavata Carter, 1886: 502; *Leucosolenia cavata*, Dendy, 1891: 56, pl. ii, fig. 7, pl. v, figs. 1–2, pl. vi, figs. 4–5, pl. ix, fig. 4; *Ascandra cavata*, Breitfuss, 1898: 213; *Leucosolenia cavata*, Dendy and Row, 1913: 724; Tanita, 1942: 83.



Text-fig. 80. *Leucosolenia cavata* after Dendy: spicules, ×100; external form, natural size; diagrammatic representation of internal structure, to show, in lower half, ascon tubes opening to form, in upper half, irregular cavities separating the narrow inhalant canals, the whole enclosed within a pseudoderm.

Description: Sponge massive, lobose, laterally compressed, sessile; surface even, minutely hispid; pseudoscula on summit, with well-developed margins; texture soft, fragile; colour, in spirit, white; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, regular, rays 0·16 by 0·014 mm.,
quadriradiates, similar to triradiates but with 'small apical ray',
oxea, 0·2 by 0·008 mm.

Distribution: Australia (Port Phillip Heads).

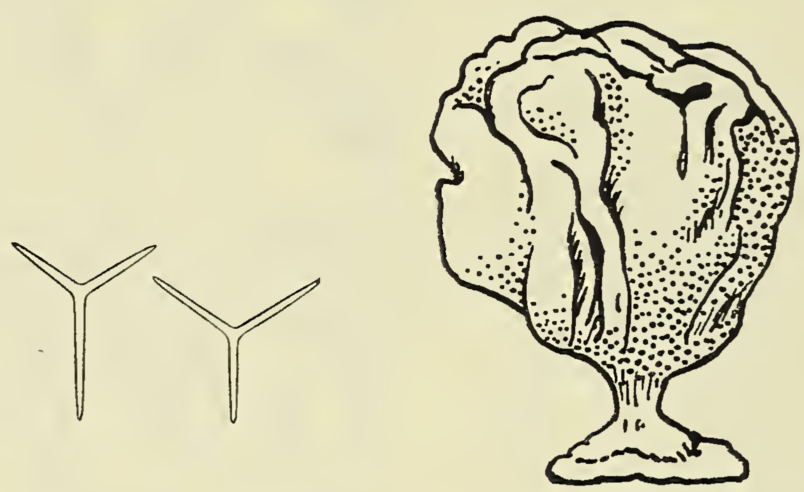
Named form: **Leucosolenia challengeri** Poléjaeff

(text-fig. 81)

Leucosolenia challengeri Poléjaeff, 1883: 38, pl. i, fig. 1, pl. iii, fig. 4; Dendy and Row, 1913: 724; *Ascetta challengeri*, Lendenfeld, 1885: 1085; *Leucosolenia challengeri*, Kirk, 1895: 207.

Description: Sponge a sub-pyriform mass, stipitate, with upper surface thrown into folds; pseudoscula scattered over upper surface; texture firm, elastic; colour, in spirit, white; skeleton of regular triradiates, rays 0·18 by 0·01 mm., with an ectosomal layer of sagittal triradiates, with basal ray 0·12 to 0·25 mm. long, and large, occasional, regular triradiates in ectosome, with rays up to 0·8 by 0·06 mm.

Distribution: Australia (Cape York); New Zealand (Cook Strait); 14 m.



Text-fig. 81. *Leucosolenia challengeri* after Poléjaeff: spicules, ×100; external form, natural size.

Named form: **Leucosolenia clathrata** (Carter)

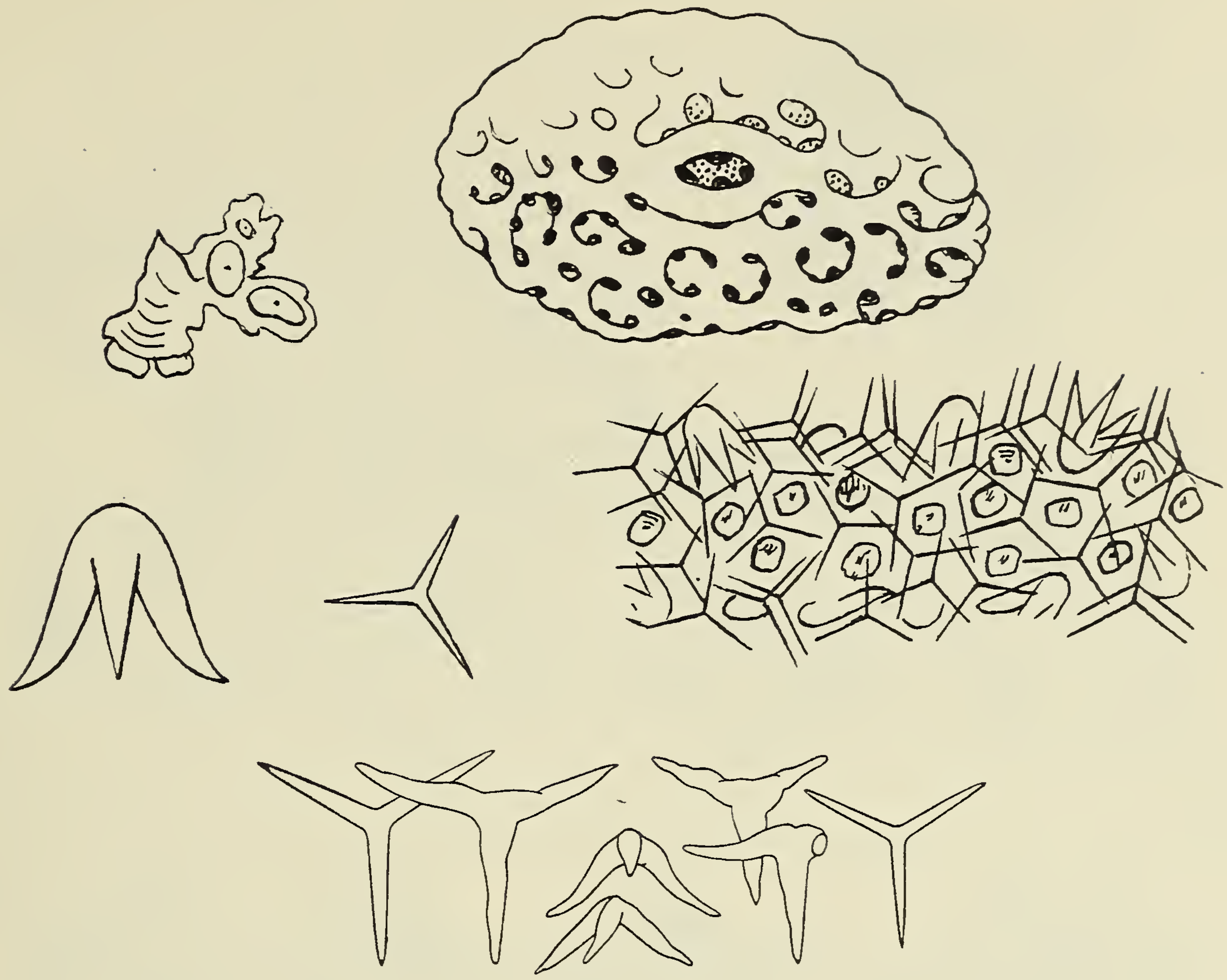
(text-fig. 82)

Leucetta clathrata Carter, 1883: 33, pl. i, figs. 13–17; *Clathrina tripodifera* var. *gravida* Carter, 1886: 507; *Leucosolenia tripodifera* var. *gravida*, Dendy, 1891: 68; *L. intermedia* Kirk, 1895: 208, pl. iv, fig. 2; *L. clathrata*, Dendy and Row, 1913: 724; *Grantia cliftoni* Bowerbank [in] Dendy and Row, 1913: 724; *Leucosolenia clathrata*, Row and Hozawa, 1931: 730; Hozawa, 1940: 30; Tanita, 1942: 76; Tanita, 1943: 368.

Description: Sponge a depressed, cake-like mass of anastomosing tubes; surface smooth; vents (?); texture firm; colour, in spirit, white (in young specimens) to yellow or brown; skeleton of triradiates only, of two sizes.

Spicules: triradiates, of ectosomal layer, sagittal, paired rays 0·09 to 0·13 by 0·03 mm., basal rays 0·13 to 0·15 by 0·03 mm.,
triradiates of inner tissues, regular, rays 0·1 to 0·11 by 0·01 mm.

Distribution: Australia (Port Phillip Heads; South-west Australia); New Zealand (Cook Strait); Japan (Miye); littoral.



Text-fig. 82. *Leucosolenia clathrata*: (top left) two cushion-shaped types growing upon seaweed, natural size; (top right) one of them enlarged; (middle) a tripod spicule and a triradiate, both × 125, and arrangement of spicules at surface of sponge, after Carter; (below) triradiates and tripods after Kirk (1895), × 100.

Named form: **Leucosolenia depressa** Dendy

(text-fig. 83)

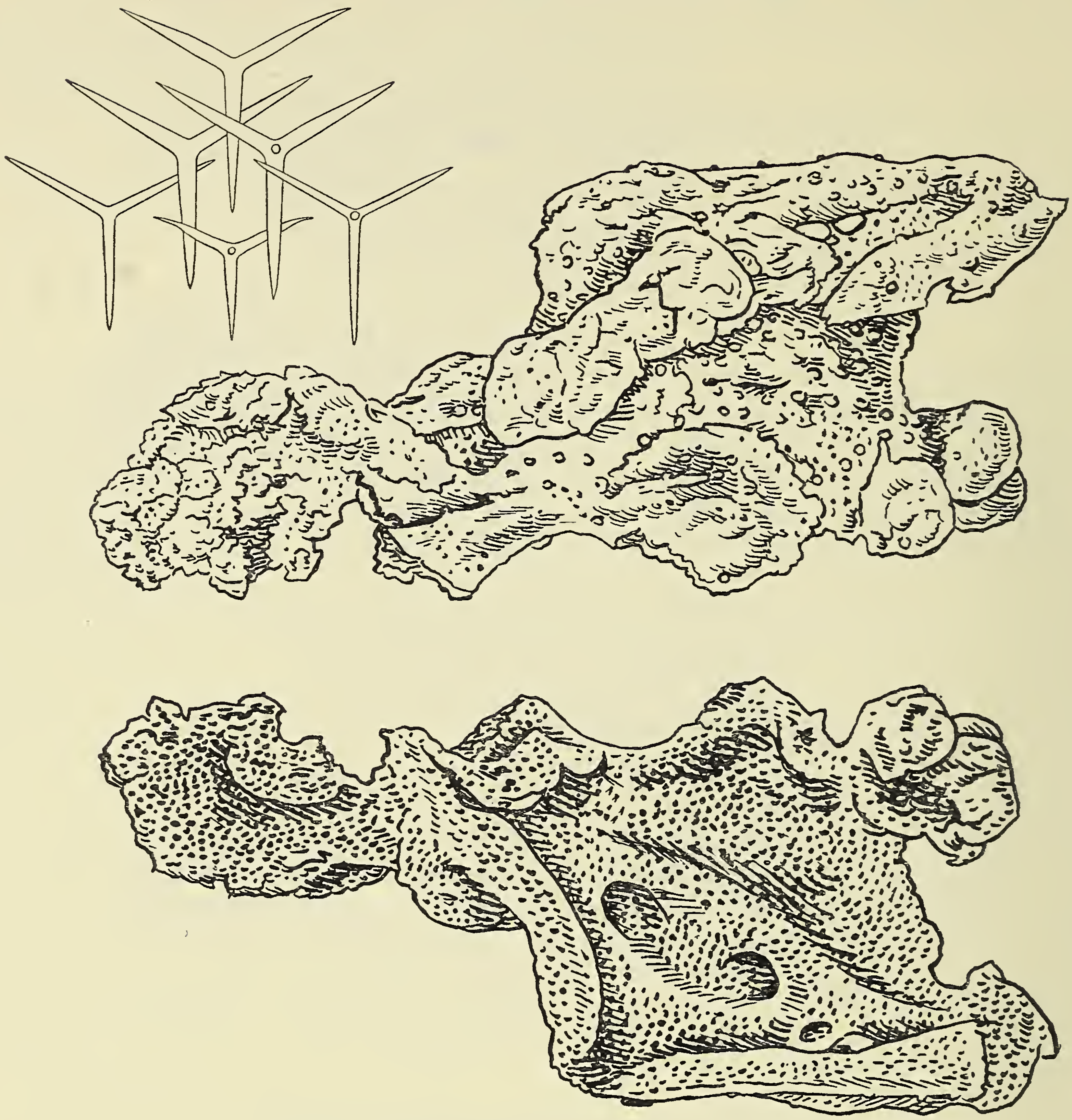
Leucosolenia depressa Dendy, 1891: 65, pl. iii, fig. 4, pl. viii, fig. 8, pl. xi, fig. 4; Dendy and Row, 1913: 725; Tanita, 1942: 78; Tanita, 1943: 377, pl. xii, fig. 13; *nec* Kirk, 1896: 209.

Description: Sponge irregularly massive, depressed, spreading; surface smooth; pseudoscules papillate; pseudopores more apparent on under surface than on upper; texture firm; colour, in spirit, greyish-white; skeleton of triradiates and quadriradiates.

Spicules: triradiates, of ectosomal layer, regular, rays 0·26 by 0·028 mm.,
triradiates, of inner tissues, regular, rays 0·14 by 0·008 mm.,
quadriradiates, regular, facial rays 0·14 by 0·008 mm., apical rays 'feebly developed'.

Distribution: Australia (Port Phillip Heads); Japan.

Remarks: Leucosolenia depressa Kirk, 1896: 209. There is a note in Dendy's copy of Kirk's paper, in Kirk's own handwriting: 'Slide sent by Dr. Dendy shows my identification to be wrong.' No mention is made, however, as to the correct identification of the specimen.



Text-fig. 83. *Leucosolenia depressa* after Dendy: spicules, ×100; external form from above (upper drawing) and from below (lower drawing) natural size.

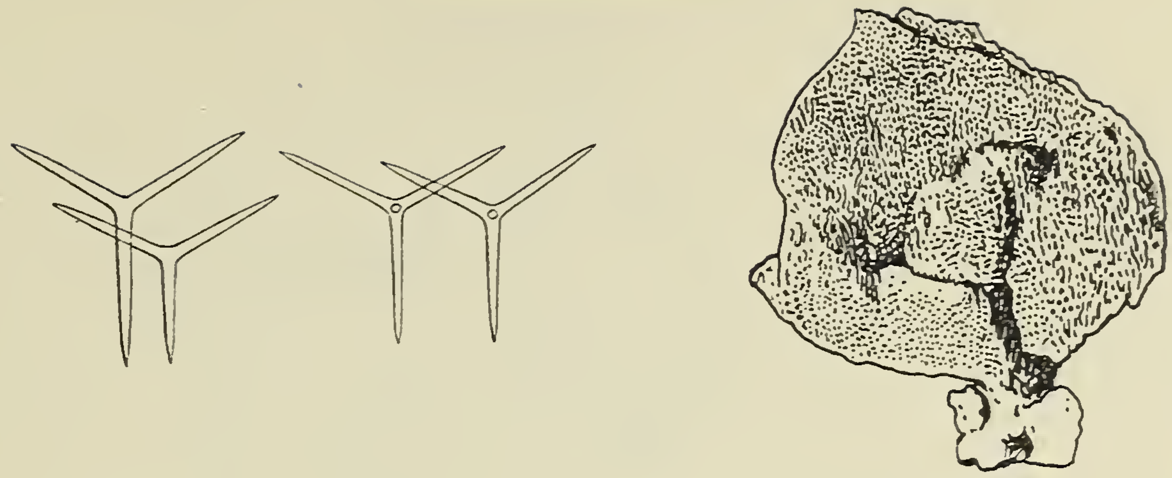
Named form: **Leucosolenia grisea** Dendy and Frederick

(text-fig. 84)

Leucosolenia grisea Dendy and Frederick, 1924: 480, pl. xxv, fig. 1, pl. xxvi, fig. 1; Tanita, 1943: 79.

Description: Sponge plicate, composed of vertical, folded lamellae; surface even, non-hispid; vents small, marginal, naked; texture firm; colour, in spirit, grey; skeleton of triradiates, regular, rays 0·14 by 0·013 mm., and quadriradiates, similar to triradiates but with a long apical ray.

Distribution: Australia (Abrolhos Islands).



Text-fig. 84. *Leucosolenia grisea* after Dendy and Frederick: spicules, ×100; external form, natural size.

Named form: **Leucetta insignis** Row and Hozawa

Leucetta insignis Row and Hozawa, 1931: 744, pl. xix, fig. 3, text-fig. 3.

Remarks: The spiculation in this species differs in minor detail only from that of *Dendya tripodifera*. The external form, also, is remarkably like that of *D. tripodifera*, yet the canal-system is said to be leuconoid. Therefore, either Row and Hozawa have introduced an error into their description, or the canal-system of *Dendya* needs further investigation to make sure whether it is invariably homocoelid.

Distribution: South-west Australia.

Named form: **Leucosolenia intermedia** Kirk

(See *L. clathrata*)

Named form: **Leucosolenia laminoclathrata** (Carter)

Clathrina laminoclathrata Carter, 1886: 509; *Leucosolenia laminoclathrata*, Dendy, 1891: 70; Dendy and Row, 1913: 727.

Description: Sponge encrusting, a circular patch of reticulating tubes; surface smooth; vents not apparent; texture firm; colour, dried, 'steel-grey'; skeleton of triradiates only, regular, rays 0·14 to 0·21 by 0·014 to 0·021 mm.

Distribution: Australia (Port Phillip Heads).

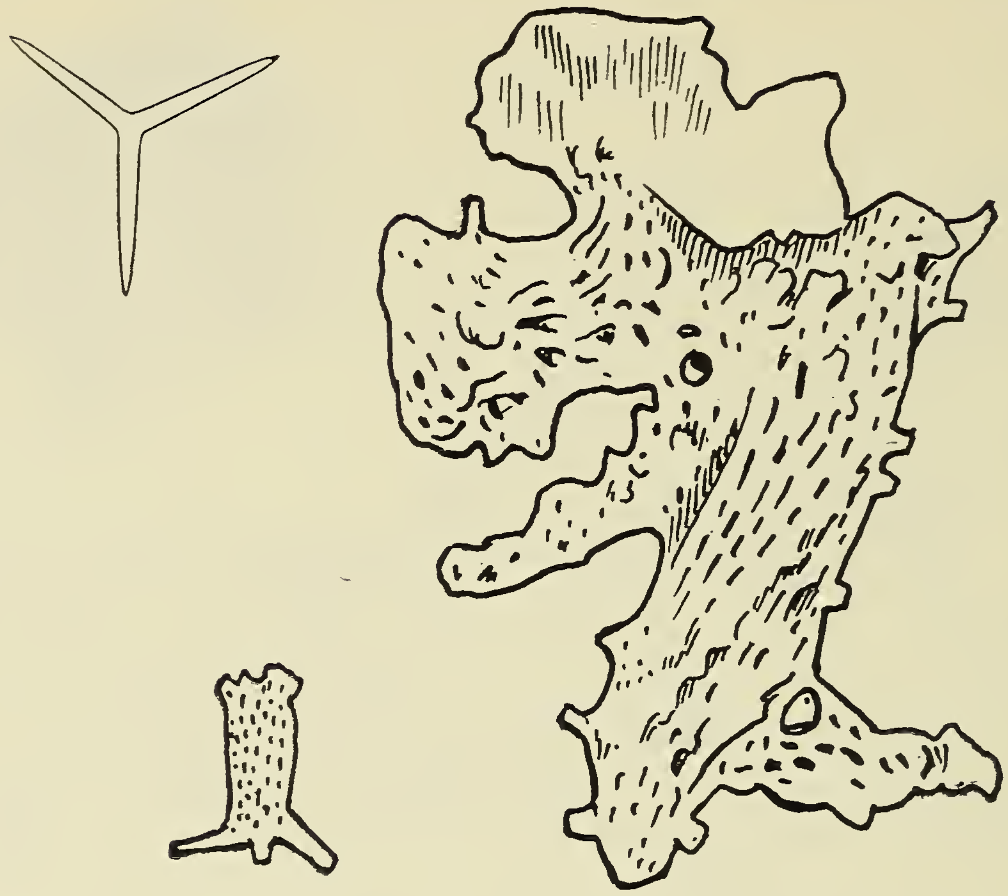
Named form: **Leucosolenia loculosa** (Haeckel)

(text-fig. 85)

Soleniscus loculosus Haeckel, 1870: 244; *Clathrina loculosa* Haeckel, 1870: 245; *Auloplegma loculosum* Haeckel, 1870: 250; *Thecometra loculosa* Haeckel, 1870: 254; *Ascetta loculosa* (= *Ascetta primordialis* var. *loculosa*) Haeckel, 1872: 17; Lendenfeld, 1885: 1085; *Leucosolenia wilsoni* Dendy, 1891; 63, pl. ii, figs. 3–4, pl. xi, fig. 3; *L. loculosa*, Dendy and Row, 1913: 726; *L. wilsoni*, Dendy and Row, 1913: 727; Tanita, 1942: 27; Tanita, 1942: 73; *L. loculosa*, Tanita, 1942: 73; Tanita, 1943: 374, pl. xi, fig. 8.

Description: Sponge irregularly massive, low-growing, clathrate; surface smooth; pseudoscula conical, scattered; texture firm; colour, in spirit, white; skeleton of one or several tangential layers of regular triradiates, with rays 0·14 by 0·014 mm.

Distribution: Australia (Port Phillip Heads); Japan.



Text-fig. 85. *Leucosolenia loculosa*: spicule, after Haeckel, ×100; external form, represented by types of *L. wilsoni*, after Dendy, both natural size.

Named form: **Leucosolenia minuta** Tanita

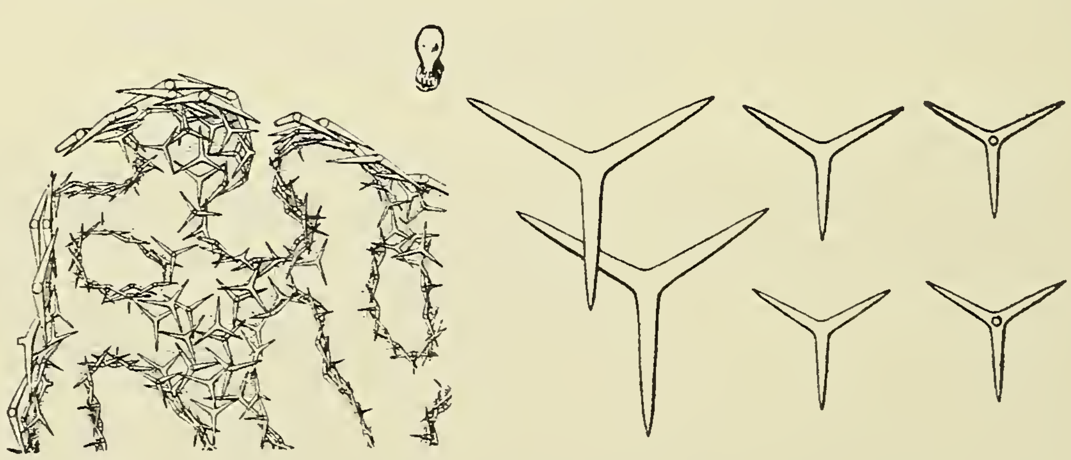
(text-fig. 86)

Leucosolenia minuta Tanita, 1943: 378, pl. xxi, fig. 15, text-figs. 2–3.

Description: Sponge small, ovate; surface non-hispid; vent minute, apical; texture soft; colour, in spirit, white; skeleton of triradiates and quadriradiates.

Spicules: triradiates of surface layers, regular, rays 0·13 to 0·175 by 0·014 to 0·018 mm., triradiates of deeper tissues, regular, rays 0·06 to 0·075 by 0·008 to 0·01 mm., quadriradiates, similar to smaller triradiates, with apical ray 0·05 to 0·06 by 0·007 to 0·01 mm.

Distribution: Japan (Wakayama Prefecture), littoral.



Text-fig. 86. *Leucosolenia minuta* after Tanita: spicules, ×120; section across body, ×50; external form, natural size.

Named form: **Leucosolenia osculum** (Carter)

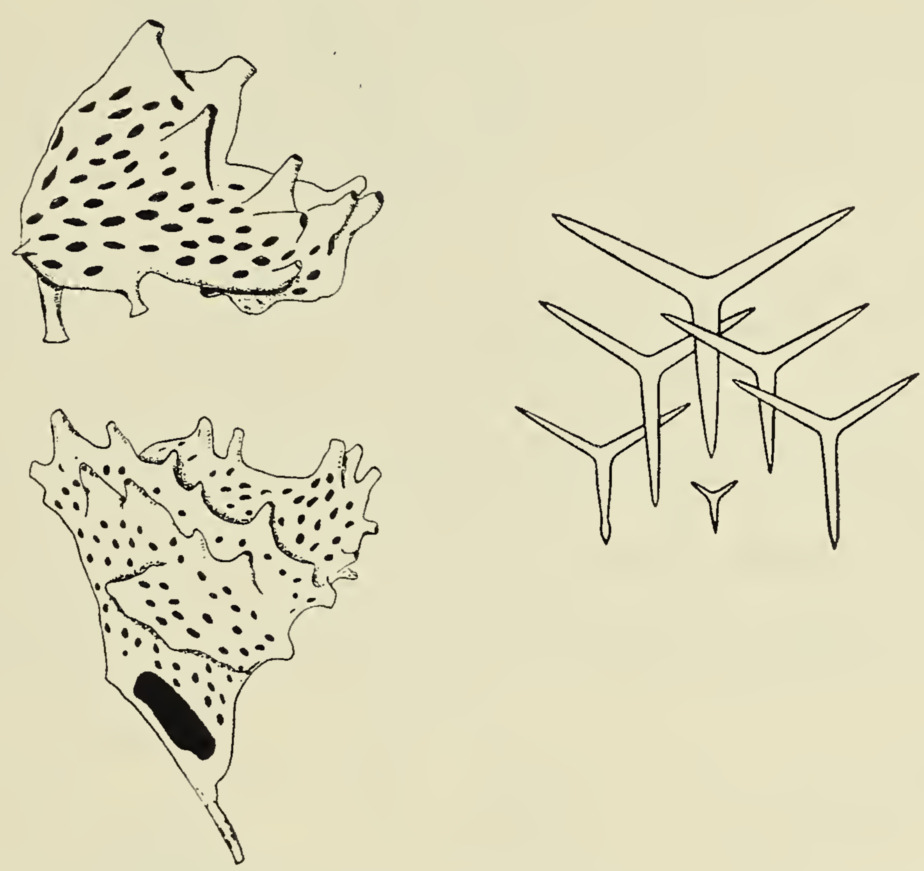
(text-fig. 87)

Clathrina osculum Carter 1886: 503; *Leucosolenia proxima* Dendy, 1891: 62, pl. ii, figs. 1–2, pl. viii, figs. 1–4, pl. xi, fig. 2; *L. osculum*, Dendy, 1889: 69; *L. proxima*, Kirk, 1896: 207; *L. osculum*, Dendy and Row, 1913: 726; *L. proxima*, Dendy and Row, 1913: 727; *L. osculum*, Tanita, 1943: 72; *L. proxima*, Tanita, 1943: 73.

Description: Sponge a low-growing mass of anastomosing tubes, sub-lobate, with short root-like processes; surface smooth; pores numerous, scattered, tubular; texture soft; colour, in spirit, white; skeleton of triradiates, of two sizes.

Spicules: triradiates, of surface layer, regular, rays 0·16 by 0·021 mm.,
triradiates, of deeper layers, regular, rays 0·12 by 0·01 mm.

Distribution: Australia (Port Phillip Heads); New Zealand (Cook Strait).



Text-fig. 87. *Leucosolenia osculum*: external form as represented by the types, ×4, and spicules of *L. proxima*, ×100, all after Dendy.

Named form: **Leucosolenia pelliculata** Dendy

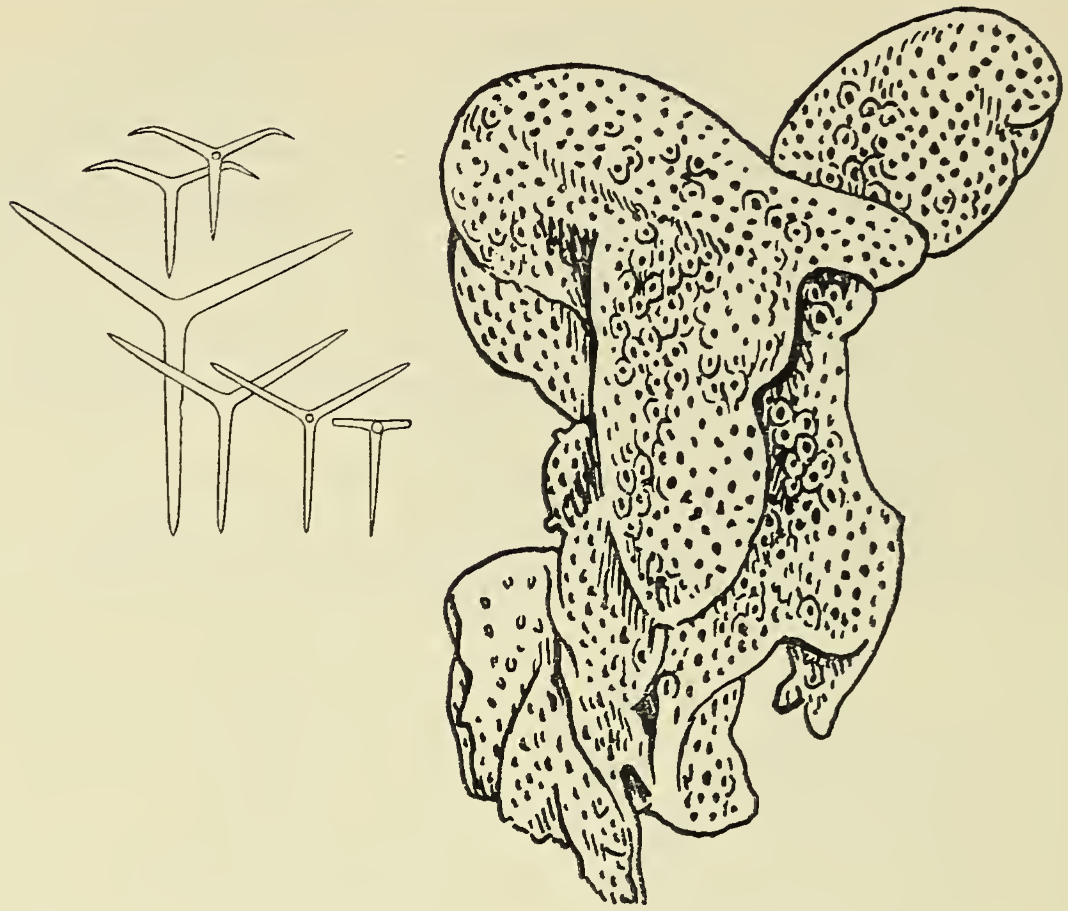
(text-fig. 88)

Leucosolenia pelliculata Dendy, 1891: 54, pl. iii, fig. 2, pl. viii, fig. 7, pl. x, figs. 1–2; Dendy and Row, 1913: 726; Tanita, 1943: 79.

Description: Sponge forming lobular masses of irregular shape, with well-marked pseudoderm; surface smooth; vents few, small, with feebly-developed margins; texture firm; colour, in spirit, white or brown; skeleton of triradiates and quadriradiates.

Spicules: triradiates, of surface layer, regular to sagittal, rays 0·01 to 0·3 by 0·01 to 0·035 mm., rarely becoming quadriradiate,
triradiates, of deeper tissues, regular, rays 0·1 to 0·15 by 0·008 to 0·014 mm.,
quadriradiates, similar to triradiates of deeper tissues, with apical rays 0·1 to 0·13 by 0·004 to 0·007 mm.
(Spicules in membrane of vent tend to become sagittal.)

Distribution: Australia (Port Phillip Heads).

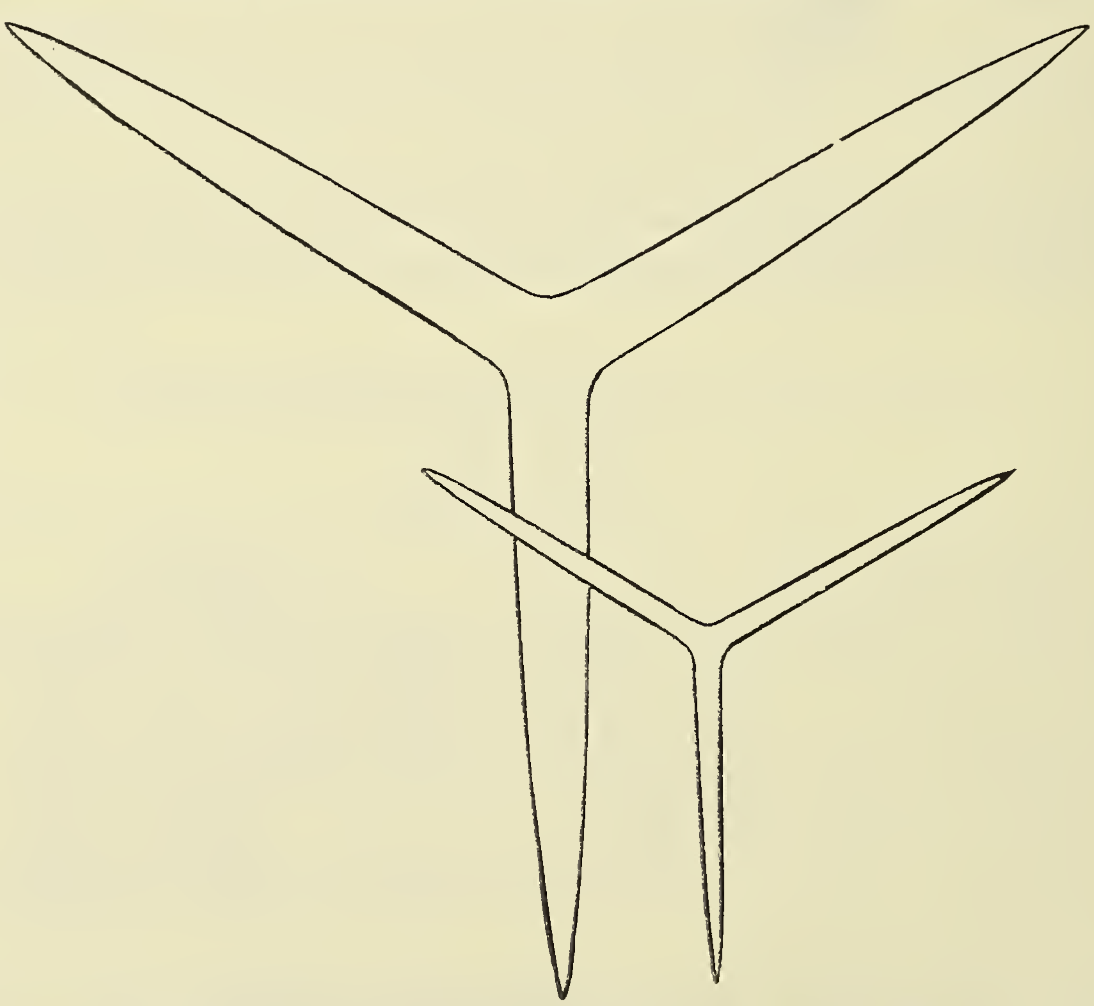


Text-fig. 88. *Leucosolenia pelliculata* after Dendy: spicules, ×100; external form, natural size.

Named form: **Leucosolenia poterium** (Haeckel)

(text-fig. 89)

Ascetta primordialis var. *poterium* Haeckel, 1872: 17, pl. ii, figs. 8–9 (?); *Leucosolenia poterium*, Poléjaeff, 1883: 35, pl. iii, figs. 1–2; *Leucosolenia poterium*, Lendenfeld, 1885: 898; Lendenfeld, 1885: 1084; *Ascandra conulata* Lendenfeld in Breitfuss, 1898: 212; *Leucosolenia poterium*, Breit-



Text-fig. 89. *Leucosolenia poterium*: spicules, after Haeckel, ×100.

fuss, 1898: 212; Breitfuss, 1898: 457, pl. xxvii, fig. 1; Dendy and Row, 1913: 726; Breitfuss, 1932, 242; Tanita, 1943: 72.

Description: Sponge pyriform, stipitate, solitary, with large pseudogaster, apical pseudoscule, pseudoderm and pseudopores; surface smooth; texture firm, compressible; colour, in spirit, white; skeleton of triradiates of three sizes, in subdermis, pseudoderm and margin of pseudoscule respectively.

Spicules: triradiates of subectosomal regions, regular, rays 0·12 to 0·18 by 0·006 to 0·01 mm.,
triradiates of pseudoderm, regular, rays up to 0·3 by 0·035 mm.,
triradiates of margin of pseudoscule, sagittal (dimensions not given).

Distribution: Australia (Twofold Bay; Port Jackson); Chile (Calbuco); 220 m.

Named form: **Leucosolenia protogenes** (Haeckel)

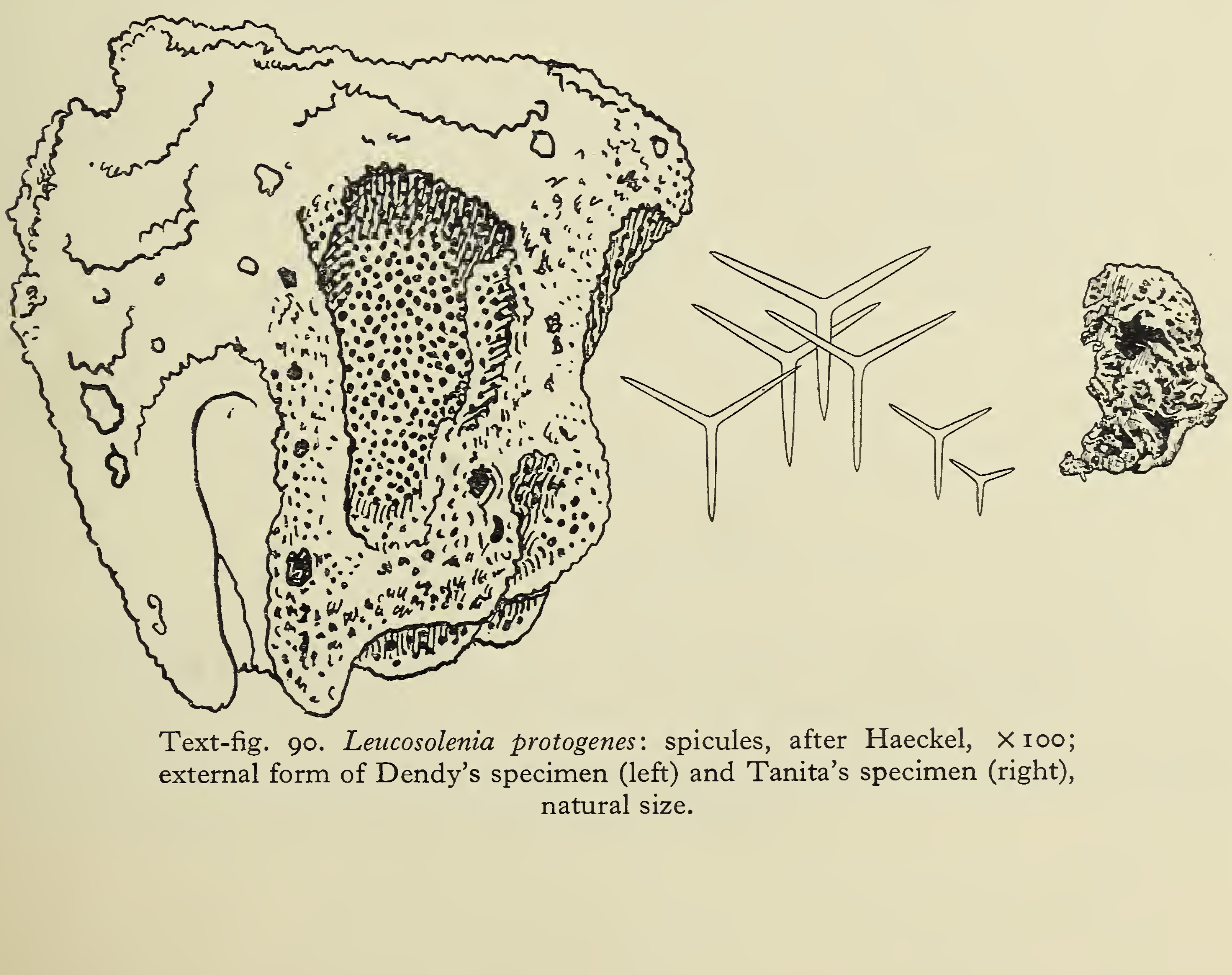
(text-fig. 90)

Ascetta primordialis var. *protogenes* Haeckel, 1872: 17; *Ascetta procumbens* Lendenfeld, 1885: 1086; *Clathrina primordialis*, Carter, 1886: 510; *Leucosolenia protogenes*, Dendy, 1891: 58, pl. iii, fig. 1, pl. xi, fig. 1; Breitfuss, 1897: 213; Dendy and Row, 1913: 726; Dendy and Frederick, 1924: 480, pl. xxv, fig. 2; Brøndsted, 1926: 297; Breitfuss, 1932: 243; Breitfuss, 1935: 13; Tanita, 1942: 24, pl. ii, fig. 3; Tanita, 1942: 74; Tanita, 1943: 371, pl. xi, fig. 4.

Description: Sponge a large, irregularly rounded, lobose mass; surface smooth; pseudoscula small, scattered; pseudopores found chiefly in depressions on surface; texture soft, fragile; colour, in spirit, white; skeleton of triradiates only, of two sizes.

Spicules: triradiates, of ectosomal layer, regular, rays 0·14 by 0·013 mm.,
triradiates, of deeper tissues, regular, rays 0·14 by 0·009 mm.

Distribution: Japan; Australia (Port Jackson, Port Phillip Heads, Abrolhos Islands); New Zealand (Hauraki Gulf, Wellington); Auckland and Campbell Islands; littoral to 8 m.



Text-fig. 90. *Leucosolenia protogenes*: spicules, after Haeckel, ×100; external form of Dendy's specimen (left) and Tanita's specimen (right), natural size.

Named form: **Leucosolenia proxima** Dendy

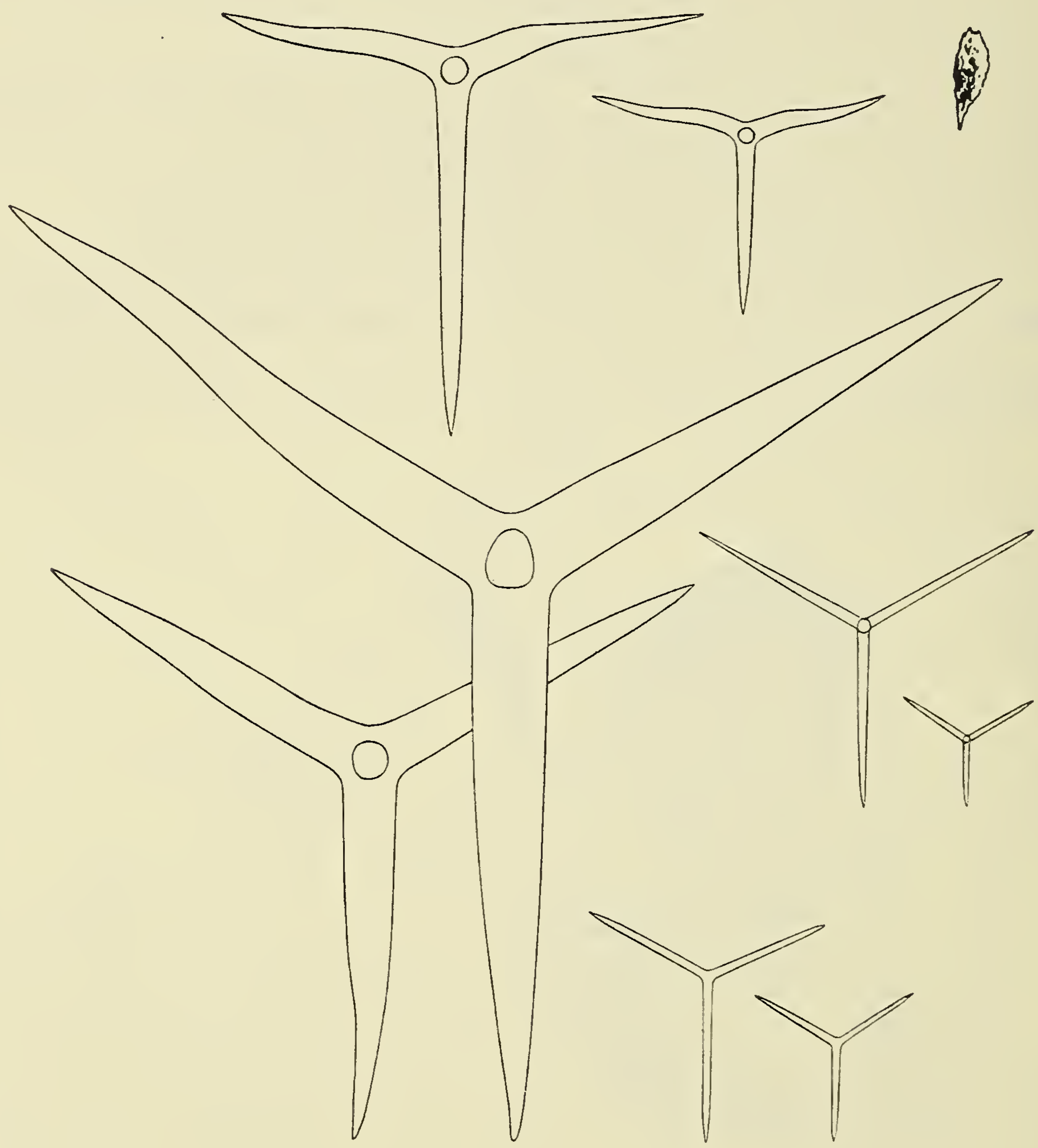
(See *L. osculum*)

Named form: **Dendya quadripodifera** Hozawa

(text-fig. 91)

Dendya quadripodifera Hozawa, 1929: 287, pl. xiii, figs. 8–9, text-fig. 4; Tanita, 1943: 388, pl. xiii, fig. 23.

Description: Sponge an elongate, oval sac, broadest near upper end; surface coarse; vent apical, naked; texture brittle; colour, in spirit, greyish-white; walls of central and radial tubes supported by triradiates and quadriradiates, with apical rays projecting into cloacal cavity; skeleton of outer surface of a few layers of large quadriradiates, with apical rays embedded in sponge wall.



Text-fig. 91. *Dendya quadripodifera* after Hozawa: spicules, ×100; external form, natural size.

Spicules: ectosomal quadriradiates, regular, facial rays 0·34 to 0·6 by 0·04 to 0·08 mm., apical ray 0·15 to 0·3 by 0·05 to 0·06 mm.,
ectosomal quadriradiates, near base of sponge, sagittal, basal ray 0·4 to 0·72 by 0·05 to 0·08 mm.,
triradiates of central and radial tubes, regular, rays 0·06 to 0·15 by 0·008 to 0·01 mm.,
quadriradiates of central and radial tubes, similar to triradiates, apical ray 0·05 to 0·1 by 0·004 to 0·006 mm.,

Distribution: Japan (Sagami Sea); 92–183 m.

Named form: **Leucosolenia rosea** Kirk

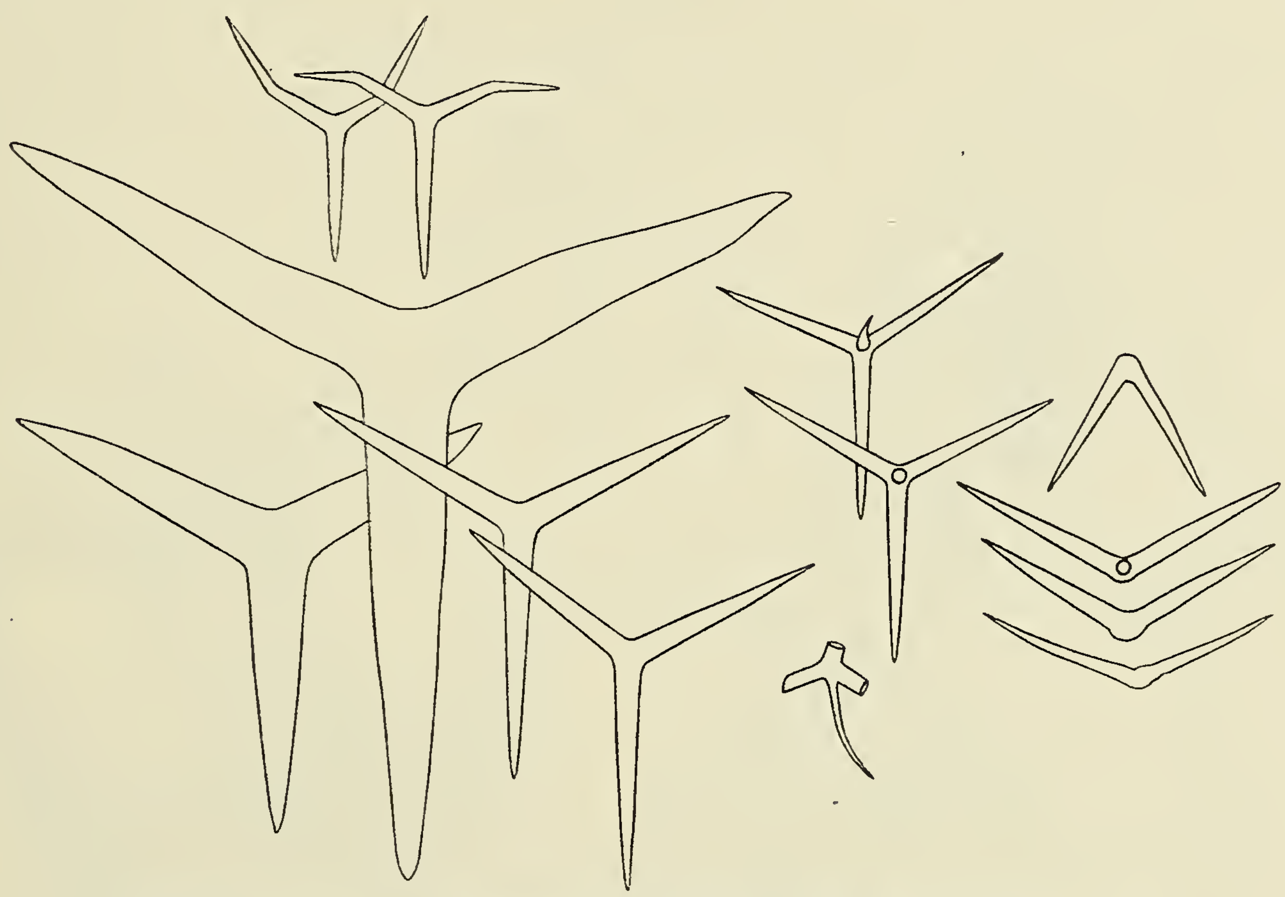
(text-fig. 92)

Leucosolenia rosea Kirk, 1895: 209, pl. iii, fig. 1; Dendy and Row, 1913: 727; Tanita, 1943: 79.

Description: Sponge forming spreading masses which rise into lobes and ridges; surface smooth; pseudoscula scattered, with feebly-developed margins; texture (?); colour, alive, pale-pink or salmon; skeleton of triradiates of two sizes and quadriradiates.

Spicules: triradiates, of ectosomal layer, regular, rays 0·3 by 0·07 mm.,
triradiates, of deeper tissues, regular, rays 0·2 by 0·018 mm.,
quadriradiates, regular, facial rays 0·14 by 0·01 mm., apical rays 0·11 by 0·008 mm.
(Spicules tend to become sagittal in region of margin of vent.)

Distribution: New Zealand.



Text-fig. 92. *Leucosolenia rosea* after Kirk: spicules, × 100.

Named form: **Leucosolenia soyo** Hozawa

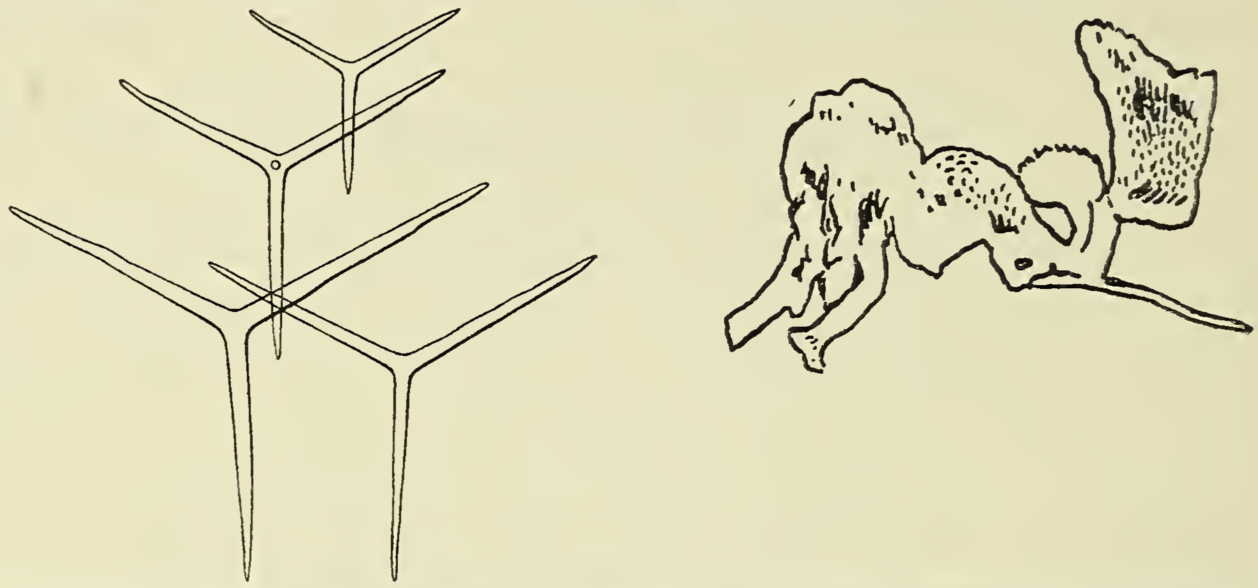
(text-fig. 93)

Leucosolenia soyo Hozawa, 1933: 4, pl. i, fig. 2, text-fig. 1; Tanita, 1943: 78; Tanita, 1943: 380.

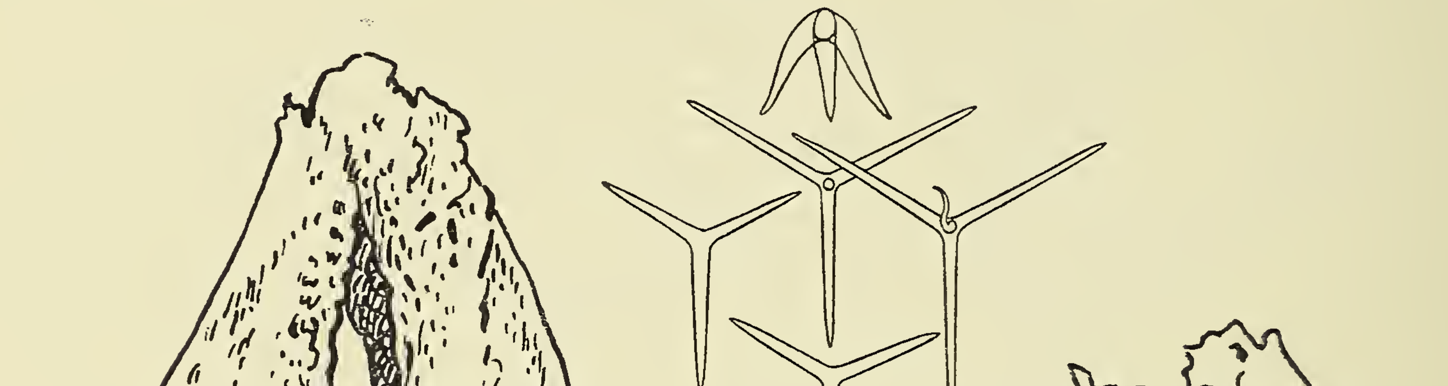
Description: Sponge composed of irregular, lobose masses, laterally compressed, with pseudoscula on upper surface and rooting processes on lower; surface uneven, covered by a pseudoderm pierced by pseudopores; pseudoscule surrounded by a thin, membranous margin; texture (?); colour (?); skeleton of ascon tubes of triradiates and quadriradiates, of pseudoderm, triradiates, of lining of pseudogaster, triradiates and quadriradiates.

Spicules: triradiates of ascon tubes, regular, rays 0·1 to 0·12 by 0·008 to 0·01 mm.,
quadriradiates of ascon tubes, similar to triradiates, with apical ray 0·08 by 0·004 mm.,
triradiates of pseudoderm, regular, rays 0·16 to 0·19 by 0·014 to 0·018 mm.,
triradiates of pseudogaster lining, 0·1 to 0·16 by 0·008 to 0·01 mm.,
quadriradiates of pseudogaster lining, similar to triradiates, apical ray 'fine'.

Distribution: Japan (off Hudai, Rikutyû and near Sado Island); 168 m.



Text-fig. 93. *Leucosolenia soyo* after Hozawa: spicules, ×100; external form.



Text-fig. 94. *Dendya tripodifera* after Dendy: spicules, ×100; external form, natural size.

Named form: **Dendya tripodifera** (Carter)

(text-fig. 94)

Clathrina tripodifera Carter, 1886: 505; *Leucosolenia tripodifera*, Dendy, 1891: 66, pl. ii, figs. 5–6, pl. v, figs. 3–4, pl. viii, figs. 5–6; pl. xi, fig. 5; *Dendya tripodifera*, Bidder, 1898: 74; Dendy and Row, 1913: 728; Tanita, 1942: 110.

Description: Sponge solitary, conical to ovoid, sessile; surface even, reticulate; vents apical, naked; texture firm; colour, in spirit, greyish-white; skeleton of triradiates and quadriradiates.

Spicules: triradiates, of ectosomal layer, ranging from regular to tripod, rays 0·12 by 0·02 mm., triradiates of deeper tissues, sagittal, paired rays 0·1 by 0·008 mm., basal rays 0·16 by 0·01 mm., quadriradiates, sagittal, paired rays 0·21 by 0·005 mm., basal rays 0·24 by 0·005 mm., apical rays variable in length.

Distribution: Australia (Westernport, Bass Straits and Port Phillip Heads); South Georgia.

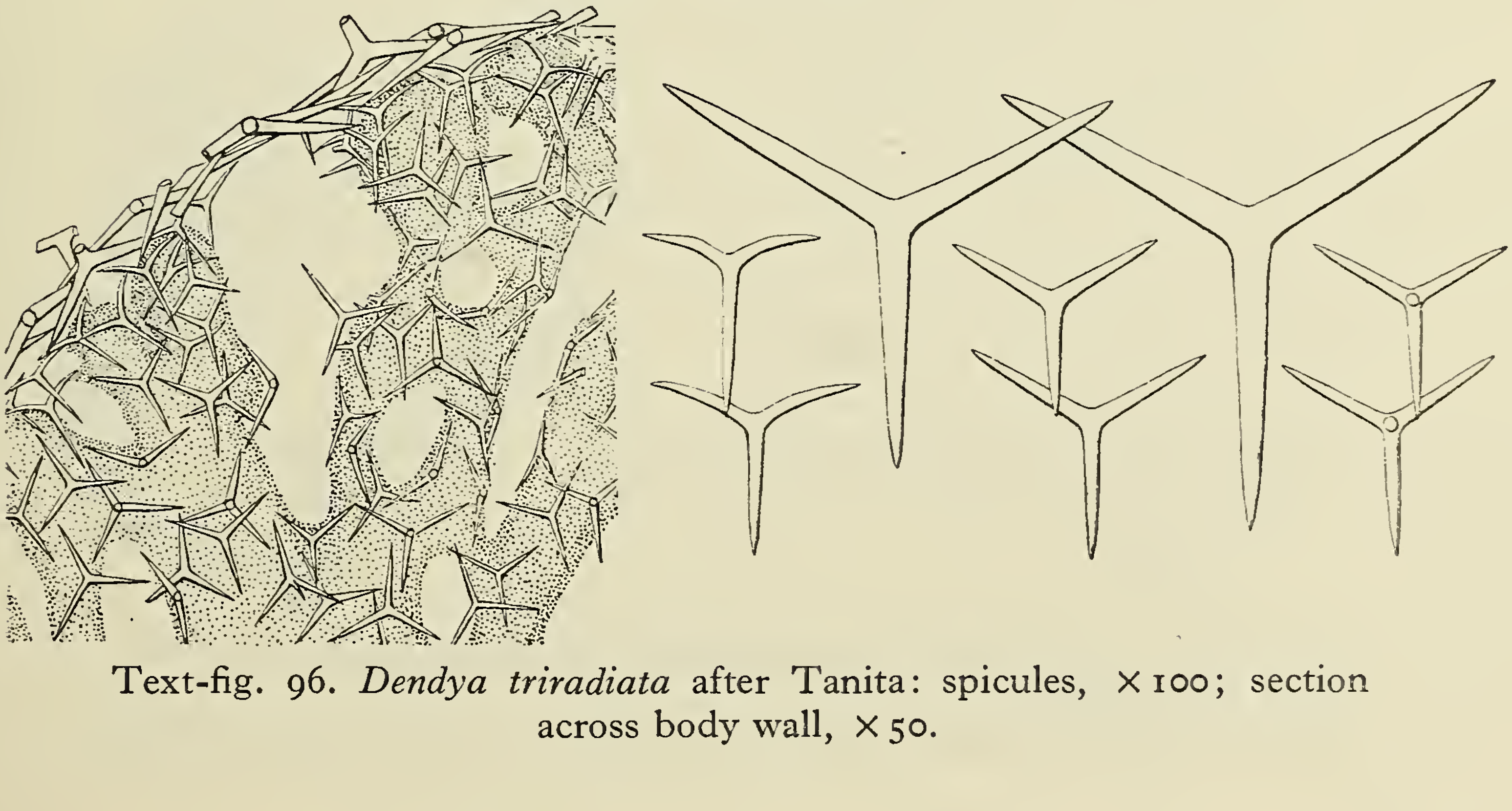
Named form: **Dendya triradiata** Tanita

(text-figs. 95–96)

Dendya triradiata Tanita, 1943: 389, pl. xiii, figs. 24, 25, text-figs. 7, 8.

Description: Sponge irregularly massive, cylindrical; surface smooth, uneven; vent on upper surface, naked; texture soft; colour, in spirit, pure white; skeleton of triradiates and quadriradiates.

Text-fig. 95. *Dendya triradiata* after Tanita: external form (holotype to left), natural size.



Text-fig. 96. *Dendya triradiata* after Tanita: spicules, ×100; section across body wall, ×50.

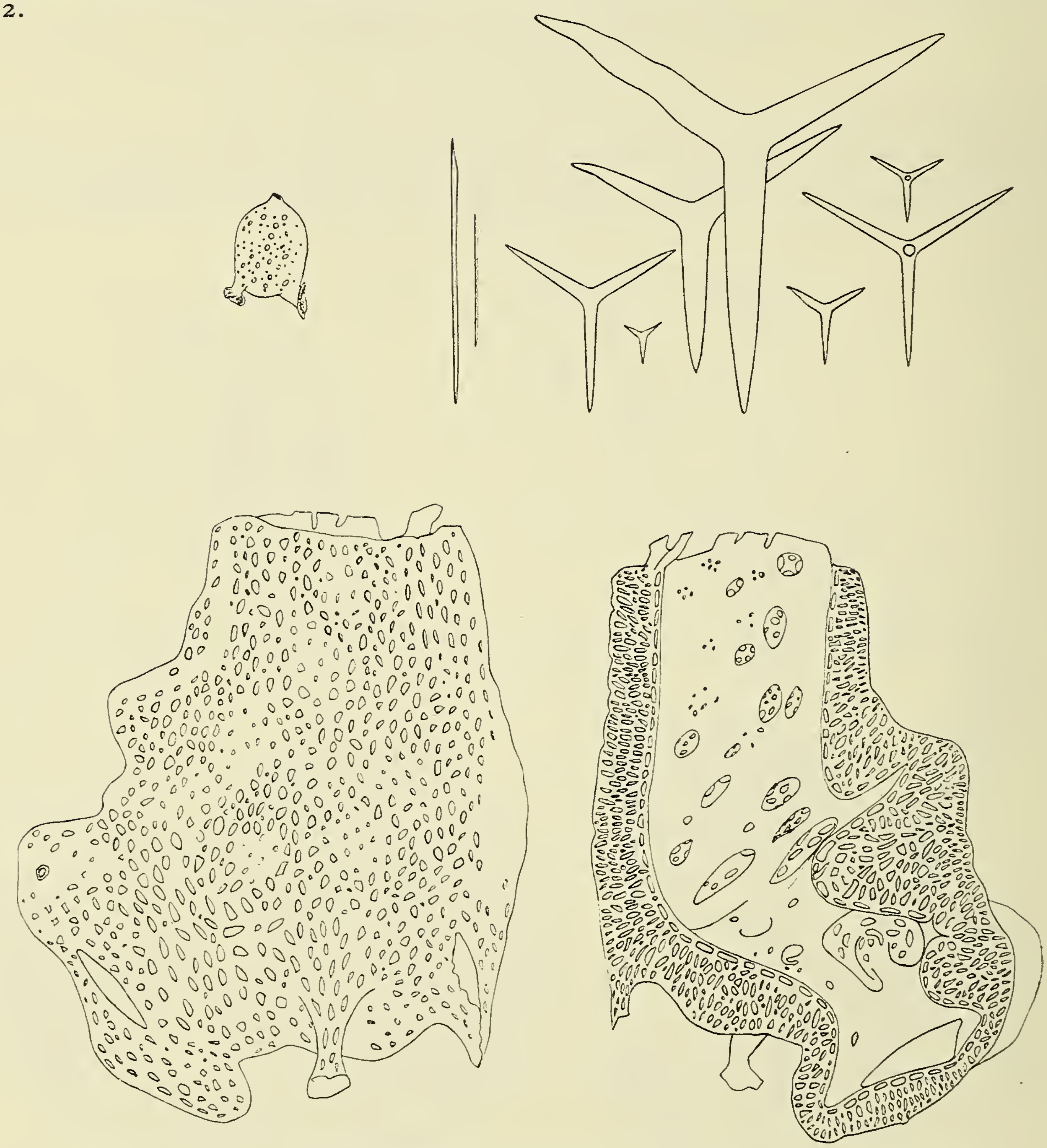
Spicules: triradiates of surface layers, regular, rays 0·22 to 0·25 by 0·02 to 0·026 mm.,
subectosomal triradiates, sagittal, paired rays 0·07 to 0·09 by 0·008 to 0·01 mm., basal ray 0·11 to 0·125 by 0·008 to 0·01 mm.,
triradiates of deeper tissues, regular, rays 0·9 to 0·11 by 0·008 to 0·01 mm.,
quadriradiates, similar to triradiates of deeper tissues, with apical ray 0·1 to 0·16 by 0·006 to 0·009 mm.

Distribution: Japan (Okinawa); littoral.

Named form: **Leucosolenia ventricosa** (Carter)

(text-fig. 97)

Clathrina ventricosa Carter, 1886: 512; *Leucosolenia ventricosa*, Dendy, 1891: 60, pl. i, figs. 8–10, pl. iv, fig. 4, pl. x, fig. 4; *L. ventricosa* var. *solida*, Dendy, 1891: 62, pl. iii, fig. 3; *Ascandra ventricosa*, Breitfuss, 1898: 215; *L. ventricosa*, Dendy and Row, 1913: 724; Dendy, 1918: 7; Tanita, 1942: 82.



Text-fig. 97. *Leucosolenia ventricosa* after Dendy: spicules, × 100; external form, natural size.
Larger specimen (bottom left) is also shown in section (bottom right).

Description: Sponge large, irregularly lobose or massive, with a central pseudogaster, a pseudoderm, pseudopores and pseudoscula; surface even, often very uneven; pseudoscula usually papillate; texture harsh, incompressible; colour, in spirit, white; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, regular, of two sizes, (*a*) ectosomal, with rays 0·35 by 0·056 mm., and (*b*) in deeper tissues, with rays 0·17 by 0·014 mm.,
quadriradiates, regular, facial rays 0·17 by 0·014 mm., apical rays 'short',
oxea, 0·16 by 0·003 mm.

Distribution: Australia (Port Phillip Heads); Tasmania.

Named form: **Leucosolenia vitraea** Row and Hozawa

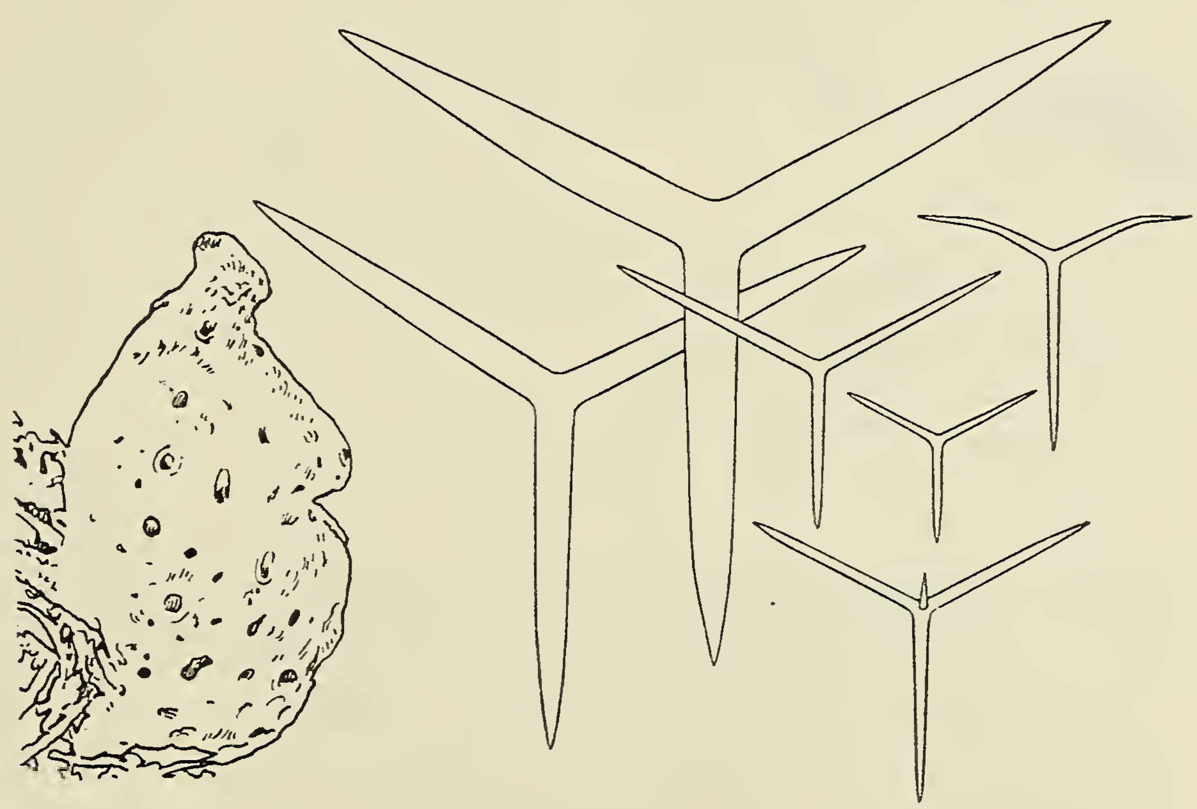
(text-fig. 98)

Leucosolenia vitraea Row and Hozawa, 1931: 740, pl. xix, fig. 2, text-fig. 2; Tanita, 1943: 78.

Description: Sponge massive, rounded, composed of a reticulation of tubes, sessile; surface smooth; vents not apparent; texture soft, tough; colour, in spirit, white, almost transparent; skeleton of triradiates only (rarely with an apical ray), of two sizes.

Spicules: triradiates, of deeper tissues, regular, rays 0·135 to 0·16 by 0·01 to 0·012 mm.,
triradiates, of ectosomal layer, regular, rays 0·248 to 0·37 by 0·025 to 0·031 mm.,
(quadriradiates, with apical rays up to 0·05 by 0·01 mm., formed from both large and small triradiates).

Distribution: S.W. Australia (Albany).



Text-fig. 98. *Leucosolenia vitraea* after Hozawa and Row: spicules, × 100; external form, × $\frac{5}{2}$.

Named form: **Leucosolenia wilsoni** Dendy

(See *L. loculosa*)

6. **Dendya prolifera** Dendy

Dendya prolifera Dendy

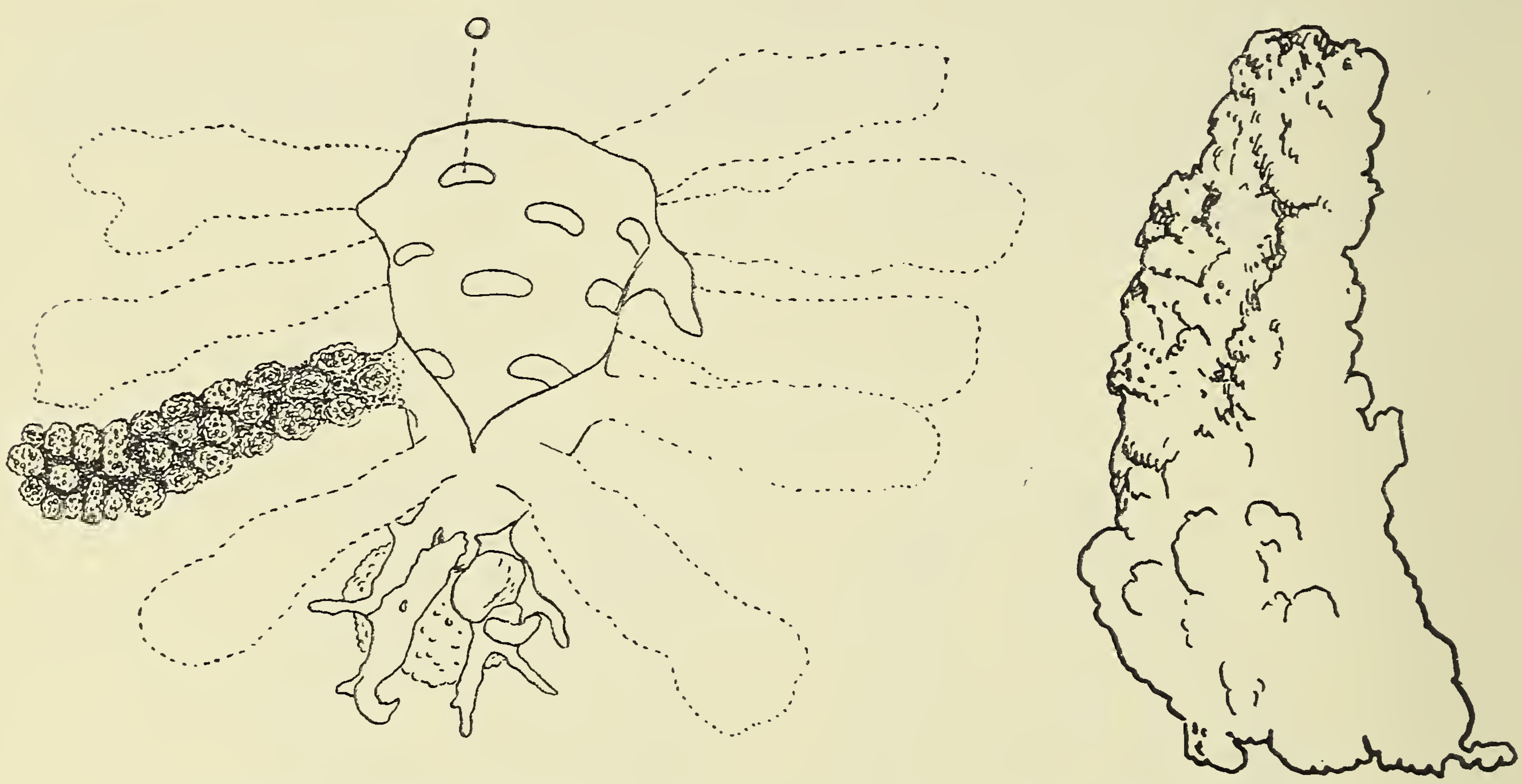
(text-fig. 99)

Dendya prolifera Dendy, 1913: 6, pl. i, figs. 3-4, pl. iii, figs. 4–5; Dendy and Row, 1913: 728; Burton, 1930: 2, figs. 1–2.

Description: Sponge composed of a thin-walled, sac-shaped body bearing numerous elongated diverticula; surface of body smooth, of diverticula, marked by numerous rounded lobes; vent (?); texture soft, friable; colour, in spirit, white; skeleton of triradiates and quadriradiates.

Spicules: triradiates of central body, regular to sagittal, rays up to 0·27 by 0·01 mm.,
triradiates of diverticula, regular to sagittal, varying from similar to triradiates of central body to sagittal, with paired rays 0·07 to 0·085 by 0·008 mm., basal rays 0·12 by 0·008 mm.,
quadriradiates, similar to varying forms of triradiates but with apical rays, up to 0·09 mm. long.

Distribution: Indian Ocean (Seychelles); Indonesia; 22–71 m.



Text-fig. 99. *Dendya prolifera*: external form of holotype, after Dendy (right) and the 'Siboga' specimen, with central cavity opened to show openings, O, into diverticula, both natural size.

Genus **Leuconia** Grant

Leuconia Grant, 1833: p. 199; *Medon* Duchassaing and Michelotti, 1864: p. 111; *Sycinula* Schmidt, 1868: p. 35; *Dyssyconella* Haeckel, 1870: p. 241; *Dyssycum* Haeckel, 1870: p. 241; *Coenostomella* Haeckel, 1870: p. 248; *Dyssiconella*, Wright, 1870: p. 674; *Leucaltaga* Haeckel, 1872: p. 143; *Mlea* Haeckel, 1872: p. 162; *Leucortis* Haeckel, 1872: p. 162; *Leucandra* Haeckel, 1872: p. 170; *Leucandraga* Haeckel, 1872: p. 172; *Leucandrusa* Haeckel, 1872: p. 172; *Dyssycarium* Haeckel, 1872: p. 173; *Coenostomium* Haeckel, 1872: p. 182; *Dyssycortus* Haeckel, 1872: p. 386; *Dyssycandrus* Haeckel, 1872: p. 386; *Dysscaltella* Haeckel, 1872: p. 387; *Dyssycandrella* Haeckel, 1872: p. 387; *Dyssycandrium* Haeckel, 1872: p. 387; *Lipostomaltis* Haeckel, 1872: p. 393; *Lipostomandra* Haeckel, 1872: p. 393; *Lipostomortis* Haeckel, 1872: p. 393; *Amphoriscandra* Haeckel, 1872: p. 398; *Amphoricortis* Haeckel, 1872: p. 398; *Amphorulandra* Haeckel, 1872: p. 398; *Amphoridandra* Haeckel, 1872: p. 399; *Coenostomandra* Haeckel, 1872: p. 403; *Coenostomandium* Haeckel, 1872: p. 403; *Coenostomellium* Haeckel, 1872: p. 403; *Coenostomortis* Haeckel, 1872: p. 403; *Artynandrium* Haeckel, 1872: p. 406; *Artynellandra* Haeckel, 1872: p. 406; *Artynortus* Haeckel, 1872: p. 406; *Aphrocerandra* Haeckel, 1872, p. 409; *Aphrocerortis* Haeckel, 1872, p. 409; *Leucortometra* Haeckel, 1872: p. 412; *Leucania*, Lendenfeld, 1885: p. 1137; *Dyssicarium*, Delage, 1899: p. 230.

Type-species: Spongia nivea Grant, 1826: p. 339.

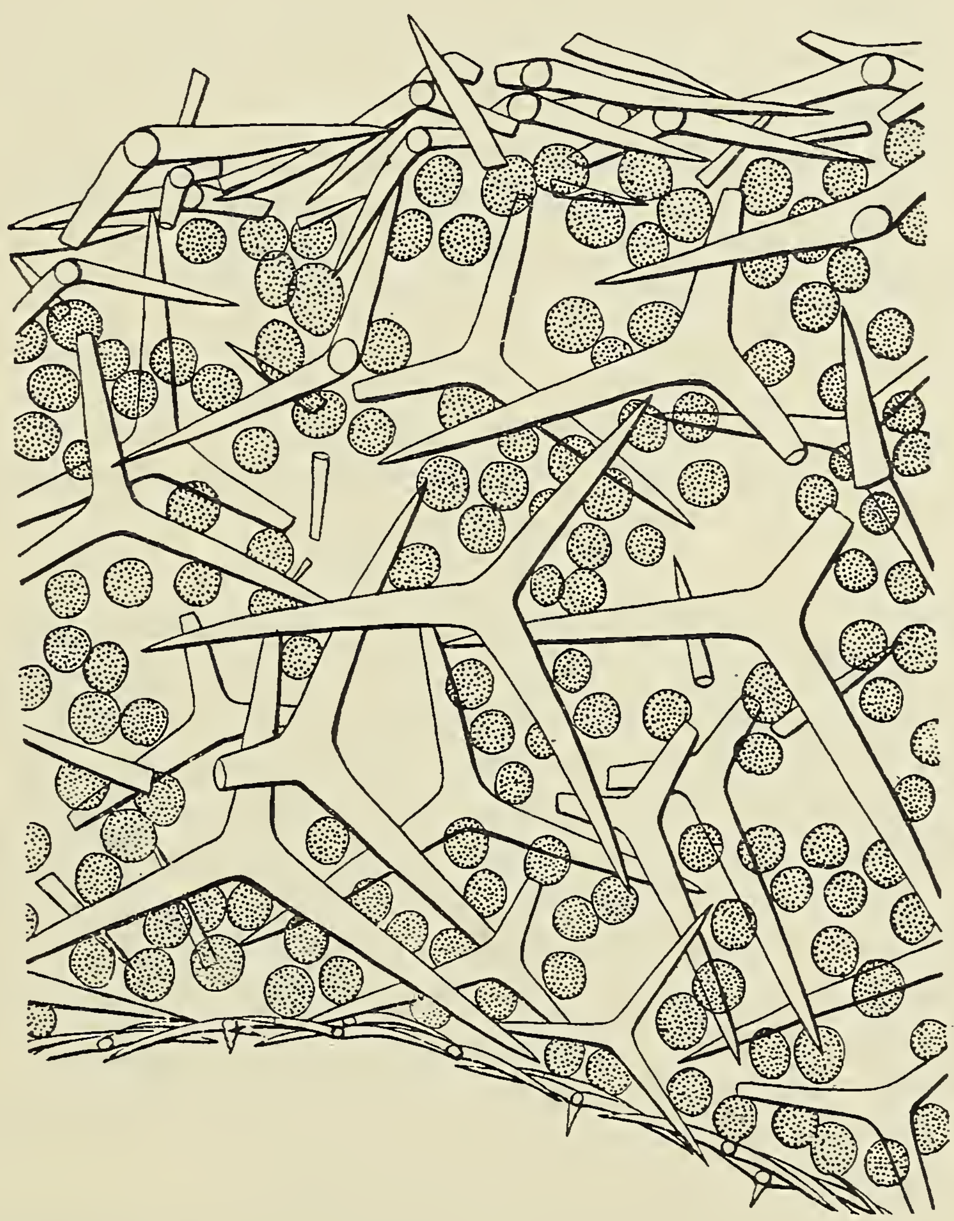
7. **Leuconia barbata** (Duchassaing and Michelotti)

Named form: **Leucandra amakusana** Tanita

(text-fig. 100)

Leucandra amakusana Tanita, 1943: 448, pl. xviii, fig. 75, text-figs. 22–23.

Description: Sponge tubular and laterally-compressed to ovate; surface smooth; vent apical, naked; texture hard; colour, in spirit, white; ectosomal skeleton a few tangential layers of



Text-fig. 100. *Leucandra amakusana* after Tanita: section at right angles to surface, ×50; external form, natural size.

triradiates; skeleton of chamber layer of triradiates irregularly disposed; endosomal skeleton of tangential layers of tri- and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·37 to 0·425 by 0·04 to 0·05 mm.,
triradiates of chamber layer, subregular, rays 0·43 to 0·58 by 0·045 to 0·055 mm.,
endosomal triradiates, sagittal, paired rays 0·2 to 0·32 by 0·013 to 0·026 mm., basal ray 0·18 to 0·26 by 0·013 to 0·026 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·04 to 0·06 by 0·018 mm.

Distribution: Japan (Kumamoto Prefecture).

Named form: **Leuconia amorpha** Poléjaeff

Leuconia multiformis var. *amorpha* Poléjaeff, 1883: 55; *Leucandra amorpha,* Dendy and Row, 1913: 772.

Description: Sponge sacciform, sessile; surface even, hispid; vent apical, fringed (?); texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea projecting at surface; skeleton of chamber layer of irregularly-arranged triradiates, with subendosomal sagittal triradiates; endosomal skeleton of several layers of quadriradiates, rarely triradiates, and microxea.

Spicules: ectosomal triradiates, subregular, rays 0·14 to 0·6 by 0·014 to 0·05 mm.,
oxea, 1·0 to 2·0 by 0·05 mm.,
triradiates of chamber layer, subregular, rays 0·2 to 0·65 by 0·018 to 0·05 mm.,
subendosomal sagittal triradiates, paired rays 0·16 to 0·2 by 0·024 mm., basal ray 0·25 to 0·35 by 0·024 mm.,
endosomal quadriradiates, sagittal, paired rays 0·24 to 0·37 by 0·014 mm., basal ray 0·1 to 0·12 by 0·014 mm., apical ray 0·025 to 0·04 by 0·014 mm.,
microxea, 0·08 to 0·14 by 0·003 to 0·005 mm.

Distribution: Bermudas; 59 m.

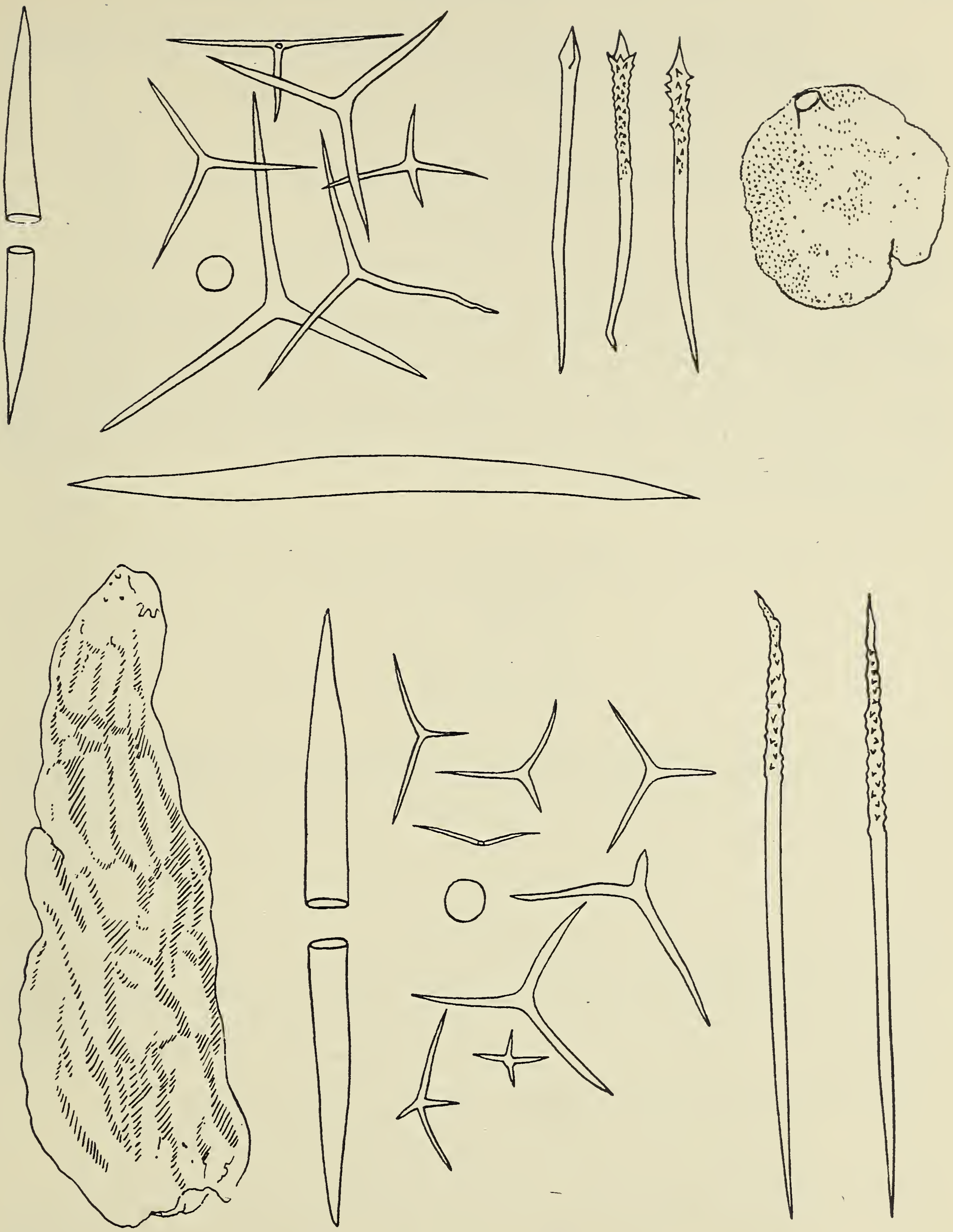
Named form: **Leucandra balearica** Lackschewitsch

(text-fig. 101)

Leucandra balearica Lackschewitsch, 1886: 339; *L. rodriguezii* Lackschewitsch, 1886: 339; *Leuconia rodriguezii* Lackschewitsch, 1886: 306, pl. vii, fig. 5; *L. balearica* Lackschewitsch, 1886: 308, pl. vii, fig. 6; *Leucandra balearica,* Dendy and Row, 1913: 722; *L. rodriguezii* Dendy and Row, 1913: 773; Ferrer, 1916: 6; *L. sulcata* Ferrer, 1919: 532, figs. 1–2; *L. riojai* Ferrer, 1919: 535, figs. 3–4; *L. balearica,* Topsent, 1934: 11; *L. rodriguezii,* Topsent, 1934: 11.

Description: Sponge massive, or compound, sessile; surface hispid; vents apical, with fringe; texture firm; colour, in spirit, white or grey; ectosomal skeleton a tangential layer of triradiates, with oxea and trichoxea projecting beyond surface; skeleton of chamber layer of irregularly-scattered triradiates of varying size; endosomal skeleton a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity, together with microxea.

Spicules: ectosomal triradiates, sagittal, paired rays 0·16 to 0·27 by 0·005 to 0·011 mm., basal rays 0·07 to 0·24 by 0·005 to 0·011 mm.,
oxea, 0·45 to 2·4 by 0·027 to 0·055 mm.,
trichoxea, sometimes absent, 0·89 by 0·002 to 0·003 mm.,
triradiates of chamber layer, sagittal, paired rays 0·27 to 0·44 by 0·005 to 0·05 mm., basal rays 0·07 to 0·44 by 0·005 to 0·038 mm.,



Text-fig. 101. *Leucandra balearica,* as represented by its synonyms. *L. sulcata*: spicules (above left), × 100, external form (bottom left), natural size; and *L. riojai*: spicules (bottom right), × 100, external form (top right), natural size. In both, the microxea are enlarged, × 500, as compared with other spicules. All after Ferrer.

endosomal quadriradiates, sagittal, paired rays 0·22 to 0·27 by 0·005 to 0·01 mm., basal rays 0·14 to 0·16 by 0·005 to 0·01 mm., apical rays 0·06 to 0·11 mm. long, microxea 0·012 to 0·014 by 0·001 mm.

Distribution: Spain (Santander); Mediterranean (Minorca).

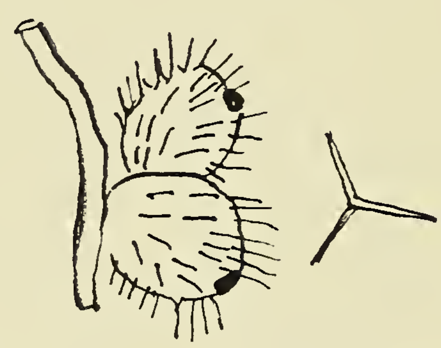
Named form: **Leuconia barbata** (Duchassaing and Michelotti)

(text-fig. 102)

Medon barbata Duchassaing and Michelotti, 1864: 111, pl. xxiv, figs. 9, 10; *Leuconia barbata*, de Laubenfels, 1936: 195, pl. xviii, fig. 4.

Description: Sponge ovate, subglobular, or massive composed of several rounded lobes; surface hispid; exhalant apertures leading into deep cloacae; texture friable; colour, in life, yellowish, dried, white; skeleton of chamber layer composed of triradiates of two sizes with rays 0·4 by 0·05 and 0·2 by 0·012 mm. respectively; endosomal skeleton of quadriradiates and triradiates, with rays 0·2 by 0·012 mm.; subendosomal skeleton of sagittal triradiates with rays 0·5 by 0·05 mm.; ectosomal skeleton of tangential triradiates, with rays 0·5 by 0·05 mm., and echinating oxea ranging from 1·1 to 3·0 by 0·05 mm.

Distribution: West Indies; Florida.



Text-fig. 102. *Medon barbata* after Duchassaing and Michelotti, as originally figured: scale unknown but external form presumed to be natural size.

Named form: **Leucandra bolivari** Ferrer

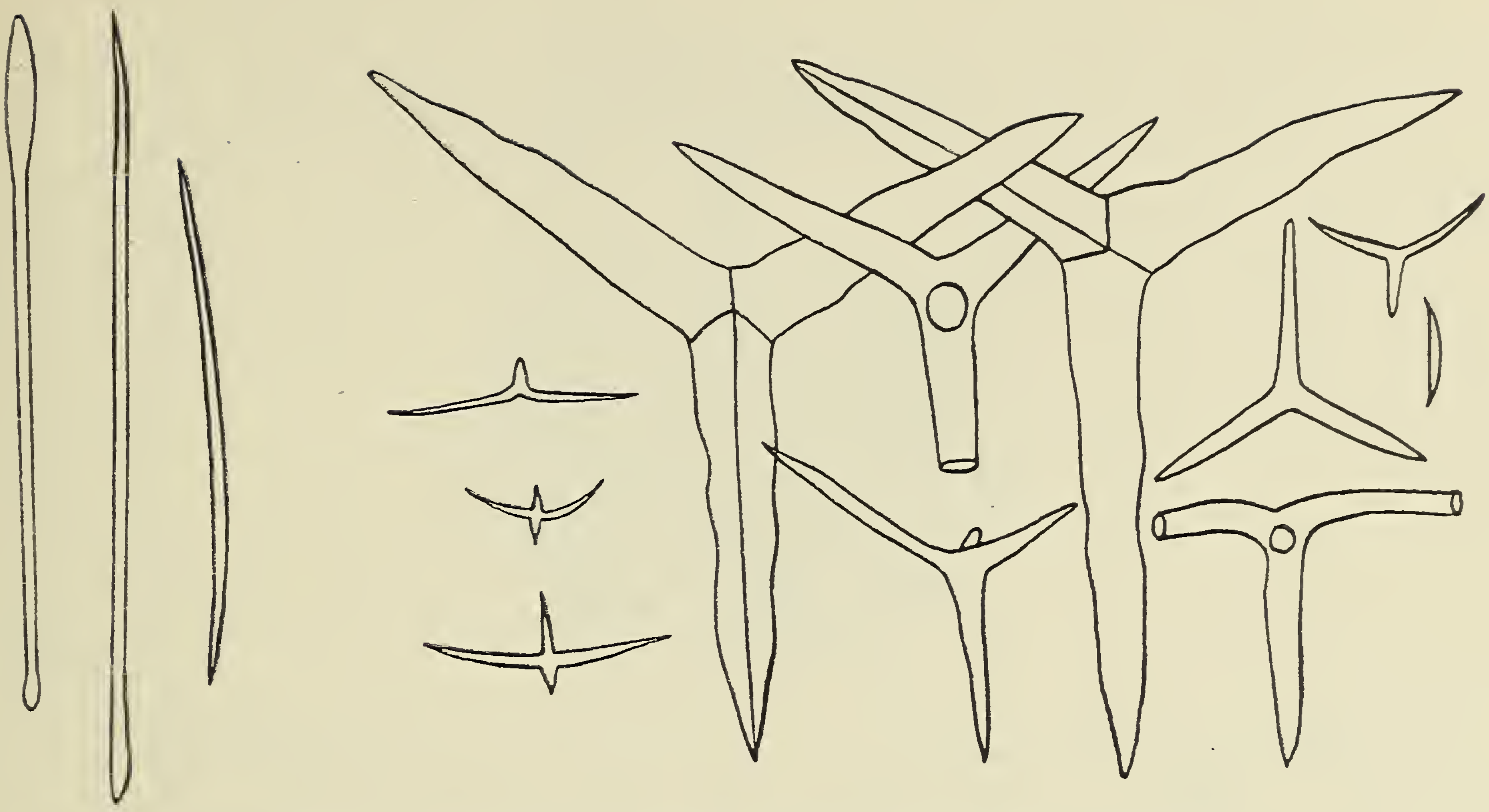
(text-fig. 103)

Leucandra bolivari Ferrer, 1916: 11, figs. 3a, b; Topsent, 1934.

Description: Sponge massive (remaining external characters not recorded); ectosomal skeleton a tangential layer of triradiates, of two sizes, and microxea, with a subectosomal layer of quadriradiates; skeleton of chamber layer of large triradiates irregularly arranged; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·35 to 0·64 by 0·04 mm.,
ectosomal triradiates, subsagittal, rays 0·08 to 0·2 by 0·016 to 0·02 mm.,
ectosomal microxea, 0·08 by 0·006 to 0·008 mm.,
subectosomal quadriradiates, subregular, rays 0·2 to 0·4 by 0·03 to 0·08 mm.,
triradiates of chamber layer, subregular to sagittal, rays 0·4 to 0·8 by 0·08 to 0·1 mm.,
endosomal triradiates, sagittal, paired rays 0·2 to 0·24 by 0·016 mm., basal ray 0·048 by 0·016 mm.,
endosomal quadriradiates, similar to endosomal triradiates, with apical ray 0·12 by 0·016 mm.

Distribution: Mediterranean (Minorca); littoral.



Text-fig. 103. *Leucandra bolivari* after Ferrer: spicules, × 100, except for microxea (on left), which are × 1000.

Named form: **Leucandra caminus** Haeckel

(text-figs. 104–105)

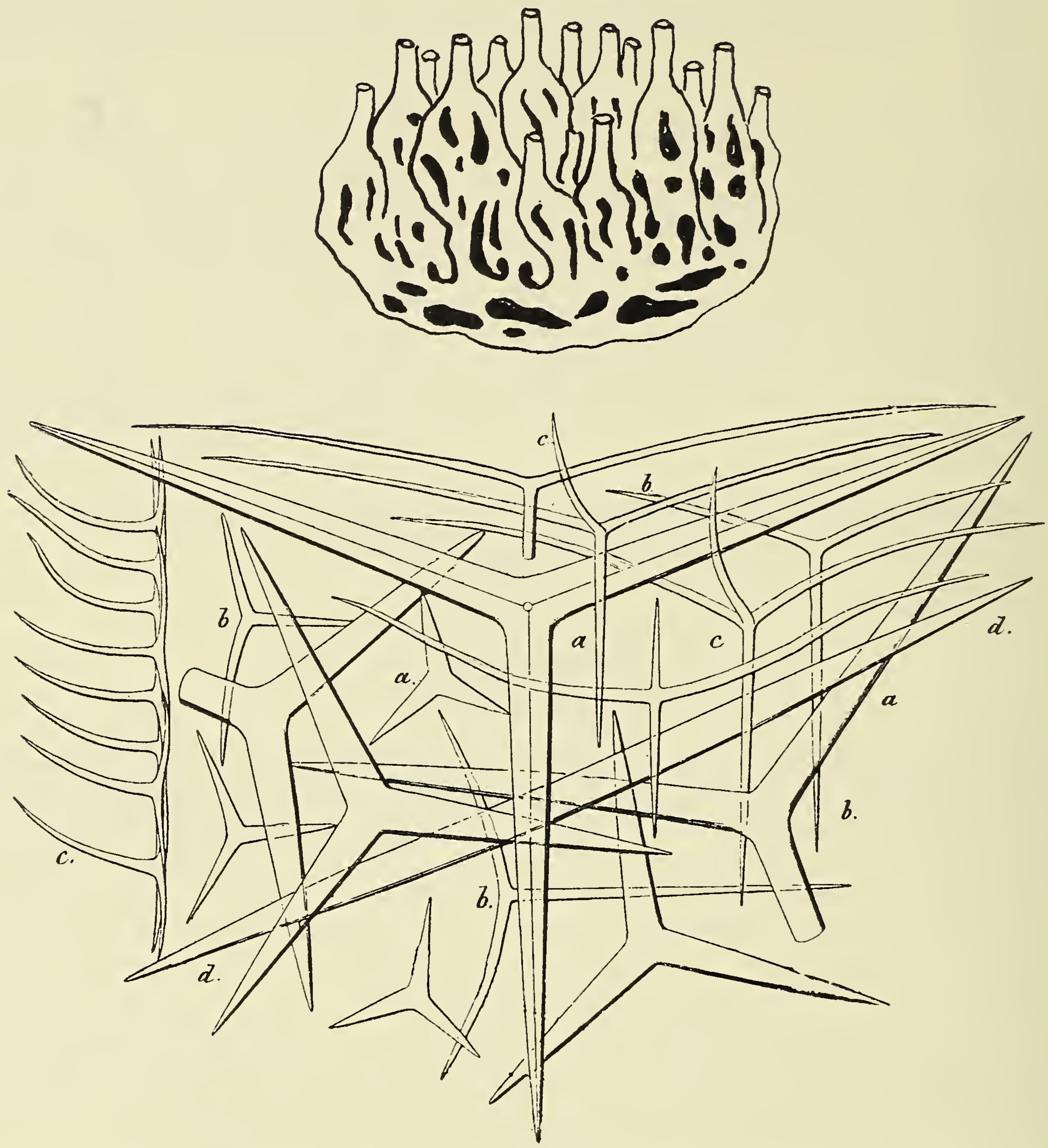
Dyssyconella caminus Haeckel, 1870: 242; *Coenostomella caminus* Haeckel, 1870: 248; *Leucandra caminus* Haeckel, 1872: 175, pl. xxxi, fig. 1, pl. xxxvii, figs. 5–6; *Dyssyconella caminus* Haeckel, 1872: 175; *Amphorula caminus* Haeckel, 1872: 175; *Coenostomella caminus* Haeckel, 1872: 175, pl. xxxvii, fig. 5; *Artynella caminus* Haeckel, 1872: 175, pl. xxxvii, fig. 6; *Aphroceras caminus*, et var. *crassior* Ridley, 1881: 135, pl. xi, figs. 6–7; *Leucandra caminus*, Arnesen, 1901: 72; Arnesen, 1901: 27; Dendy and Row, 1913: 769; Breitfuss, 1927: 20; Arndt, 1935: 18, fig. 23; Arndt, 1941: 47.

Description: Sponge massive, clathrate, sessile or substipitate, with well-developed cloacal tubes; surface even, non-hispid; vents tubular, apical, fringed; texture (?); colour, in spirit (?), white, yellow or brown; ectosomal skeleton a tangential layer of triradiates, with oxea not projecting at surface; skeleton of chamber layer of triradiates; endosomal skeleton a tangential layer of quadriradiates.

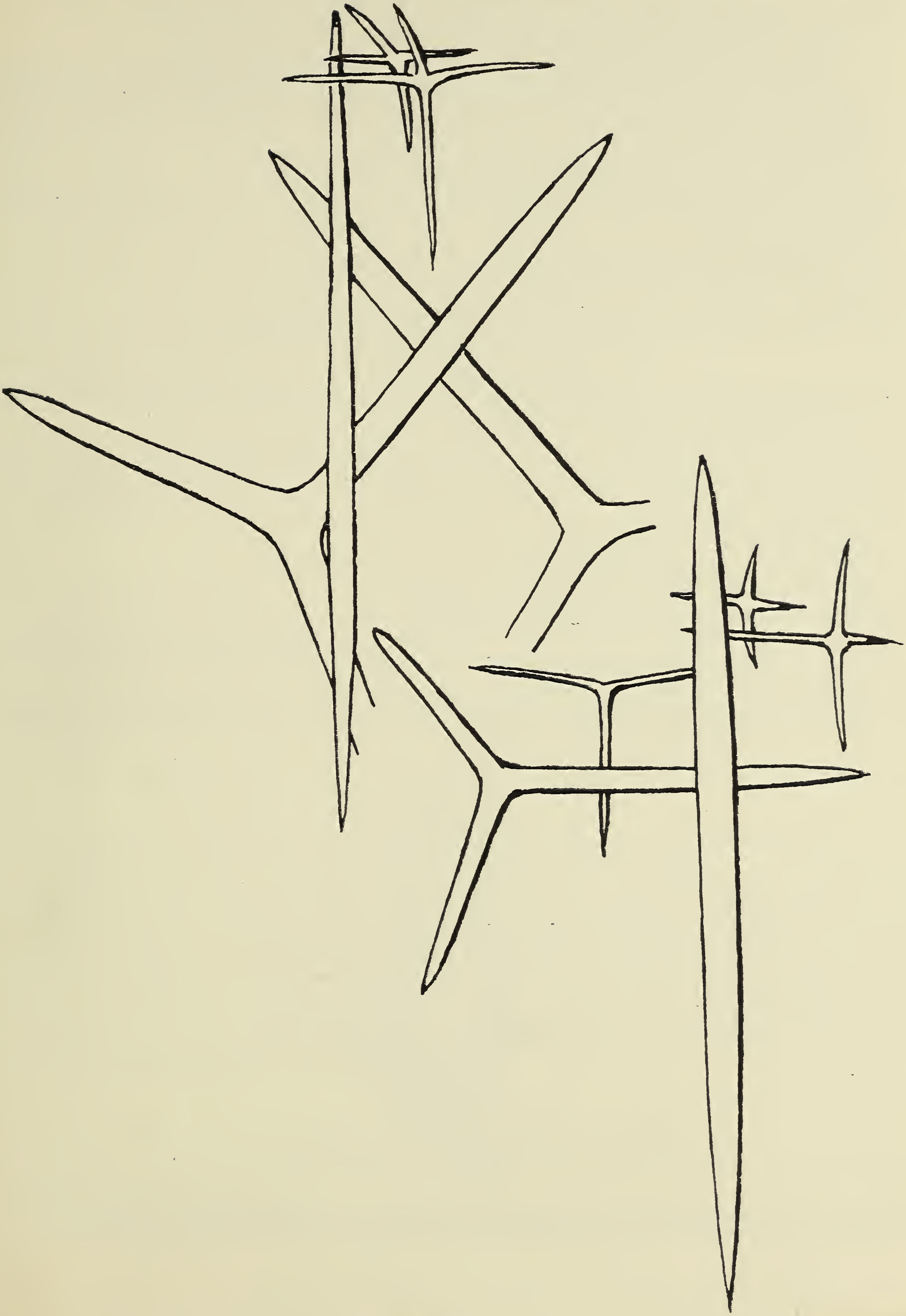
Spicules: ectosomal triradiates, regular, rays 0·4 to 0·65 by 0·04 to 0·05 mm.,
oxea, 1·0 to 1·5 by 0·05 mm.,
triradiates of chamber layer regular, rays 0·4 to 0·65 by 0·04 to 0·05 mm.,
triradiates of chamber layer, sagittal, paired rays 0·2 by 0·01 to 0·02 mm., basal rays 0·35 by 0·01 to 0·02 mm.,
endosomal quadriradiates, sagittal, paired rays 0·3 to 0·4 by 0·01 to 0·015 mm., basal ray 0·2 to 0·3 by 0·01 to 0·015 mm., apical ray 0·1 to 0·2 by 0·01 to 0·015 mm.

Distribution: Norway (Hardanger Fiord, Bergen); British Isles (Devon); Portugal; Labrador; Barbados; depth unknown.

Remarks: Our knowledge of this species rests entirely on the notes published by Haeckel (1872), and although subsequent authors have mentioned it they have done no more than refer to Haeckel.



Text-fig. 104. *Leucandra caminus*, after Haeckel: external form, natural size; spicules, × 100.
a. small triradiates of the choanosome; b. large triradiates of the choanosome; c. endosomal quadriradiates; d. oxea.



Text-fig. 105. *Aphroceras caminus* and *A. caminus* ? var. *crassior* after Ridley: spicules, ×100.

Named form: **Pericharax canaliculata** Burton and Srinivasa Rao

Pericharax canaliculata Burton and Srinivasa Rao, 1932: 304, pl. xviii, fig. 1.

Description: Sponge small (probably young), more or less oval, with a shallow depression on one side; surface, to naked eye, even, minutely and irregularly tuberculate; without specialised vent, exhalant openings probably represented by minute pits in the shallow depression already referred to; colour, in spirit, yellow; no central cloaca, but body traversed by a few irregular, longitudinal canals; skeleton composed of small triradiates, equiangular, or occasionally inequiangular, closely packed to form an irregular reticulation, with a few large triradiates scattered therein; rays of smaller radiates measuring 0·15 by 0·012 mm., those of larger radiates about three times as large.

Distribution: Mergui (Indian Ocean).

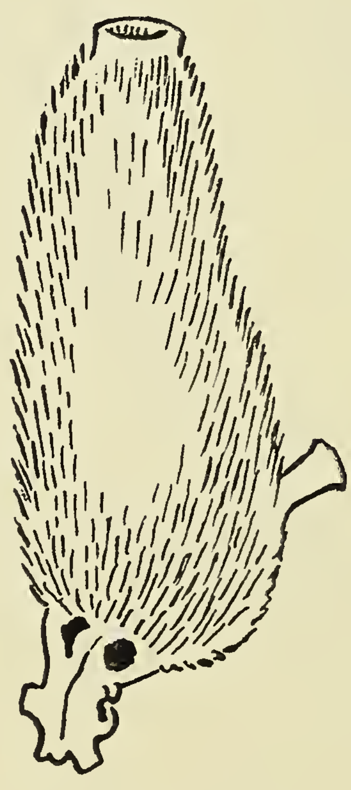
Named form: **Leuconia capillata** Poléjaeff

(text-fig. 106)

Leuconia multiformis var. *capillata* Poléjaeff, 1883: 55, pl. ii, fig. 1; *Leucandra capillata,* Dendy and Row, 1913: 770.

Description: Sponge tubular, sessile; surface strongly hispid; vent apical, fringed; texture firm; colour, in spirit, brownish-white; ectosomal skeleton a tangential layer of triradiates, with oxea projecting at surface; skeleton of chamber layer of irregularly-arranged triradiates, with subendosomal sagittal triradiates, rarely quadriradiates; endosomal skeleton a tangential layer of quadriradiates, rarely triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·3 to 0·4 by 0·012 to 0·02 mm., basal ray 0·18 to 0·4 by 0·012 to 0·02 mm.,
oxea, 0·1 to 0·2 by 0·032 to 0·05 mm.,
triradiates of chamber layer, subregular, rays 0·32 to 0·5 by 0·018 to 0·048 mm.,
subendosomal sagittal triradiates, paired rays 0·22 to 0·5 by 0·017 mm., basal ray 0·5 to 0·8 by 0·017 mm.,
subendosomal sagittal quadriradiates, similar to endosomal triradiates, with apical ray 0·07 to 0·1 by 0·017 mm.,



Text-fig. 106. *Leuconia capillata* after Poléjaeff: external form, natural size.

endosomal quadriradiates, sagittal, paired rays 0·24 to 0·6 by 0·007 to 0·014 mm., basal ray 0·1 to 0·3 by 0·007 to 0·014 mm., apical ray 0·1 to 0·14 by 0·007 to 0·014 mm.,

endosomal triradiates, similar to quadriradiates, but without apical ray.

Distribution: Philippines; Indonesia; 9–183 m.

Named form: **Leucetta carteri** (Dendy)

Leucaltis floridana var. *australiensis* Carter, 1886: 145; *Leucandra carteri* Dendy, 1892: 103; *Leucetta carteri*, Dendy and Row, 1913: 734.

Description: Sponge irregularly massive, sessile; surface uneven, harsh; vents large, scattered; texture firm; colour, dried, dirty yellowish brown; ectosomal skeleton of irregularly-arranged microxea, tangential or echinating surface (with tangential layer of triradiates?); skeleton of chamber layer of large and small triradiates, with small quadriradiates lining larger canals; endosomal skeleton a tangential layer of small triradiates and quadriradiates.

Spicules: large triradiates, regular, rays 1·13 by 0·24 mm.,
small triradiates, regular, rays 0·144 by 0·012 mm.,
small quadriradiates, similar to small triradiates, with short apical rays,
microxea, 0·4 by 0·004 mm.

Distribution: Australia (Port Phillip Heads).

Named form: **Leucetta chagosensis** Dendy

Leucetta chagosensis Dendy, 1913: 10, pl. i, fig. 6, pl. iv, fig. 2; Dendy and Row, 1913: 733; *L. infrequens* Row and Hozawa, 1931: 747, pl. xix, fig. 4, text-fig. 4; *L. expansa* Row and Hozawa, 1931: 749, pl. xix, fig. 5, text-fig. 5.

Description: Sponge encrusting to massive, irregular to lobose, sessile; surface smooth, even; vents few, large, scattered, naked; texture firm, friable; colour, in spirit, white to dark brown; skeleton of triradiates of two sizes, lying tangentially in ectosomal and endosomal surfaces, irregularly scattered in chamber layer.

Spicules: large triradiates, regular, rays 0·59 by 0·046 mm. (in ectosome only),
small triradiates, regular, rays 0·19 by 0·17 mm.,
microxea, 0·04 by 0·004 mm.

Distribution: Indian Ocean (Diego Garcia and Egmont Reef); south-west Australia.

Remarks: In describing *L. infrequens*, Row and Hozawa drew attention to its resemblance to *L. chagosensis* but suggested that it was distinguished from it 'in not having a distinct system of subdermal cavities . . . and in the absence of smaller oscular triradiates. . . .' These differences are negligible against the strong general resemblance between the two species. Moreover, *L. expansa* Row and Hozawa is remarkably like *L. infrequens* except for the presence of microxea and of small quadriradiates in the walls of the larger exhalant canals. These three species taken in conjunction, afford further evidence of the inadvisability of basing species on trivial details in the spiculation. So far as external appearance and the general form of the skeleton are concerned there is virtually nothing to distinguish them.

Named form: **Leucascus clavatus** Dendy

Leucascus clavatus Dendy, 1892: 78; Dendy and Row, 1913: 731; Brøndsted, 1926: 300, fig. 3; Row and Hozawa, 1931: 743.

Description: Sponge solitary, sub-spherical or irregularly lobate, sessile; surface hispid; vents small, scattered, naked; texture firm; colour, in spirit (?); skeleton of triradiates, occasionally with incipient apical rays, and oxea.

Spicules: triradiates, regular, rays 0·1 by 0·01 mm. (occasionally quadriradiate).
oxea, 0·7 by 0·1 mm.

Distribution: Australia (Port Phillip Heads).

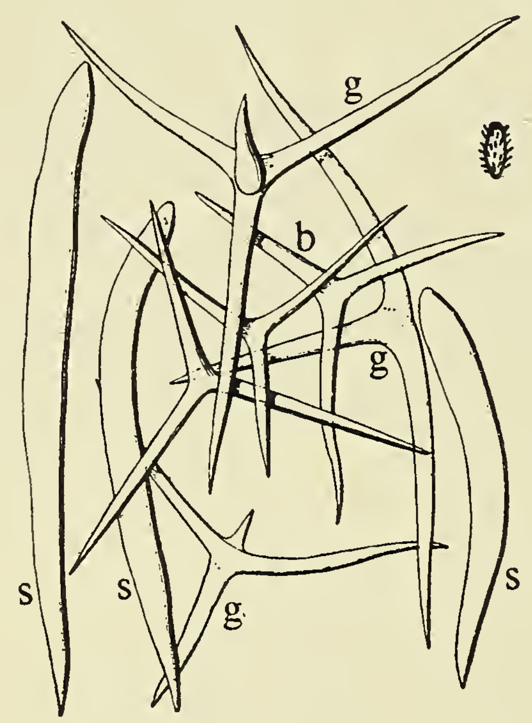
Named form: **Leucandra claviformis** Schuffner
(text-fig. 107)

Leucandra claviformis Schuffner, 1877: 414, pl. xxiv, fig. 5; Dendy and Row, 1913: 770.

Description: Sponge solitary, cylindrical, sessile; surface minutely hispid; vent terminal, with well-developed fringe; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea projecting at right angles to surface; skeleton of chamber layer of triradiates, irregularly-scattered; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·11 to 0·175 by 0·015 to 0·02 mm.,
triradiates of chamber layer, of similar dimensions to ectosomal triradiates,
endosomal quadriradiates, subregular, facial rays 0·175 to 0·25 by 0·015 to 0·02 mm.,
apical rays 0·05 to 0·1 by 0·015 to 0·02 mm.,
oxea, 0·27 to 0·4 by 0·031 mm.

Distribution: Mauritius.



Text-fig. 107. *Leucandra claviformis* Schuffner: spicules, ×100; external form, natural size.
b. triradiates of chamber layer; g. endosomal quadriradiates; s. oxea.

Named form: **Grantessa ? compressa** (Carter)

Heteropia compressa Carter, 1886: 51; *Grantessa ? compressa*, Dendy, 1892: 109; Dendy and Row, 1913: 752.

Description: Sponge massive, composed of conical individuals, sessile; surface even, non-hispid, vents apical on conical processes, fringed; texture firm; colour, alive (?), white; ectosomal skeleton a tangential layer of triradiates, with outer rays of subectosomal pseudosagittal triradiates; tubar skeleton of centripetal rays of subectosomal triradiates, scattered tubar triradiates, and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of endosomal triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·18 by 0·018 mm., basal ray 0·28 by 0·018 mm.,
subectosomal pseudosagittal triradiates, outer rays 0·4 to 0·8 by 0·048 to 0·08 mm., centripetal ray 0·4 to 0·95 by 0·048 to 0·08 mm.,
triradiates of chamber layer, similar to subectosomal triradiates,
subendosomal sagittal triradiates, paired rays 0·3 to 0·4 by 0·032 to 0·08 mm., basal ray 0·35 to 0·6 by 0·032 to 0·08 mm.,
endosomal triradiates, sagittal, paired rays 0·16 by 0·022 mm., basal ray 0·3 by 0·022 mm.

Distribution: Australia (Port Phillip Heads).

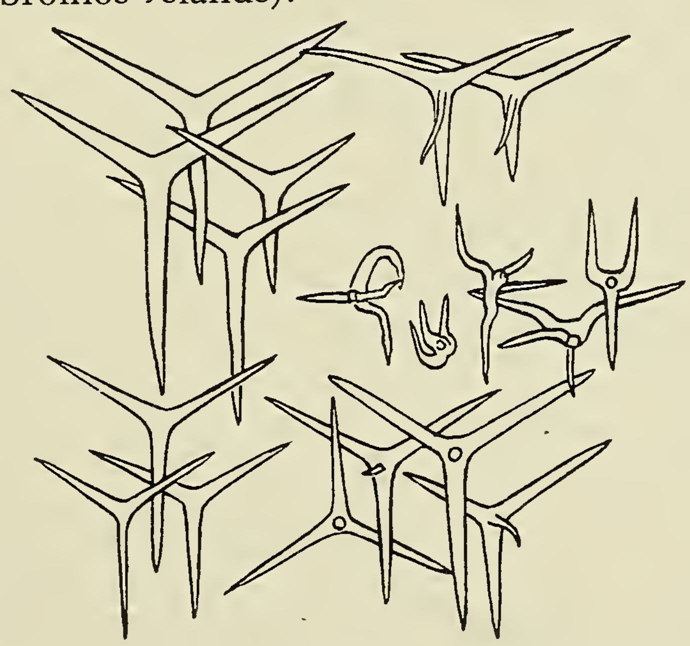
Named form: **Ascoleucetta compressa** Dendy and Frederick
(text-fig. 108)

Ascoleucetta compressa Dendy and Frederick, 1924: 481, pl. xxv, fig. 3, pl. xxvi, figs. 2–5.

Description: Sponge massive, lobulate, laterally compressed, sessile; surface even, with conspicuous pores, hispid only around pore-margins; vents naked, small, scattered, mainly marginal; texture firm, hard; colour, in spirit, light greyish brown; ectosomal skeleton a tangential layer of triradiates, with smaller triradiates and microxea around pore-margins; skeleton of chamber layer of irregularly-arranged small triradiates and quadriradiates; endosomal skeleton of small triradiates and quadriradiates.

Spicules: large ectosomal triradiates, regular, rays 0·35 by 0·052 mm.,
microxea, 0·16 by 0·001 mm.,
small ectosomal triradiates, regular, 0·14 by 0·03 mm.,
triradiates of chamber layer, similar to small ectosomal triradiates,
quadriradiates of chamber layer, similar to ectosomal triradiates, with apical ray 0·05 by 0·01 mm.,
endosomal triradiates, similar to small ectosomal triradiates,
endosomal quadriradiates, similar to quadriradiates of chamber layer.

Distribution: Australia (Abrolhos Islands).



Text-fig. 108. *Ascoleucetta compressa* after Dendy and Frederick: spicules, ×100 except for large triradiates (top left) which are ×60; external form, natural size.

Named form: **Leucandra conica** Lendenfeld

Leucandra conica Lendenfeld, 1885: 1126; Dendy, 1892: 98; Dendy and Row, 1913: 772.

Description: Sponge tubular, sessile; surface even, minutely hispid; vent apical, with slight fringe; texture (?); colour (?); ectosomal skeleton of triradiates (?), with oxea and microxea projecting at surface; skeleton of choanosome of scattered triradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates (?),
ectosomal oxea, 1·5 by 0·035 mm.,
ectosomal microxea, 0·08 by 0·002 mm.,
triradiates of choanosome, regular, rays 0·35 by 0·01 mm.,
endosomal quadriradiates, subregular, all rays 0·028 to 0·08 by 0·004 to 0·007 mm.

Distribution: Australia (Port Jackson); Laminarian Zone.

Named form: **Leucandra consolida** Tanita

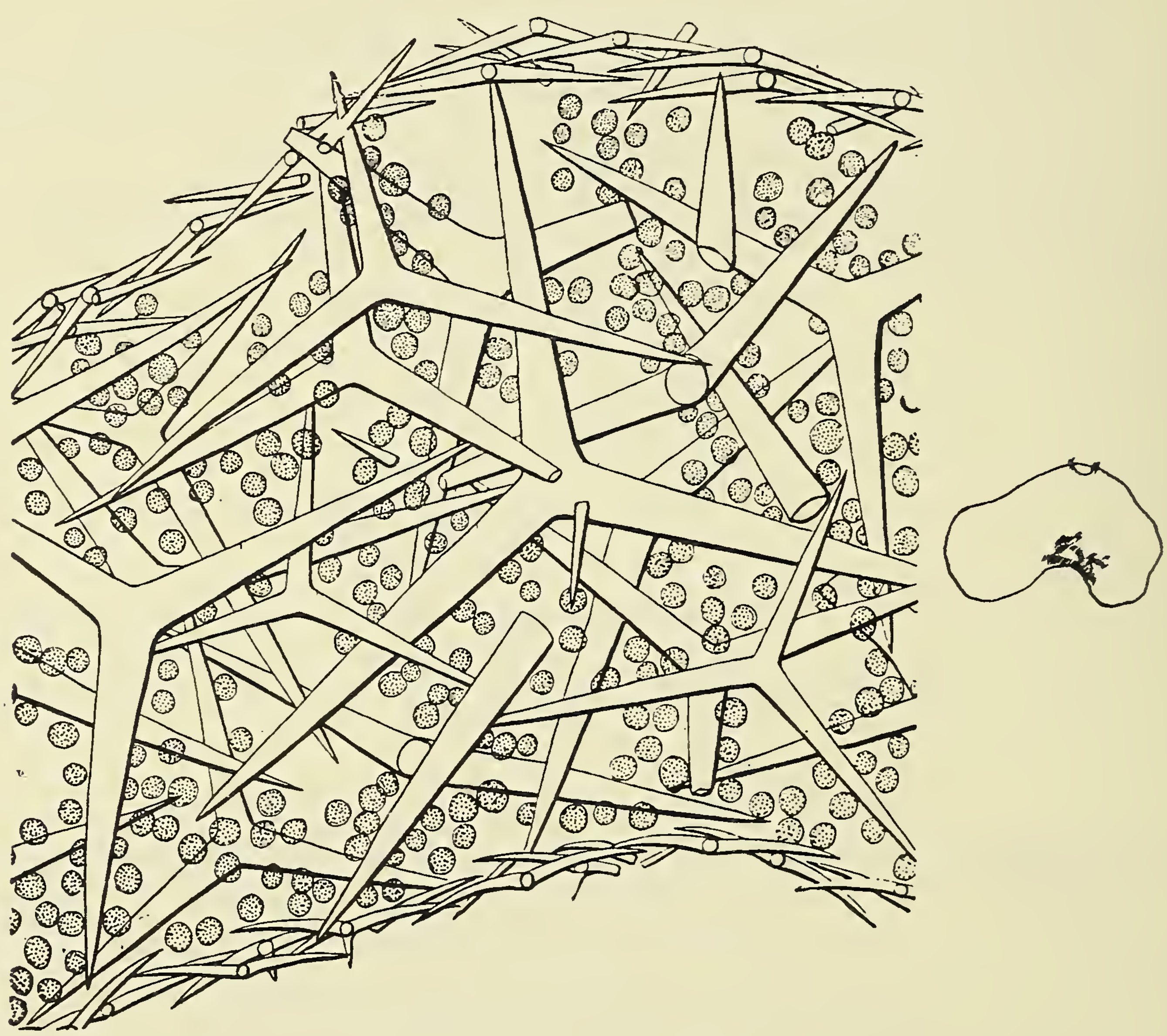
(text-fig. 109)

Leucandra consolida Tanita, 1943: 451, pl. xviii, fig. 76, text-figs. 24–25.

Description: Sponge massive; surface smooth, uneven; vent on upper surface; texture hard; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates; skeleton of chamber layer of triradiates irregularly arranged; endosomal skeleton of a few layers of tri- and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·24 to 0·35 by 0·02 to 0·025 mm.,
triradiates of chamber layer, subregular, rays 0·55 to 0·74 by 0·06 to 0·086 mm.,
endosomal triradiates, subregular, rays 0·22 to 0·3 by 0·015 to 0·018 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·08 by 0·014 mm.

Distribution: Japan (Okinawa); littoral.



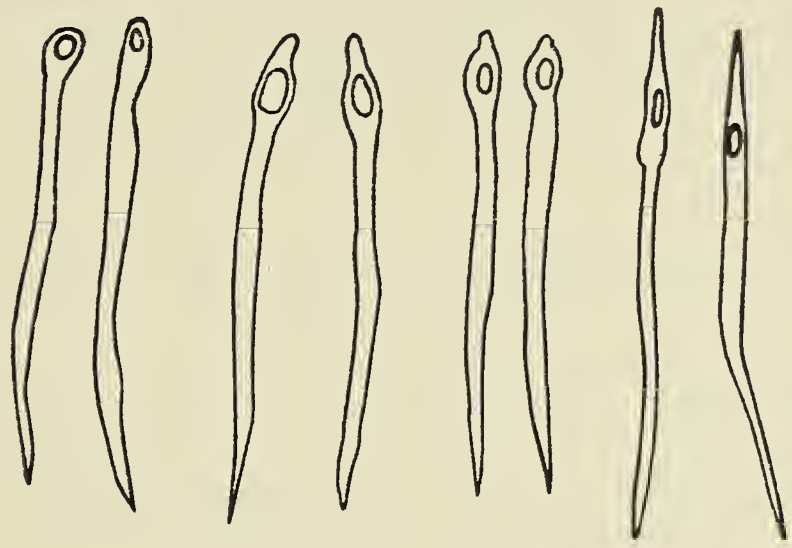
Text-fig. 109. *Leucandra consolida* after Tanita: section at right angles to surface, ×50; external form, natural size.

Named form: **Kuarrhaphis cretacea** (Haeckel)
(text-fig. 110)

Leucyssa cretacea Haeckel, 1872: 138, pl. xxv, figs. 14–17; *Lipostomella cretacea* Haeckel, 1872: 138; *L.* (*Lipostomyssa*) *cretacea* Haeckel, 1872: 393; *Kuarrhaphis cretacea*, Dendy and Row, 1913: 780.

Description: Sponge encrusting to massive and low-growing; surface even, non-hispid; vents not apparent; texture (?); colour, dried, white; skeleton of 'needle-eye' spicules, 0·08 to 0·1 by 0·002 to 0·003 mm.

Distribution: North Pacific (Kamtschatka).

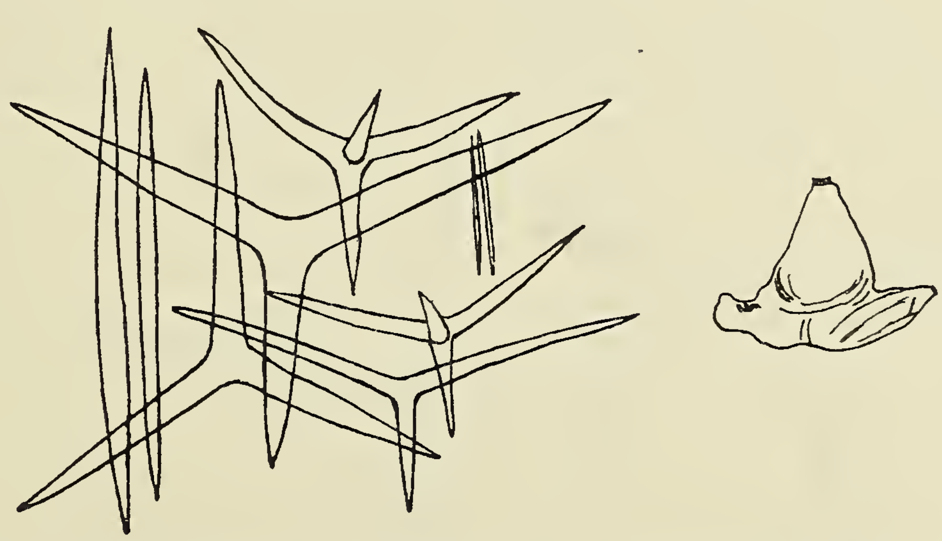


Text-fig. 110. *Kuarrhaphis cretacea* after Haeckel: spicules, ×400. (External form in this species is like that of *Leucandra nivea*; and these spicules, also, should be compared with similar spicules in *L. nivea* and *Baeria ochotensis.*)

Named form: **Leucandra crosslandi** Thacker
(text-fig. 111)

Leucandra crosslandi Thacker, 1908: 777, pl. xl, fig. 8, text-fig. 165; *L. gemmipara* Thacker, 1908: 779, pl. xl, fig. 9, text-fig. 166; Dendy and Row, 1913: 770; *L. crosslandi*, Dendy and Row, 1913: 772; Ferrer, 1918: 15.

Description: Sponge pyriform, with secondary individuals near base, sessile; surface minutely hispid; vents apical, with well-developed fringe; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates with oxea and microxea projecting beyond surface; skeleton of chamber layer of irregularly-scattered triradiates; endosomal skeleton a tangential layer of quadriradiates.



Text-fig. 111. *Leucandra crosslandi* after Thacker: spicules, ×100, except for two oxea, which are ×20; external form, natural size.

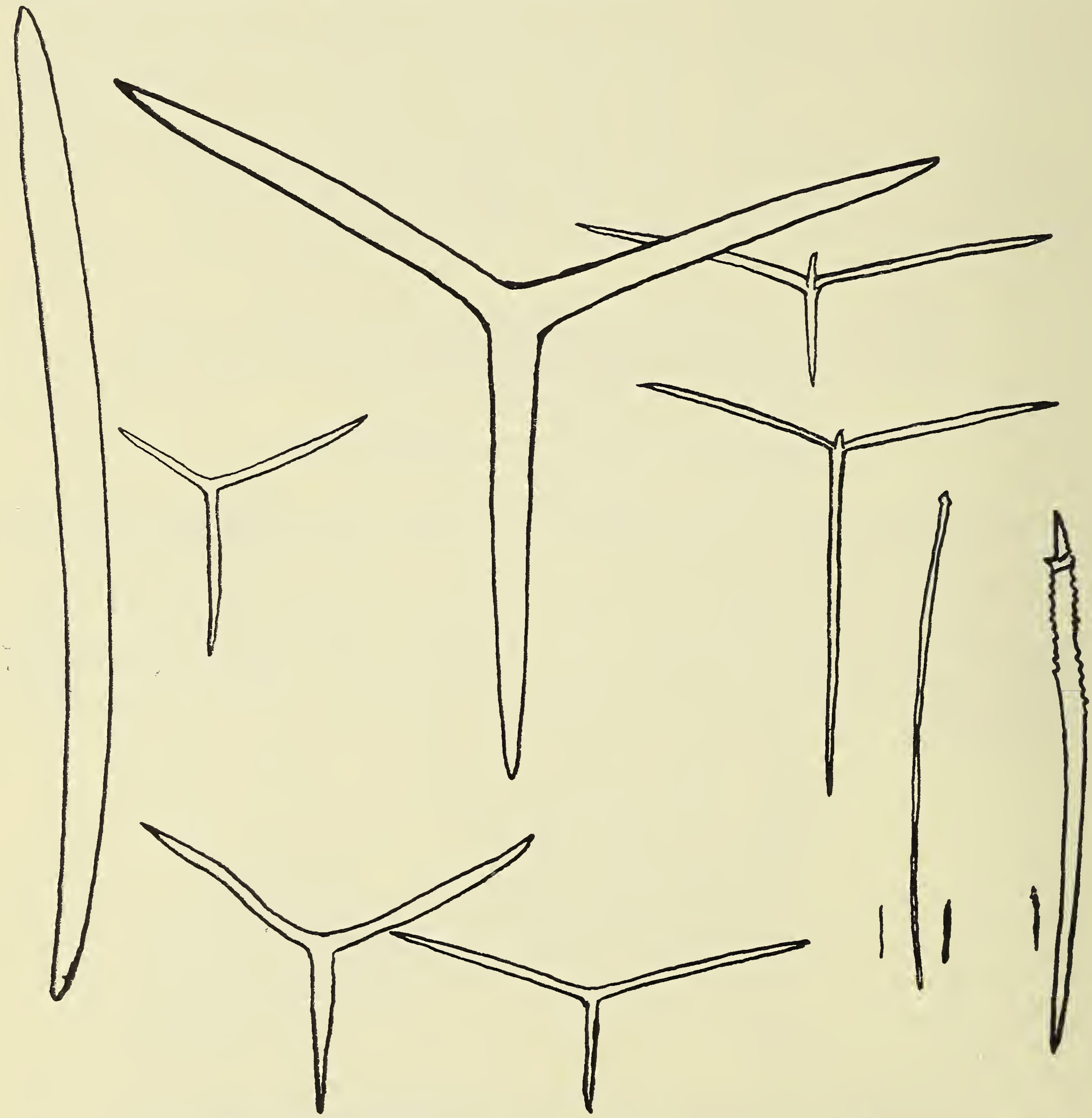
Spicules: ectosomal triradiates, sagittal, paired rays 0·18 by 0·012 mm., basal rays 0·07 by 0·012 mm.,
oxea, 1·0 to 1·5 by 0·08 to 0·1 mm.,
microxea, 0·15 by 0·003 mm.,
triradiates of chamber layer, subregular, rays 0·25 by 0·035 mm.,
endosomal quadriradiates, subregular, facial rays 0·15 by 0·02 mm., apical rays 0·05 to 0·075 by 0·02 mm.

Distribution: Cape Verde Islands; Spain (Asturias); littoral to 37 m.

Leuconia dentata Sarà

(text-fig. 112)

Remarks: This is included as a synonym of *L. solida* (*q.v.*).



Text-fig. 112. *Leuconia dentata* after Sarà: spicules, × 100.

Named form: **Vosmaeropsis depressa** Dendy

Vosmaeropsis depressa Dendy, 1892: 110; Dendy and Row, 1913: 755.

Description: Sponge massive, cushion-shaped; surface even, mainly non-hispid; vent apical, naked; texture firm; colour (?); ectosomal skeleton of several layers of triradiates, with a subectosomal layer of triradiates, and with oxea projecting slightly from surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of triradiates.

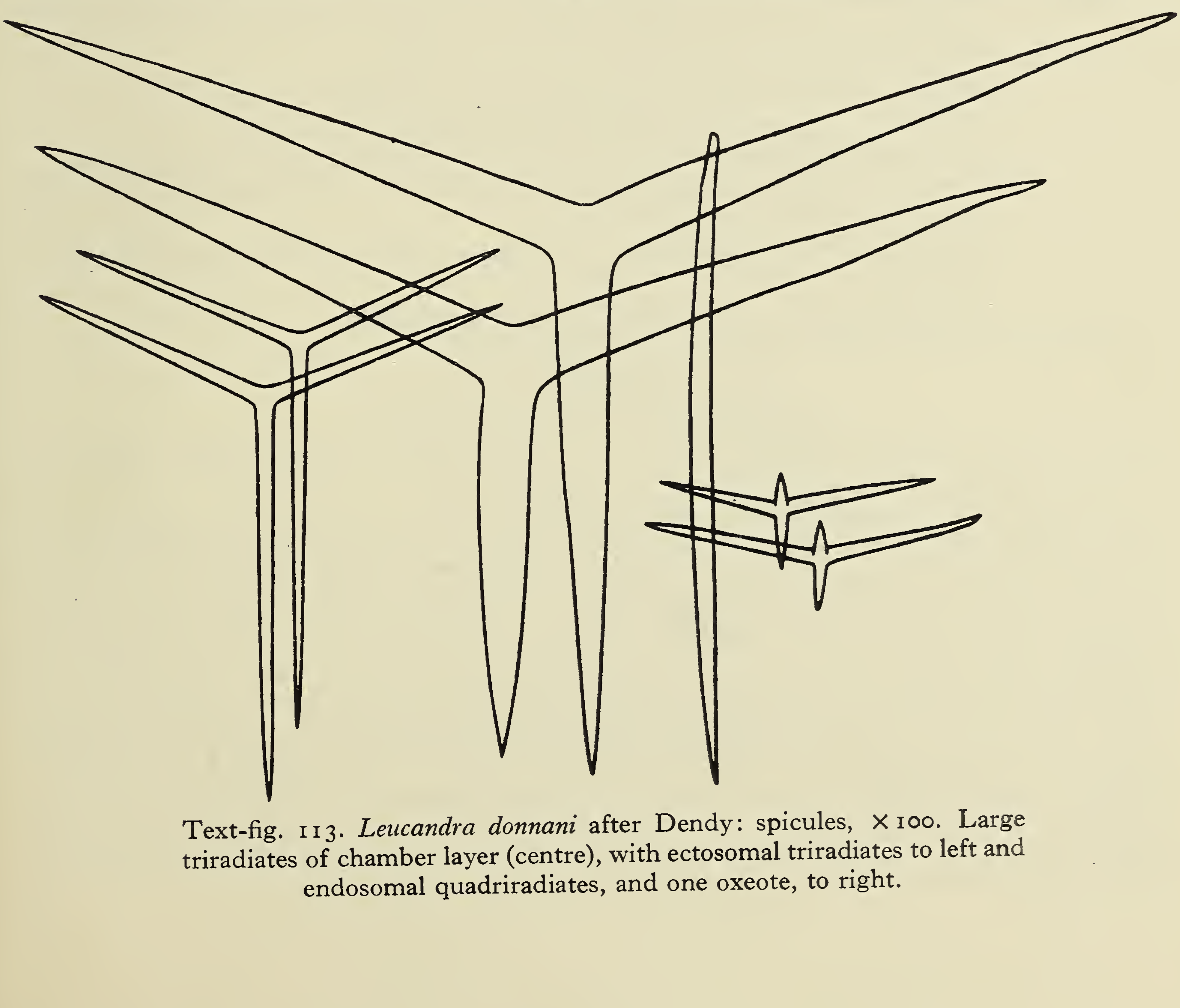
Spicules: ectosomal triradiates, subregular, rays 0·54 by 0·045 mm.,
subectosomal triradiates, subregular, rays 0·36 by 0·024 mm.,
ectosomal oxea (dimensions not recorded),
triradiates of chamber layer, subregular, rays 0·36 by 0·024 mm.,
endosomal triradiates, sagittal, paired rays 0·16 by 0·012 mm., basal rays 0·12 by 0·012 mm.

Distribution: Australia (Port Phillip Heads).

Named form: **Leucandra donnani** Dendy
(text-fig. 113)

Leucandra donnani Dendy, 1905: 228, pl. xiii, fig. 10; Dendy and Row, 1913: 770; *L. donnani* var. *tenuiradiata* Dendy, 1915: 86, pl. i, fig. 4, pl. ii, fig. 9.

Description: Sponge sacciform, laterally compressed; surface even, sparingly hispid; vent apical, naked; texture firm; colour, in spirit, light brown; ectosomal skeleton of several tangential



Text-fig. 113. *Leucandra donnani* after Dendy: spicules, ×100. Large triradiates of chamber layer (centre), with ectosomal triradiates to left and endosomal quadriradiates, and one oxeote, to right.

layers of triradiates, with oxea projecting beyond surface; skeleton of chamber layers of scattered triradiates; endosomal skeleton of several tangential layers of quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·28 by 0·016 mm.,
ectosomal oxea, 0·74 by 0·02 mm.,
triradiates of chamber layer, sagittal, paired rays 0·7 by 0·066 mm., basal ray 0·57 by 0·066 mm.,
endosomal quadriradiates, sagittal, paired rays 0·19 by 0·012 mm., basal ray 0·072 by 0·012 mm., apical ray 0·048 by 0·01 mm.

Distribution: Indian Ocean (Gulf of Manaar).

Named form: **Leucandra dura** Hozawa

(text-fig. 114)

Leucandra dura Hozawa, 1929: 371, pl. xxii, figs. 66–68, text-fig. 33; Hozawa, 1933: 15, pl. i, fig. 7; *L. ohshimai* Tanita, 1939: 322, figs. 3–4; *L. dura*, Tanita, 1942: 47; Tanita, 1943: 445, pl. xviii, figs. 70, 71; *L. ohshimai* Tanita, 1943: 446, pl. xviii, fig. 72.

Description: Sponge irregularly lobose; surface corrugated, harsh to touch; vents not apparent; texture compact, firm; colour, in spirit, greyish-white; skeleton of chamber layer of large triradiates irregularly arranged; exhalant canals lined by triradiates and quadriradiates; ectosomal skeleton of a few layers of tangential triradiates, of varying size, and small oxea set at various angles to surface; endosomal skeleton of a few layers of triradiates and quadriradiates, with apical ray projecting into cloacal cavity, and irregularly scattered microxea.

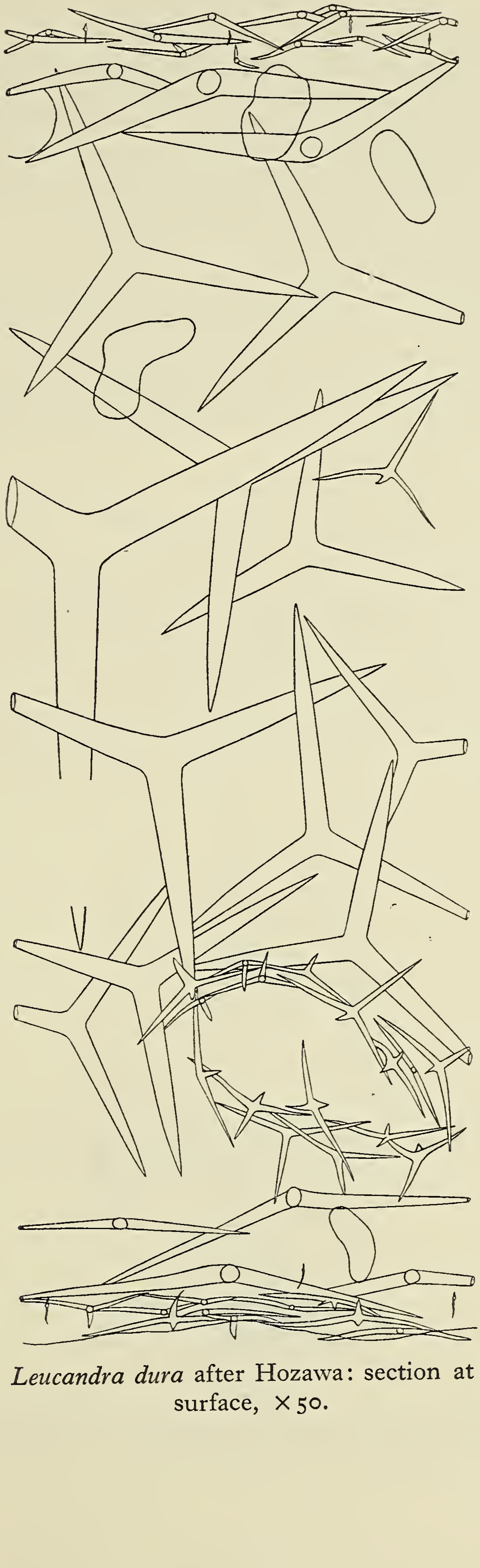
Spicules: ectosomal triradiates, sagittal, paired rays 0·08 to 0·36 by 0·01 to 0·032 mm., basal ray 0·08 to 0·3 by 0·01 to 0·032 mm.,
ectosomal microxea, 0·032 to 0·05 by 0·004 to 0·006 mm.,
triradiates of chamber layer, regular, rays 0·35 to 1·0 by 0·05 to 0·12 mm.,
triradiates of exhalant canals, regular, facial rays 0·18 by 0·02 mm.,
quadriradiates of exhalant canals, similar to triradiates, apical ray 0·05 by 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·16 to 0·3 by 0·012 to 0·028 mm., basal ray 0·3 to 0·1 by 0·012 to 0·024 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·01 to 0·03 by 0·006 to 0·012 mm.,
endosomal microxea, 0·032 to 0·07 by 0·004 to 0·006 mm.

Distribution: Japan (Misaki, Shimoda, Wakayama); 64 m.

Leuconia echinata Autt. *nec* Schuffner

Leuconia echinata, Ridley, 1884: 630; Carter, 1886: 129; *Leucandra echinata*, Dendy, 1892: 89; Dendy, 1913: 23, pl. ii, fig. 4; Dendy and Row, 1913: 770.

Remarks: The holotype of *Leucandra echinata* Schuffner (1877), from Mauritius, appears to be closely related to *L. fistulosa* and is, therefore, treated here as a synonym of *Scypha ciliata*. The *Leuconia echinata* (Schuffner) recorded by Ridley (1884) from the Mascarenes is nearer to *Leuconia barbata* (Duchassaing and Michelotti) and so is *Leuconia echinata* Carter from South Australia. Dendy (1892) recorded more specimens of *L. echinata* Carter from South Australia, and these show a wide range of variation, sufficient to embrace many of the named forms here included under *L. barbata*. One of these is almost identical with the holotype of *L. solida* (Schmidt). Furthermore, Dendy (1913) recorded a specimen of *Leucandra echinata* Schuffner from Cargados Carajos which is very close to the holotype of *Leuconia barbata*. At the same time, Dendy drew attention to the dissimilarity between *Leuconia echinata* Schuffner and *L. echinata* Carter, pointing out that it was improbable that Carter was aware of Schuffner's name, or even of the work in which it was published. It is the more surprising therefore that in Dendy and Row (1913) the two species should have been treated as synonyms without further comment.



Text-fig. 114. *Leucandra dura* after Hozawa: section at right angles to surface, ×50.

Named form: **Leucandra dwarkaensis** Dendy

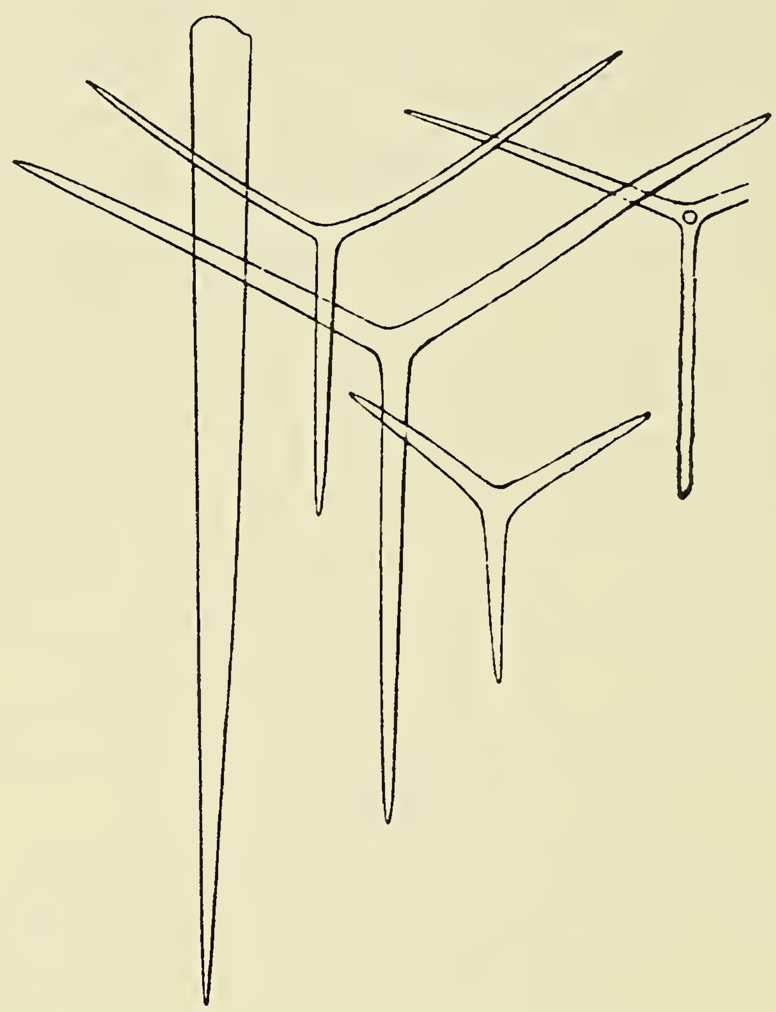
(text-figs. 115–116)

Leucandra dwarkaensis Dendy, 1915: 88, pl. i, fig. 6, pl. ii, fig. 10.

Description: Sponge massively sacciform, laterally-compressed; vent apical, slit-like, with a partial fringe; texture (?); colour, in spirit, dirty white; ectosomal skeleton of tangentially-arranged triradiates, with scattered microxea and large oxea projecting at surface; skeleton of chamber layer of stouter triradiates irregularly scattered, together with basal rays of subendosomal sagittal tri- and quadriradiates; endosomal skeleton of triradiates and quadriradiates.

Spicules: ectosomal triradiates, with rays 0·28 by 0·017 mm.,
oxea, up to 2·0 by 0·05 mm.,
microxea (dimension not given),
subendosomal sagittal triradiates, paired rays 0·19 by 0·015 mm., basal ray 0·32 by 0·015 mm.,
subendosomal quadriradiates, similar to triradiates, with apical ray 'short',
endosomal triradiates similar to ectosomal triradiates but with more slender rays,
endosomal quadriradiates, similar to triradiates, with apical ray 'moderately long'.

Distribution: Okhamandal; 27–31 m.



Text-fig. 115. *Leucandra dwarkaensis* after Dendy: spicules (portion of an oxeote to left), × 100.

Text-fig. 116. *Leucandra dwarkaensis* after Dendy: external form, natural size.

Named form: **Grantessa erecta** (Carter)

Heteropia erecta Carter, 1886: 53; *Grantessa erecta*, Dendy, 1892: 109; Dendy and Row, 1913: 752.

Description: Sponge flabellate, composed of several tubular individuals, substipitate; surface even, hispid; vents on upper margin, fringed; texture soft; colour, in spirit, pale whitish-yellow; ectosomal skeleton a tangential layer of triradiates, with outer rays of subectosomal triradiates; skeleton of chamber layer of centripetal rays of subectosomal triradiates and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of endosomal triradiates.

Spicules: ectosomal triradiates, subregular rays 0·12 to 0·24 by 0·01 to 0·017 mm.,
subectosomal pseudosagittal triradiates, outer rays 0·16 to 0·24 by 0·016 to 0·028 mm., centripetal ray 0·24 to 0·4 by 0·016 to 0·028 mm.,
subendosomal sagittal triradiates, paired rays 0·24 to 0·32 by 0·02 to 0·03 mm., basal ray 0·32 to 0·65 by 0·02 to 0·03 mm.,
endosomal triradiates, subregular, rays 0·21 to 0·27 by 0·014 to 0·017 mm.

Distribution: Australia (Port Phillip Heads).

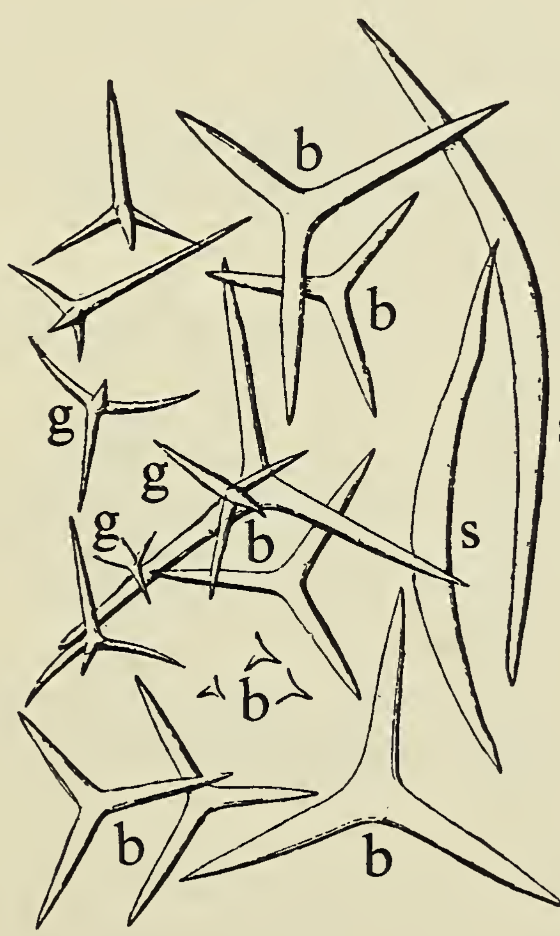
Named form: **Leucandra falcigera** Schuffner

(text-fig. 117)

Leucandra falcigera Schuffner, 1877: 416, pl. xxv, fig. 6; Dendy and Row, 1913: 770.

Description: Sponge solitary, tubular, sessile; surface smooth; vent terminal, with well-developed fringe; texture firm; colour, in spirit, greyish-brown; ectosomal skeleton of triradiates (?); skeleton of chamber layer of triradiates and oxea irregularly scattered; endosomal skeleton a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates (?),



Text-fig. 117. *Leucandra falcigera* after Schuffner; spicules, ×60. s. oxea; b. triradiates of chamber layer; g. endosomal quadriradiates.

triradiates of chamber layer, sagittal, paired rays 0·4 by 0·04 mm., basal rays 0·2 by 0·04 mm.,
triradiates of chamber layer, subregular, rays 0·054 to 0·09 mm. long (?),
oxea, 0·9 by 0·04 mm.,
endosomal quadriradiates, sagittal, paired rays 0·136 by 0·013 mm., basal rays 0·23 by 0·013 mm., apical rays 0·04 mm. long.

Distribution: Mauritius.

Leuconia fernandensis Breitfuss

Leuconia fernandensis Breitfuss 1898: 466, pl. xxvii, fig. 9; *Leucandra fernandensis* Dendy and Row, 1913: 772.

Description: Sponge solitary, cylindrical, sessile; surface hispid; vent terminal, naked; texture (?); colour, in spirit, white; ectosomal skeleton a tangential layer of quadriradiates, with apical rays projecting into chamber layer, oxea, microxea and trichoxea; skeleton of chamber layer of irregularly-arranged triradiates, of two sizes, and quadriradiates; endosomal skeleton a tangential layer of quadriradiates and occasional triradiates.

Spicules: ectosomal quadriradiates, sagittal, paired rays 0·17 to 0·2 by 0·018 mm., basal rays 0·21 to 0·28 by 0·018 mm., apical rays 0·08 to 0·12 by 0·018 mm.,
oxea, 0·346 by 0·019 to 0·022 mm.,
trichoxea, 0·283 by 0·011 mm.,
microxea, 0·063 to 0·095 by 0·002 mm.,
triradiates of chamber layer, regular, rays 0·12 to 0·18 by 0·006 to 0·009 mm.,
triradiates of chamber layer, rays 0·06 to 0·09 by 0·003 to 0·004 mm.,
quadriradiates of chamber layer, sagittal, paired rays 0·012 by 0·006 mm., basal rays 0·126 by 0·006 mm., apical rays 0·157 by 0·006 mm.,
endosomal triradiates, regular to subregular, facial rays 0·113 by 0·006 to 0·009 mm., apical rays 0·018 to 0·022 mm. long,
endosomal quadriradiates, similar to quadriradiates but without apical rays.

Distribution: Juan Fernandez.

Remarks: The species is doubtfully assigned to *Leuconia barbata* because Breitfuss makes no mention of an ectosomal layer of triradiates. Apart from this, it has sufficient in common with certain forms of *L. barbata* to make its inclusion here justifiable.

Named form: **Leucetta floridana** (Haeckel)

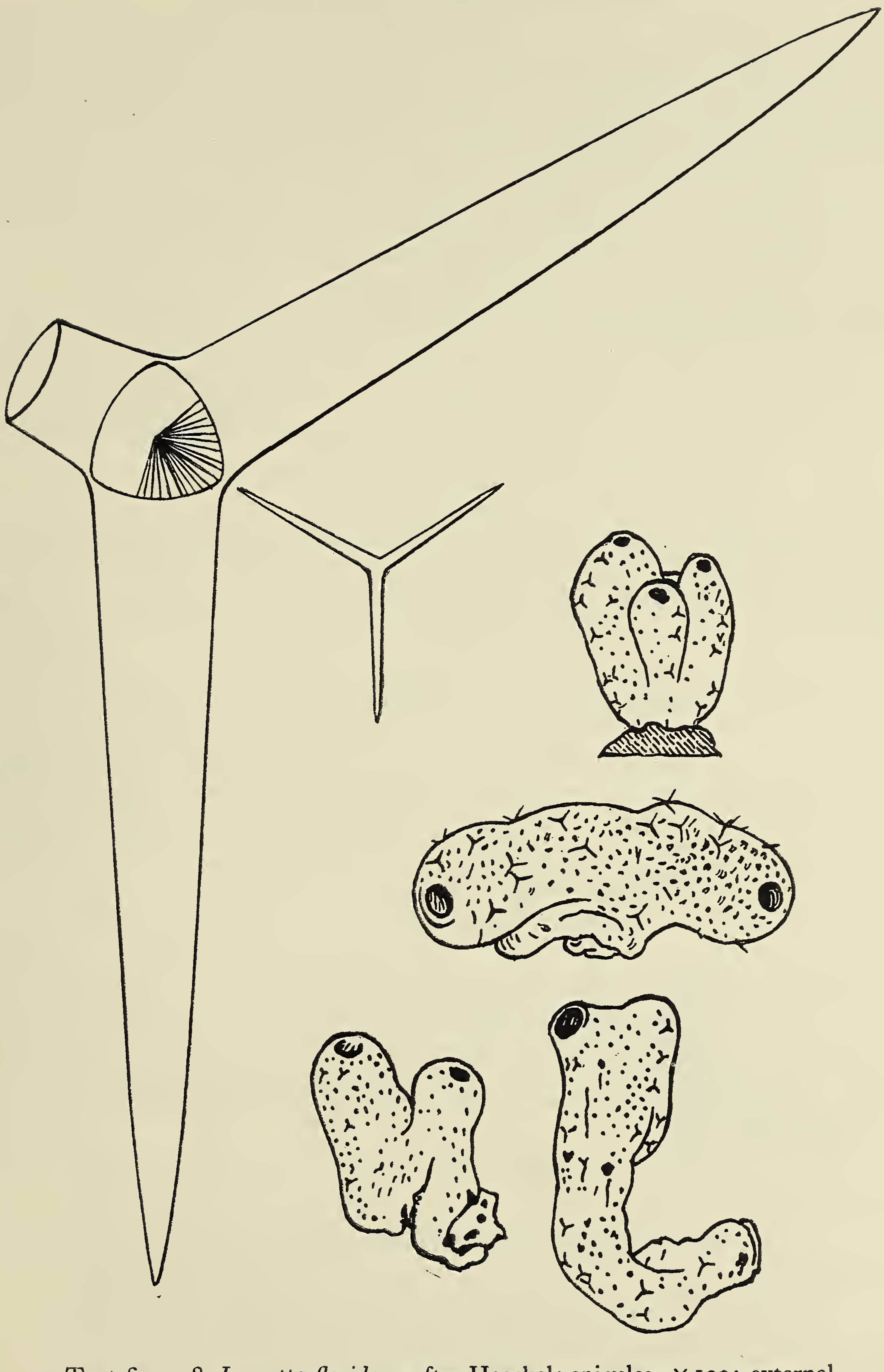
(text-fig. 118)

Leucaltis floridana Haeckel, 1872: 144, pl. xxvi, figs. 1–17, pl. xxvii, fig. 1; *Dyssycus floridanus* Haeckel, 1872: 144, pl. xxvi, figs. 1–14; *Lipostomella floridana* Haeckel, 1872: 144, pl. xxvi, fig. 5; *Amphoriscus floridanus* Haeckel, 1872: 144, pl. xxvi, figs. 6–11; *Leucaltis pura* Haeckel, 1872: 144; *L. impura* Haeckel, 1872: 144; *Leucilla floridana*, Jenkin, 1908: 453; *Leucetta floridana*, Dendy and Row, 1913: 734.

Description: Sponge solitary or compound, irregularly massive, pyriform or lobose, sessile; surface even, harsh; vents apical, naked; texture firm; colour, in spirit, brown; skeleton of large and small triradiates forming tangential ectosomal and endosomal skeletons and irregularly scattered in chamber layer.

Spicules: large triradiates, regular, rarely sagittal, rays 0·7 to 1·5 by 0·1 to 0·15 mm.,
small triradiates, regular, rarely sagittal, occasionally with an apical ray, rays 0·15 to 0·25 by 0·01 to 0·015 mm.

Distribution: Florida; East Africa (Wasin); 18–73 m.



Text-fig. 118. *Leucetta floridana* after Haeckel: spicules, × 100; external form, natural size except for centre specimen, which is × 2.

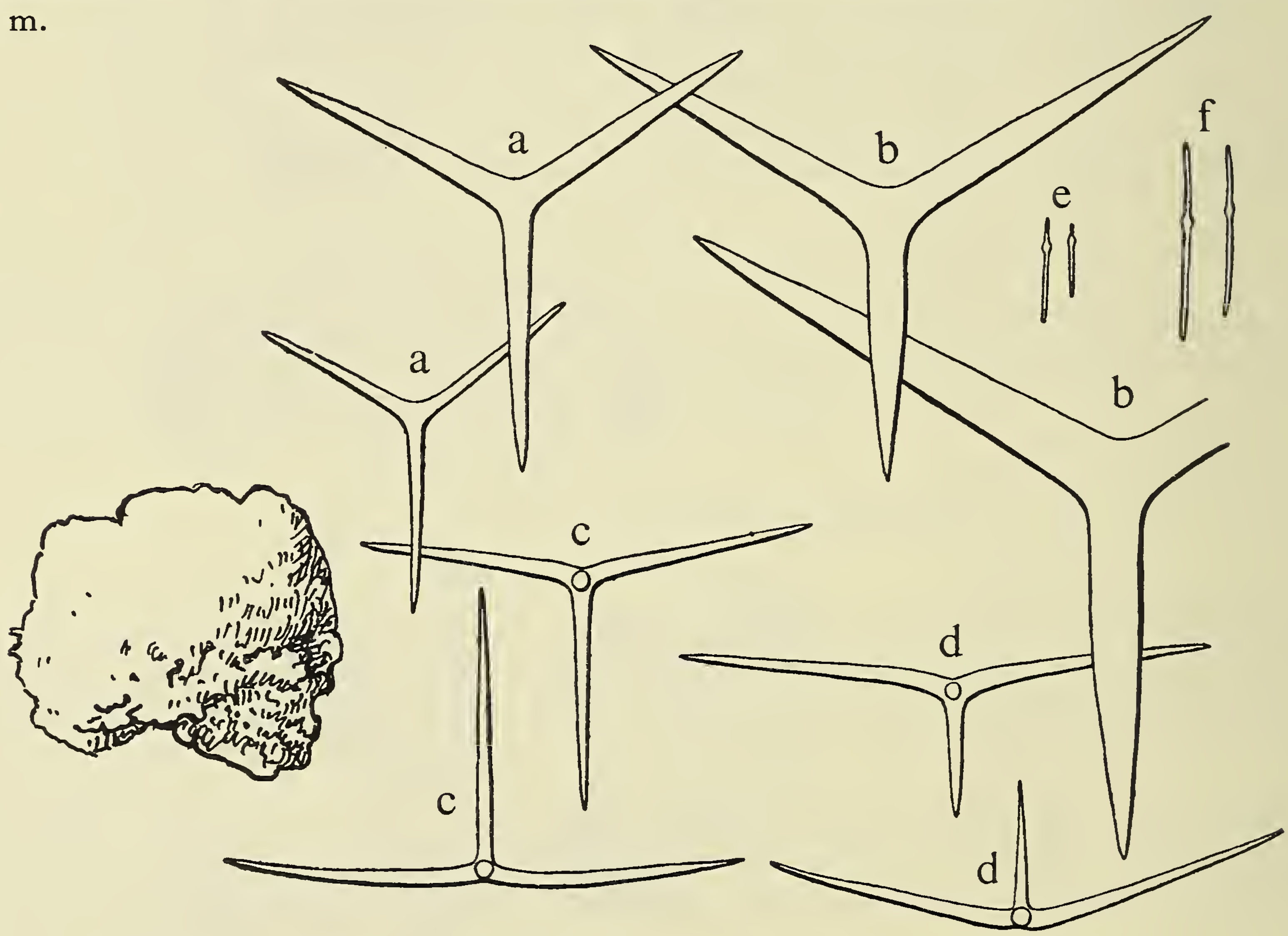
Named form: **Leucandra foliata** Hozawa

Leucandra foliata Hozawa, 1918: 547, pl. lxxxiv, fig. 5, text-fig. 9; Hozawa, 1929: 370; Tanita, 1942: 47, pl. iv, fig. 21; Tanita, 1943: 446.

Description: Sponge composed of an irregularly folded lamella with one surface bearing vents; surface smooth; texture rigid, brittle; colour, in spirit, greyish-white; skeleton of chamber layer of triradiates of variable size irregularly arranged; exhalant canals lined with quadriradiates, with apical ray projecting into lumen of canal; ectosomal skeleton a single layer of large and small triradiates; endosomal skeleton of tangential triradiates, of two sizes, quadriradiates and microxea.

Spicules: large ectosomal triradiates, regular, rays 0·19 to 0·9 by 0·028 to 0·1 mm.,
small ectosomal triradiates, sagittal, paired rays 0·08 to 0·12 by 0·008 to 0·02 mm., basal ray 0·11 to 0·25 by 0·008 to 0·02 mm.,
triradiates of chamber layer, regular, rays 0·19 to 0·9 by 0·028 to 0·11 mm.,
quadriradiates of exhalant canals, sagittal, paired rays 0·15 to 0·2 by 0·012 to 0·016 mm., basal ray 0·12 to 0·25 by 0·012 to 0·016 mm., apical ray 0·1 by 0·12 mm.
large endosomal triradiates, regular, rays 0·19 to 0·9 by 0·028 to 0·1 mm.,
small endosomal triradiates, sagittal, paired rays 0·08 to 0·12 by 0·008 to 0·02 mm., basal ray 0·11 to 0·25 by 0·008 to 0·02 mm.,
endosomal quadriradiates, sagittal, paired rays 0·17 to 0·33 by 0·02 mm., basal ray 0·08 to 0·21 by 0·012 to 0·016 mm., apical ray 0·07 mm. long,
microxea of endosomal surface, lanceolate, 0·05 to 0·07 mm. long and up to 0·005 mm. thick.

Distribution: N. W. Pacific (Commandorski Islands); Japan (Sagami Sea, Hutamatiya); 27–37 m.



Text-fig. 119. *Leucandra fragilis* after Hozawa: spicules, ×100 except e and f which are ×200; external form, natural size.
a. ectosomal triradiates; b. triradiates of chamber layer; c. quadriradiates of larger exhalant canals; d. endosomal quadriradiates; e. ectosomal microxea; f. endosomal microxea.

Named form: **Leucandra fragilis** Hozawa
(text-fig. 119)

Leucandra fragilis Hozawa, 1940: 51, pl. iv, fig. 6, text-fig. 8; Tanita, 1943: 446.

Description: Sponge massive, low-lying; surface (?); vent slit-like; texture firm, brittle; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates and microxea; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton of tangential quadriradiates and microxea.

Spicules: ectosomal triradiates regular, rays 0·12 to 0·36 by 0·016 to 0·036 mm.,
ectosomal microxea, 0·04 to 0·05 by 0·002 mm.,
triradiates of chamber layer, sagittal, paired rays 0·27 to 0·7 by 0·045 to 0·1 mm., basal ray 0·23 to 0·64 by 0·045 to 0·1 mm.,
endosomal quadriradiates, sagittal, paired rays 0·09 to 0·32 by 0·008 to 0·018 mm., basal rays 0·03 to 0·13 by 0·008 to 0·015 mm., apical rays 0·1 to 0·13 by 0·008 to 0·012 mm.,
endosomal microxea, 0·07 to 0·09 by 0·005 mm.

Distribution: Japan (Miye Prefecture).

Named form: **Leuconia frigida** (Jenkin)
(text-fig. 120)

Leucandra frigida Jenkin, 1908: 15, pl. xxvii, fig. 6, pl. xxix, figs. 35–39, pl. xxx, fig. 40; *L. brumalis* Jenkin, 1908: 16, pl. xxx, figs. 41–43; *L. gelatinosa* Jenkin, 1908: 17, pl. xxx, figs. 44–53; *L. brumalis*, Dendy and Row, 1913: 774; *L. frigida*, Dendy and Row, 1913: 774; *L. gelatinosa*, Dendy and Row, 1913: 774; *L. mawsoni* Dendy, 1918: 13, pl. i, figs. 5, 10; *Leuconia frigida*, Burton, 1929: 403.

Description: Sponge subspherical to tuberose; surface, even, non-hispid; vent apical, naked; texture firm; colour, in spirit, white; ectosomal skeleton and skeleton of chamber layer of triradiates; endosomal skeleton of quadriradiates.

Spicules: triradiates, regular, rays 0·13 to 0·32 by 0·006 to 0·02 mm.,
endosomal quadriradiates, also lining walls of exhalant canals, regular, facial rays 0·6 to 0·2 by 0·004 to 0·012 mm., apical rays 0·08 to 0·28 by 0·003 to 0·009 mm.

Distribution: Antarctic; 110 m.

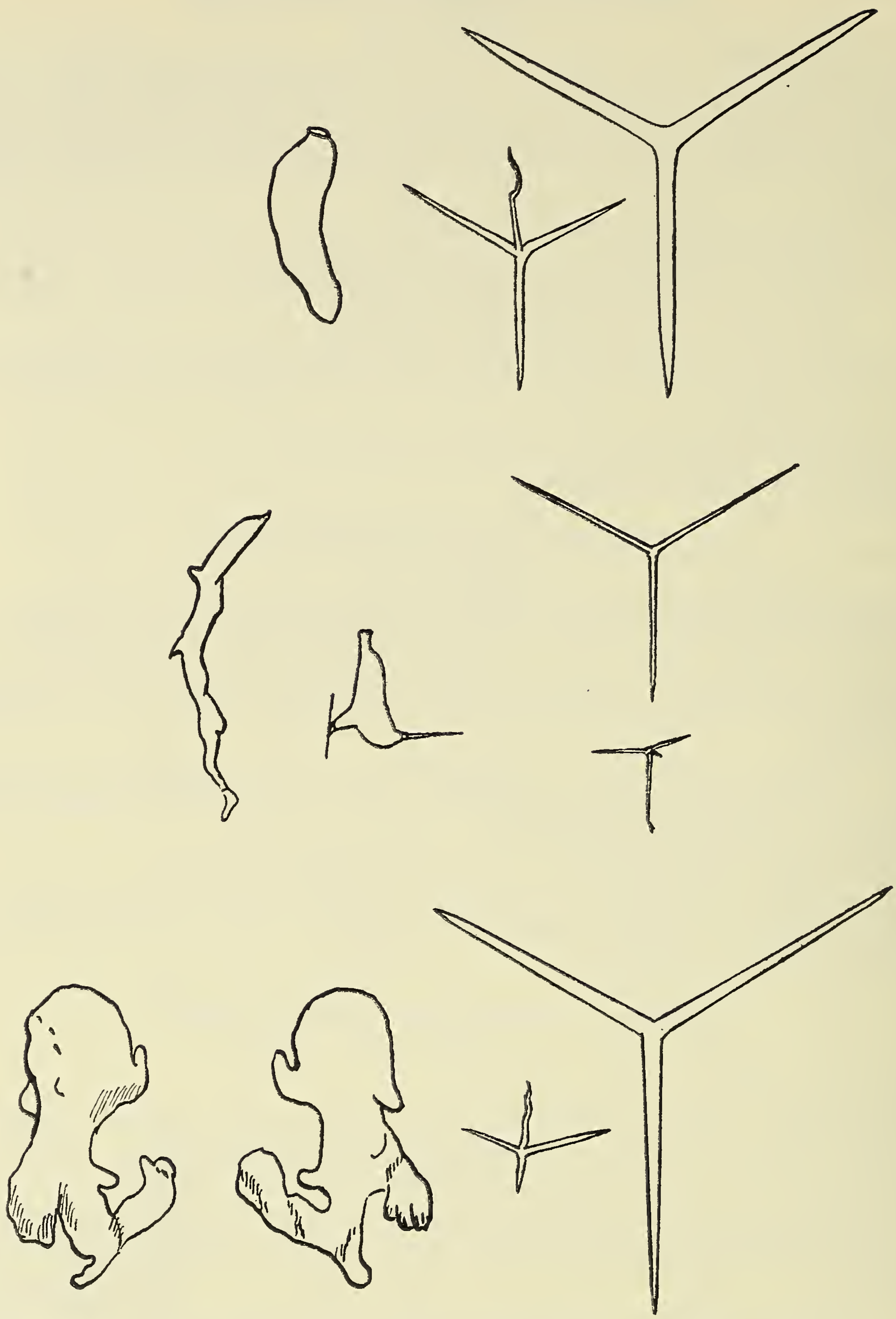
Named form: **Vosmaeropsis gardineri** Ferrer
(text-fig. 121)

Vosmaeropsis gardineri Ferrer, 1916: 7, figs. 1–2.

Description: Sponge sacciform, depressed, sessile; surface even, non-hispid; vents small, few, scattered, naked; texture (?); colour (?); ectosomal skeleton of tangentially-arranged triradiates, together with paired rays of sub-ectosomal triradiates and microxea; skeleton of chamber layer of basal rays of subectosomal and subendosomal triradiates, with irregularly-arranged tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and tangentially-arranged quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·12 to 0·32 by 0·012 to 0·028 mm.,
microxea, 0·12 by 0·004 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·22 to 0·24 and 0·18 to 0·2 mm. long by 0·024 mm. thick, basal ray 0·4 to 0·42 by 0·024 mm.,
triradiates of chamber layer, subregular, rays 0·32 to 0·6 by 0·04 to 0·056 mm.,
subendosomal sagittal triradiates, paired rays 0·24 to 0·32 by 0·02 to 0·028 mm., basal ray 0·34 to 0·4 by 0·02 to 0·028 mm.,
endosomal quadriradiates, subregular, facial rays 0·2 by 0·008 to 0·01 mm., apical ray 0·09 to 0·1 by 0·008 to 0·01 mm.

Distribution: Mediterranean (Minorca); littoral.

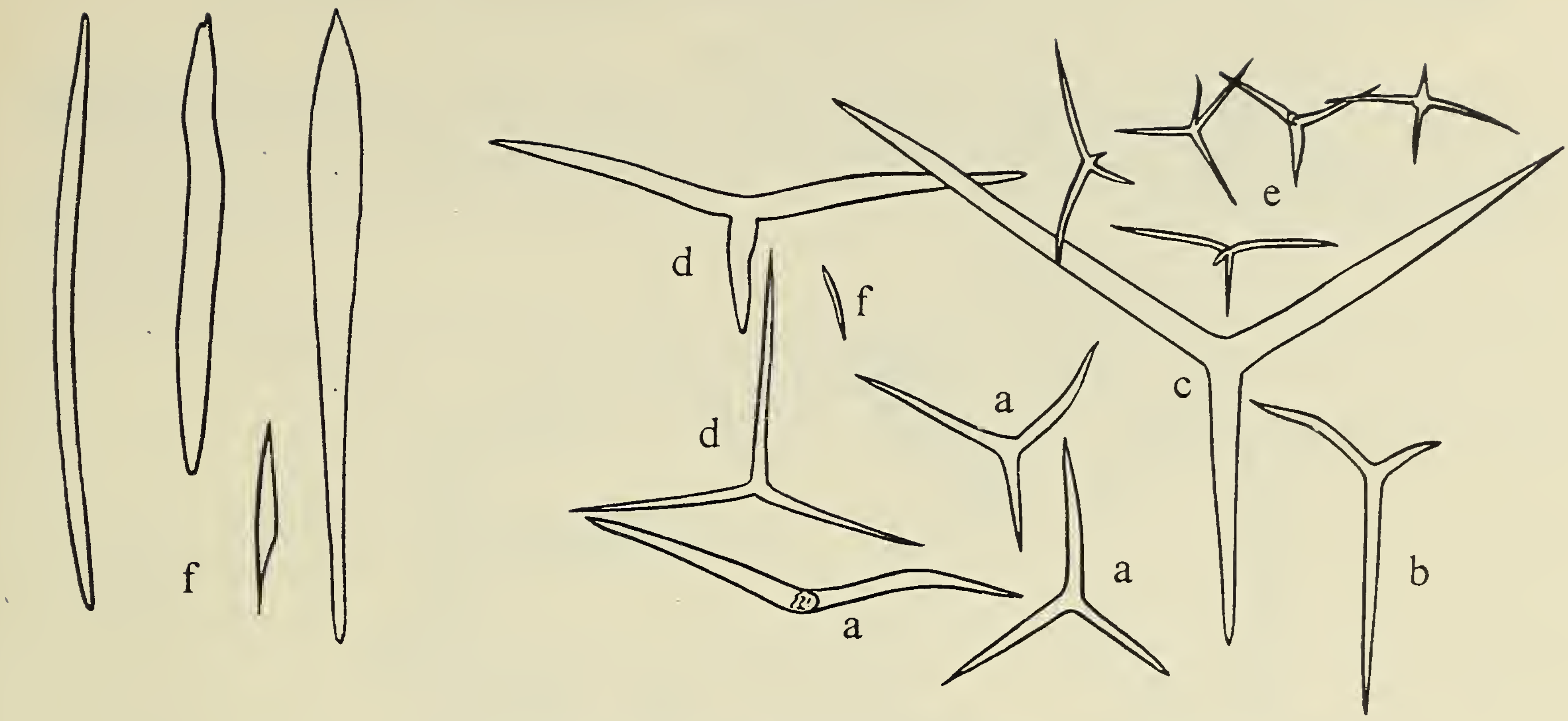


Text-fig. 120. *Leucandra frigida* after Jenkin: as represented by *L. frigida*, *L. brumalis* and *L. gelatinosa*.

L. frigida: spicules (top right), × 100; external form (top left), natural size.

L. brumalis: spicules (centre right), × 100; external form (centre left), natural size.

L. gelatinosa: spicules (bottom right), × 100; external form (bottom left), natural size.

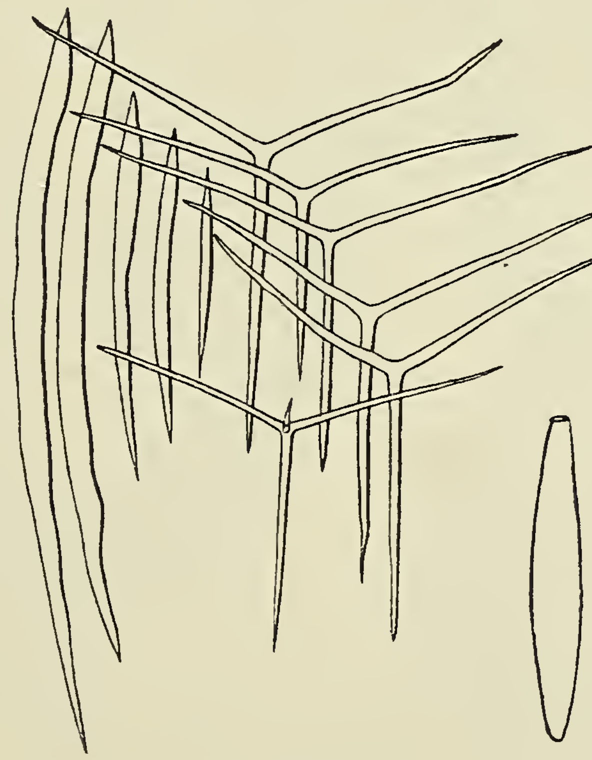


Text-fig. 121. *Vosmaeropsis gardineri* after Ferrer: spicules, ×100; except for the four microxea (left), which are ×500.
a. ectosomal triradiates; b. subectosomal pseudosagittal triradiates; c. triradiates of chamber layer; d. subendosomal sagittal triradiates; e. endosomal quadriradiates; f. microxeote.

Named form: **Leucetta gaussii** Brøndsted
(text-fig. 122)

Leucetta gaussii Brøndsted, 1931: 21, fig. 19.

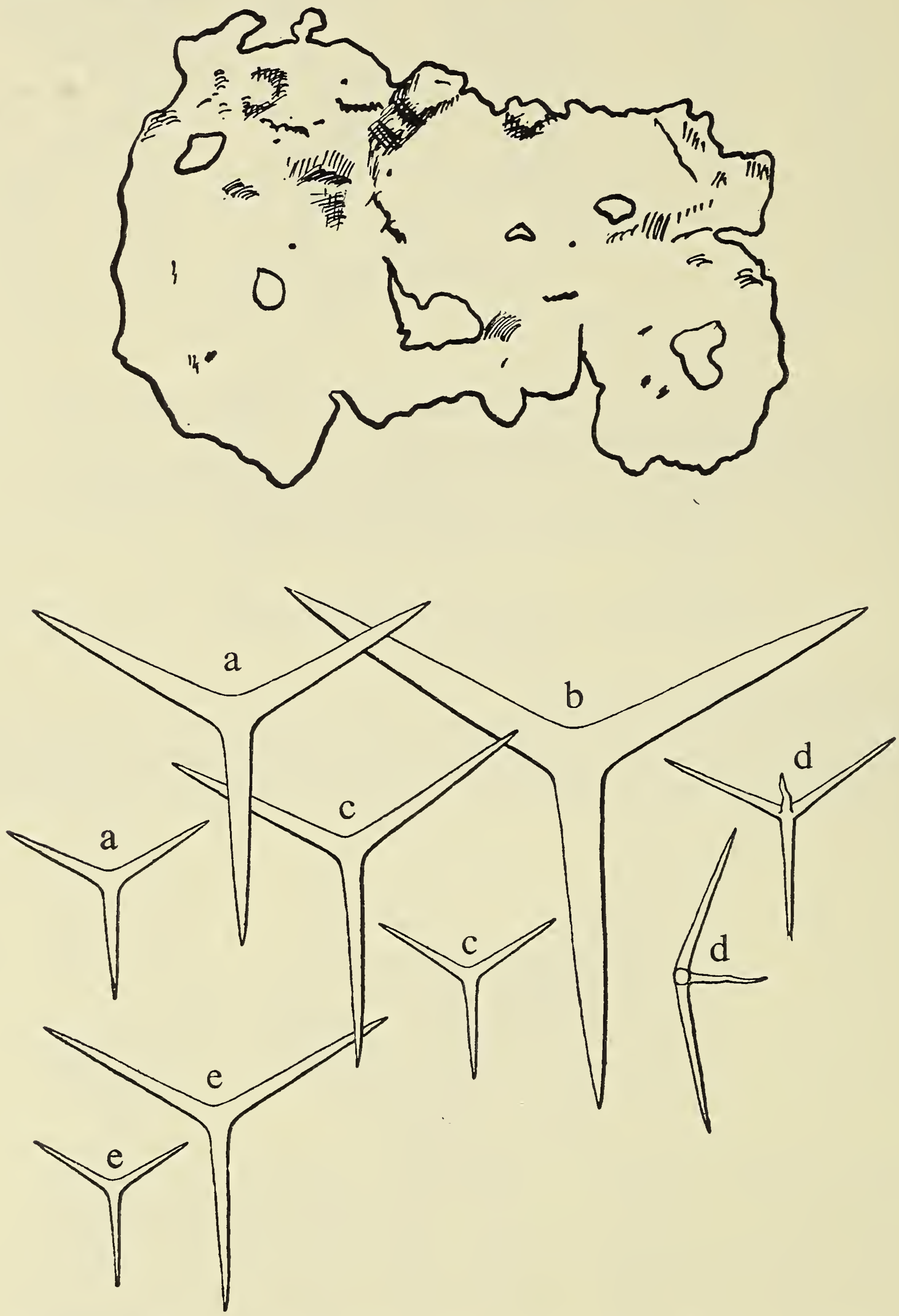
Description: Sponge tubular; surface hispid; vent apical, naked; texture (?); colour, in spirit, white grey or pale yellow; ectosomal skeleton of a few tangential layers of triradiates; skeleton of chamber layer of triradiates, rarely quadriradiates; endosomal skeleton a thin tangential layer of quadriradiates.



Text-fig. 122. *Leucetta gaussii* after Brøndsted: spicules, ×100; external form, based on Brøndsted's written description, natural size.

Spicules: ectosomal triradiates, subregular, rays 0·19 to 0·26 by 0·008 to 0·01 mm.,
oxea 0·5 to 1·0, by 0·022 to 0·03 mm.,
triradiates and quadriradiates of chamber layer, similar to ectosomal triradiates, quadriradiates with apical ray small,
endosomal quadriradiates, similar to those of chamber layer.

Distribution: Kerguelen.



Text-fig. 123. *Leucandra glabra* after Tanita: spicules, ×100; external form, drawn from published photograph, natural size.
a. ectosomal triradiates; b–c. tubar triradiates; d. tubar quadriradiates (? of linings of exhalant canals); e. subendosomal triradiates.

Named form: **Leucandra glabra** Hozawa

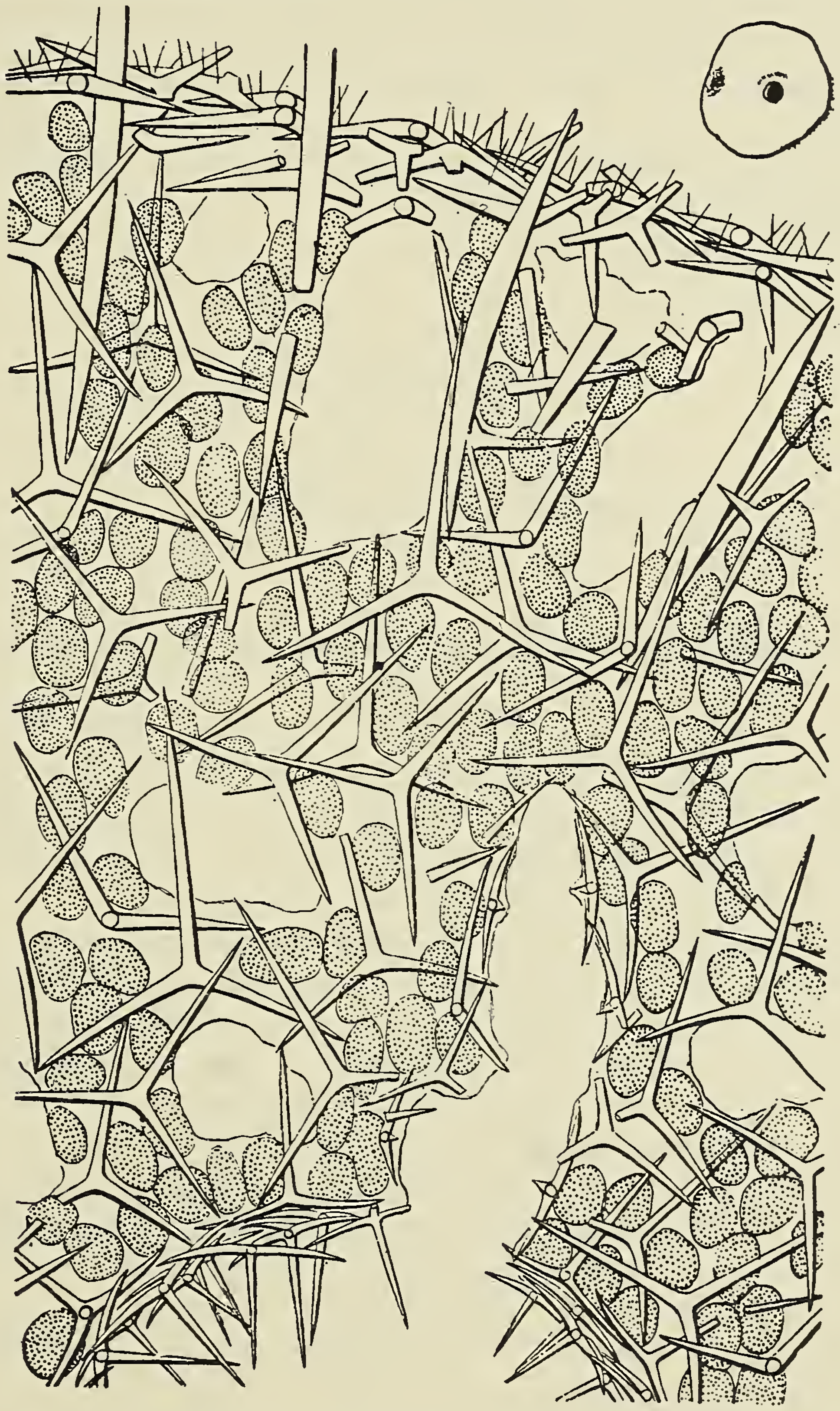
(text-fig. 123)

Leucandra glabra Hozawa, 1940: 49, pl. iv, fig. 5, text-fig. 7; Tanita, 1943; 454.

Description: Sponge massive, low-lying, sub-clathrate; surface smooth; vents small, scattered; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates; skeleton of chamber layer of large and small triradiates, and small quadriradiates; endosomal skeleton of triradiates.

Spicules: ectosomal triradiates, regular, rays 0·12 to 0·24 by 0·014 to 0·028 mm.,
triradiates of chamber layer, regular, of two sizes, rays 0·1 to 0·2 by 0·01 to 0·02 and 0·4 to 0·95 by 0·042 to 0·11 mm., respectively,
quadriradiates of chamber layer, similar to smaller triradiates, with apical ray 0·08 by 0·01 mm.,
endosomal triradiates, regular, rays 0·09 to 0·2 by 0·012 to 0·02 mm.

Distribution: Japan (Miye Prefecture).



Text-fig. 124. *Leucandra globosa* after Tanita: section at right angles to surface, ×50; external form, natural size.

Named form: **Leucandra globosa** Tanita

(text-fig. 124)

Leucandra globosa Tanita, 1943: 439, pl. xvii, fig. 65, text-figs. 20–21.

Description: Sponge globose; surface hispid; vent apical, slightly fringed; texture hard; colour, in spirit, pale grey; ectosomal skeleton of a few tangential layers of triradiates, with oxea projecting at surface, and densely packed microxea; skeleton of chamber layer of irregularly-arranged triradiates, together with basal rays of subendosomal tri- and quadriradiates; endosomal skeleton of paired rays of subendosomal radiates and several layers of endosomal quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·4 to 0·45 by 0·045 to 0·054 mm., basal ray 0·3 to 0·38 by 0·045 to 0·054 mm.,
oxea, 0·63 to 1·5 by 0·045 to 0·06 mm.,
microxea, 0·085 by 0·003 mm.,
triradiates of chamber layer, subregular, rays 0·35 to 0·5 by 0·022 to 0·023 mm.,
subendosomal sagittal triradiates, paired rays 0·14 to 0·21 by 0·016 to 0·02 mm., basal ray 0·2 to 0·36 by 0·016 to 0·02 mm.,
subendosomal quadriradiates, similar to triradiates, with apical ray 0·08 by 0·013 to 0·016 mm,
endosomal quadriradiates, subregular, facial rays 0·2 to 0·28 by 0·018 mm., apical ray 0·2 to 0·42 by 0·015 to 0·018 mm.

Distribution: Japan (Sakatahana).

Leuconia globosa Sarà

(text-fig. 125)

Remarks: This is included as a synonym of *L. solida* (*q.v.*).

Named form: **Pericharax heteroraphis** (Poléjaeff)

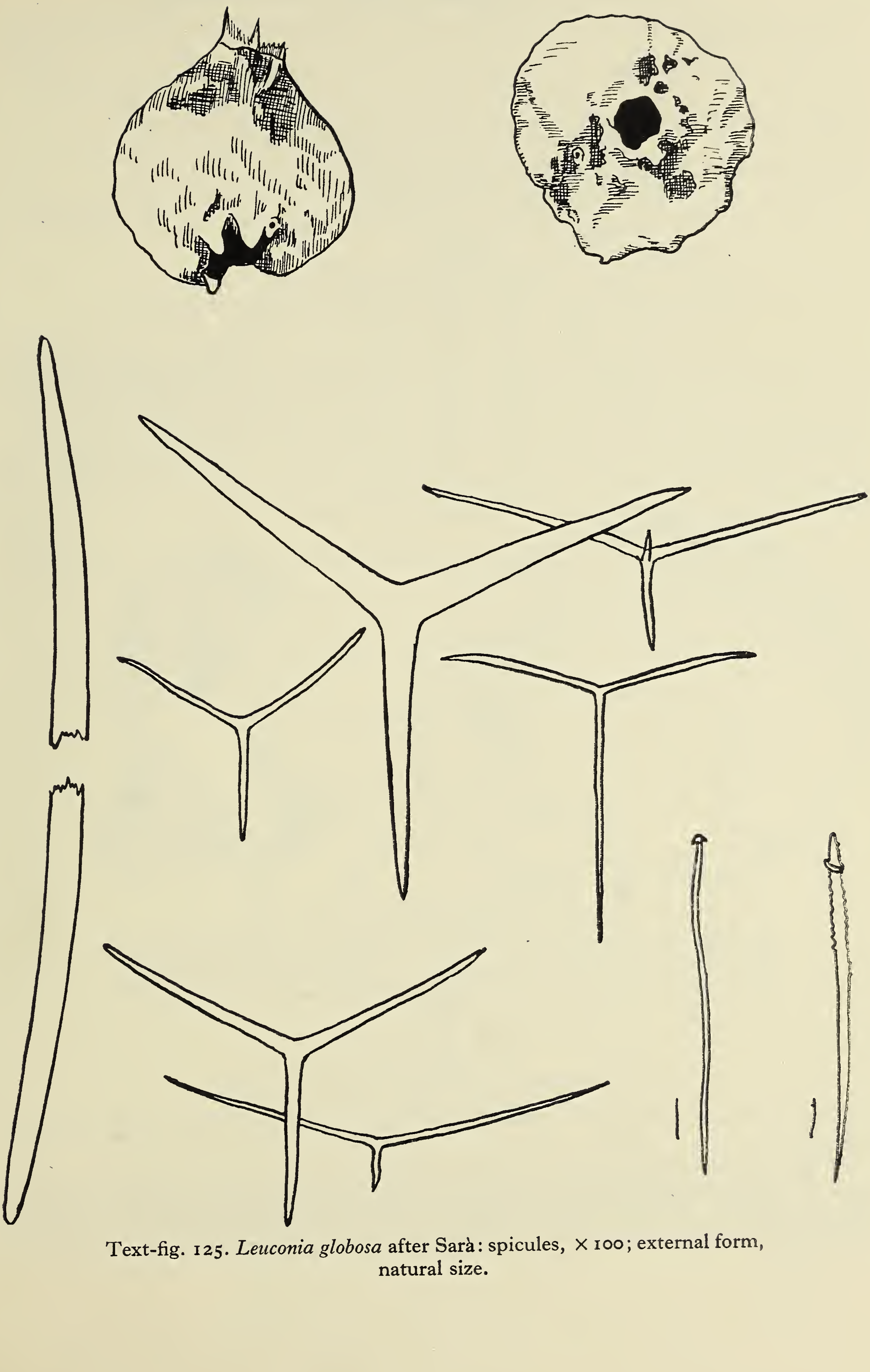
(text-fig. 126)

Pericharax carteri var. *heteroraphis* Poléjaeff, 1883: 66, pl. ii, fig. 5, pl. vii, fig. 8; *P. heteroraphis*, Dendy, 1913: 13; *P. peziza* Dendy, 1913; 15, pl. i, fig. 9, pl. v, figs. 3–4; *P. heteroraphis*, Dendy and Row, 1913: 735; *P. peziza*, Dendy and Row, 1913: 735; Burton, 1930: 3; *P. pyriformis* Burton, 1932: 258, pl. xlviii, figs. 1–2; *P. peziza*, Burton, 1934: 518.

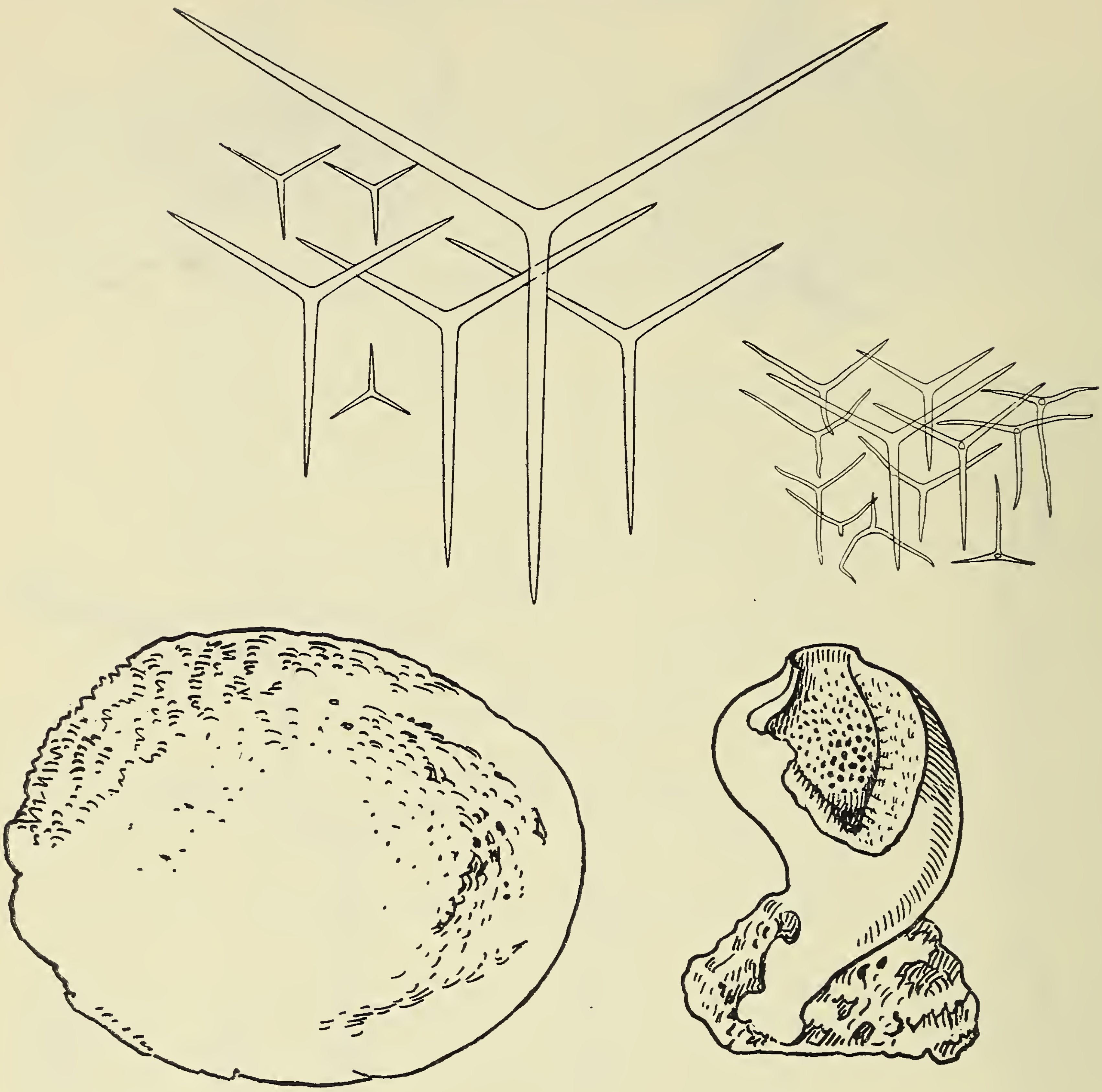
Description: Sponge solitary or compound, cup-shaped, sub-spherical or massive and lobose; surface even, smooth but sometimes harsh, often thrown into irregular folds; vents apical, with or without margin, naked; texture firm; colour, in spirit, white, yellow to brown; ectosomal skeleton a tangential layer of triradiates; skeleton of chamber layer of large and small triradiates irregularly-scattered; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·1 to 0·13 by 0·005 to 0·008 mm.,
large triradiates of chamber layer, regular, rays 0·48 to 2·0 by 0·035 to 0·128 mm.,
small triradiates of chamber layer, regular, rays 0·18 by 0·015 mm.,
endosomal quadriradiates, regular, facial rays 0·18 by 0·012 mm., apical rays 0·075 to 0·1 by 0·012 mm.,
quadriradiates of larger canals, similar to endosomal quadriradiates but with apical rays up to 0·29 mm. long.

Distribution: Tristan da Cunha; Shag Rock, 177 m.; Indian Ocean (Salomon, Cargados, Carajos, Andamans); Indonesia; Australia (Great Barrier Reef); 16–110 m.



Text-fig. 125. *Leuconia globosa* after Sarà: spicules, × 100; external form, natural size.



Text-fig. 126. *Pericharax heteroraphis*: holotype (bottom right), natural size, Dendy's *P. peziza* (bottom left), ×2; spicules, after Dendy (1913), in two groups (top left), large radiates, ×36 (top right), small radiates, ×180.

Named form: **Leucetta homoraphis** (Poléjaeff)

Pericharax carteri var. *homoraphis* Poléjaeff, 1883: 66; *Leucetta homoraphis*, Dendy and Row, 1913: 734.

Description: Sponge subspherical, irregular, with mammiform processes; surface even, harsh; vents at apices of mammiform processes; texture firm, friable; colour, in spirit, yellowish; ectosomal skeleton a tangential layer of large triradiates, with small triradiates and occasional quadriradiates of same size; skeleton of chamber layer of similar spicules to ectosomal skeleton, irregularly arranged; endosomal skeleton of large triradiates and small triradiates and quadriradiates.

Spicules: large triradiates of ectosomal, chamber layer and endosomal skeletons, regular, rays 0·8 by 0·09 mm.,
small triradiates of ectosomal, chamber layer and endosomal skeletons, regular, rays 0·14 to 0·21 by 0·007 to 0·014 mm.,
small quadriradiates of ectosomal, chamber layer and endosomal skeletons, similar to small triradiates, with apical rays 0·02 to 0·17 by 0·004 mm.

Distribution: Tristan da Cunha; 110 m.

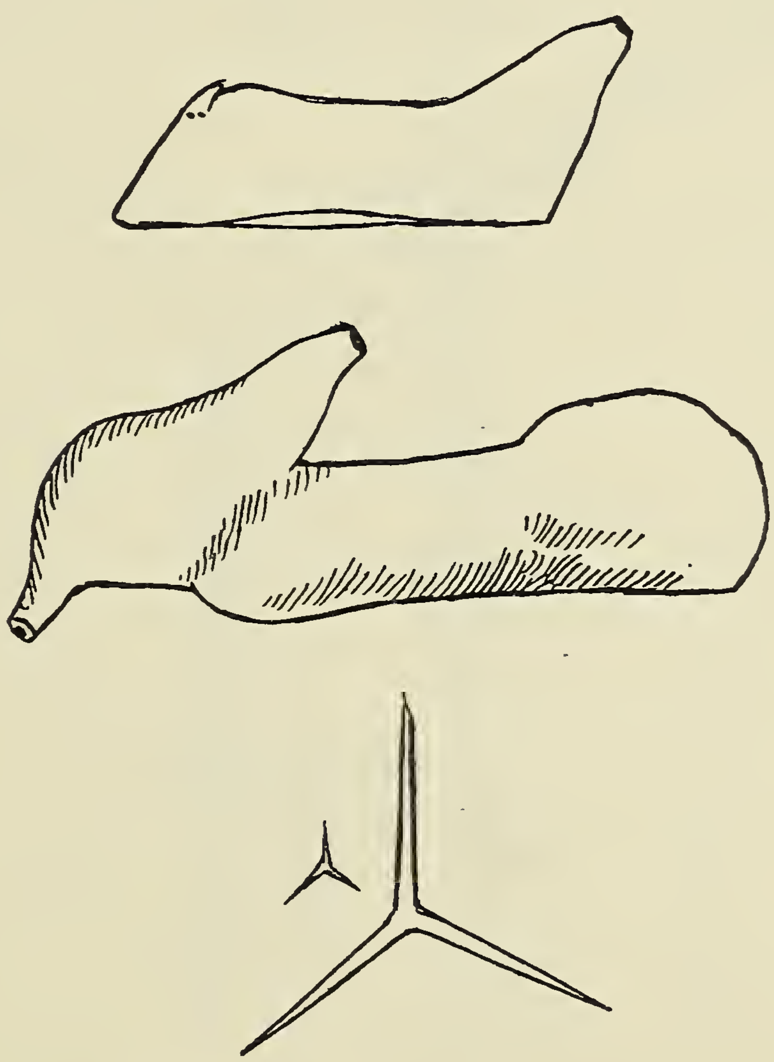
Named form: **Pericharax imberbis** (Duchassaing and Michelotti)

(text-fig. 127)

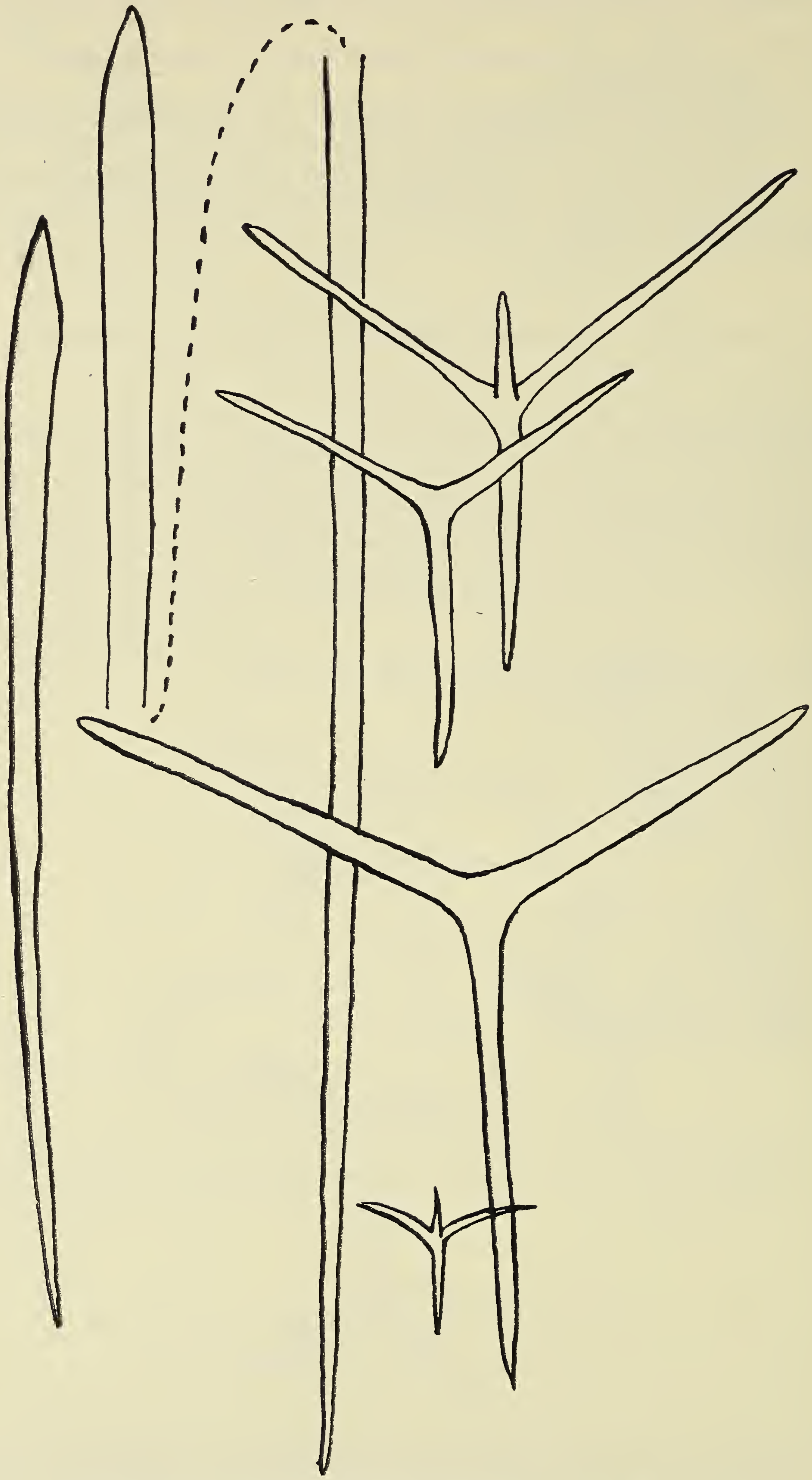
Medon imberbis Duchassaing and Michelotti, 1864: 111, pl. xxv, fig. 2; *Pericharax carteri* var. *homorhaphis*, Wilson, 1902: 382: nec *P. carteri* var. *homorhaphis*, Poléjaeff.

Description: Sponge composed typically of cylindrical processes arising from a massive base, but may be tubular or vase-shaped; surface smooth; texture friable; colour, both dried and living, white; main skeleton of large and small triradiates, with rays measuring approximately 0·91 by 0·013 and 0·11 by 0·011 mm. respectively; endosomal skeleton of quadriradiates, with facial rays 0·15 by 0·012 mm. and apical ray varying from rudimentary to nearly 0·25 mm. long, often curved or flexuous.

Distribution: West Indies (Porto Rico, St. Thomas); 29 m.



Text-fig. 127. *Medon imberbis* after Duchassaing and Michelotti: illustrations from original publication, in which scales of magnification were not included. Presumably the external forms are natural size.



Text-fig. 128. *Leucilla intermedia* after Row: spicules, × 100.

Named form: **Leucandra infesta** Dendy and Row

(text-fig. 128)

Leucilla intermedia Row, 1909: 205, pl. xx, fig. 7, text-fig. 5; *Leucandra infesta* Dendy and Row, 1913: 771.

Description: Sponge irregularly massive, sessile; surface even, hispid; vents apical, naked (?); texture firm; colour, in spirit, white; ectosomal skeleton of one or more tangential layers of triradiates and quadriradiates, with large oxea projecting beyond surface; skeleton of chamber layer of irregularly-scattered triradiates; endosomal skeleton a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, regular, rays 0·23 to 0·26 by 0·015 to 0·017 mm.,
ectosomal quadriradiates, sagittal, paired rays 0·4 to 0·5 by 0·015 to 0·017 mm., basal rays 0·17 to 0·5 by 0·015 to 0·017 mm., apical rays 0·12 by 0·015 to 0·016 mm.,
oxea, 1·0 to 3·0 by 0·05 to 0·06 mm.,
triradiates of chamber layer, regular, rays 0·37 to 0·5 by 0·03 to 0·035 mm.,
endosomal quadriradiates, regular, rays 0·1 to 0·11 by 0·008 mm., apical rays 0·07 to 0·8 by 0·007 mm.

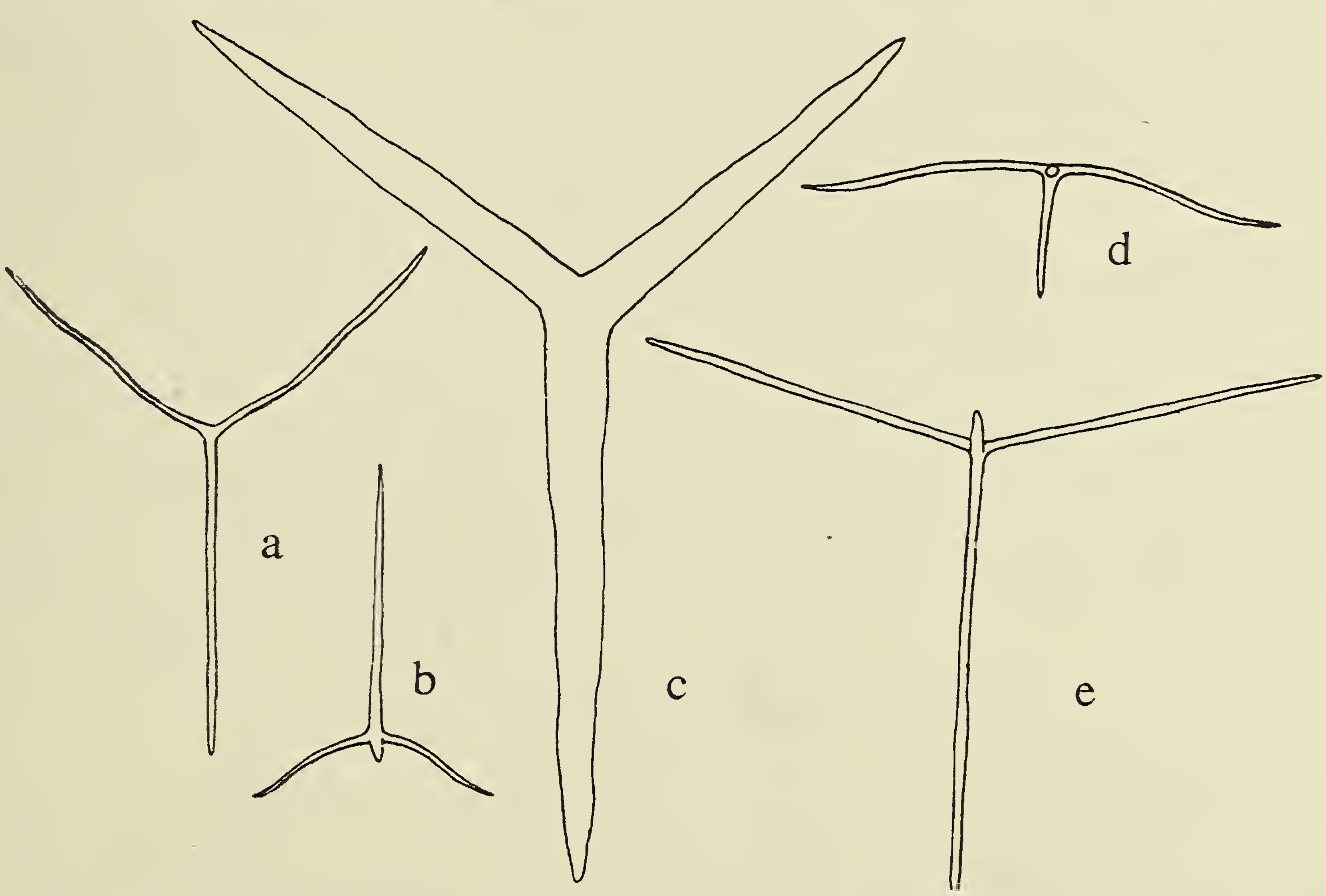
Distribution: Red Sea.

Named form: **Anamixilla irregularis** Burton

(text-fig. 129)

Anamixilla irregularis Burton, 1930: 6, text-fig. 5.

Description: Sponge tubular, conical, erect; surface, harsh to touch; vent apical; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates; skeleton of chamber layer of



Text-fig. 129. *Anamixilla irregularis* after Burton: spicules, ×100. a. ectosomal triradiate; b. subendosomal sagittal quadriradiate; c. triradiate of chamber layer; d. endosomal quadriradiate; e. quadriradiate from margin of vent.

basal rays of subendosomal sagittal quadriradiates and of large triradiates irregularly arranged; endosomal skeleton of paired rays of subendosomal quadriradiates.

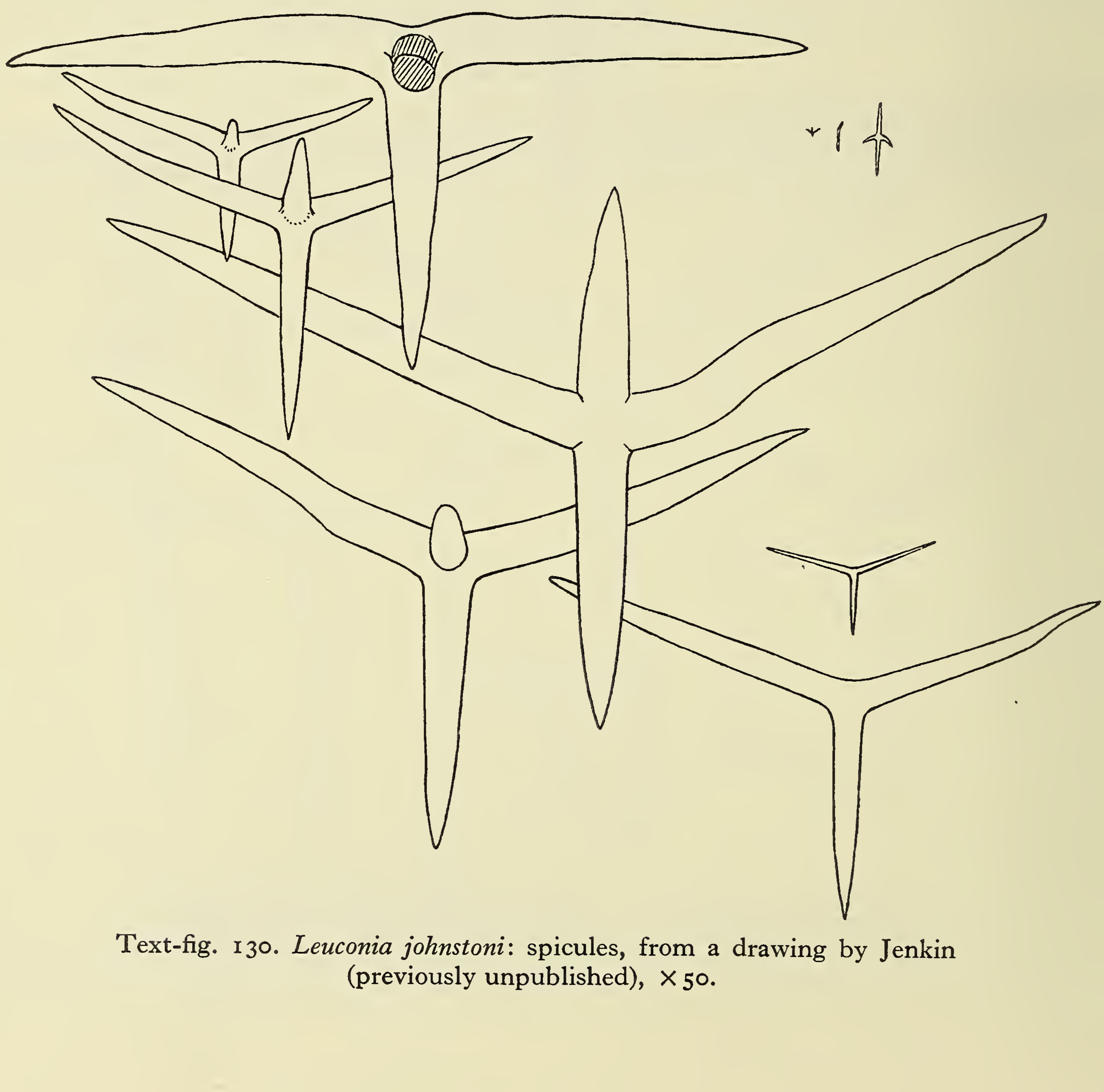
Spicules: ectosomal triradiates, sagittal, paired rays 0·195 to 0·24 by 0·006 to 0·01 mm., basal ray 0·21 to 0·33 by 0·006 to 0·012 mm.,
triradiates of chamber layer, subregular, rays up to 0·7 by 0·045 mm.,
subendosomal sagittal quadriradiates, paired rays 0·09 by 0·008 mm., basal ray 0·24 by 0·009 mm., apical ray 0·09 by 0·008 mm.,
endosomal quadriradiates, facial rays 0·24 by 0·009 mm., apical ray 0·09 mm. long.

Distribution: Indonesia, 55 m.

Named form: **Leuconia johnstoni** Carter

(text-fig. 130)

Grantia nivea, var. Johnston, 1842: 183, pl. xx, fig. 6; *Leuconia nivea*, Bowerbank, 1864: 164, pl. xvii, figs. 351, 352; Bowerbank, 1866: 36; *L. johnstonii* Carter, 1871: 3, pl. i, figs. 5–12; *Leucandra johnstonii*, Haeckel, 1872: 216, pl. xxxiv, fig. 1; *Dyssycus johnstonii*, Haeckel, 1872: 217; *Dyssycarium johnstonii*, Haeckel, 1872: 217; *Amphoriscus johnstonii*, Haeckel, 1872: 217; *Amphoridium johnstonii*, Haeckel, 1872: 217; *Leucometra johnstonii*, Haeckel, 1872: 217; *Leuconia nivea* (pars), Bowerbank, 1874: 11, pl. v, fig. 2; *Leucandra johnstonii*, Bowerbank, 1882: 229; *Leuconia john-*



Text-fig. 130. *Leuconia johnstoni*: spicules, from a drawing by Jenkin (previously unpublished), ×50.

stoni, Topsent, 1891: 128; Topsent, 1891: 526; *Leucandra johnstoni*, Stephens, 1912: 12; Dendy and Row, 1913: 773; Farran, 1915: 10; Ferrer, 1918: 16; Prenant, 1927: 6; Breitfuss, 1927: 30; *Leucandra johnstoni*, Burton, 1932: 167; Arndt, 1935: 19, fig. 25; *Leucandra johnstonii*, Moore, 1937: 33; Topsent, 1937: 11; *Leuconia johnstoni*, Lévi, 1951: 5.

Description: Sponge massive, lobular or crested; surface even, non-hispid; vents small, scattered or apical on lobes; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates and facial rays of large ectosomal quadriradiates, with groups of microxea and associated small quadriradiates; skeleton of chamber layer of scattered triradiates and small quadriradiates; endosomal skeleton a tangential layer of small quadriradiates.

Spicules: ectosomal triradiates, subregular to sagittal, rays 0·2 to 0·3 by 0·015 to 0·025 mm.;
microxea, 0·06 to 0·08 by 0·005 mm.,
quadriradiates associated with microxea, regular, rays 0·025 by 0·006 mm.,
ectosomal quadriradiates, regular, facial rays 0·65 by 0·08 mm.; apical ray 0·5 by 0·1 mm.;
triradiates of chamber layer, regular or subregular rays 0·1 to 1·0 by 0·01 to 0·07 mm.,
quadriradiates of chamber layer, sagittal; paired rays 0·03 to 0·04 by 0·008 mm., basal and apical rays 0·06 by 0·008 mm.,
endosomal quadriradiates, similar to small quadriradiates of chamber layer.

Distribution (*Summary*)*:* British Isles, south of 55° N.; Channel coasts of France; Spain (Asturias); littoral, at extreme low-water springs, under stones (always?).

Named form: **Leucetta leptoraphis** (Jenkin)

Leucandra primigenia, var. *leptoraphis* Jenkin, 1908: 14, pl. xxix, figs. 33–34; *Leucetta antarctica* Dendy, 1918: 8, pl. i, figs. 2–7; *L. leptoraphis*, Burton, 1929: 404; *L. isoraphis*, var. *apicalis* Brøndsted, 1931: 21.

Description: Sponge tubular and simple to massive, sessile; surface even, non-hispid; vents apical in tubular forms, small and scattered in massive forms; texture firm; colour, in spirit, greyish-white to olive-green, rarely pink; skeleton of triradiates arranged in tangential ectosomal and endosomal layers, and scattered irregularly in body wall.

Spicules: triradiates, regular, rays 0·14 to 0·3 by 0·004 to 0·007 mm.,
quadriradiates, variable in occurrence, similar to triradiates, with apical ray 0·07 to 0·15 mm. long.

Distribution: Antarctic; 82–385 m.

Remarks: Brøndsted (l.c.) gives no details of the external form of his specimens and few details of the spicules. He also says that his var. *apicalis* is provisional. From the details he does give, however, there is justification for identifying his specimens with those recorded by Jenkin. On the other hand, the measurements of the spicules given by Brøndsted are noteworthy. The rays of the triradiates from 9 individuals range from 0·15 to 0·3 mm. long. The quadriradiates may be very rare, rare, common or very abundant.

Named form: **Vosmaeropsis levis** Hozawa

(text-figs. 131 a & b)

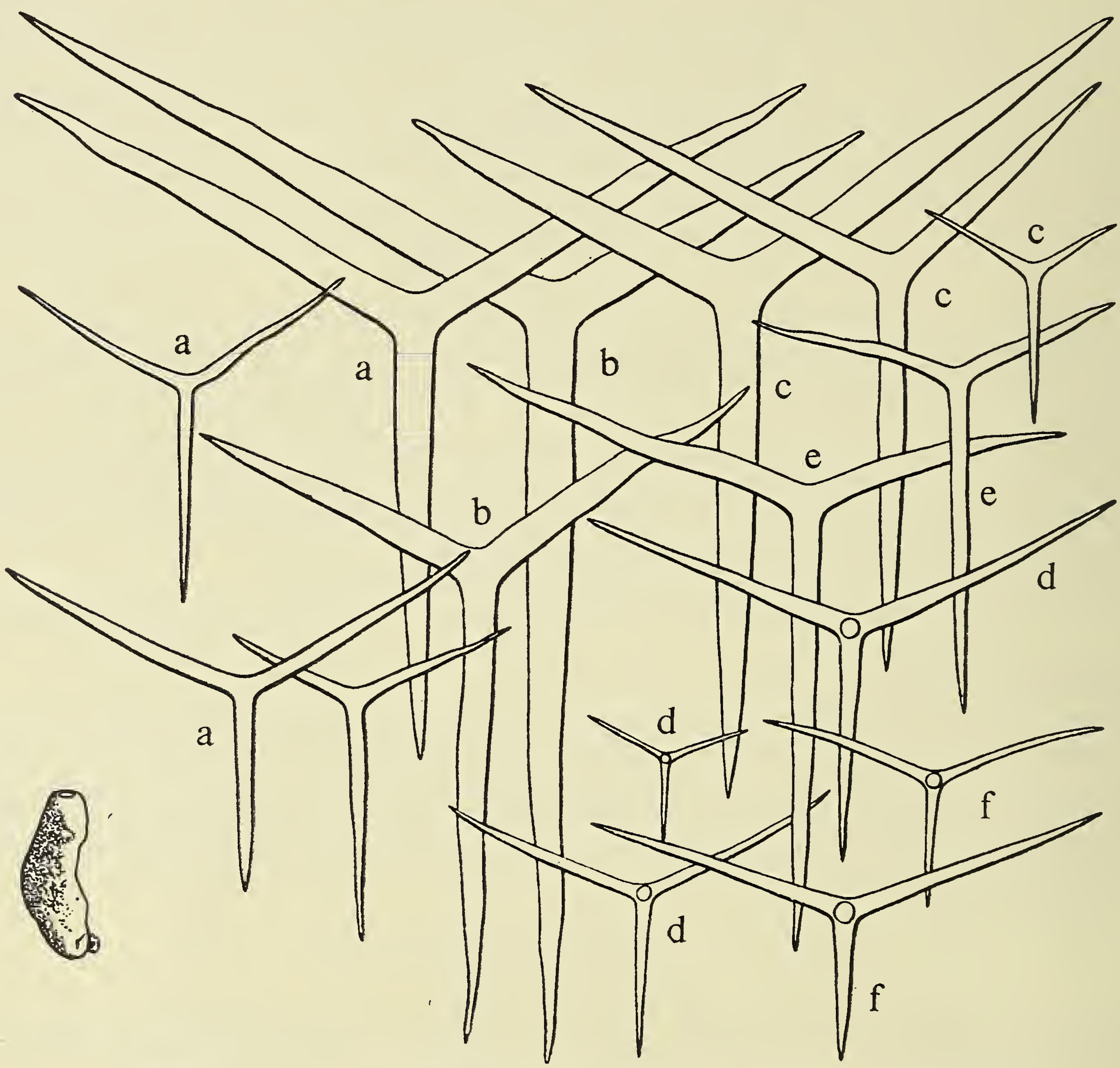
Vosmaeropsis levis Hozawa, 1940: 146, pl. vii, fig. 8, text-fig. 6; *V. triradiata* Hozawa, 1940: 149, pl. vii, fig. 9, text-fig. 7.

Description: Sponge sub-cylindrical; surface smooth; vent terminal; texture firm, compact; colour, in spirit, greyish-white; ectosomal skeleton of a few confused layers of triradiates; skeleton of chamber layer of basal rays of subectosomal pseudosagittal triradiates, irregularly-arranged triradiates and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of endosomal quadriradiates.

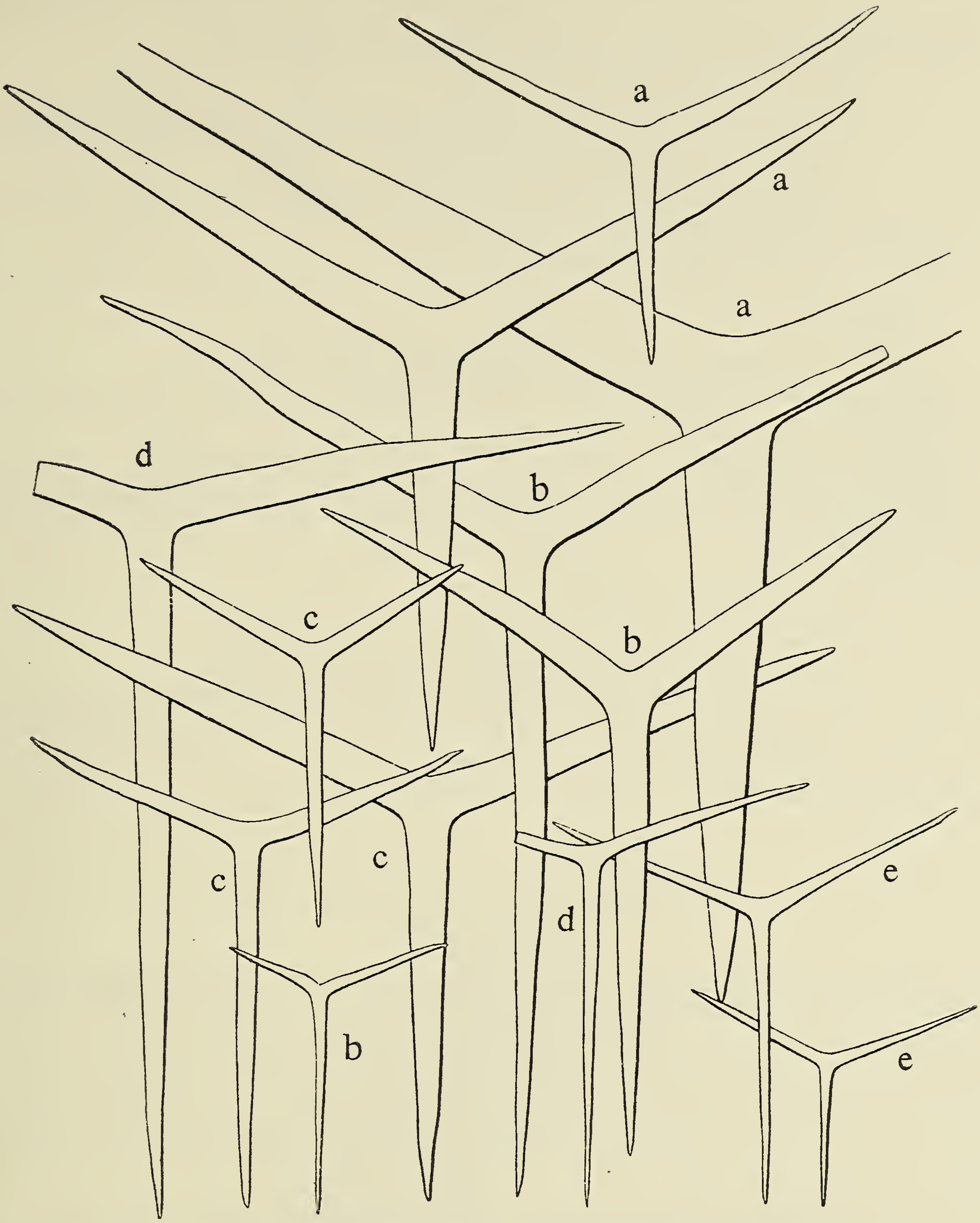
Spicules: ectosomal triradiates, subregular, rays 0·06 to 0·47 by 0·006 to 0·04 mm., subectosomal pseudosagittal triradiates, paired rays, unequal, 0·15 to 0·65 by 0·012 to 0·05 mm., basal ray 0·24 to 0·8 by 0·012 to 0·05 mm., triradiates of chamber layer, subregular, rays 0·27 to 0·55 by 0·03 to 0·044 mm., subendosomal triradiates, sagittal, paired rays 0·09 to 0·34 by 0·01 to 0·039 mm., basal ray 0·135 to 0·49 by 0·01 to 0·039 mm., endosomal quadriradiates, sagittal, paired rays 0·185 to 0·28 by 0·01 to 0·02 mm., basal ray 0·13 to 0·23 by 0·01 to 0·02 mm., apical ray 0·08 to 0·185 by 0·008 to 0·016 mm.

Distribution: Mexico.

Remarks: The only noteworthy difference between *V. levis* and *V. triradiata*, both from Mexico, lies in the one having endosomal quadriradiates and the other having endosomal triradiates.



Text-fig. 131a. *Vosmaeropsis levis* after Hozawa: spicules, × 100; external form, natural size.
a. ectosomal triradiates; b. subectosomal triradiates; c. triradiates of chamber lay; d. quadriradiates of larger exhalant canals; e. subendosomal triradiates; f. endosomal quadriradiates. (Definition of spicules is according to Hozawa.)



Text-fig. 131b. *Vosmaeropsis triradiata* after Hozawa: spicules, × 100. a. ectosomal triradiates; b. subectosomal pseudosagittal triradiates; c. triradiates of chamber layer; d. subendosomal sagittal triradiates; e. endosomal triradiates.

Named form: **Leuconia lobata** Carter

Leuconia lobata Carter, 1886: 143; *Leucandra lobata*, Dendy, 1892: 100; Dendy and Row, 1913: 773.

Description: Sponge massive, lobose; surface even, minutely hispid; vents small, scattered, naked; texture firm; colour, in spirit, whitish-yellow; ectosomal skeleton a tangential layer of triradiates, with microxea set at right angles to surface; skeleton of chamber layer of triradiates of varying size and small quadriradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·21 by 0·014 mm.,
microxea, 0·052 by 0·002 mm.,
triradiates of chamber layer, subregular, rays 0·2 to 0·5 by 0·014 to 0·05 mm.,
quadriradiates of chamber layer and exhalant canals, subregular, facial rays 0·14 by 0·01 mm., apical ray 0·06 by 0·008 mm.,
endosomal quadriradiates, sagittal, paired rays 0·25 by 0·014 mm., basal ray 0·07 by 0·014 mm., apical ray 0·04 by 0·014 mm.

Distribution: Australia (Port Phillip Heads).

Named form: **Leucandra meandrina** Lendenfeld

Leucandra meandrina Lendenfeld, 1885: 1128, pl. lxvii, figs. 43–44; Dendy, 1892: 98; Dendy and Row, 1913: 771.

Description: Sponge tubular, sessile; surface meandrine, minutely hispid; vent (position ?), naked; texture (?); colour (?); ectosomal skeleton of triradiates (?): with oxea projecting slightly at surface; skeleton of choanosome of scattered triradiates; endosomal skeleton and linings of canals of quadriradiates.

Spicules: ectosomal triradiates (?),
ectosomal oxea, 1·5 by 0·035 mm.,
triradiates of choanosome, regular, rays 0·28 by 0·021 mm.,
triradiates of choanosome, regular, rays 0·28 by 0·007 mm.,
quadriradiates of choanosome, rare, similar to triradiates, with short apical ray,
endosomal quadriradiates, also lining canals, regular, facial rays 0·18 by 0·005 mm., apical ray 0·07 to 0·28 by 0·005 mm.

Distribution: Australia (Port Jackson, Port Phillip Heads); 18–37 m.

Named form: **Leucetta microraphis** Haeckel

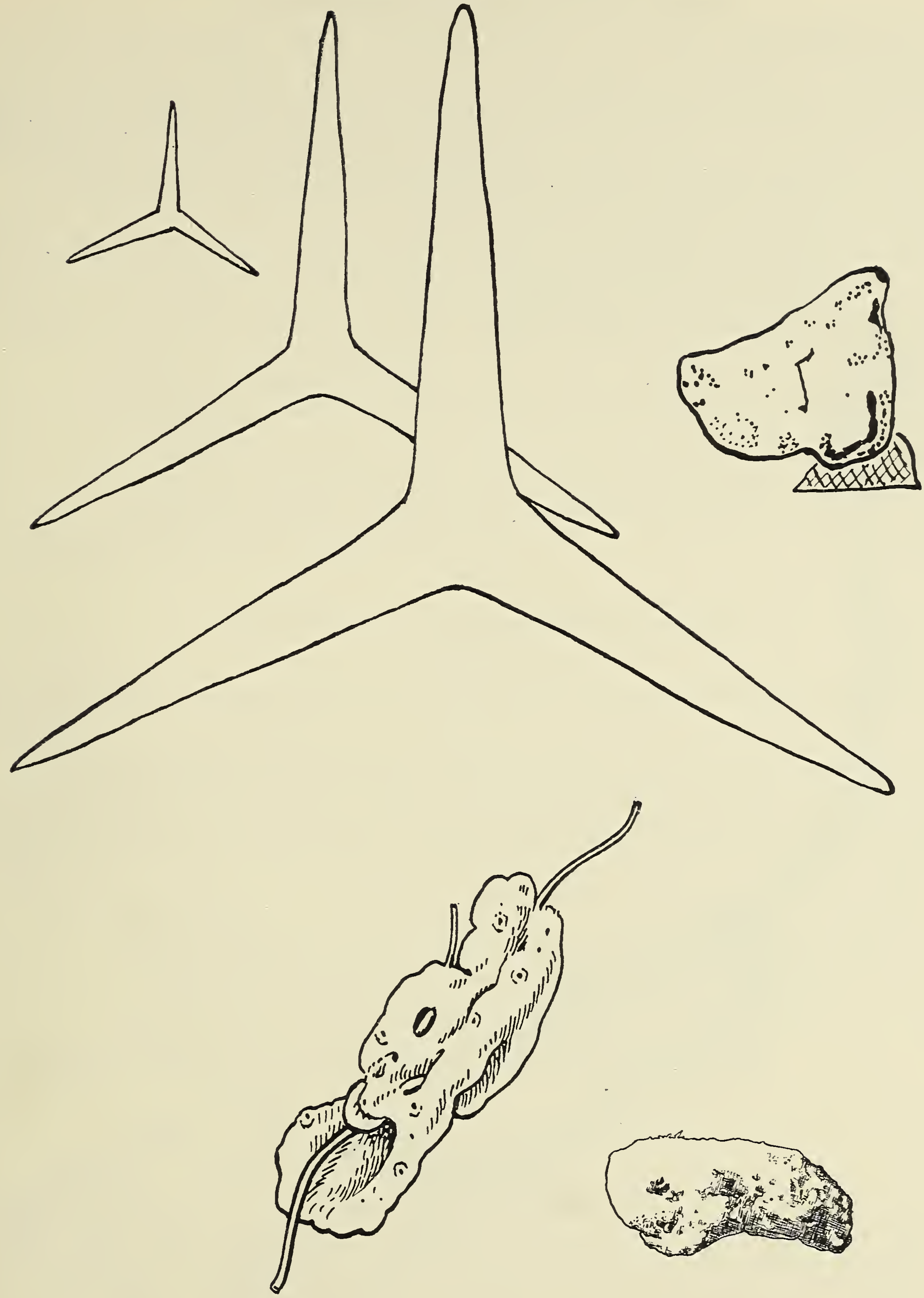
(text-fig. 132)

Dyssycus primigenius (pars) Haeckel, 1872: 118, pl. xxi, figs. 10–11; *Lipostomella primigenia* (pars) Haeckel, 1872: 118, pl. xxi, figs. 12–13; *Amphoriscus primigenius* Haeckel, 1872: 118, pl. xxi, fig. 14; *Aphroceras primigenium* (pars) Haeckel, 1872: 118, pl. xxi, fig. 15; *Leucetta microraphis* Haeckel, 1872: 119, pl. xxi, figs. 10–17; *Leuconia dura* Poléjaeff, 1883: 65, pl. ii, fig. 3, pl. vii, fig. 7; *Leucetta microraphis*, Ridley, 1884: 482; Lendenfeld, 1885: 1117; *Leucandra microraphis*, Dendy, 1892: 104; *Leucetta primigenia*, var. *microraphis*, Row, 1909: 186; *Leucetta mircoraphis*, Dendy and Row, 1913: 734; Dendy and Frederick, 1924: 482; Row and Hozawa, 1931: 746; Tanita, 1942: 111, pl. vi, fig. 4.

Description: Sponge irregularly massive, sessile; surface even, harsh; vents few, large, scattered, or solitary and apical, naked; texture firm; colour, in spirit, yellow to grey; ectosomal skeleton a tangential layer of triradiates of two sizes; skeleton of chamber layer of irregularly-arranged triradiates of two sizes; endosomal skeleton a tangential layer of triradiates, mainly of small size.

Spicules: triradiates, large, of ectosomal, chamber layer and endosomal skeletons, regular rays 0·8 by 0·085 mm.,
triradiates, small, of ectosomal, chamber layer and endosomal skeletons, regular, rays 0·15 to 0·2 by 0·015 to 0·02 mm. (?).

Distribution: Bermudas; Australia (north, east, south and south-west coasts); Red sea; Brazil; 14–59 m.



Text-fig. 132. *Leucetta microraphis*: spicules, modified from those figured by Haeckel, ×100; external form from Haeckel (top right), from Poléjaeff (holotype of *Leuconia dura*: bottom left), and Tanita (1943: bottom right), natural size.

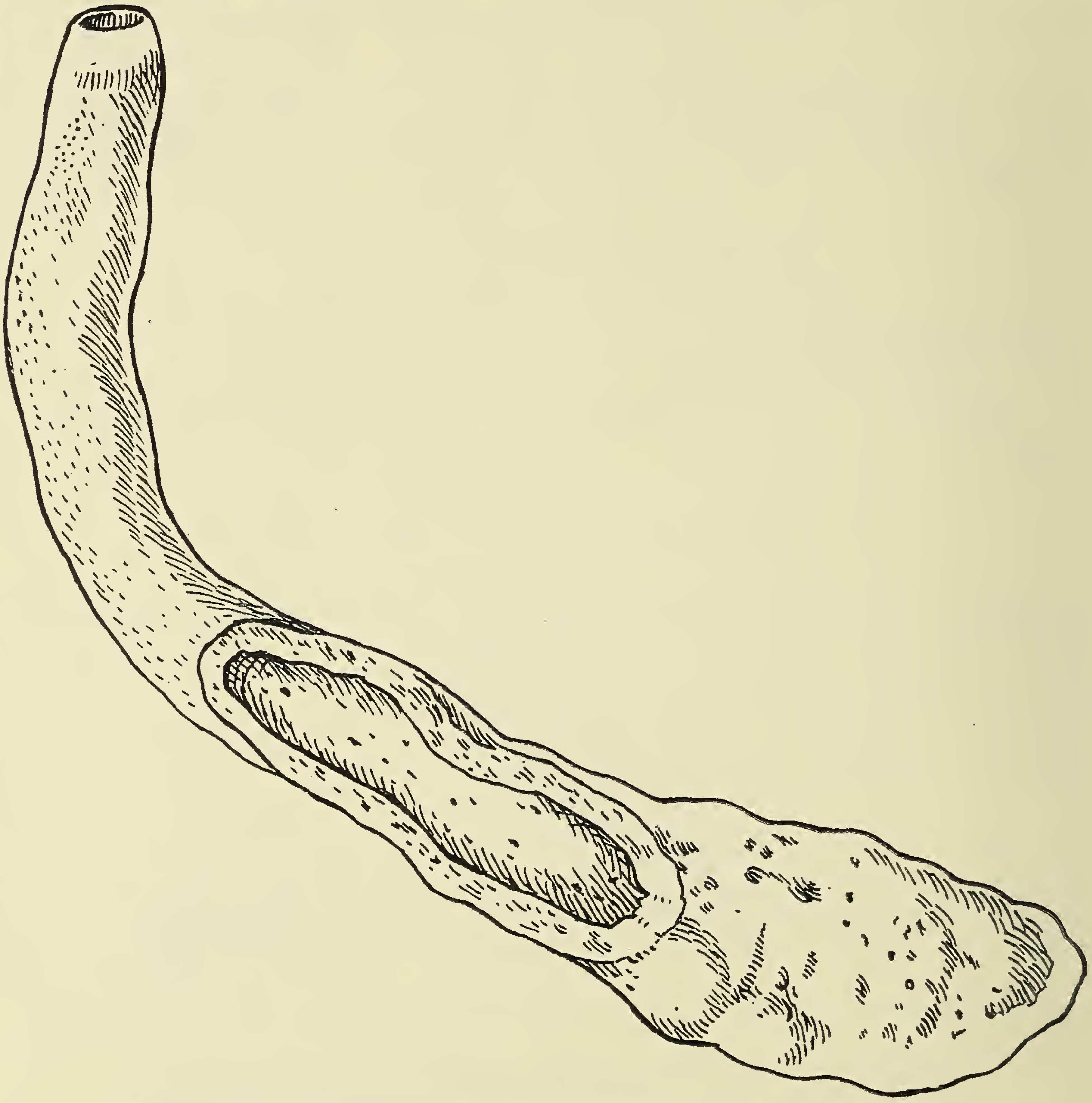
Named form: **Leuconia multifida** Carter

Leuconia multifida Carter, 1886: 141; *Leucandra multifida*, Dendy, 1892: 99; Dendy and Row, 1913: 773.

Description: Sponge massive, compressed, with marginal vents, sessile; surface even, minutely hispid; texture firm; colour, in spirit, whitish-yellow to brown; ectosomal skeleton a tangential layer of triradiates, with sparse microxea set at right angles to surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of triradiates.

Spicules: ectosomal triradiates, subregular, rays 0·12 to 0·64 by 0·012 to 0·032 mm.,
microxea, 0·06 by 0·002 mm.,
triradiates of chamber layer, similar in size and form to ectosomal triradiates,
endosomal triradiates, subregular, rays 0·3 by 0·014 mm.

Distribution: Australia (Port Phillip Heads).



Text-fig. 133. *Leucandra multiformis* after Poléjaeff: external form, natural size, as represented by the type of the var. *goliath*.

Named form: **Leuconia multiformis** Poléjaeff

(text-fig. 133)

Leuconia multiformis Poléjaeff, 1883: 54, pl. i, fig. 8, pl. vi, fig. 3, pl. vii, fig. 1; *L. multiformis* var. *goliath* Poléjaeff, 1883: 54, pl. i, fig. 8; *L. multiformis* var. *amorpha* Poléjaeff, 1883: 55: *Leucandra multiformis*, Dendy and Row, 1913: 771; *L. amorpha*, Dendy and Row, 1913: 772; *L. minima* Row and Hozawa, 1931: 785, pl. xxvi, fig. 13, text-fig. 12.

Description: Sponge tubular to sacciform, sessile; surface even, hispid; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea projecting only slightly at surface; skeleton of chamber layer of irregularly-arranged triradiates of varying sizes, together with subendosomal sagittal triradiates; endosomal skeleton of several layers of quadriradiates and triradiates.

Spicules: ectosomal triradiates, sagittal to subregular, with rays averaging 0·26 by 0·02 mm.,
oxea, 0·9 to 2·0 by 0·032 mm.,
triradiates of chamber layer, subregular, rays 0·32 to 0·64 by 0·032 to 0·05 mm.,
subendosomal sagittal triradiates, paired rays 0·45 by 0·01 mm., basal ray 0·75 by 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·2 to 0·5 by 0·01 to 0·014 mm., basal ray 0·24 to 0·3 by 0·011 to 0·014 mm., apical ray 0·1 to 0·18 by 0·011 to 0·014 mm.,
endosomal triradiates, similar to quadriradiates but without apical ray.

Distribution: Bermudas; Philippines; 59–183 m.

Named form: **Leucandra nausicaae** Schuffner

(text-fig. 134)

Leucaltis nausicaae Schuffner, 1877: 407, pl. xxiv, fig. 1; *Leucandra nausicaae*, Dendy and Row, 1913: 774.

Description: Sponge irregularly massive, sessile; surface smooth; vents small, scattered (sometimes with marginal fringe?); texture firm; colour, in spirit, yellowish-white; ectosomal skeleton a tangential layer of small triradiates; skeleton of chamber layer of irregularly-scattered triradiates; endosomal skeleton a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

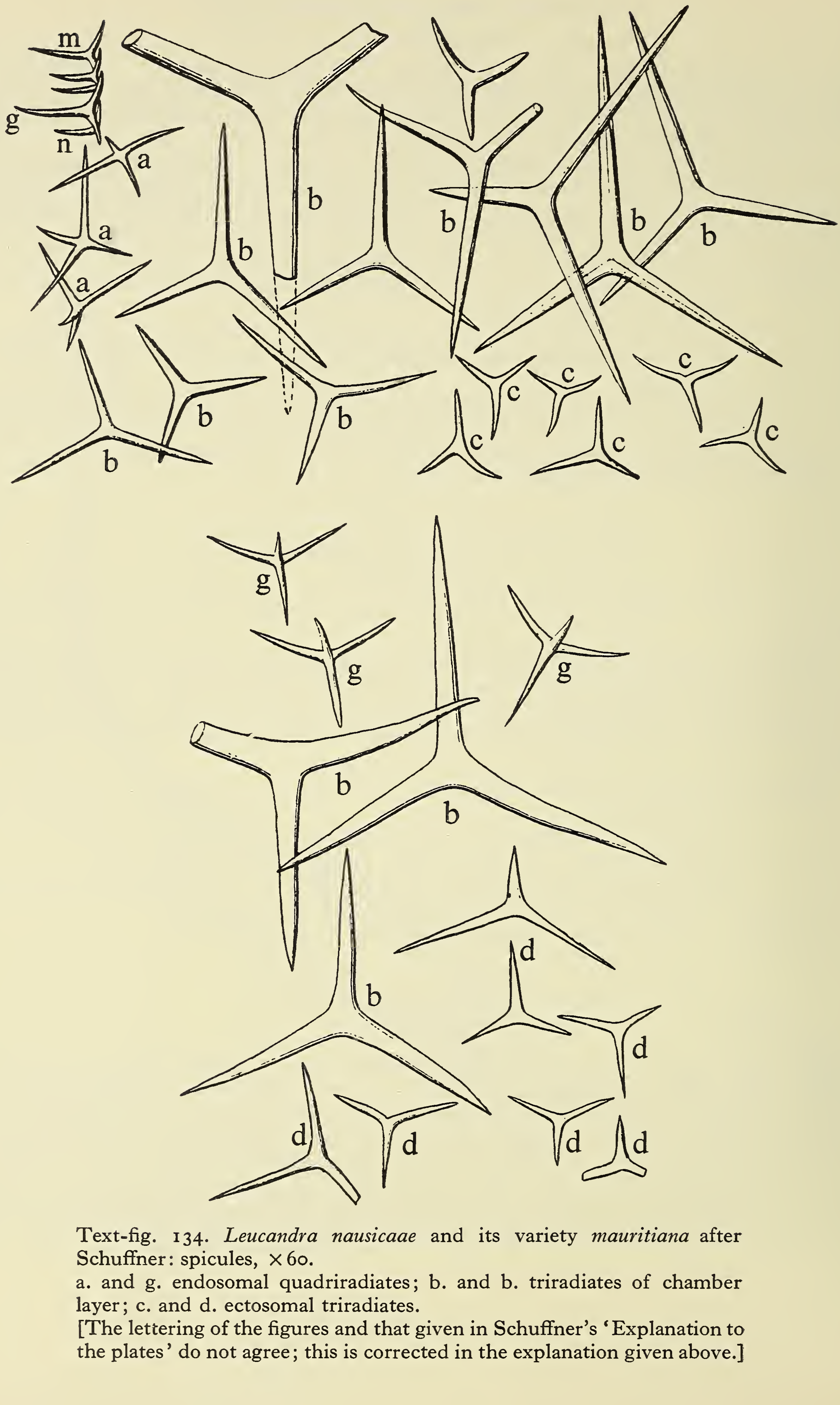
Spicules: ectosomal triradiates, sagittal, paired rays 0·1 by 0·016 mm., basal rays 0·15 by 0·016 mm.,
triradiates of chamber layer, sagittal, paired rays 0·5 to 0·75 by 0·05 to 0·06 mm., basal rays 0·38 to 0·58 by 0·05 to 0·06 mm.,
quadriradiates, of endosomal layer, sagittal, paired rays 0·2 by 0·03 mm., basal rays 0·13 by 0·03 mm., apical rays 0·11 by 0·03 mm.

Distribution: Mediterranean (Corfu); Red Sea (Gulf of Aqaba); littoral.

Named form: **Leuconia nivea** Grant

(text-fig. 135)

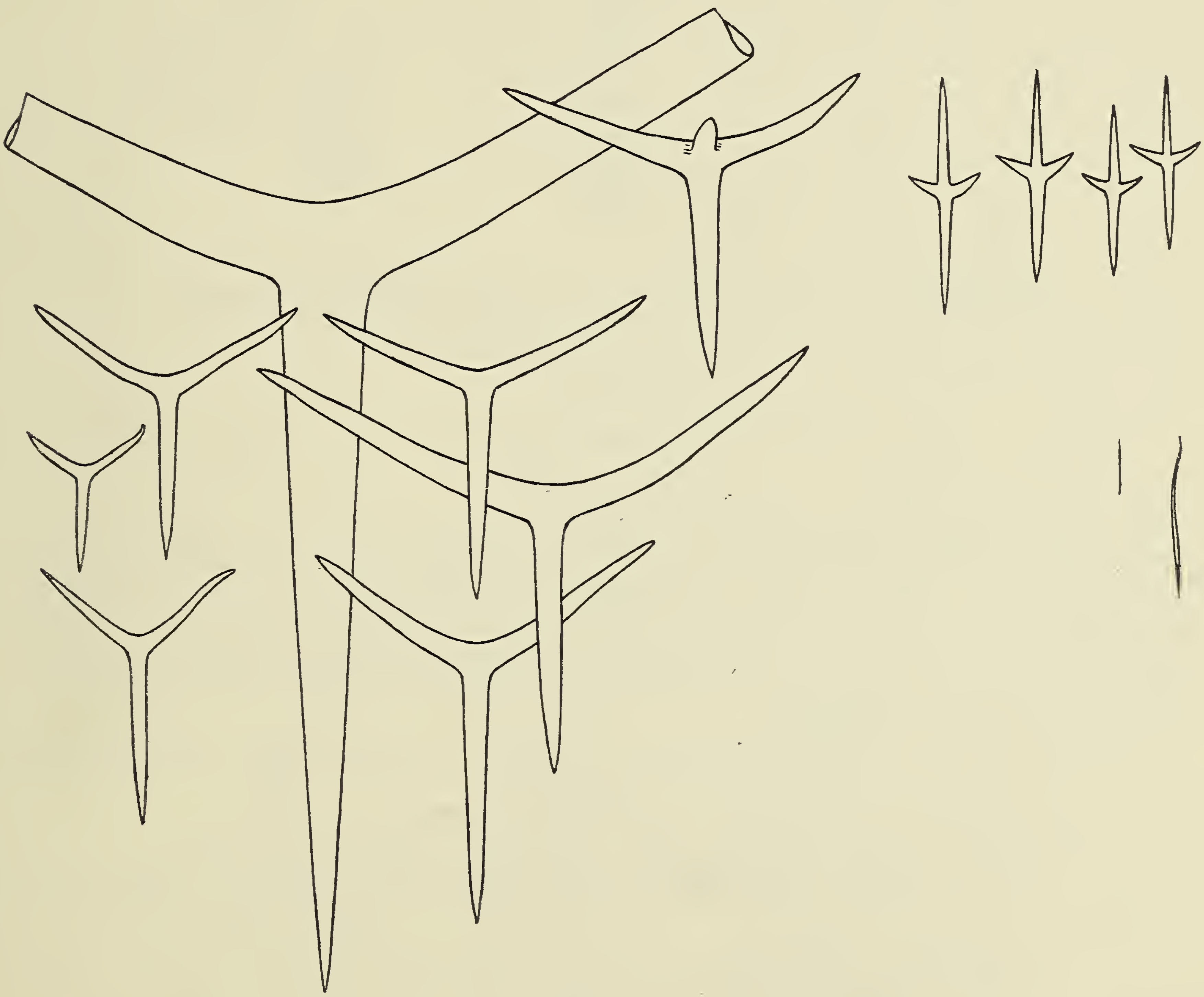
Spongia nivea Grant, 1826: 339; Grant, 1826: 168; Grant, 1826: 139, pl. ii, figs. 14–16; *Grantia nivea*, Fleming, 1828: 525; *Leuconia nivea* Grant, 1833: 199; *Calcispongia nivea*, Blainville, 1834: 531, pl. xciv, figs. 14–16; *Grantia nivea*, Johnston, 1842: 182, pl. xxi, fig. 8; Bowerbank, 1858: 295; *Leuconia nivea*, McAndrew, 1861; 236; *Grantia nivea*, Bowerbank, 1862: 764; Bowerbank, 1862: 1092; *Leuconia nivea*, Bowerbank, 1866: 36; Gray, 1867: 556; *Grantia nivea*, Andrews, 1868: 307; *Leuconia nivea*, Haeckel, 1870: 247; Wright, 1869: 223; Wright, 1870: 51; Carter, 1871: 5; *Leucandra nivea*, Haeckel, 1872: 211, pl. xxxiv, fig. 2, pl. xxxix; *Dyssycus nivea*, Haeckel, 1872: 212; *Lipostomella nivea*, Haeckel, 1872: 212; *Amphoriscus niveus*, Haeckel, 1872: 212;



Text-fig. 134. *Leucandra nausicaae* and its variety *mauritiana* after Schuffner: spicules, ×60.
a. and g. endosomal quadriradiates; b. and b. triradiates of chamber layer; c. and d. ectosomal triradiates.
[The lettering of the figures and that given in Schuffner's 'Explanation to the plates' do not agree; this is corrected in the explanation given above.]

Aphroceras niveum, Haeckel, 1872: 212; *Leuconia nivea* (pars) Bowerbank, 1874: 11, pl. v, figs. 1–8; *Leucandra nivea*, M'Intosh, 1874: 143; *Leuconia nivea*, Leslie and Herdman, 1881: 59; Bowerbank, 1882: 26, 229; Koehler, 1886: 52; Koehler, 1886: 360; *Leucandra nivea*, Torre, 1889: 97; Hanitsch, 1889: 1590; Hanitsch, 1890: 236; *Leuconia nivea*, Topsent, 1890: 201; Topsent, 1891: 526; *Leucandra nivea*, Brunchorst, 1891: 31; Duerden, 1894: 231; Topsent, 1894: 7; Topsent, 1894: 22; Hanitsch, 1894: 183; *Leuconia nivea*, Breitfuss, 1896: 431; Breitfuss, 1897: 225; *Leucandra nivea*, Pruvot, 1897: 584; *Leuconia nivea*, Breitfuss, 1898: 305; Breitfuss, 1898: 116; Breitfuss, 1898: 29; *Leucandra nivea*, Rankin, 1901: 372; Arnesen, 1901: 28; Arnesen, 1901: 72; Rousseau, 1903: 12; Farran, 1915: 10; *Leuconia nivea*, M'Intosh, 1926: 247; *Leucandra nivea*, Breitfuss, 1927: 31; Prenant, 1927: 6; Arndt, 1928: 27, figs. 23–24; Burton, 1930: 488; Renouf, 1931: 427; Breitfuss, 1932: 250; *Leuconia nivea*, Burton, 1932: 167; *Leucandra nivea*, Arndt, 1935: 19, fig. 26; Renouf, 1936: 835; *Leuconia nivea*, Burton, 1936: 5; Moore, 1937: 23; *Leucandra nivea*, Renouf, 1937: 52; Topsent, 1937: 10; *Leuconia nivea*, Lévi, 1951: 5.

Description: Sponge encrusting; surface smooth; vents naked, small and scattered; texture firm, friable; colour, alive and in spirit, white; ectosomal skeleton of several tangential layers of



Text-fig. 135. *Leuconia nivea* (Grant): spicules, from a drawing by Jenkin (hitherto unpublished) ×50.

triradiates; skeleton of chamber layer of triradiates and microxea irregularly arranged; endosomal skeleton, and linings of exhalant canals, a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·12 by 0·01 mm.,
triradiates of chamber layer, subregular, rays 0·05 to 1·2 by 0·01 to 0·08 mm.,
microxea, 0·04 to 0·06 by 0·002 mm.,
quadriradiates, of endosomal skeleton and lining exhalant canals, sagittal, paired rays 0·02 by 0·006 mm., basal rays 0·06 to 0·08 by 0·006 mm., apical rays 0·06 to 0·08 by 0·005 mm.

Distribution: Spitzbergen; Norway; British Isles; Heligoland; France; Mediterranean; littoral to 128 m., on rock.

Leucandra ohshimai Tanita

(text-fig. 136)

[See *Leuconia dura* Hozawa, p. 248]

Text-fig. 136. *Leucandra ohshimai* after Tanita: external form, natural size. The spiculation in this species is practically identical with that of the holotype of *Anamixilla torresi.*

Named form: **Leucandra okinoseana** Hozawa

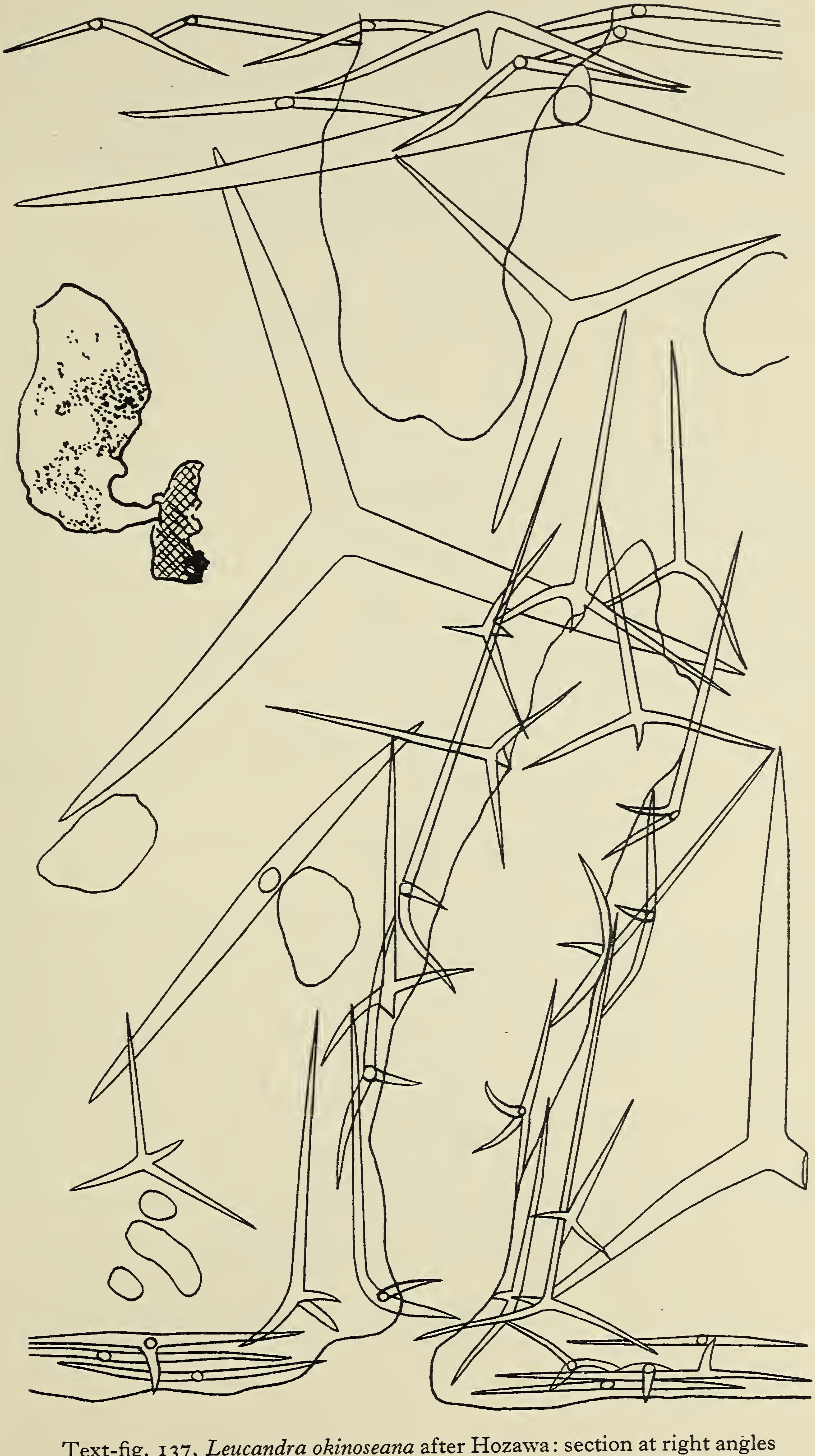
(text-fig. 137)

Leucandra okinoseana Hozawa, 1929: 376, pl. xxiii, figs. 71, 72, text-fig. 35; Tanita, 1943: 454.

Description: Sponge sac-shaped, broad below and narrowing above, with a number of low protuberances on lower half of body; surface uneven, smooth; margin of vent feebly-developed; texture rigid, elastic; colour, in spirit, white tinged with grey; ectosomal skeleton of a few layers of tangential triradiates, large and small; skeleton of chamber layer of large triradiates; exhalant canals lined with quadriradiates; endosomal skeleton of a few layers of small triradiates and quadriradiates, with a few large triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·12 to 0·25 by 0·016 to 0·024 mm., basal rays 0·15 to 0·35 by 0·016 to 0·024 mm.,
ectosomal triradiates, regular, rays 0·4 to 1·4 by 0·032 to 0·12 mm.,
triradiates of chamber layer, regular, rays 0·4 to 1·4 by 0·032 to 0·12 mm.,
quadriradiates of exhalant canals, sagittal, paired rays 0·15 to 0·2 by 0·016 to 0·02 mm., basal ray 0·12 to 0·57 by 0·012 to 0·016 mm., apical ray 0·07 to 0·2 by 0·008 to 0·012 mm.,
endosomal triradiates, sagittal, paired rays 0·19 to 0·37 by 0·02 to 0·032 mm., basal ray 0·07 to 0·27 by 0·016 to 0·24 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·05 to 0·11 by 0·008 to 0·016 mm.

Distribution: Japan (Sagami Sea); 429–572 m.



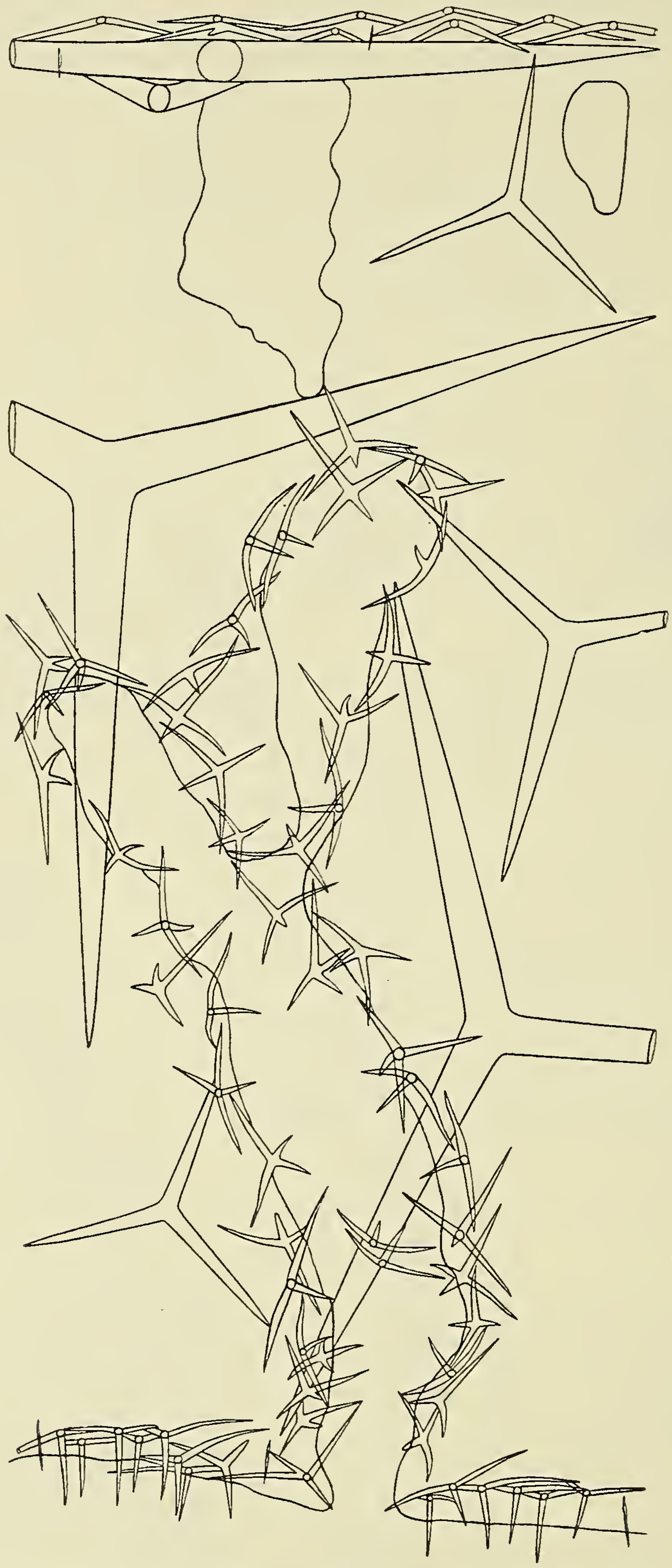
Text-fig. 137. *Leucandra okinoseana* after Hozawa: section at right angles to surface, ×100; external form drawn from a published photograph, natural size.

Named form: **Leucandra onigaseana** Hozawa

(text-fig. 138)

Leucandra onigaseana Hozawa, 1929: 373, pl. xxiii, figs. 69, 70, text-fig. 34; Tanita, 1943: 447.

Description: Sponge cylindrical, solitary; surface corrugated, hispid; vent apical, margin feebly developed; texture hard, compact; colour, in spirit, white; ectosomal skeleton of a few layers of tangential triradiates, with a few larger triradiates, and with sparsely scattered microxea projecting



Text-fig. 138. *Leucandra onigaseana* after Hozawa: section at right angles to surface, ×50.

beyond surface; skeleton of chamber layer of large triradiates irregularly arranged; exhalant canals lined with quadriradiates; endosomal skeleton of several layers of quadriradiates, with a few triradiates, and sparse microxea set at varying angles to surface.

Spicules: ectosomal triradiates, sub-regular, rays 0·11 to 0·3 by 0·008 to 0·024 mm.,
large ectosomal triradiates, regular, rays 0·33 to 1·5 by 0·03 to 0·14 mm.,
triradiates of chamber layer, regular, rays 0·33 to 1·5 by 0·03 to 0·14 mm.,
quadriradiates of exhalant canals, sagittal, paired rays 0·15 to 0·2 by 0·012 mm., basal ray 0·11 to 0·27 by 0·012 mm.,
endosomal quadriradiates, sagittal, paired rays 0·15 to 0·24 by 0·016 to 0·02 mm., basal ray 0·05 to 0·12 by 0·012 to 0·016 mm., apical ray 0·09 to 0·15 by 0·012 to 0·016 mm.,
endosomal triradiates, similar to quadriradiates but without apical ray,
microxea, 0·04 to 0·06 by 0·002 to 0·004 mm.

Distribution: Japan (Sagami Sea, Niijima).

Named form: **Leuconia ovata** Poléjaeff

Leuconia ovata Poléjaeff, 1883: 61; *Leucandra ovata*, Dendy and Row, 1913: 773.

Description: Sponge solitary, ovate, laterally-compressed, sessile; surface smooth; vent apical, naked (?); texture firm; colour, in spirit, violet-grey; ectosomal skeleton a tangential layer of triradiates and quadriradiates, with irregularly-scattered microxea; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of triradiates, with irregularly-scattered microxea.

Spicules: ectosomal triradiates, regular to sagittal, rays 0·3 to 0·45 by 0·025 to 0·035 mm.,
ectosomal quadriradiates, regular, all rays 0·4 by 0·03 to 0·04 mm.,
triradiates of chamber layer, regular to sagittal, rays 0·3 to 0·45 by 0·03 to 0·04 mm.,
endosomal triradiates, sagittal, paired rays 0·15 to 0·3 mm. long, basal rays 0·08 to 0·2 mm. long (with apical rays, rare, 0·02 to 0·08 mm. long),
microxea, smooth or spined, 0·09 by 0·006 mm.

Distribution: Kerguelen; 128 m.

Named form: **Vosmaeropsis ovata** Tanita*

(text-fig. 139)

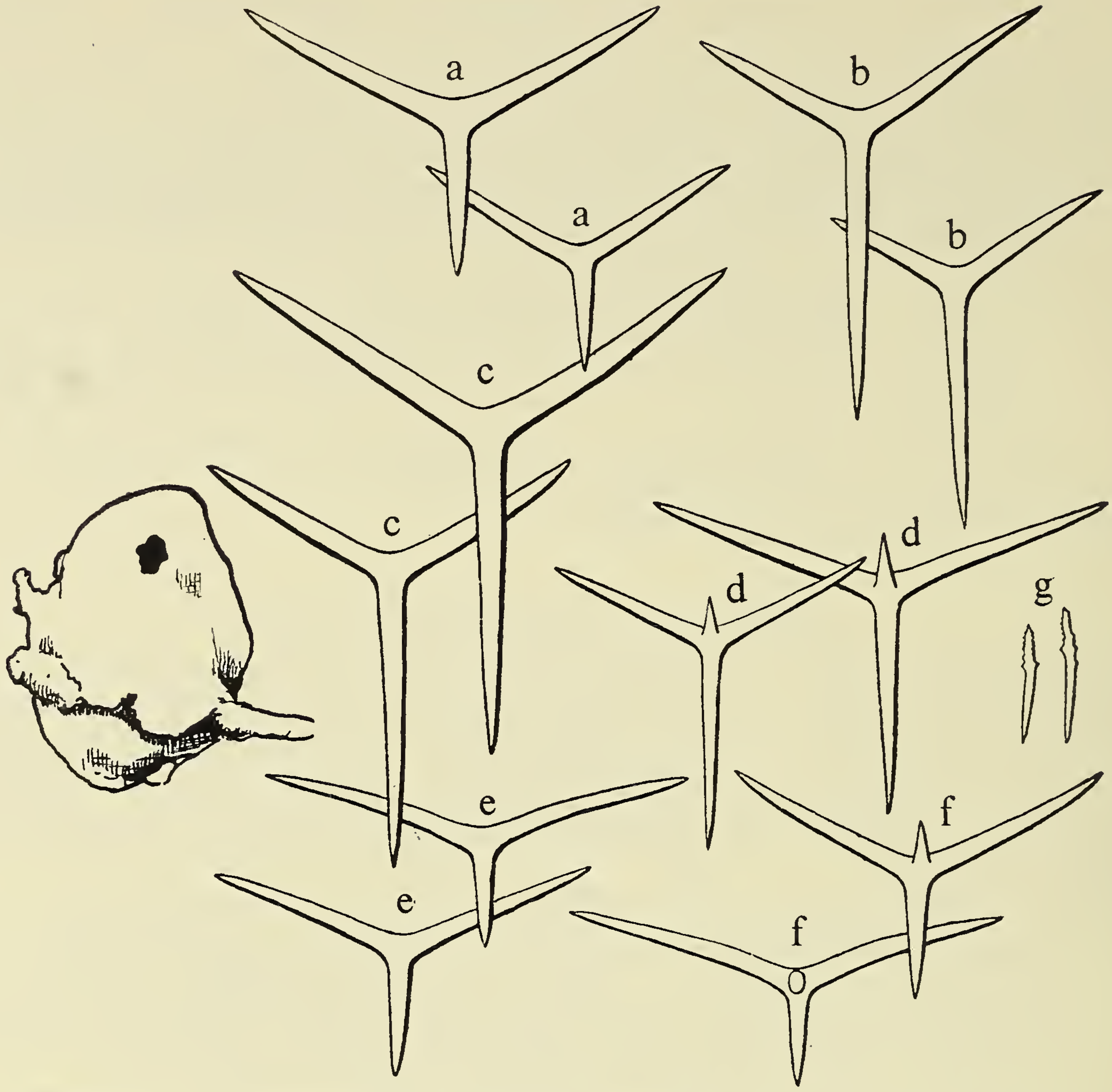
Vosmaeropsis ovata Tanita, 1942: 116, pl. vi, fig. 9, text-fig. 3.

Description: Sponge oval; surface smooth, even; vent apical, naked; texture elastic; colour, in spirit, white; ectosomal skeleton of several tangential layers of triradiates, together with subectosomal pseudosagittal triradiates and scattered microxea; skeleton of chamber layer of basal rays of subectosomal triradiates, scattered tubar triradiates, and basal rays of subendosomal triradiates; endosomal skeleton of tangentially-arranged triradiates and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·13 to 0·18 by 0·012 to 0·015 mm.,
microxea, 0·06 to 0·08 by 0·004 to 0·006 mm.,
subectosomal pseudosagittal triradiates, paired rays, unequal, 0·09 to 0·18 by 0·015 to 0·02 mm., basal ray 0·17 to 0·23 by 0·015 to 0·02 mm.,
tubar triradiates, subregular, rays 0·18 to 0·28 by 0·018 to 0·022 mm.,
endosomal triradiates, sagittal, paired rays 0·22 to 0·25 by 0·012 to 0·018 mm., basal ray 0·12 to 0·16 by 0·012 to 0·018 mm.,
endosomal quadriradiates, similar to triradiates, with apical rays 0·07 to 0·13 by 0·01 to 0·014 mm.

Distribution: Chile (Sarmiento).

* Included here in error (see p. 81).



Text-fig. 139. *Vosmaeropsis ovata* after Tanita: spicules, × 100, except g. which is × 200; external form, just over natural size.
a. extosomal triradiates; b. subectosomal sagittal triradiates; c. triradiates of chamber layer; d. quadriradiates of larger exhalant canals; e. endosomal triradiates; f. endosomal quadriradiates; g. microxea.

Named form: **Leucandra pacifica** Hozawa

(text fig. 140)

Leucandra pacifica Hozawa, 1929: 368, pl. xxi, figs. 63, 64, text-figs. 32; Tanita, 1943: 58, pl. iv. fig. 27; Tanita, 1943: 447.

Description: Sponge cylindrical with apical vent small and naked; surface even, minutely hispid; texture hard, brittle; colour, in spirit, white; ectosomal skeleton of a thin layer of triradiates with hair-like oxea set at right angles to surface; skeleton of chamber layer of triradiates, variable in size, with quadriradiates and a few triradiates lining exhalant canals; endosomal skeleton of several layers of quadriradiates with apical rays projecting into cloacal cavity, and microxea.

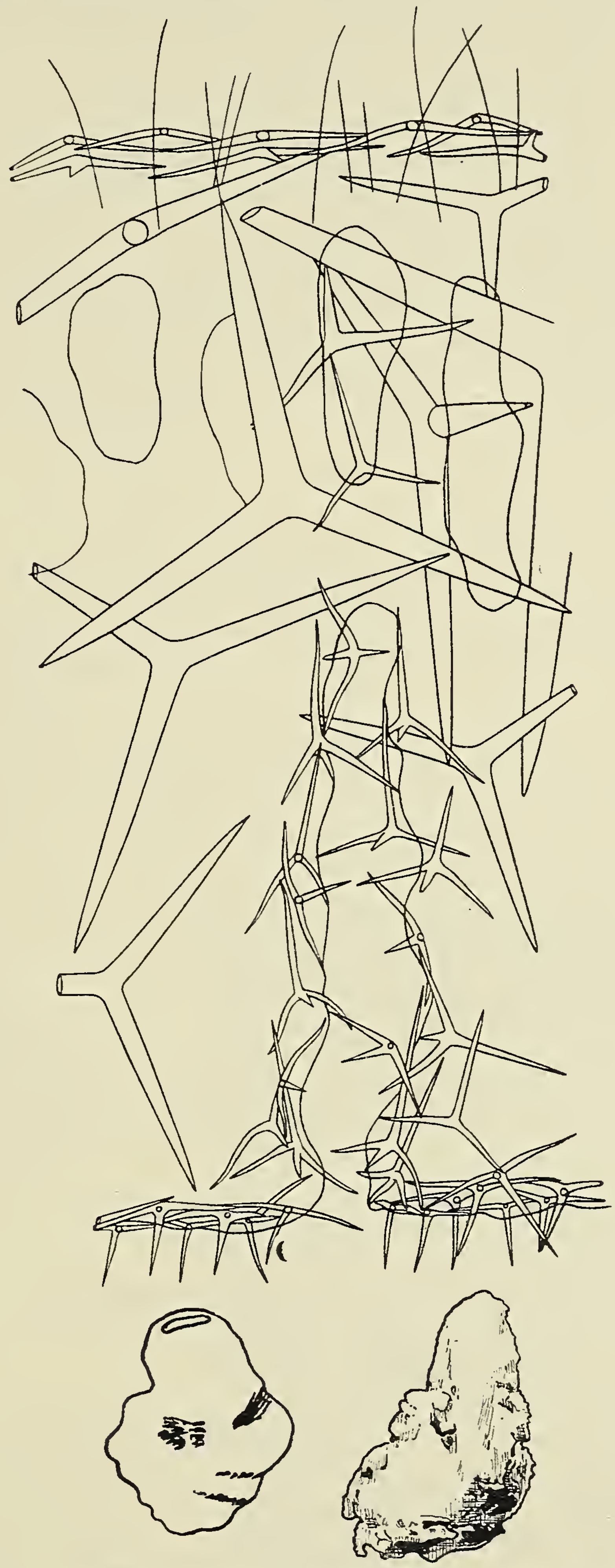
Spicules: smaller ectosomal triradiates sagittal, paired rays 0·1 to 0·3, by 0·01 to 0·028 mm., basal ray 0·12 to 0·4 by 0·01 to 0·028 mm.,
triradiates of chamber layer, regular, rays 0·35 to 1·0 by 0·03 to 0·13 mm.,
triradiates of exhalant canals, sagittal, paired rays 0·1 to 0·32 by 0·01 to 0·02 mm., basal ray 0·1 to 0·22 by 0·01 to 0·02 mm.,
quadriradiates of exhalant canals, similar to triradiates, apical ray 0·07 to 0·12 by 0·008 to 0·012 mm.,

endosomal quadriradiates, sagittal, paired rays 0·12 to 0·24 by 0·012 to 0·024 mm., basal ray 0·06 to 0·18 by 0·012 to 0·02 mm., apical ray 0·09 to 0·22 by 0·008 to 0·016 mm.,

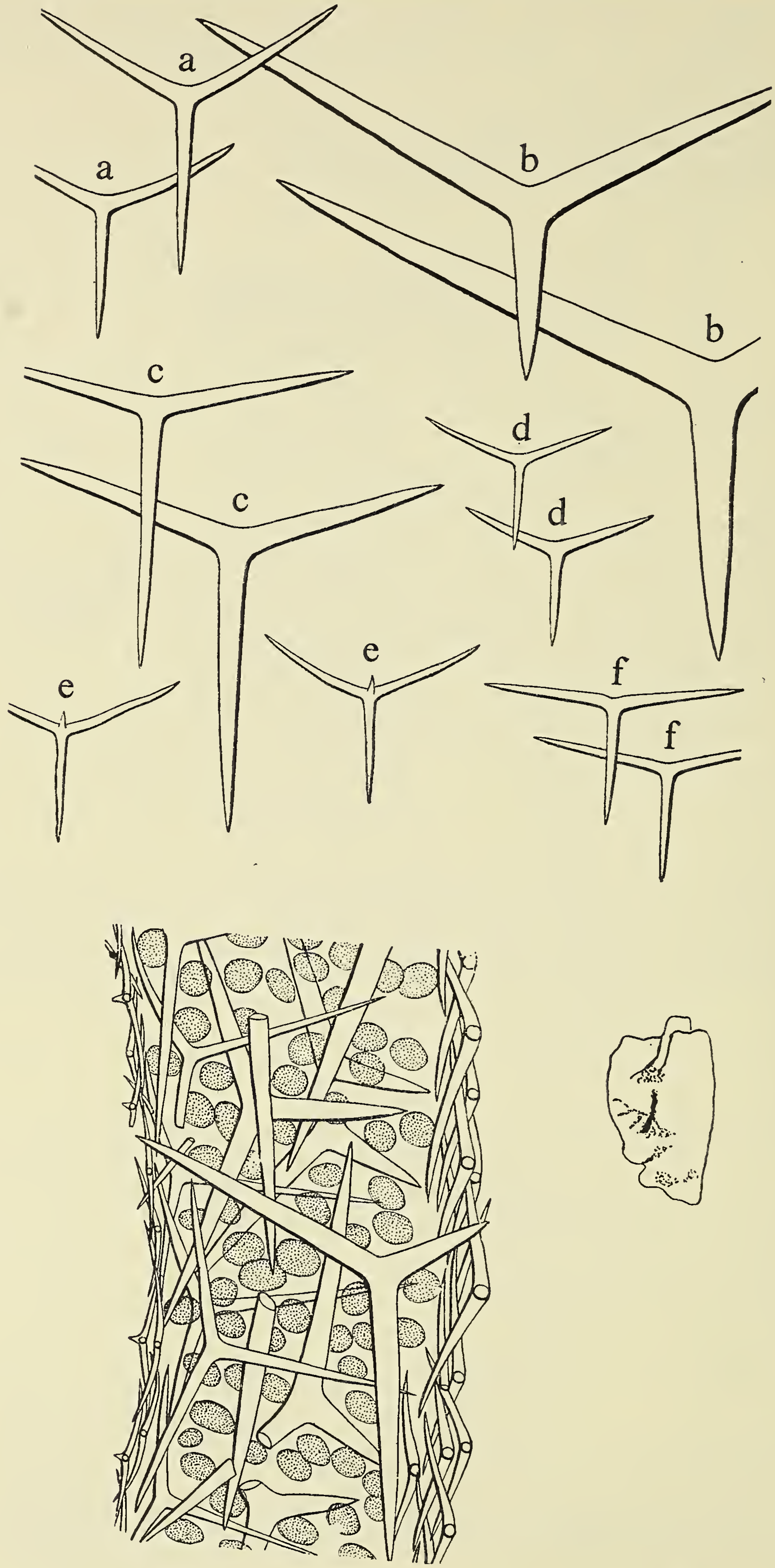
linear spicules, 0·6 by 0·006 mm.,

endosomal microxea, hastate, 0·1 by 0·004 mm.

Distribution: Japan (Sagami Sea, Simasita, Misaki).



Text-fig. 140. *Leucandra pacifica* after Hozawa: external form of holotype (left) and Tanita's (1943) specimen, both drawn from published photographs, natural size; section at right angles to surface, ×50.



Text-fig. 141. *Leucandra palaoensis* after Tanita: section through body wall, ×50; spicules, ×100; external form, natural size.
a. ectosomal triradiates; b. tubar triradiates; c. subendosomal triradiates; d. endosomal triradiates.

Named form: **Leucandra palaoensis** Tanita

(text-fig. 141)

Leucandra palaoensis Tanita, 1943: 454, pl. xviii, fig. 77, text-figs. 26–27.

Description: Sponge massively tubular; surface smooth, even; vent apical; texture firm; colour, in spirit, rusty yellow; ectosomal skeleton of triradiates arranged tangentially; skeleton of chamber layer of triradiates irregularly arranged, and basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and tangential layers of tri- and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·25 to 0·44 by 0·023 to 0·035 mm.,
triradiates of chamber layer, sagittal, paired rays 0·72 to 1·17 by 0·065 to 0·09 mm., basal ray 0·31 to 0·47 by 0·065 to 0·09 mm.,
subendosomal sagittal triradiates, paired rays 0·29 to 0·45 by 0·033 to 0·055 mm., basal ray 0·43 to 0·6 by 0·033 to 0·055 mm.,
endosomal triradiates, subregular, rays 0·21 to 0·3 by 0·014 to 0·02 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·04 to 0·07 by 0·01 mm.

Distribution: Caroline Islands (Palao).

Named form: **Sycaltis perforata** Haeckel

Sycaltis perforata Haeckel, 1872: 266, pl. xlvi, figs. 1–9; *Sycurus perforatus* Haeckel, 1872: 267, pl. xlvi, figs. 1–2; *Sycothamnus perforatus* Haeckel, 1872: 267, pl. xlvi, figs. 3–5; *Sycaltis perforata*, Dendy and Row, 1913: 786.

Description: Sponge tubular, sessile; surface even, non-hispid; vent apical, naked; texture soft; colour, in spirit, brownish; ectosomal skeleton a tangential layer of triradiates of two sizes; skeleton of chamber layer of triradiates and quadriradiates, with apical rays projecting into cloacal cavity; endosomal skeleton a tangential layer of triradiates of two sizes.

Spicules: ectosomal triradiates, regular, rays 0·3 to 0·4 by 0·02 to 0·025 mm.,
ectosomal triradiates, regular, rays 0·08 to 0·12 by 0·008 mm.,
triradiates of chamber layer, regular, rays 0·1 by 0·008 mm.,
quadriradiates of chamber layer, similar to triradiates with apical ray 0·05 to 0·15 by 0·002 to 0·004 mm.,
endosomal triradiates, regular, rays 0·2 by 0·008 mm.,
endosomal triradiates, regular, rays 0·08 to 0·12 by 0·008 mm.

Distribution: Florida; 270 m.

Named form: **Leuconia platei** Breitfuss

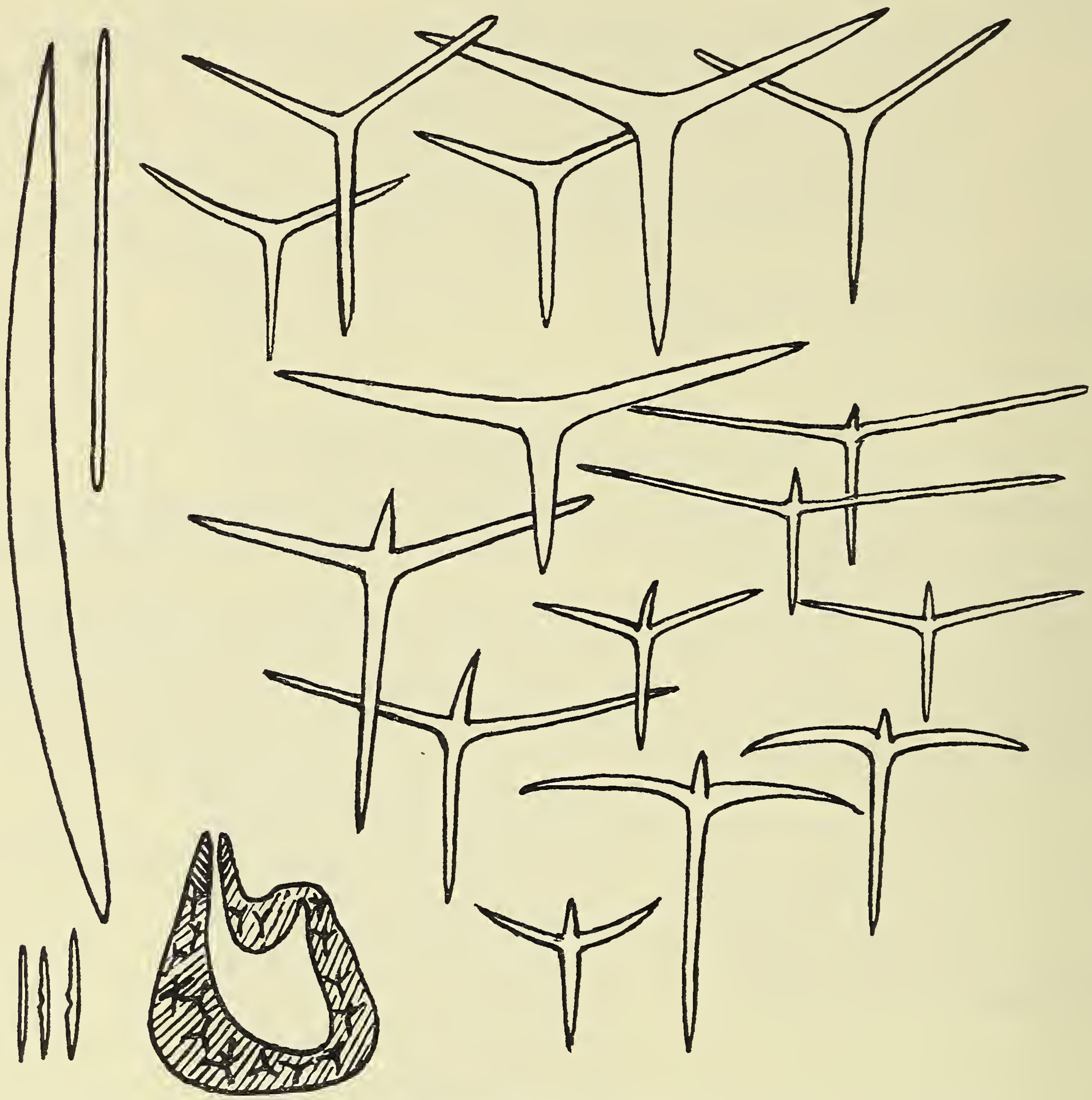
(text-fig. 142)

Leuconia platei Breitfuss, 1898: 463, pl. xxvii, fig. 8; *Leucandra platei*, Dendy and Row, 1913: 772.

Description: Sponge subspherical, with conical processes on upper surface; surface minutely hispid; vents at apices of conical processes, with fringe; texture firm; colour, in spirit, white; ectosomal skeleton absent; skeleton of chamber layer of irregularly-arranged triradiates and, more rarely, quadriradiates; apical rays of quadriradiates near surface frequently projecting beyond surface; endosomal skeleton a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity, and a few microxea.

Spicules: triradiates of chamber layer, regular to subsagittal, rays 0·15 to 0·35 by 0·015 to 0·019 mm.,
quadriradiates of chamber layer, sagittal, paired rays 0·18 to 0·3 by 0·015 to 0·019 mm., basal rays 0·315 to 0·33 by 0·025 to 0·032 mm., apical rays 0·06 mm. long,
endosomal quadriradiates, sagittal, paired rays 0·315 by 0·013 mm., basal rays 0·113 by 0·013 mm., apical rays 0·068 by 0·013 mm.,
microxea, 0·063 to 0·088 by 0·003 mm.

Distribution: Punta Arenas; 14 m.



Text-fig. 142. *Leucandra platei* after Breitfuss: spicules, ×100, except for microxea (bottom left) which are ×200; section through holotype, natural size.

Named form: **Leucandra poculiformis** Hozawa

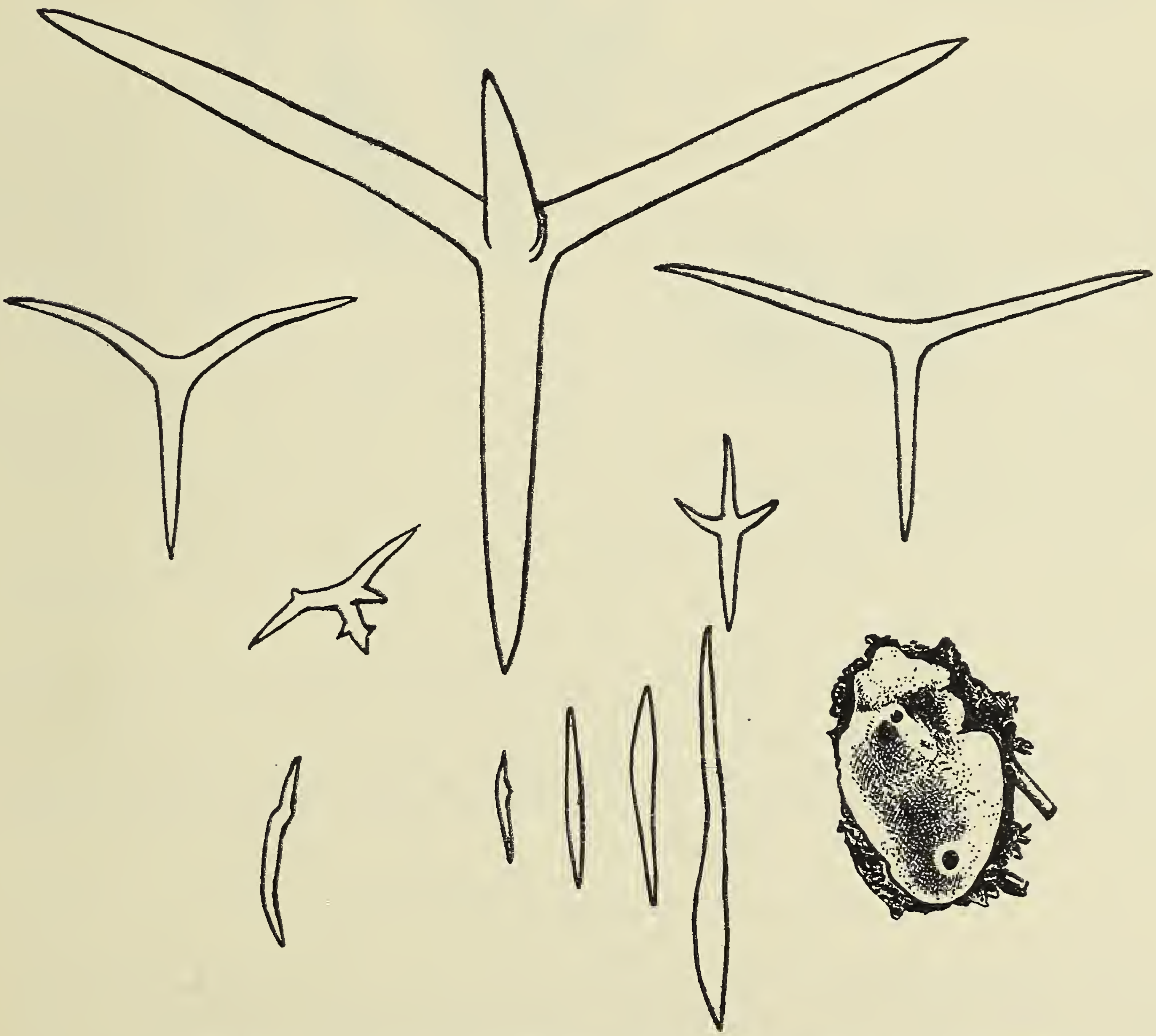
Leucandra poculiformis Hozawa, 1918: 545, pl. lxxxiv, fig. 4, text-fig. 8.

Description: Sponge an irregular thick-walled cup, with a laterally compressed vent at upper end; surface even, minutely hispid; texture soft, brittle; colour, in spirit, white to brown; ectosomal skeleton of several layers of tangential triradiates, with microxea set at varying angles to surface; skeleton of chamber layer of triradiates, variable in size and irregularly-arranged;

exhalant canals lined with triradiates and quadriradiates, with apical rays of latter projecting into lumenof canals; endosomal skeleton of tangential triradiates, similar to those of ectosomal skeleton, with numerous microxea as well as sagittal triradiates and quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·13 to 0·68 by 0·02 to 0·06 mm.,
triradiates of chamber layer, regular, rays 0·28 to 0·64 by 0·04 to 0·06 mm.,
triradiates of exhalant canals, sagittal, paired rays 0·17 to 0·37 by 0·016 to 0·032 mm., basal ray 0·13 to 0·26 by 0·012 to 0·032 mm.,
quadriradiates of exhalant canals, paired rays 0·23 to 0·33 by 0·02 to 0·032 mm., basal ray 0·14 to 0·27 by 0·02 to 0·03 mm., apical ray 0·06 by 0·016 to 0·02 mm.,
large endosomal triradiates, regular, rays 0·13 to 0·68 by 0·02 to 0·06 mm.,
small endosomal triradiates, sagittal, paired rays 0·12 to 0·2 by 0·016 to 0·02 mm., basal ray 0·08 to 0·12 by 0·016 to 0·02 mm.,
endosomal quadriradiates, similar to small gastral triradiates, apical ray 'short',
microxea of ectosomal and endosomal skeletons, lanceolate, 0·06 to 0·09 by 0·004 to 0·006 mm.

Distribution: Aleutian Islands; 95 m.



Text-fig. 143. *Leuconia prava* after Breitfuss: spicules, ×100; external form, ×3.

Named form: **Leuconia prava** Breitfuss

(text-fig. 143)

Leuconia prava Breitfuss, 1898: 100, pl. xi, figs. 3–19; *Leucandra prava*, Dendy and Row, 1913: 773; *L. parva* (*sic*), Topsent, 1937: 14; Arndt, 1941: 47.

Description: Sponge encrusting; surface hispid; vents scattered; texture firm; colour, in spirit, white; ectosomal skeleton a layer of large quadriradiates, with apical rays projecting into chamber layer; skeleton of chamber layer of oxea, microxea, triradiates and small quadriradiates irregularly-arranged; endosomal skeleton a tangential layer of small quadriradiates and triradiates.

Spicules: ectosomal quadriradiates, subregular, rays 0·15 to 1·0 by 0·05 to 0·11 mm.,
microxea of chamber layer, 0·05 to 0·06 by 0·004 mm.,
oxea of chamber layer, 0·2 to 0·5 by 0·02 to 0·027 mm.,
triradiates of chamber layer, subregular, rays 0·3 to 0·5 by 0·02 to 0·03 mm.,
small quadriradiates of chamber layer, cruciform, long axis 0·16 to 0·2 mm., short axis 0·55 to 0·65 mm., thickness of rays 0·01 mm.,
endosomal quadriradiates, cruciform, similar to those of chamber layer,
endosomal triradiates, subregular, rays 0·15 to 0·25 by 0·01 to 0·015 mm.

Distribution: Portugal.

Named form: **Leucetta primigenia** Haeckel

? *Sycothamnus fruticosus* Haeckel, 1870: 246; ? *Lipostomella clausa* Haeckel, 1870: 249; *Leucetta primigenia* Haeckel 1872: 118; *Dyssycus primigenius* (pars) Haeckel, 1872: 118, pl. xxi, fig. 1 (pars) *Lipostomella primigenia* (pars) Haeckel, 1872: 118, pl. xxi, fig. 2; *Coenostomus primigenius* Haeckel, 1872: 118, pl. xxi, figs. 4, 7–8; *Artynas primigenius* Haeckel, 1872: 118, pl. xxi, fig. 3; *Aphroceras primigenium* (pars) Haeckel, 1872: 118, pl. xxi, fig. 15; *Leucometra primigenia* Haeckel, 1872: 118, pl. xxi, fig. 5; *Leucetta isoraphis* Haeckel, 1872: 118, pl. xxi, figs. 1–9; ?? *L. megaraphis* Haeckel, 1872: 119; *Leuconia fruticosa*, Poléjaeff, 1883: 64, pl. ii, fig. 4; *Leucetta primigenia*, Urban, 1909: 19, pl. iii, figs. 17–35; *Leucandra primigenia*, Row, 1909: 186; Dendy and Row, 1913: 734; Burton, 1926: 71; *L. isoraphis*, var. *apicalis* Brøndsted, 1931: 21; *L. primigenia*, Topsent, 1934: 9.

Description: Sponge solitary or compound, tubular, clathrate with tubular vents, or lobose; surface even, harsh; vents apical, naked; texture firm; colour, in spirit, white, yellow or brown; skeleton of triradiates, arranged tangentially in ectosomal and endosomal skeletons, irregularly-arranged in chamber layer.

Spicules: triradiates, regular to subregular, rays 0·1 to 0·2 by 0·009 to 0·014 mm.

Distribution: Mediterranean (Messina); Morocco; West Indies (Cuba, St. Thomas); Red Sea; Indian Ocean (Ceylon); Australia (Cape St. Vincent, Bass Straits); South America (Valparaiso); Viti Islands, South Pacific; Kerguelen: Heard Island; 37–220 m.

Remarks: Brøndsted (1931: 18–20) had, in a sense, anticipated Sasaki's work on the spicules of *Sycon okadai* by his table showing the dimensions of the rays of triradiates in *Leucetta primigenia*. Although that species is difficult to define, we may suppose that the 55 specimens listed were all sufficiently alike to influence even Brøndsted into thinking them conspecific. Yet his table shows an almost perfect gradation, from one individual to another, from rays 0·145 to 1·5 mm. long.

Named form: **Leucetta prolifera** (Carter)

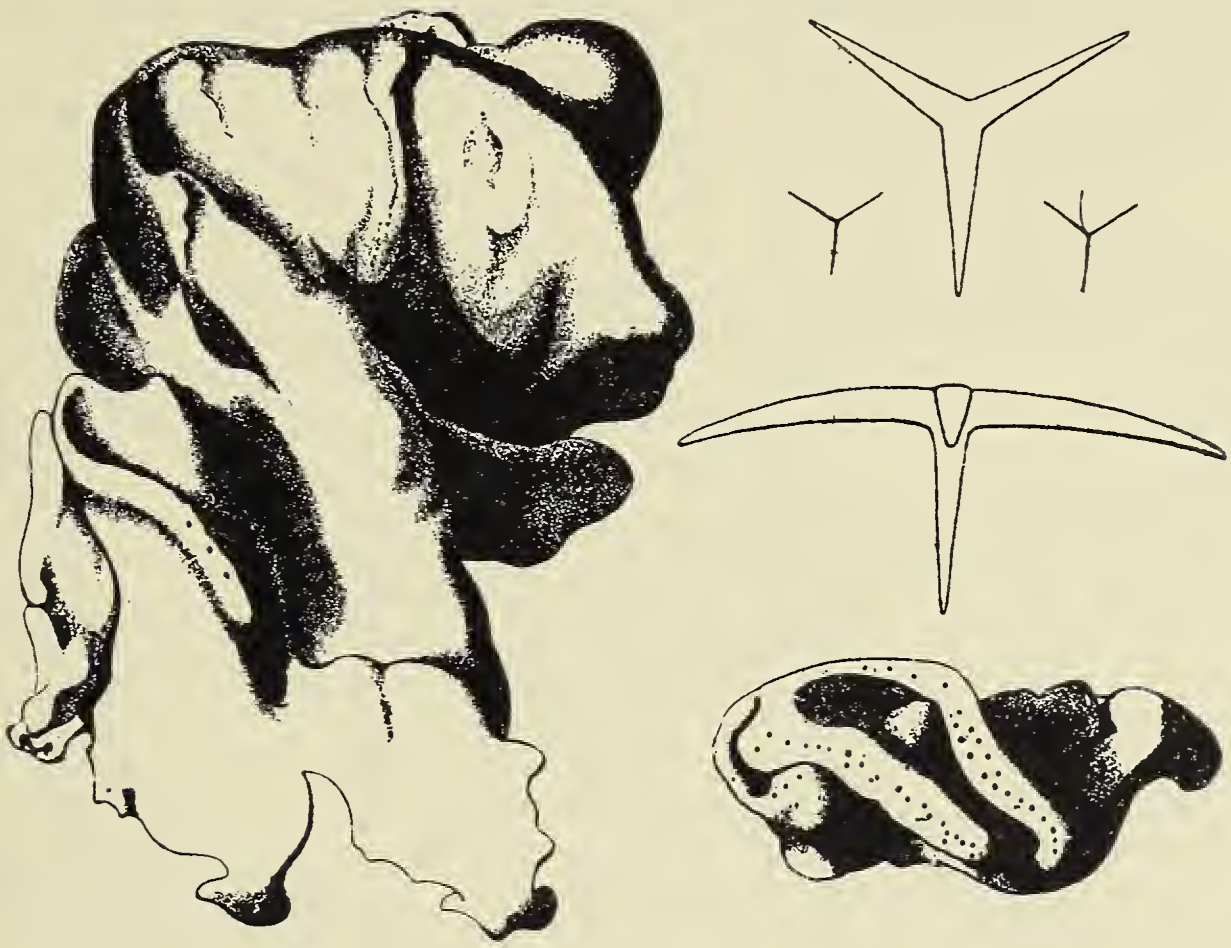
(text-fig. 144)

Teichonella prolifera Carter, 1878: 35, pl. ii, figs. 1–5; Carter, 1886; 146; Lendenfeld, 1886: 1141; *Leucilla prolifera*, Dendy, 1892: 115; *Leucetta prolifera*, Dendy and Row, 1913: 734.

Description: Sponge massive, irregularly lamellate and proliferous, sessile; surface even, harsh; vents small, in linear series on summits of lamellae, naked; texture firm; colour, in spirit, yellowish-white; ectosomal skeleton a tangential layer of large and small triradiates; skeleton of chamber layer of large and small triradiates irregularly-arranged; endosomal skeleton a tangential layer of quadriradiates.

Spicules: large triradiates, of ectosomal and chamber layers, regular, rays 0·52 mm. long, small triradiates, of ectosomal and chamber layers, regular, rays 0·13 mm. long, endosomal quadriradiates, similar to small triradiates but with apical rays.

Distribution: Australia (Port Phillip Heads, Fremantle).



Text-fig. 144. *Leucetta prolifera* after Carter: spicules, ×100; external form (side view, to left, top view, to right), natural size.

Named form: **Leuconia pumila** Bowerbank

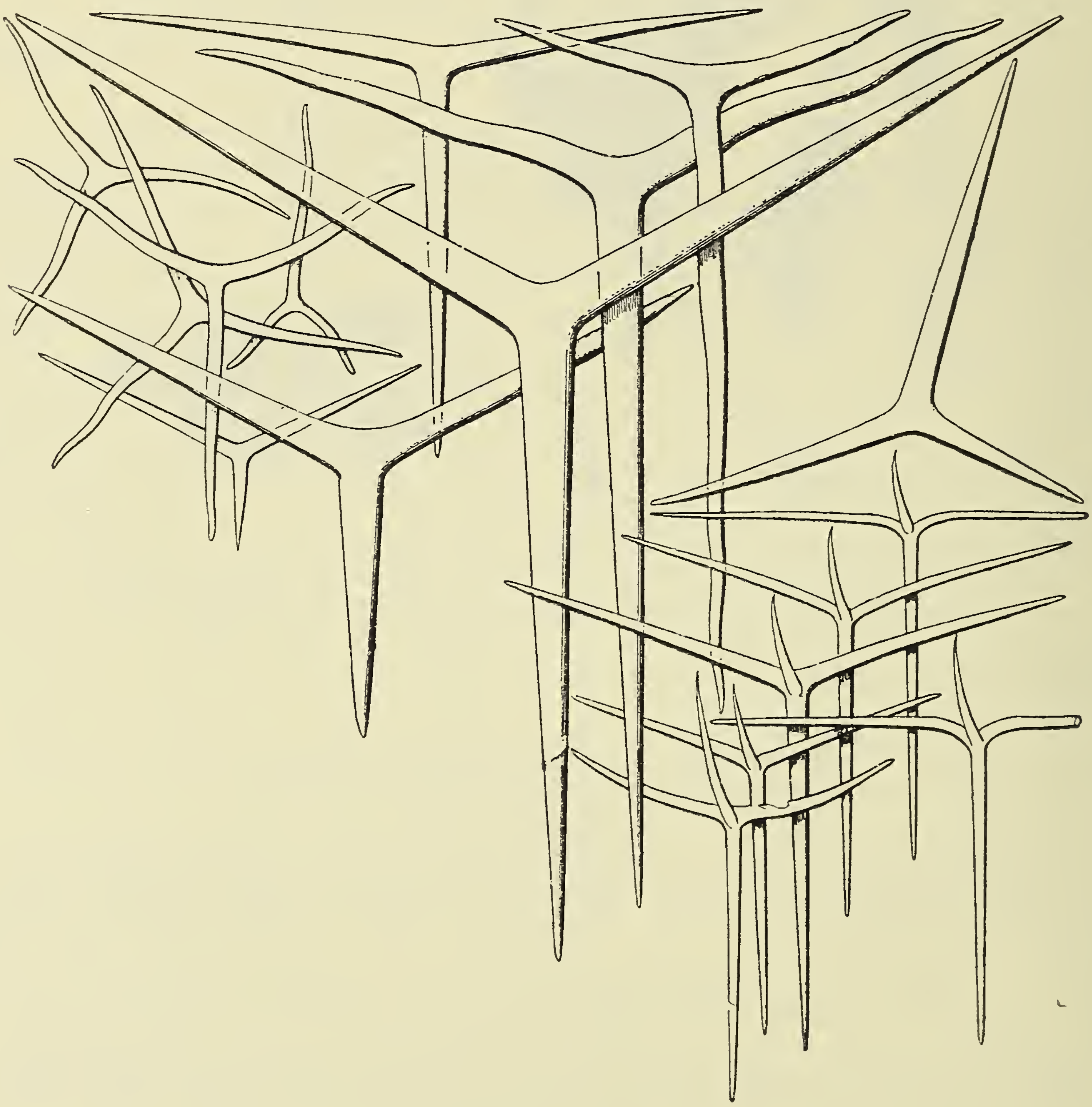
(text-figs. 145–146)

Leuconia pumila Bowerbank, 1866: 41; Gray, 1867: 556; *Dyssyconella pumila*, Haeckel, 1870: 242; *Leucaltis pumila*, Haeckel, 1872: 148, pl. xxvii, fig. 2; *Dyssycus pumilus*, Haeckel, 1872: 148; *Dyssyconella pumila*, Haeckel, 1872: 149; *Lipostomella pumila*, Haeckel, 1872: 149; *Leucaltis normanni* (=*L. pumila*, var. *normanni*), Haeckel, 1872: 149; *Leuconia pumila* Bowerbank, 1874: 13, pl. vi, figs. 1–5; Bowerbank, 1882: 26; *Leucaltis pumila*, Lackschewitsch, 1886: 338; *Leuconia pumila*, Lackschewitsch, 1886: 304; *Leucandra pumila*, Dendy, 1892: 104; *Leuconia pumila*, Topsent, 1891: 526; *Leucandra pumila*, Topsent, 1892: 23; Hanitsch, 1894: 183; Topsent, 1895: 214; Dendy and Row, 1913: 774; Prenant, 1927: 6; Topsent, 1934: 11; Topsent, 1937: 7; Hozawa 1940: 155, pl. vii, fig. 14, text-fig. 9; *Leuconia pumila*, Lévi, 1951: 5.

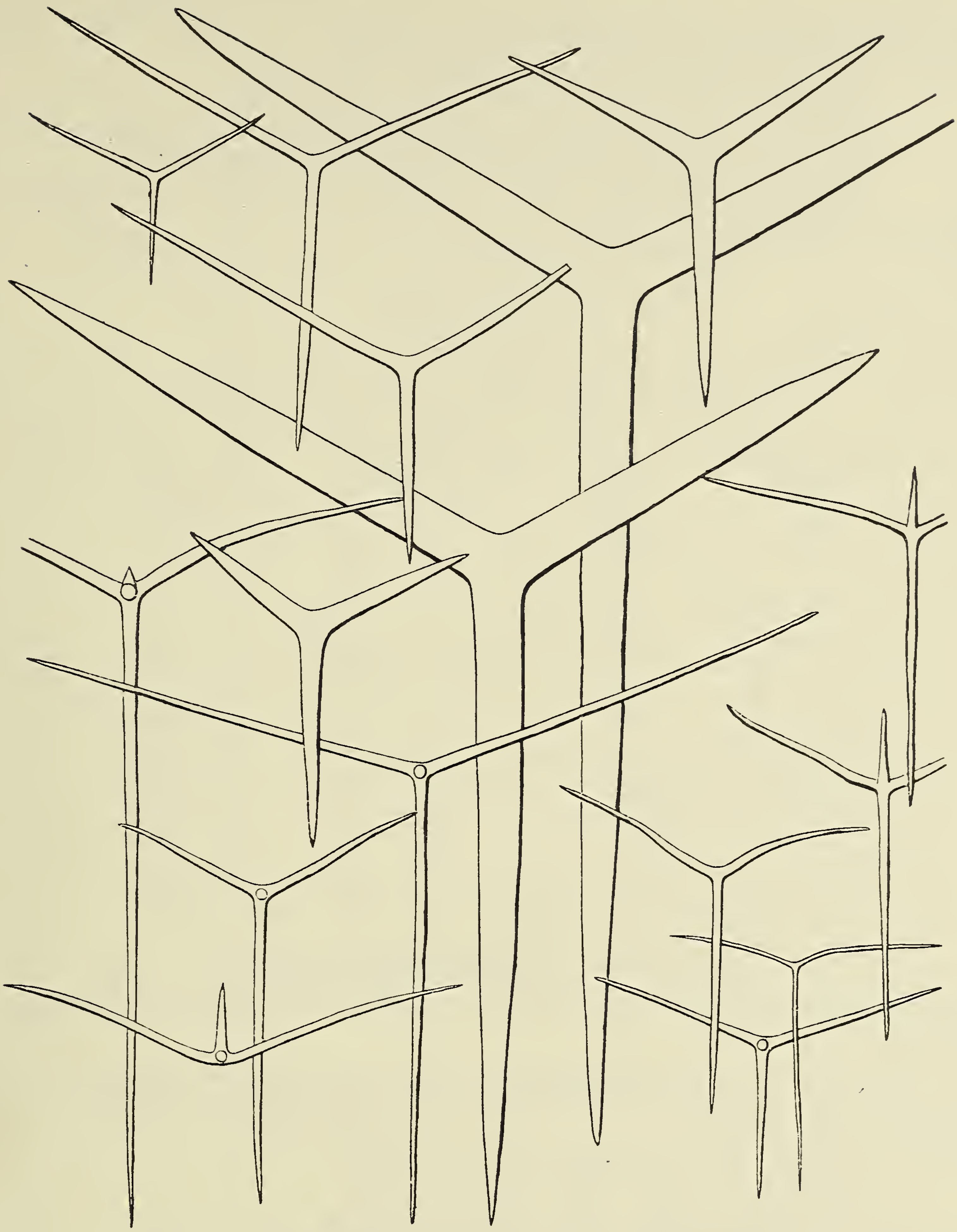
Description: Sponge subspherical, hemispherical or cylindrical, sessile; surface even, non-hispid; vent apical, naked; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of large and small triradiates; skeleton of chamber layer of large and small triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: large ectosomal triradiates, regular to sagittal, rays 0·6 to 1·2 by 0·03 to 0·08 mm., small ectosomal triradiates, regular to sagittal, rays 0·2 to 0·3 by 0·01 to 0·02 mm., large triradiates of chamber layer, similar to large ectosomal triradiates, small triradiates of chamber layer, similar to small ectosomal triradiates, endosomal quadriradiates, sagittal; paired rays 0·15 to 0·3 by 0·01 to 0·02 mm., basal rays 0·25 to 0·35 by 0·01 to 0·02 mm., apical ray 0·05 to 0·15 by 0·01 to 0·02 mm.

Distribution (*Summary*): Channel Islands; France; Spain; Mediterranean; Morocco; Azores; Mexico; South Africa; Australia; littoral to 1,262 m., on sand, shells, rock, gravel or pebbles.



Text-fig. 145. *Leuconia pumila*: spicules, after Haeckel, × 100.



Text-fig. 146. *Leuconia pumila*: spicules, after Hozawa, × 100.

Named form: **Leucetta pyriformis** Dendy

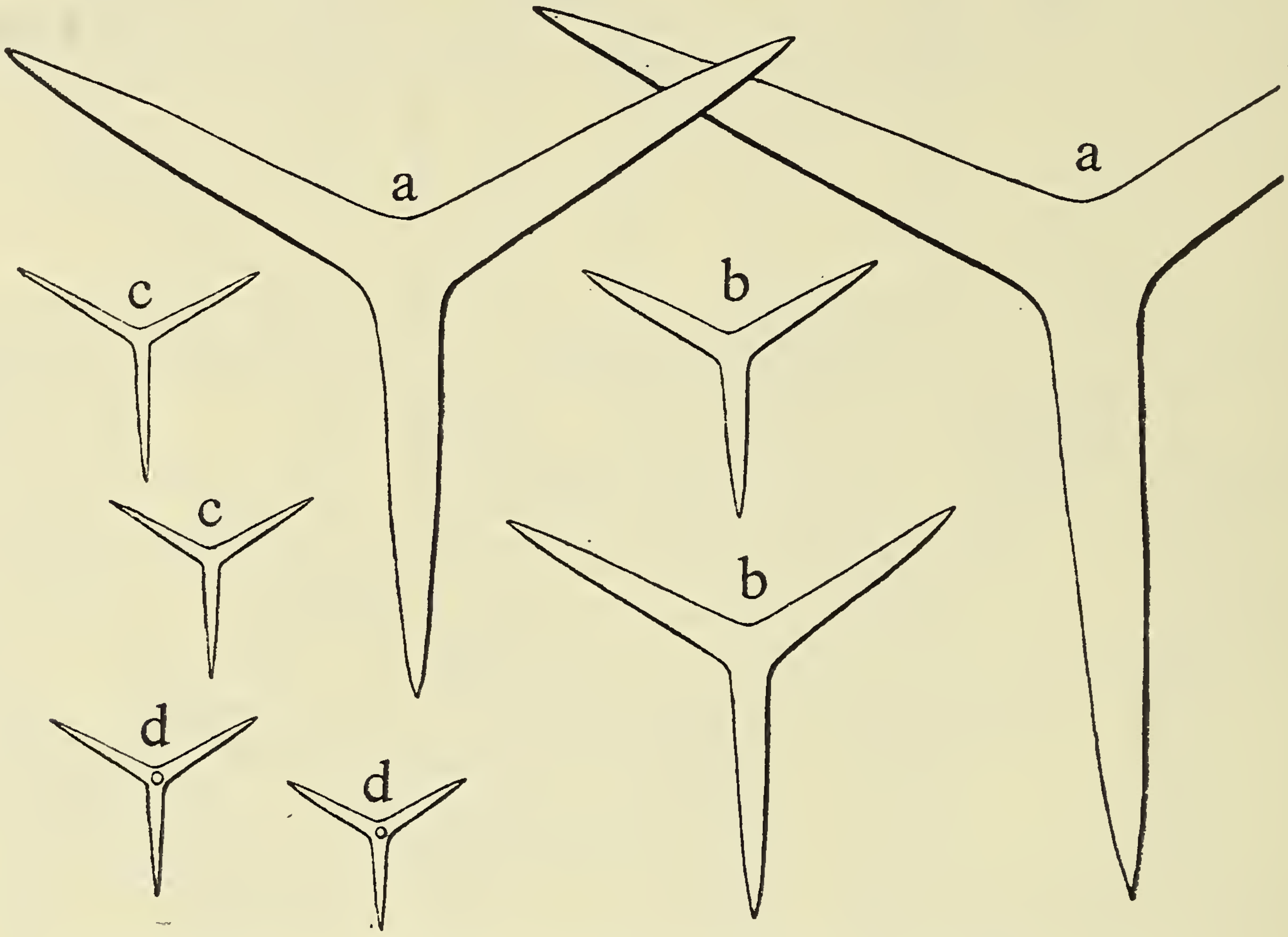
(text-fig. 147)

Leucetta pyriformis Dendy, 1913: 11, pl. i, fig. 7, pl. iv, fig. 3; Dendy and Row, 1913; 734; Tanita, 1943: 392, pl. xiii, fig. 26, text-fig. 9.

Description: Sponge solitary, pyriform, sessile; surface even, harsh; vent apical, naked; texture firm; colour, in spirit, light brown; ectosomal skeleton of several tangential layers of large and small triradiates; skeleton of chamber layer of large and small triradiates; endosomal skeleton of several layers of small triradiates and quadriradiates.

Spicules: ectosomal triradiates, large, regular, rays 1·0 by 0·1 mm.,
ectosomal triradiates, small, regular, rays 0·17 by 0·013 mm.,
triradiates of chamber layer, large and small, similar to those of ectosomal skeleton,
endosomal triradiates, similar to small triradiates of ectosomal skeleton,
endosomal quadriradiates, similar to triradiates but with an apical ray, 0·17 by 0·013 mm.

Distribution: Indian Ocean (Cargados Carajos); Japan (Okinawa); littoral to 82 m.



Text-fig. 147. *Leucetta pyriformis*: spicules × 100, after Tanita.

Named form: **Leucandra regina** Brøndsted

Leucandra regina Brøndsted 1926: 315, text-fig. 11; *L. regina* var. *regularis* Brøndsted 1926: 316, text-fig. 12.

Description: Sponge small, conical; surface smooth; vent apical; texture elastic; colour white; skeleton of small to large triradiates in choanosome, with ectosomal skeleton of microxea; endosomal skeleton of quadriradiates.

Spicules: microxea, 0·03 to 0·05 by 0·002 to 0·004 mm.,
triradiates, rays up to 1·0 by 0·05 to 0·1 mm.,
quadriradiates, rays 0·17 to 0·2 by 0·015 mm.

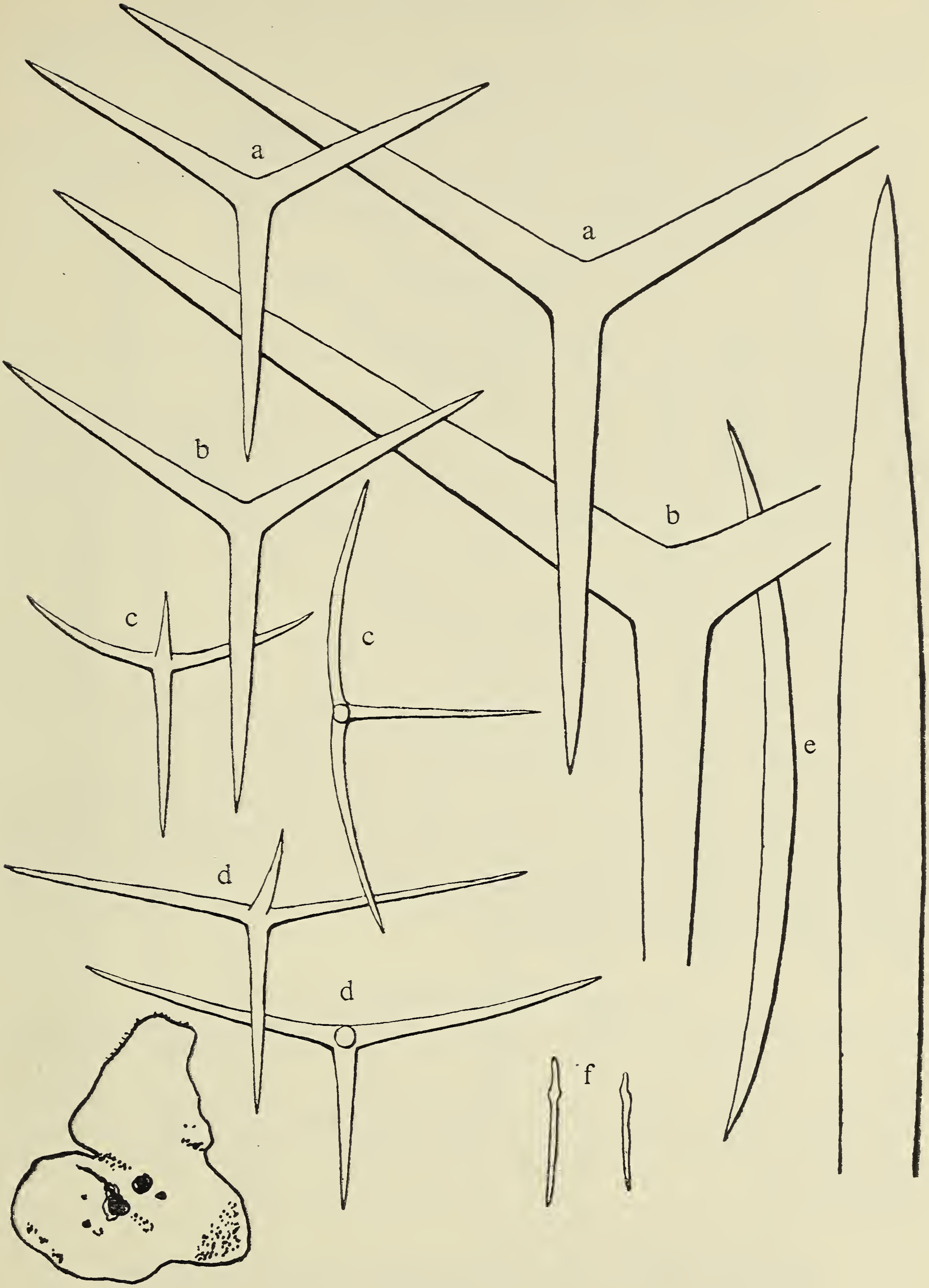
Distribution: New Zealand (Queen Charlotte Sound, Slipper Island); 0–18 m.

Named form: **Leucandra rigida** Hozawa

(text-fig. 148)

Leucandra rigida Hozawa, 1940: 44, pl. iv, fig. 3, text-fig. 5; Tanita, 1943: 445.

Description: Sponge irregular, massive; surface hispid; vents on chimney-like craters; texture rigid; colour, in spirit, white; ectosomal skeleton of triradiates with oxea projecting from surface and microxea also set at right angles to surface; skeleton of chamber layer of triradiates of varying size irregularly scattered; endosomal skeleton of quadriradiates and microxea.



Text-fig. 148. *Leucandra rigida* after Hozawa: spicules, as originally figured, ×100, f. ×350; external form drawn from a published photograph, natural size.

a. ectosomal triradiates; b. tubar triradiates; c. quadriradiates of larger exhalant canals; d. subendosomal quadriradiates; e. oxea; f. subendosomal microxea (much enlarged as compared with remaining spicules).

Spicules: ectosomal triradiates, regular or subregular, rays 0·1 to 0·77 by 0·01 to 0·06 mm.,
oxea, 0·26 to 0·9 by 0·01 to 0·038 mm.,
ectosomal microxea, 0·05 by 0·002 mm.,
tubar triradiates, regular, rays 0·2 to 0·9 by 0·02 to 0·09 mm.,
quadriradiates, sagittal, paired rays 0·14 to 0·21 by 0·008 to 0·01 mm., basal ray 0·1 to 0·14 by 0·008 to 0·01 mm., apical ray 0·06 to 0·31 by 0·006 to 0·008 mm.,
endosomal microxea, 0·06 to 0·07 by 0·003 to 0·004 mm.

Distribution: Japan (Miye Prefecture).

Named form: **Leuconia rudifera** Poléjaeff

(text-fig. 149)

Leuconia rudifera Poléjaeff, 1883: 58, pl. vii, fig. 3; *Leucandra rudifera*, Thacker, 1908: 773, pl. xl, fig. 7, text-fig. 164; Dendy and Row, 1913: 773.

Description: Sponge ovoid to irregularly-massive, solitary, sessile; surface even, minutely hispid; vents apical, with fringe; texture firm; colour, in spirit, white to pale yellow; ectosomal skeleton a tangential layer of triradiates, oxea, only slightly projecting at surface, and microxea; skeleton of chamber layer of irregularly-scattered triradiates; endosomal skeleton a tangential layer of quadriradiates, with grapnel spicules projecting into cloacal cavity.

Spicules: ectosomal triradiates, subregular, rays 0·35 by 0·022 mm. (rarely with incipient apical ray),
oxea, 1·5 to 2·5 by 0·055 to 0·06 mm.,
microxea, 0·15 to 0·3 by 0·002 to 0·003 mm.,
triradiates of chamber layer, regular to subregular, rays 0·35 to 0·45 by 0·034 to 0·045 mm.,
endosomal quadriradiates, paired rays 0·35 by 0·015 mm., basal rays 0·2 by 0·015 mm., apical rays 0·05 to 0·12 by 0·015 mm. (rarely triradiate in form),
grapnel-spicules, 0·06 to 0·068 by 0·007 to 0·014 mm.

Distribution: Bermudas: Cape Verde Islands, West Africa, South Africa; littoral to 59 m.

Remarks: I have examined two specimens, one from South Africa and another from West Africa, both of which clearly belong to *L. rudifera*. Another specimen (B.M.35.10.21.44), from South Africa (Oudekraal), collected by Professor T. A. Stephenson, was identified by me twenty years ago as a specimen of *L. pumila* lacking oxea. Having re-examined it again I regard it as a specimen of *L. rudifera*. This species appears, therefore, not only to be widely spread over the Atlantic, but also closely related to *L. pumila*.

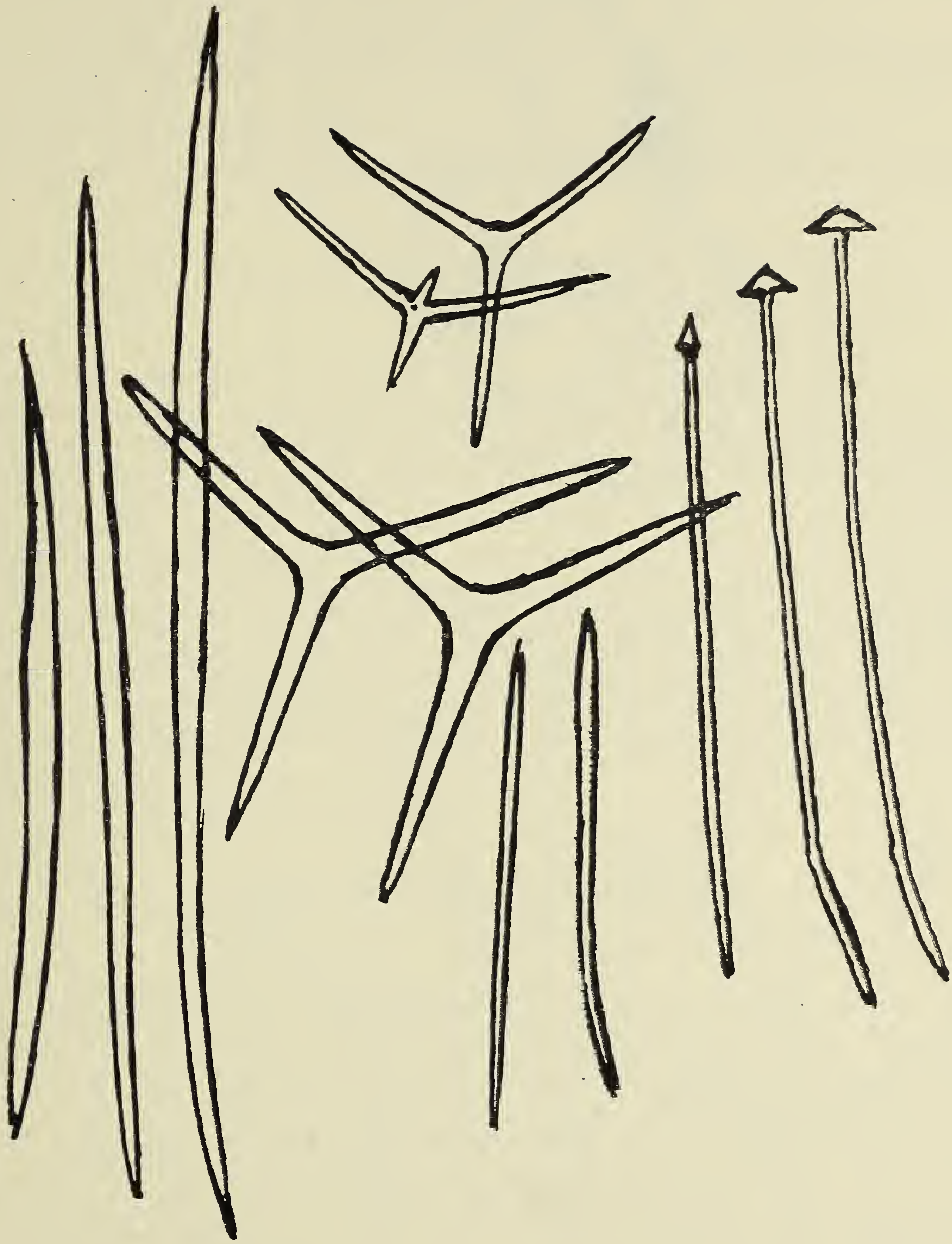
Named form: **Leuconia sagittata** (Haeckel)

Leucetta sagittata Haeckel, 1872: 125, pl. xxii, fig. 2; *Artynas sagittatus* Haeckel, 1872: 125, pl. xxii, fig. 2; *Leucandra sagittata*, Dendy and Row, 1913: 774; *Leuconia sagittata*, de Laubenfels, 1932: 11.

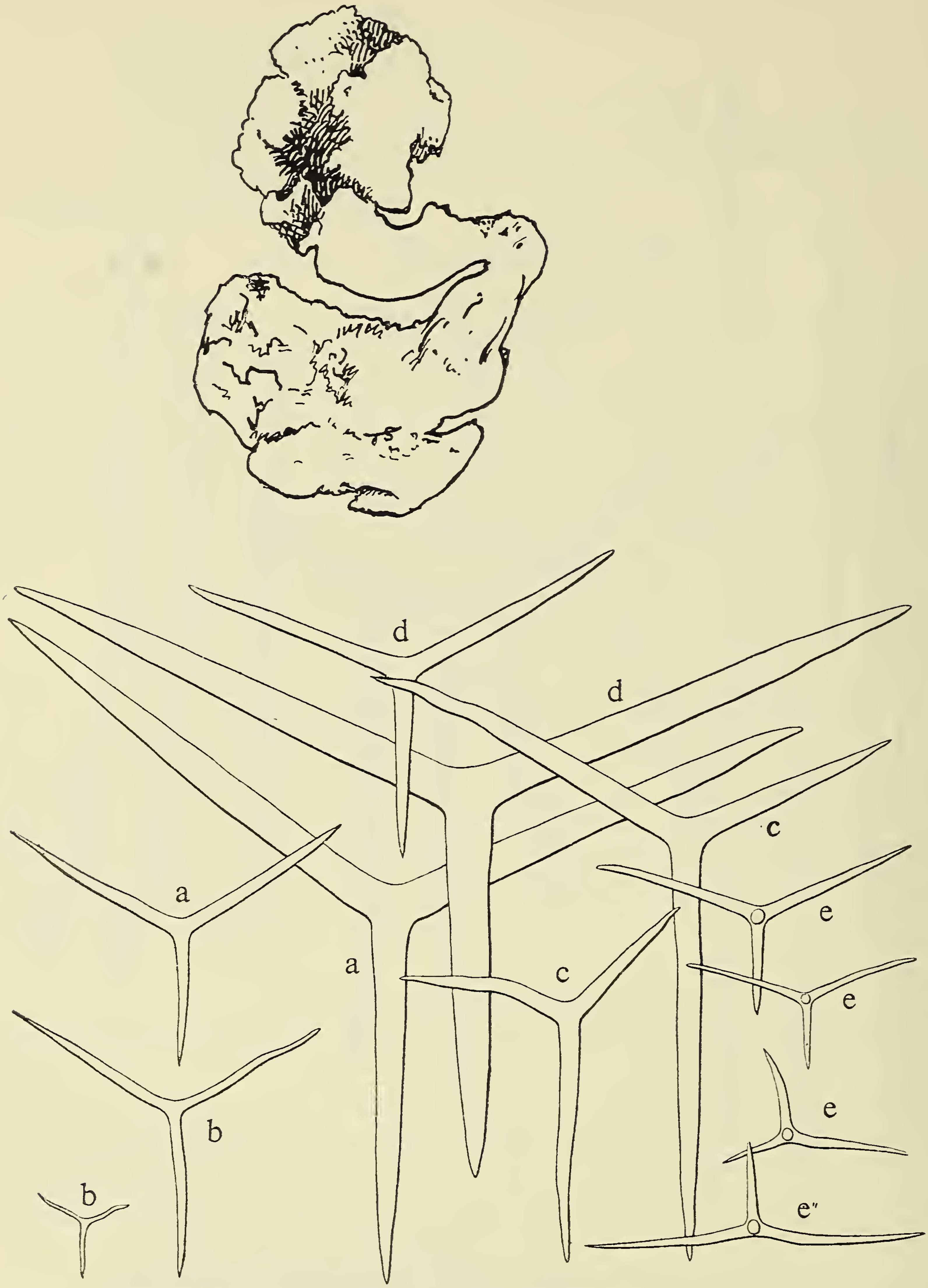
Description: Sponge a clathrate mass of anastomosing tubes, with short, erect tubes; surface even, non-hispid; vents apical on erect tubes, naked; texture (?); colour, in spirit, brown; ectosomal skeleton a tangential layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·4 to 0·6 by 0·05 to 0·06 mm., basal ray 0·7 to 0·8 by 0·05 to 0·06 mm.,
triradiates of chamber layer, sagittal, paired rays 0·2 to 0·3 by 0·02 to 0·03 mm., basal ray 0·4 to 0·5 by 0·02 to 0·03 mm.,
endosomal triradiates, sagittal, paired rays 0·1 to 0·2 by 0·01 to 0·02 mm., basal ray 0·3 to 0·4 by 0·01 to 0·02 mm.

Distribution: California.



Text-fig. 149. *Leucandra rudifera*: spicules, after Thacker (1908), × 100, except for small oxea and grapnel-spicules, (to right of picture) which are × 480 and × 2000 respectively.



Text-fig. 150. *Vosmaeropsis simplex* after Hozawa: spicules as originally drawn, × 100, external form drawn from a published photograph, natural size. Hozawa originally described the spicules as follows: a. large dermal triradiates; b. small dermal triradiates; c. subdermal triradiates; d. tubar triradiates; e, e″. gastral quadriradiates. A better interpretation would be to call b, and also the smaller of the spicules marked a, the dermal (now ectosomal) triradiates and the larger of the two so-called large dermal triradiates a tubar triradiate, homologous with d.

Named form: **Leucascus simplex** Dendy

Leucascus simplex Dendy, 1892: 77; Kirk, 1898: 313; Dendy, 1913: 9, pl. i, fig. 5, pl. iv, fig. 1; Dendy and Row, 1913: 731; Row and Hozawa, 1931: 742.

Description: Sponge solitary, irregularly massive to spherical, sessile; surface even, smooth; vents small, scattered; texture firm; colour, in spirit, (?); skeleton of triradiates, occasionally with incipient apical rays.

Spicules: triradiates, regular, rays 0·1 by 0·01 mm. (occasionally quadriradiate).

Distribution: Australia (Port Jackson, Port Phillip); Indian Ocean (Providence); 92–143 m.

Named form: **Vosmaeropsis simplex** Hozawa

(text-fig. 150)

Vosmaeropsis simplex Hozawa, 1940: 144, pl. vi, fig. 7, text-fig. 5.

Description: Sponge an irregularly-massive, sub-clathrate group of tubular individuals; surface smooth, uneven; vents apical on tubes; texture firm, harsh to touch; colour, in spirit, greyish-white; ectosomal skeleton of triradiates, of two sizes; skeleton of chamber layer including occasional subectosomal pseudosagittal triradiates and irregularly arranged triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, subregular, of two sizes, rays 0·054 to 0·212 by 0·008 to 0·012 and 0·16 to 0·6 by 0·02 to 0·045 mm. respectively,
subectosomal pseudosagittal triradiates, paired rays, unequal, 0·18 to 0·425 by 0·026 to 0·032 mm., basal ray 0·32 to 0·53 by 0·028 to 0·038 mm.,
triradiates of chamber layer, subregular, rays 0·23 to 0·62 by 0·024 to 0·056 mm.,
endosomal quadriradiates, sagittal, paired rays 0·126 to 0·21 by 0·01 to 0·016 mm., basal ray 0·075 to 0·1 by 0·01 to 0·016 mm., apical ray 0·097 to 0·11 by 0·01 to 0·014 mm.

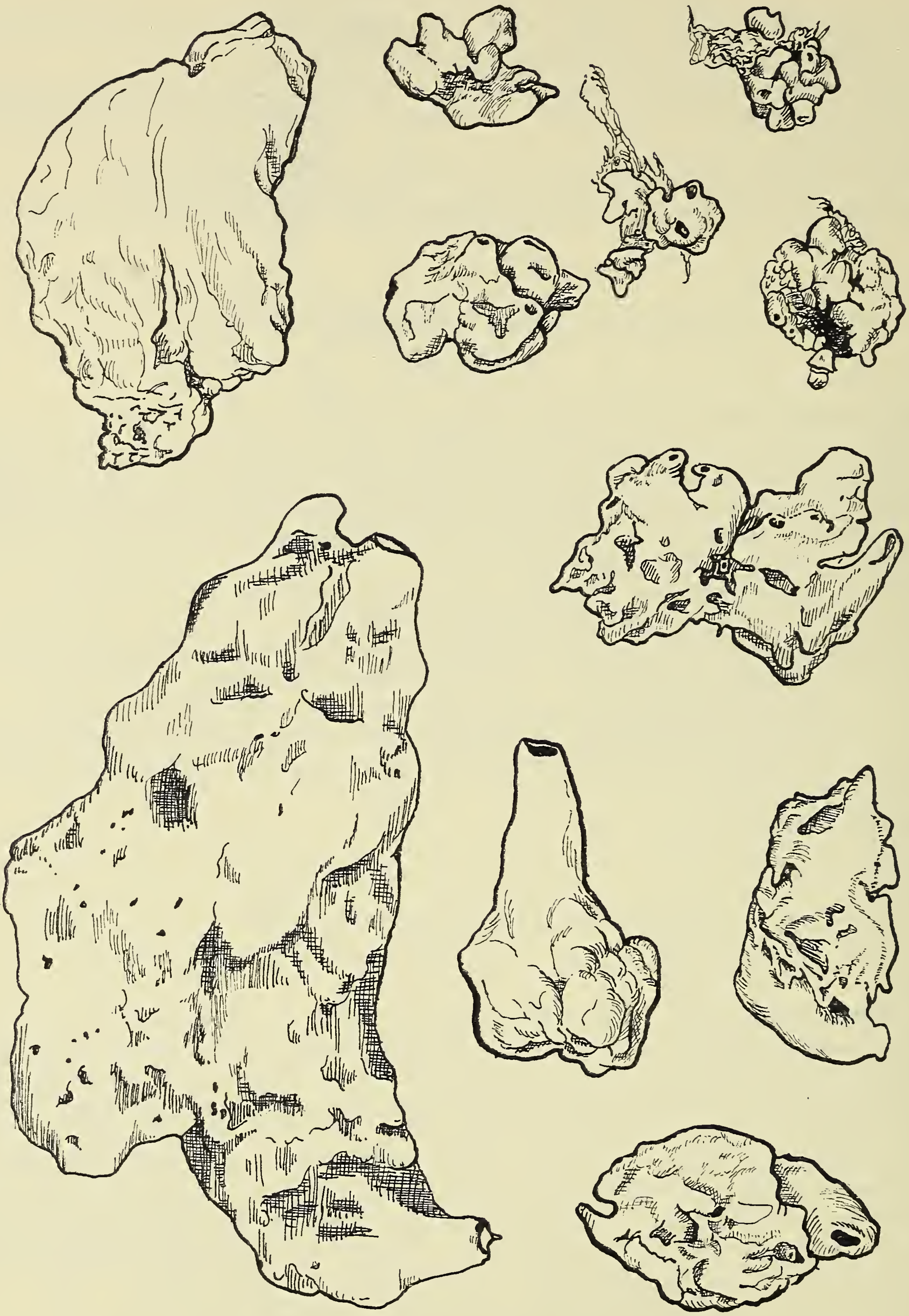
Distribution: Naples.

Named form: **Leucetta solida** (Schmidt)

(text-figs. 151–154; see also text-figs. 112 and 125)

Grantia solida Schmidt, 1862: 18, pl. i, fig. 7; Schmidt, 1864: 23; *Dyssycum solidum*, Haeckel, 1870: 241; *Leuconia solida*, Haeckel, 1870: 247; *Leucaltis solida*, Haeckel, 1872: 151, pl. xxvii, fig. 3; *Dyssycus solidus*, Haeckel, 1872: 152: *Dyssyconella solida*, Haeckel, 1872: 152; *Lipostomella solida*, Haeckel, 1872: 152; *Amphoriscus solidus*, Haeckel, 1872: 152; *Amphorula solida*, Haeckel, 1872: 152; *Aphroceras solidum*, Haeckel, 1872: 152; *Leucometra solida*, Haeckel, 1872: 152; *Leucetta solida*, Haeckel, 1872: 152; *Leucandra solida*, Haeckel, 1872: 142; *Leucaltis solida*, Vosmaer, 1881: 5; *Leucetta solida*, Lendenfeld, 1891: 303, pl. xi, fig. 76, pl. xv, figs. 130–131; Dendy and Row, 1913: 734; Topsent, 1934: 9; Breitfuss, 1935: 435; de Laubenfels, 1950: 34, fig. 23; *Leuconia kaiana* de Laubenfels, 1941: 268, fig. 18; *L. solida*, de Laubenfels, 1951: 269; *L. dentata* Sarà, 1951: 2, pl. i, fig. 2, text-figs. 1A–B, 2; *L. globosa* Sarà (*nec* Schmidt), 1951: 6, pl. i, figs. 3–6, text-figs. 1C–D, 3; *L. solida*, Sarà, 1953: 1, pl. i, figs. 1–6, text-figs. 1–5.

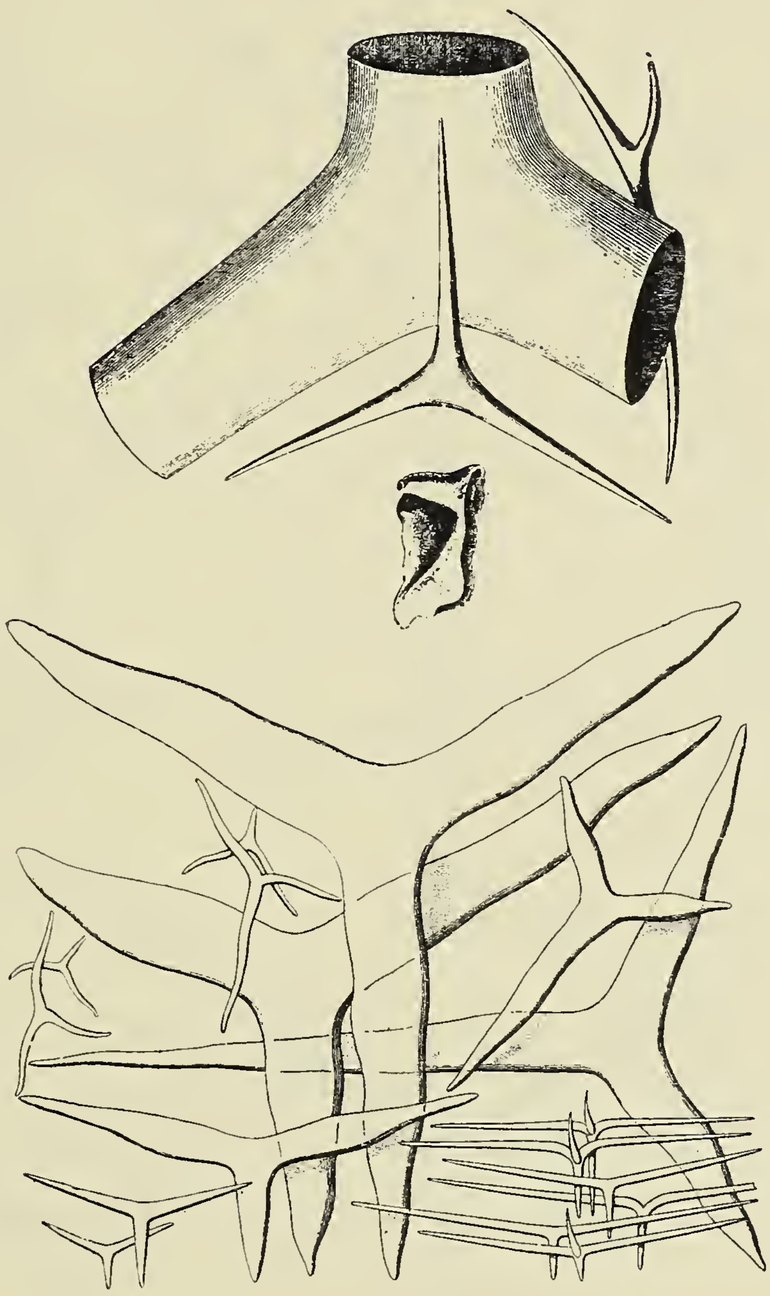
Description: Sponge solitary, subspherical to ovate or tubular, sessile; surface even, harsh; vents apical, naked; texture firm; colour, in spirit, white to yellow; ectosomal skeleton a tangential layer of large and small triradiates; skeleton of chamber layer of large and small triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.



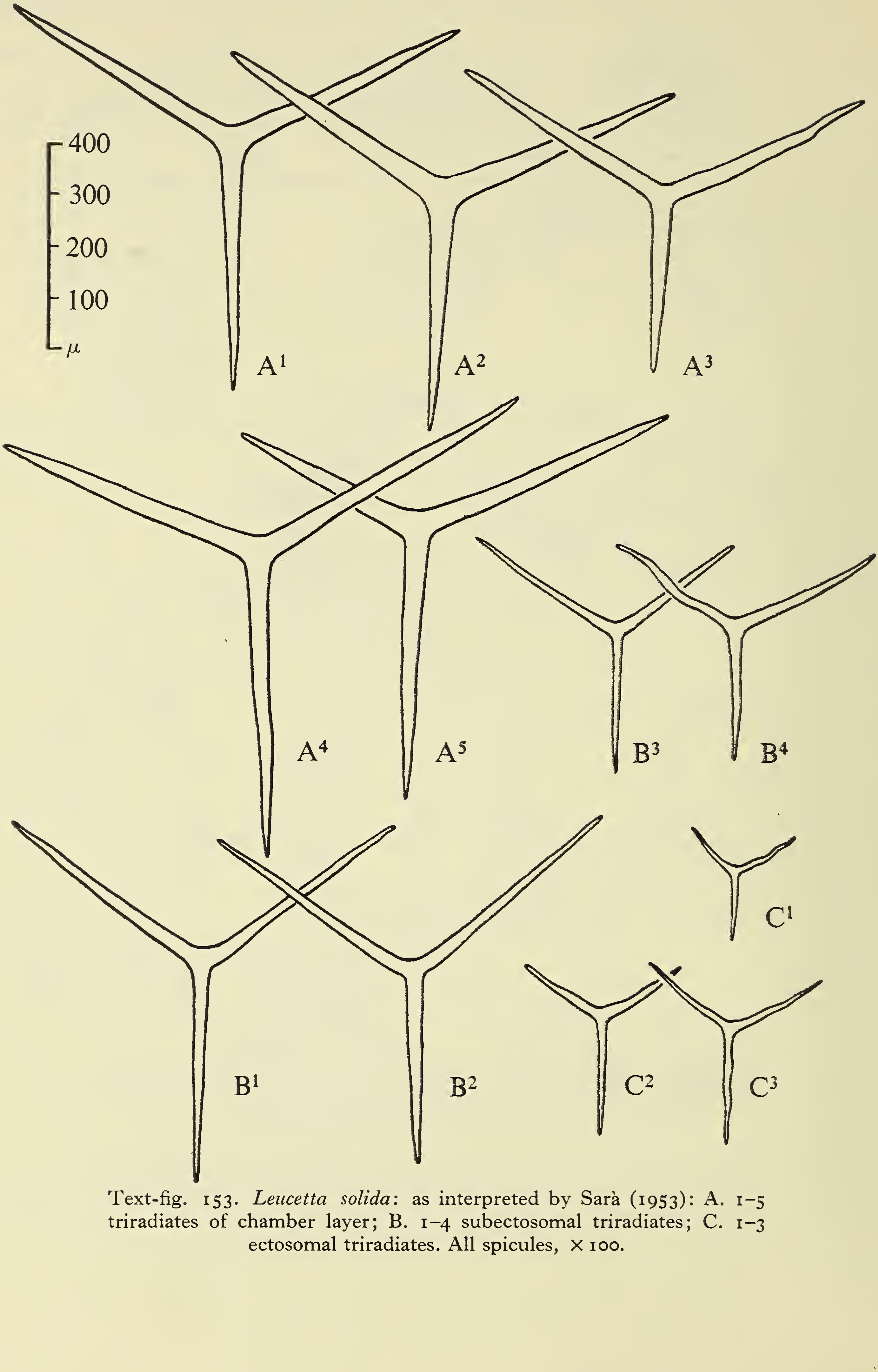
Test-fig. 151. *Leuconia solida*: a series of specimens from Naples identified under this name by Sarà (1953), to show range in form and size, all $\times\frac{3}{5}$, with *L. dentata* Sarà (bottom left), from the same locality and to the same scale, to show their similarity in form.

Spicules: large triradiates, of ectosomal and chamber layers, regular, rays 0·7 to 2·0 by 0·08 to 0·15 mm.,
small triradiates, of ectosomal and chamber layers, regular, rays 0·1 to 0·3 by 0·005 to 0·015 mm.,
endosomal triradiates, similar to small triradiates of ectosomal and chamber layers,
endosomal triradiates, sagittal, paired rays 0·15 to 0·3 by 0·008 to 0·02 mm., basal rays 0·05 to 0·1 by 0·003 to 0·008 mm.,
endosomal quadriradiates, similar to sagittal triradiates, with apical rays 0·05 to 0·3 by 0·003 to 0·01 mm.

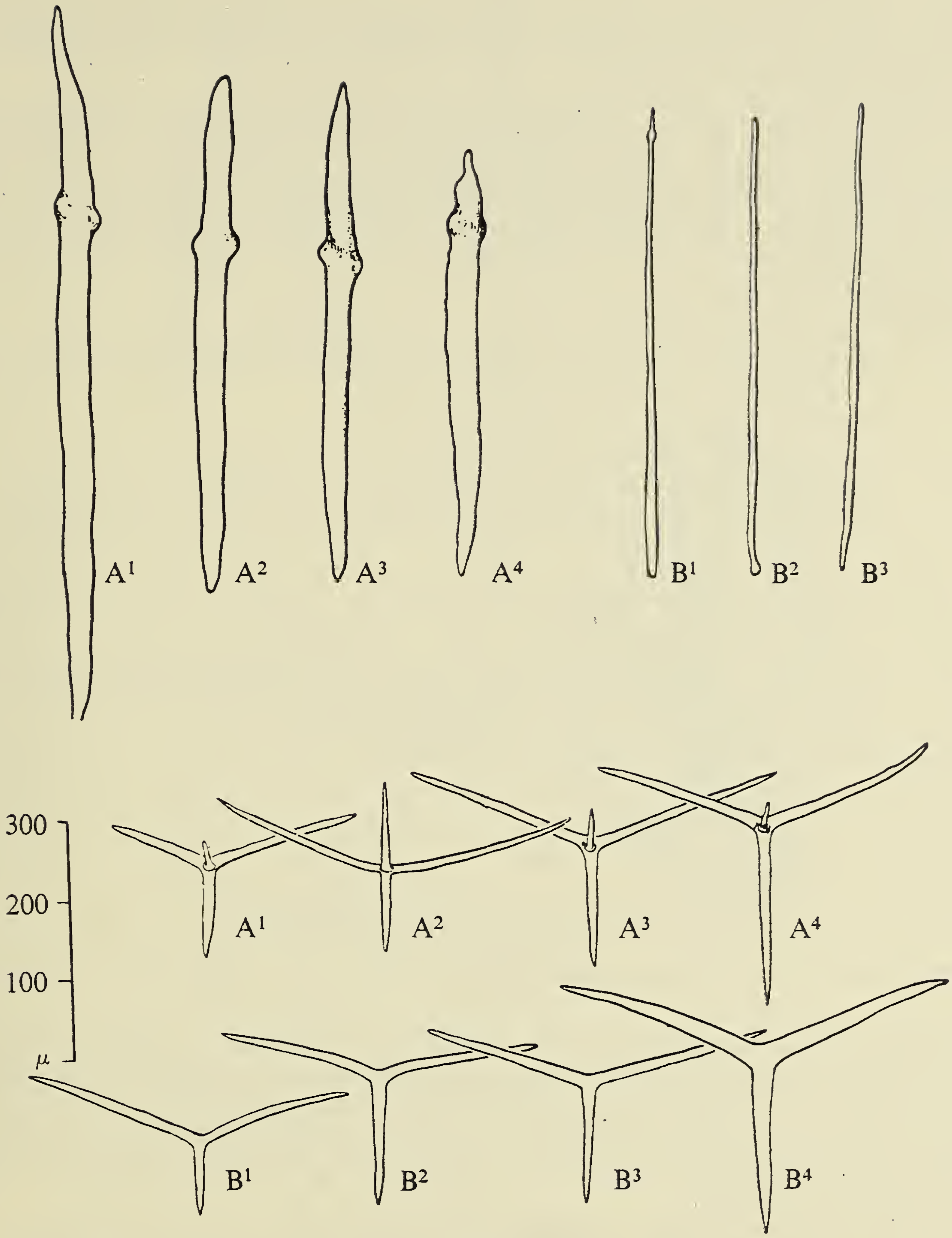
Distribution: Mediterranean; Hawaii; 2–40 m.



Text-fig. 152. *Leucetta solida*, showing external form (centre), natural size, a group of spicules (above) as drawn for Schmidt (1862) and (below) as portrayed by Haeckel (1872).



Text-fig. 153. *Leucetta solida*: as interpreted by Sarà (1953): A. 1–5 triradiates of chamber layer; B. 1–4 subectosomal triradiates; C. 1–3 ectosomal triradiates. All spicules, × 100.



Text-fig. 154. *Leucetta solida* as interpreted by Sarà (1953). Above, A. 1–4 and B. 1–3 microxea; below, A. 1–4 endosomal and subendosomal quadriradiates, B. 1–4 endosomal and subendosomal triradiates.

Named form: **Leucandra solida** Hozawa

(text-fig. 155: cf. also text fig. 112)

Leucandra solida Hozawa, 1929: 362, pl. xxi, figs. 59, 60, text-fig. 30; *Leuconia losangelensis* de Laubenfels, 1930: 25; *Leucetta losangelensis* de Laubenfels, 1932: 13, fig. 6; de Laubenfels, 1935: 2; *Leucandra solida*, Tanita, 1943: 445.

Description: Sponge massive, irregular, with several vents (1–15 mm. diameter) of which largest is slit-like, leading into an irregularly branching cloacal cavity; surface corrugated, hispid; texture coarse, brittle; colour, in spirit, greyish-white; ectosomal skeleton of several layers of large and small triradiates, with oxea and microxea set at varying angles to surface; skeleton of chamber layer of large triradiates, with smaller quadriradiates lining exhalant canals; endosomal skeleton a few layers of smaller triradiates and quadriradiates, a few large triradiates and microxea set at varying angles to surface.

Spicules: large ectosomal triradiates, regular, rays 0·32 to 0·65 by 0·04 to 0·1 mm.,
small ectosomal triradiates, sagittal, paired rays 0·11 to 0·22 by 0·012 to 0·024 mm., basal ray 0·13 to 0·25 by 0·012 to 0·024 mm.,
oxea, 0·42 to 0·9 by 0·016 to 0·03 mm.,
ectosomal microxea, 0·03 to 0·08 by 0·004 to 0·006 mm.,
triradiates of chamber layer, regular, rays 0·32 to 0·65 by 0·04 to 0·1 mm.,
quadriradiates lining exhalant canals, sagittal, paired rays 0·15 to 0·2 by 0·016 to 0·02 mm., basal ray 0·1 to 0·17 by 0·016 to 0·02 mm., apical ray 0·05 to 0·09 by 0·008 to 0·012 mm.,
small endosomal triradiates, sagittal, paired rays 0·23 by 0·02 mm., basal ray 0·07 by 0·016 mm.,
endosomal quadriradiates, similar to small triradiates, apical ray 0·1 by 0·008 mm.,
large endosomal triradiates regular, rays 0·23 to 0·65 by 0·04 to 0·1 mm.,
gastral microxea, 0·07 to 0·1 by 0·004 to 0·006 mm.

Distribution: Japan (Misaki); California; littoral.

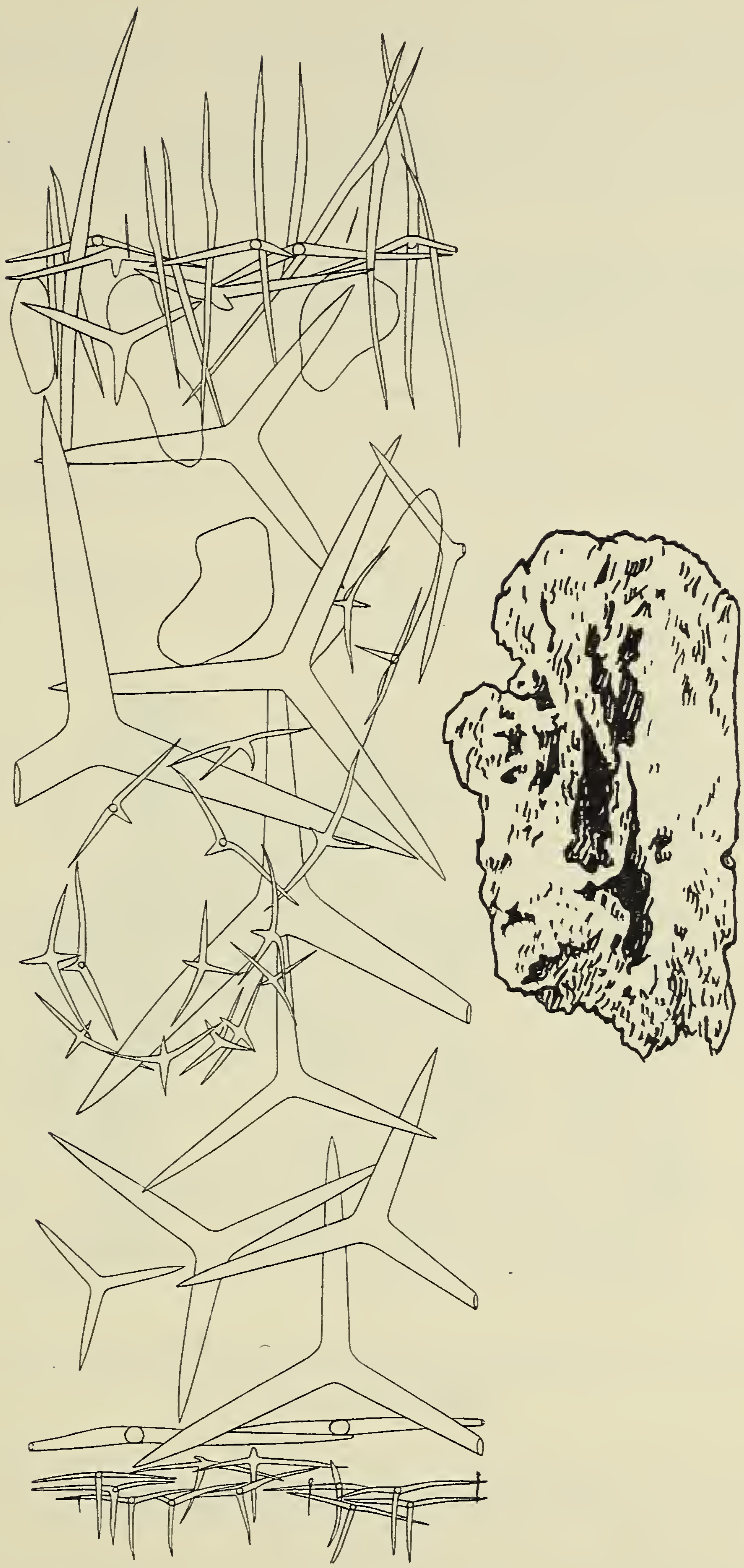
Named form: **Grantessa spissa** (Carter)

Heteropia spissa Carter, 1886: 54; *Grantessa spissa*, Dendy, 1892: 109; Dendy and Row, 1913: 753.

Description: Sponge triangular in outline, compressed; surface even, roughened; vents at each angle of triangle, with fringed margin; texture firm; colour, in spirit, whitish; ectosomal skeleton a tangential layer of triradiates, with paired rays of subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subendosomal sagittal triradiates, with irregularly scattered intermediate triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of endosomal triradiates.

Spicules: ectosomal triradiates, subregular, rays 0·05 to 0·3 by 0·007 to 0·035 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·35 to 0·64 by 0·056 to 0·086 mm., basal rays 0·5 to 0·9 by 0·06 to 0·086 mm.,
intermediate tubar triradiates, subregular, rays 0·1 to 0·4 by 0·017 to 0·054 mm.,
subendosomal sagittal triradiates, similar in all respects to subectosomal pseudosagittal triradiates,
endosomal triradiates, subregular, rays 0·15 to 0·25 by 0·017 mm.

Distribution: Australia (Port Phillip Heads).



Text-fig. 155. *Leucandra solida* Hozawa *nec* Schmidt: section through body wall, ×50; external form, natural size, both after Hozawa.

Named form: **Leucandra telum** Lendenfeld

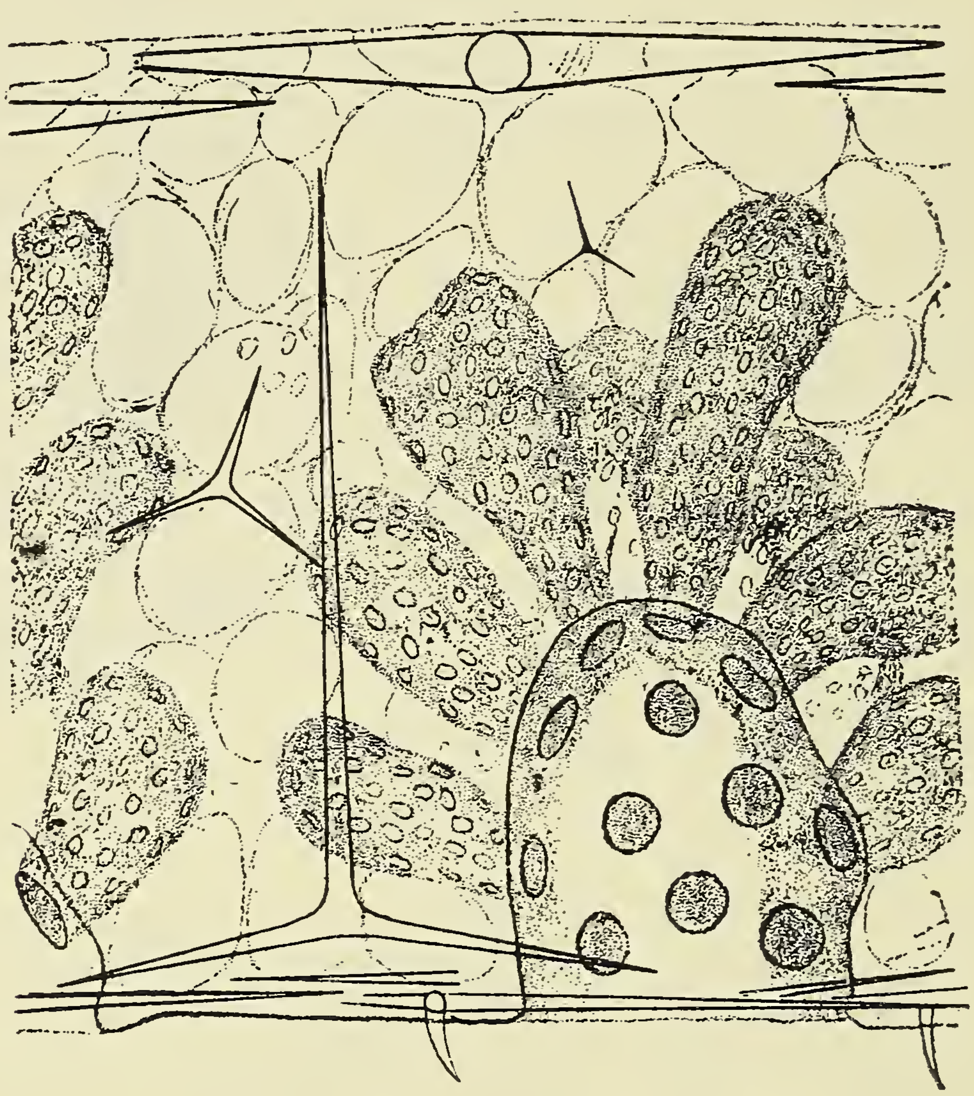
(text-fig. 156)

Polejna telum Lendenfeld, 1891: 295, text-fig.; Breitfuss, 1897: 221; *Leucandra telum*, Dendy and Row, 1913: 744; Breitfuss, 1935: 28.

Description: Sponge tubular, sessile (?); surface even, non-hispid; vent apical, naked; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates; skeleton of chamber layer of scattered triradiates and large subendosomal triradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·9 to 1·1 by 0·067 mm.,
triradiates, regular, rays 0·06 to 0·12 by 0·006 to 0·012 mm.,
subendosomal triradiates, sagittal, paired rays 0·4 by 0·03 mm., basal ray 0·7 to 0·9 by 0·02 mm.,
endosomal quadriradiates, sagittal, paired rays 0·27 by 0·02 mm., apical ray 0·1 by 0·02 mm.

Distribution: Mediterranean (Adriatic).



Text-fig. 156. *Leucandra telum* after Lendenfeld: as originally figured, now with magnification ×100.

Named form: **Anamixilla torresi** Poléjaeff

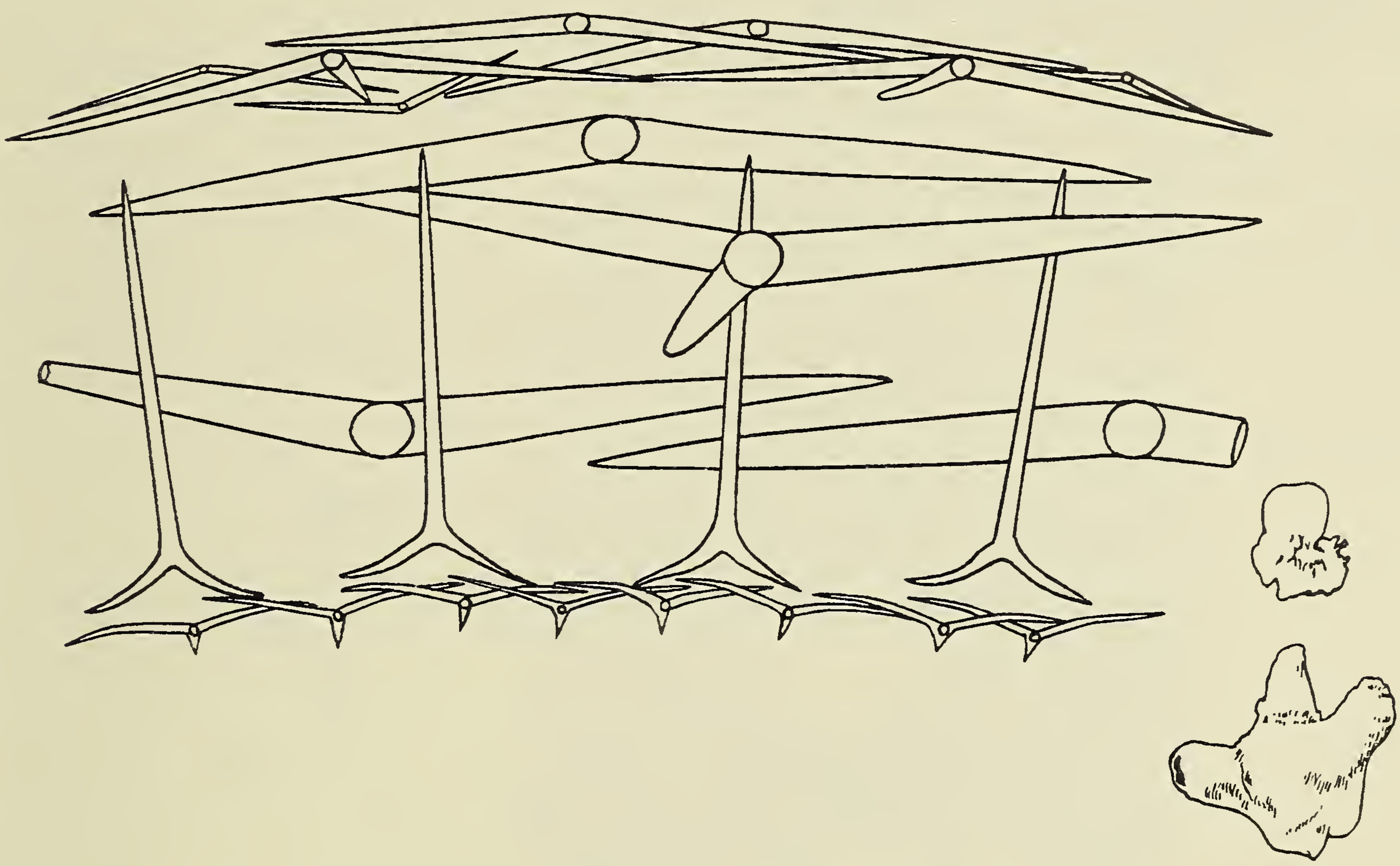
(text-fig. 157)

Anamixilla torresi Poléjaeff, 1883: 50, pl. iv, fig. 2; Lendenfeld, 1885: 1109; Dendy, 1892: 97; Dendy and Row, 1913: 766; Burton, 1930; 5, fig. 4; Tanita, 1943: 431, pl. xvi, figs. 57–58.

Description: Sponge a colony of tubular individuals, sessile; surface even, roughened; vents apical, naked; texture firm; colour, in spirit, pale yellowish; ectosomal skeleton a tangential layer of triradiates; tubar skeleton of centrifugally-directed basal rays of subendosomal sagittal triradiates, with irregularly-arranged tubar triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·3 by 0·02 mm.,
tubar triradiates, regular or subregular, rays up to 1·0 by 0·1 to 0·125 mm.,
subendosomal sagittal triradiates, paired rays 0·4 to 0·8 by 0·02 to 0·05 mm., basal rays up to 0·8 by 0·02 to 0·05 mm.,
endosomal triradiates, subregular, rays 0·4 by 0·015 mm.,
endosomal quadriradiates, sagittal, paired rays 0·35 to 0·4 by 0·02 mm., basal rays 0·16 to 0·4 by 0·02 mm., apical rays 0·06 by 0·02 mm.

Distribution: Australia (Torres Straits); Indonesia; 6–45 m.



Text-fig. 157. *Anamixilla torresi*: section at right angles to surface, after Poléjaeff, ×50; external form, after Tanita's (1943) specimens, natural size.

Named form: **Leucandra tropica** Tanita

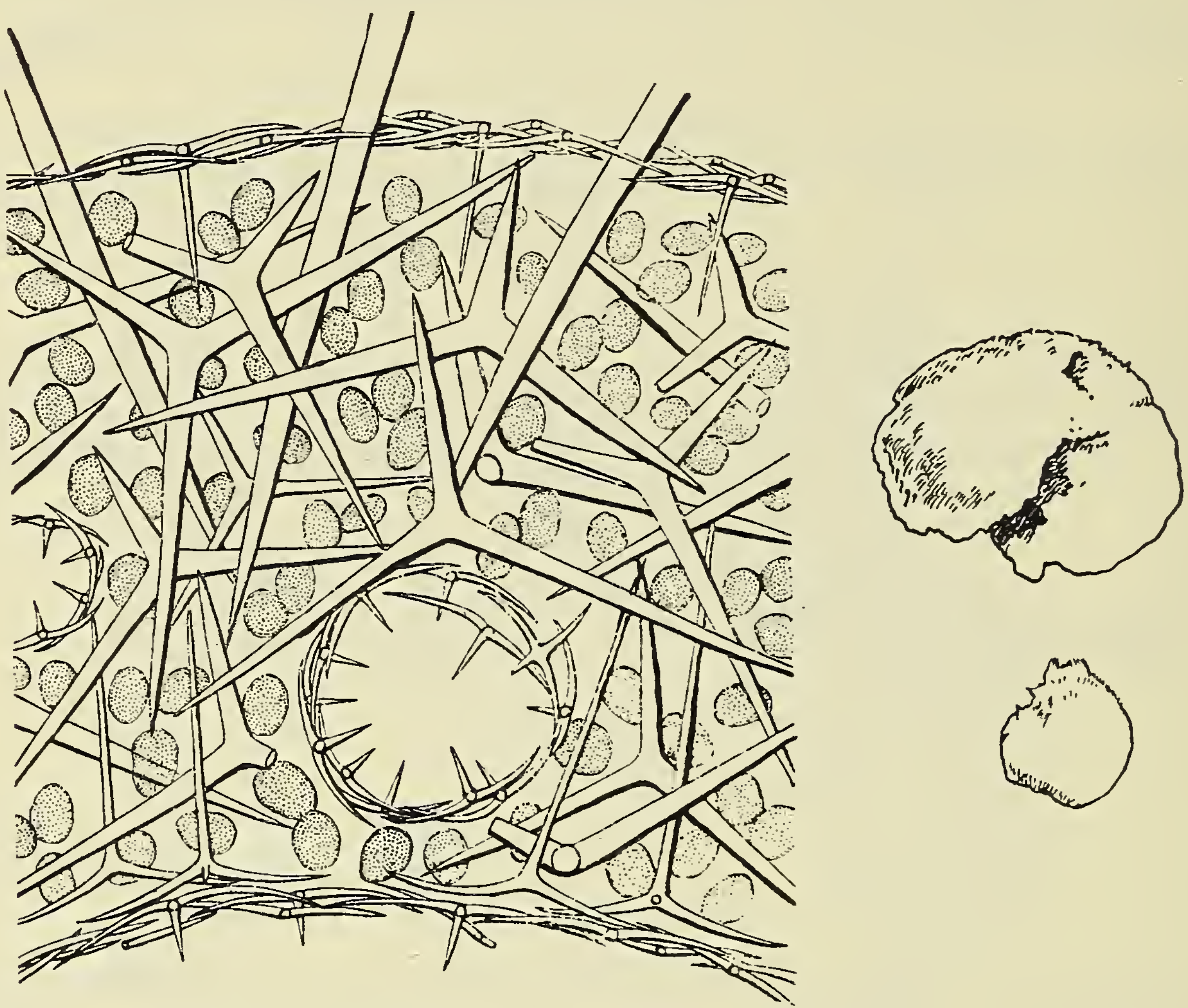
(text-fig. 158)

Leucandra tropica Tanita, 1943: 434, pl. xvii, figs. 61–62, text-figs. 18–19.

Description: Sponge globular; surface hispid; vent apical, with a feebly-developed collar; texture hard, brittle; colour in spirit, yellowish-white; ectosomal skeleton of a few tangential layers of triradiates, with occasional quadriradiates, and with oxea projecting at surface; skeleton of chamber layer of large triradiates irregularly arranged, and the basal rays of subendosomal radiates; endosomal skeleton of paired rays of subendosomal radiates and a thin tangential layer of endosomal tri- and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·25 to 0·38 by 0·014 to 0·018 mm.,
ectosomal quadriradiates, similar to triradiates, with apical ray 0·23 to 0·25 by 0·012 mm.,
oxea, 0·8 to 1·5 by 0·045 to 0·065 mm.,
triradiates of chamber layer, sagittal, paired rays unequal, 0·64 to 0·8 by 0·045 to 0·06 mm., basal ray 0·34 to 0·48 by 0·045 to 0·06 mm.,
subendosomal sagittal triradiates, paired rays 0·28 to 0·32 by 0·015 to 0·023 mm., basal ray 0·45 to 0·6 by 0·015 to 0·023 mm.,
subendosomal quadriradiates, similar to triradiates, apical ray rudimentary,
endosomal triradiates, sagittal, paired rays 0·26 to 0·3 by 0·01 to 0·012 mm., basal ray 0·37 to 0·45 by 0·01 to 0·012 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·11 to 0·15 by 0·01 mm.

Distribution: Caroline Islands (Palao).



Text-fig. 158. *Leucandra tropica* after Tanita: section at right angles to surface, ×50; external form, natural size.

Named form: **Leucandra tuba** Hozawa

Leucandra tuba Hozawa, 1918: 542, pl. lxxxiv, fig. 3, text-fig. 7; Hozawa, 1929: 367; Tanita, 1943: 447.

Description: Sponge a mass of anastomosing, cylindrical tubes, some of which bear vents at ends; surface smooth; vent without margin; texture compact, hard; colour, in spirit, greyish-white; ectosomal skeleton of large and small triradiates in several layers; skeleton of chamber layer of large and small triradiates irregularly arranged; exhalant canals lined with triradiates and quadriradiates; endosomal skeleton of large and small triradiates and microxea.

Spicules: large ectosomal triradiates, regular, rays 0·2 to 0·8 by 0·02 to 0·09 mm.,
small ectosomal triradiates, sagittal, paired rays 0·15 to 0·27 mm. long, basal ray 0·2 to 0·3 by 0·016 to 0·028 mm.,
triradiates of chamber layer, regular, 0·35 to 0·8 by 0·014 to 0·09 mm.,
triradiates of exhalant canals, regular, rays 0·2 by 0·016 mm.,
quadriradiates of exhalant canals, similar to triradiates, apical ray 0·05 by 0·008 mm.,
endosomal triradiates, sagittal, paired rays 0·2 to 0·4 by 0·02 to 0·024 mm., basal ray 0·08 to 0·15 by 0·016 mm.,
microxea, lanceolate, 0·04 to 0·06 by 0·002 to 0·004 mm.

Distribution: Japan (Okinoshima); 108 m.

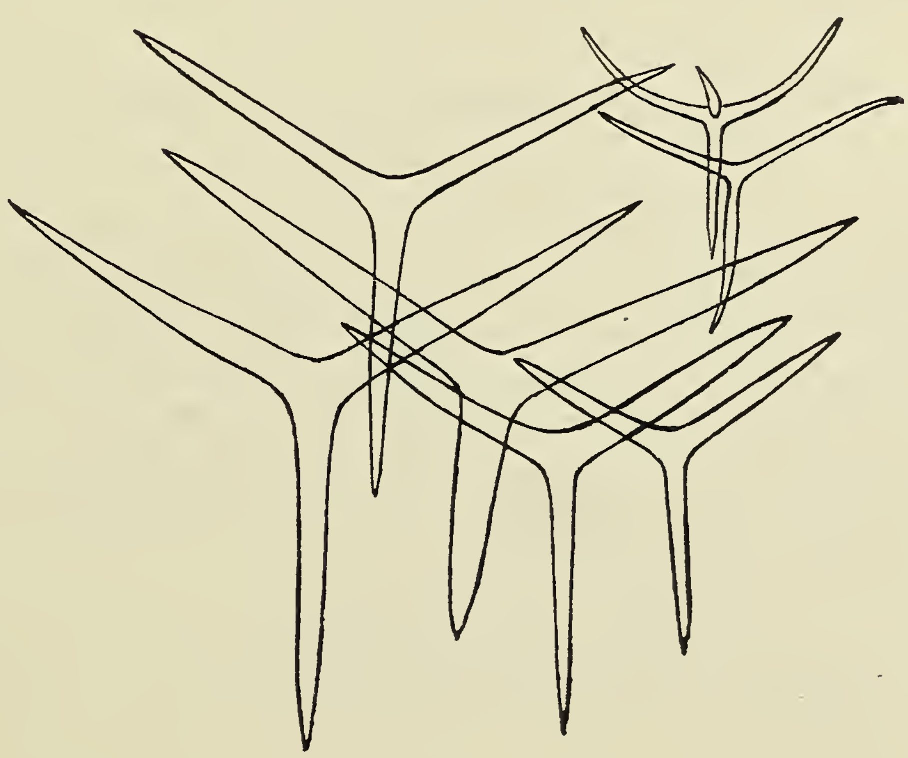
Named form: **Leuconia typica** Poléjaeff

Leuconia typica et varr. *tuba, massa* Poléjaeff, 1883: 56, pl. vii, fig. 2; *Leucandra typica*, Lendenfeld, 1885: 1130; Lendenfeld, 1888: 11; Dendy, 1892: 98; *Leuconia typica*, Breitfuss, 1898: 226; *Leucandra typica*, Thacker, 1908: 776; Dendy and Row, 1913: 773.

Description: Sponge solitary or compound, tubular or irregularly massive, sessile; surface harsh to tough; vents apical, naked; texture firm; colour, in spirit, grey to yellowish; ectosomal skeleton a tangential layer of triradiates; skeleton of chamber layer of triradiates and quadriradiates, with oxea irregularly scattered and only occasionally piercing ectosomal surface; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·35 by 0·02 mm.,
triradiates of chamber layer, subregular, rays 0·75 by 0·065 mm.,
oxea, 0·1 to 0·3 by 0·001 to 0·004 mm.,
quadriradiates of chamber layer, sagittal, paired rays 0·23 by 0·015 mm., basal rays 0·18 by 0·012 mm., apical rays 0·06 to 0·1 mm. long,
endosomal quadriradiates, similar to quadriradiates of chamber layer,
endosomal triradiates, very rare, similar to quadriradiates.

Distribution: Bermudas; Cape Verde Islands; Australia (Port Jackson); 59 m.



Text-fig. 159. *Leucandra verdensis* after Thacker: spicules, × 100.

Named form: **Leucandra verdensis** Thacker

(text-fig. 159)

Leucandra verdensis Thacker, 1908: 772, pl. xl, fig. 6, text-fig. 163; Dendy and Row, 1913: 774.

Description: Sponge solitary, sub-pyriform, sessile; surface even, smooth; vent apical, naked; texture firm; colour, in spirit, brown; ectosomal skeleton of tangential layers of triradiates of two sorts, and quadriradiates; skeleton of chamber layer of irregularly-scattered triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, regular, rays 0·2 by 0·025 mm.,
ectosomal triradiates, sagittal, paired rays 0·3 by 0·04 mm., basal rays 0·2 by 0·04 mm.,
ectosomal quadriradiates, similar to sagittal triradiates, with apical rays 0·075 by 0·03 mm.,
triradiates of chamber layer, regular, rays 0·3 by 0·04 mm.,
endosomal triradiates, subregular, rays 0·15 by 0·015 mm.,
endosomal quadriradiates, similar to triradiates, apical rays 0·05 by 0·009 mm.

Distribution: Cape Verde Islands; 18 m.

Named form: **Leucandra vesicularis** Brøndsted

Leucandra vesicularis Brøndsted, 1926: 317, text-fig. 13.

Description: Sponge subspherical; surface 'a little warty', finely hispid; vent apical; texture hard, rather stony; ectosomal skeleton a tangential layer of small triradiates, with large oxea projecting slightly at surface and scattered microxea; skeleton of chamber layer of a mass of large triradiates and oxea; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates (dimensions not given),
oxea, up to 1·5 by 0·09 mm.,
microxea, 0·025 to 0·03 mm. long,
triradiates of chamber layer, rays up to 0·75 by 0·078 mm.,
endosomal quadriradiates, paired rays 0·185 by 0·011 mm.,
basal ray 0·14 by 0·011 mm., apical ray 0·13 by 0·011 mm.

Distribution: New Zealand (Cape Maria van Diemen), 92 m.

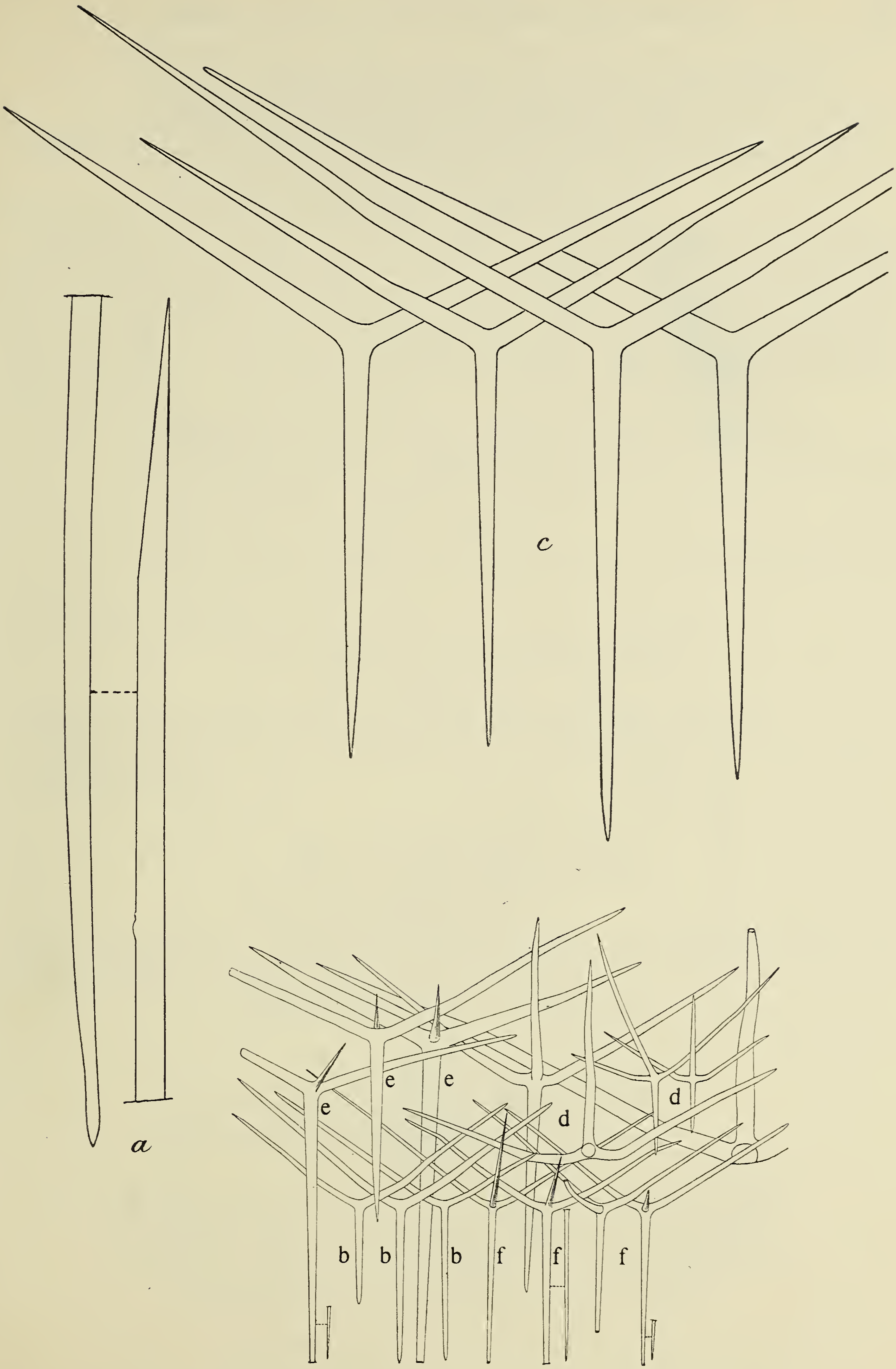
Named form: **Leucandra wasinensis** Jenkin

(text-fig. 160)

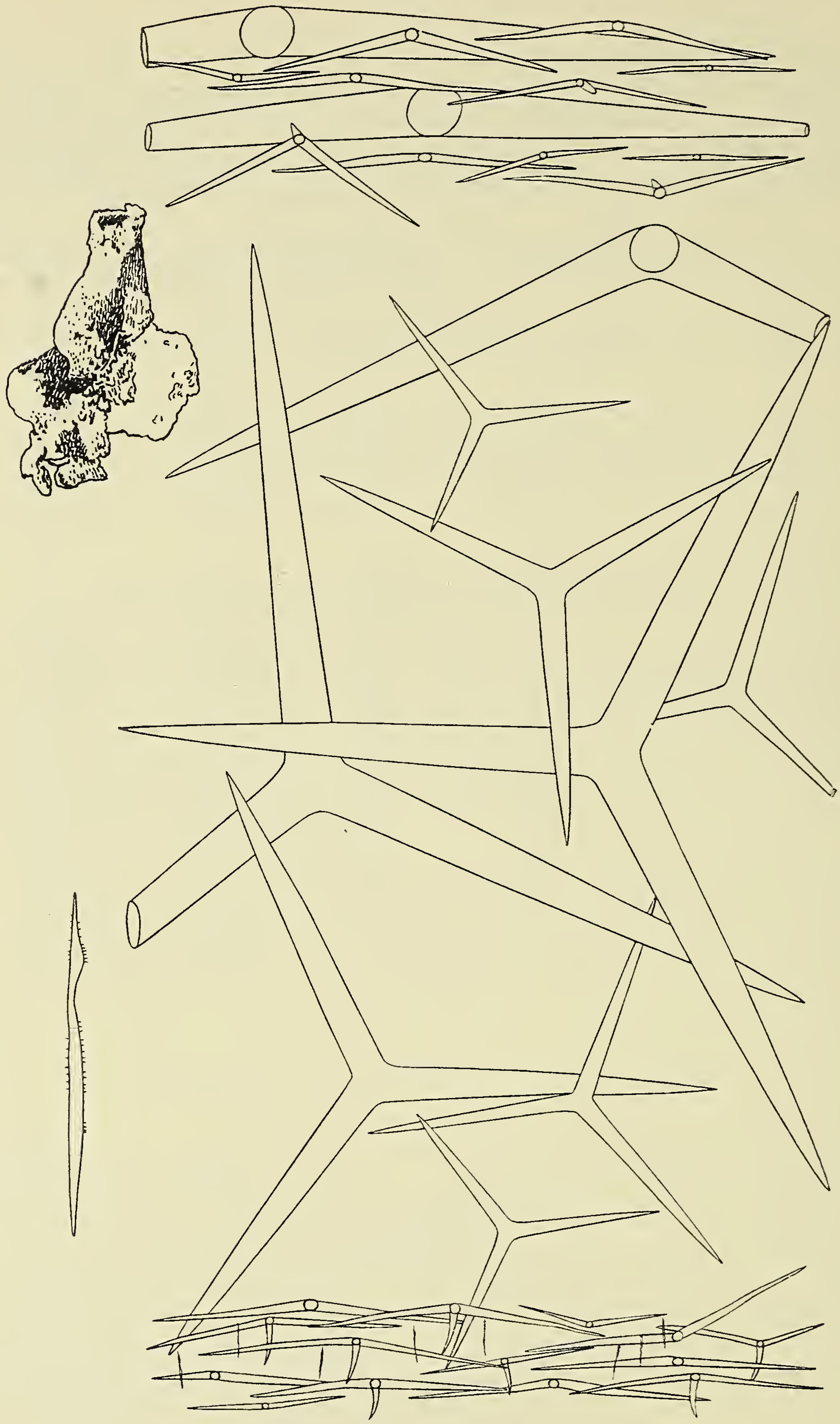
Leucilla wasinensis Jenkin, 1908: 454, fig. 104; *Leucandra wasinensis*, Dendy, 1913: 24, pl. ii, fig. 5; Dendy and Row, 1913: 772.

Description: Sponge ovoid, sessile; surface hispid; vent terminal, with well-marked fringe; texture (?); colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with large oxea projecting beyond surface; skeleton of chamber layer of subectosomal quadriradiates, with apical rays directed centripetally, and irregularly arranged triradiates and quadriradiates; exhalant canals lined by quadriradiates; endosomal skeleton of one or more layers of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·16 to 0·32 by 0·009 to 0·013 mm., basal ray 0·15 to 0·24 by 0·01 to 0·013 mm.,
subectosomal quadriradiates, facial rays up to 0·7 by 0·026 mm., apical rays up to 0·5 by 0·026 mm.,
oxea, of ectosomal skeleton, more than 3 mm. long by 0·045 mm. thick.
triradiates of chamber layer, subregular, rays 0·6 to 0·95 by 0·035 to 0·04 mm.,



Text-fig. 160. *Leucilla wasinensis* after Jenkin: spicules, × 100.



Text-fig. 161. *Leucandra yuriagensis* after Hozawa: section at right angles to surface, ×50; endosomal microxeote (to left) ×500; external form, natural size.

quadriradiates lining exhalant canals, sagittal, paired rays 0·32 to 0·42 by 0·014 to 0·024 mm., basal rays 0·28 to 0·08 by 0·02 to 0·028 mm., apical rays short,
endosomal quadriradiates, sagittal, paired rays 0·24 to 0·45 by 0·008 to 0·01 mm., basal rays 0·3 to 0·56 by 0·01 to 0·012 mm., apical ray 0·18 to 0·26 by 0·008 mm.

Distribution: East Africa (Wasin); Indian Ocean (Saya da Malha, Okhamandal); 11–101 m.

Named form: **Vosmaeropsis wilsoni** Dendy

Vosmaeropsis wilsoni Dendy, 1892: 111; Dendy and Row, 1913: 755.

Description: Sponge colonial, individuals conical or subcylindrical, sessile; surface slightly uneven; non-hispid; vents apical, naked or fringed; texture firm; colour, in spirit, white to pale brown; ectosomal skeleton of an external layer of several layers of small triradiates and an inner layer of large triradiates, together with paired rays of subectosomal pseudosagittal triradiates, and a few oxea; skeleton of chamber layer of basal rays of subectosomal and subendosomal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and several tangential layers of triradiates.

Spicules: ectosomal triradiates, of outer layers, subregular, rays 0·08 by 0·006 mm.,
ectosomal triradiates, of inner layer, subregular, rays up to 1·0 by 0·17 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·32 to 0·8 by 0·032 to 0·12 mm., basal ray 0·5 to 1·0 by 0·032 to 0·12 mm.,
subendosomal sagittal triradiates, paired rays 0·32 to 0·5 by 0·032 to 0·08 mm., basal ray 0·5 to 0·8 by 0·032 to 0·08 mm.,
endosomal triradiates, sagittal, paired rays 0·3 by 0·024 mm., basal ray 0·24 by 0·024 mm.

Distribution: Australia (Port Phillip Heads).

Named form: **Leucandra yuriagensis** Hozawa
(text-fig. 161)

Leucandra yuriagensis Hozawa, 1933: 16, pl. i, fig. 8, text-fig. 4; Tanita, 1942: 448.

Remarks: The species is so like *L. pacifica*, on Hozawa's own showing, that a written description of it is unnecessary.

Distribution: Japan.

8. **Leuconia ananas** (Montagu)

Named form: **Leuconia ananas** (Montagu)
(text-fig. 162)

Spongia ananas Montagu, 1818: 96, pl. xvi, figs. 1–2; *Sycinula penicillata* Schmidt, 1869: 91; Schmidt, 1870: 73, pl. ii, fig. 25; *Dyssycum penicillatum*, Haeckel, 1870: 241; Haeckel, 1872: 200; *nec Leucandra* (=*Leuconia*) *ananas* Auttorum (see p. 97 and p. 361).

[*Holotype known from external form only.*]

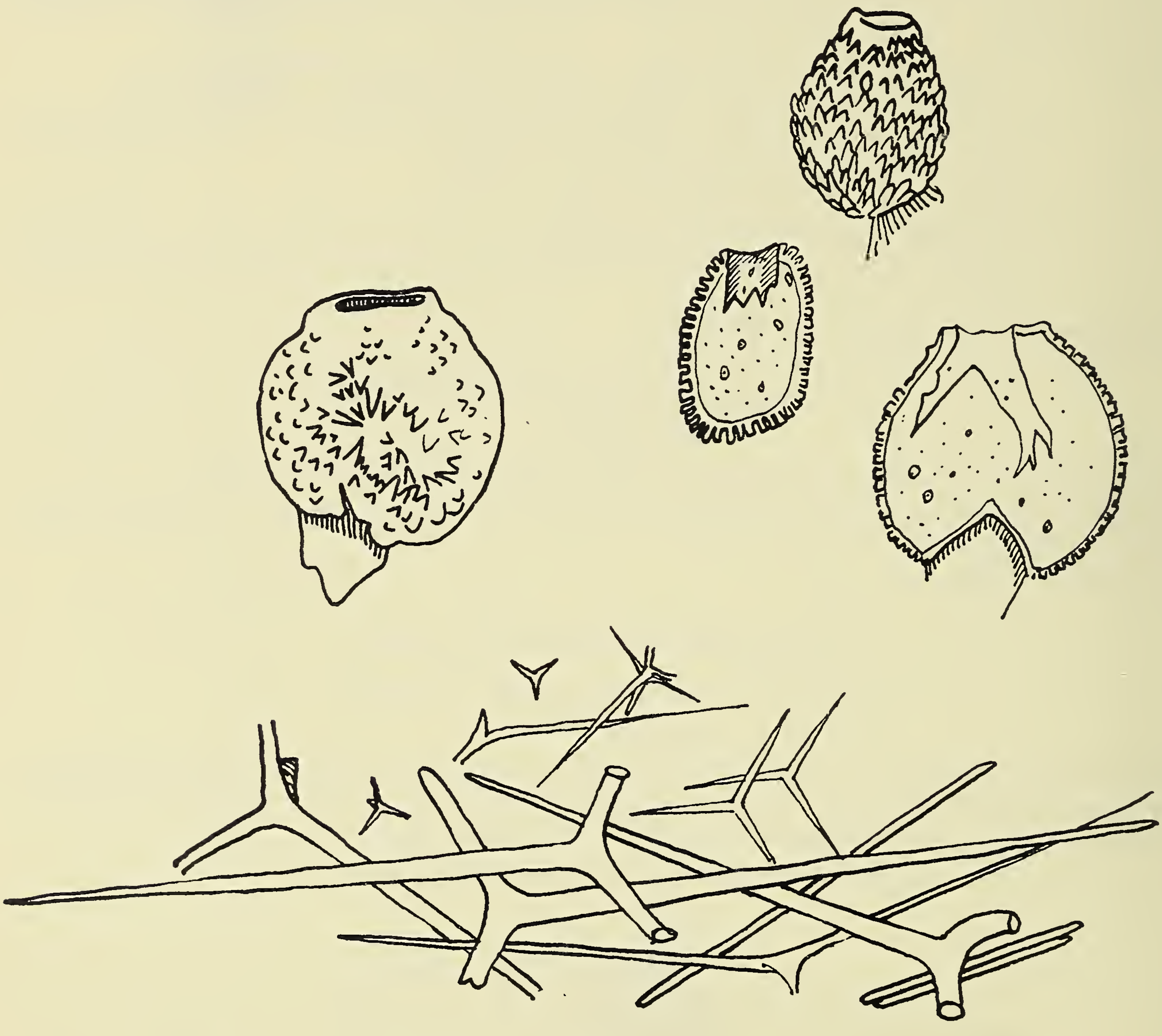
Text-fig. 162. *Spongia ananas* after Montagu: as originally figured, the same specimen shown twice, above ×3, below natural size.

Named form: **Baeria ochotensis** Miklucho-Maclay

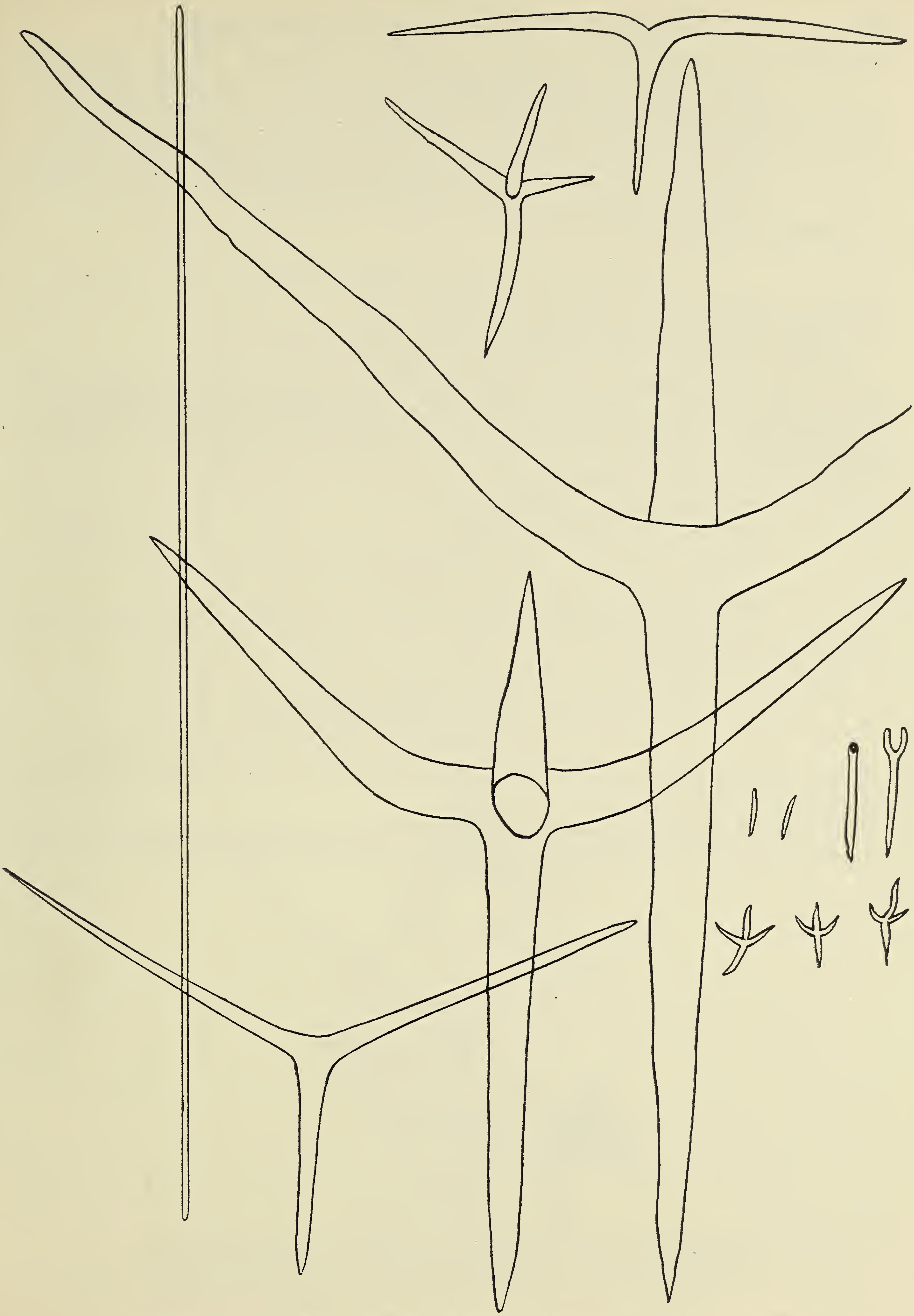
(text-figs. 163–164)

Baeria ochotensis Miklucho-Maclay, 1870: 16, pl. ii, figs. 33–35; *Leucandra ochotensis*, Haeckel, 1872: 221, pl. xxxiv, fig. 3; *Dyssycus ochotensis*, Haeckel, 1872: 221; *Baeria ochotensis*, Dendy and Row, 1913: 775.

Description: Sponge ovate, sessile; surface villose, hispid; vent apical, naked; texture (?); colour, dried, white; ectosomal skeleton a tangential layer of triradiates, with oxea and microxea set at right angles to surface; skeleton of chamber layer of scattered quadriradiates; endosomal skeleton a tangential layer of quadriradiates.



Text-fig. 163. *Baeria ochotensis* after Miklucho-Maclay: as originally figured, showing two type-specimens, and their appearance in longitudinal section, the upper specimen natural size, that on left $\times \frac{1}{2}$; spicules, $\times 33$.



Text-fig. 164. *Baeria ochotensis* Miklucho-Maclay: spicules, ×100, as figured by Haeckel (1872). Note: to right, in group of small spicules, two microxea are enlarged to show the 'needle-eye' and the converging paired rays presumed to give rise to it, as described by Dendy and Row.

Spicules: ectosomal triradiates, regular 0·4 to 0·6 by 0·03 to 0·05 mm.,
oxea, 1·0 to 2·0 by 0·005 to 0·02 mm.,
microxea, 0·05 to 0·09 by 0·002 to 0·004 mm.,
quadriradiates of chamber layer, sagittal, paired rays 1·0 to 2·0 by 0·08 to 0·1 mm., basal ray 0·5 to 2·0 by 0·08 to 0·1 mm., apical ray 0·2 to 2·0 by 0·08 to 0·1 mm.,
endosomal quadriradiates, sagittal, paired rays 0·04 by 0·008 mm., basal ray 0·06 by 0·008 mm., apical ray 0·06 by 0·008 mm.

Distribution: Sea of Okhotsk.

Named form: **Leucandra polejaevi** Breitfuss

Pericharax polejaevi Breitfuss, 1896: 431; Breitfuss, 1898: 116, pl. xii, figs. 21–34; Breitfuss, 1898: 306; *Leucandra polejaevi*, Dendy and Row, 1913: 735; Breitfuss, 1932: 250.

Description: Sponge pyriform, sub-stipitate; surface hispid; vent terminal, with well-developed fringe; texture firm; colour, in spirit, yellowish-brown; ectosomal skeleton with oxea and microxea projecting from surface and a tangential layer of triradiates; skeleton of chamber layer of irregularly-arranged triradiates, of varying size; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·08 to 0·1 by 0·01 mm.,
oxea, 0·5 to 0·7 by 0·009 to 0·012 mm.,
microxea, 0·09 to 0·1 by 0·004 mm.,
triradiates of chamber layer, sagittal, paired rays 0·14 to 0·22 by 0·01 to 0·02 mm., basal rays 0·19 to 0·4 by 0·01 to 0·02 mm.,
endosomal triradiates, subregular, rays 0·08 to 0·1 by 0·01 mm.,
endosomal quadriradiates, subregular, facial rays, 0·14 by 0·01 mm., apical rays 0·04 by 0·01 mm.

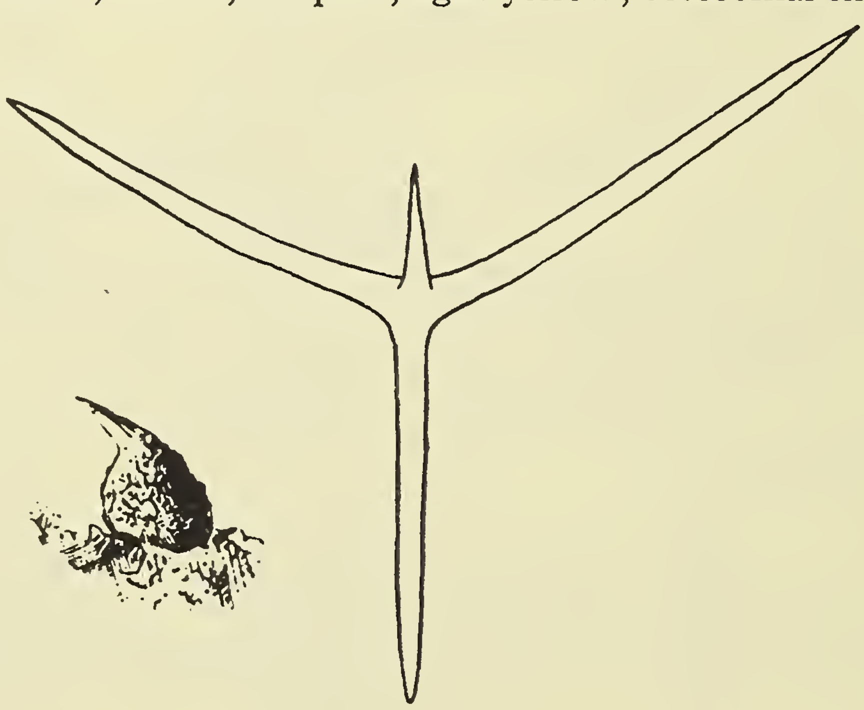
Distribution: Arctic (Spitzbergen, Franz Josef Land, Murmansk); 141–147 m.

Named form: **Leuconia pyriformis** Lambe

(text-fig. 165)

Leuconia pyriformis Lambe, 1893; 40, pl. iii, fig. 4; Lambe, 1900: 167; *Leucandra pyriformis*, Dendy and Row, 1913: 773.

Description: Sponge solitary, pyriform, sessile; surface even, smooth; vent terminal, with well-developed fringe; texture firm; colour, in spirit, light yellow; ectosomal skeleton a tangential layer



Text-fig. 165. *Leuconia pyriformis* after Lambe: external form, natural size, spicule, × 100.

of triradiates; skeleton of chamber layer of irregularly-disposed triradiates and numerous microxea; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, regular, with rays often much twisted, rays 0·59 by 0·061 mm.,
triradiates of chamber layer, regular, smallest with rays 0·027 to 0·006 mm., but size gradually increasing as ectosome is approached until spicules near it have similar size to ectosomal triradiates,
microxea, 0·12 by 0·004 mm.,
endosomal quadriradiates, regular, facial rays 0·23 by 0·013 mm., apical rays 0·082 by 0·013 mm.

Distribution: Vancouver Island; 73 m.

Named form: **Leucandra splendens** Hozawa

(text-fig. 166)

Leucandra splendens Hozawa, 1918: 551, pl. lxxxv, figs. 12–14, text-fig. 11.

Description: Sponge ovoid, with apical vent having a well-developed fringe; surface uneven, subconulose, hispid; texture firm; colour, in spirit, greyish-white; skeleton of chamber layer of quadriradiates of varying size; ectosomal skeleton of a few layers of tangential triradiates, large oxea projecting beyond surface and microxea of two kinds, one scattered tangentially, other in vertical tufts; endosomal skeleton of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·27 to 0·44 by 0·016 to 0·02 mm., basal ray 0·25 to 0·4 by 0·02 to 0·024 mm.,
oxea, up to 1·0 by 0·02 to 0·04 mm.,
microxea, lanceolate, of two kinds, 0·18 to 0·4 by 0·006 to 0·008 and 0·06 to 0·08 by 0·006 to 0·008 mm.,
quadriradiates of chamber layer, paired rays 0·3 to 0·45 by 0·032 mm., basal ray 0·3 to 0·45 by 0·032 mm., apical ray shorter than facial rays,
endosomal quadriradiates, sagittal, paired rays 0·21 to 0·44 by 0·02 to 0·24 mm., basal ray 0·17 to 0·33 by 0·024 to 0·028 mm., apical ray 0·15 to 0·17 by 0·016 mm

Distribution: Commandorski Islands, N.W. Pacific; 117–132 m.

Text-fig. 166. *Leucandra splendens* after Hozawa: about natural size.

Named form: **Leucopsila stilifera** (Schmidt)

(text-fig. 167)

Leuconia stilifera Schmidt, 1870: 73, pl. ii, fig. 24; Haeckel, 1870: 247; Haeckel, 1872: 225, pl. xxxiii, fig. 4, pl. xi, fig. 11; *Leucopsila stylifera*, Dendy and Row, 1913: 776; Hozawa, 1918: 554, pl. lxxxv, figs. 15, 16; Hozawa, 1929: 379; Tanita, 1943: 457.

Description: Sponge tubular, laterally compressed, single or colonial, vent apical with margin thin, undulating; surface smooth, even or sub-conulose in parts; texture soft; colour, in spirit, white; ectosomal skeleton of several layers of tangential triradiates with numerous microxea; skeleton of chamber layer a confused mass of microxea, with large quadriradiates scattered between; endosomal skeleton a dense layer of microxea.

Spicules: ectosomal triradiates, sagittal, paired rays 0·5 to 1·5 by 0·05 to 0·07 mm., basal ray 0·45 to 0·95 by 0·05 to 0·07 mm.,
quadriradiates of chamber layer, sagittal, paired rays 0·9 to 2·0 by 0·1 to 0·15 mm., basal ray 0·8 to 1·27 by 0·1 to 0·15 mm., apical ray 0·35 to 0·85 by 0·1 by 0·15 mm.,
microxea, curved, lanceolate.

Distribution: Greenland; N.W. Pacific (Kurile and Commandorski Islands); 132–419 m.

Text-fig. 167. *Leucopsila stilifera* after Schmidt: as exemplified by the holotype of *Sycinula penicillata* Schmidt (see p. 309 under *Leuconia ananas*), about natural size.

9. **Leuconia trigona** (Haeckel)

Leucetta trigona Haeckel

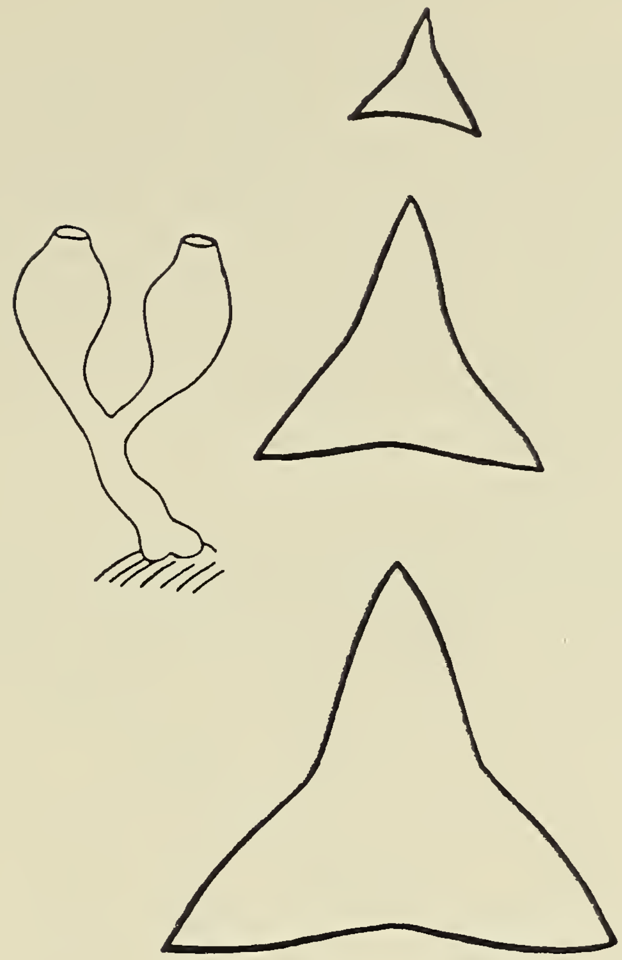
(text-fig. 168)

Leucetta trigona Haeckel, 1872: 123, pl. xxii, fig. 1; *Amphoriscus trigona* Haeckel, 1872: 123, pl. xxii, fig. 1; *Leucetta trigona*, Dendy and Row, 1913: 734.

Description: Sponge compound, body ovate, stipitate; surface even, harsh; vents apical, naked; texture firm; colour, in spirit, white; skeleton of a single form of triradiate, with very short, stout rays, arranged in an ectosomal tangential layer, an endosomal tangential layer and a confused chamber layer.

Spicules: triradiates, regular, rays 0·2 to 0·25 by 0·12 to 0·16 mm.

Distribution: South Africa (Algoa Bay).



Text-fig. 168. *Leucandra trigona* after Haeckel: spicules, × 100.

Genus **Eilhardia** Poléjaeff

Eilhardia Poléjaeff, 1883: 70.

Type-species: Eilhardia schulzei Poléjaeff, 1883: 70, pl. ii, fig. 7, pl. ix, figs. 1–10.

10. **Eilhardia schulzei** Poléjaeff

Named form: **Leucandra gladiator** Dendy

Leucandra gladiator Dendy, 1892: 101; Dendy and Row, 1913: 772.

Description: Sponge encrusting, irregular, ridged; surface even, slightly hispid; vents small, scattered; texture coarse, fragile; colour (?); ectosomal skeleton a tangential layer of triradiates, with oxea projecting beyond surface; skeleton of chamber layer of triradiates and trichodragmata; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·65 by 0·036 mm., basal rays 0·3 by 0·036 mm.,
oxea, 0·4 by 0·01 mm.,
triradiates of chamber layer, subregular to irregular, rays 1·8 by 0·016 mm.,
trichodragmata, 0·1 mm. long,
endosomal quadriradiates, sagittal, paired rays 0·02 by 0·007 mm., basal rays 0·03 by 0·007 mm., apical rays 0·08 by 0·006 mm.

Distribution: Australia (Port Phillip Heads).

Named form: **Leuconia loricata** Poléjaeff

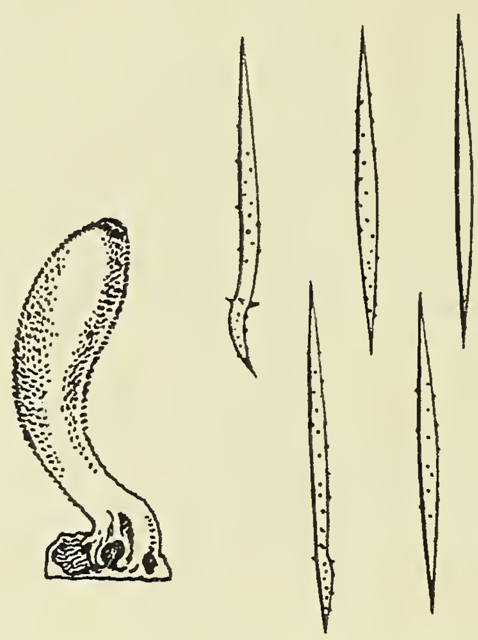
(text-fig. 169)

Leuconia loricata Poléjaeff, 1883: 63, pl. ii, fig. 2, pl. vii, fig. 6; *Leucortis loricata*, Lendenfeld, 1885: 1123; *Leucandra loricata*, Dendy, 1892: 103; Dendy and Row, 1913: 772.

Description: Sponge solitary, tubular, sub-stipitate; surface hispid; vent apical, with well-developed fringe; texture firm; colour, in spirit, pale yellow; ectosomal skeleton of several tangential layers of triradiates, with oxea and trichoxea projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton of microxea.

Spicules: ectosomal triradiates, sagittal, paired rays 0·32 to 0·5 by 0·02 to 0·03 mm., basal rays 0·3 to 0·55 by 0·02 to 0·03 mm.,
oxea, 0·75 by 0·04 mm.,
trichoxea, 0·3 by 0·0025 mm.,
triradiates of chamber layer, regular to sagittal, rays 0·6 to 1·0 by 0·07 to 0·12 mm.,
microxea, of endosomal skeleton, rarely found in chamber layer or in ectosome, 0·025 by 0·002 mm.

Distribution: Australia (Port Jackson); 55–64 m.



Text-fig. 169. *Leuconia loricata* after Poléjaeff: microxea, ×1000; external form, natural size.

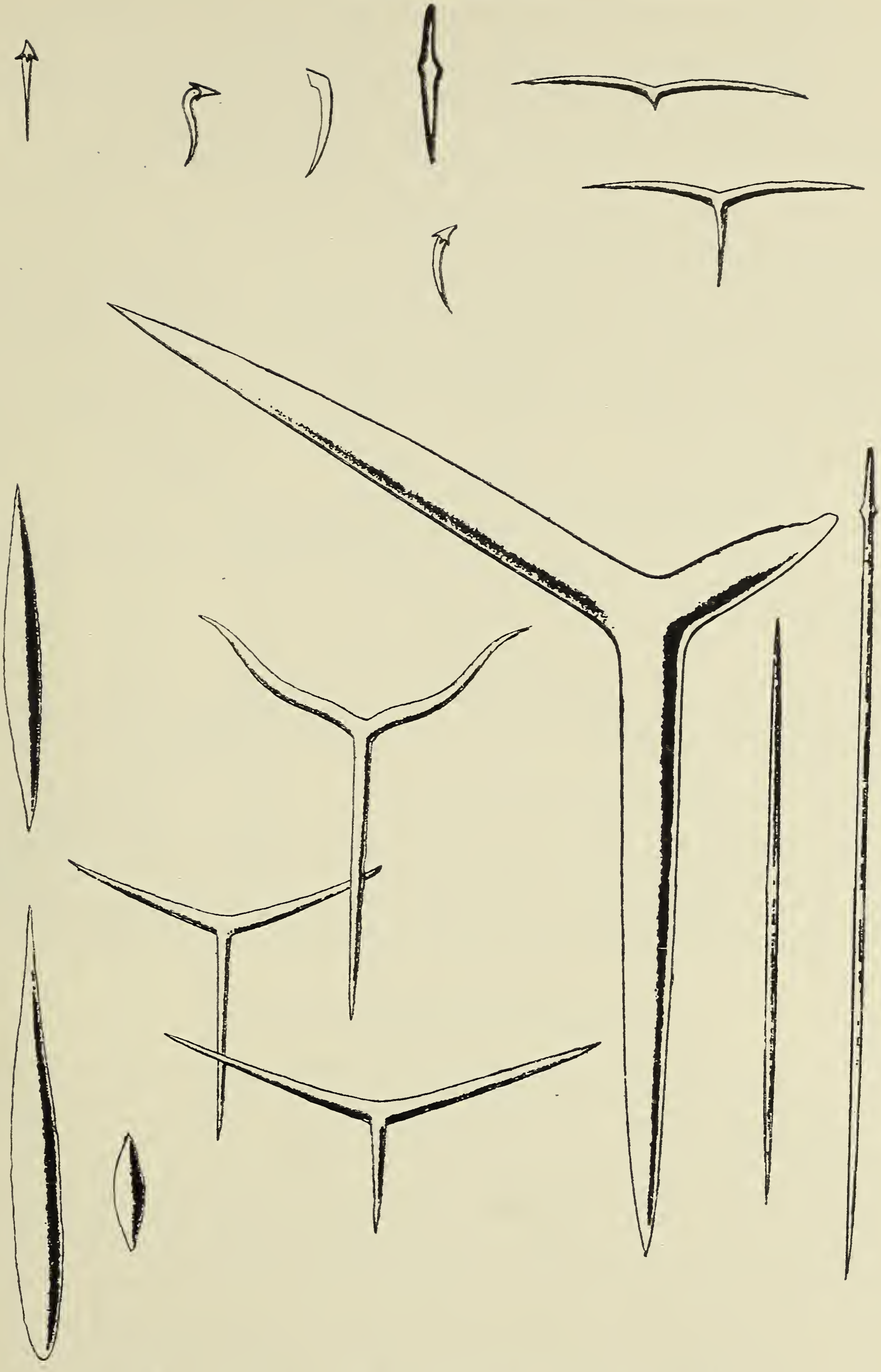
Named form: **Eilhardia schulzei** Poléjaeff

(text-fig. 170)

Eilhardia schulzei Poléjaeff, 1883: 70, pl. ii, fig. 7, pl. ix, figs. 1–10; Lendenfeld, 1885: 1143; *Leucandra schulzei*, Dendy, 1892: 103; *Eilhardia schulzei*, Dendy and Row, 1913: 781.

Description: Sponge solitary, cup-shaped, stipitate to sub-stipitate; surface even, hispid; vents sub-papillate, on outer surface of cup only; texture firm; colour, in spirit, white; ectosomal skeleton of an outer palisade of oxea and trichoxea, with an inner tangential layer of triradiates; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton of a tangential layer of triradiates; with numerous microxea scattered irregularly throughout all tissues.

Spicules: oxea, up to 1·0 by 0·01 to 0·12 mm.,
trichoxea, 0·3 to 1·1 by 0·004 mm.,
ectosomal triradiates, sagittal, paired rays 0·32 to 0·65 by 0·02 to 0·06 mm., basal rays 0·3 to 1·2 by 0·02 to 0·045 mm.,
microxea, abundantly scattered in all layers, 0·05 to 0·1 by 0·0025 mm.,



Text-fig. 170. *Eilhardia schulzei* after Poléjaeff: (top left) microxea, × 300, (the typical form is shown to the top right of the group); (top right) triradiates from margin of vent, × 200; bottom (reading from left to right), oxea, × 100, three triradiates from ectosome, × 50, triradiate of chamber layer, × 100, and two slender oxea from inner surface, × 100.

triradiates of chamber layer, regular to sagittal, rays 0·14 to 1·8 by 0·015 to 0·15 mm.,
endosomal triradiates or quadriradiates, sagittal, paired rays 0·08 to 0·75 by 0·012 to 0·05 mm., basal rays 0·12 to 0·8 by 0·012 to 0·05 mm., apical ray, when present, 0·12 by 0·012 mm.

Distribution: Australia (Port Jackson, Twofold Bay, Port Phillip Heads); 55–220 m.

Named form: **Leucandra secutor** Brøndsted

Leucandra secutor Brøndsted, 1926: 313, text-fig. 10.

Description: Sponge tubular to irregular and massive; surface even, smooth, occasionally hirsute; vents apical, on conical processes in irregular individuals; texture hard, brittle; colour, in spirit, whitish; ectosomal skeleton of several layers of tangentially-placed triradiates, with microxea and trichodragmata scattered therein and also in choanosome; choanosomal skeleton of large triradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates, markedly sagittal, paired rays 0·8 by 0·04 mm., basal ray 0·2 by 0·04 mm.,
microxea, 0·015 by 0·0015 mm.,
trichodragmata, 0·12 to 0·2 mm. long,
triradiates of chamber layer, rays up to 1·3 by 0·12 mm.,
quadriradiates ('dagger-shaped'), paired rays 0·015 by 0·005 mm., basal ray 0·027 by 0·005 mm., apical ray 0·078 by 0·005 mm.

Distribution: New Zealand (Hauraki Gulf); 92 m.

Genus **Sycettusa** Haeckel

Sycettusa Haeckel, 1872: 236; *Djeddea* Miklucho-Maclay [in] Haeckel, 1872: 245; *Sycothamnetta* Haeckel, 1872: 399; *Vosmaeropsis* Dendy, 1892: 76; *Amphiute* Hanitsch, 1894: 433; *Grantilla* Row, 1909: 198.

Type-species: Leucaltis bathybia Haeckel, 1872: 156.

Remarks: Five species are recognised for this genus. In my first revision, I had included six, keeping *Sycettusa bathybia* and *S. macera* separate, for although they were so closely related they seemed to be separated geographically, the first being typically Indian Ocean, the second typically Australian. Then a specimen from South Africa (B.M. 1938. 3.26.85) proved to have intermediate characters, thus reducing still further any possibility of maintaining the two forms as distinct.

11. **Sycettusa bathybia** (Haeckel)

Named form: **Leucandra anguinea** (Ridley)

(text-fig. 171)

Leucortis anguinea Ridley, 1884: 629, pl. liii, fig. L, pl. liv, fig. d; *Leucandra anguinea*, Dendy and Row, 1913: 769.

Description: Sponge tubular, substipitate; surface even, minutely hispid; vent apical, naked (?); texture firm; colour, in spirit, white or grey (?); ectosomal skeleton a tangential layer of triradiates, with oxea projecting at right angles to surface; skeleton of chamber layer of subectosomal pseudosagittal and subendosomal sagittal triradiates; endosomal skeleton a tangential layer of triradiates.

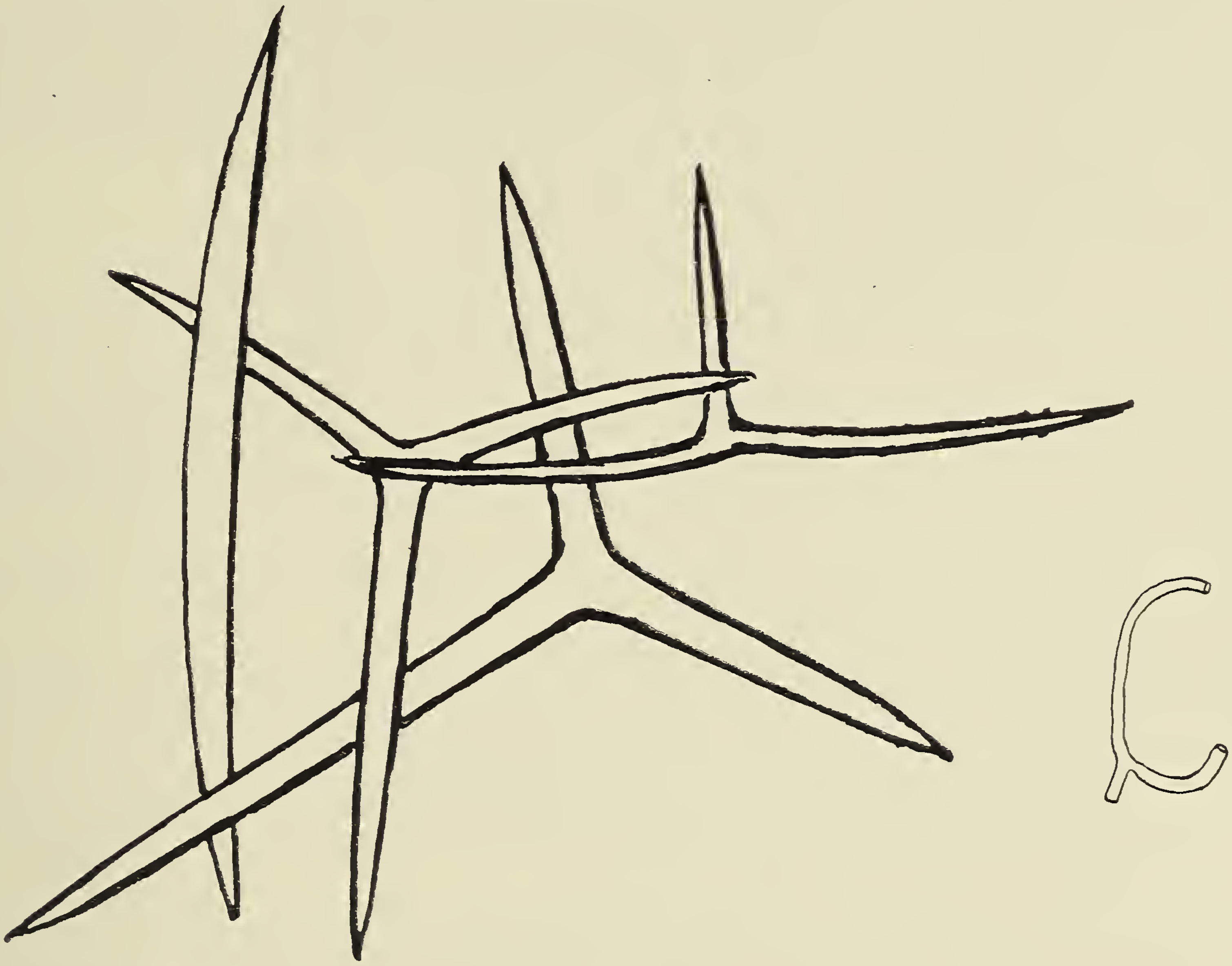
Spicules: ectosomal triradiates, sagittal, paired rays 0·16 to 0·22 by 0·013 to 0·019 mm., basal ray 0·28 by 0·019 mm.,
oxea, 0·65 by 0·019 mm.,

subectosomal pseudosagittal triradiates, paired rays 0·12 by 0·012 mm., basal ray 0·23 by 0·012 mm.,

subendosomal sagittal triradiates, paired rays 0·24 by 0·021 mm., basal ray 0·3 by 0·021 mm.,

endosomal triradiates, sagittal, paired rays 0·15 by 0·011 mm., basal ray 0·18 by 0·011 mm.

Distribution: Indian Ocean (Mascarenes); 44 m.



Text-fig. 171. *Leucandra anguinea* after Ridley: spicules, × 100; external form, natural size.

Leuconia bathybia (Haeckel)

Dyssycum periminum Haeckel, 1870: 241; *Grantia arabica* Maclay in Haeckel, 1872: 156; *Leucaltis bathybia* Haeckel, 1872: 156, pl. xxviii, fig. 2; *Dyssycus bathybius* Haeckel, 1872: 156; *Leucaltis perimina* (=*L. bathybia* var. *perimina*), Haeckel, 1872: 157; *L. arabica* (=*L. bathybia* var. *arabica*), Haeckel, 1872: 157; *L. bathybia*, var. *australiensis* Ridley, 1884: 482; *L. bathybia*, Lendenfeld, 1886: 1121; *Leucandra bathybia*, Dendy, 1892: 104; *Leucilla bathybia*, Row, 1909: 205; *Leucandra bathybia*, Dendy and Row, 1913: 773; *Leucilla bathybia*, Brøndsted, 1931: 46, text-fig. 36; *Leuconia bathybia*, Burton, 1952: 164.

Description: Sponge cylindrical, sessile; surface even, non-hispid; vent apical, naked; texture firm; colour, in spirit, brownish-grey; ectosomal skeleton a tangential layer of triradiates; skeleton of chamber layer of irregularly arranged large quadriradiates and small triradiates; endosomal skeleton tangential layer of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·34 by 0·012 mm., basal ray 0·23 to 0·25 by 0·012 mm.,

quadriradiates of chamber layer, sagittal, paired rays 0·34 to 0·6 by 0·024 to 0·05 mm., basal ray 0·3 to 0·76 by 0·024 to 0·05 mm., apical ray 0·19 to 0·28 by 0·024 to 0·05 mm.,
triradiates of chamber layer, subregular, rays 0·11 to 0·14 by 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·28 to 0·34 by 0·012 mm., basal ray 0·22 to 0·27 by 0·012 mm., apical ray 0·07 to 0·09 by 0·012 mm.

Distribution: Red Sea; Australia (Port Jackson); South Africa; 4–626 m.

Remarks: Haeckel's (1872) description of *Leucaltis bathybia* leaves no doubt of its true characters. The group of spicules he figures are so like those seen in preparations from Ridley's *L. bathybia* var. *australiensis* and Row's *Leucilla bathybia* that we need have no hesitation in accepting all as synonymous. The same may be said of *Leuconia bathybia* Burton 1952 and *Leucilla bathybia* Brøndsted.

Dyssycum periminum is, of course, a *nomen nudum*.

Named form: **Leucandra helena** (Lendenfeld)

Leucaltis helena Lendenfeld, 1885: 1119; *Leucandra helena*, Dendy, 1892: 104; Dendy and Row, 1913: 774.

Description: Sponge tubular, ovate; surface even, non-hispid; vent apical, naked; texture (?); colour (?); ectosomal skeleton of quadriradiates, with apical ray projecting into choanosome; tubar skeleton of triradiates and quadriradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal quadriradiates, regular, facial rays 0·28 by 0·033 to 0·04 mm., apical ray 0·57 by 0·05 to 0·06 mm.,
triradiates of choanosome, regular, rays 0·28 by 0·03 mm.,
quadriradiates of choanosome, regular, facial rays 0·35 by 0·042 mm., apical ray 0·42 by 0·056 mm.,
endosomal triradiates, regular, rays 1·0 by 0·01 mm.,
endosomal quadriradiates, similar to endosomal triradiates, with short apical ray.

Distribution: Australia (Port Jackson).

Named form: **Leucilla hirsuta** Tanita

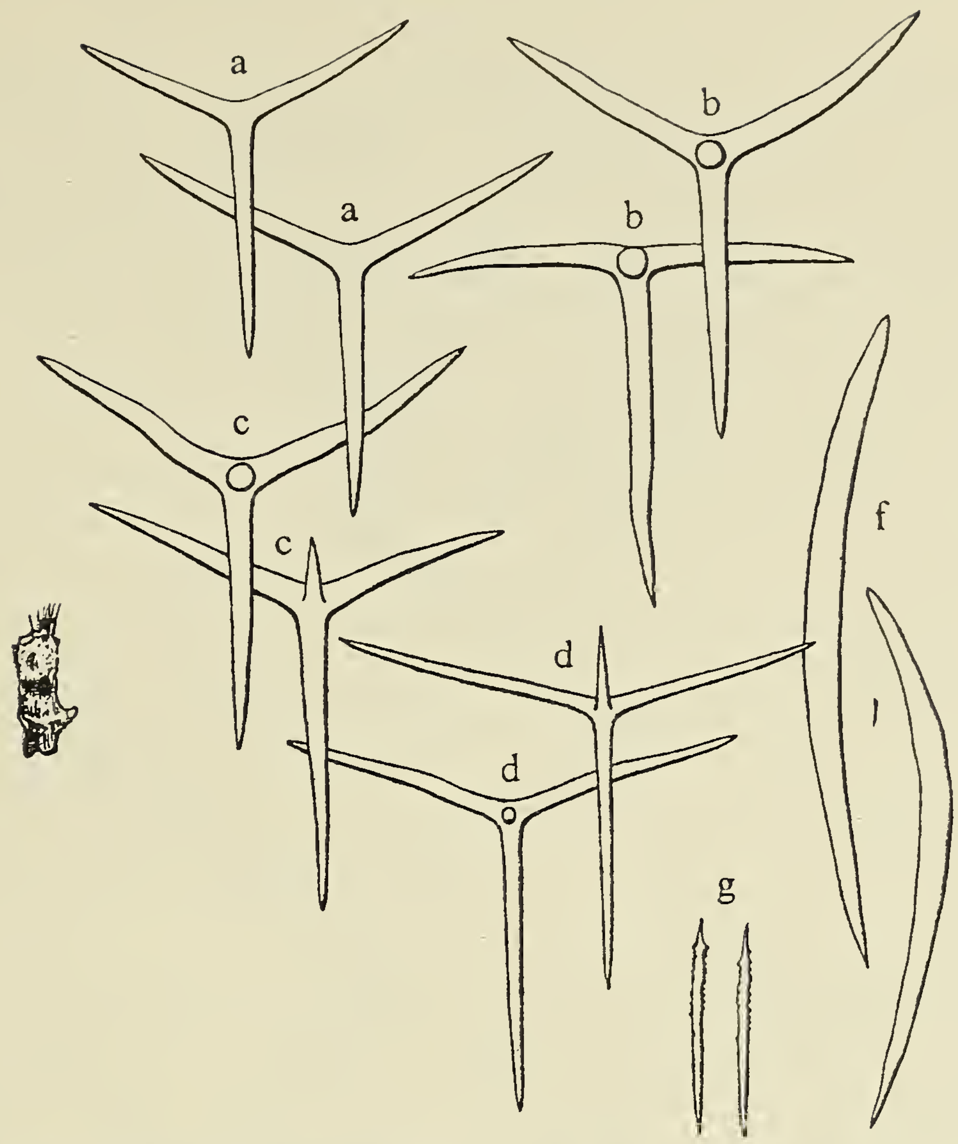
(text-fig. 172)

Leucilla hirsuta Tanita, 1942: 62, pl. iv, fig. 30, text-fig. 13; Tanita, 1943: 458.

Description: Sponge tubular, small; surface hispid; vent apical, fringed; texture firm; colour, in spirit, white; ectosomal skeleton of tangentially-arranged triradiates, facial rays of subectosomal quadriradiates, oxea with ends projecting at surface, and scattered microxea; tubar skeleton of quadriradiates and basal rays of subendosomal quadriradiates; endosomal skeleton of facial rays of subendosomal quadriradiates together with a layer of endosomal quadriradiates with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, subregular, rays 0·16 to 0·22 by 0·015 to 0·022 mm.,
oxea, 0·48 to 0·85 by 0·028 to 0·04 mm.,
microxea, 0·085 to 0·13 by 0·003 to 0·006 mm.,
subectosomal quadriradiates, facial and apical rays of similar size, 0·18 to 0·26 by 0·015 to 0·025 mm.,
tubar quadriradiates similar to subectosomal quadriradiates,
subendosomal quadriradiates similar to subectosomal quadriradiates,
endosomal quadriradiates, sagittal, paired rays 0·17 to 0·24 by 0·01 mm., basal ray 0·22 to 0·26 by 0·01 mm., apical ray 0·12 to 0·21 by 0·07 to 0·01 mm.

Distribution: Japan (Awa-Kominato).



Text-fig. 172. *Leucilla hirsuta* after Tanita: spicules, ×100, except g. which is ×160; external form, ×$\frac{4}{3}$.
Spicules: a. ectosomal triradiates; b. subectosomal quadriradiates; c. tubar quadriradiates; d. endosomal quadriradiates; f. oxea; g. microxea.

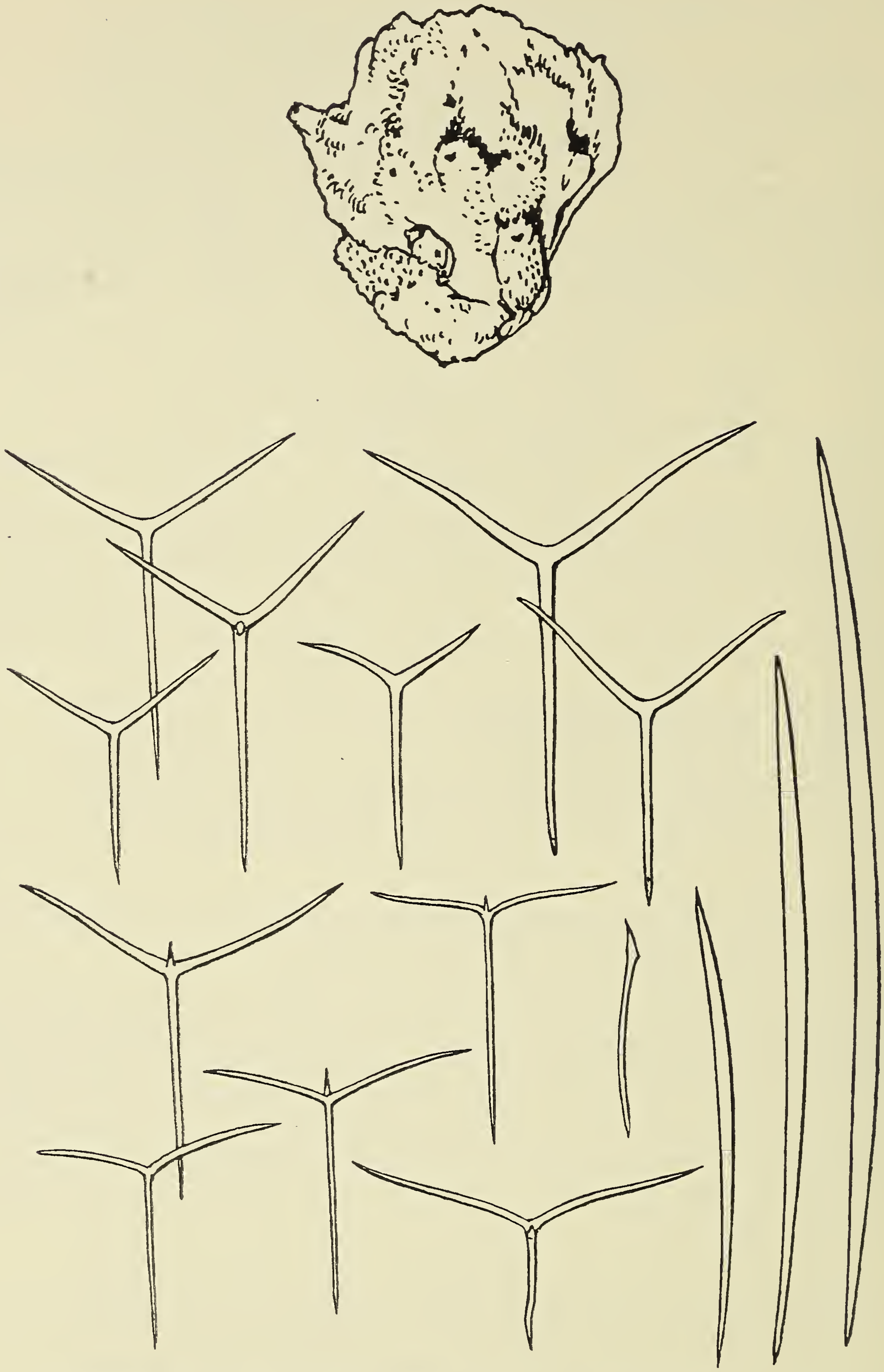
Named form: **Vosmaeropsis macera** (Carter)
(text-fig. 173)

Heteropia macera Carter 1886: 50; *Vosmaeropsis macera,* Dendy, 1892: 110; Dendy and Row, 1913: 755; *V. mackinnoni* Dendy and Frederick, 1924: 185, pl. xxv, figs. 5–8, pl. xxvi, fig. 4; *V. dendyi,* Row and Hozawa, 1931: 777, pl. xx, fig. 11, text-fig. 10.

Description: Sponge tubular to sacciform, compound, sessile; surface even, hispid to non-hispid; vents apical, fringed; texture firm, fragile; colour, in spirit, pale brown to whitish-yellow; ectosomal skeleton of several layers of triradiates, together with paired rays of subectosomal pseudo-sagittal triradiates and microxea, with or without oxea projecting at the surface; skeleton of chamber layer of basal rays of subectosomal and subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and several layers of triradiates.

Spicules: ectosomal triradiates, regular to subregular, rarely quadriradiate, rays 0·17 to 0·4 by 0·011 to 0·04 mm.,
microxea, 0·05 to 0·16 by 0·003 mm.,
oxea, 0·5 to 1·2 by 0·024 to 0·06 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·12 to 0·35 by 0·014 to 0·035 mm., basal ray 0·2 to 0·5 by 0·014 to 0·035 mm.,
subendosomal sagittal triradiates (rarely quadriradiates), paired rays 0·14 to 0·41 by 0·01 to 0·04 mm., basal ray 0·4 to 0·52 by 0·01 to 0·05 mm.,
endosomal triradiates, regular to subregular, or sagittal, rays 0·21 to 0·22 by 0·013 to 0·014 mm.

Distribution: Australia (Port Phillip Heads).



Text-fig. 173. *Vosmaeropsis macera* (Carter): as represented by spicules of *V. dendyi* Row and Hozawa, ×100, except for microxeote, which is ×300, and by external form of *V. mackinnoni*, natural size.

Named form: **Grantessa mitsukurii** Hozawa

Grantessa mitsukurii Hozawa, 1916: 23, pl. i, fig. 7, pl. ii, fig. 15, text-fig. 5; Hozawa, 1929: 318; Tanita, 1942: 37, pl. ii, fig. 11; Tanita, 1943: 416, pl. xv, figs. 47–48.

Description: Sponge irregularly massive, sub-lobose, apparently formed by fusion of several tubular individuals; surface even, minutely hispid; vents, at summits of lobes, with feebly-developed fringes; texture rigid; colour, in spirit, greyish-white; tubar skeleton of centripetally-directed basal rays of subectosomal triradiates and centrifugally-directed basal rays of subendosomal triradiates; ectosomal skeleton of several layers of tangential triradiates, paired rays of subectosomal triradiates, with small tufts of oxea projecting beyond surface; endosomal surface of paired rays of subendosomal triradiates and a few layers of tangential triradiates.

Spicules: ectosomal triradiates, regular, rays 0·13 to 0·41 by 0·02 to 0·05 mm.,
oxea, 0·13 by 0·004 mm.,
subectosomal triradiates, pseudosagittal, paired rays 0·16 to 0·43 by 0·03 to 0·05 and 0·12 to 0·33 by 0·03 to 0·05 mm., basal ray 0·32 to 0·63 by 0·03 to 0·06 mm.,
subendosomal triradiates, sagittal, paired rays 0·13 to 0·31 by 0·016 to 0·05 mm., basal ray 0·24 to 0·58 by 0·02 to 0·05 mm.,
endosomal triradiates, paired rays 0·16 to 0·2 by 0·016 to 0·024 mm., basal ray 0·12 to 0·22 by 0·016 to 0·024 mm.

Distribution: Japan (several localities).

Named form: **Grantessa pluriosculifera** (Carter)

Heteropia pluriosculifera Carter, 1886: 52; *Grantessa pluriosculifera*, Dendy, 1892: 109; Dendy and Row, 1913: 752.

Description: Sponge tubular, compound, sessile; surface even, hispid; vent apical, fringed; texture soft; colour, in spirit, pale whitish-yellow; ectosomal skeleton a tangential layer of triradiates, with outer rays of subectosomal triradiates, and with oxea projecting beyond surface; tubar skeleton of centripetal rays of subectosomal triradiates and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·08 to 0·1 by 0·017 mm., basal ray 0·24 by 0·017 mm.,
oxea, 1·0 by 0·036 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·14 to 0·28 by 0·014 to 0·017 mm., centripetal rays 0·2 to 0·35 by 0·014 to 0·017 mm.,
subendosomal sagittal triradiates, paired rays 0·1 to 0·28 by 0·011 to 0·017 mm., basal ray 0·2 to 0·35 by 0·011 to 0·017 mm.,
endosomal triradiates, sagittal, paired rays 0·14 by 0·014 mm., basal ray 0·18 by 0·014 mm.

Distribution: Australia (Port Phillip Heads).

Named form: **Grantessa poculum** (Poléjaeff)

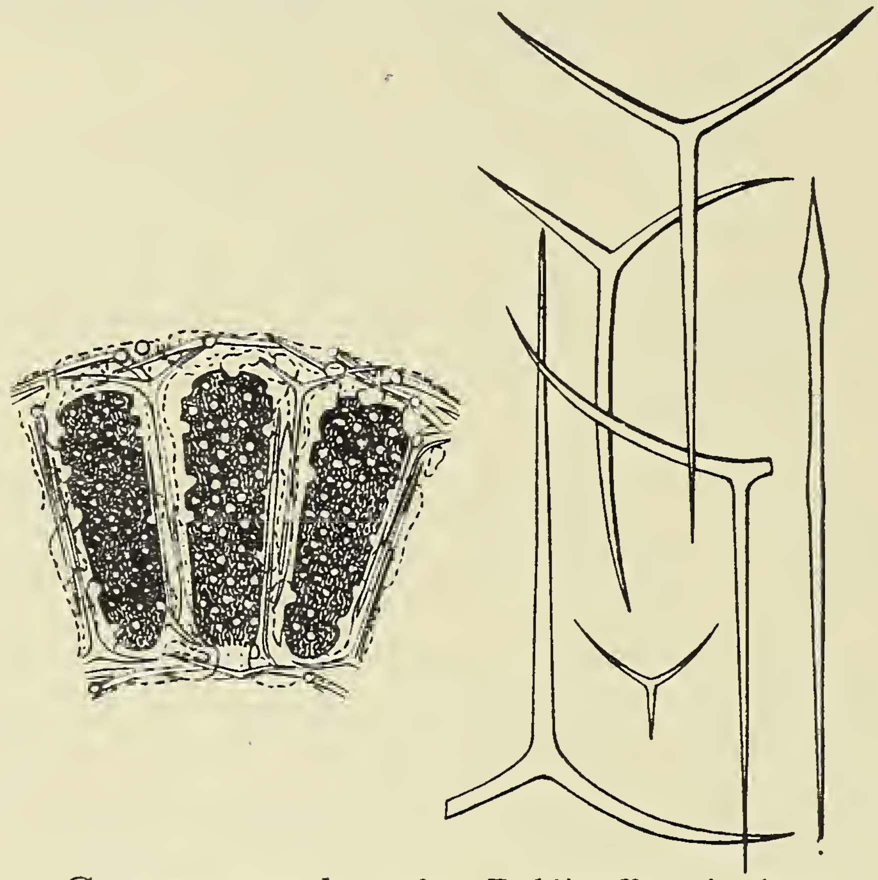
(text-fig. 174)

Amphoriscus poculum Poléjaeff, 1883: 46, pl. iv, fig. 4, pl. v, fig. 2; *Heteropia patulosculifera* Carter, 1886: 49; *Grantessa poculum*, Dendy, 1892: 107; Dendy and Row, 1913: 752.

Description: Sponge tubular, solitary or compound; surface minutely hispid; vents, with ill-defined fringes, terminal; texture soft; colour, in spirit, pale yellow; ectosomal skeleton a tangential layer of triradiates, with paired rays of subectosomal pseudosagittal triradiates, and with oxea projecting beyond surface; tubar skeleton of basal rays of subectosomal pseudosagittal triradiates and subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of endosomal triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·25 by 0·02 mm., basal rays 0·425 by 0·02 mm.,
oxea, 1·0 by 0·05 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·1 to 0·15 by 0·015 mm., basal rays 0·12 to 0·35 by 0·015 mm.,
subendosomal sagittal triradiates, paired rays 0·27 by 0·02 mm., basal rays 0·38 to 0·45 by 0·02 mm.,
endosomal triradiates, sagittal, paired rays 0·25 by 0·015 mm., basal rays 0·3 to 0·37 by 0·015 mm.

Distribution: Australia (Port Jackson, Port Phillip Heads); 55–64 m.



Text-fig. 174. *Grantessa poculum* after Poléjaeff: spicules, ×100; section at right angles to surface, ×50.

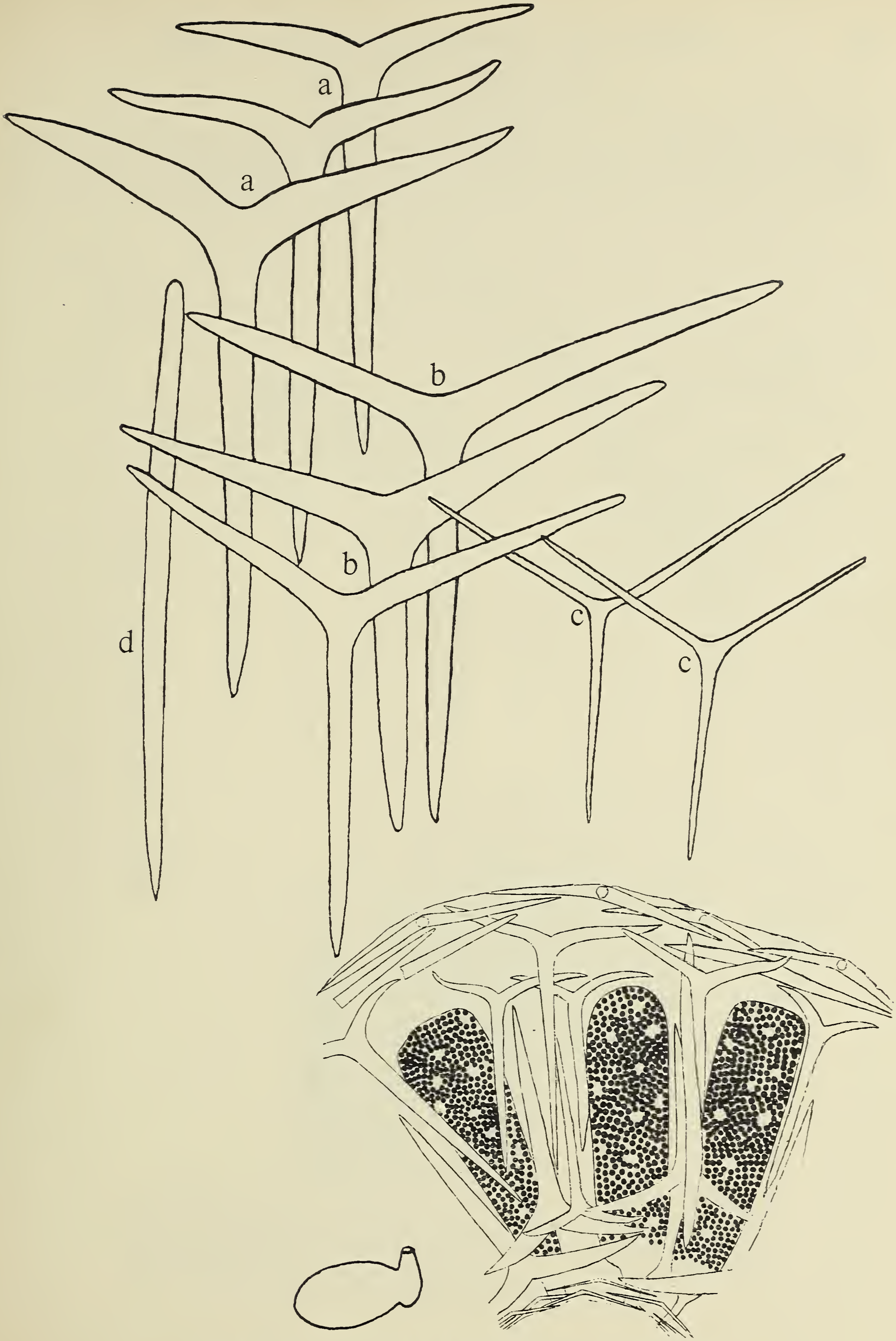
Named form: **Grantessa polyperistomia** (Carter)

Heteropia polyperistomia Carter, 1886: 47; *Grantessa polyperistomia*, Dendy, 1892: 109; Dendy and Row, 1913: 753.

Description: Sponge irregularly subglobular; surface minutely hispid, even; vents small, scattered, with well-developed fringes; texture firm; colour, in spirit, grey-brown; ectosomal skeleton a tangential layer of triradiates, with paired rays of subectosomal pseudosagittal triradiates and oxea, with ends projecting beyond surface; tubar skeleton of basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates, with several rows of intermediate triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of triradiates.

Spicules: ectosomal triradiates, subregular, rays 0·14 by 0·017 mm.,
oxea, strongly curved in distal third, 0·65 by 0·07 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·25 by 0·021 mm., basal rays 0·34 by 0·024 mm.,
intermediate tubar triradiates, sagittal, paired rays 0·24 to 0·32 by 0·032 mm., basal rays 0·54 to 0·8 by 0·032 mm.,
subendosomal sagittal triradiates, similar to intermediate triradiates,
endosomal triradiates, sagittal, paired rays 0·14 to 0·17 by 0·014 mm., basal rays 0·21 by 0·014 mm.

Distribution: Australia (Port Phillip Heads).

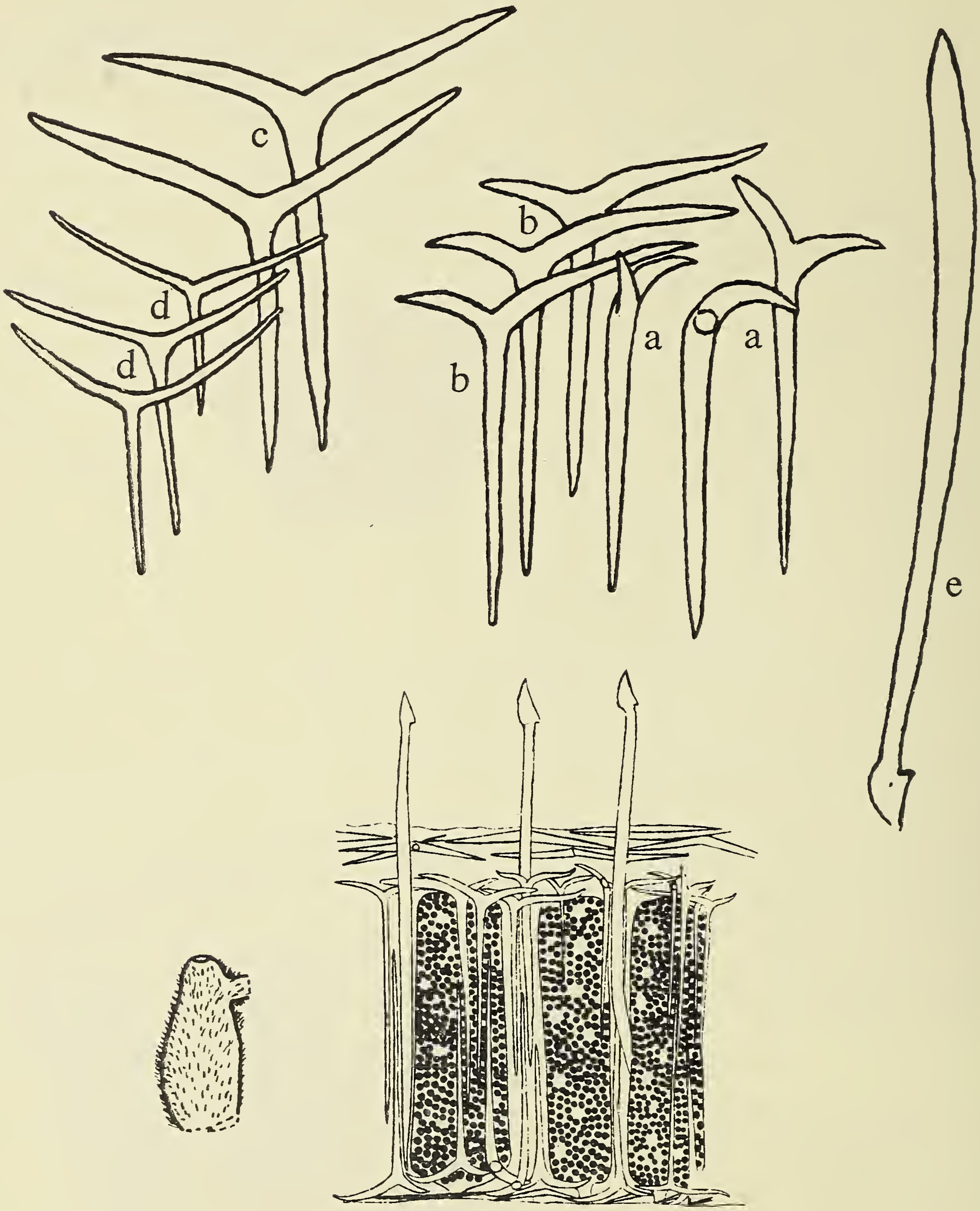


Text-fig. 175. *Grantessa glabra* after Row: spicules, × 100.
a. subectosomal and subendosomal triradiates; b. ectosomal triradiates; c. endosomal triradiates; d. oxea; section at right angles to surface, × 50; external form, natural size.

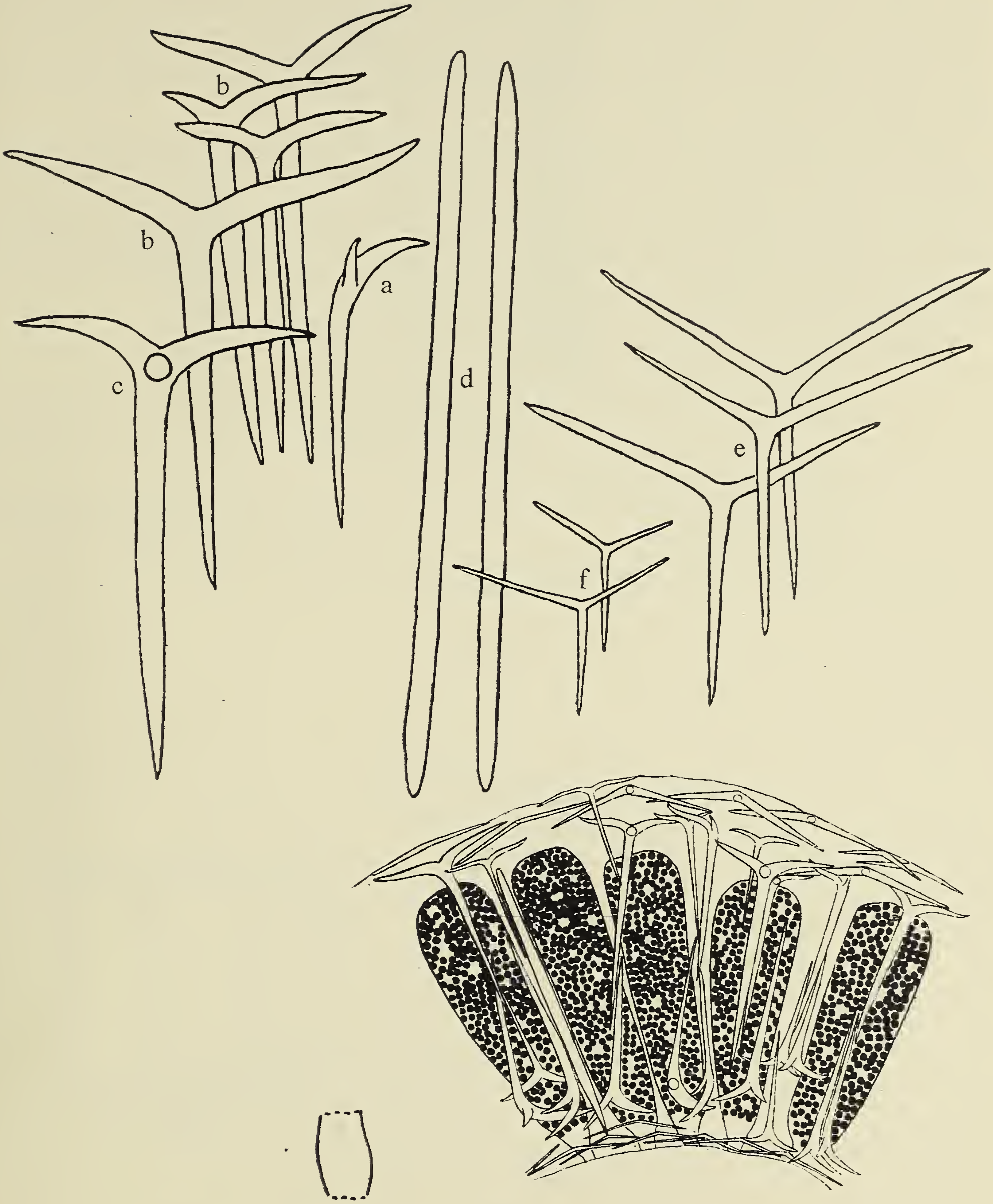
Sycettusa stauridia (Haeckel)

(text-figs. 175–180)

Sycetta stauridia Haeckel, 1872: 245, pl. xlii, figs. 13–16; (*Ute stauridia* Haeckel MS, *Djeddea violacea* Mikluchlo MS in Haeckel, 1872: 245); *Sycothamnus stauridia* Haeckel, 1872: 245, pl. xlii, fig. 13; *Grantessa simplex* Jenkin, 1908: 446, figs. 93–97; *G. zanzibaris* Jenkin, 1908: 449,



Text-fig. 176. *Grantilla hastifera* after Row: spicules, ×100.
a–b. subectosomal and subendosomal triradiates; c. ectosomal triradiates; d. endosomal triradiates; e. oxea; section at right angles to surface, ×50; external form, natural size.



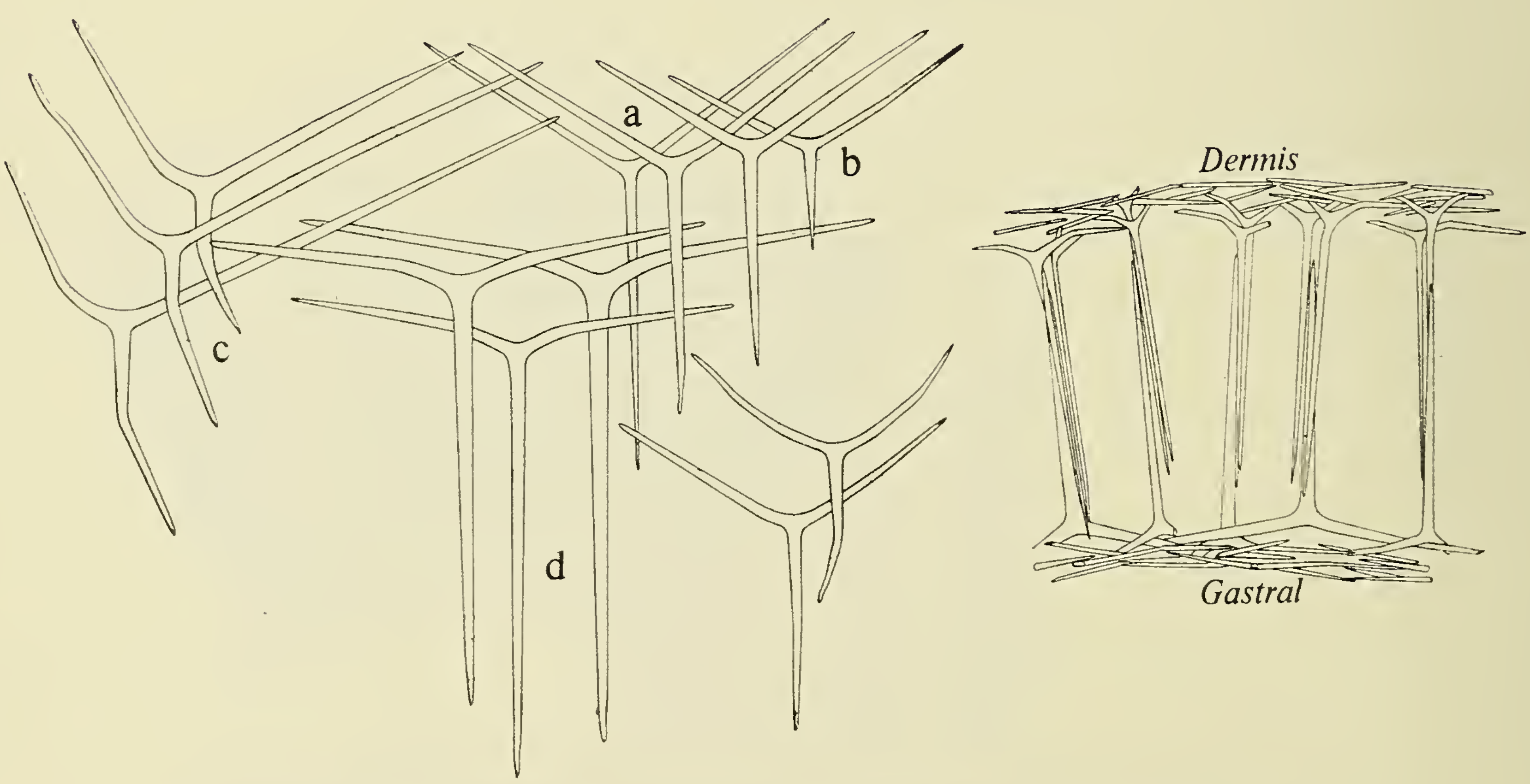
Text-fig. 177. *Grantilla quadriradiata* after Row: spicules, ×100. a–c. subectosomal and subendosomal triradiates and quadriradiates; d. oxea; e. ectosomal triradiates; f. endosomal triradiates; section at right angles to surface, ×50; external form, natural size.

figs. 98–102; *Grantilla quadriradiata* Row, 1909: 198, pl. xix, figs. 1–2, text-fig. 2; *G. hastifera* Row, 1909: 200, pl. xix, figs. 3–4; *Grantessa glabra* Row, 1909: 203, pl. xix, figs. 5–6; *G. hastifera*, Dendy, 1913: 19, pl. ii, fig. 6; *G. glabra*, Dendy and Row, 1913: 752; *G. hastifera*, Dendy and Row, 1913: 752; *G. stauridea* (*sic*), Dendy and Row, 1913: 753; *G. simplex*, Dendy and Row, 1913: 753; *G. zanzibarensis* (*sic*), Dendy and Row, 1913; 753, *Grantilla quadriradiata*, Dendy and Row, 1913: 756.

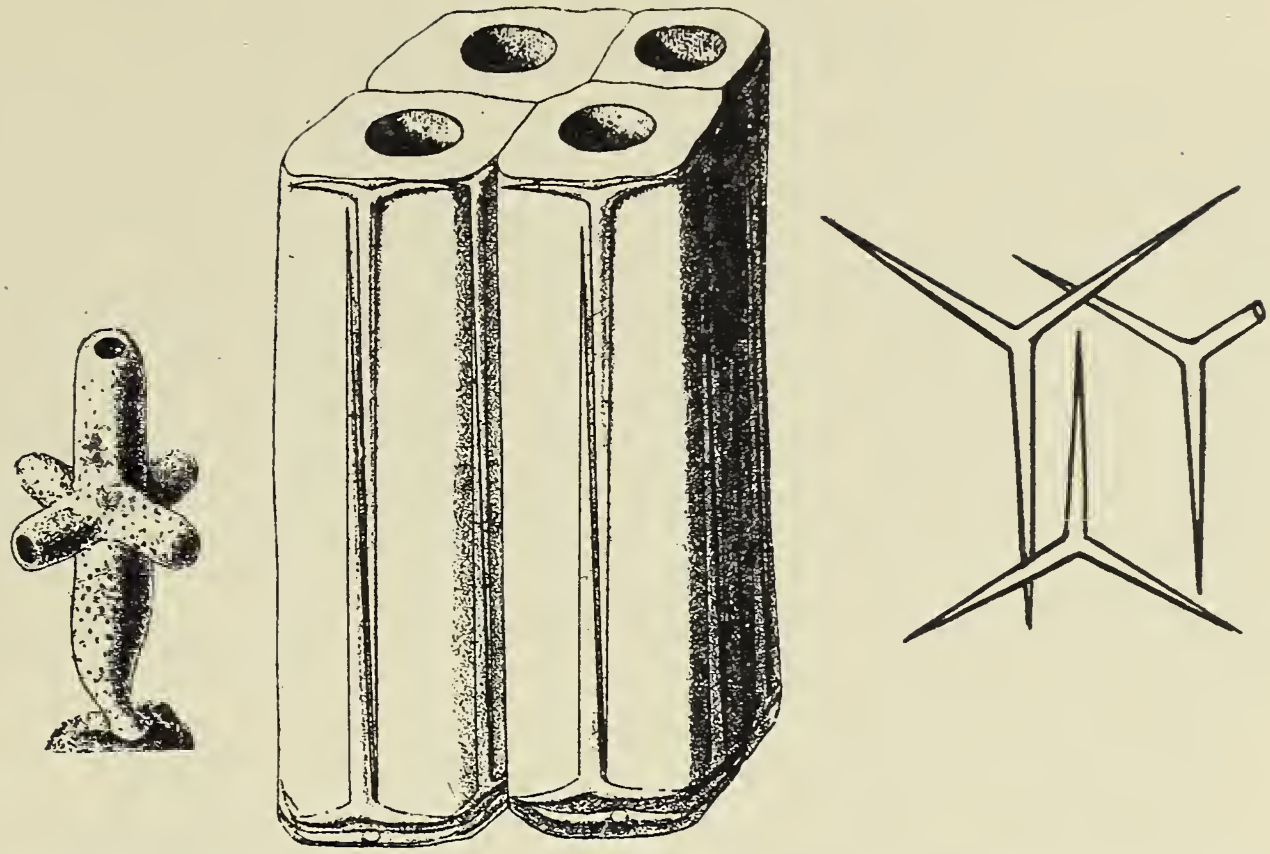
Description: Sponge tubular, simple and erect or clathrate; surface even and smooth, at most minutely hispid; vents terminal, naked (?); texture firm; colour, in spirit, white or whitish-yellow; ectosomal skeleton a tangential layer of triradiates, together with paired rays of subectosomal pseudosagittal triradiates and apical rays of subectosomal quadriradiates, if present; with oxea sometimes projecting beyond surface; tubar skeleton of centripetally directed basal rays of subectosomal triradiates and quadriradiates, and centrifugally directed basal rays of subendosomal sagittal triradiates and one or more tangential layers of endosomal triradiates.

Spicules: ectosomal triradiates, subregular, rays 0·2 to 0·7 by 0·01 to 0·065 mm.,
oxea, 1·0 to 1·3 by 0·03 to 0·06 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·1 to 0·5 by 0·034 to 0·08 mm., basal rays 0·24 to 0·8 by 0·034 to 0·09 mm.,
subectosomal pseudosagittal quadriradiates, similar to subectosomal triradiates, with apical rays 0·23 to 0·25 by 0·035 mm.,
subendosomal sagittal triradiates, similar in all respects to subectosomal pseudosagittal triradiates,
endosomal triradiates, subregular, rays 0·15 to 0·5 by 0·01 to 0·02 mm.

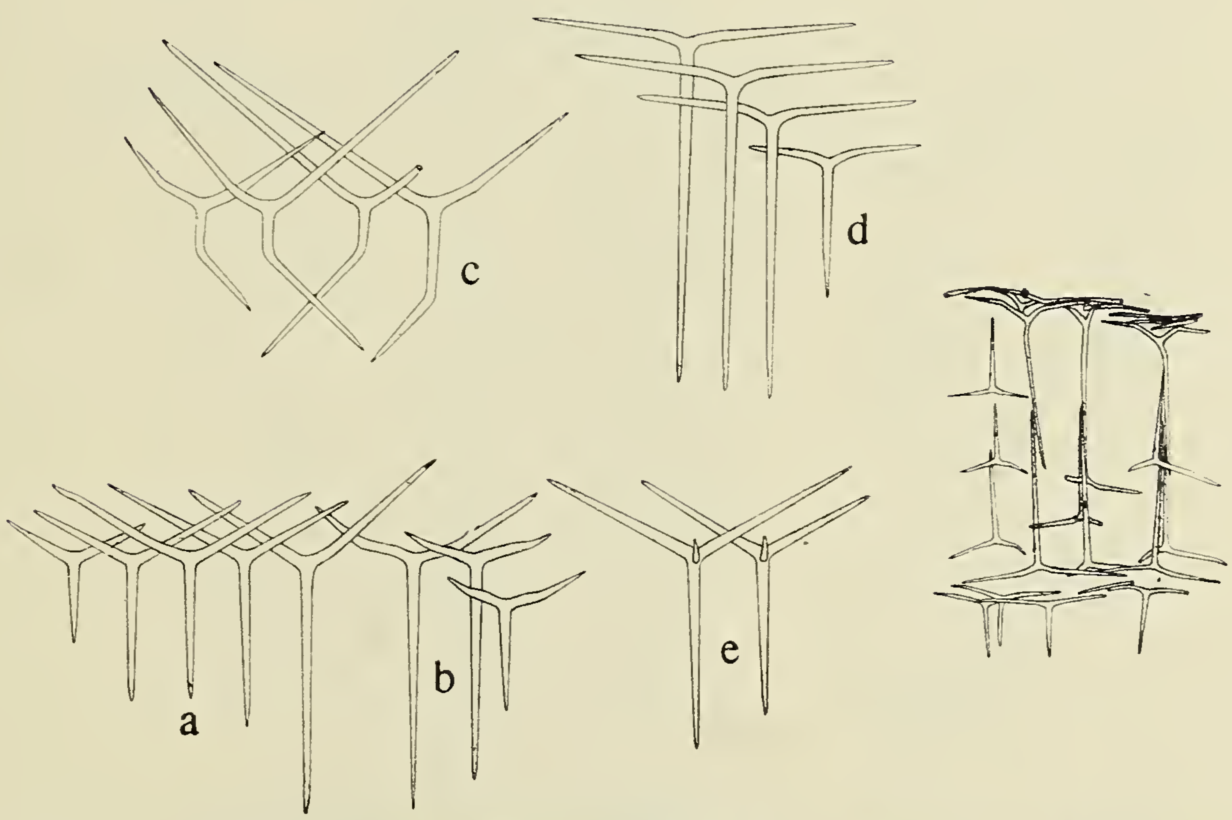
Distribution: Suez; Red Sea; Zanzibar; Providence.



Text-fig. 178. *Grantessa simplex* after Jenkin: section at right angles to surface, ×50; spicules, ×100.
a. ectosomal triradiates; b. endosomal triradiates; c. subectosomal pseudosagittal triradiates; d. subendosomal triradiates.



Text-fig. 179. *Sycetta stauridia* after Haeckel: spicules, ×100; diagrammatic representation of skeleton, ×100; external form, ×2. (All from Haeckel [1872].)
[There is an obvious disparity between the spicules shown separately and those shown *in situ*.]



Text-fig. 180. *Grantessa zanzibaris* after Jenkin: section at right angles to surface, ×50; spicules, ×100.
a. ectosomal triradiates; b. tubar triradiates; c. subectosomal pseudo-sagittal triradiates; d. subendosomal triradiates; e. endosomal quadriradiates.

12. **Sycettusa glacialis** (Haeckel)

Named form: **Grantessa bifida** Tanita

(text-fig. 181)

Grantessa bifida Tanita, 1943: 417, pl. xv, fig. 49, text-figs. 14–15.

Description: Sponge tubular; surface strongly hispid; vent apical, naked; texture hard; colour, in spirit, white with yellowish tinge; ectosomal skeleton of several tangential layers of triradiates, together with paired rays of subectosomal pseudosagittal triradiates, and large oxea projecting at surface; skeleton of chamber layer of basal rays of subectosomal and subendosomal radiates, together with several rows of tubar triradiates; endosomal skeleton of paired rays of endosomal triradiates and quadriradiates, a tangential layer of endosomal quadriradiates, and densely packed microxea.

Spicules: ectosomal triradiates, subregular, rays 0·17 to 0·24 by 0·015 to 0·018 mm.,
oxea, 0·8 to 1·5 by 0·035 to 0·085 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·14 to 0·23 by 0·016 to 0·02 mm., basal ray 0·24 to 0·31 by 0·016 to 0·02 mm.,
tubar triradiates, sagittal, paired rays 0·17 to 0·23 by 0·018 to 0·025 mm., basal ray 0·2 to 0·31 by 0·018 to 0·025 mm.,
subendosomal sagittal triradiates, paired rays 0·25 to 0·33 by 0·023 to 0·03 mm., basal ray 0·42 to 0·61 by 0·023 to 0·03 mm.,
subendosomal quadriradiates with a rudimentary apical ray,
endosomal quadriradiates, sagittal, paired rays 0·17 to 0·22 by 0·01 mm., basal ray 0·2 to 0·27 by 0·01 mm., apical ray 0·08 by 0·008 mm.,
microxea, 0·095 to 0·12 by 0·004 mm.

Distribution: Japan (Wakayama and Kôti Prefectures).

Text-fig. 181. *Grantessa bifida* after Tanita: section at right angles to surface, ×50; external form, natural size.

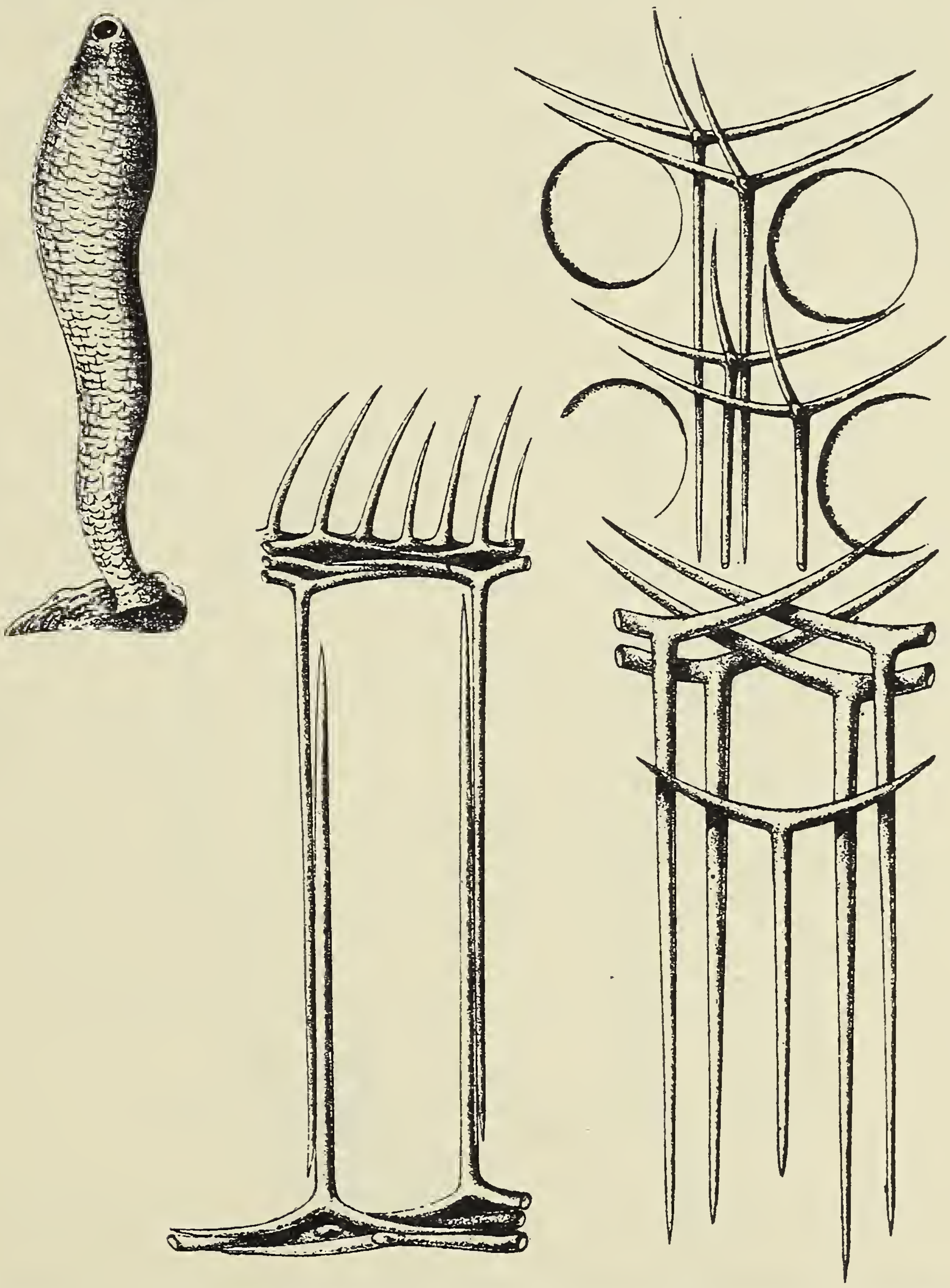
Named form: **Achramorpha diomediae** Hozawa

Achramorpha diomediae Hozawa, 1918: 540, pl. lxxxv, fig. 10, text-fig. 6; Hozawa, 1929: 340.

Description: Sponge a thin-walled tube; surface slightly hispid; margin of vent feebly developed; texture fragile; colour, in spirit, whitish; ectosomal skeleton of tangential sagittal triradiates, with tufts of projecting oxea; tubar skeleton of centrifugal rays of subendosomal sagittal triradiates and proximal parts of ectosomal oxea; endosomal skeleton of tangential quadriradiates with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·11 to 0·2 by 0·008 to 0·01 mm.,
oxea, 0·8 by 0·008 mm.,
subendosomal triradiates, sagittal, paired rays, 0·1 to 0·15 by 0·008 to 0·01 mm., basal ray 0·2 to 0·31 by 0·008 to 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·11 to 0·15 by 0·008 to 0·01 mm., basal ray 0·2 to 0·25 by 0·01 to 0·012 mm., apical ray 0·1 by 0·008 mm.,

Distribution: Kurile Islands.



Text-fig. 182. *Grantessa glacialis* after Haeckel: spicules in endosome (top right), in ectosome (bottom right), and in cross-section of body wall (bottom centre), × 100; external form, × 2.

Named form: **Sycettusa glacialis** (Haeckel)

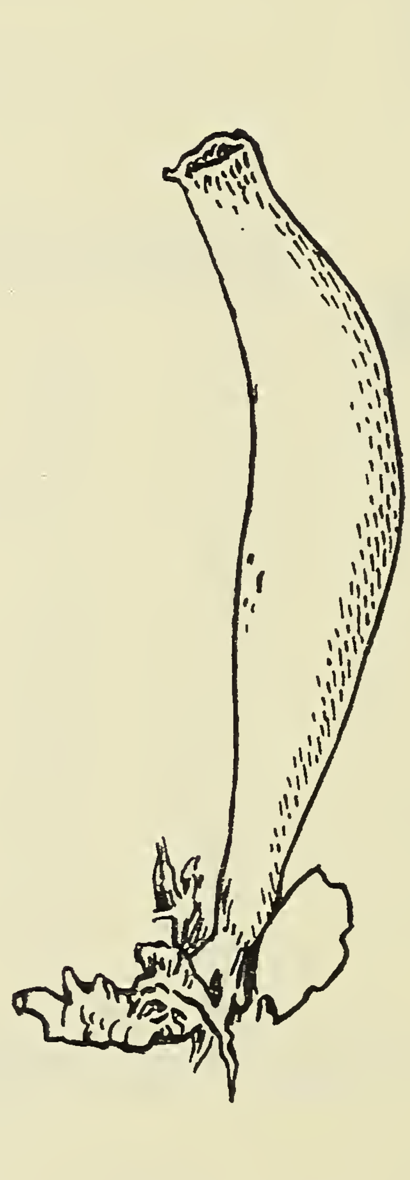
(text-fig. 182)

Sycaltis glacialis Haeckel, 1872: 269, pl. xlv, figs. 4-7; *Sycurus glacialis* Haeckel, 1872: 269, pl. xlv, fig. 4; *Sycaltis glacialis*, Stuxberg, 1887: 357; *Amphoriscus glacialis*, Breitfuss, 1898: 26, pl. i, fig. 6; Breitfuss, 1898: 304; Breitfuss, 1898: 221; *Grantessa glacialis*, Dendy and Row, 1913: 573; Breitfuss, 1932: 246.

Description: Sponge solitary, cylindrical or subclavate; surface smooth, porose; vent naked, fringe not visible to naked eye; texture soft; colour, in spirit, dark grey to brown; ectosomal skeleton of tangential triradiates in one or two layers, and paired rays of subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and endosomal quadriradiates.

Spicules: ectosomal triradiates sagittal, paired rays 0·2 to 0·3 by 0·02 mm., basal ray 0·4 to 0·6 by 0·02 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·1 to 0·2 by 0·02 mm., basal ray 0·4 to 0·6 by 0·02 mm.,
subendosomal sagittal triradiates, paired rays 0·1 to 0·2 by 0·01 mm., basal ray 0·4 to 0·6 by 0·01 mm.,
endosomal quadriradiates, basal ray 0·3 to 0·4 by 0·01 mm., paired rays 0·15 to 0·2 by 0·01 mm., apical ray 0·15 to 0·2 by 0·01 mm.

Distribution: Arctic (Greenland, Spitzbergen, Barents Sea, Murmansk); 15–245 m.



Text-fig. 183. *Amphiute ijimai*: holotype, after Hozawa, (right), Tanita's (1942) specimen (left), both natural size.

Named form: **Amphiute ijimai** Hozawa

(text-fig. 183)

Amphiute ijimai Hozawa, 1916: 33, pl. i, fig. 9, pl. ii, fig. 17, text-fig. 7; Hozawa, 1929: 319; Hozawa, 1933: 8, pl. i, fig. 4; Tanita, 1942: 44, pl. iii, fig. 16; Tanita, 1943: 422.

Description: Sponge tubular; surface smooth, striated; vent apical, naked; texture firm, elastic; colour, in spirit, greyish-white; ectosomal skeleton of a few layers of tangential triradiates, longitudinal oxea and tufts of oxea projecting from surface; tubar skeleton of centrifugally-directed rays of subgastral triradiates and centripetally-directed rays of subectosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates several layers of tangential quadriradiates and longitudinal oxea.

Spicules: ectosomal triradiates, sagittal, paired rays 0·08 to 0·18 by 0·012 to 0·014 mm., basal ray 0·08 to 0·19 by 0·008 to 0·012 mm.,
large oxea of ectosomal and endosomal skeletons, 1·2 to 3·0 by 0·05 to 0·08 mm.,
microxea, 0·11 to 0·21 by 0·006 to 0·008 mm.,
subectosomal triradiates, pseudosagittal, paired rays, unequal, 0·15 to 0·28 by 0·014 to 0·016 and 0·08 to 0·17 by 0·012 mm., basal ray 0·28 to 0·6 by 0·014 to 0·016 mm.,
subendosomal triradiates, sagittal, paired rays 0·17 to 0·22 by 0·012 mm., basal ray 0·38 to 0·88 by 0·012 mm.,
endosomal quadriradiates, sagittal, paired rays 0·09 to 0·23 by 0·012 mm., basal ray 0·23 to 0·36 by 0·08 mm., apical ray 0·15 to 0·008 mm.

Distribution: Japan (Sagami Sea, Suruga Bay, Misaki); 79–257 m.

Named form: **Grantessa kuekenthali** (Breitfuss)

Ebnerella kuekenthali Breitfuss, 1896: 430; Breitfuss, 1897: 221; Breitfuss, 1898: 112, pl. xii, figs. 10–20, pl. xiii, fig. 53; Breitfuss, 1898: 304; *Grantessa kuekenthali*, Dendy and Row, 1913: 753; Breitfuss, 1932: 246; Breitfuss, 1936: 8.

Description: Sponge solitary, tubular, sessile (?); surface hispid; vent terminal, naked; texture (?); colour, in spirit, dirty yellow; ectosomal skeleton of a tangential layer of sub-regular triradiates, oxea projecting beyond surface, and paired rays of subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal pseudosagittal triradiates and subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of sagittal triradiates.

Spicules: ectosomal triradiates, subregular, rays 0·089 to 0·12 by 0·006 to 0·008 mm.,
oxea, 0·22 to 0·33 by 0·008 to 0·018 mm.,
subectosomal pseudosagittal and subendosomal sagittal triradiates, paired rays 0·089 to 0·12 by 0·006 to 0·008 mm., basal rays 0·09 to 0·17 by 0·006 to 0·008 mm.,
endosomal triradiates, paired rays 0·15 to 0·18 by 0·01 mm., basal rays 0·39 to 0·5 by 0·007 mm.

Distribution: Arctic (Spitzbergen, White Sea); Baltic; 75–1,000 m.

Named form: **Grantessa lanceolata** (Breitfuss)

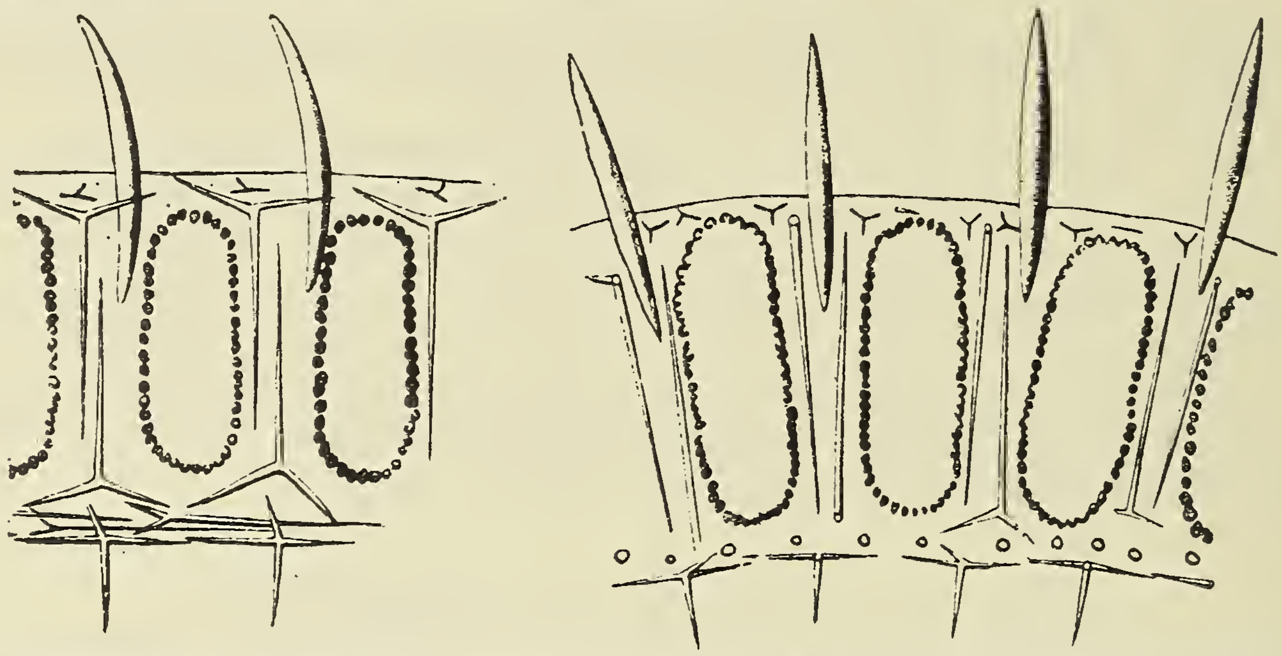
(text-fig. 184)

Ebnerella lanceolata Breitfuss, 1898: 28, pl. i, figs. 3–5, pl. iv, figs. 24–25; Breitfuss, 1898: 304; *Grantessa lanceolata*, Dendy and Row, 1913: 752; Breitfuss, 1932: 246.

Description: Sponge sac-shaped, compressed, substipitate; surface smooth or hispid; vent terminal, naked; texture (?); colour, in spirit, white or yellowish-white; ectosomal skeleton of irregularly-disposed, sub-regular triradiates, and paired rays of subectosomal pseudosagittal triradiates, with, in distal part, large oxea projecting beyond surface; tubar skeleton of basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates, a layer of sagittal triradiates and quadriradiates and outer layer of quadriradiates with apical ray projecting into cloacal cavity; skeleton of vent (?).

Spicules: ectosomal triradiates, subregular, rays 0·08 to 0·12 by 0·006 to 0·008 mm.,
oxea, 0·15 to 0·35 by 0·012 to 0·028 mm.,
subectosomal pseudosagittal and subendosomal sagittal triradiates, paired rays 0·04 to 0·06 by 0·006 mm., basal rays 0·13 to 0·18 by 0·008 mm.,
endosomal triradiates and quadriradiates, regular, facial rays 0·08 to 0·12 by 0·006 to 0·007 mm., apical ray 0·04 to 0·06 mm. long,
endosomal triradiates and quadriradiates, sagittal, similar to regular endosomal radiates but with basal ray 0·25 to 0·29 mm. long.

Distribution: Arctic (White Sea, Murmansk); 46–73 m.



Text-fig. 184. *Grantessa lanceolata* (after Breitfuss): sections at right angles to surface, × 100.

Named form: **Heteropia medioarticulata** Hozawa

Heteropia medioarticulata Hozawa, 1918: 531, pl. lxxxiv, fig. 7, text-fig. 3; Hozawa, 1929: 319.

Description: Sponge tubular, compressed, substipitate; surface smooth; vent with a slight collar; texture firm; colour, in spirit, greyish-white; tubar skeleton of centripetal basal rays of subectosomal pseudosagittal triradiates and centrifugal basal rays of subendosomal sagittal triradiates, and several rows of triradiates; ectosomal skeleton of paired rays of subectosomal triradiates, with sparse tufts of outwardly directed oxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates, endosomal triradiates and quadriradiates, with apical ray projecting into cloacal cavity.

Spicules: subectosomal triradiates, pseudosagittal, irregular, paired rays unequal, 0·1 to 0·16 by 0·012 and 0·06 to 0·08 by 0·012 mm. respectively, basal ray 0·14 to 0·24 by 0·012 mm.,
ectosomal oxea, 0·47 to 0·7 by 0·012 to 0·016 mm.,
microxea, 0·24 by 0·01 mm.,
tubar triradiates, sagittal, paired rays 0·1 to 0·19 by 0·012 mm., basal ray 0·17 to 0·29 by 0·012 mm.,
subendosomal triradiates, sagittal, paired rays 0·09 to 0·14 by 0·01 to 0·012 mm., basal ray 0·17 to 0·2 by 0·01 to 0·012 mm.,
endosomal triradiates, sagittal, paired rays 0·18 to 0·24 by 0·008 to 0·012 mm., basal ray 0·56 to 0·73 by 0·008 to 0·012 mm.,
endosomal quadriradiates, similar to endosomal triradiates, apical ray 0·26 to 0·47 by 0·025 mm. thick.

Distribution: Saghalin.

Named form: **Grantessa murmanensis** (Breitfuss)

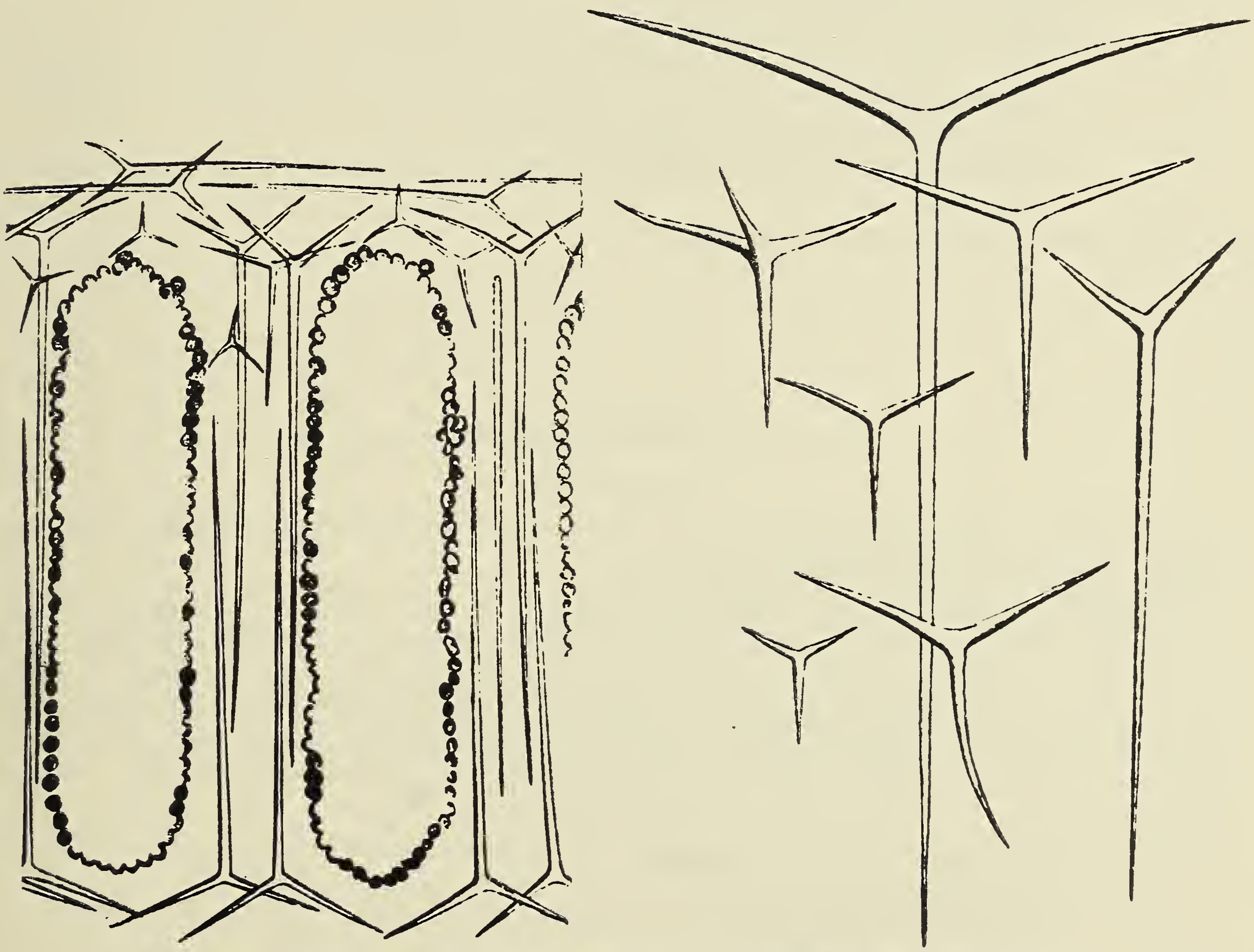
(text-fig. 185)

Amphoriscus murmanensis Breitfuss, 1898: 27, pl. i, fig. 7, pl. iii, figs. 20–21; Breitfuss, 1898: 304; *Grantessa murmanensis*, Dendy and Row, 1913: 753; Breitfuss, 1932: 247.

Description: Sponge sac-shaped, compressed, substipitate; surface hispid; vent terminal, naked; texture (?); colour, in spirit, yellowish-white; ectosomal skeleton of regular or subregular quadriradiates, with apical ray projecting beyond surface, and sagittal triradiates, and paired rays of subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates only.

Spicules: ectosomal quadriradiates, regular or subregular, rays 0·07 to 0·09 mm. long, apical ray slightly shorter,
ectosomal triradiates, sagittal, paired rays 0·22 to 0·26 by 0·012 mm., basal rays 0·5 to 0·6 by 0·014 mm.,
subectosomal pseudosagittal and subendosomal sagittal triradiates, paired rays 0·2 to 0·35 by 0·012 mm., basal rays 1·06 to 1·12 by 0·014 mm.

Distribution: Arctic (Murmansk).



Text-fig. 185. *Grantessa murmanensis* (after Breitfuss): spicules (right), ×100; section at right angles to surface, showing ectosomal surface towards top of page, ×65.
Note: positions of individual spicules can be seen by reference to section (left).

Named form: **Grantessa nemurensis** Hozawa

Grantessa nemurensis Hozawa, 1929: 315, pl. xvi, figs. 28, 29, text-fig. 15; Hozawa and Tanita, 1941: 421, fig. 1; Tanita, 1943: 414.

Description: Sponge composed of numerous tubes (10 mm. maximum diameter), erect or oblique, often branching and anastomosing; surface even, minutely hispid; vent without margin; texture compact, firm; colour, in spirit, greyish-white; skeleton of chamber layer of centripetally-directed basal rays of subectosomal pseudosagittal triradiates and centrifugally-directed basal rays of subendosomal pseudosagittal triradiates; ectosomal skeleton of paired rays of subectosomal pseudosagittal triradiates, several layers of tangential triradiates, with large oxea and slender linear spicules projecting vertically from surface; endosomal skeleton of paired rays of subendosomal sagittal triradiates and of several rows of tangential triradiates, with a few quadriradiates, apical rays of which project into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·06 to 0·07 by 0·008 to 0·014 mm., basal ray 0·06 to 0·1 by 0·008 to 0·014 mm.,
oxea, 0·18 to 0·25 by 0·01 to 0·024 mm.,
linear spicules (trichoxea) 0·07 to 0·13 by 0·002 to 0·003 mm.,
subectosomal triradiates, pseudosagittal, paired rays unequal, 0·045 by 0·009 and 0·075 by 0·009 mm. respectively,
subendosomal triradiates, pseudosagittal, paired rays 0·08 to 0·1 by 0·012 to 0·016 mm., basal ray 0·11 to 0·14 by 0·012 to 0·016 mm.,
endosomal triradiates, sagittal, paired rays 0·09 to 0·15 by 0·012 to 0·014 mm., basal ray 0·22 to 0·29 by 0·01 to 0·012 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·1 to 0·48 by 0·01 to 0·024 mm.

Distribution: Japan (northern localities).

Named form: **Grantessa nitida** (Arnesen)

(text-fig. 186)

Ebnerella nitida Arnesen, 1901: 24, pl. i, figs. 1–3; *Grantessa nitida*, Dendy and Row, 1913: 752; Breitfuss, 1932: 247; Rezvoi, 1928: 72, fig. 1.

Description: Sponge solitary, tubular, sub-stipitate; surface hispid; vent terminal, naked; texture (?); colour, in spirit, greyish-brown; ectosomal skeleton of subregular triradiates, large oxea projecting beyond surface, and paired rays of subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates, with occasional triradiates scattered in middle of body wall; endosomal skeleton of paired rays of subendosomal triradiates and of endosomal quadriradiates with apical ray projecting into cloacal cavity.

Spicules: ectosomal triradiates, sub-regular or only slightly sagittal, rays 0·105 by 0·006 mm.,
oxea, 0·21 by 0·007 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·09 by 0·005 mm., basal rays 0·09 by 0·005 mm.,
subendosomal sagittal triradiates, paired rays 0·1 by 0·005 mm., basal rays 0·14 by 0·005 mm.,
endosomal quadriradiates, facial rays 0·1 by 0·006 mm., apical ray, 0·005 mm. long.

Distribution: Norway (Tromsö); Arctic (Barents Sea); 146 m.

Text-fig. 186. *Grantessa nitida* after Arnesen: spicules and a section at right angles to surface (it is not possible to be sure of the correct dimensions of these spicules); external form, natural size.

Named form: **Grantessa parva** Tanita

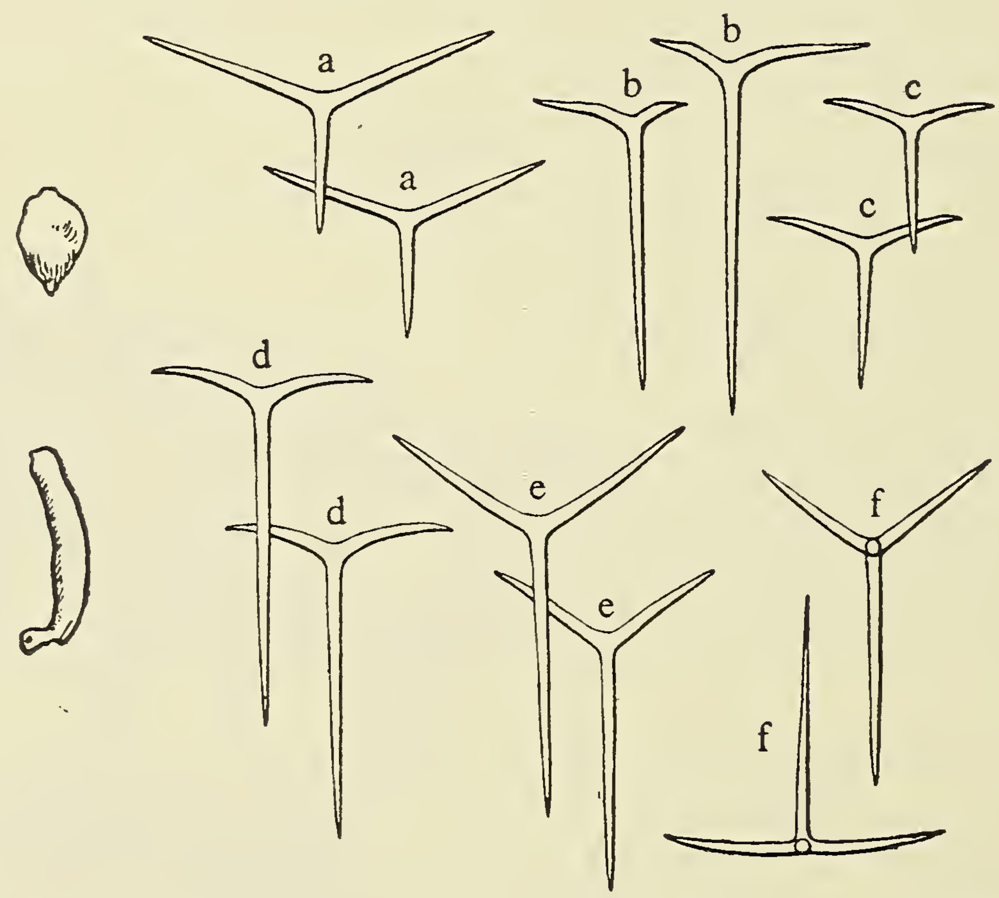
(text-fig. 187)

Grantessa parva Tanita, 1942: 38, pl. ii, fig. 12, text-fig. 6; Tanita, 1943: 420, pl. xv, fig. 50.

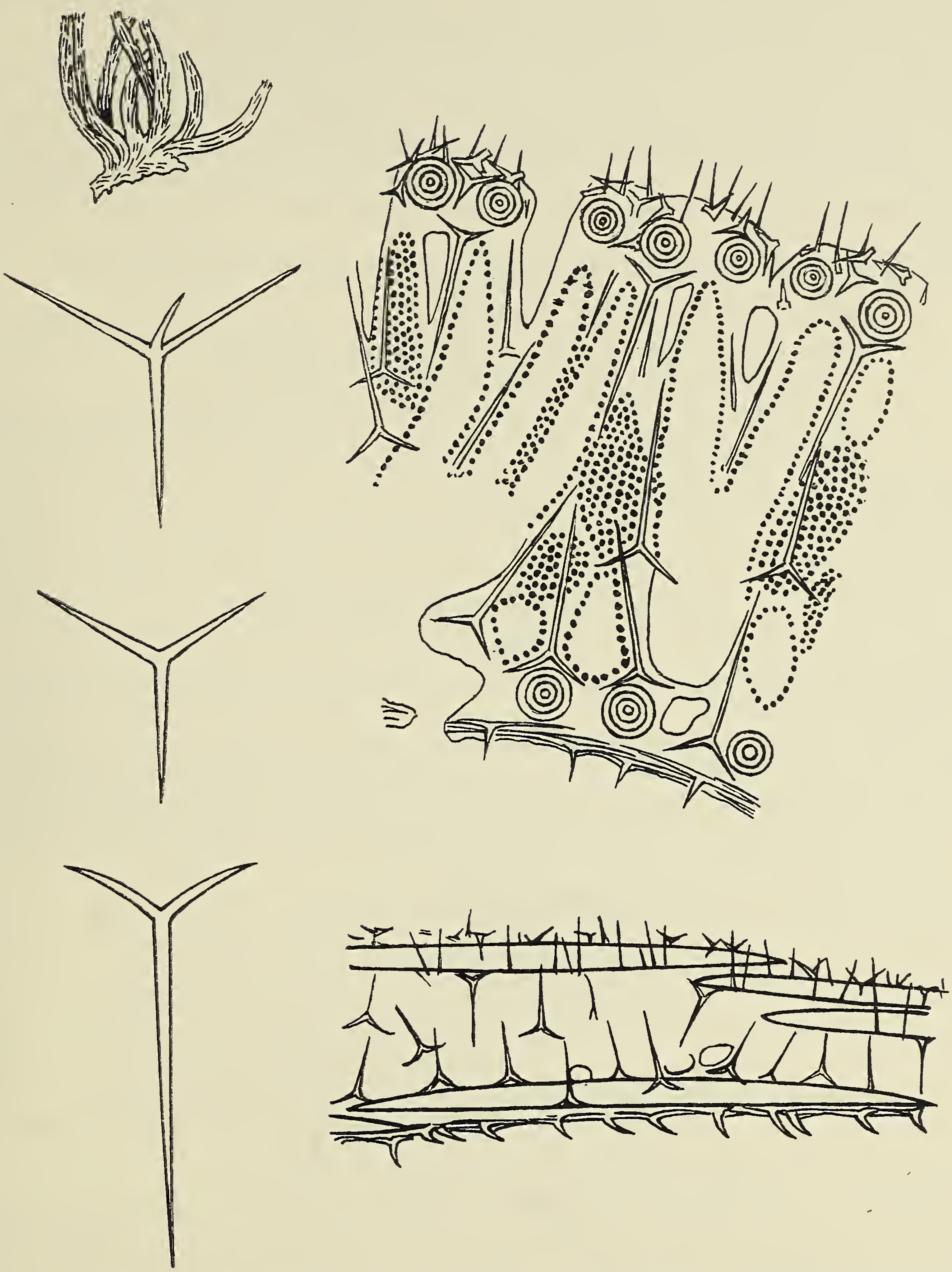
Description: Sponge an elongated tube; surface smooth, even; vent apical, without special skeleton; texture very soft; colour, in spirit, white; ectosomal skeleton a thin tangential layer of triradiates, together with paired rays of subectosomal pseudosagittal triradiates; skeleton of chamber layer of basal rays of subectosomal and subendosomal triradiates, together with scattered tubar triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and tangential layers of endosomal tri- and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·11 to 0·15 by 0·008 to 0·01 mm., basal ray 0·065 to 0·095 by 0·008 to 0·01 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·08 to 0·11 by 0·008 to 0·012 mm., basal ray 0·18 to 0·25 by 0·008 to 0·012 mm.,
tubar triradiates similar to ectosomal triradiates,
subendosomal sagittal triradiates, paired rays 0·07 to 0·11 by 0·008 to 0·012 mm., basal ray 0·17 to 0·26 by 0·008 to 0·012 mm.,
endosomal triradiates, sagittal, paired rays 0·1 to 0·16 by 0·008 mm., basal ray 0·19 to 0·3 by 0·008 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·11 to 0·23 by 0·006 to 0·008 m.

Distribution: Japan (Misaki, Mie); 37 m.



Text-fig. 187. *Grantessa parva* after Tanita; spicules, × 100; external form (holotype is lower of two specimens), × $\frac{4}{3}$.
a. ectosomal triradiates; b. subectosomal triradiates; c. tubar triradiates; d. subendosomal triradiates; e. endosomal triradiates; f. endosomal quadriradiates.



Text-fig. 188. *Amphiute paulini* after Hanitsch: spicules, ×150; section at right angles to surface across body wall (top right), ×80, and in longitudinal section, ×50; external form, natural size.

Named form: **Amphiute paulini** Hanitsch

(text-fig. 188)

Amphiute paulini Hanitsch, 1894: 433, pl. xii, figs. 1–5, pl. xiii, fig. 1; Breitfuss, 1898: 93; Dendy and Row, 1913: 755; Hozawa, 1940: 152, pl. vii, fig. 10; Arndt, 1940: 6.

Description: Sponge tubular, solitary or compound, sessile; surface smooth; vents apical, with fringe; texture (?); colour, in spirit, white; ectosomal skeleton of large, longitudinally-arranged oxea, microxea set at right-angles to surface, a tangential layer of triradiates and paired rays of subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal pseudosagittal triradiates and subendosomal sagittal triradiates; endosomal skeleton of paired rays of subectosomal sagittal triradiates and a tangential layer of large oxea and endosomal quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·1 to 0·15 by 0·009 to 0·013 mm.,
oxea, 0·99 to 2·7 by 0·05 to 0·12 mm.,
microxea, 0·2 to 0·25 by 0·002 to 0·003 mm.,
subectosomal pseudosagittal triradiates, paired rays, 0·089 to 0·136 by 0·008 to 0·01 mm., basal rays 0·23 to 0·29 by 0·009 to 0·012 mm.,
subendosomal sagittal triradiates, similar to subectosomal pseudosagittal triradiates,
endosomal quadriradiates, regular, facial rays 0·128 to 0·165 by 0·004 to 0·008 mm., apical rays 0·05 to 0·08 by 0·003 to 0·006 m.

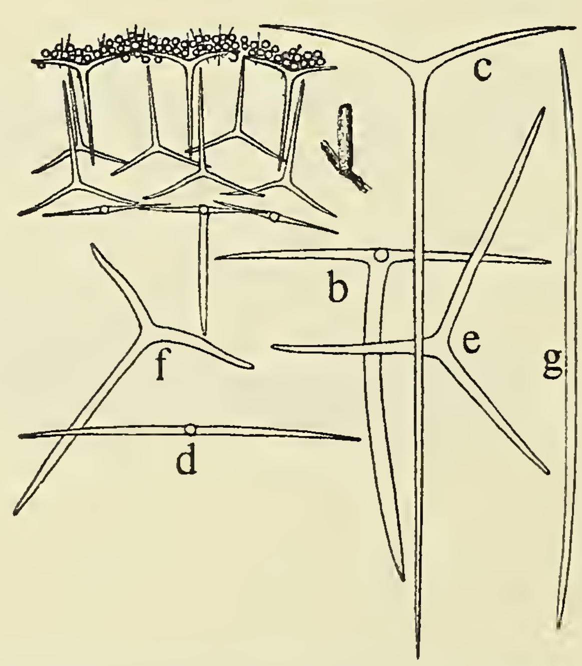
Distribution: Portugal; Spain (Asturias); littoral.

Named form: **Heteropia rodgeri** Lambe

(text-fig. 189)

Heteropia rodgeri Lambe, 1900: 35, pl. vi, fig. 13; Lambe, 1900: 168; Dendy and Row, 1913: 754; Breitfuss, 1932: 250.

Description: Sponge solitary, cylindrical, sessile; surface even, very minutely hispid; vent terminal, naked (?); texture firm; (colour not stated); ectosomal skeleton of tangential oxea, microxea set at right angles to surface, and paired rays of subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal pseudosagittal and endosomal sagittal triradiates,



Text-fig. 189. *Heteropia rodgeri* after Lambe: spicules, × 100; section at right angles to surface, × 50; external form, about natural size.
Spicules: f. subectosomal triradiate; e. subendosomal triradiate; b. endosomal quadriradiate; c, d. endosomal triradiate: g. ectosomal oxeote.

with subsagittal triradiates scattered in chamber layer; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of endosomal triradiates and quadriradiates.

Spicules: oxea, 0·82 by 0·013 mm.,
microxea, 0·098 by 0·002 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·078 by 0·006 mm., basal rays 0·17 by 0·006 mm.,
tubar triradiates, subsagittal, paired rays 0·09 by 0·006 mm., basal rays 0·15 by 0·006 mm.,
subendosomal sagittal triradiates, paired rays 0·11 by 0·006 mm., basal rays 0·19 by 0·006 mm.,
endosomal triradiates, sagittal, paired rays 0·1 by 0·006 mm., basal rays 0·42 by 0·006 mm.,
endosomal quadriradiates, regular, facial rays 0·1 by 0·006 mm., apical rays 0·23 by 0·013 mm.

Distribution: Arctic Canada (Belle Isle Strait); 120 m.

Named form: **Grantessa sagamiana** Hozawa
(text-fig. 190)

Grantessa sagamiana Hozawa, 1916: 8, pl. i, fig. 2, pl. ii, fig. 12, text-fig. 2; Hozawa, 1929: 315; Tanita, 1943: 513.

Description: Sponge tubular; surface even, hispid; vent apical, with conspicuous fringe; texture firm, elastic; colour, in spirit, greyish-white; ectosomal skeleton of paired rays of subectosomal triradiates, a few layers of tangential triradiates, large oxea and rare trichoxea; skeleton of chamber layer of centripetally-directed basal rays of subectosomal triradiates and centrifugally-directed basal rays of subendosomal pseudosagittal triradiates with basal ray directed towards surface; endosomal skeleton of paired rays of subendosomal triradiates and a few layers of tangential quadriradiates, with apical rays projecting into cloacal cavity, together with a few triradiates.

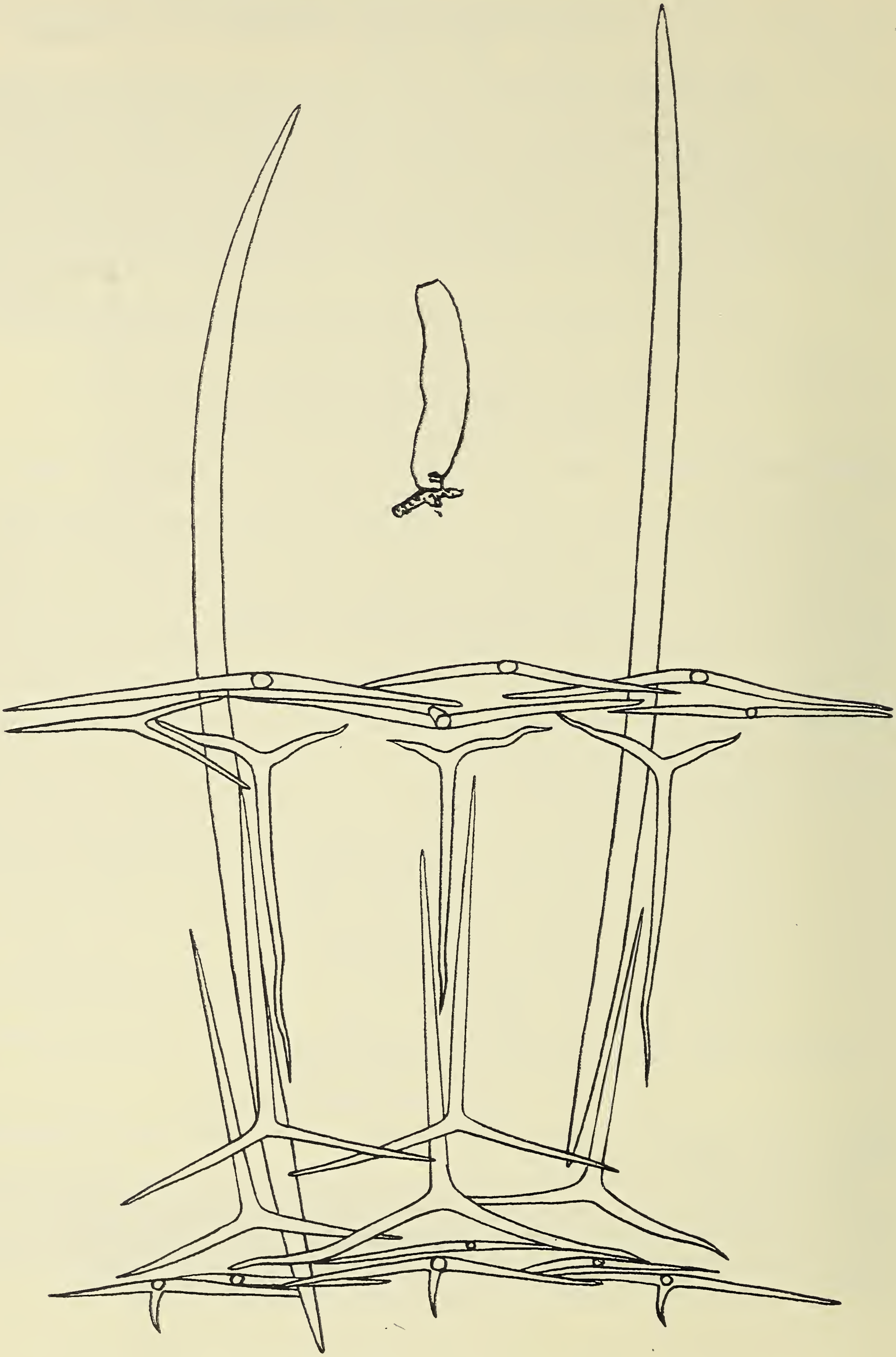
Spicules: ectosomal triradiates, sagittal, paired rays 0·2 to 0·27 by 0·02 mm., basal ray 0·24 to 0·37 by 0·02 to 0·028 mm.,
oxea, 0·6 to 1·8 by 0·03 to 0·05 mm.,
trichoxea, up to 0·7 (?) by 0·002 mm.,
subectosomal triradiates, pseudosagittal, paired rays 0·1 to 0·16 by 0·012 to 0·016 and 0·09 to 0·11 by 0·016 to 0·02 mm., basal ray 0·2 to 0·24 by 0·016 to 0·02 mm.,
tubar triradiates, sagittal, paired rays 0·08 to 0·21 by 0·012 to 0·02 mm., basal ray 0·16 to 0·48 by 0·012 to 0·024 mm.,
subendosomal triradiates, sagittal, paired rays 0·18 to 0·25 by 0·016 to 0·024 mm., basal ray 0·42 to 0·48 by 0·02 to 0·024 mm.,
endosomal triradiates, sagittal, paired rays 0·17 to 0·021 by 0·016 mm., basal ray 0·18 to 0·27 by 0·016 to 0·02 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·05 to 0·07 by 0·016 mm.

Distribution: Japan (Okinose, Sunosaki, Suruga Bay); 429–572 m.

Named form: **Achramorpha schulzei** (Breitfuss)

Ebnerella schulzei Breitfuss, 1896: 429; Breitfuss, 1898: 113, pl. xiii, figs. 39–52; *Achramorpha schulzei*, Dendy and Row, 1913: 765.

Description: Sponge tubular, stipitate; surface even, hispid; fringe around vent well-developed; texture (?); colour, in spirit, grey-brown; ectosomal skeleton of tangential triradiates, of two kinds, regular and sagittal, large projecting oxea and microxea; tubar skeleton of subendosomal sagittal triradiates and proximal parts of large ectosomal oxea; endosomal skeleton of quadriradiates.



Text-fig. 190. *Grantessa sagamiana* after Hozawa: section at right angles to surface, × 100, with (above) external form (natural size).

Spicules: ectosomal triradiates, regular, rays 0·12 to 0·2 by 0·005 to 0·009 mm.,
ectosomal triradiates, sagittal, similar to regular triradiates but with basal ray longer,
large oxea, 1·0 to 1·5 by 0·017 mm.,
ectosomal microxea, 0·075 to 0·09 by 0·001 to 0·003 mm.,
subendosomal triradiates, sagittal, paired rays 0·13 by 0·005 mm., basal ray 0·3 by 0·006 mm.,
endosomal quadriradiates, regular, rays 0·18 to 0·24 by 0·008 mm.

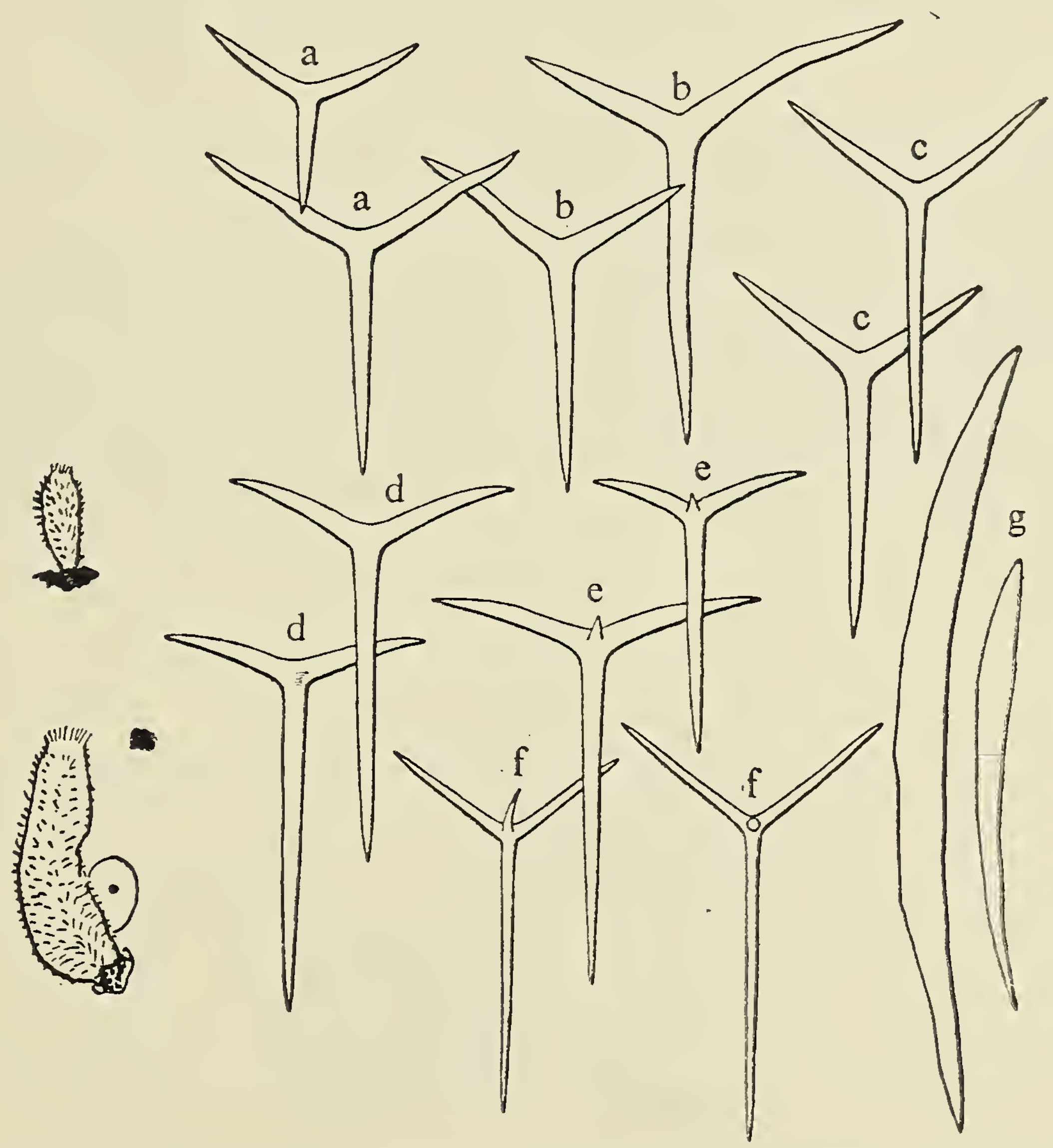
Distribution: Spitzbergen.

Named form: **Grantessa shimoda** Tanita

(text-fig. 191)

Grantessa shimoda Tanita, 1942: 40, pl. iii, fig. 14, text-fig. 7; Tanita, 1943: 415, pl. xiv, figs. 45–46.

Description: Sponge tubular; surface hispid; vent apical, fringed; texture firm; colour, in spirit, nearly white; ectosomal skeleton of a few tangential layers of triradiates, together with paired rays of subdermal pseudosagittal triradiates, supplemented by oxea projecting at surface;



Text-fig. 191. *Grantessa shimoda* after Tanita: spicules, ×100, except g. which is ×60; external form, upper (holotype), ×$\frac{4}{3}$, lower (from Tanita 1943), natural size.
Spicules: a. ectosomal triradiates; b. subectosomal triradiates; c. tubar triradiates; d. subendosomal triradiates; e. subendosomal quadriradiates; f. endosomal quadriradiates; g. oxea.

skeleton of chamber layer of basal rays of subectosomal and subendosomal triradiates, with intermediate rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal pseudosagittal triradiates and quadriradiates and tangential layers of quadriradiates with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, subregular, rays 0·15 to 0·2 by 0·015 to 0·02 mm.,
oxea, 0·65 to 1·3 by 0·055 to 0·08 mm.,
subectosomal pseudosagittal triradiates, paired rays unequal, 0·1 to 0·18 by 0·015 to 0·02 mm., basal ray 0·18 to 0·24 by 0·015 to 0·02 mm.,
tubar triradiates, sagittal, paired rays 0·105 to 0·15 by 0·012 to 0·018 mm., basal ray 0·17 to 0·25 by 0·012 to 0·018 mm.,
subendosomal sagittal triradiates, paired rays 0·09 to 0·145 by 0·014 to 0·02 mm., basal ray 0·24 to 0·3 by 0·014 to 0·02 mm.,
subendosomal sagittal quadriradiates, similar to triradiates, with apical ray 0·04 by 0·008 mm.,
endosomal quadriradiates, sagittal, paired rays 0·1 to 0·16 by 0·01 mm., basal ray 0·2 to 0·35 by 0·01 mm., apical ray 0·07 to 0·11 by 0·008 mm.

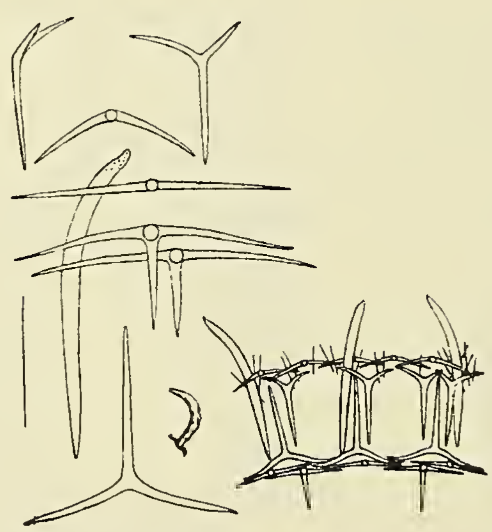
Distribution: Japan (Shimoda Bay, Toba Bay, Tomioka); 5 m.

Named form: **Grantessa thompsoni** (Lambe)

(text-fig. 192)

Amphoriscus thompsoni Lambe, 1900: 36, pl. iii, fig. 8; Lambe, 1900: 168; *Grantessa thompsoni*, Dendy and Row, 1913: 753; Breitfuss, 1932: 247.

Description: Sponge erect, cylindrical, solitary, sessile; surface hispid; vent terminal, with well-developed fringe; texture firm; colour, in spirit (?); ectosomal skeleton a layer of tangential triradiates, oxea and microxea projecting beyond surface, and paired rays of subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates, a tangential layer of triradiates and a layer of quadriradiates with apical rays projecting into cloacal cavity.



Text-fig. 192. *Amphoriscus thompsoni* after Lambe: spicules, ×100; section at right angles to surface, ×50; external form, ×$\frac{2}{3}$.
Spicules: two subectosomal pseudosagittal triradiates (above), with an ectosomal triradiate between them, followed by an endosomal triradiate, two endosomal quadriradiates and (to left) an oxeote and a trichoxeote, with (bottom) a subendosomal sagittal triradiate.

Spicules: ectosomal triradiates, subregular, rays 0·085 mm. long,
oxea, 0·26 by 0·014 mm.,
microxea, 0·098 mm. long,
subectosomal pseudosagittal triradiates, paired rays 0·072 mm. long, basal ray 0·091 by 0·006 mm.,
subendosomal sagittal triradiates, paired rays 0·1 mm. long, basal rays 0·14 by 0·006 mm.,
endosomal triradiates, subregular, rays 0·124 by 0·006 mm.,
endosomal quadriradiates, subregular, facial rays 0·11 by 0·006 mm., apical rays 0·085 by 0·006 mm.

Distribution: North-eastern Canada (Gulf of St. Lawrence); 110 m.

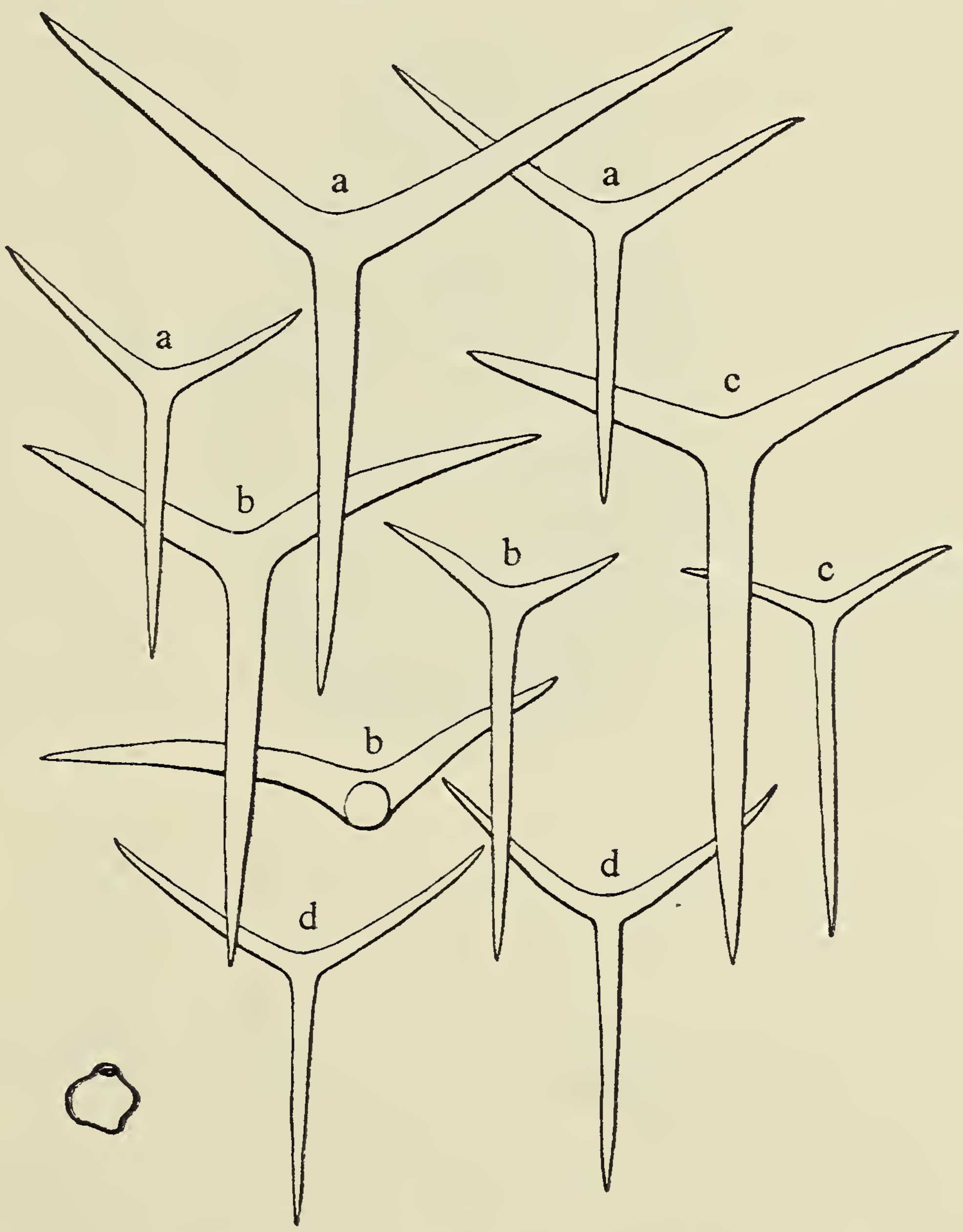
13. **Sycettusa glomerosa** (Bowerbank)

Named form: **Grantessa ampullae** Hozawa

(text-fig. 193)

Grantessa ampullae Hozawa, 1940: 38, pl. iv, fig. 2, text-fig. 3; Tanita, 1943: 420.

Description: Sponge subspherical; surface smooth; vent apical; texture rigid; colour, in spirit, white; ectosomal skeleton a dense tangential layer of triradiates together with paired rays of



Text-fig. 193. *Grantessa ampullae* after Hozawa: spicules, × 100; external form, natural size.
a. ectosomal triradiates; b. subectosomal sagittal triradiates; c. subendosomal sagittal triradiates; d. endosomal triradiates.

subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal triradiates and subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and endosomal triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·09 to 0·33 by 0·014 to 0·032 mm., basal ray 0·135 to 0·32 by 0·014 to 0·032 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·09 to 0·25 by 0·02 to 0·04 mm., basal ray 0·26 to 0·48 by 0·02 to 0·04 mm.,
subendosomal triradiates, paired rays 0·09 to 0·25 by 0·014 to 0·03 mm., basal ray 0·26 to 0·41 by 0·014 to 0·03 mm.,
endosomal triradiates, sagittal, paired rays 0·065 to 0·19 by 0·01 to 0·018 mm., basal ray 0·09 to 0·21 by 0·01 to 0·018 mm.

Distribution: Japan (Ishikawa Prefecture).

Named form: **Grantessa basipapillata** Hozawa

Grantessa basipapillata Hozawa, 1916: 19, pl. i, fig. 6, pl. ii, fig. 14, text-fig. 4; Hozawa, 1929: 318; Tanita, 1943: 420.

Description: Sponge tubular, with mammiform protuberances (buds?) irregularly scattered along sides; surface even, smooth; vent apical, with feebly-developed margin; texture firm, brittle; colour, in spirit, greyish-white; ectosomal skeleton of several layers of tangential triradiates and paired rays of subectosomal triradiates; skeleton of chamber layer of oppositely-directed basal rays of subectosomal and subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a few layers of triradiates and quadriradiates, with apical rays barely projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·15 to 0·4 by 0·016 to 0·036 mm., basal ray 0·13 to 0·46 by 0·02 to 0·048 mm.,
subectosomal triradiates, pseudosagittal, irregular, paired rays 0·13 to 0·17 by 0·02 to 0·028 and 0·14 to 0·2 by 0·016 to 0·024 mm., basal ray 0·36 to 0·48 by 0·02 to 0·028 mm.,
subendosomal triradiates, paired rays 0·14 to 0·3 by 0·024 to 0·03 mm., basal ray 0·4 to 0·55 by 0·028 to 0·04 mm.,
endosomal triradiates, paired rays 0·13 to 0·2 by 0·012 to 0·016 mm., basal ray 0·14 to 0·28 by 0·012 to 0·016 mm.,
endosomal quadriradiates, paired rays 0·07 to 0·2 by 0·008 to 0·012 mm., basal ray 0·09 to 0·25 by 0·012 to 0·016 mm., apical ray 0·02 to 0·03 by 0·012 mm.

Distribution: Japan (Sagami Bay).

Named form: **Heteropia glomerosa** (Bowerbank)

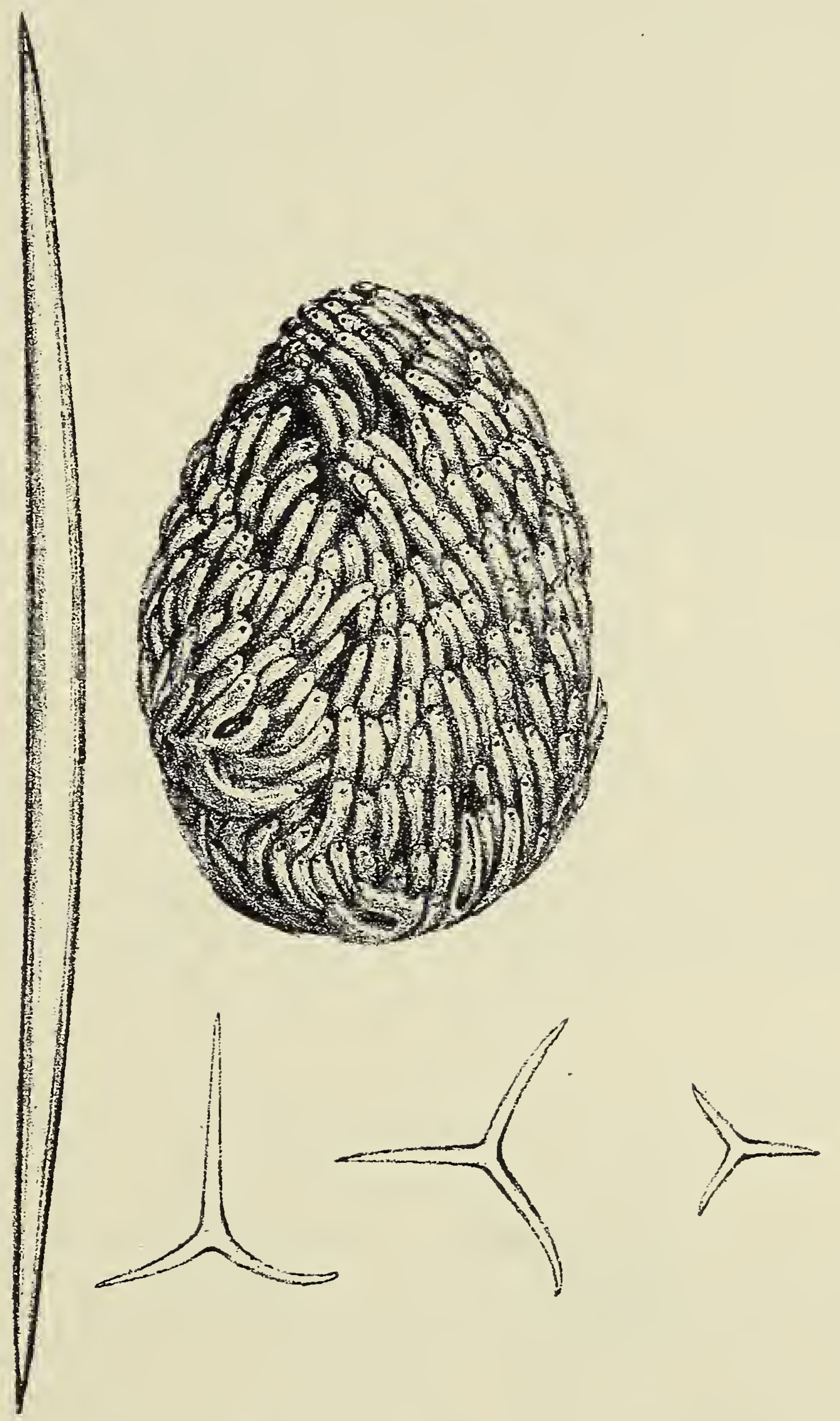
(text-figs. 194–195)

Leuconia glomerosa Bowerbank, 1873: 17, pl. iv, figs. 1–6; *Heteropia glomerosa*, Dendy and Row, 1913: 754; *H. simplex* Row [in] Dendy and Row, 1913: 754; *H. glomerosa*, Dendy, 1915: 83, pl. i, fig. 3, pl. ii, fig. 8; Row and Hozawa, 1931: 776; Burton, 1933: 236.

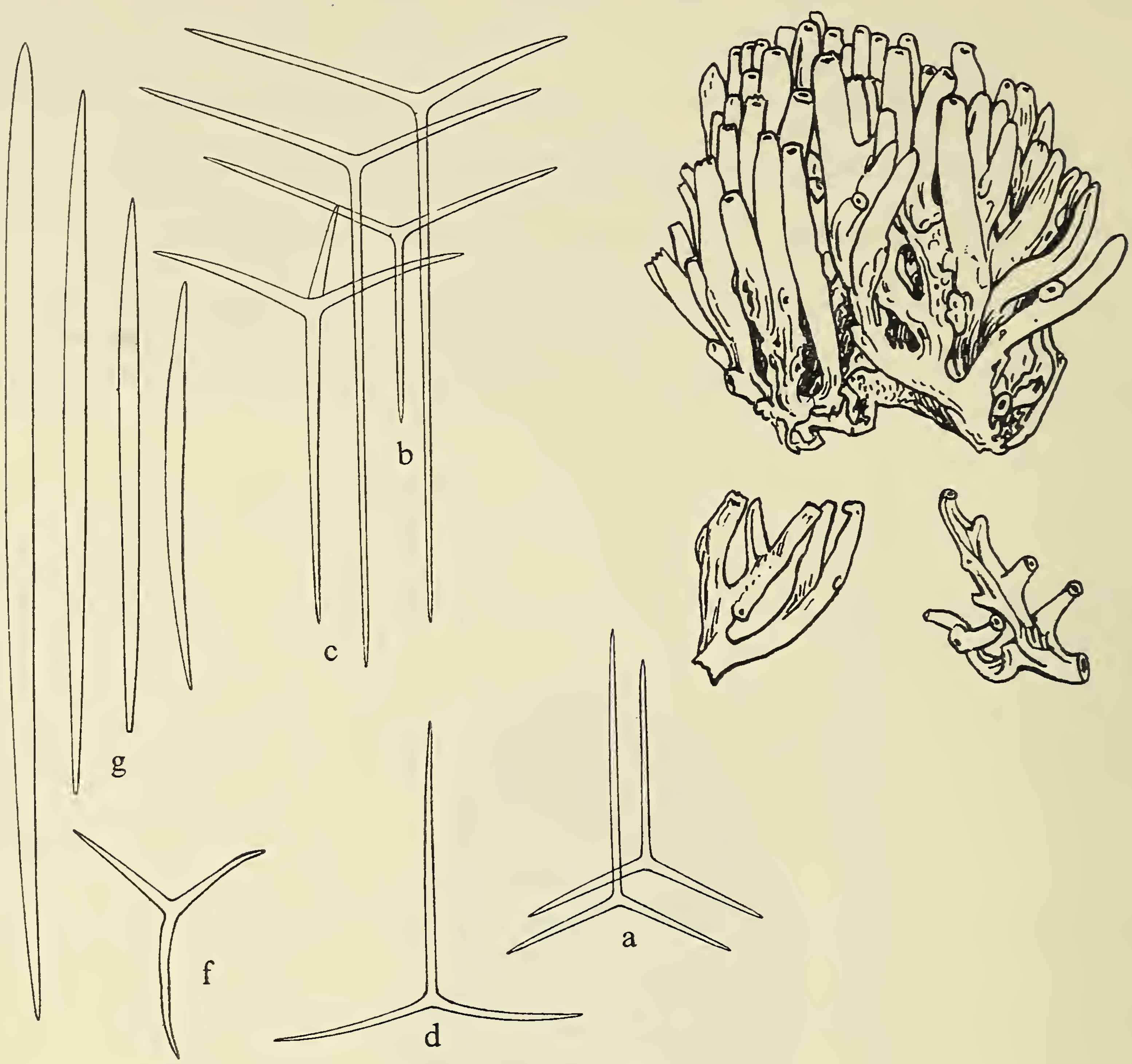
Description: Sponge tubular, compound, sessile; surface even, non-hispid; vents apical, slightly fringed; texture firm; colour, alive and in spirit, white; ectosomal skeleton a tangential layer of triradiates, paired rays of subectosomal triradiates and longitudinal oxea; skeleton of chamber layer oppositely-directed rays of subectosomal and subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates, and a tangential layer of endosomal triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·11 by 0·01 mm., basal ray 0·24 by 0·008 mm.,
oxea, 2·9 by 0·075 mm.,
subectosomal pseudosagittal triradiates, outer rays 0·11 by 0·01 mm., centripetal ray 0·13 by 0·01 mm.,
subendosomal sagittal triradiates, paired rays 0·145 by 0·01 mm., basal ray 0·25 by 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·17 to 0·2 by 0·012 mm., basal ray 0·44 by 0·012 mm.,
endosomal quadriradiates, rare, similar to endosomal triradiates with short apical ray.

Distribution: Indian Ocean (Okhamandal); South Africa (Port Elizabeth, Stil Bay); Australia (Sharks Bay and Bunbury Bay); littoral.



Text-fig. 194. *Heteropia glomerosa* after Bowerbank: spicules, ×80; external form, natural size; drawings as originally published by Bowerbank.



Text-fig. 195. *Heteropia glomerosa*: spicules ×100, except g. which are ×35; external form slightly more than natural size (all figures after Dendy).
Spicules: a. ectosomal triradiates; b–c. endosomal triradiates and a quadriradiate; d. subendosomal triradiate; f. subectosomal pseudosagittal triradiate; g. ectosomal oxea.

Named form: **Grantessa intusarticulata** (Carter)

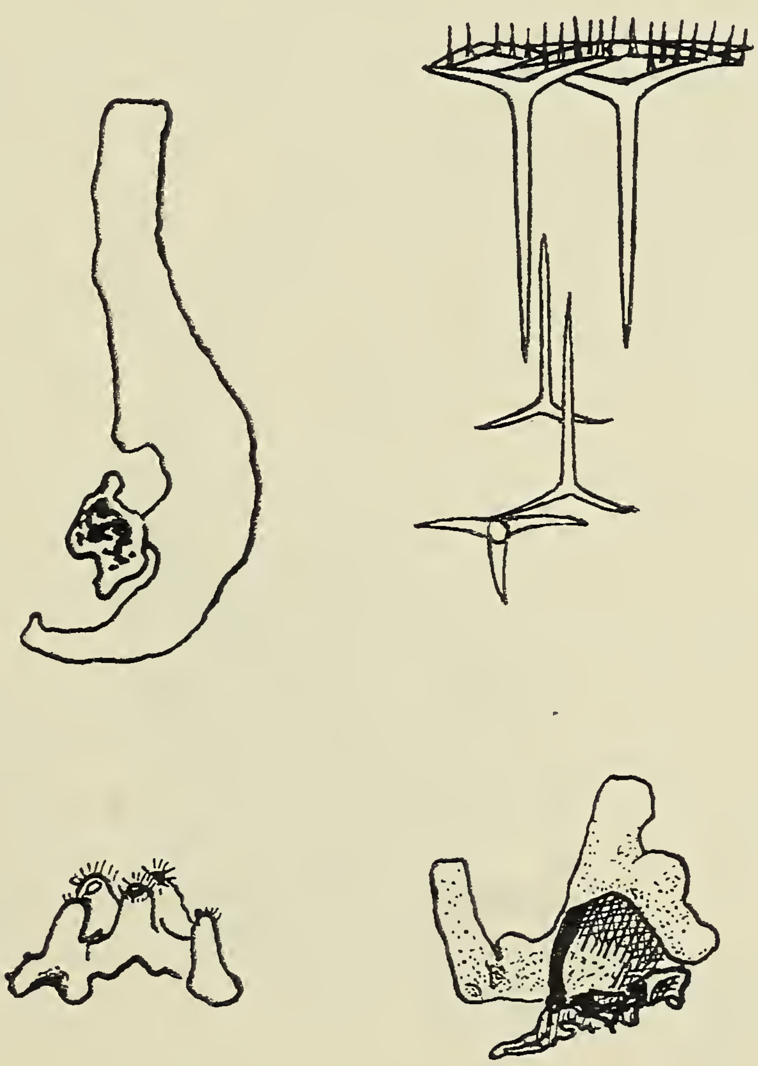
(text-fig. 196)

Hypograntia intusarticulata Carter, 1886: 45; *H. medioarticulata* Carter, 1886: 46; *Grantessa intusarticulata*, Dendy, 1892: 108; Dendy, 1893: 181, pl. xiii, fig. 18; *Grantia intusarticulata*, Breitfuss, 1897: 219; *Grantessa intusarticulata*, Dendy and Row, 1913: 753; Hozawa, 1916: 14, pl. i, figs. 4–5, pl. ii, fig. 13, text-fig. 3; Brøndsted, 1926: 308; Hozawa, 1929: 318; *G. intusarticulata*, Row and Hozawa, 1931: 775; Hozawa, 1933: 7; Hozawa, 1940: 37; Tanita, 1942: 36, pl. ii, fig. 10; Tanita, 1943: 514.

Description: Sponge tubular, single or colonial, with oval or circular vents; surface smooth; with fringe round vent; texture firm, elastic; colour, in spirit, greyish-white; ectosomal skeleton of a tangential layer of triradiates, microxea set at right angles to surface, and paired rays of ectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates, with, in thicker parts of body-wall, several rows of intermediate sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates, several rows of tangential triradiates and a layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·08 to 0·19 by 0·012 to 0·016 mm., basal rays 0·12 to 0·25 by 0·016 to 0·02 mm.,
microxea, 0·076 to 0·092 by 0·004 mm.,
subectosomal pseudosagittal triradiates, paired rays unequal, 0·08 to 0·13 by 0·012 to 0·016 and 0·05 to 0·12 by 0·012 to 0·016 mm. respectively, basal rays 0·28 to 0·36 by 0·012 to 0·016 mm.,
tubar triradiates, sagittal, paired rays 0·06 to 0·12 by 0·008 to 0·012 mm., basal rays 0·12 to 0·38 by 0·012 to 0·016 mm.,
subendosomal sagittal triradiates, paired rays 0·1 to 0·16 by 0·012 to 0·016 mm., basal rays 0·25 to 0·33 by 0·016 to 0·02 mm.,
endosomal triradiates, regular or subregular, rays 0·1 to 0·16 by 0·012 mm.,
endosomal quadriradiates, facial rays 0·18 to 0·23 by 0·024 mm., apical rays 0·28 by 0·024 mm.

Distribution: Australia (Port Jackson, Port Phillip Heads, Geraldton District); New Zealand (Wellington); Japan (Sagami Sea, Miye, Wajima); 82–214 m.



Text-fig. 196. *Grantessa intusarticulata*: external forms (to left), after Hozawa (1916), natural size, and (to bottom right) after Tanita (1943), ×2; section at right angles to surface, after Dendy (1893), ×50 (?).

Named form: **Grantessa preiwischi** Dendy and Row

Ebnerella compressa Preiswisch, 1904: 19, pl. iv, figs. 13–18; *Grantessa preiswischi*, Dendy and Row, 1913: 753.

Description: Sponge foliate, compressed; surface hispid; vents lateral, often fistular; texture (?); colour, in spirit, white; ectosomal skeleton a single layer of triradiates, with paired rays of subectosomal pseudosagittal triradiates and microxea set at right angles to surface; tubar skeleton of basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates; endosomal skeleton a layer of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sub-regular, 0·079 to 0·16 by 0·015 mm.,
microxea, 0·05 to 0·08 by 0·002 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·067 to 0·15 by 0·008 to 0·01 mm., basal rays 0·13 to 0·3 by 0·01 mm.,
subendosomal sagittal triradiates, paired rays 0·08 to 0·096 by 0·009 to 0·012 mm., basal rays 0·14 to 0·18 by 0·016 to 0·02 mm.,
endosomal triradiates, sagittal, paired rays 0·06 to 0·1 by 0·01 mm., basal rays 0·1 to 0·16 by 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·09 by 0·016 mm., basal rays 0·116 by 0·016 mm.

Distribution: Chatham Islands.

Named form: **Grantessa shimeji** Hozawa

(text-fig. 197)

Grantessa shimeji Hozawa, 1916: 2, pl. i, figs. 1–2, pl. ii, figs. 10–11, text-fig. 1; Hozawa, 1929: 315; Tanita, 1942: 40, pl. iii, fig. 13; Tanita, 1943: 414, pl. xiv, fig. 44.

Description: Sponge a sub-spherical mass of radiating tubes, each ending in a vent; surface

Text-fig. 197. *Grantessa shimeji* after Hozawa: external form, of a co-type (after Hozawa 1916: left), of Tanita's (1942) specimen (right), natural size.

rough, minutely hispid; fringe round vent not visible to naked eye; texture firm, compact; colour, in spirit, white; ectosomal skeleton of tangential triradiates, in several layers, paired rays of subectosomal pseudosagittal triradiates and oxea grouped in vertical tufts; tubar skeleton, in thickest part of wall, of basals of subectosomal pseudosagittal and subendosomal sagittal triradiates, with rows of sagittal triradiates; endosomal skeleton of tangential triradiates, paired rays of subendosomal sagittal triradiates, and endosomal quadriradiates.

Spicules: ectosomal triradiates, paired rays 0·12 by 0·01 mm., basal ray 0·08 by 0·008 mm., subectosomal pseudosagittal triradiates, paired rays, unequal, 0·06 to 0·14 by 0·01 mm., basal rays 0·12 to 0·18 by 0·01 mm., tubar triradiates, paired rays 0·07 to 0·1 by 0·01 mm., basal ray 0·12 to 0·27 by 0·01 mm., subendosomal triradiates, paired rays 0·08 by 0·012 mm., basal ray 0·25 by 0·01 mm., endosomal triradiates, paired rays 0·09 to 0·12 by 0·01 to 0·012 mm., basal ray 0·14 to 0·27 by 0·008 to 0·01 mm., endosomal quadriradiates, paired rays 0·1 to 0·12 by 0·01 to 0·012 mm., basal ray 0·15 to 0·2 by 0·008 to 0·01 mm., apical ray 0·03 to 0·05 by 0·008 to 0·01 mm.

Distribution: Japan (Misaki, Sima-Ôsima, Simoda, Toba Bay).

Named form: **Heteropia striata** Hozawa

Heteropia striata Hozawa, 1916: 28, pl. i, fig. 8, pl. ii, fig. 16, text-fig. 6; Hozawa, 1929: 318; *H. striata*, var. *minor* Burton, 1930: 4; *H. striata*, Tanita, 1942: 43, pl. iii, fig. 15; Tanita, 1943: 421, pl. xv, fig. 51.

Description: Sponge composed of erect tubes, united at base, often branching and anastomosing; surface striated, hispid; vents apical, margins feebly developed; texture rigid; colour, in spirit, white to brownish-white; ectosomal skeleton of several layers of tangential triradiates, paired rays of subectosomal triradiates and longitudinal oxea; tubar skeleton of centripetally-directed basal rays of subectosomal triradiates and centrifugally-directed rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a few layers of triradiates and a few quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·06 to 0·1 by 0·008 to 0·012 mm., basal ray 0·08 to 0·17 by 0·008 to 0·012 mm., oxea, 0·49 to 2·0 by 0·018 to 0·09 mm., subectosomal triradiates, pseudosagittal, paired rays 0·13 by 0·016 and 0·11 by 0·016 mm., basal ray 0·19 by 0·016 mm., subendosomal triradiates, sagittal, paired rays 0·09 to 0·17 by 0·016 to 0·02 mm., basal ray 0·15 to 0·3 by 0·016 to 0·02 mm., endosomal triradiates, sagittal, paired rays 0·09 to 0·15 by 0·012 to 0·016 mm., basal ray 0·17 to 0·23 by 0·008 to 0·012 mm., endosomal quadriradiates, similar to triradiates, apical ray 0·04 to 0·06 by 0·006 to 0·008 mm.

Distribution: Japan (Misaki); Indonesia; 27–54 m.

Named form: **Grantessa sycilloides** (Schuffner)

(text-fig. 198)

Sycortis sycilloides Schuffner, 1877: 420, pl. xxv, fig 10; *Grantessa sycilloides*, Dendy and Row, 1913: 753; *G. sibogae* Burton, 1930: 4.

Description: Sponge cylindrical, usually composed of more than one individual; surface even, harsh or smooth; vents terminal, with slight fringe; colour, in spirit, white or brown; ectosomal skeleton a tangential layer of triradiates, with paired rays of subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal pseudosagittal triradiates and subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of triradiates.

Spicules: ectosomal triradiates, subregular, rays 0·3 to 0·4 by 0·03 to 0·036 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·15 to 0·24 by 0·018 to 0·035 mm., basal rays 0·42 to 0·5 by 0·024 to 0·04 mm.,
subendosomal sagittal triradiates, paired rays 0·24 to 0·3 by 0·018 to 0·07 mm., basal rays 0·4 to 1·0 by 0·024 to 0·08 mm.,
endosomal triradiates, subregular, rays 0·1 to 0·25 by 0·01 to 0·025 mm.

Distribution: Mauritius; Indonesia; 59 m.

Text-fig. 198. *Grantessa sycilloides* after Schuffner: spicules, ×60; section at right angles to surface (Note: endosomal surface is at top), ×60; external form (a–c.), seen from three different angles, natural size. Spicules: s. oxea; d. ectosomal triradiates; b. subectosomal pseudosagittal triradiates; e. subendosomal sagittal triradiates; g. endosomal triradiates. [Although Schuffner gives no explanation of the spicules marked b. in his 'Explanation of the Plates' and although he refers to e. as comprising both subectosomal and subendosomal triradiates, it is more probable that the correct description is the one given above.]

14. **Sycettusa pelagica** (Ridley)

Named form: **Grantessa flamma** (Poléjaeff)

Amphoriscus flamma Poléjaeff, 1883: 49, pl. i, fig. 5, pl. v, fig. 3; *Grantessa flamma*, Dendy and Row, 1913: 752.

Description: Sponge composed of tubular individuals arising from a common base; surface minutely hispid; vents terminal, with well-developed fringe; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, paired rays of subectosomal pseudosagittal triradiates, and oxea projecting beyond surface; tubar skeleton of basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays up to 0·5 mm. by 0·025 to 0·05 mm., basal rays up to 0·45 by 0·025 to 0·05 mm.,
oxea, 1·0 to 2·5 by 0·06 to 0·1 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·38 to 0·5 by 0·03 mm., basal rays 0·28 by 0·03 mm.,
subendosomal sagittal triradiates, paired rays 0·36 by 0·045 mm., basal rays 0·7 by 0·045 mm.,
endosomal quadriradiates, sagittal, paired rays 0·3 to 0·45 by 0·01 to 0·012 mm., basal rays 0·15 to 0·25 by 0·01 to 0·013 mm., apical rays 0·1 to 0·15 by 0·01 to 0·012 mm.

Distribution: Bahia; 'shallow water'.

Named form: **Grantessa pelagica** (Ridley)

(text-fig. 199)

Nardoa pelagica Ridley, 1881: 133, pl. xi, fig. 4; *Grantessa pelagica*, Dendy and Row, 1913: 752.

Description: Sponge cylindrical, compressed; surface hispid; vent (?); texture (?); colour, in spirit (?); ectosomal skeleton of one or two layers of tangential triradiates, paired rays of subectosomal pseudosagittal triradiates, and two sorts of oxea extending from endosomal layer to ectosome and projecting beyond surface; tubar skeleton of basal rays of subectosomal pseudosagittal triradiates and subendosomal sagittal triradiates and quadriradiates and scattered sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and quadriradiates, and a tangential layer of quadriradiates with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, subregular, rays 0·1 to 0·45 by 0·019 to 0·022 mm.,
oxea, 1·25 by 0·063 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·14 to 0·3 by 0·011 to 0·018 mm., basal rays 0·32 to 0·42 by 0·016 to 0·018 mm.,
scattered tubar triradiates, sagittal, paired rays 0·35 by 0·02 mm., basal rays 0·3 by 0·02 mm.,
subendosomal sagittal triradiates, paired rays 0·29 by 0·032 mm., basal rays 0·38 by 0·032 mm.,
subendosomal sagittal quadriradiates, similar to triradiates but with an apical ray, 0·057 by 0·013 mm.,
endosomal quadriradiates, sub-regular, facial rays 0·127 by 0·01 mm., apical rays 0·126 by 0·01 mm.

Distribution: Brazil (Victoria Bank); 71 m.

Text-fig. 199. *Grantessa pelagica* after Ridley: spicules, ×100.

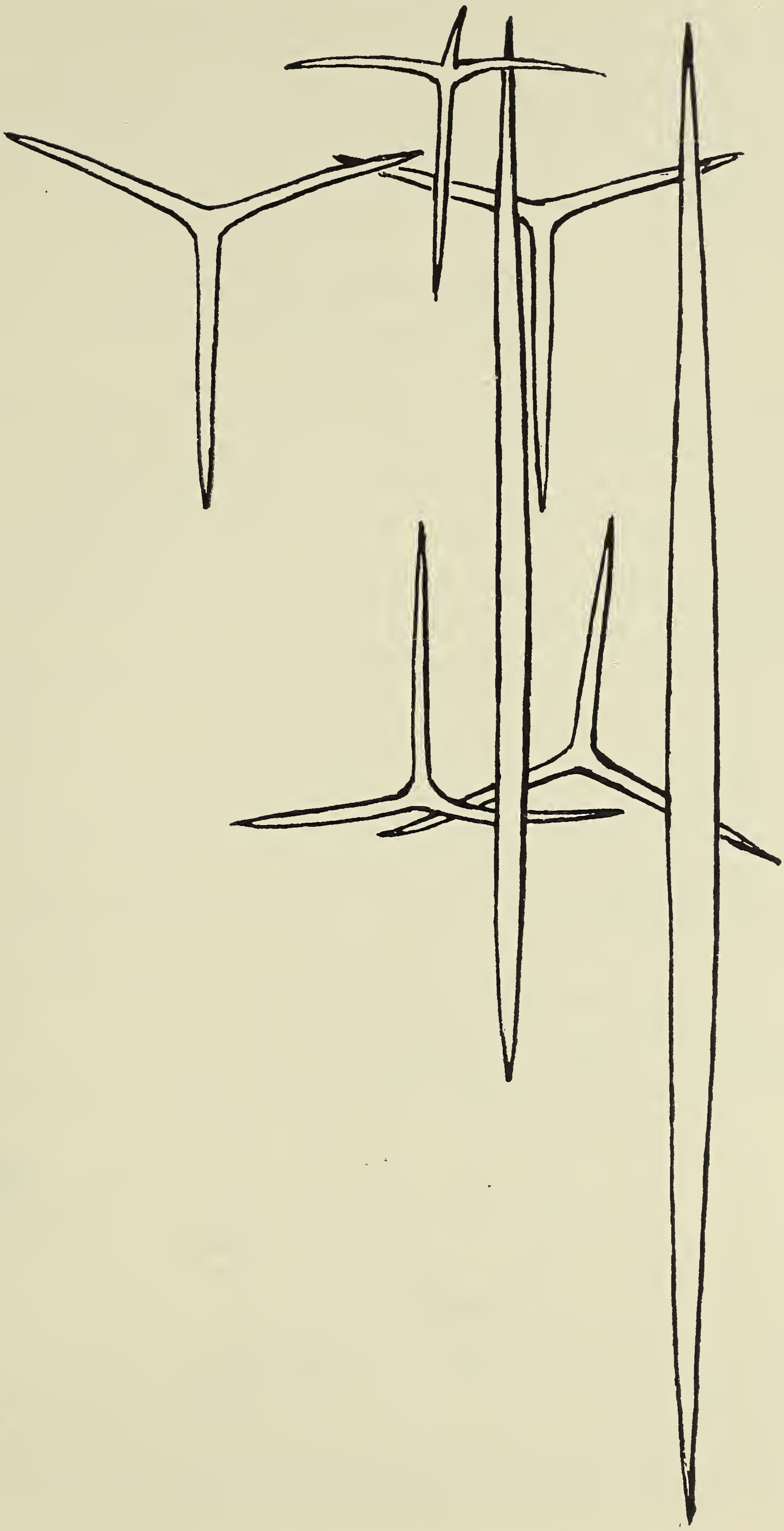
Named form: **Vosmaeropsis sericatum** (Ridley)

(text-fig. 200)

Aphroceras sericatum Ridley, 1881: 134, pl. xi, fig. 5; *Leuconia sericatum*, Breitfuss, 1898: 463; *Vosmaeropsis sericatum*, Dendy and Row, 1913: 756; *nec Leucandra sericatum*, Thacker, 1908: 776.

Description: Sponge solitary, tubular, sessile; surface hispid; vent terminal, with ill-developed fringe; texture firm; colour, in spirit, white; ectosomal skeleton of several layers of tangential triradiates, together with paired rays of subectosomal triradiates, and oxea projecting beyond surface; tubar skeleton of oppositely-directed basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, subregular, rays 0·32 by 0·017 mm.,
oxea, 2·0 to 3·6 by 0·06 to 0·09 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·17 by 0·017 mm., basal rays 0·32 by 0·017 mm.,
subendosomal sagittal triradiates, paired rays 0·32 by 0·019 to 0·032 mm., basal rays 0·35 to 0·52 by 0·019 to 0·032 mm.,
endosomal quadriradiates, subregular, facial rays 0·18 to 0·25 by 0·01 mm., apical rays 0·16 to 0·2 by 0·01 mm.



Text-fig. 200. *Aphroceras sericatum* after Ridley: spicules, × 100.

Distribution: Brazil (Victoria Bank); Chile (Punta Arenas); 71 m.

Remarks: The species is clearly related to *V. macera* but is distinguished from it mainly by its long straight oxea.

There is only one specimen in the British Museum collection although Ridley originally wrote of several specimens. It is noteworthy that he commented upon the variability within those specimens: 'This Sponge shows a considerable amount of variation in the size of the spicules in different specimens.'

15. **Sycettusa connexiva** (Poléjaeff)

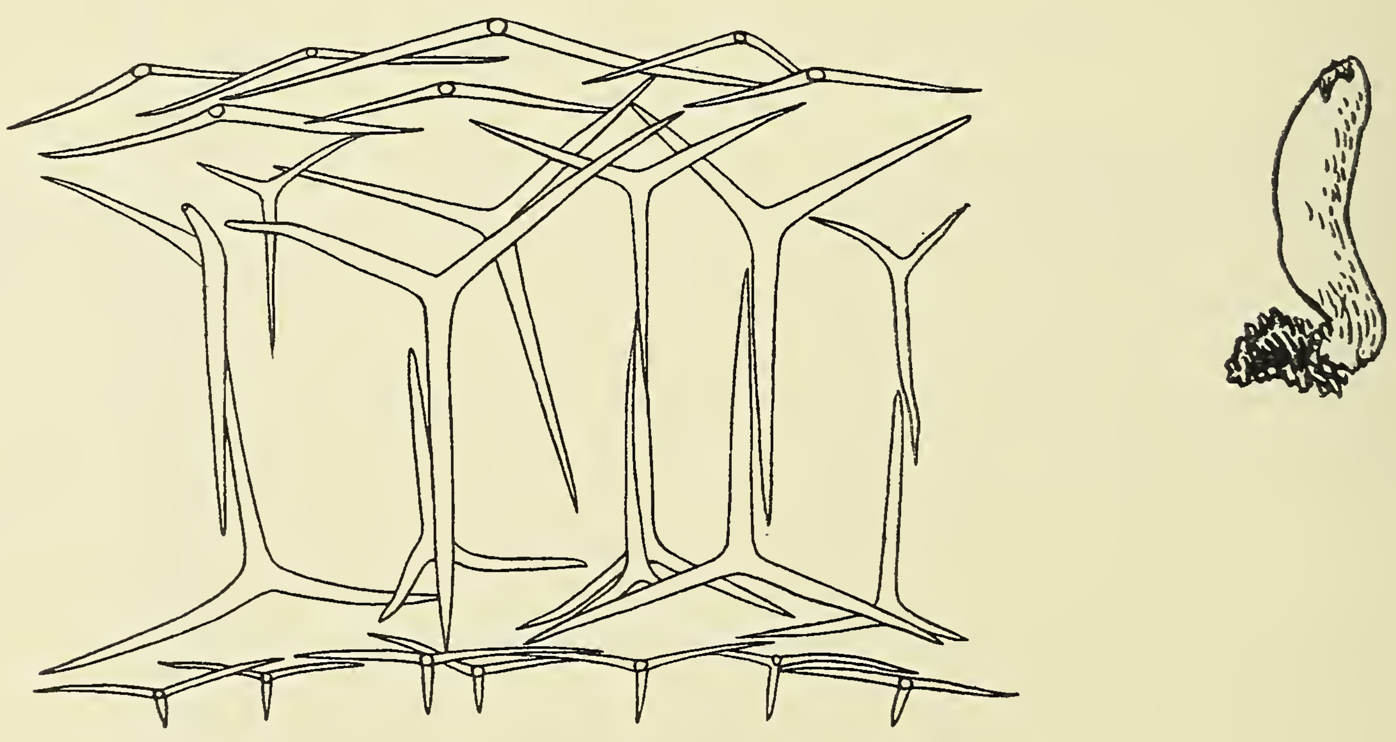
Named form: **Sycettusa connexiva** (Poléjaeff)

(text-fig. 201)

Leucilla connexiva Poléjaeff, 1883: 51, pl. vi, fig. 1; *Vosmaeropsis connexiva*, Dendy and Row, 1913: 756; *V. sasakii* Hozawa 1929: 319, pl. xvi, figs. 30, 31, text-fig. 16; Tanita, 1943: 428.

Description: Sponge tubular, solitary; surface smooth, uneven; vent apical, naked; texture rigid, elastic; colour, in spirit, greyish-white; ectosomal skeleton of several layers of tangential triradiates, together with paired rays of subectosomal triradiates; tubar skeleton of oppositely-directed basal rays of subectosomal and subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates, with a few layers of quadriradiates, with apical rays projecting into cloacal cavity, and a few triradiates.

Spicules: ectosomal triradiates, regular with rays up to 0·8 by 0·07 mm., or sagittal, paired rays 0·16 to 0·33 by 0·016 to 0·03 mm., basal ray 0·2 to 0·4 by 0·016 to 0·03 mm.,
subectosomal triradiates, pseudosagittal, paired rays 0·15 to 0·4 by 0·02 to 0·04 mm., basal ray 0·18 to 0·55 by 0·02 to 0·04 mm.,
subendosomal triradiates, sagittal, paired rays 0·25 to 0·4 by 0·024 to 0·04 mm., basal ray 0·36 to 0·6 by 0·02 to 0·04 mm.,
endosomal triradiates, sagittal, paired rays 0·11 to 0·32 by 0·01 to 0·02 mm., basal rays 0·15 to 0·32 by 0·01 to 0·016 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·02 to 0·05 by 0·006 to 0·008 mm.



Text-fig. 201. *Vosmaeropsis sasakii* after Hozawa: section at right angles to surface, ×50; external form, natural size.

Distribution: Japan (Hakodate); Philippines; 42–183 m.

Remarks: The published descriptions of *Leucilla connexiva* and *Vosmaeropsis sasakii* suggest two markedly different species characterised by the larger dermal triradiates in the former, and the presence in it of tubar triradiates. Other differences between them are trivial.

There are four preparations only of *Leucilla connexiva* available for examination but the features these show are too close to those of *Vosmaeropsis sasakii* to leave any doubt of the identity of the two with a single species. In fact, it is difficult to see what Poléjaeff meant by tubar triradiates. Further than this the dermal triradiates are not so markedly larger in his holotype than in the holotype of *V. sasakii.*

Genus **Sycolepis** Haeckel

Sycolepis Haeckel, 1870: 251; *Trichogypsia* Carter, 1871: 1; *Dyssycyssus* Haeckel, 1872: 386; *Amphoriscyssa* Haeckel, 1872: 397; *Aphroceryssa* Haeckel, 1872: 409; *Sycolepsis*, Lendenfeld, 1885: 1124.

Type-species: Trichogypsia villosa Carter, 1871: 1.

Description: Heterocoelidae of encrusting form, with skeleton composed entirely of spined oxea; canal system leuconoid.

Remarks: In 1870, Haeckel established the genus *Sycolepis*, with the following characters: 'Der Stock bildet eine flache ausgebreitete Rinde oder einem unförmlichen Klumpen, in dessen Parenchym die einfachen (nich facherigen) Magenhöhlen der Personen zerstreut liegen welche nur durch die verästelten Parietal-Canäle zusammenhängen und nur durch die Hautporen nach aussen münden.'

This we may take as the diagnosis meant by Haeckel to represent his genus, and although it would be inadequate for present-day taxonomy, it makes valid the name *Sycolepis*. The two species assigned to it are, however, *nomina nuda*. Dendy and Row (1913) accepted the first of the two species, *S. incrustans* (called *Leucyssa incrustans* var. *lichenoides* by Haeckel in 1872) as a member of the genus *Trichogypsia* Carter. They remarked: 'It is doubtful whether Haeckel's *Sycolepis incrustans* is really a synonym of *Trichogypsia villosa* or *T. incrustans*.' It may be inferred from this, since Row went to Hamburg to re-examine Haeckel's types, that *Sycolepis incrustans* and *Trichogypsia villosa* are, at least, congeneric. It follows, therefore, that the genus *Sycolepis* is valid from Haeckel's description, however inadequate it may be, but that the first valid species belonging to it is *Trichogypsia villosa* Carter, which, as a matter of course, becomes the type-species.

I find it difficult to believe that the specimens Haeckel included under *Leucyssa incrustans* represent more than fluctuating variations within a single species.

16. **Sycolepis villosa** (Carter)

Sycolepis villosa (Carter)

(text-fig. 202)

[*Sycolepis incrustans* Haeckel, 1870]: 251; *Trichogypsia villosa* Carter, 1871: 1, pl. i, figs. 1–4; *Leucyssa incrustans* Haeckel, 1872: 139, pl. xxv, figs. 1–10; *Dyssycus incrustans* Haeckel, 1872: 139; *Lipostomella incrustans* Haeckel, 1872: 140; *Amphoriscus incrustans* Haeckel, 1872: 140, pl. xxv, fig. 1; *Aphroceras incrustans* Haeckel, 1872: 140; *Leucyssa lichenoides* Haeckel, 1872: 140, pl. xxv, figs. 9–10; *L. villosa*, Haeckel, 1872: 140; *L. incrustans*, Arnesen, 1901: 72; Arnesen, 1901: 29; *Trichogypsia incrustans*, Dendy and Row, 1913: 779; *T. villosa*, Dendy and Row, 1913: 779; *T. incrustans*, Breitfuss, 1927: 31.

Description: Sponge encrusting to irregularly massive; surface uneven, irregular, minutely hispid; vents small, scattered; texture (?); colour, in spirit, white, grey or greenish-white; skeleton of distally-spined oxea, 0·2 to 0·5 by 0·01 to 0·02 mm.

Distribution (*Summary*): Norway; British Isles; ? from the Laminaria zone.

Remarks: Although Haeckel (1872, p. 140) says his sponge grows on 'Algen, Steinen, Muschelschalen u.s.w.', there is no evidence that he examined more than one specimen. The only record we have (Carter, *l.c.*) is of a specimen cast up by storms. It was growing on the 'shell of a shark's egg' on *Laminaria*. Since Haeckel gives no record of depth, we can but presume that the species has not been seen in the littoral zone, and that it probably grows in that little-explored Laminaria zone.

Text-fig. 202. Diacts of *Leucyssa incrustans* after Haeckel (above), × 200, and *Trichogypsia villosa* after Carter (below), × 130 (?).

Genus **Scypha** Gray

Scypha Gray, 1821: 357; *Sycon* Risso, 1826: 368; *Grantia* Fleming, 1828: 524; *Calcispongia* Blainville, 1830: 494; *Calcepongia* Lamarck, 1836: 560; *Dunstervillia* Bowerbank, 1845: 297; *Coniasterium* Ehrenberg, 1861: table opposite p. 452; *Ute* Schmidt, 1862: 16; *Artynes* Gray, 1867: 555; *Syconella* Schmidt, 1868: 29; *Sycum* Haeckel, 1870: 217; *Artynella* Haeckel, 1870: 234; *Sycarium* Haeckel, 1870: 238; *Artynas* Haeckel, 1870: 241; *Sycodendrum* Haeckel, 1870: 245; *Sycidium* Haeckel, 1870: 245; *Artynium* Haeckel, 1870: 246; *Sycocystis* Haeckel, 1870: 248; *Artynella* Haeckel, 1870: 249; *Artynophyllum* Haeckel, 1870: 250; *Sycophyllum* Haeckel, 1870: 250; *Sycometra* Haeckel, 1870: 254; *Leucomalthe* Haeckel, 1872: 172; *Leucandropa* Haeckel, 1872: 172; *Sycetta* Haeckel, 1872: 235; *Sycettopa* Haeckel, 1872: 236; *Sycettaga* Haeckel, 1872: 236; *Sycurus* Haeckel, 1872: 237; *Sycaltaga* Haeckel, 1872: 264; *Sycortis* Haeckel, 1872: 277; *Sycortusa* Haeckel, 1872: 278; *Sycuraltis* Haeckel, 1872: 289; *Sycandra* Haeckel, 1872: 291; *Sycocarpus* Haeckel, 1872: 294; *Sycocerus* Haeckel, 1872: 294; *Sycocubus* Haeckel, 1872: 294; *Sycostrobus* Haeckel, 1872: 195; *Sycodorilla* Haeckel, 1872: 295; *Sycodoranna* Haeckel, 1872: 295; *Sycodorus* Haeckel, 1872: 295; *Sycophractus* Haeckel, 1872: 295; *Leukartea* Miklucho-Maclay [in] Haeckel, 1872: 358; *Sycuretta* Haeckel, 1872: 388; *Sycuranda* Haeckel, 1872: 389; *Sycurortis* Haeckel, 1872: 389; *Syconellortis* Haeckel, 1872: 389; *Sycortarium* Haeckel, 1872: 390; *Sycandrarium* Haeckel, 1872: 390; *Syconellandra* Haeckel, 1872: 390; *Sycocystandra* Haeckel, 1872: 394; *Sycocystortis* Haeckel, 1872: 394; *Sycothamnandra* Haeckel, 1872: 399; *Sycodenandrum* Haeckel, 1872: 400; *Sycinulandra* Haeckel, 1872: 400; *Sycandrophyllum* Haeckel, 1872: 410; *Leucandrometra* Haeckel, 1872: 412; *Sycandrometra* Haeckel, 1872: 412; *Homoderma* Lendenfeld, 1885: 1088; *Vosmaeria* Lendenfeld, 1885: 1111; *Sphenophorus* Breitfuss, 1898: 4; *Sphenophorina* Breitfuss, 1898: 29; *Megapogon* Jenkin, 1908: 35; *Tenthrenodes* Jenkin, 1908: 9; *Streptoconus* Jenkin, 1908: 25; *Hypodictyon* Jenkin, 1908: 27; *Teichonopsis* Dendy and Row, 1913: 761; *Jenkina* Brøndsted, 1931: 33; *Hozawaia* de Laubenfels, 1936: 194; *Paragrantia* Hozawa, 1940: 40.

17. **Scypha ciliata** (Fabricius)

Named form: **Sycon album** Tanita

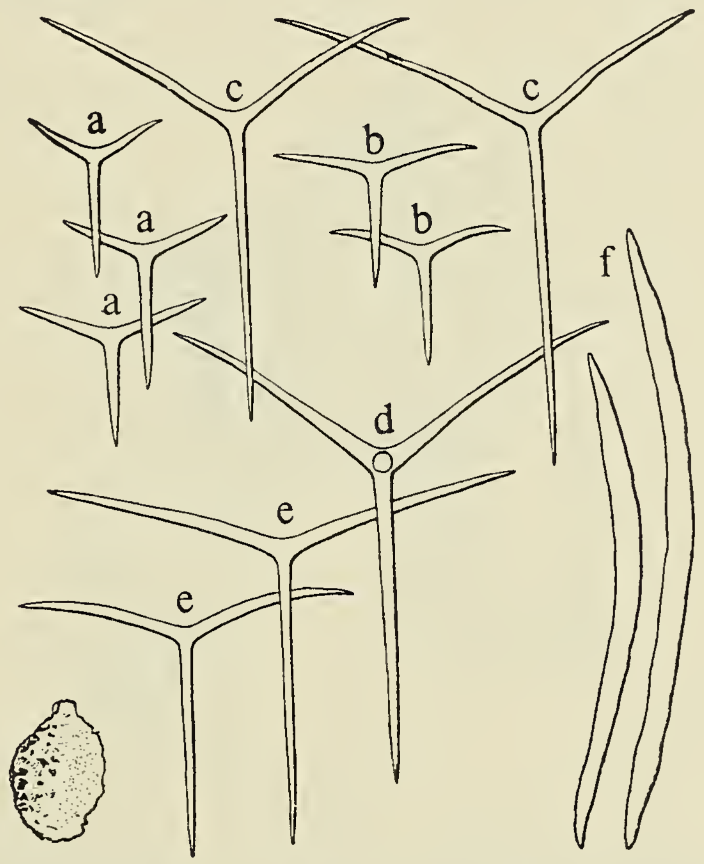
(text-fig. 203)

Sycon album Tanita, 1942: 28, pl. ii, fig. 6, text-fig. 3; Tanita, 1943: 397.

Description: Sponge ovate, with central cloaca; surface hispid; vent apical, fringed; texture soft; colour, in spirit, whitish; tubar skeleton of basal rays of subendosomal triradiates and of tubar triradiates, with distal ends of chambers ornamented with oxea; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·07 to 0·085 by 0·008 to 0·01 mm., basal ray 0·09 to 0·115 by 0·008 to 0·01 mm.,
oxea, 0·23 to 0·47 by 0·009 to 0·02 mm.,
subendosomal sagittal triradiates, similar to tubar triradiates,
endosomal triradiates, sagittal, paired rays, 0·16 to 0·22 by 0·008 to 0·012 mm., basal ray 0·18 to 0·26 by 0·008 to 0·012 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·07 to 0·18 by 0·007 to 0·01 mm.

Distribution: Japan (Okinoshima).



Text-fig. 203. *Sycon album* after Tanita: spicules, × 100; external form, natural size.
Spicules: a. tubar triradiates; b. subendosomal triradiates; c. endosomal triradiates; d. endosomal quadriradiates; e. triradiates from margin of vent; f. oxea.

Named form: **Sycon ampulla** (Haeckel)

(text-fig. 204)

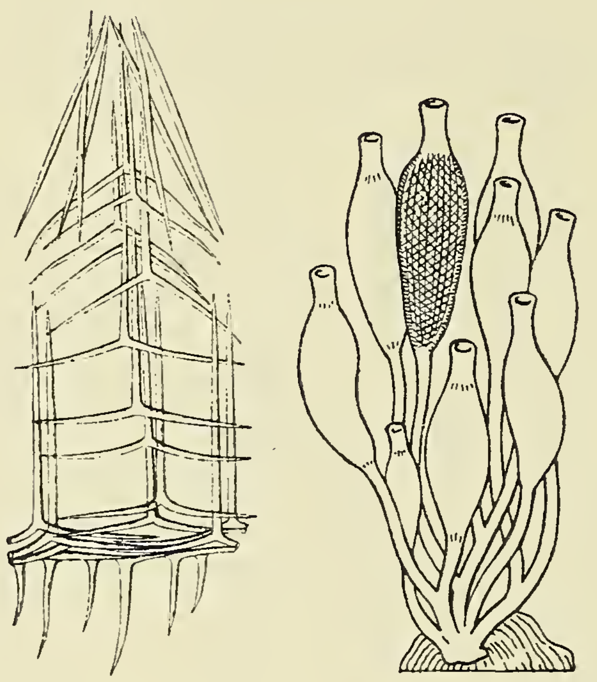
Sycarium ampulla Haeckel, 1870: 238; *Sycum alopecurus* Haeckel, 1870: 239; *Sycum petiolatum,* Haeckel, 1870: 239; *Sycon petiolatus* Schmidt [in] Haeckel, 1870: 239; *Sycandra ampulla* Haeckel, 1872: 308, pl. lii, fig. 2, pl. lviii, fig. 6; *Syconella ampulla* Haeckel, 1872: 309; *Sycarium ampulla* Haeckel, 1872: 309; *Sycinula ampulla* Haeckel, 1872: 309, pl. lviii, fig. 6; *Sycodendrum ampulla*

Haeckel, 1872: 309; *Sycandra alopecurus* Haeckel, 1872: 309; *S. petiolata* Haeckel, 1872: 309; *Sycon ampulla*, Topsent, 1892: 22; *S. ampullum*, Jenkin, 1908: 443; *S. ampulla*, Stephens, 1912: 11; *S. alopecus*, Dendy and Row, 1913: 744; *S. ampulla*, Dendy and Row, 1913: 744; *S. petiolatum*, Dendy and Row, 1913: 747.

Description: Sponge tubular, stipitate or sessile; surface hispid; vent apical, with well-marked fringe; texture soft; colour, in spirit, white; tubar skeleton of centripetally-directed rays of subendosomal triradiates, with several rows of triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and with oxea; endosomal skeleton of paired rays of subendosomal triradiates and a layer of triradiates and quadriradiates; skeleton of stalk composed of oxea.

Spicules: tubar triradiates, sagittal, paired rays 0·05 to 0·08 by 0·005 mm., basal rays 0·1 to 0·15 by 0·005 mm.,
oxea, 0·1 to 0·5 by 0·005 mm.,
subendosomal triradiates, sagittal, paired rays 0·05 to 0·08 by 0·005 mm., basal rays 0·17 by 0·005 mm.,
endosomal triradiates, subregular, rays 0·06 to 0·08 by 0·005 mm.,
endosomal quadriradiates similar to triradiates, with apical rays 0·04 to 0·1 mm. long.

Distribution: Atlantic Coast of South America (Venezuela and Brazil); East Africa (Wasin); 11–14 m.



Text-fig. 204. *Sycon ampulla*: spicules diagrammatically placed as if arranged in a flagellate chamber, ×100; external form, ×4 (both after Haeckel).

Named form: **Leuconia ananas** (Montagu) var.

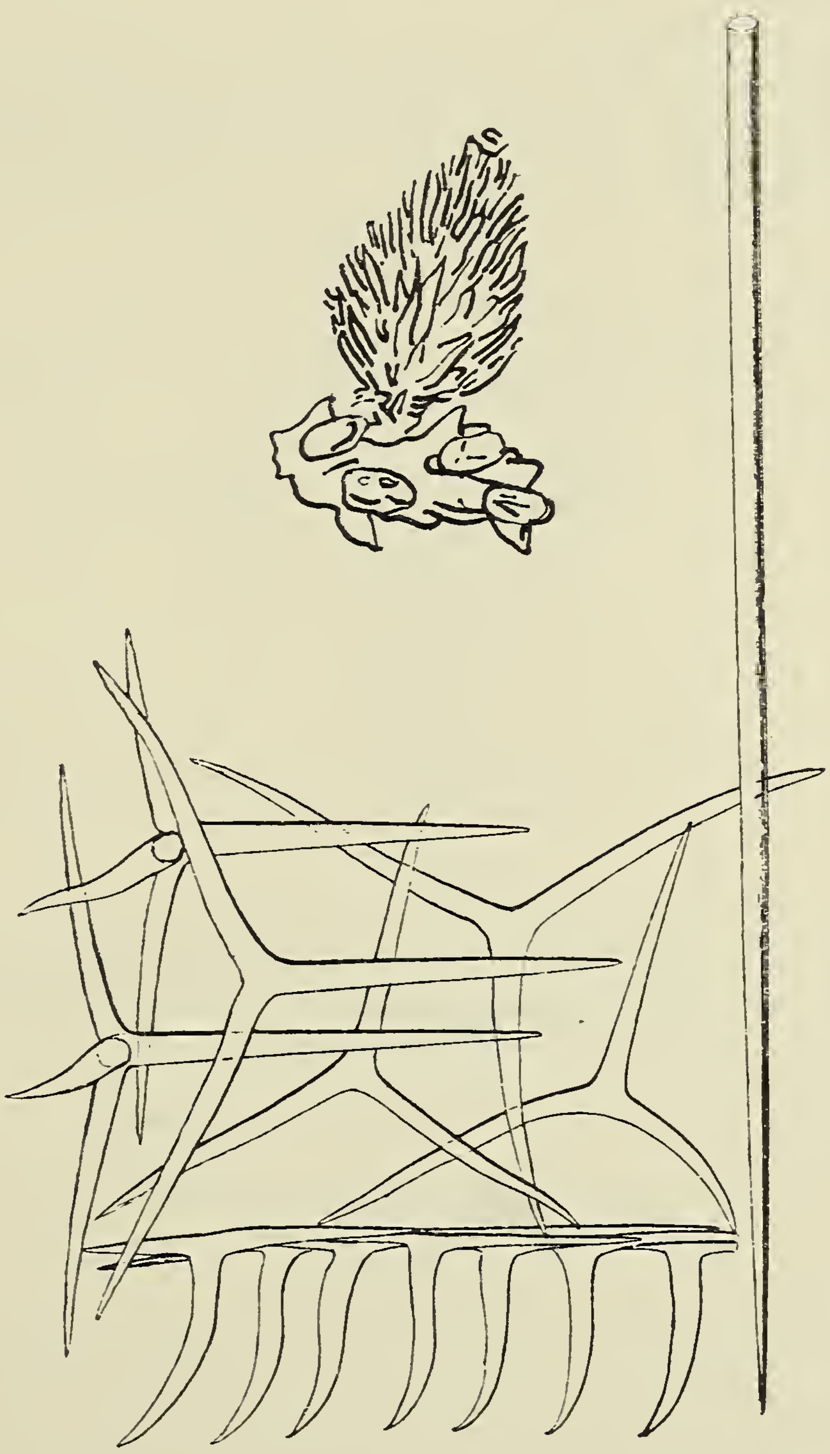
(text-fig. 205)

Spongia ananas var. Montagu, 1818: 96, pl. xvi, fig. 3; *Spongia pulverulenta* Grant, 1826: 170; *Grantia pulverulenta* Fleming, 1828: 525; *Calcispongia pulverulenta*, Blainville, 1834: 531; *Grantia pulverulenta*, Bellamy, 1839: 269; Johnston, 1842: 180; *Sycum ananas*, Haeckel, 1870: 239; *Leucandra ananas*, Haeckel, 1872: 200, pl. xxxii, fig. 5, pl. xl, figs. 1–8; *Dyssycus ananas*, Haeckel, 1872: 200; *Dyssycarium ananas*, Haeckel, 1872: 200; *Leucandra pulverulenta* (=*L. ananas*, var. *pulverulenta*) Haeckel, 1872: 200; *L. ananas*, Knipowitsch, 1892: 65; *Leuconia ananas*, Breitfuss, 1896: 431; *Leucandra ananas*, Vanhöffen, 1897: 249; *Leuconia ananas*, Breitfuss, 1898: 305; *L. ananas*, var. *pulverulenta*, Breitfuss, 1898: 305; *L. ananas*, var. *penicillata*, Breitfuss, 1898: 305; *L. ananas*, Breitfuss, 1898: 31; Breitfuss, 1898: 115; *Leucandra ananas*, Arnesen, 1901: 25; Arnesen, 1901: 71; Jenkin, 1908: 444, text-fig. 92; Dendy and Row, 1913: 769; *Leuconia ananas*, Breitfuss, 1927: 30; Breitfuss, 1932: 249; Arndt, 1935: 17, text-fig. 21; de Laubenfels, 1942: 267.

Description: Sponge cylindrical, sessile; surface even, hispid; vent apical, fringed; texture firm; colour, alive and in spirit, white or grey; ectosomal skeleton a tangential layer of triradiates, with oxea projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, 0·18 by 0·008 to 0·01 mm.,
oxea, 1·0 to 2·0 by 0·02 to 0·03 mm.,
triradiates of chamber layer, subregular, rays 0·2 to 0·3 by 0·015 to 0·025 mm.,
endosomal quadriradiates, sagittal, paired rays 0·18 by 0·015 to 0·025 mm., basal ray 0·2 to 0·3 by 0·015 to 0·025 mm., apical ray 0·12 by 0·015 to 0·025 mm.

Distribution (Summary): Arctic; Faroes; Norway; British Isles; France; Zanzibar; 6–120 m., on *Sertularia*, on a substratum of stones and mud.



Text-fig. 205. *Leuconia ananas* var.: spicules, as illustrated by Haeckel, ×100; external form, as illustrated by Montagu (size unknown).

Named form: **Sycetta antarctica** Brøndsted

(text-fig. 205A)

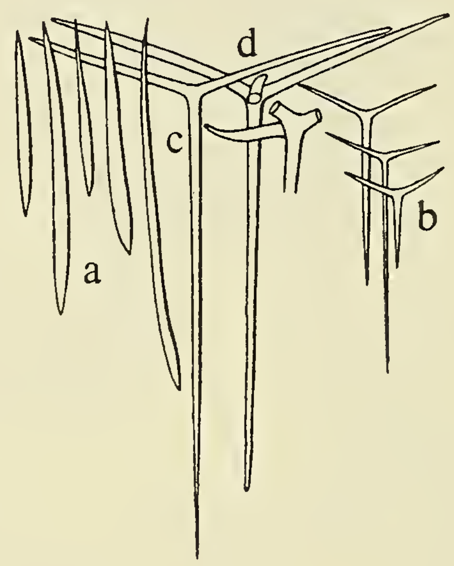
Sycetta antarctica Brøndsted, 1931: 23, fig. 20; *Tenthrenodes primitivus* Brøndsted, 1931: 24, figs. 21–23.

Description: Sponge tubular, substipitate; surface papillate, non-hispid; vent apical; texture (?); colour (?); tubar skeleton of a few triradiates, together with basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a thin tangential layer of endosomal triradiates and quadriradiates.

Spicules: tubar triradiates, subregular, rays 0·06 to 0·8 by 0·006 to 0·007 mm.,
oxea, 0·14 to 0·35 by 0·008 to 0·012 mm.,
oxea, 0·1 to 0·2 by 0·006 mm.,
subendosomal sagittal triradiates, paired rays 0·06 to 0·08 by 0·006 to 0·007 mm., basal ray 0·12 to 0·16 by 0·006 to 0·007 mm.,
endosomal triradiates, sagittal, paired rays 0·11 to 0·2 by 0·007 to 0·01 mm., basal ray 0·22 to 0·4 by 0·007 to 0·01 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·06 to 0·07 by 0·008 to 0·01 mm.

Distribution: Antarctic; 350–385 m.

Remarks: There is so little difference between the written descriptions of *Sycetta antarctica* and *Tenthrenodes primitivus*, apart from the presence in the latter of oxea, that there is no point in giving separate descriptions of them.



Text-fig. 205A. *Tenthrenodes primitivus* after Brøndsted: spicules, × 100. a. oxea; b. ectosomal triradiates; c, d. endosomal triradiates and quadriradiates.

Named form: **Leucandra apicalis** Urban

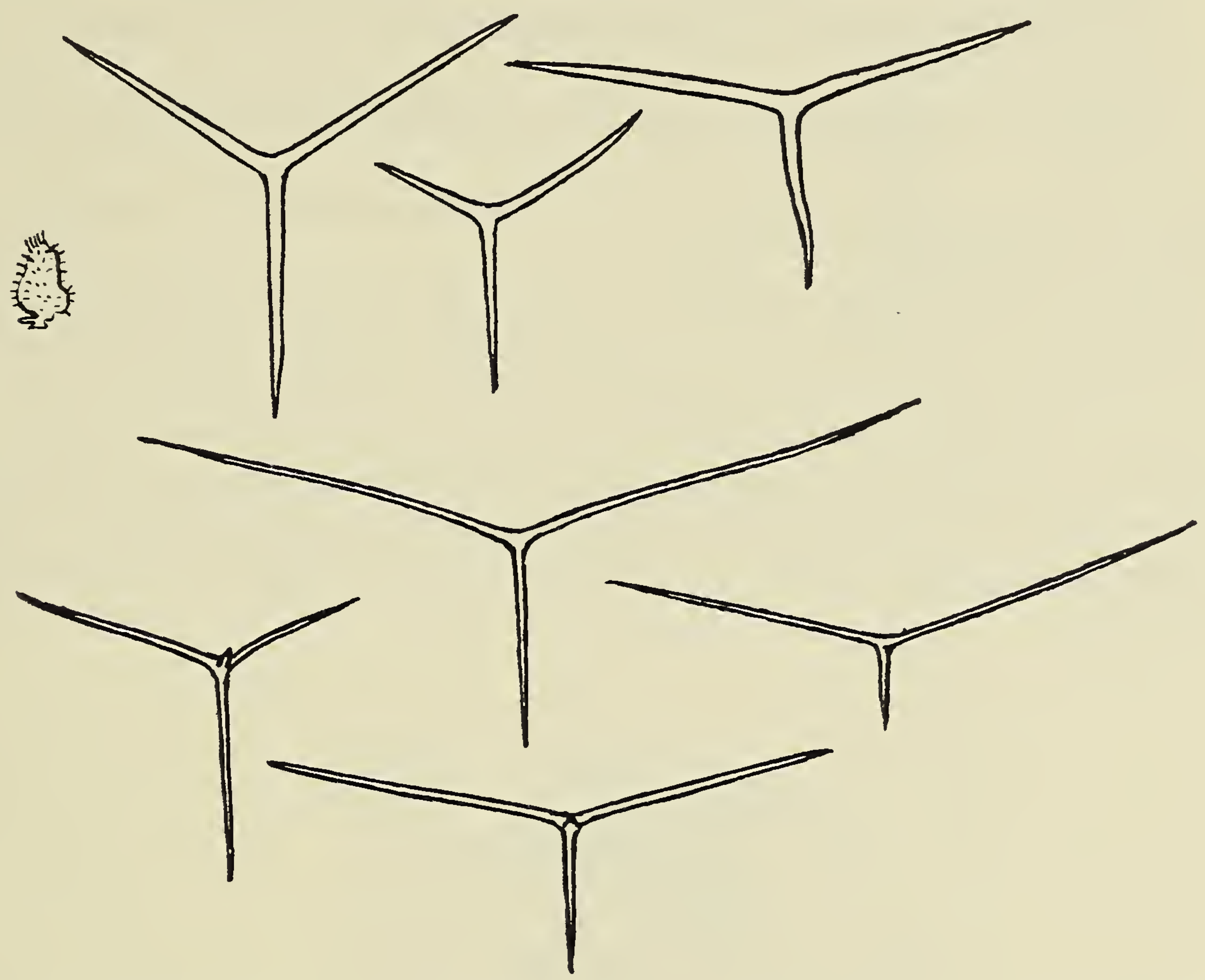
(text-fig. 206)

Leucandra apicalis Urban, 1905: 67, pl. vii, figs. 89–107; Dendy and Row, 1913: 772.

Description: Sponge oval to subspherical, sessile; surface hispid; vent apical, fringed; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea and microxea projecting beyond surface; skeleton of chamber layer of triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·107 to 0·274 by 0·01 to 0·015 mm., basal ray 0·074 to 0·19 by 0·01 to 0·015 mm.,
oxea, 0·62 to 2·7 by 0·062 to 0·067 mm.,
microxea, 0·07 to 0·14 by 0·003 to 0·004 mm.,
triradiates of chamber layer, sagittal, paired rays 0·19 to 0·25 by 0·017 to 0·018 mm., basal ray 0·19 to 0·24 by 0·017 to 0·018 mm.,
endosomal triradiates, sagittal, paired rays 0·25 to 0·3 by 0·01 mm., basal rays 0·15 to 0·24 by 0·01 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·1 to 0·14 by 0·01 mm.

Distribution: California; littoral.



Text-fig. 206. *Leucandra apicalis* after Urban: spicules, ×100; external form, natural size.

Named form: **Sycon arcticum** (Haeckel)
(text-fig. 207)

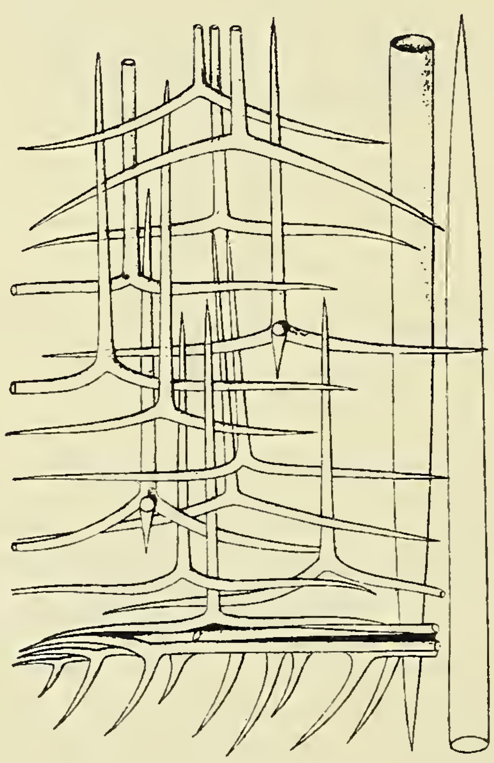
Sycon raphanus Schmidt, 1870: 74; *Sycum arcticum* Haeckel, 1870: 239; *Sycandra arctica* Haeckel, 1872: 353, pl. lv, fig. 1, pl. lx, fig. 15; *Sycurus arcticus* Haeckel, 1872: 354; *Syconella arctica* Haeckel, 1872: 354; *Sycarium arcticum* Haeckel, 1872: 354; *Sycandra polaris* (= *S. arctica* var. *polaris*) Haeckel, 1872: 354; *S. maxima* (= *S. arctica* var. *maxima*) Haeckel, 1872: 354; *Grantia arctica*, Verrill, 1874: 393; *Sycon arcticum*, Poléjaeff, 1883: 40, pl. iii, fig. 5; Hansen, 1885: 20; Levinsen, 1887: 342; *Sycandra arctica*, Fristedt, 1887: 409; *Grantia arctica*, Breitfuss, 1898: 21; *G. arctica*, et varr. *maxima*, *polaris*, Breitfuss, 1898: 26; Arnesen, 1901: 20; Breitfuss, 1911: 212; *Sycon arcticum*, Dendy and Row, 1913: 744; *S. maximum*, Dendy and Row, 1913: 747; *S. polare*, Dendy and Row, 1913: 747; *Grantia arctica*, Derjugin, 1915: 290; *S. arcticum*, Breitfuss, 1930: 276; Breitfuss, 1932: 243.

Description: Sponge tubular, sessile; surface minutely papillate, strongly hispid; vent apical, naked or with fringe; texture soft; colour, in spirit, white, grey or dark brown; tubar skeleton of basal rays of subendosomal triradiates and several rows of tubar triradiates, rarely quadriradiates; distal ends of radial chambers ornamented with basal rays of outermost tubar radiates and with long oxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates, and tangential triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·1 to 0·15 by 0·01 mm., basal rays 0·2 to 0·25 by 0·01 mm.,
tubar quadriradiates, similar to tubar triradiates, with apical ray 0·01 to 0·065 by 0·01 mm.,
oxea, 1·0 to 3·0 by 0·01 to 0·04 mm.,
oxea, 0·1 to 0·3 by 0·001 to 0·005 mm.,
subendosomal triradiates, sagittal, paired rays 0·17 by 0·01 mm., basal ray 0·25 by 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·05 to 0·15 by 0·01 mm., basal ray 0·2 to 0·25 by 0·01 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·02 to 0·1 by 0·01 mm.

Distribution: Arctic (Greenland, Spitzbergen, Jan Mayen, Kara Sea, Kola Fiord, Barents Sea); Norway; Bermudas; Philippines; 2–222 m.

Remarks: The only illustrations given for this species are from Haeckel (reproduced here: fig. 207) and Poléjaeff. The drawing given by the last-named differs markedly from that by Haeckel but bears a close similarity to *Sycon protectum* Lambe, especially in the form of the triradiates ornamenting the distal ends of the radial tubes. At the same time, Haeckel gives the distribution of his specimens as Greenland and Spitzbergen; Lambe's specimens were from the Atlantic and Pacific coasts of Canada; and Poléjaeff's specimens were from Bermuda and the Philippines. This wide distribution alone suggests the identity of *S. arcticum* with some other widely-distributed and variable species.



Text-fig. 207. *Sycon arcticum* after Haeckel: spicules, × 100.

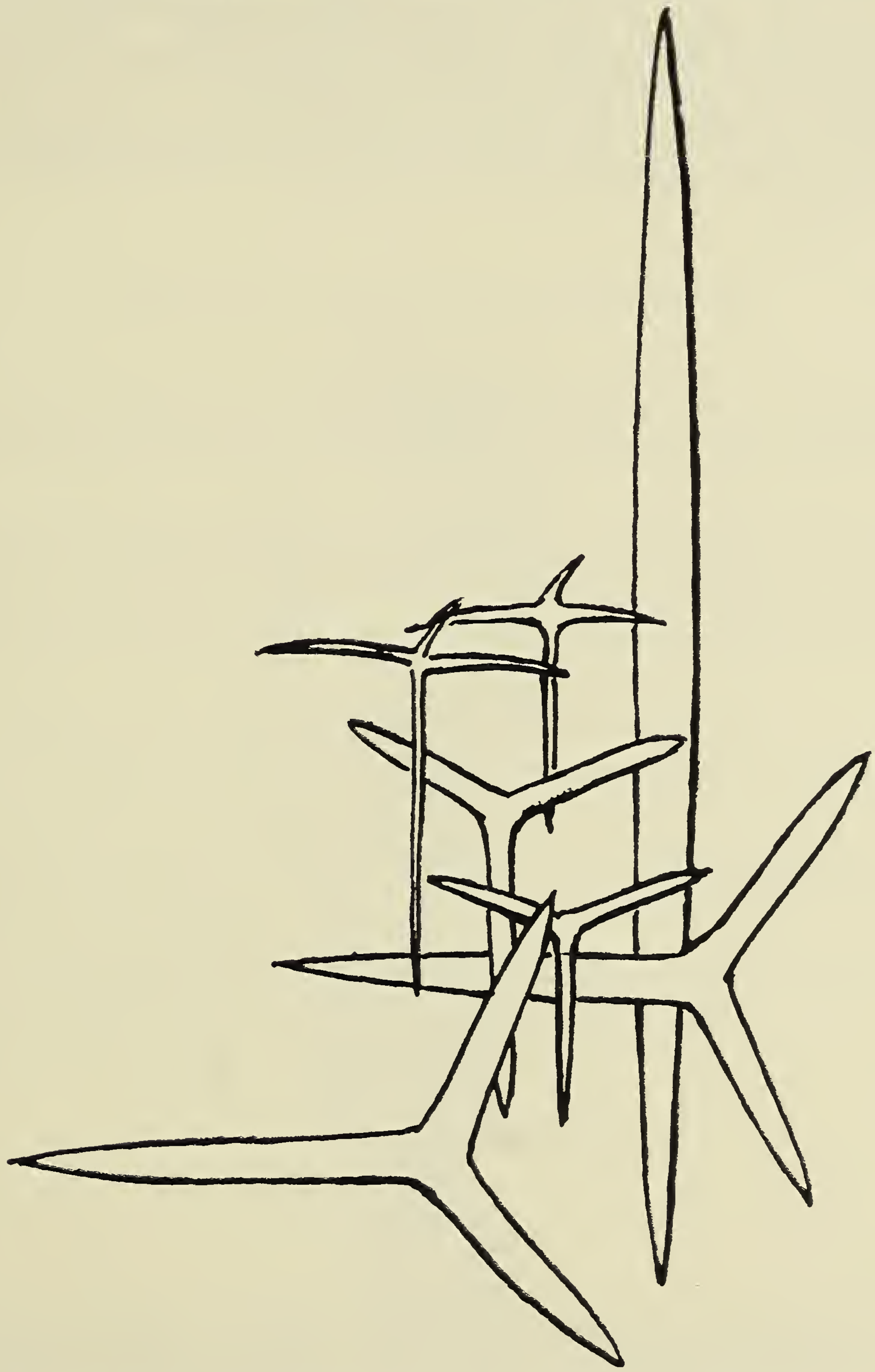
Named form: **Grantia asconoides** (Breitfuss)

Sycetta asconoides Breitfuss, 1896: 428; Breitfuss, 1898: 108, pl. xiii, figs. 35–38; Breitfuss, 1898: 299; *Grantia asconoides*, Dendy and Row, 1913: 760; Breitfuss, 1932: 247.

Description: Sponge solitary, tubular, stipitate; surface smooth; vent terminal, naked; texture soft; colour, in spirit, yellow or brown; ectosomal skeleton a tangential layer of triradiates (?); tubar skeleton of centripetally-directed rays of subendosomal sagittal triradiates (?) and several rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates (?) and a tangential layer of quadriradiates.

Spicules: ectosomal triradiates (?),
tubar triradiates, sagittal, paired rays 0·085 by 0·006 mm., basal rays 0·24 by 0·006 mm.,
subendosomal sagittal triradiates, paired rays 0·1 by 0·006 mm., basal rays 0·32 by 0·007 mm.,
endosomal quadriradiates, sagittal, paired rays 0·05 to 0·07 by 0·006 mm., basal rays 0·1 to 0·15 by 0·006 mm., apical rays 0·04 to 0·06 by 0·006 mm.

Distribution: Arctic (Spitzbergen, Barents Sea, Kola Fiord); 100–256 m.



Text-fig. 208. *Grantia atlantica* after Ridley: spicules, ×100.

Grantia atlantica Ridley

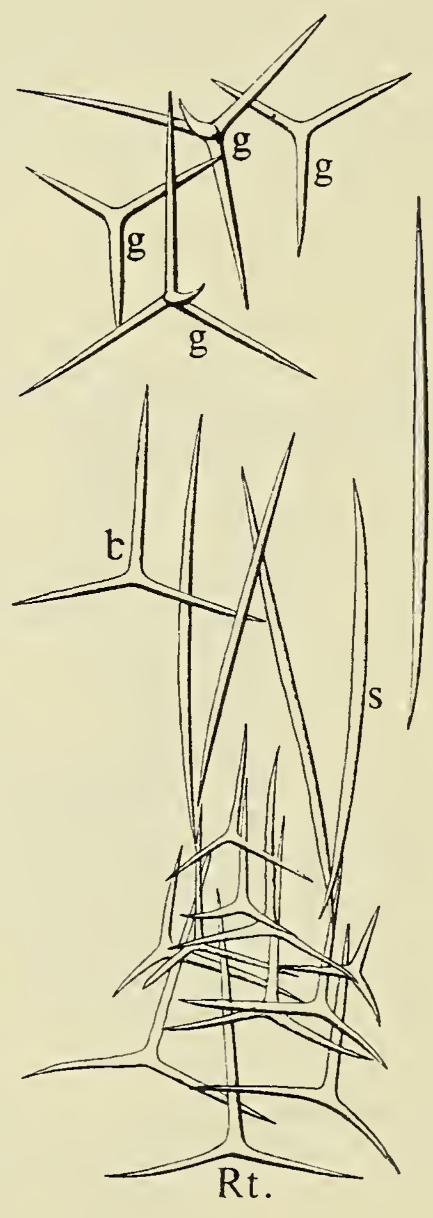
(text-fig. 208)

Grantia atlantica Ridley, 1881: 136, pl. xi, fig. 8; Dendy and Row, 1913: 759.

Description: Sponge solitary, tubular, sessile; surface slightly hispid; vent terminal, with slight marginal fringe; texture (?); colour, in spirit, yellowish-white; ectosomal skeleton a tangential layer of triradiates, with oxea set at an angle to surface; tubar skeleton of centripetally-directed rays of subendosomal sagittal triradiates and rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of quadriradiates of two sizes.

Spicules: ectosomal triradiates, sagittal, paired rays 0·22 to 0·31 by 0·038 to 0·044 mm., basal rays 0·3 to 0·42 by 0·044 to 0·05 mm.,
oxea, up to 2·1 by 0·095 mm.,
subendosomal sagittal triradiates and tubar triradiates, paired rays 0·12 to 0·15 by 0·016 mm., basal rays 0·25 to 0·38 by 0·019 mm.,
endosomal quadriradiates, sagittal, paired rays 0·1 by 0·013 mm., basal rays 0·28 by 0·019 mm., apical rays 0·05 by 0·006 mm.,
endosomal quadriradiates, sagittal, paired rays 0·08 by 0·01 mm., basal rays 0·44 by 0·01 mm., apical rays 0·019 by 0·006 mm.

Distribution: Brazil.



Text-fig. 209. *Sycon barbadense* after Schuffner: spicules, × 100. Rt. spicules as arranged in a radial tube; s. oxea; b. tubar triradiates; g. endosomal quadriradiates and triradiates.

Named form: **Sycon barbadense** (Schuffner)

(text-fig. 209)

Sycandra barbadensis Schuffner, 1877: 429, pl. xxvi, fig. 14; *Sycon barbadense*, Dendy and Row, 1913: 745.

Description: Sponge solitary, tubular, sessile; surface minutely hispid; vent terminal, with well-developed fringe; texture (?); colour, in spirit, greyish-white; tubar skeleton of centripetally-directed basal rays of subendosomal sagittal triradiates and rows of tubar triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and with oxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates and tangential layers of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·8 mm. long, basal rays 0·15 mm. long,
oxea, 0·4 by 0·009 mm.,
subendosomal sagittal triradiates (?),
endosomal triradiates, sagittal, paired rays 0·15 by 0·009 mm., basal rays 0·2 by 0·009 mm.,
endosomal quadriradiates, similar to triradiates, with apical rays 0·08 by 0·013 mm.

Distribution: Barbados.

Named form: **Leucomalthe bomba** Haeckel

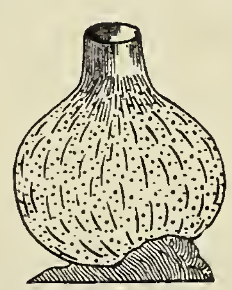
(text-fig. 210)

Leucandra (*Leucomalthe*) *bomba* Haeckel, 1872: 172, 209, pl. xxxiii, fig. 2, pl. xxxviii, figs. 1–6, pl. xl, fig. 9; *Dyssyconella bomba* Haeckel, 1872: 209, pl. xxxviii, fig. 1; *Leucomalthe bomba*, Dendy and Row, 1913: 732.

Description: Sponge solitary, spherical, sessile; surface even, smooth (?); vent apical, with well-developed fringe; texture firm; colour, dried, red or brown; ectosomal skeleton of tangential layers of microxea and triradiates; skeleton of chamber layer of triradiates and longitudinally-placed oxea, with larger canals lined with quadriradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: triradiates of outer layers of ectosome, regular, rays 0·1 to 0·2 by 0·008 to 0·012 mm.,
microxea, 0·02 to 0·04 by 0·001 mm.,
triradiates of inner layers of ectosome, regular, 0·25 to 0·35 by 0·02 to 0·25 mm.,
oxea, 1·0 to 1·5 by 0·04 to 0·05 mm.,
triradiates of chamber layer, regular, rays 0·2 to 0·3 by 0·02 to 0·03 mm.,
quadriradiates of larger canals, subregular, facial rays 0·21 by 0·008 to 0·012, apical rays 0·07 by 0·008 to 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·33 by 0·02 mm., basal rays 0·23 to 0·35 by 0·015 mm., apical rays 0·15 by 0·01 mm.

Distribution: Viti Island, Pacific Ocean.



Text-fig. 210. *Leucomalthe bomba* (after Haeckel): natural size.

Named form: **Sycon boreale** (Schuffner)

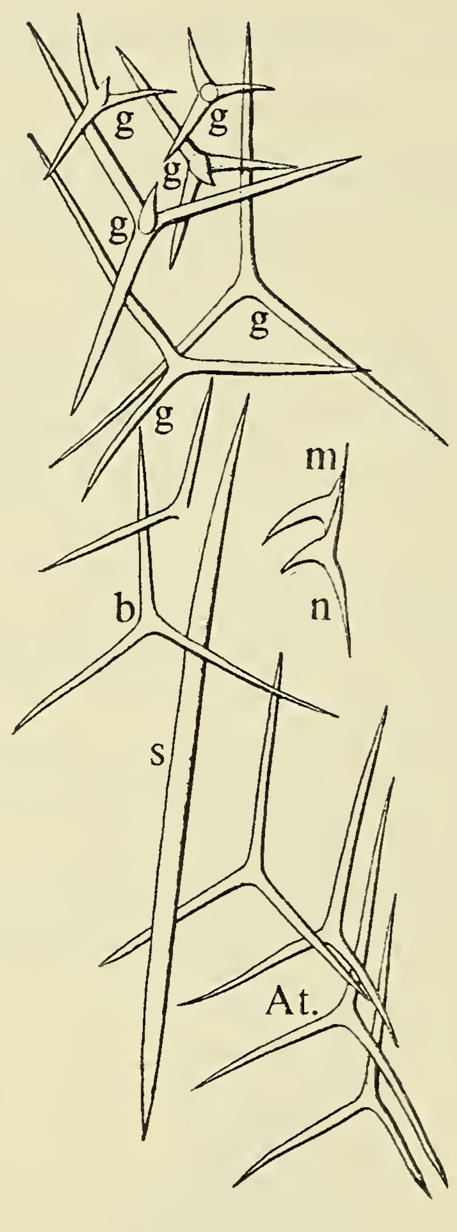
(text-fig. 211)

Sycandra borealis Schuffner, 1877: 427, pl. xxvi, fig. 13; *Sycon boreale*, Dendy and Row, 1913: 745; Arndt, 1935: 10, fig. 12.

Description: Sponge solitary, tubular, sessile; surface minutely hispid; vent apical, with well-developed fringe; texture firm, friable; colour, in spirit, yellowish-white; tubar skeleton of centripetally directed rays of subendosomal sagittal triradiates and rows of tubar triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and oxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·18 mm. long, basal rays 0·5 mm. long,
oxea, 0·5 by 0·009 mm.,
subendosomal sagittal triradiates (?),
endosomal triradiates, regular or subregular, rays 0·18 by 0·007 mm.,
endosomal quadriradiates, similar to triradiates, with apical rays 0·05 by 0·013 mm.

Distribution: Norway.



Text-fig. 211. *Sycon boreale* after Schuffner: spicules, × 100. s. oxeote; b. and At. tubar triradiates; g. endosomal quadriradiates and triradiates; m–n. apical rays of endosomal quadriradiates.

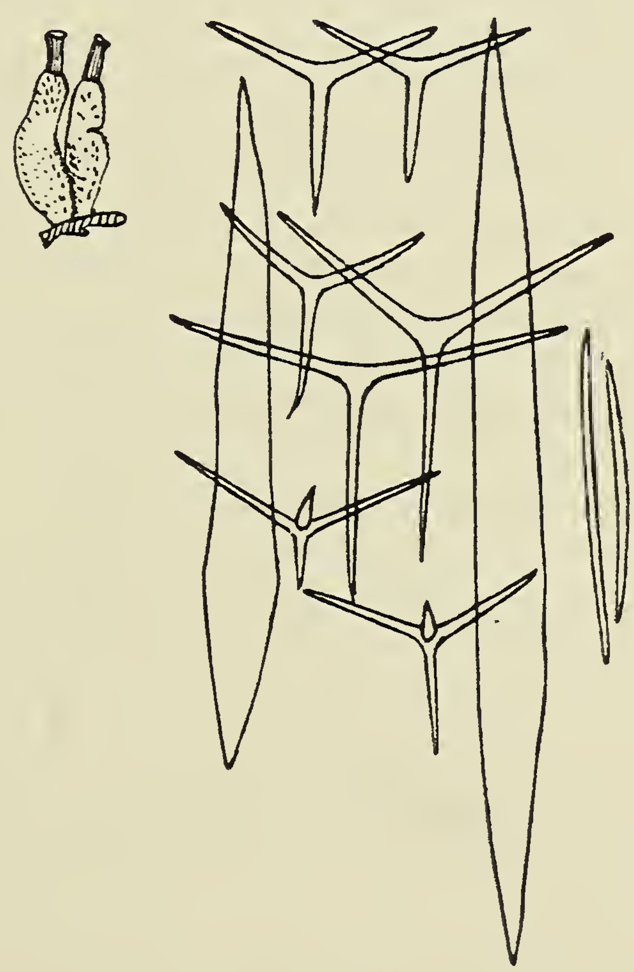
Named form: **Sycon calcar-avis** Hozawa

Sycon calcar-avis Hozawa, 1929: 304, pl. xiv, figs. 20, 21, text-fig. 11; Tanita, 1943: 397.

Description: Sponge tubular, ovoid; surface strongly hispid; fringe round vent strongly developed; texture firm; colour, in spirit, greyish white; tubar skeleton of centripetally directed rays of subendosomal triradiates and quadriradiates, with several rows of triradiates and quadriradiates, with recurved apical rays; distal ends of chambers ornamented with basal rays of outermost triradiates and with oxea of two kinds; endosomal skeleton of paired rays of subendosomal triradiates and paired and apical rays of subendosomal quadriradiates, and four or five layers of quadriradiates.

Spicules: tubar triradiates, nearly regular, rays 0·09 to 0·15 by 0·008 to 0·012 mm.,
tubar quadriradiates, sagittal, paired rays 0·1 to 0·15 by 0·012 mm., basal rays 0·16 to 0·25 by 0·012 mm., apical ray 0·05 by 0·006 to 0·008 mm.,
oxea, curved, of two kinds, 0·8 to 2·5 by 0·02 to 0·05 and 2·0 or more by 0·002 to 0·004 mm.
subendosomal triradiates, sagittal, paired rays 0·1 to 0·17 by 0·012 to 0·016 mm., basal ray 0·26 to 0·3 by 0·012 to 0·016 mm.,
subendosomal quadriradiates, similar to triradiates, apical ray 0·09 to 0·18 by 0·008 to 0·012 mm.,
endosomal quadriradiates, sagittal, paired rays 0·1 to 0·25 by 0·012 to 0·016 mm., basal ray 0·07 to 0·15 by 0·01 to 0·016 mm., apical ray 0·11 to 0·2 by 0·008 to 0·012 mm.

Distribution: Japan (Sagami Sea); 170 m.



Text-fig. 212. *Sycon caminatum* after Thacker: spicules, $\times$100; external form, natural size.

Named form: **Sycon caminatum** Thacker

(text-fig. 212)

Sycon caminatum Thacker, 1908: 767, pl. xl, fig. 4, text-fig. 161; Dendy and Row, 1913: 745.

Description: Sponge solitary, or in groups, tubular, sessile; surface hispid; vent apical, with well-developed fringe; texture firm; colour, in spirit, light brown; tubar skeleton of centripetally-directed basal rays of subendosomal sagittal triradiates and rows of tubar triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and with oxea of two sorts, and with trichoxea; endosomal skeleton of several tangential layers of triradiates and quadriradiates.

Spicules: tubar triradiates, rarely quadriradiate, regular to sagittal, rays 0·09 to 0·11 by 0·012 mm.,
oxea, 0·8 by 0·05 mm.,
oxea, up to 0·25 by 0·01 mm.,
trichoxea (?),
subendosomal sagittal triradiates, paired rays 0·12 by 0·01 mm., basal rays 0·15 by 0·01 mm.,
endosomal triradiates, regular to subregular, rays 0·12 by 0·008 mm.,
endosomal quadriradiates, similar to triradiates, with apical rays 0·05 by 0·011 mm.

Distribution: Cape Verde Islands.

Named form: **Sycon ciliatum** (Fabricius)

(text-fig. 213)

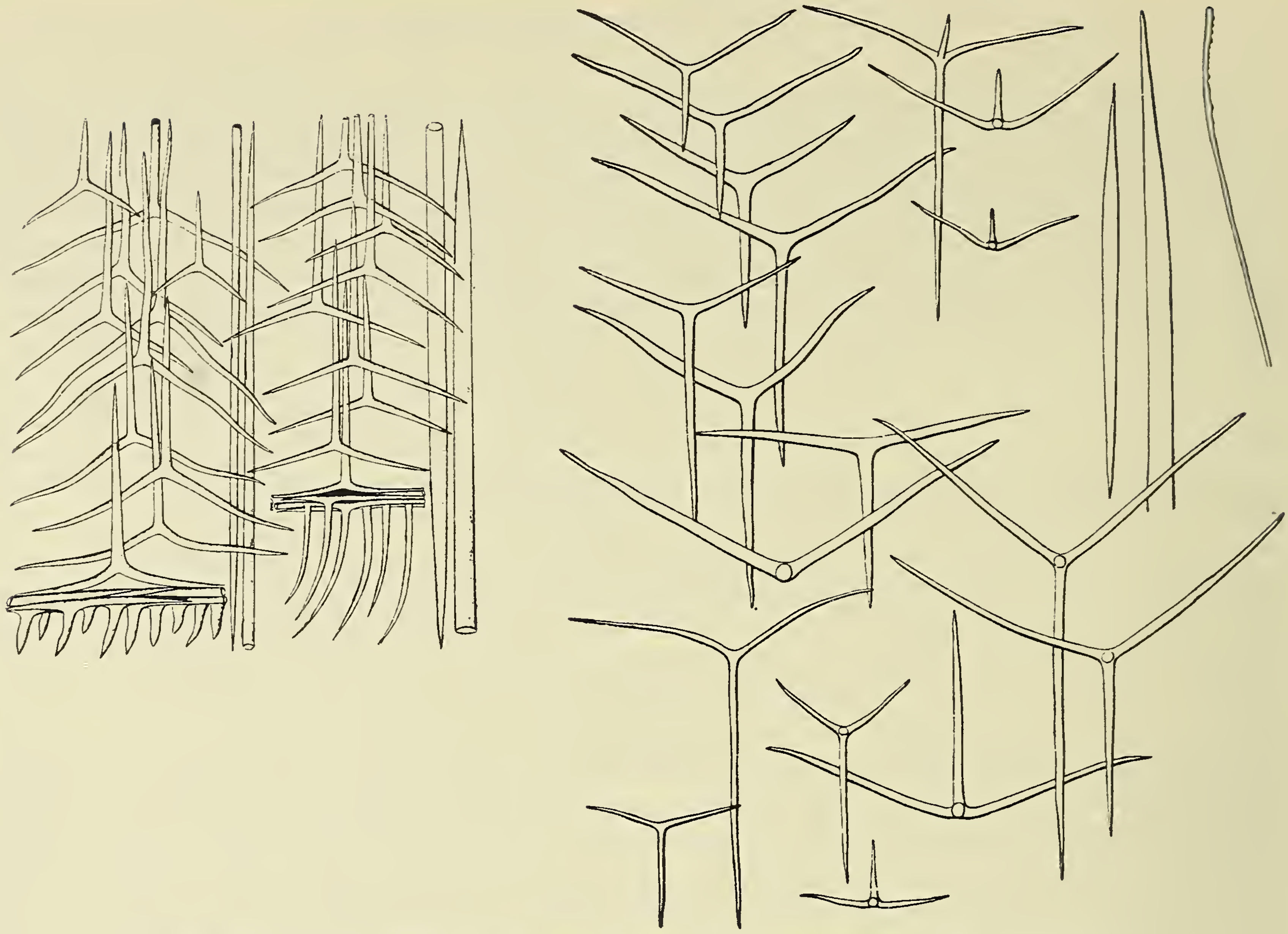
Spongia ciliata Fabricius, 1780: 488; *S. coronata* Ellis and Solander, 1786: 190, pl. lviii, figs. 8–9; Montagu, 1818: 88; Schweigger, 1819: 80, pl. v, fig. 47; *Scypha coronata*, Gray, 1821: 357; *Spongia coronata*, Grant, 1826: 166; Grant, 1826: 122, pl. ii, figs. 17–18; *Grantia ciliata*, Fleming, 1828: 525; *Calcispongia ciliata*, Blainville, 1834: 531, pl. xciv, figs. 17–18; *Grantia coronata*, Hassall, 1841: 174; *G. ciliata*, Johnston, 1838: 271; Johnston, 1842: 176, pl. xx, figs. 4–5, pl. xxi, figs. 6–7; *Sycon ciliatum*, Lieberkühn, 1859: 353, pl. ix, figs. 3, 5–9; *Grantia ciliata*, Fyfe, 1861: 6; *Sycon ciliatum*, Lieberkühn, 1865: 739, pl. xix, figs. 6–7; *Grantia ciliata*, Bowerbank, 1864: 283, pl. xxvi, fig. 345; Bowerbank, 1866: 19; Gray, 1867: 554; Wright, 1869: 223; *Sycon ciliatum*, Schmidt, 1869: 93; Schmidt, 1870: 74; *Syconella tubulosa* Haeckel, 1870: 239; *Sycum ciliatum*, Haeckel, 1870: 239; *S. coronatum*, Haeckel, 1870: 239; *S. giganteum*, 1870: 239; *S. ovatum* Haeckel, 1870: 239; *S. clavatum* Haeckel, 1870: 239; *S. lanceolatum* Haeckel, 1870: 239; *Sycodendrum ramosum* Haeckel, 1870: 245; *Sycocystis oviformis* Haeckel, 1870: 249; *Sycandra ciliata*, Haeckel, 1872: 296, pl. li, fig. 1, pl. lviii, fig. 9; *Sycurus ciliatus*, Haeckel, 1872: 296; *Syconella ciliata*, Haeckel, 1872: 296; *Sycarium ciliatum*, Haeckel, 1872: 296; *Sycocystis ciliata*, Haeckel, 1872: 297; *Sycothamnus ciliatus*, Haeckel, 1872: 297; *Sycinula ciliata*, Haeckel, 1872: 297; *Sycodendrum ciliatum*, Haeckel, 1872: 297; *Sycophyllum ciliatum*, Haeckel, 1872: 297; *Sycometra ciliata*, Haeckel, 1872: 297, pl. lviii, fig. 9; *Sycandra ovata* Haeckel, 1872: 297; *S lanceolata* Haeckel, 1872: 297; *Sycortis ciliata*, Haeckel, 1872: 297; *Sycandra coronata*, Haeckel, 1872: 304, pl. li, fig. 2, pl. lx, figs. 1–6; *Sycurus coronatus*, Haeckel, 1872: 304; *Syconella coronata*, Haeckel 1872: 304; *Sycarium coronatum*, Haeckel, 1872: 305; *Sycandra tubulosa* (= *S. coronata* var. *tubulosa*) Haeckel, 1872: 305; *Sycandra clavata* Haeckel, 1872: 325; *S. ciliata*, Möbius, 1873: 97; *Grantia ciliata*, Verrill, 1873: 330; Bowerbank, 1874: 3, pl. ii, figs. 1–15; *G. ciliata*, M'Intosh, 1874: 143; Verrill, 1874: 364; *G. coronata*, Verrill, 1874: 364; *Sycandra ciliata*, Keller, 1876: 19; *S. coronata*, Keller, 1876: 19; *Grantia ciliata*, var. *spinispiculum* Carter, 1876: 468, pl. xii, figs. 6–8; *G. ciliata*, Leslie and Herdman, 1881: 59; *Sycandra ciliata*, Vosmaer, 1882: 4; *Sycon ciliatum*, Marion, 1883: pp. 1–104; *Sycandra coronata*, et var. *spinispiculum*, Fristedt, 1885: 10–11; *S. coronata*, Lendenfeld, 1885: 1092; *Sycon coronatum*, Lackschewitsch, 1886: 302; *S. ciliatum*, Koehler, 1886: 362; Koehler, 1886: 11, 34, 52; *Sycandra ciliata*, Hanitsch, 1889: 172; Torre, 1889: 97; Hanitsch, 1890: 195; *Sycon ciliatum*, Topsent, 1890: 201; *S. coronatum*, Topsent, 1890: 201; *Sycandra coronata*, Lendenfeld, 1891: 242, pl. xi, fig. 71; *Sycon ciliatum*, Topsent, 1891:

128; *S. coronatum*, Topsent, 1891: 128; *S. ciliatum*, Topsent, 1891: 525; *S. coronatum*, Topsent, 1891: 525; Hanitsch, 1891: 214; *S. ciliatum*, Topsent, 1891: 13; Grentzenberg, 1891: 43; *Grantia ciliata*, Apstein, 1892: 194; Holt, 1892: 270, 290; *Sycon ciliatum*, Topsent, 1892: 22; *S. coronatum*, Dendy, 1892: 79; *Sycandra ciliata*, Ostroumow, 1893: 159; *S. coronata* var. *commutata*, Knipowitsch, 1893: 65; *Sycon coronatum*, Hanitsch, 1894: 182; Topsent, 1894: 7; *Sycandra coronata*, var. *commutata*, Stieren, 1894: 290; *Grantia coronatum*, Duerden, 1894: 231; *Sycon ciliatum*, Maitland, 1897: 55; Breitfuss, 1898: 216; *S. coronatum* var. *commutata*, Breitfuss, 1898: 216; 1898: 458; *S. ciliatum*, Breitfuss, 1898: 18, pl. i, figs. 9–12; ? *S. ciliatum*, var. *polaris* Breitfuss, 1898: 19, pl. ii, figs. 13–17; *S. ciliatum*, Breitfuss, 1898: 299; Breitfuss, 1898: 23; Topsent, 1899: 105; *S. coronatum*, Allen and Todd, 1900: 184; Rankin, 1901: 372; *Sycandra ciliata*, var. *ovata*, Arnesen, 1901: 17; *S. ciliata*, var. *lanceolata*, Arnesen, 1901: 17; *S. coronata*, Arnesen, 1901: 17; *S. ciliata*, Arnesen, 1901: 70; *S. coronata*, Arnesen, 1901: 70; *Sycon ciliatum*, Rousseau, 1903: 9, fig. 5; *S. coronatum*, Rousseau, 1903: 10, fig. 6; *S. ciliatum*, Cotte, 1903: 420; *Sycandra coronata*, Sowinsky, 1904: 34; Kirkpatrick, 1907; 86; *Sycon coronatum*, Jenkin, 1908: 442; Row, 1909: 185; *S. ciliatum*, Whitehead, 1911: 197; Stephens, 1912: 10; *S. coronatum*, Stephens, 1912: 10; *S. ciliatum*, Crawshay, 1912: 303; Dendy and Row, 1913: 745; *S. commutatum*, Dendy and Row, 1913: 745; *S. coronatum*, Dendy and Row, 1913: 745; *S. lanceolatum*, Dendy and Row, 1913: 746; *S. ovatum*, Dendy and Row, 1913: 747; *S. tubulosum*, Dendy and Row, 1913: 749; *Sicandra ciliata*, Woods, 1913; 365; *Sycon coronatum*, Walton, 1913: 106; Farran, 1915: 29; *S. ciliatum*, Farran, 1915: 29; *S. coronatum*, Renouf, 1920: 115; *S. ciliatum*, Breitfuss, 1927: 29; Broch, 1927: 5; *S. coronatum*, Breitfuss, 1927: 29; *S. spinispiculum*, Breitfuss, 1927: 29; *S. ciliatum*, Arndt, 1928: 24, pl. i, figs. 9–12; *S. coronatum*, Arndt, 1928: 25, figs. 21–22; *S. ciliatum*, Breitfuss, 1930: 276; Burton, 1930: 488; *S. coronatum*, Burton, 1930: 488; Allen, 1931: 59: *S. ciliatum*, Renouf, 1931: 427; Row and Hozawa, 1931: 756; Breitfuss, 1932: 244; *S. commutatum*, Breitfuss, 1932: 244; *S. coronatum*, Breitfuss, 1932: 244; Topsent, 1932: 1; *S. ciliatum*, Burton, 1932: 167; de Laubenfels, 1932: 11; *S. coronatum*, Burton, 1932: 167; *S. ciliatum*, Burton, 1933: 236; Topsent, 1934: 9; *S. coronatum*, Topsent, 1934: 9; Kitching, Macan and Gibson, 1934: 692; *S. ciliatum*, Arndt, 1935: 10, fig. 13; *S. coronatum*, Arndt, 1935: 12, fig. 14; *S. tubulosum*, Breitfuss, 1935: 25; *S. coronatum*, Moore, 1937: 32; *S. ciliatum*, Moore, 1937: 32; *S. coronatum*, Hozawa, 1940: 140, pl. vi, fig. 5, text-fig. 4; Tanita, 1941: 2; *S. ciliatum*, Tanita, 1941: 268, pl. xvii, fig. 3; *S. coronatum*, Tanita, 1942: 111, pl. vi, fig. 5; Tanita, 1943: 398, pl. xiii, figs. 28, 29; Levi, 1950: 3; *S. ciliatum*, Levi, 1950: 3.

Description: Sponge tubular, spherical to elongate and cylindrical; surface minutely papillate and hispid; vent apical, with or without fringe; texture soft to firm; colour, in spirit, grey, white, yellow or brown; tubar skeleton of basal rays of subendosomal sagittal triradiates and several rows of tubar triradiates, distal cones ornamented with oxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates and endosomal triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal or subregular, paired rays 0·1 to 0·2 by 0·005 to 0·01 mm., basal ray 0·1 to 0·25 by 0·005 to 0·01 mm.,
ectosomal oxea, 1·0 to 3·0 by 0·006 to 0·025 mm.,
subendosomal triradiates, sagittal, paired rays 0·1 to 0·2 by 0·005 to 0·01 mm., basal ray 0·25 by 0·005 to 0·01 mm.,
endosomal triradiates, sagittal or subregular, paired rays 0·1 to 0·15 by 0·005 to 0·01 mm., basal ray 0·1 to 0·2 by 0·005 to 0·01 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·02 to 0·08 by 0·008 to 0·01 mm.

Distribution (*Summary*): Arctic generally; Atlantic coasts of Europe (to Gibraltar) and America (to New England coast); Pacific coast of North America; Chili (Punta Arenas); Mediterranean; Africa, west coast southwards to Stil Bay, South Africa; Zanzibar; Australia; Sandwich Islands; littoral (mid-tide to low-tide) to 860 m. Ecology: growing on stones, seaweeds, hydroids, etc. Recorded bottom temperature, 3·78° C.



Text-fig. 213. *Sycon ciliatum*: spicules of *S. ciliatum* and *S. coronatum* (left), as illustrated by Haeckel, and of *S. coronatum* (right) as illustrated by Hozawa (1940), all × 100.

Named form: **Sycon coactum** Urban

Sycandra coacta Urban, 1905: 55, pl. vii, figs. 69-88; *Sycon coactum*, Dendy and Row, 1913: 745; de Laubenfels, 1932: 10.

Description: Sponge tubular, sessile; surface reticulate, hispid; vent apical, with fringe; texture soft; colour, in spirit, white; tubar skeleton of basal rays of subendosomal sagittal triradiates with several rows of tubar triradiates and quadriradiates, with distal cones ornamented with oxea and microxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·085 to 0·12 by 0·01 mm., basal ray 0·12 to 0·2 by 0·01 mm.,
tubar quadriradiates, similar to tubar triradiates, with apical ray 0·035 to 0·006 to 0·008 mm.,
oxea, 1·0 by 0·035 mm.,
microxea, 0·03 to 0·05 by 0·001 to 0·003 mm.,
subendosomal sagittal triradiates, paired rays 0·08 to 0·09 by 0·01 mm., basal ray 0·125 by 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·15 to 0·24 by 0·005 to 0·01 mm., basal ray 0·13 to 0·17 by 0·005 to 0·01 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·1 by 0·005 to 0·01 mm.

Distribution: California; littoral.

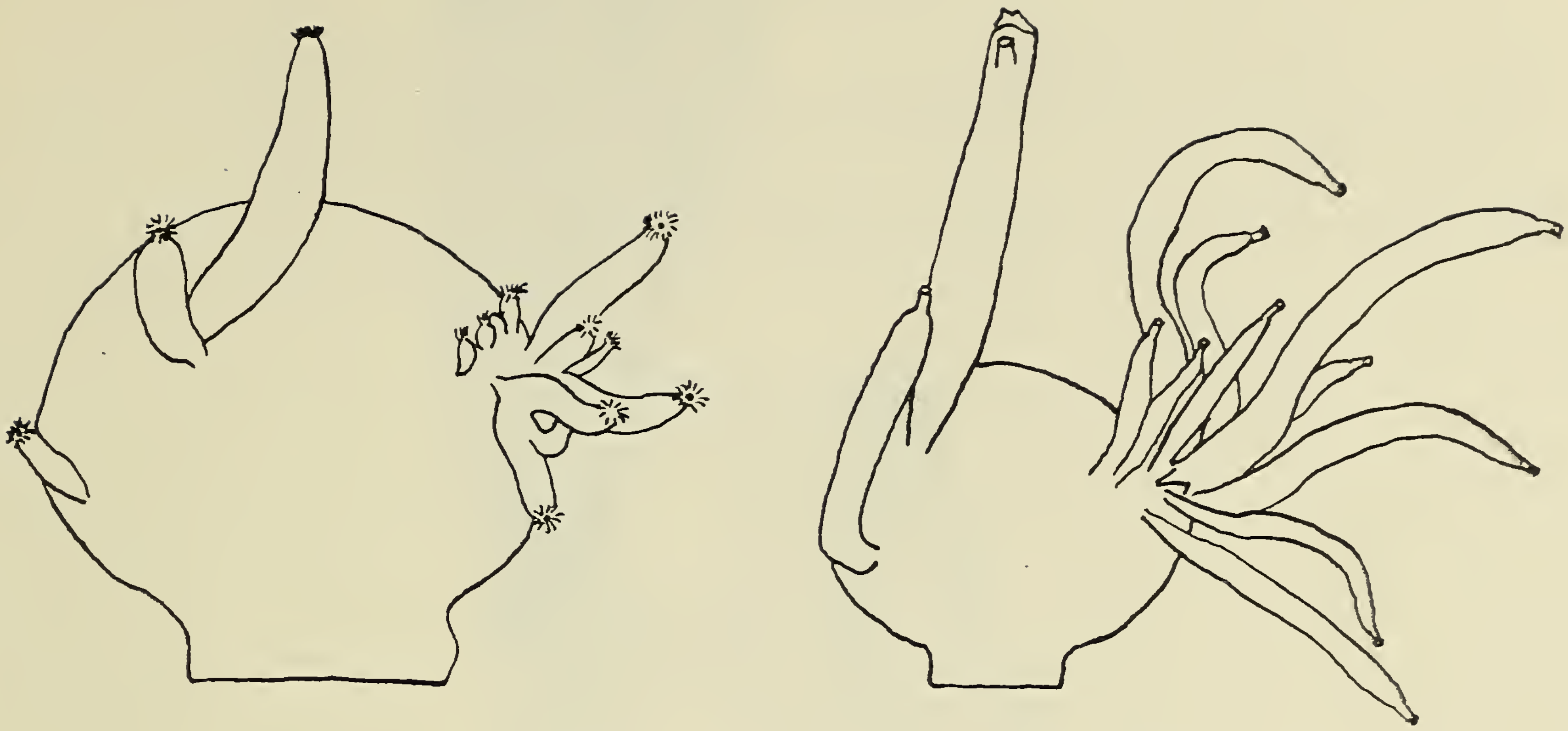


Fig. 213A. Although *Sycon ciliatum* has so often been recorded, its external form has seldom been figured. Special interest attaches therefore to these tracings from photographs taken by Dr. Douglas Wilson at Plymouth of *S. ciliatum* growing on a *Pecten* shell. On the left is shown the specimens as they appeared on December 9, 1947. On the right, at a lower magnification, is shown the same shell with the specimens grown larger as it appeared on March 9, 1948. Apart from the increase in size of the *Sycon*, the most significant change is in the vents, which were ornamented at first with a corona of spicules, and three months later were simple membranous chimneys. From photographs taken at the same time, of other series of specimens, it seems that other changes in the shape and structure of the vent can occur, suggesting that the vent and its spicules, in this species at all events, have little or no diagnostic value.

Named form: **Sycon compactum** Lambe

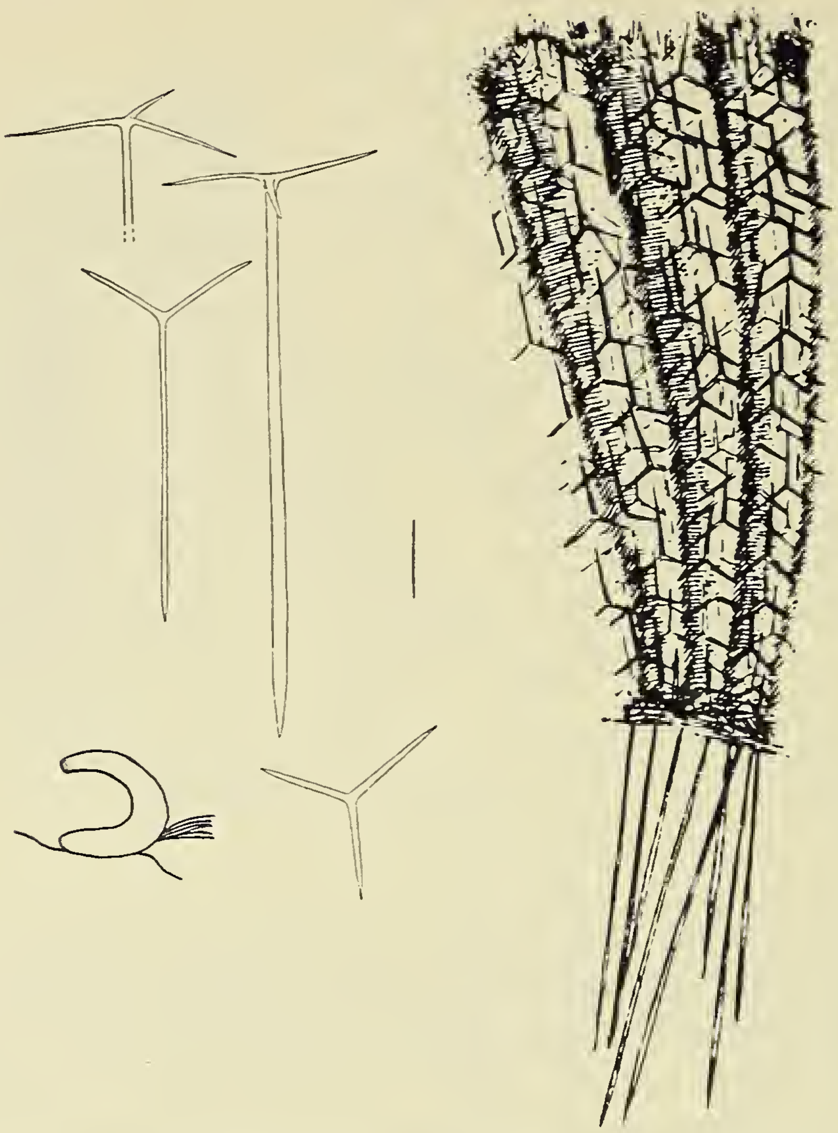
(text-fig. 214)

Sycon compactum Lambe, 1893: 38, pl. iv, fig. 3; Lambe, 1900: 165; Dendy and Row, 1913: 745.

Description: Sponge solitary, tubular, sessile; surface even, minutely hispid; vent terminal, naked; texture firm; compact; colour, in spirit, dull yellow; tubar skeleton of centripetally-directed rays of subendosomal triradiates and numerous rows of triradiates; distal ends of chambers ornamented with microxea and basal rays of outermost triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: tubar triradiates, sagittal, paired rays 0·065 by 0·006 mm., basal rays 0·065 to 0·13 by 0·006 mm.,
microxea, 0·065 by 0·003 mm.,
subendosomal sagittal triradiates, paired rays 0·09 by 0·006 mm., basal rays 0·22 by 0·006 mm.,
endosomal quadriradiates, regular, facial rays 0·11 by 0·006 mm., apical rays 0·28 to 0·57 by 0·006 mm.

Distribution: Vancouver Island; 37–46 m.



Text-fig. 214. *Sycon compactum* after Lambe: spicules, ×100; section across body wall, showing three radial chambers, ×60; external form, natural size.

Named form: **Sycetta conifera** (Haeckel)

(text-fig. 215)

Sycaltis conifera Haeckel, 1872: 264, pl. xlv, figs. 1–3; *Sycurus conifer* Haeckel, 1872: 265, pl. xlv, fig. 1; *Sycon conifera*, Poléjaeff, 1883: 24; *Sycetta conifera*, Lendenfeld, 1892: 239, pl. xi, fig. 74; Dendy and Row, 1913: 743; ? Hozawa, 1929: 292, fig. 6; Topsent, 1934: 9; Tanita, 1943: 396.

Description: Sponge tubular, substipitate; surface minutely papillate; vent small, apical; texture soft; colour, in spirit, yellowish-white; tubar skeleton of triradiates, endosomal skeleton of quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·05 to 0·16 by 0·005 to 0·008 mm. (subendosomal triradiates exactly similar to tubar triradiates: *vide* Hozawa *l.c.*), endosomal quadriradiates, sagittal, paired rays 0·2 by 0·005 mm., basal ray 0·3 by 0·005 mm., apical ray 0·1 by 0·005 mm.

Distribution: Adriatic; Japan (Kagoshima Bay); 100 m.

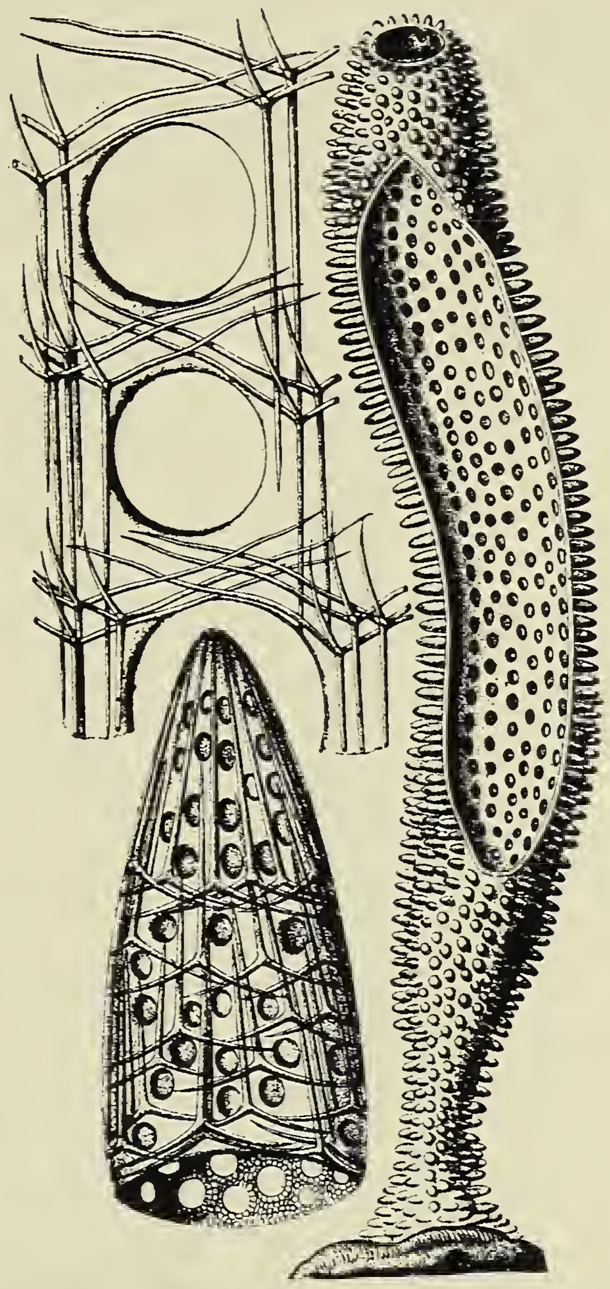
Named form: **Megapogon cruciferus** (Poléjaeff)

Leuconia crucifera Poléjaeff, 1883: 60, pl. vii, fig. 5; *Megapogon cruciferus*, Jenkin, 1908: 36, pl. xxxvi, fig. 114; Dendy and Row, 1913: 768.

Description: Shape (?); surface hispid; vent (?); texture (?); colour, in spirit, dirty white; ectosomal skeleton a tangential layer of triradiates, with oxea and trichoxea projecting from surface; skeleton of chamber layer of centrifugally-directed basal rays of subendosomal sagittal quadriradiates, together with scattered triradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·2 by 0·018 mm., basal rays 0·3 by 0·018 mm.,
oxea, 3·0 by 0·1 mm.,
trichoxea, 0·8 by 0·0025 mm.,
triradiates of chamber layer, similar to ectosomal triradiates, often with incipient apical ray, up to 0·1 mm. long,
endosomal quadriradiates, sagittal, paired rays 0·2 by 0·015 mm., basal rays 0·25 by 0·015 mm., apical rays up to 0·2 by 0·015 mm.

Distribution: Azores; 823 m.



Text-fig. 215. *Sycetta conifera* after Haeckel: (left) endosomal quadriradiates *in situ*, ×100; a radial tube, ×100; (right) external form, holotype (?), ×5.

Named form: **Leucandra cumberlandensis** Lambe

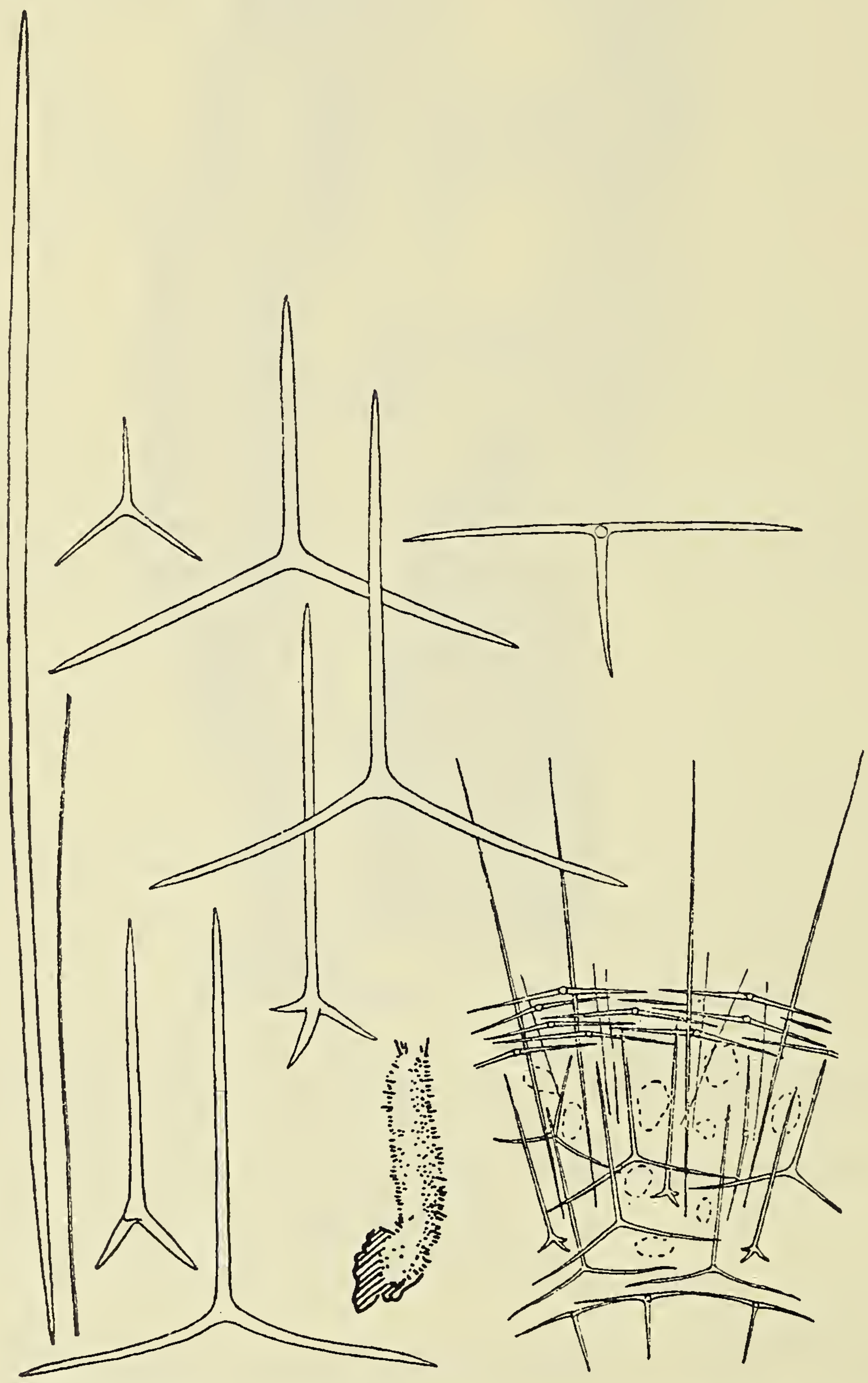
(text-fig. 216)

Leucandra cumberlandensis Lambe, 1900: 34, pl. v, fig. 12; Lambe, 1900: 167; Dendy and Row, 1913: 770; Breitfuss, 1932: 249.

Description: Sponge solitary, tubular, sessile; surface hispid; vent terminal, with well-developed fringe; texture firm; colour, in spirit (?); ectosomal skeleton of several tangential layers of triradiates, with oxea and trichoxea projecting at right angles to surface; skeleton of chamber layer of triradiates and quadriradiates, with basal rays directed more or less centrifugally, and centrifugally-directed basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, regular or slightly sagittal, of two sizes, larger having rays 0·24 by 0·013 mm., and smaller with rays 0·089 by 0·006 mm.,
oxea, 1·2 by 0·019 mm.,
trichoxea, 0·65 by 0·002 mm.,
triradiates of chamber layer, sagittal, paired rays 0·25 by 0·013 mm., basal rays 0·37 by 0·013 mm.,
quadriradiates of chamber layer, sagittal, paired rays 0·05 by 0·009 mm., basal rays 0·36 by 0·009 mm., apical rays 0·035 by 0·009 mm.,
subendosomal sagittal triradiates, paired rays 0·2 by 0·01 mm., basal rays 0·37 by 0·01 mm.,
endosomal quadriradiates, facial rays 0·19 by 0·006 mm., apical rays 0·137 by 0·006 mm.

Distribution: Arctic (Davis Strait); 10–130 m.



Text-fig. 216. *Leucandra cumberlandensis* after Lambe: spicules, $\times 100$; section at right angles to surface, $\times 50$; external form, $\times \frac{5}{3}$. Spicules: two ectosomal triradiates (top left), triradiate of chamber layer (top centre), and endosomal quadriradiate (top right); below these are two quadriradiates with shortened rays, from the chamber layer, and a subendosomal sagittal triradiate; and (left) an oxeote and a trichoxeote.

Named form: **Grantia cupula** (Haeckel)

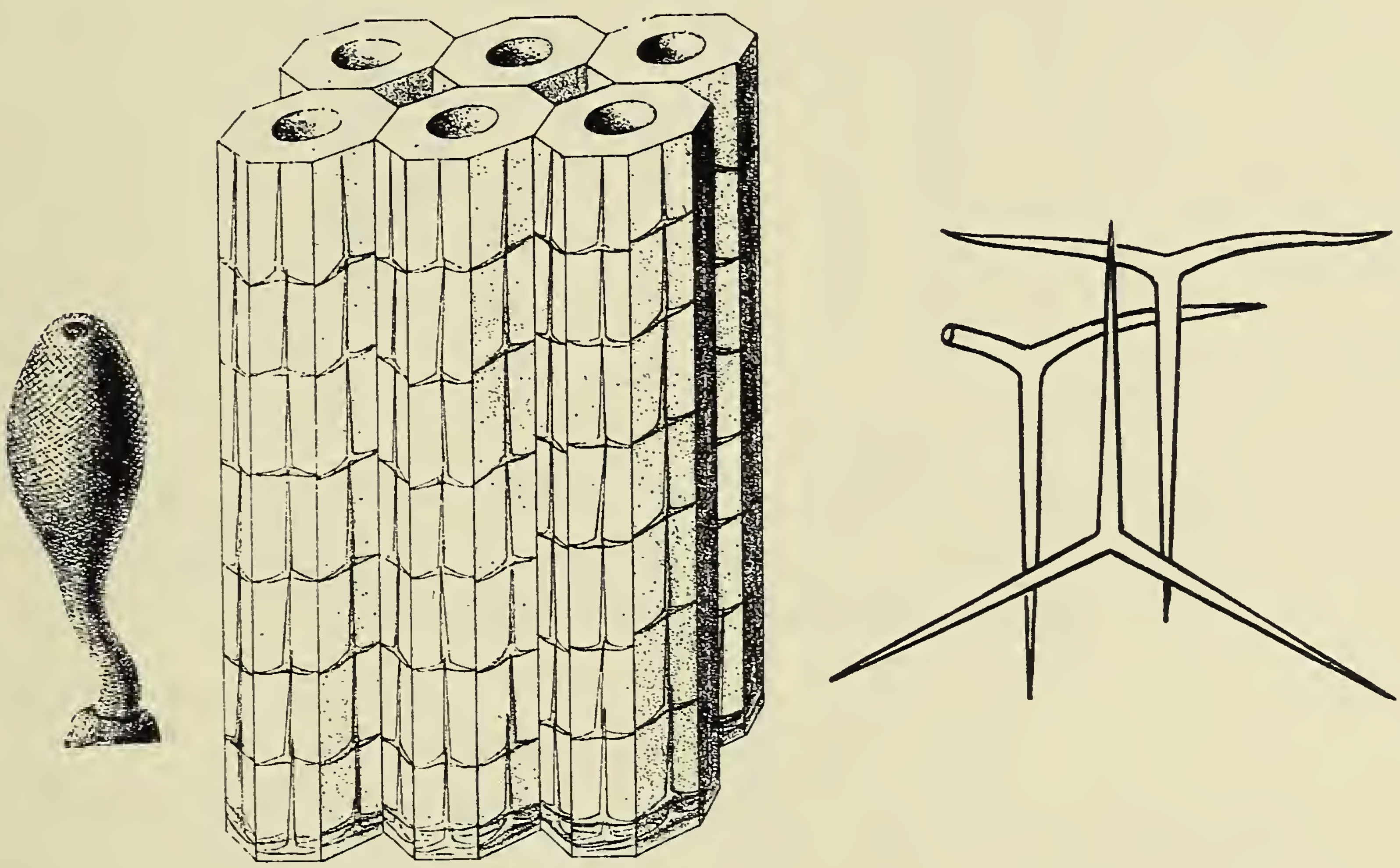
(text-fig. 217)

Sycetta cupula Haeckel, 1872: 243, pl. xlii, figs. 9–12; *Sycurus cupula* Haeckel, 1872: 244, pl. xlii, fig. 9; *Grantia cupula*, Dendy and Row, 1913: 761; Hozawa, 1929: 334; Tanita, 1943: 429.

Description: Sponge ovate, stipitate; surface even, non-hispid; vent apical, naked; texture (?); colour, in spirit, brown; ectosomal skeleton a tangential layer of triradiates; tubar skeleton of basal rays of subendosomal sagittal triradiates and several rows of tubar triradiates; endosomal skeleton a tangential layer of triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·16 to 0·2 by 0·02 mm., basal ray 0·24 to 0·3 by 0·02 mm.,
tubar triradiates, sagittal, paired rays 0·05 to 0·06 by 0·007 to 0·008 mm., basal ray 0·1 to 0·12 by 0·007 to 0·008 mm.,
subendosomal sagittal triradiates indistinguishable from tubar triradiates,
endosomal triradiates, regular, rays 0·2 to 0·3 by 0·02 mm.

Distribution: Japan.



Text-fig. 217. *Grantia cupula* after Haeckel: spicules, ×100; radial chambers represented diagrammatically (Haeckel gives the magnification ×100, which is clearly incorrect); external form, ×4.

Named form: **Leuconia cylindrica** (Fristedt)

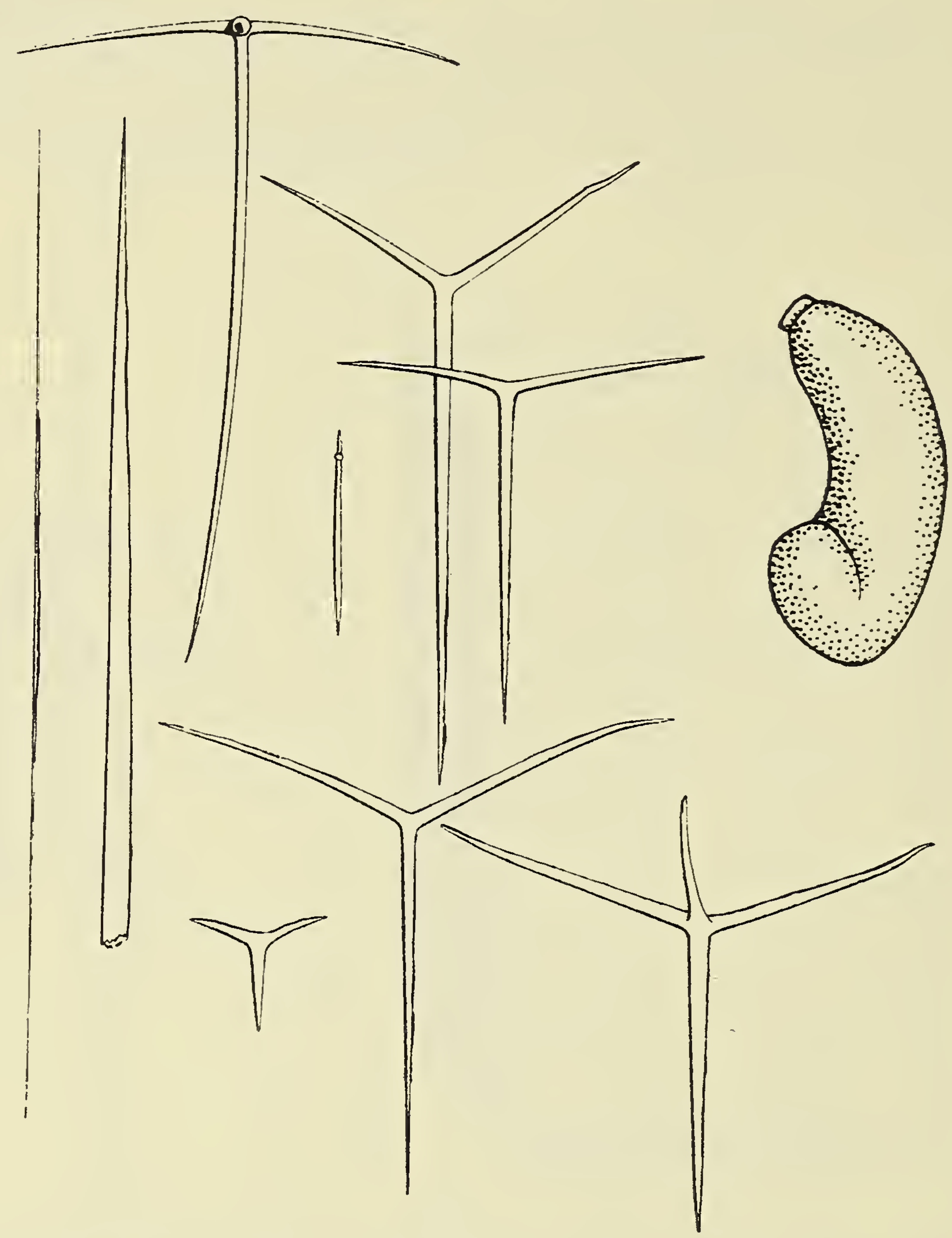
(text-fig. 218)

Leucandra cylindrica Fristedt, 1887: 408, pl. xxii, figs. 14–22, pl. xxvi, fig. 3; *Leuconia cylindrica*, Breitfuss, 1898: 29; *Leucandra cylindrica*, Dendy and Row, 1913: 772.

Description: Sponge tubular, sessile; surface even, usually only slightly hispid; vent apical, fringed; texture (?); colour, alive, grey; ectosomal skeleton a tangential layer of triradiates, with oxea projecting at surface; skeleton of chamber layer of scattered quadriradiates (and triradiates?); endosomal skeleton a tangential layer of quadriradiates, with microxea.

Spicules: ectosomal triradiates, subregular, rays 0·2 to 0·3 mm., long,
oxea, 2·0 mm. long,
quadriradiates of chamber layer, similar to ectosomal triradiates, with apical ray 0·1 to 0·2 mm. long
(triradiates of chamber layer similar to dermal triradiates?),
endosomal quadriradiates, subregular, facial rays 0·2 mm. long, apical ray 0·7 mm long,
microxea, 0·09 mm. long.

Distribution: Arctic (Pitlekai); 22 m.



Text-fig. 218. *Leucandra cylindrica* after Fristedt: spicules, ×100; external form, natural size.

Named form: **Sycon cylindricum** Tanita

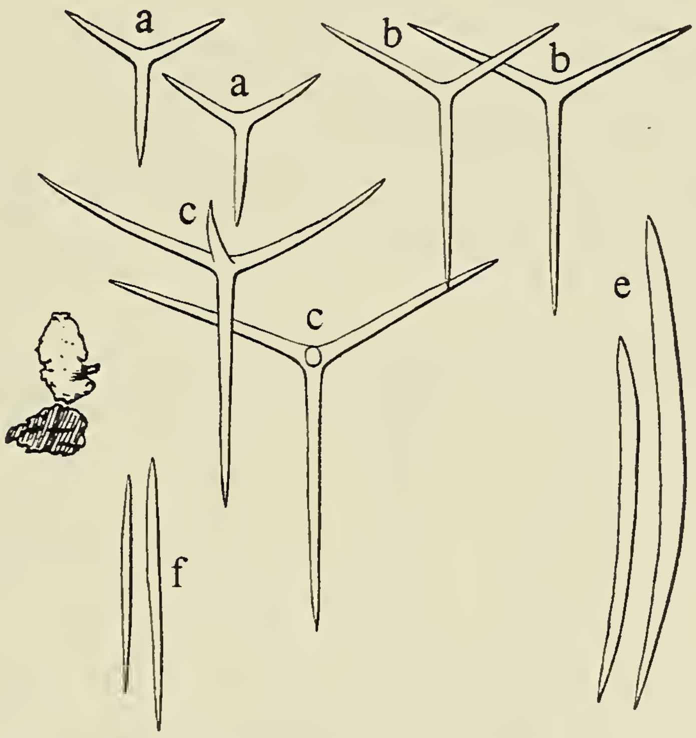
(text-fig. 219)

Sycon cylindricum Tanita, 1942: 30, pl. ii, fig. 7, text-fig. 4; Tanita, 1943: 399, pl. xiii, fig. 30.

Description: Sponge tubular; surface rough; vent apical, slightly fringed; texture firm, elastic; colour, in spirit, yellowish-white; tubar skeleton of basal rays of subendosomal triradiates and several rows of tubar triradiates, with distal ends of chambers ornamented with oxea of two sizes; endosomal skeleton of triradiates with some quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·065 to 0·08 by 0·008 to 0·01 mm., basal ray 0·09 to 0·115 by 0·008 to 0·01 mm.,
oxea, 0·32 to 0·55 by 0·017 to 0·025 mm.,
oxea, 0·17 to 0·25 by 0·005 to 0·01 mm.,
subendosomal sagittal triradiates similar to tubar triradiates,
endosomal triradiates, sagittal, paired rays 0·13 to 0·18 by 0·007 to 0·01 mm., basal ray 0·18 to 0·23 by 0·007 to 0·01 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·06 to 0·12 by 0·008 to 0·01 mm.

Distribution: Japan (Shimoda, Mie); littoral.



Text-fig. 219. *Sycon cylindricum* after Tanita: spicules, × 100; external form, natural size,
Spicules: a. tubar triradiates; b. endosomal triradiates; c. endosomal quadriradiates; e and f. oxea.

Named form: **Sycon digitiformis** Hozawa

Sycon digitiformis Hozawa, 1929: 307, pl. xv, figs. 22, 23, text-fig. 12; Tanita, 1943: 399.

Description: Sponge cylindrical, compressed laterally, surface granular, slightly hispid; vent elliptical, naked; texture soft, delicate; colour, in spirit, greyish-white; tubar skeleton of centripetally-directed basal rays of subendosomal quadriradiates and several rows of triradiates; endosomal skeleton of paired and apical rays of quadriradiates, with a single layer of triradiates and quadriradiates with apical rays projecting into cloacal cavity.

Spicules: tubar triradiates, sagittal, paired rays 0·11 to 0·14 by 0·008 to 0·01 mm., basal ray 0·13 to 0·2 by 0·008 to 0·01 mm.,
oxea, 0·2 to 0·5 by 0·006 to 0·012 mm.,
subendosomal quadriradiates, sagittal, paired rays 0·06 to 0·12 by 0·008 mm., basal ray 0·22 to 0·03 by 0·01 mm., apical ray 0·03 to 0·05 by 0·006 mm.,
endosomal triradiates, sagittal, paired rays 0·25 by 0·012 mm., basal ray 0·37 by 0·01 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·13 mm. long.

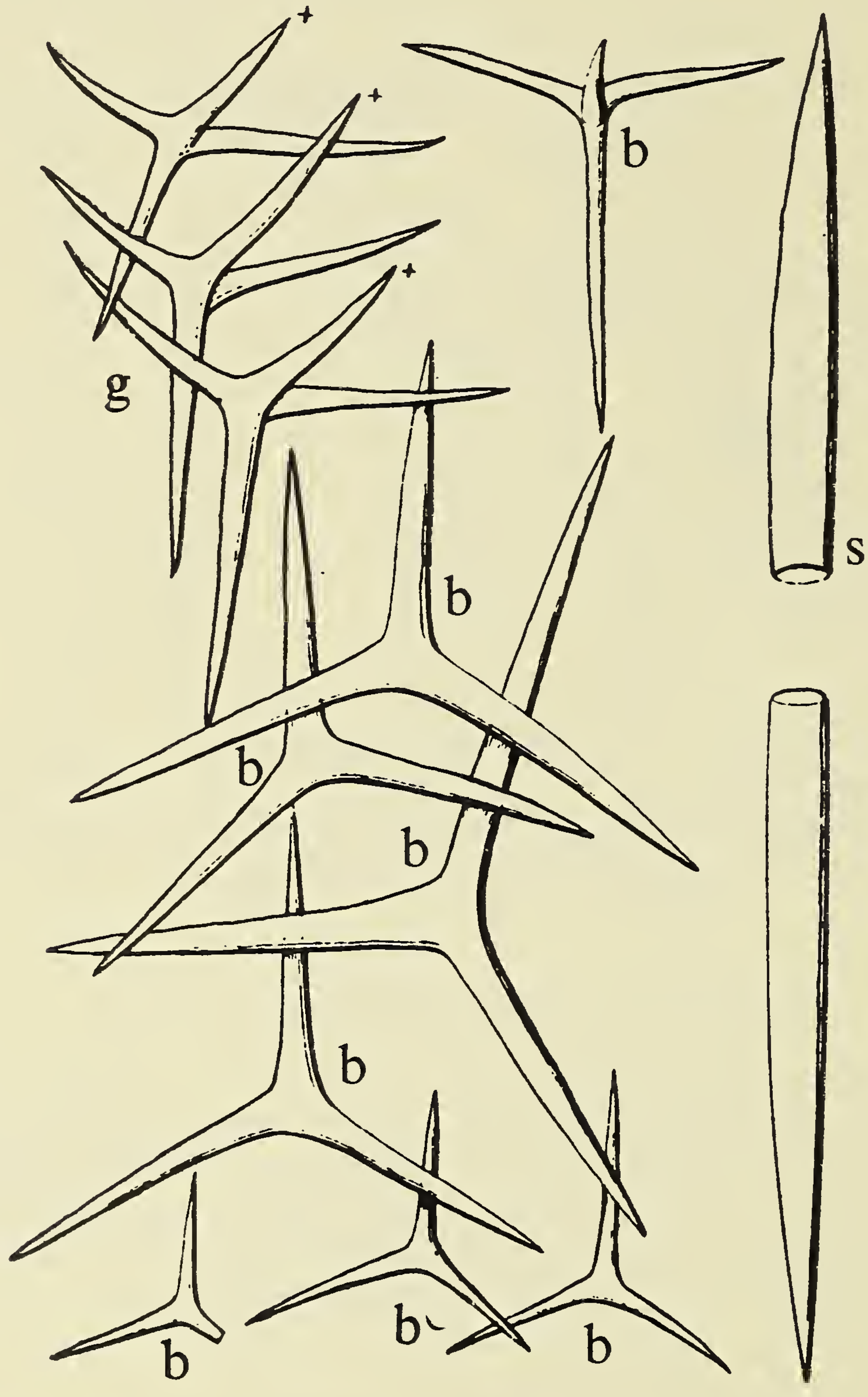
Distribution: Japan (Sagami Sea); 357 mm.

Named form: **Leucandra echinata** Schuffner

(text-fig. 220)

Leucandra echinata Schuffner, 1887: 411, pl. xxiv, fig. 4.

Description: Sponge ovoid, solitary, sessile; surface hispid; vent terminal, with well-developed fringe; texture (?); colour, in spirit, greyish-brown; ectosomal skeleton a tangential layer of triradiates, with occasional quadriradiates and large oxea projecting at right angles to surface; skeleton of chamber layer of triradiates irregularly scattered; endosomal skeleton of quadriradiates, with apical rays projecting into cloacal cavity.



Text-fig. 220. *Leucandra echinata* after Schuffner: spicules, × 100. [The lettering of the figures and the explanation of these given by Schuffner do not agree. Endosomal quadriradiates are marked g; an oxeote is marked s.; the group of large triradiates (centre) marked b are from the chamber layer, and presumably the three triradiates (bottom: marked b also) are ectosomal. There is no explanation for the quadriradiate (top centre), which is also marked b.]

Spicules: ectosomal triradiates, occasionally quadriradiates, sagittal, paired rays 0·16 by 0·016 to 0·024 mm., basal rays 0·19 by 0·016 to 0·024 mm.,
oxea, 1·0 to 2·0 by 0·05 to 0·08 mm.,
triradiates of chamber layer, sagittal, paired rays 0·4 by 0·04 mm., basal rays 0·22 to 0·35 by 0·04 mm.,
endosomal quadriradiates, subregular, facial rays 0·11 by 0·018 mm., apical rays 0·04 to 0·09 mm. long.

Distribution: Mauritius.

Remarks: The *Leucandra echinata* of Schuffner has nothing to do with *Leuconia echinata* of Carter, or the *Leucandra echinata* of Ridley and of Dendy, which are discussed under *Leucandra echinata* as a synonym of *Leuconia barbata* (see p. 248).

Named form: **Leuconia egedii** (Schmidt)

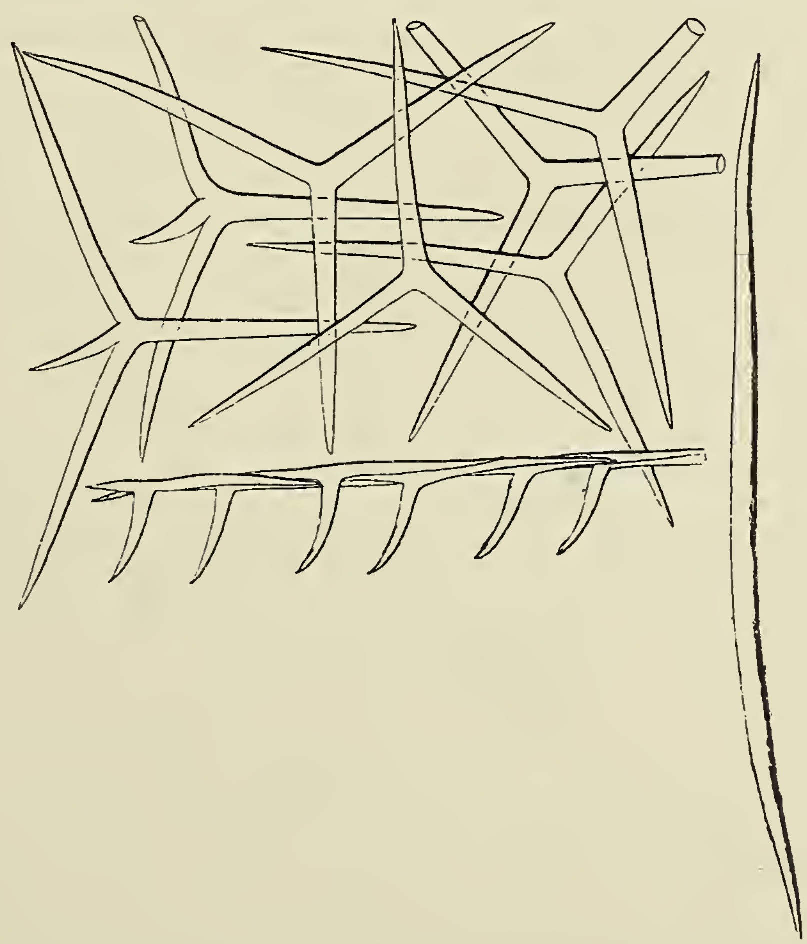
(text-fig. 221)

Sycinula egedii Schmidt, 1870: 74; Haeckel, 1870: 242; *Leucandra egedii*, Haeckel, 1872: 173, pl. xxxii, fig. 1; *Dyssycus egedii*, Haeckel, 1872: 173; *Dyssycarium egedii*, Haeckel, 1872: 173; *Leuconia egedii*, Breitfuss, 1898: 30; Breitfuss, 1898: 305; Breitfuss, 1911: 213; *Leucandra egedii*, Dendy and Row, 1913: 770.

Description: Sponge tubular, sessile; surface even, hispid; vent apical, fringed; texture (?); colour, in spirit, greyish-brown; ectosomal skeleton a tangential layer of triradiates (?); skeleton of chamber layer of irregularly-arranged triradiates and of radial oxea; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates (?),
oxea, 0·5 to 0·8 by 0·02 to 0·03 mm.,
triradiates of chamber layer, regular, rays 0·2 to 0·3 by 0·015 to 0·02 mm.,
endosomal quadriradiates, sagittal, paired rays 0·2 by 0·02 mm., basal ray 0·3 by 0·02 mm., apical ray 0·05 to 0·15 by 0·02 mm.

Distribution: Arctic (Greenland, Murmansk, Kola Fiord); 2,195 m.



Text-fig. 221. *Leucandra egedii* after Haeckel: spicules, × 100.

Named form: **Sycon eglintonensis** Lambe

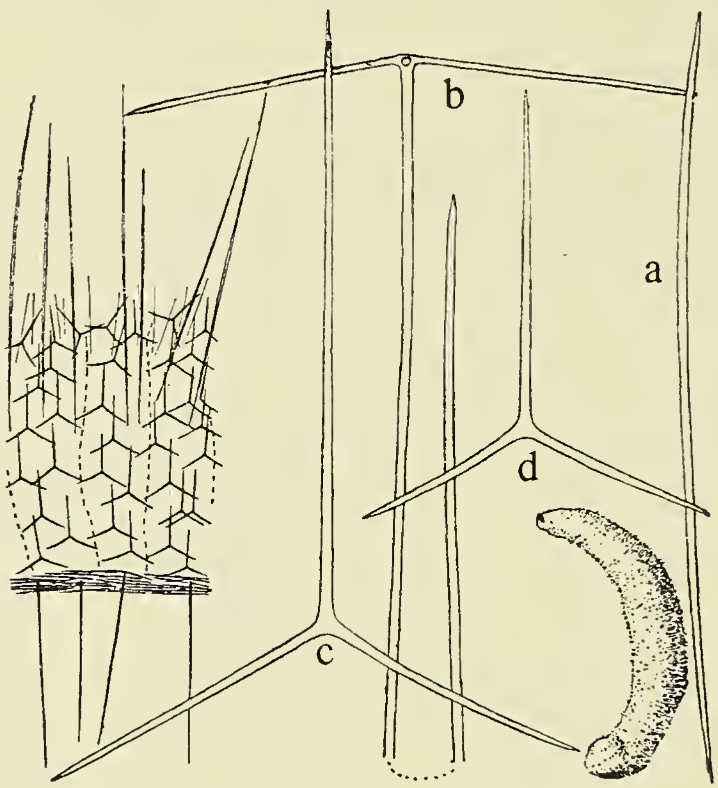
(text-fig. 222)

Sycon eglintonensis Lambe, 1900: 29, pl. ii, fig. 6; Lambe, 1900: 166; Dendy and Row, 1913: 745; Breitfuss, 1932: 244.

Description: Sponge solitary, tubular, sessile; surface hispid; vent terminal, naked; texture firm; colour, in spirit (?); tubar skeleton of centripetally-directed rays of subendosomal triradiates, with several rows of triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and tufts of oxea; endosomal skeleton of paired rays of subendosomal triradiates and several layers of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: triradiates of chambers, sagittal, paired rays 0·117 by 0·006 mm., basal rays 0·19 by 0·006 mm.,
oxea, 0·85 by 0·013 mm.,
trichoxea, 0·196 by 0·002 mm.,
subendosomal triradiates, sagittal, of about same size as triradiates of chamber layer,
endosomal triradiates, sagittal, paired rays 0·176 by 0·006 mm., basal rays 0·35 by 0·006 mm.,
endosomal quadriradiates, regular, facial rays 0·17 by 0·005 mm., apical rays 0·75 by 0·006 mm.

Distribution: Arctic (Davis Strait); 27·5 m.



Text-fig. 222. *Sycon eglintonensis* after Lambe: spicules, ×120; section at right angles to surface, ×30; external form, natural size. Spicules: b. endosomal quadriradiate; c. endosomal triradiate; d. tubar triradiate; a. oxeote.

Named form: **Sycon elegans** (Bowerbank)

Dunstervillia elegans Bowerbank, 1845: 297, pl. xvii; Bronn, 1859: pl. ii, fig. 2; *Grantia tessellata* Bowerbank, 1864: 29, pl. iv, fig. 86, pl. xvii, fig. 286; *Dunstervillia tessellata*, Gray, 1867: 557; *D. elegans*, Haeckel, 1870: 239; *Sycum tessellatum*, Haeckel, 1870: 239; *Sycandra elegans*, Haeckel, 1872: 338, pl. liv, fig. 3, pl. lviii, fig. 3; *Sycurus elegans*, Haeckel, 1872: 338; *Sycarium elegans*, Haeckel, 1872: 339; *Sycandra dunstervillia*, Haeckel, 1872: 339; *S. tessellata*, Haeckel, 1872: 339; *Grantia tessellata* Bowerbank, 1874: 5, pl. ii, figs. 21–27; *Sycandra elegans*, Keller, 1876: 19, pl. i; Vosmaer, 1881: 5; *Grantia tessellata* Bowerbank, 1882: 231; *Sycon elegans*, Poléjaeff, 1883: 24; *Sycandra elegans*, Lackschewitsch, 1886: 340; 1886: 303; Lendenfeld, 1891: 267, pl. xi, fig. 61; Cotte, 1903: 422; *Sycons elegans*, Dendy and Row, 1913: 749; Ferrer, 1916: 6; Ferrer, 1918: 11; Ferrer, 1923: 161; Topsent, 1934: 9; Tanita, 1942: 112, pl. vi, fig. 6.

Description: Sponge ovate to cylindrical, sessile or stipitate; surface reticulate, minutely hispid; vent apical, fringed; texture soft; colour, in spirit, white, grey or dark yellow; tubar skeleton of triradiates with subendosomal sagittal triradiates, and distal cones ornamented with oxea and thickened triradiates; endosomal skeleton of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal paired rays 0·08 by 0·01 mm., basal ray 0·12 by 0·01 mm.,
oxea, 0·2 to 0·25 by 0·003 to 0·02 mm.,
thickened triradiates of distal cones, paired rays 0·05 to 0·09 by 0·025 to 0·035 mm., basal ray 0·2 to 0·4 by 0·025 to 0·035 mm.,
subendosomal sagittal triradiates, paired rays 0·08 to 0·1 by 0·01 mm., basal ray 0·1 to 0·12 by 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·12 by 0·008 mm., basal ray 0·08 by 0·008 mm.,
endosomal quadriradiates, similar to endosomal triradiates, with apical ray 0·12 to 0·16 by 0·012 to 0·016 mm.

Distribution: Channel Islands; France; Portugal; Mediterranean; Canaries; South Africa; Antilles; littoral to 24 m., on fragments of shells.

Named form: **Leuconia fistulosa** (Johnston)

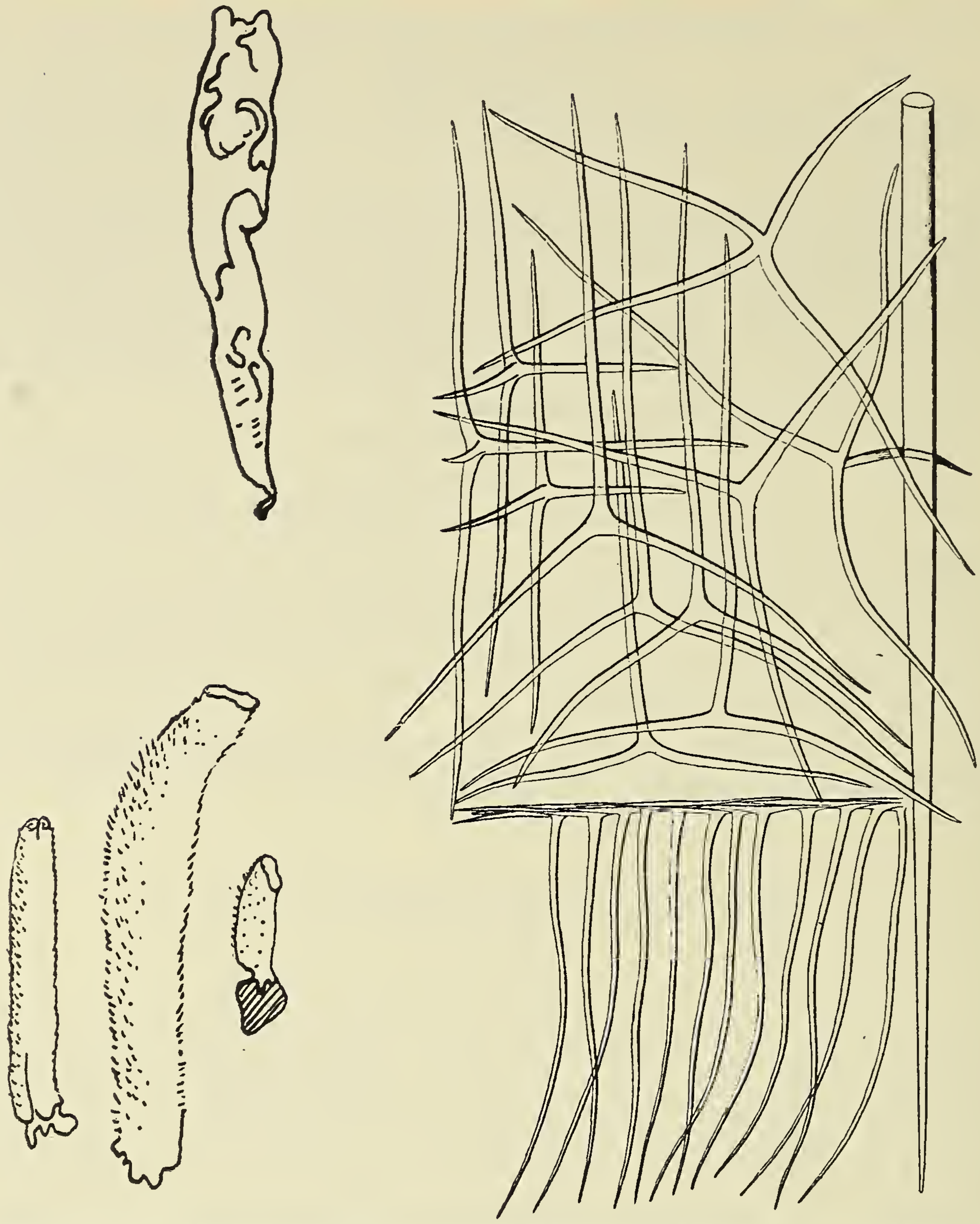
(text-fig. 223)

Grantia fistulosa Johnston, 1842: 181, pl. xx, fig. 7; *Leuconia fistulosa*, McAndrew, 1861: 236; Bowerbank, 1866: 39; Gray, 1867: 556; Wright, 1869: 223; *Dyssycum fistulosum*, Haeckel, 1870: 241; *Leucandra fistulosa*, Haeckel, 1872: 197, pl. xxxi, fig. 4, pl. xl, fig. 10; *Dyssycus fistulosus*, Haeckel, 1872: 198; *Leuconia fistulosa*, Bowerbank, 1874: 12, pl. v, figs. 9–16; Bowerbank, 1882: 26, 228; *Leucandra fistulosa*, Hanitsch, 1894: 182; Topsent, 1894: 7; *Leuconia fistulosa*, Breitfuss, 1897: 224; Breitfuss, 1898: 97; *Leucandra fistulosa*, Arnesen, 1901: 27; Rousseau, 1903: 12; Crawshay, 1912: 305; Dendy and Row, 1913: 770; Breitfuss, 1927: 30; Breitfuss, 1929: 265; *Leuconia fistulosa*, Allen, 1931: 60; Burton, 1932: 167; Arndt, 1935: 18, fig. 24; Moore, 1937: 33; *Vosmaeropsis griseus* Tanita, 1939: 319, text-figs. 1–2.

Description: Sponge tubular, sessile; surface villose, hispid; vent apical, naked or slightly fringed; texture soft; colour, alive and in spirit, white to brownish-grey; ectosomal skeleton a tangential layer of triradiates, with oxea projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·2 to 0·32 by 0·01 to 0·015 mm., basal ray 0·15 to 0·3 by 0·01 to 0·015 mm.,
oxea, 2·0 to 5·0 by 0·02 to 0·03 mm.,
triradiates of chamber layer, sagittal, paired rays 0·25 to 0·32 by 0·012 to 0·015 mm., basal ray 0·4 to 0·5 by 0·012 to 0·015 mm.,
subendosomal sagittal triradiates (?),
endosomal quadriradiates, sagittal, paired rays 0·25 to 0·37 by 0·005 to 0·01 mm.; basal ray 0·2 to 0·26 by 0·005 to 0·01 mm., apical ray 0·35 to 0·45 by 0·004 to 0·006 mm.

Distribution: Norway; British Isles; France; Portugal; Japan; littoral to 183 m., on rocks and on *Fucus*.



Text-fig. 223. *Leucandra fistulosa*: spicules (after Haeckel), × 100; external form, natural size.
The outline (top left) is from Johnston's original drawing of the type, a dried and pressed specimen in which the surface characters have been obliterated. The three specimens beneath it are from Bowerbank (1874).

Named form: **Sycon formosum** (Haeckel)

Dunstervillia formosa Haeckel, 1870: 240; *Sycandra formosa* Haeckel, 1872: 339; *Sycon formosum*, Dendy and Row, 1913: 746.

Remarks: Haeckel leaves us in doubt about its characters except that it differs from *Sycon elegans* in that (1) the apical rays of the gastral quadriradiates are swollen distally; and (2) the ectosomal oxea are mainly 'Kolben'.

Distribution: West Indies.

Named form: **Grantia glabra** Hozawa

Grantia glabra Hozawa, 1933: 9, pl. i, fig. 5; text-fig. 2; Tanita, 1943: 429.

Description: Sponge tubular, laterally compressed; surface even, smooth; margin of vent feebly-developed; texture rigid; colour, in spirit, greyish-white; ectosomal skeleton of several layers of tangential triradiates; tubar skeleton of triradiates and centripetal rays of subendosomal sagittal quadriradiates; endosomal skeleton of quadriradiates, with apical ray projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·11 to 0·17 by 0·014 to 0·02 mm., basal ray 0·07 to 0·15 by 0·014 to 0·02 mm.,
tubar triradiates, sagittal, paired rays 0·12 by 0·012 mm., basal ray 0·17 by 0·012 mm.,
subendosomal quadriradiates, sagittal, paired rays 0·07 by 0·01 mm., basal ray 0·21 by 0·01 mm., apical ray 0·03 by 0·006 mm.,
endosomal quadriradiates, sagittal, paired rays 0·12 by 0·01 mm., basal ray 0·25 by 0·008 mm., apical ray 0·15 by 0·008 mm.

Distribution: Japan (Ugo, Iwaki); 150–161 m.

Remarks: This species bears a very close resemblance to *Sycon calcar-avis* Hozawa, also from Japan. The main differences are the presence of a grantioid ectosomal skeleton and the absence of oxea. A result of these two factors is to give the sponges representing the holotypes of the two species very different appearances. Fundamentally, however, they have the same form. Another difference is that the characteristic, spur-like apical rays, which give *S. calcar-avis* its name, are present on the tubar radiates in that species and on the subendosomal spicules in *Grantia glabra*.

Named form: **Sycon globulatum** (Hozawa)

(text-fig. 224)

Sycon globulatum Hozawa, 1929: 312, pl. xv, figs. 26, 27, text-fig. 14; Tanita, 1943: 400.

Description: Sponge solitary, oval, narrowing towards base; surface hispid; vent velate or subvelate, without margin; texture firm, elastic; colour, in spirit, brownish; tubar skeleton of centripetally-directed rays of subendosomal triradiates and several rows of triradiates; distal ends of chambers ornamented by basal rays of outermost triradiates with tufts of oxea; endosomal skeleton of paired rays of subendosomal triradiates and several layers of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·08 to 0·12 by 0·008 to 0·012 mm., basal ray 0·1 to 0·16 by 0·008 to 0·012 mm.,
oxea, slightly curved, 0·46 to 0·7 by 0·01 to 0·028 mm.,
subendosomal triradiates, sagittal, paired rays 0·07 to 0·1 by 0·008 to 0·012 mm., basal ray 0·09 to 0·12 by 0·004 to 0·008 mm.,
endosomal triradiates, sagittal, paired rays 0·07 to 0·1 by 0·008 to 0·012 mm., basal ray 0·1 to 0·12 by 0·008 to 0·012 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·05 to 0·07 by 0·01 mm.

Distribution: Japan (Ôsumi).

Text-fig. 224. *Sycon globulatum* after Hozawa: external form, natural size.

Named form: **Sycon grantioides** Dendy

Sycon grantioides Dendy, 1914; 79, pl. i, fig. 1; Burton and Srinivasa Rao, 1932: 304, pl. xviii, fig. 2.

Description: Sponge tubular; surface papillate, hispid; vent apical, with feebly-developed collar; texture soft; colour, in spirit, white; tubar skeleton of a few rows of triradiates, with distal ends of chambers ornamented with tufts of oxea; endosomal skeleton a tangential layer of triradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·12 by 0·005 mm., basal ray 0·2 by 0·005 mm.,
oxea, up to 1·7 by 0·025 mm.,
endosomal triradiates, sagittal, paired rays 0·2 by 0·01 mm., basal ray 0·4 by 0·01 mm.

Distribution: Indian Ocean (Okhamandal, Ceylon).

Remarks: The statement (see Burton and Srinivasa Rao) that the rays of the endosomal triradiates project into the central cloaca is not correct.

Named form: **Leuconia heathi** (Urban)

Leucandra heathi Urban, 1905: 59, pl. viii, figs. 108–117, pl. ix, figs. 118–160; Dendy and Row, 1913: 772; *Leuconia heathi*, de Laubenfels, 1932: 12, fig. 5.

Description: Sponge cylindrical to subspherical; surface strongly hispid; vent apical, fringed; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea of two sizes and microxea projecting from surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·1 to 0·17 by 0·01 to 0·011 mm., basal ray 0·031 to 0·168 by 0·01 to 0·011 mm.,
oxea, up to 5·0 by 0·03 to 0·15 mm.,
microxea, 0·04 to 0·1 by 0·002 to 0·005 mm.,
subectosomal triradiates, sagittal, paired rays 0·1 to 0·15 by 0·012 to 0·02 mm., basal ray 0·092 to 0·118 by 0·012 to 0·02 mm.,
triradiates, of chamber layer, sagittal, paired rays 0·15 to 0·2 mm. long, basal ray 0·11 to 0·21 mm. long,
endosomal triradiates, sagittal, paired rays 0·14 to 0·29 by 0·008 to 0·011 mm., basal ray 0·2 to 0·36 by 0·08 to 0·011 mm.

Distribution: California; littoral to 78 m.

Named form: **Sycon helleri** (Lendenfeld)

Sycandra helleri Lendenfeld, 1891: 269, pl. xi, fig. 70, pl. xiii, figs. 103–108; *Sycon helleri*, Dendy and Row, 1913: 746; Topsent, 1934: 9.

Description: Sponge ovate, sessile; surface minutely papillose and hispid; vent apical, naked or fringed; texture firm; colour, in spirit, yellowish-white; tubar skeleton of triradiates, with subendosomal sagittal triradiates and distal cones ornamented with oxea; endosomal skeleton of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·048 to 0·056 by 0·008 to 0·01 mm., basal ray 0·05 to 0·12 by 0·008 to 0·01 mm.,
oxea, 1·12 by 0·056 mm.,
subendosomal sagittal triradiates, paired rays 0·07 by 0·008 mm., basal ray 0·15 by 0·008 mm.,
endosomal triradiates, subregular rays 0·1 to 0·12 by 0·008 mm.,
endosomal quadriradiates, similar to subendosomal triradiates, with apical rays 0·02 by 0·008 mm.

Distribution: Mediterranean (Lesina).

Named form: **Vosmaeropsis hispanica** Ferrer

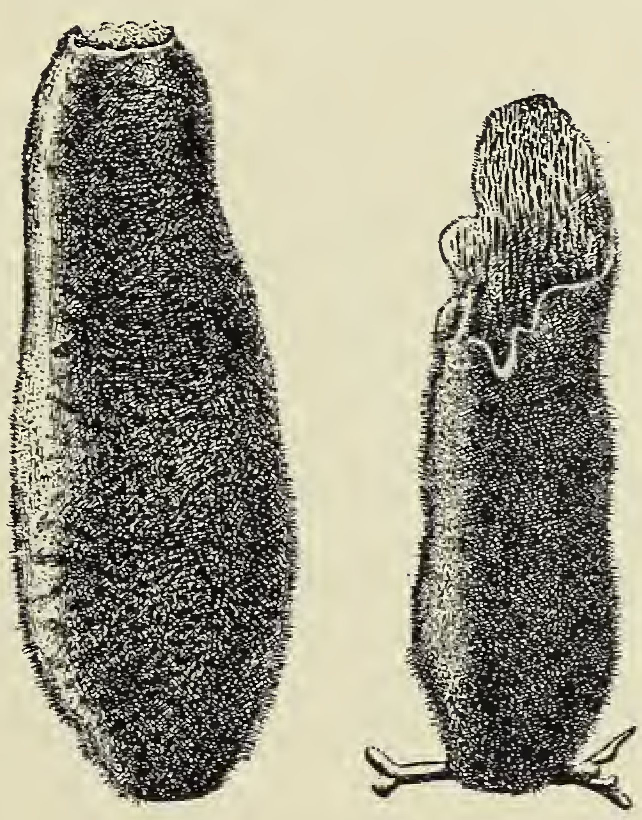
(text-fig. 225)

Vosmaeropsis hispanica Ferrer, 1933: 353, pl. xxiv, figs. 1–2, text-fig. 4.

Description: Sponge sacciform, sessile; surface even, hispid; vent apical, naked; texture (?); colour (?); ectosomal skeleton of several tangential layers of triradiates, with, usually, one ray directed towards exterior, oxea, of two sizes, projecting at surface, and paired rays of subectosomal pseudosagittal triradiates; skeleton of chamber layer of basal rays of subectosomal pseudosagittal triradiates and subendosomal sagittal quadriradiates and of triradiates, rarely quadriradiates, arranged subregularly in choanosome; endosomal skeleton of rays of subendosomal sagittal quadriradiates, several layers of endosomal quadriradiates, and microxea arranged tangentially.

Spicules: ectosomal triradiates, sagittal, paired rays 0·35 to 0·36 by 0·015 mm., basal ray 0·12 by 0·015 mm.,
oxea, 1·6 by 0·024 to 0·028 mm.,
oxea, 1·4 by 0·005 to 0·006 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·21 by 0·015 mm., basal ray 0·32 to 0·36 by 0·015 mm.,
tubar triradiates, subregular, rays 0·39 to 0·6 by 0·012 to 0·018 mm.,
quadriradiates lining canals, paired rays 0·13 to 0·19 by 0·006 mm., basal ray 0·13 by 0·006 mm., apical ray 0·07 to 0·13 by 0·006 mm.,
subendosomal sagittal quadriradiates, paired rays 0·21 by 0·012 mm., basal ray 0·38 by 0·012 mm., apical ray 0·21 by 0·012 mm.,
endosomal quadriradiates, sagittal, paired rays 0·39 by 0·015 mm., basal ray 0·19 by 0·018 mm., apical ray 0·18 by 0·015 mm.,
endosomal quadriradiates, sagittal, paired rays 0·18 to 0·19 by 0·008 to 0·012 mm., basal ray 0·2 by 0·012 mm., apical ray 0·2 by 0·012 mm.,
microxea, 0·01 to 0·39 by 0·006 mm.

Distribution: Mediterranean (Spain, Galicia).



Text-fig. 225. *Vosmaeropsis hispanica* after Ferrer: external form, natural size.

Named form: **Leuconia hispida** Carter

Leuconia hispida Carter, 1886: 128; *Leucandra hispida*, Dendy, 1892: 99; Dendy and Row, 1913: 771.

Description: Sponge tubular, oval or subspherical; surface even, hispid; vent apical, fringed; texture firm; colour, in spirit, whitish-yellow to pale brown; ectosomal skeleton a sparse tangential layer of triradiates, with oxea projecting at surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·13 by 0·01 mm., basal ray 0·24 by 0·01 mm.,
oxea, 0·8 by 0·016 mm.,
triradiates of chamber layer, subregular to sagittal, rays 0·24 to 0·32 by 0·01 to 0·016 mm.,
endosomal quadriradiates, sagittal, paired rays 0·13 by 0·01 mm., basal ray 0·24 by 0·01 mm., apical ray 0·05 by 0·008 mm.

Distribution: Australia (Port Jackson, Port Phillip Heads).

Named form: **Sycon hozawai** Breitfuss

Sycon ciliatum, var. *polaris* Breitfuss, 1898: 19, pl. ii, figs. 13, 17; *S. hozawai* Breitfuss, 1932: 244.

Description: Sponge sac-shaped, compressed; surface hispid; vents large, naked, apical or marginal; texture firm; colour, in spirit, brown; tubar skeleton of rows of triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and tufts of oxea; occasionally microxea occur (?); endosomal skeleton of a tangential layer of triradiates and quadriradiates.

Spicules: (dimensions not given).

Distribution: Arctic.

Named form: **Sycon humboldtii** Risso

(text-fig. 226)

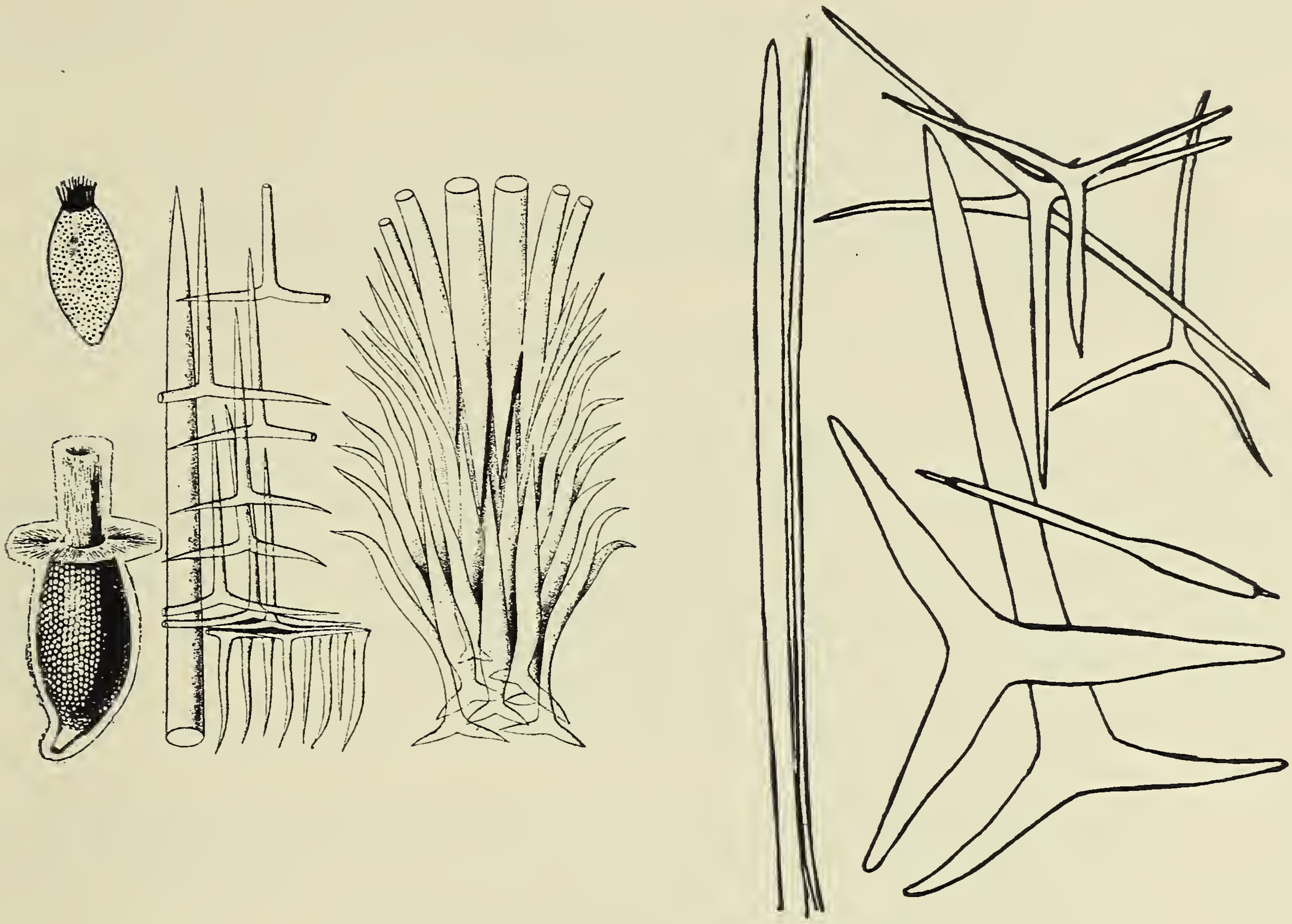
Sycon humboldtii Risso, 1826: 368, pl. x, fig. 61; Lieberkühn, 1859: 381, pl. ix, fig. 4; Schmidt: 1862: 14; *Dunstervillia corcyrensis* Schmidt, 1862: 16, pl. i, fig. 5; *Grantia humboldtii*, Gray, 1867, 554; *Dunstervillia corcyrensis*, Gray, 1867: 558; *Sycum humboldtii*, Haeckel, 1870: 238; *Dunstervillia corcyrensis*, Haeckel, 1870: 240; *D. schmidtii* Haeckel, 1870: 240; *Sycandra tabulata* Haeckel, 1872: 339; *S. humboldtii*, Haeckel, 1872: 344, pl. liv, fig. 2, pl. lx, fig. 12; *Sycarium humboldtii*, Haeckel, 1872: 345; *Sycandra corcyrensis*, Haeckel, 1872: 345; *S. scoparia* Haeckel, 1872: 345; *S. erinaceus* Haeckel, 1872: 345; *Sycon humboldtii*, Marion, 1883: 1–104; *Sycandra humboldtii*, Lackschewitsch, 1886: 341; 1886: 304; Lendenfeld, 1891: 273, pl. xi, fig. 65, pl. xii, fig. 93; *Sycon humboldtii*, Dendy and Row, 1913: 746; Topsent, 1934: 10.

Description: Sponge ovate, sessile; surface minutely papillate, hispid; vent apical, fringed; texture firm; colour, in spirit, grey or brown; tubar skeleton of triradiates, with subendosomal sagittal triradiates, and with distal cones ornamented with oxea and thickened triradiates; endosomal skeleton of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·08 by 0·008 mm., basal ray 0·12 by 0·012 mm.,
oxea, 0·05 to 2·0 by 0·02 to 0·04 mm.,
oxea, 0·2 to 0·4 by 0·005 to 0·02 mm.,
triradiates of distal cones, paired rays 0·03 to 0·06 by 0·01 to 0·015 mm., basal ray 0·15 to 0·25 by 0·02 to 0·03 mm.,

subendosomal sagittal triradiates, paired rays 0·08 to 0·12 by 0·008 mm., basal ray 0·12 by 0·008 to 0·012 mm.,
endosomal triradiates, regular to sagittal, paired rays 0·05 to 0·12 by 0·008 mm., basal ray 0·05 to 0·2 by 0·008 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·1 to 0·12 by 0·008 mm.

Distribution: Mediterranean (Adriatic, Minorca).



Text-fig. 226. *Sycon humboldtii*: external form (top left) as illustrated by Risso, and (bottom left) by Schmidt; spicules (centre) after Haeckel, × 100; and (right) as shown by Lieberkühn (magnification not given), for comparison with Haeckel's figures.

Named form: **Sycon inconspicua** (Lendenfeld)

Sycandra inconspicua Lendenfeld, 1885: 1093; *Sycon inconspicuum*, Dendy and Row, 1913: 746.

Description: Sponge tubular, sessile; surface minutely subpapillate, hispid; vent apical, fringed; texture soft; colour (?); tubar skeleton of triradiates, with subendosomal sagittal triradiates (?) and with distal cones ornamented with oxea; endosomal skeleton of quadriradiates.

Spicules: tubar triradiates, regular, rays 0·12 by 0·007 to 0·008 mm.,
oxea, 0·8 to 1·2 by 0·016 mm.,
subendosomal sagittal triradiates (?),
endosomal quadriradiates, regular, facial rays 0·074 by 0·004 mm., apical ray 0·14 to 0·2 by 0·005 mm.

Distribution: New Zealand.

Named form: **Sycon incrustans** Breitfuss

Sycon incrustans Breitfuss, 1898: 461, pl. xxvii, figs. 5–7; Dendy and Row, 1913: 746.

Description: Sponge low-growing, massive to lobose; surface hispid; vents at summits of lobes; texture firm; colour, alive, pale yellow, in spirit, brown; tubar skeleton of centripetally-directed rays of subendosomal sagittal triradiates and numerous rows of tubar triradiates; distal ends of chambers ornamented with oxea of two sizes and basal rays of outermost triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of endosomal triradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·063 to 0·115 by 0·007 to 0·009 mm., basal rays 0·042 to 0·21 by 0·007 to 0·009 mm.,
oxea, 0·6 to 0·9 by 0·03 to 0·05 mm.,
oxea, 0·3 to 0·7 by 0·006 to 0·01 mm.,
subendosomal sagittal triradiates, paired rays 0·063 to 0·115 by 0·007 to 0·009 mm., basal rays 0·21 by 0·007 to 0·009 mm.,
endosomal triradiates, subregular, rays 0·126 to 0·315 by 0·004 mm.

Distribution: Chile (Tumbes).

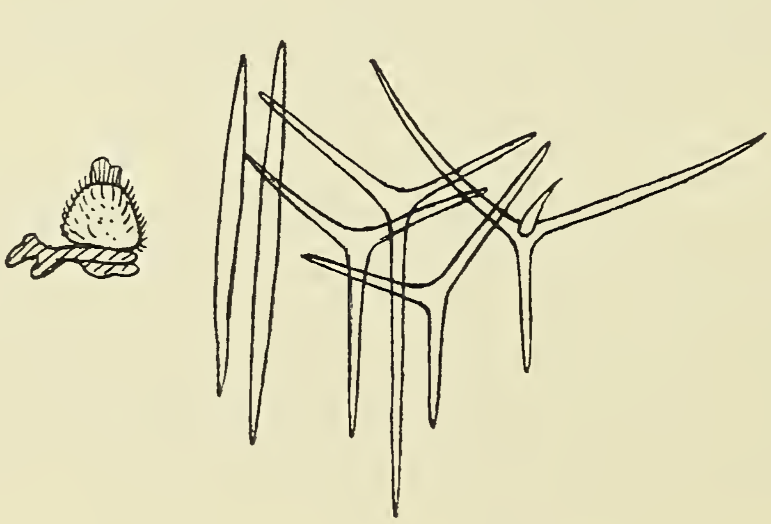
Named form: **Grantia intermedia** Thacker
(text-fig. 227)

Grantia intermedia Thacker, 1908: 770, pl. xl, fig. 5, text-fig. 162; Dendy and Row, 1913: 760.

Description: Sponge solitary, subspherical, sessile; surface strongly hispid; vent apical, with well-developed fringe; texture firm; colour, in spirit, pale brown; ectosomal skeleton of several layers of triradiates, with occasional quadriradiates, with oxea projecting beyond surface; tubar skeleton of centrifugally-directed basal rays of subendosomal sagittal triradiates and tubar triradiates and quadriradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and several tangential layers of quadriradiates, with a few triradiates.

Spicules: ectosomal triradiates, regular to sagittal, rays 0·12 to 0·24 by 0·011 to 0·014 mm.,
ectosomal quadriradiates, similar to triradiates but with apical rays,
oxea, up to 2·0 by 0·06 mm.,
tubar triradiates, sagittal or regular, rays 0·12 to 0·24 by 0·011 to 0·014 mm.,
tubar quadriradiates, similar to triradiates, with apical rays 0·08 to 0·16 by 0·011 to 0·014 mm.,
endosomal quadriradiates, similar to tubar quadriradiates,
endosomal triradiates, similar to tubar triradiates.

Distribution: Cape Verde Islands; 36 m.



Text-fig. 227. *Grantia intermedia* after Thacker: spicules, × 100, except for the two oxea, which are × 20; external form, natural size.

Named form: **Grantia invenusta** Lambe

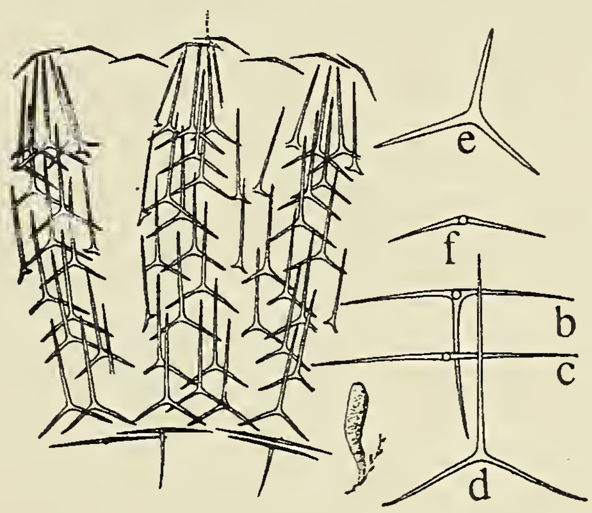
(text-fig. 228)

Grantia invenusta Lambe, 1900: 32, pl. vi, fig. 14; Lambe, 1900: 167; Dendy and Row, 1913: 761; Breitfuss, 1932: 248.

Description: Sponge solitary, tubular, sessile; surface marked by a regular reticulation of low ridges; vent terminal, naked; texture firm; colour, in spirit, (?); ectosomal skeleton a tangential layer of triradiates; tubar skeleton of rows of sagittal triradiates; endosomal skeleton of one or two tangential layers of triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·058 by 0·005 mm., basal rays 0·072 by 0·005 mm.,
tubar triradiates, sagittal, paired rays 0·078 by 0·005 mm., basal rays 0·15 by 0·005 mm.,
endosomal triradiates, regular, rays 0·1 by 0·003 mm.,
endosomal quadriradiates, regular, facial rays 0·085 by 0·003 mm., apical rays 0·098 by 0·005 mm.

Distribution: Arctic (Davis Strait); 110 m.



Text-fig. 228. *Grantia invenusta* after Lambe: spicules, × 100; section at right angles to surface, × 50; external form, about natural size.
Spicules: e, f. ectosomal triradiates; b. endosomal quadriradiate; c. endosomal triradiate; d. tubar triradiate.

Named form: **Vosmaeropsis japonica** Hozawa

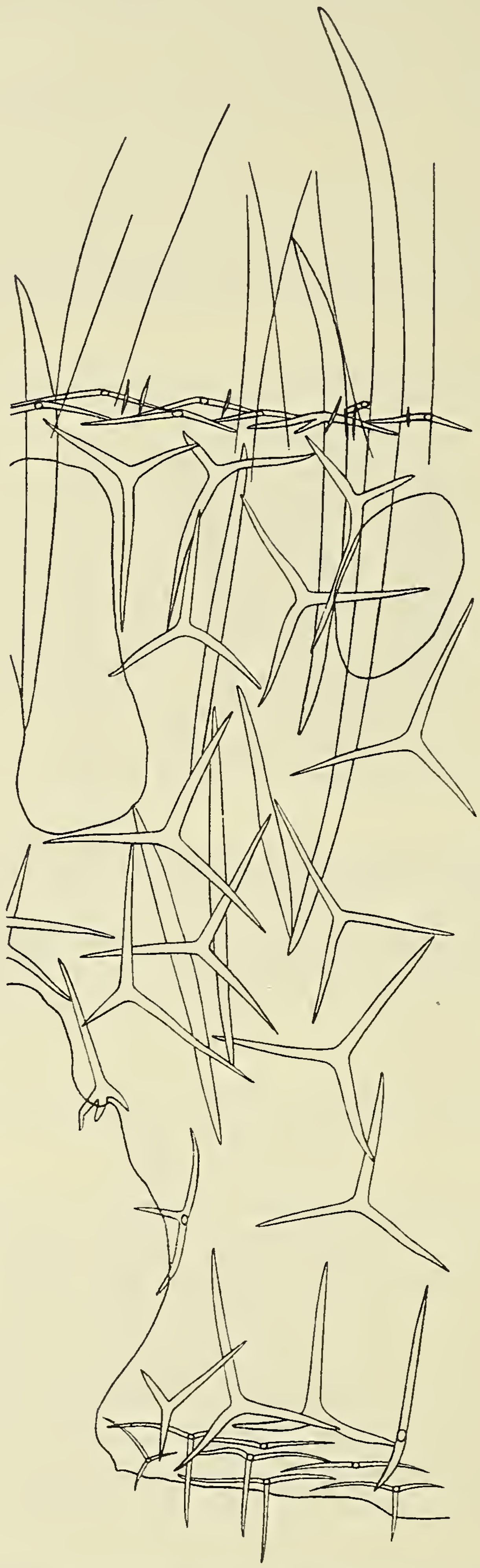
(text-fig. 229)

Vosmaeropsis japonica Hozawa, 1929: 324, pl. xvii, figs. 34, 35, text-fig. 18; Hozawa, 1940: 143, pl. vi, fig. 6; Tanita, 1942: 44, pl. iii, fig. 17; Tanita; 1943: 422.

Description: Sponge ovoid, solitary; surface hispid; vent apical, oval, with prominent margin; texture soft, elastic; colour, in spirit, grey; ectosomal skeleton of tangential triradiates, paired rays of subectosomal triradiates, with oxea, linear spicules and microxea projecting beyond surface; tubar skeleton of oppositely-directed basal rays of subectosomal and subendosomal triradiates, with several irregular rows of tubar triradiates and scattered large oxea; exhalant canals lined with quadriradiates; endosomal skeleton of paired rays of subendosomal triradiates, and a few layers of tangential quadriradiates, with apical rays projecting into cloacal cavity, together with a few tangential triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·11 to 0·18 by 0·008 to 0·012 mm., basal ray 0·09 to 0·18 by 0·008 to 0·012 mm.,

large oxea, 0·9 to 1·8 by 0·05 to 0·09 mm.,
hair-like oxea, 1·0 by 0·002 mm.,
microxea, 0·07 to 0·14 by 0·006 to 0·008 mm.,
subectosomal triradiates, pseudosagittal, paired rays 0·08 to 0·13 and 0·1 to 0·18 mm. long respectively and 0·02 to 0·028 mm. thick, basal ray 0·13 to 0·22 by 0·02 to 0·028 mm.,



Text-fig. 229. *Vosmaeropsis japonica* after Hozawa: section across body wall, ×50.

tubar triradiates, sagittal, paired rays 0·11 to 0·31 by 0·02 to 0·028 mm., basal ray 0·15 to 0·36 by 0·024 to 0·032 mm.,

quadriradiates of exhalant canals, similar to tubar triradiates with an apical ray,

subendosomal triradiates, sagittal, paired rays 0·17 to 0·26 by 0·024 to 0·032 mm., basal ray 0·33 to 0·43 by 0·028 to 0·036 mm.,

endosomal quadriradiates, paired rays 0·23 to 0·3 by 0·016 mm., basal ray 0·31 to 0·4 by 0·012 mm., apical ray 0·12 to 0·18 mm. long,

endosomal triradiates, similar to quadriradiates but without apical ray.

Description: Japan (several localities).

Text-fig. 230. *Leucandra kagoshimensis* after Hozawa: section at right angles to surface, ×50; part of holotype (top left), ×$\frac{3}{2}$.

Named form: **Leucandra kagoshimensis** Hozawa

(text-fig. 230)

Leucandra kagoshimensis Hozawa, 1929: 344, pl. xviii, figs. 46, 47, text-fig. 24; Tanita, 1943: 433.

Description: Sponge tubular, solitary; surface hispid; vent apical, with well-developed fringe; texture firm, elastic; colour, in spirit, greyish-white; ectosomal skeleton of a few layers of tangential triradiates, with oxea of two kinds projecting beyond surface; skeleton of chamber layer of centrifugally-directed basal rays of subendosomal triradates and quadriradiates, with several rows of triradiates irregularly-arranged but with basal rays directed more or less centrifugally; (a few triradiates occur sporadically beneath ectosomal layer, with basal rays directed centripetally); endosomal skeleton of paired rays of subendosomal triradiates and paired and apical rays of subendosomal quadriradiates, with a few layers of endosomal triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, variable in size, paired rays up to 0·2 by 0·016 mm., basal ray up to 0·23 by 0·016 mm.,
oxea, of two kinds, up to 2·0 by 0·02 to 0·05 and up to 1·0 by 0·002 to 0·004 mm.,
tubar triradiates, sagittal, paired rays 0·18 by 0·016 mm., basal ray 0·2 by 0·016 mm.,
subendosomal triradiates, sagittal, paired rays 0·15 by 0·012 mm., basal ray 0·24 by 0·012 mm.,
subendosomal quadriradiates, similar to triradiates, apical ray short,
endosomal triradiates sagittal, paired rays 0·15 to 0·23 by 0·008 by 0·01 mm., basal ray 0·22 to 0·25 by 0·008 to 0·01 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·04 to 0·07 by 0·008 mm.

Distribution: Japan (Kagoshima Bay).

Named form: **Sycon karajakense** Breitfuss

Sycon karajakense Breitfuss, 1898: 207, fig. 1; Breitfuss, 1898; 301; Dendy and Row, 1913: 746; Breitfuss, 1932: 244.

Description: Sponge solitary, tubular, sessile; surface smooth; vent terminal, naked; texture firm; colour, in spirit, white; tubar skeleton of rows of triradiates, with microxea in distal ends of chambers but not protruding beyond surface; endosomal skeleton of tangentially-arranged subendosomal triradiates and a tangential layer of endosomal quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: tubar triradiates, subregular to sagittal, paired rays 0·08 to 0·09 by 0·006 mm., basal rays 0·085 to 0·09 by 0·006 mm.,
microxea, 0·06 to 0·1 by 0·004 to 0·006 mm.,
subendosomal sagittal triradiates, paired rays 0·04 to 0·05 by 0·004 to 0·005 mm., basal rays 0·25 to 0·3 by 0·004 to 0·005 mm.,
endosomal quadriradiates, subregular, facial rays 0·063 by 0·007 mm., apical ray 0·075 by 0·009 mm.

Distribution: Arctic (Greenland); littoral.

Named form: **Sycon kerguelensis** Urban

(text-fig. 231)

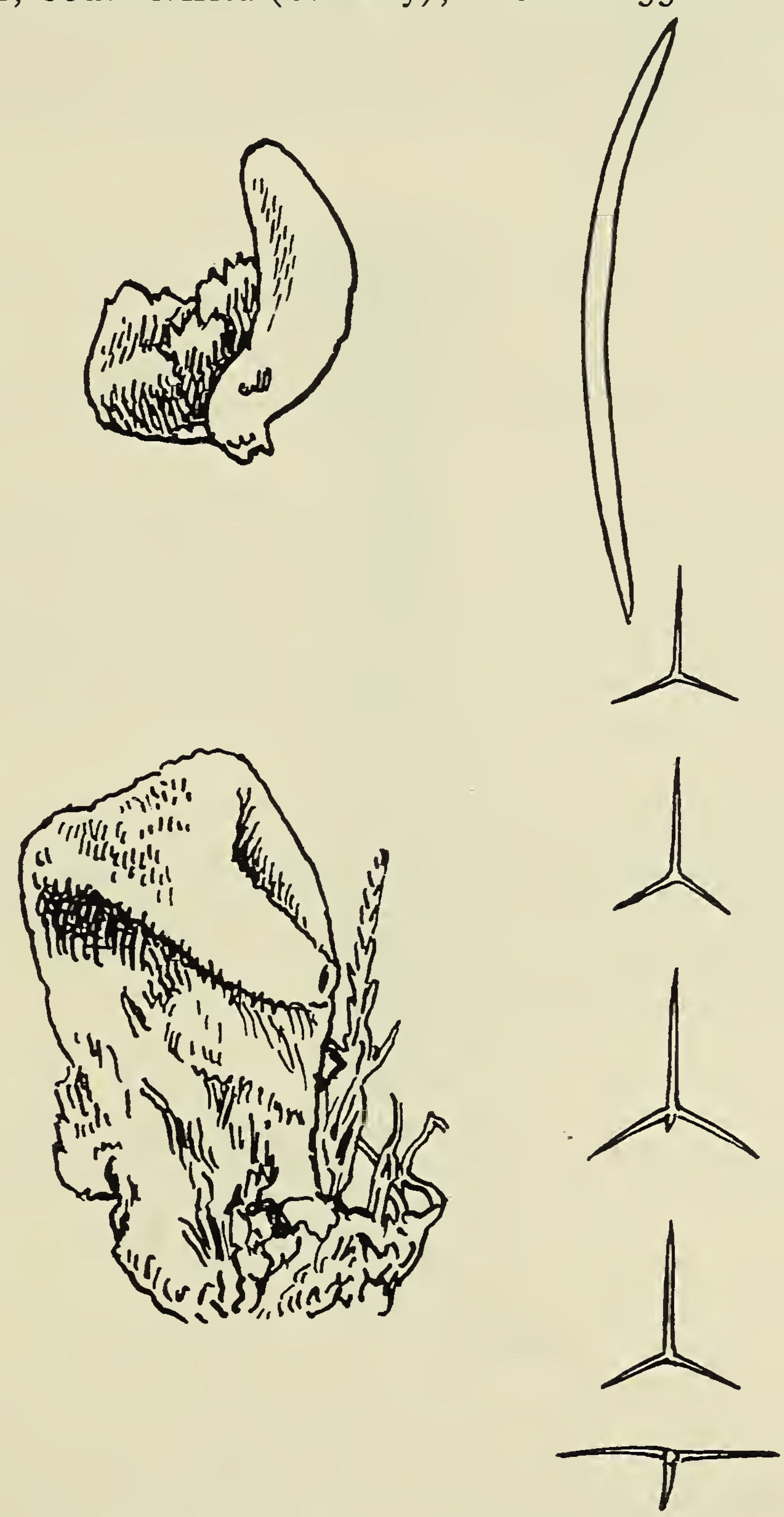
Sycon kerguelensis Urban, 1908: 248; *Leuconia minor* Urban, 1908: 251; *Sycon kerguelensis* Urban, 1909: 5, pl. i, figs. 2–42, pl. ii, figs. 1–8; *Leuconia minor* Urban 1909: 32, pl. vi. figs. 1–19; *Sycon kerguelensis*, Dendy and Row, 1913: 736; *Leucandra minor*, Dendy and Row, 1913: 772; *Sycon kerguelensis*, Burton, 1933: 236.

Description: Sponge solitary, sac-shaped and laterally-compressed to tubular, sessile; surface hispid; vent apical, naked; texture soft; colour, in spirit, white to yellowish; tubar skeleton of centrifugally-directed rays of subendosomal sagittal triradiates and rows of tubar triradiates;

distal ends of chambers ornamented with basal rays of outermost triradiates and with tufts of oxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates and one or more tangential layers of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·055 to 0·078 by 0·007 to 0·01 mm., basal rays 0·065 to 0·117 by 0·007 to 0·011 mm.,
oxea, 0·45 to 0·6 by 0·015 to 0·025 mm.,
microxea, 0·12 to 0·2 by 0·005 mm.,
trichoxea, 0·2 to 0·4 by 0·0015 mm.,
subendosomal sagittal triradiates, paired rays 0·068 to 0·087 by 0·009 to 0·01 mm., basal rays 0·088 to 0·127 by 0·008 to 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·14 to 0·15 by 0·01 to 0·011 mm., basal rays 0·18 to 0·2 by 0·009 to 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·12 by 0·008 mm., basal rays 0·17 by 0·008 mm., apical rays 0·05 by 0·008 mm.

Distribution: Kerguelen; South Africa (Stil Bay); littoral to 33 m.



Text-fig. 231. *Sycon kerguelensis* after Urban: spicules, arranged as in section across body wall, ×100; external form (bottom left), ×3; external form (top left) of *Leuconia minor*, ×3.

Named form: **Leucandra kurilensis** Hozawa

Leucandra kurilensis Hozawa, 1918: 549, pl. lxxxv, fig. 11, text-fig. 10; Hozawa, 1929: 342; Tanita, 1943: 433.

Description: Sponge ovoid, slightly laterally compressed, with apical vent surrounded by a well-developed fringe; surface hispid; texture firm; colour, in spirit, greyish-white; ectosomal skeleton of many layers of tangential triradiates, with large oxea and slender rhabds projecting from surface; skeleton of chamber layer subendosomal sagittal triradiates and irregularly arranged triradiates; endosomal skeleton of tangential triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·19 to 0·29 by 0·02 mm., basal ray 0·12 to 0·17 by 0·02 mm.,
oxea, 1·0 by 0·02 to 0·04 mm.,
rhabds, 0·37 to 1·0 by 0·005 to 0·01 mm.,
triradiates of chamber layer, sagittal, paired rays 0·17 to 0·23 by 0·02 to 0·024 mm., basal ray 0·27 to 0·52 by 0·02 to 0·024 mm.,
subendosomal sagittal triradiates with more divergent paired rays than other triradiates of chamber layer,
endosomal triradiates, sagittal, paired rays 0·19 to 0·3 by 0·02 mm., basal ray 0·24 to 0·4 by 0·02 mm.

Distribution: Kurile Islands; 419 m.

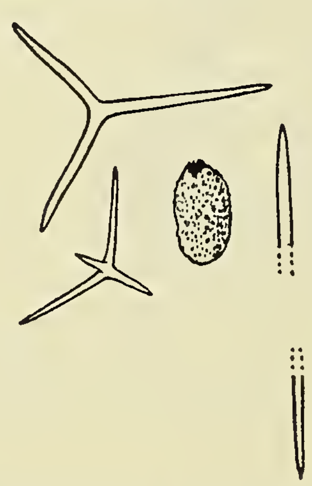
Named form: **Sycon lambei** Dendy and Row
(text-fig. 232)

Sycon asperum Lambe, 1896: 205, pl. ii, fig. 8; Lambe, 1900: 166; *S. lambei* Dendy and Row, 1913: 746; Breitfuss, 1932: 244; *Scypha asperum*, de Laubenfels, 1949: 42; *nec Sycon asperum* (Gibson).

Description: Sponge solitary, ovoid, sessile; surface hispid; vent terminal, with feebly-developed fringe; texture firm; colour, in spirit, greyish-white; tubar skeleton of centripetally-directed rays of subendosomal triradiates and several rows of triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and with oxea; endosomal skeleton of paired rays of subendosomal triradiates and one or more tangential layers of quadriradiates.

Spicules: triradiates of chambers, sagittal, paired rays 0·11 by 0·009 mm., basal rays 0·164 by 0·009 mm.,
oxea, from distal ends of chambers, 1·15 by 0·02 (?) mm.,
subendosomal triradiates, sagittal, of same dimensions as triradiates of chambers (?),
endosomal quadriradiates, regular, facial rays 0·098 by 0·006 mm., apical rays 0·026 to 0·065 by 0·006 to 0·013 mm.

Distribution: Atlantic Coast of Canada; 102·5 m.



Text-fig. 232. *Sycon lambei* (after *S. asperum* Lambe): spicules, ×100, except oxeote which is ×60; external form, slightly less than natural size.

Named form: **Sycon lingua** (Haeckel)

(text-fig. 233)

Sycortis lingua Haeckel, 1872: 278, pl. xlviii, figs. 1–2; *Sycocystis lingua* Haeckel, 1872: 278; *Sycon lingua*, Breitfuss, 1898: 20; Breitfuss, 1898: 24; Dendy and Row, 1913; 747; *Scypha lingua*, de Laubenfels, 1942: 268; *Sycon lingua*, Brøndsted, 1942: 3; *Scypha lingua*, de Laubenfels, 1949: 26, figs. 26–28.

Description: Sponge tubular, laterally-compressed; surface minutely papillate, hispid; vent apical (?); texture (?); colour, in spirit, brown; tubar skeleton of basal rays of subendosomal sagittal triradiates and numerous rows of tubar triradiates, distal cones ornamented with oxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates and several tangential layers of triradiates.

Spicules: tubar triradiates, paired rays 0·05 to 0·08 by 0·008 mm., basal rays 0·1 to 0·15 by 0·008 mm.,
oxea, 0·5 to 1·0 by 0·008 mm.,
subendosomal sagittal triradiates, similar to tubar triradiates,
endosomal triradiates, regular, rays 0·15 to 0·2 by 0·008 mm.

Distribution: Newfoundland; Baffinland; Wood's Hole; Faroes; 46–56 m.

Text-fig. 233. *Sycon lingua* after Haeckel: a radial chamber, to show arrangement of skeleton, ×50.

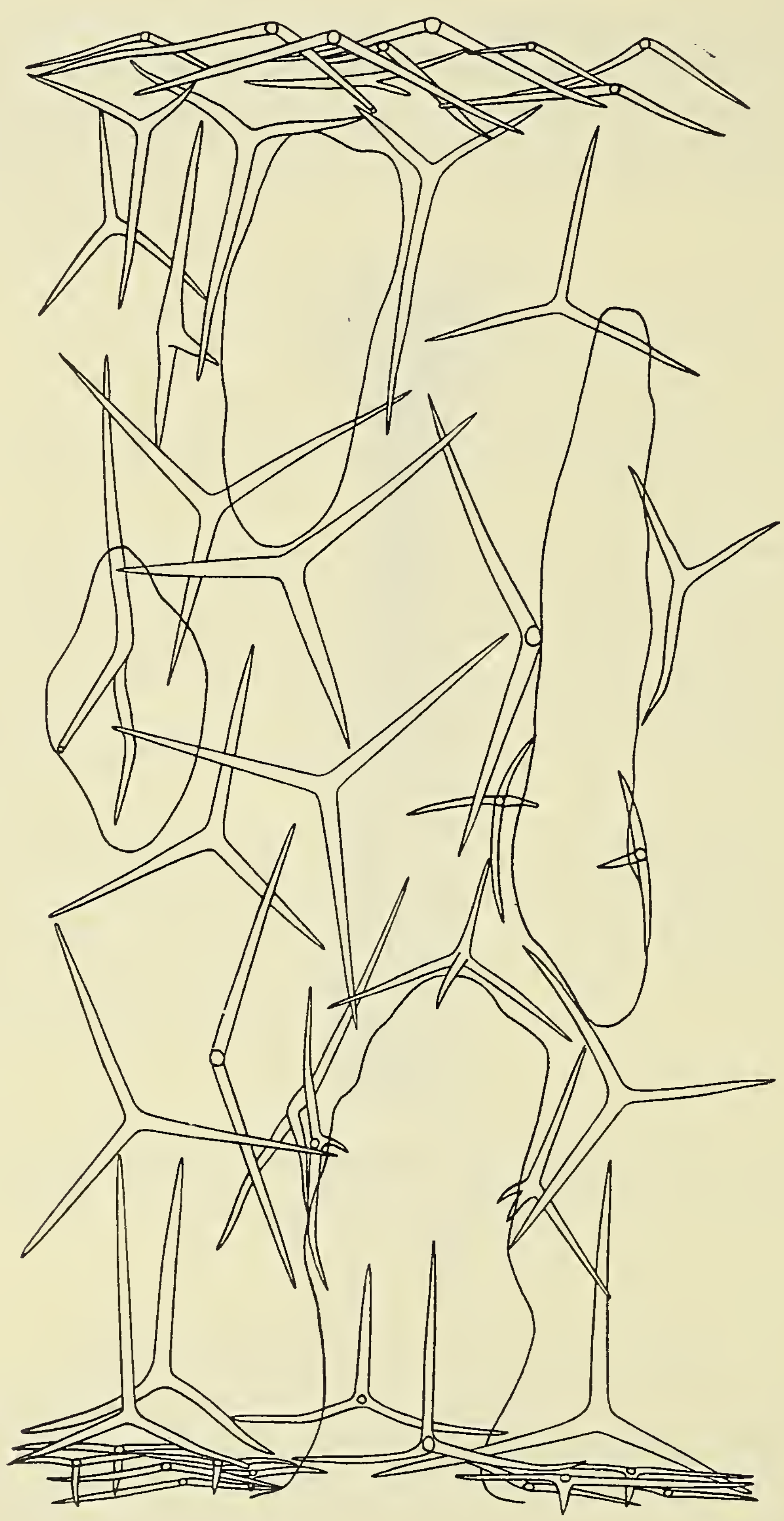
Named form: **Sycon luteolum** Tanita

Sycon luteolum Tanita, 1942: 32, pl. ii, fig. 8, text-fig. 5; Tanita, 1943: 401, pl. xiii, fig. 33.

Description: Sponge ovate; surface papillate, hispid; vent apical, fringed; texture firm, elastic; colour, in spirit, yellowish-grey; tubar skeleton of basal rays of subendosomal triradiates and several rows of tubar tri- and quadriradiates, with distal ends of chambers ornamented with oxea of two sizes; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·08 to 0·095 by 0·01 mm., basal ray 0·085 to 0·14 by 0·01 mm.,
oxea, 0·42 to 0·9 by 0·02 to 0·05 mm.,
oxea, 0·27 to 0·38 by 0·006 to 0·012 mm.,
subendosomal sagittal triradiates, paired rays 0·08 to 0·095 by 0·008 to 0·01 mm., basal ray 0·11 to 0·165 by 0·008 to 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·08 to 0·16 by 0·007 to 0·01 mm., basal ray 0·14 to 0·24 by 0·007 to 0·01 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·08 to 0·22 by 0·006 to 0·007 mm.

Distribution: Japan (many localities).



Text-fig. 234. *Vosmaeropsis maculata* after Hozawa: section at right angles to surface, ×50.

Named form: **Vosmaeropsis maculata** Hozawa

(text-fig. 234)

Vosmaeropsis maculata Hozawa, 1929: 321, pl. xvi, figs. 32, 33, text-fig. 17; Tanita, 1941: 273, pl. xvii, fig. 6; Tanita, 1942: 45, pl. iii, fig. 18; Tanita, 1943: 427, pl. xvi, figs. 54, 55.

Description: Sponge ovoid, solitary; surface smooth, uneven; vent apical, naked; texture compact, elastic; colour, in spirit, greyish-white; ectosomal skeleton of a few layers of tangential triradiates, together with paired rays of subectosomal triradiates; tubar skeleton of oppositely directed basal rays of subectosomal and subendosomal triradiates and several irregular rows of tubar triradiates; exhalant canals lined with quadriradiates; endosomal skeleton of paired rays of subendosomal triradiates, and a few layers of quadriradiates, with apical rays projecting into cloacal cavity, together with a few triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·11 to 0·35 by 0·012 to 0·04 mm., basal ray 0·13 to 0·4 by 0·012 to 0·04 mm.,
subectosomal triradiates, pseudosagittal, irregular, paired rays 0·15 to 0·2 and 0·17 to 0·21 mm. long respectively and 0·016 to 0·036 mm. thick, basal ray 0·28 to 0·46 by 0·017 to 0·032 mm.,
tubar triradiates, sagittal, paired rays 0·32 to 0·47 by 0·02 mm., basal ray 0·27 to 0·52 by 0·02 to 0·04 mm.,
quadriradiates of exhalant canals, paired rays 0·2 by 0·012 mm., basal ray 0·07 by 0·012 mm., apical ray 0·06 by 0·008 mm.,
subendosomal triradiates, sagittal, paired rays 0·25 to 0·4 by 0·024 to 0·036 mm., basal ray 0·33 to 0·5 by 0·024 to 0·036 mm.,
endosomal quadriradiates, sagittal, paired rays 0·13 to 0·3 by 0·012 to 0·02 mm., basal ray 0·08 to 0·18 by 0·012 to 0·02 mm., apical ray 0·04 to 0·08 by 0·012 mm.,
endosomal triradiates, similar to quadriradiates, but without apical ray.

Distribution: Japan (several localities).

Remarks: Vosmaeropsis maculata Hozawa (1929) is, for all practical purposes, a specimen of *V. japonica* Hozawa lacking diacts. The last-named can be regarded as a synonym of *Leuconia fistulosa,* here regarded as identical with *Sycon ciliatum.* For all its difference in appearance, therefore, *Vosmaeropsis maculata* can be included in the same series.

Named form: **Leucandra magna** Tanita

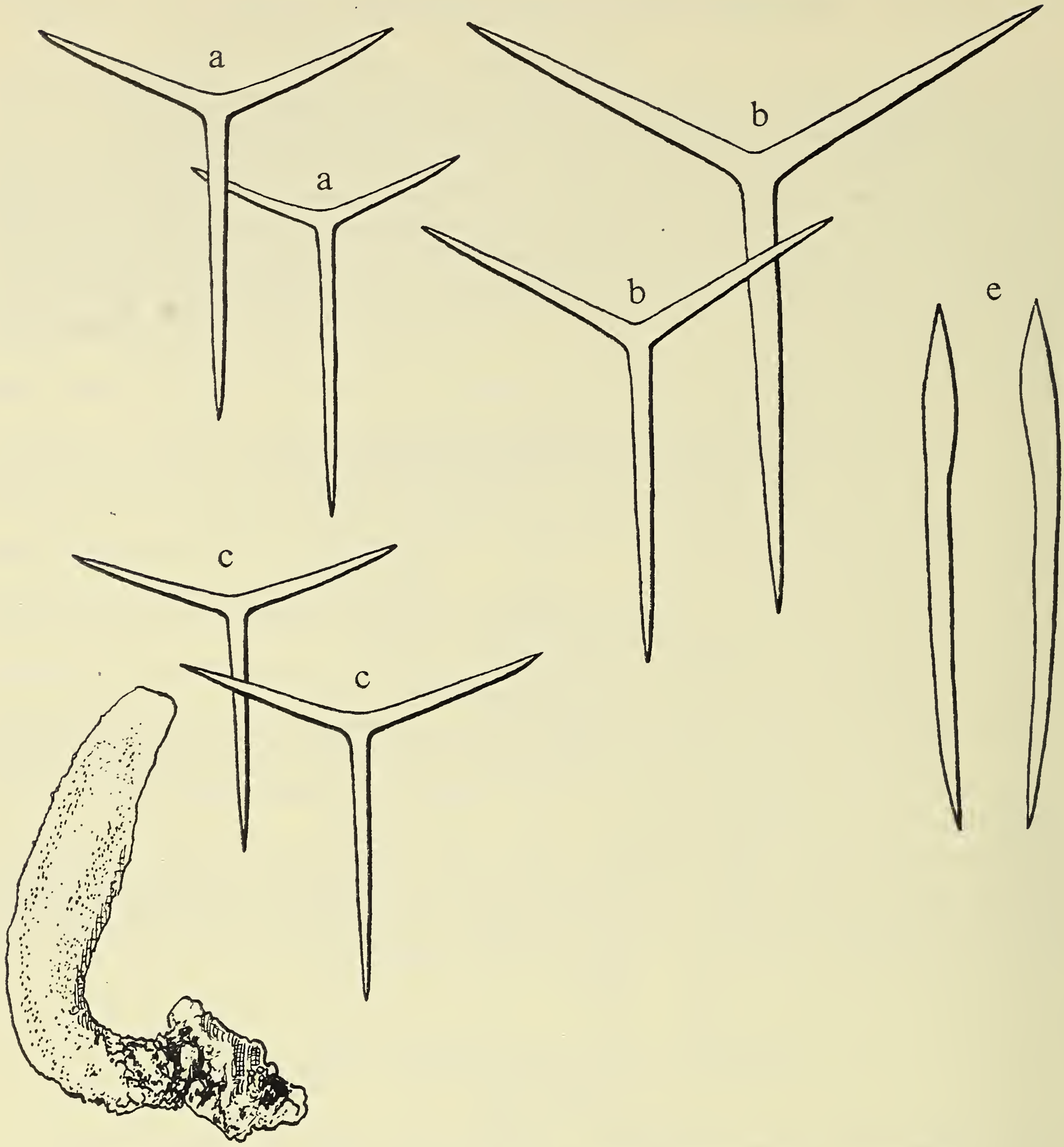
(text-fig. 235)

Leucandra magna Tanita, 1942: 53, pl. iv, fig. 24, text-fig. 10; Tanita, 1943: 433.

Description: Sponge tubular; surface slightly hispid; vent apical, naked; texture firm; colour, in spirit, nearly white; ectosomal skeleton of several tangential layers of triradiates, with occasional oxea projecting beyond surface; skeleton of chamber layer of scattered triradiates; endosomal skeleton of several tangential layers of triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·23 to 0·31 by 0·012 to 0·02 mm., basal ray 0·41 to 0·49 by 0·012 to 0·02 mm.,
oxea, 0·7 to 1·0 by 0·04 to 0·055 mm.,
trichoxea (occasional), 0·9 by 0·003 mm.,
triradiates of chamber layer, sagittal, paired rays 0·26 to 0·47 by 0·025 to 0·05 mm., basal ray 0·3 to 0·72 by 0·025 to 0·05 mm.,
endosomal triradiates, sagittal, paired rays 0·2 to 0·31 by 0·014 to 0·02 mm., basal ray 0·27 to 0·35 by 0·014 to 0·02 mm.

Distribution: Japan (Bôsyû); 183–366 m.



Text-fig. 235. *Leucandra magna* after Tanita: spicules, ×80; external form, natural size.
a. ectosomal triradiates; b. tubar triradiates; c. endosomal triradiates; e. oxea.

Remarks: Leucandra magna has the appearance of a large specimen of *Leuconia fistulosa*. Its spicules are, on the whole, larger than have been recorded for that species, but they still come within a range comparable to that shown by Sasaki to occur in a group of individuals of *Sycon okadai*, itself a synonym of *S. ciliatum* (with which *Leuconia fistulosa* is synonymous).

Named form: **Sycon matsushimense** Tanita

(text-fig. 236)

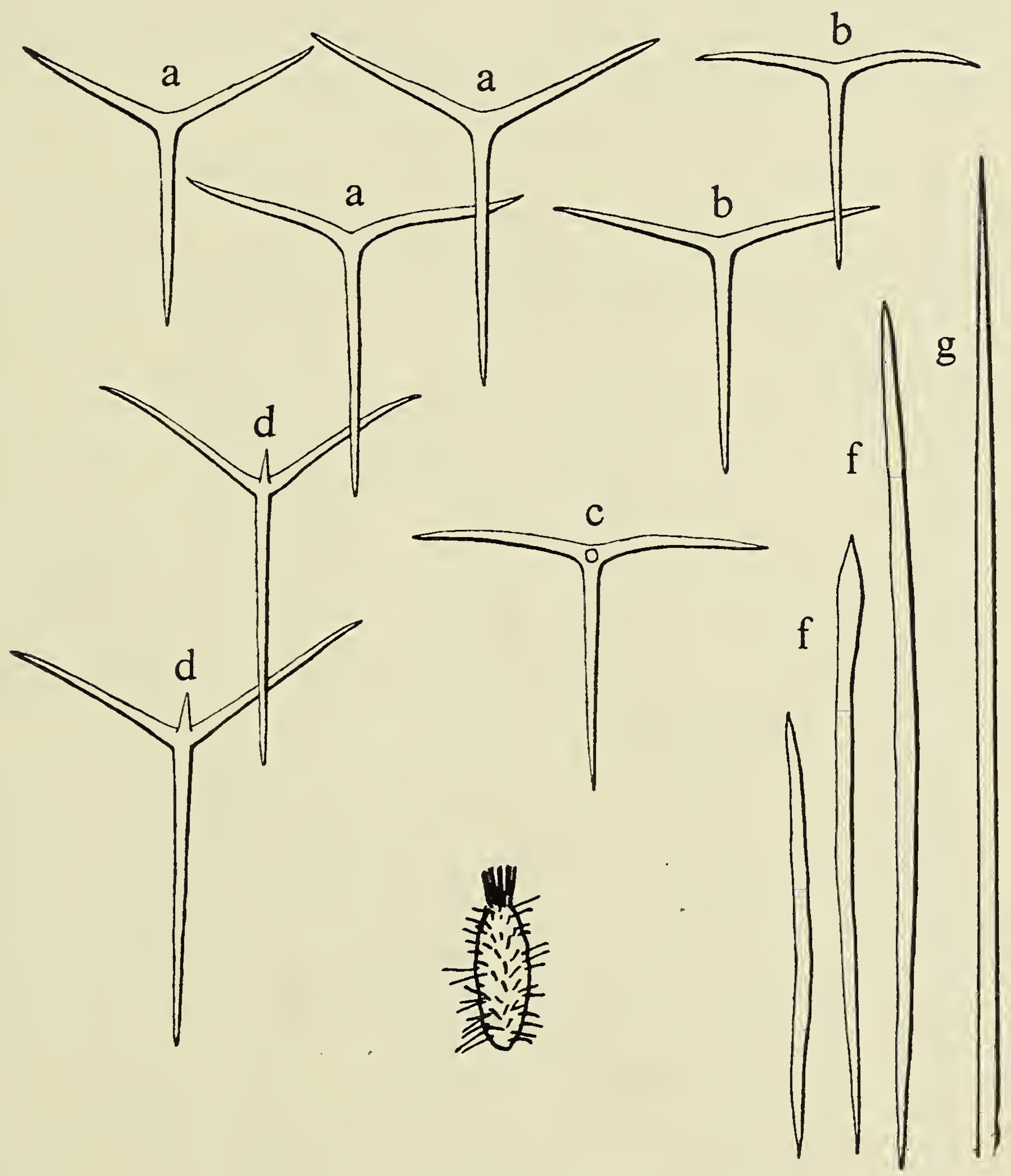
Sycon matsushimense Tanita, 1940: 168, pl. viii, fig. 4, text-fig. 2; Tanita, 1943: 401, pl. xiv, fig. 43.

Description: Sponge tubular; surface strongly hispid; vent apical, with well-developed fringe;

texture soft, elastic; colour, in spirit, greyish-white; tubar skeleton of basal rays of subendosomal sagittal radiates and several layers of tubar triradiates, with distal ends of chambers ornamented with oxea and trichoxea; endosomal skeleton of paired rays of subendosomal radiates and a tangential layer of endosomal quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·12 to 0·19 by 0·008 to 0·01 mm., basal ray 0·18 to 0·27 by 0·008 to 0·01 mm.,
oxea, 0·42 to 0·85 by 0·014 to 0·018 mm.,
trichoxea, 3·6 by 0·01 mm.,
subendosomal sagittal triradiates, paired rays 0·15 to 0·2 by 0·008 to 0·01 mm., basal ray 0·19 to 0·22 by 0·008 to 0·01 mm.,
subendosomal sagittal quadriradiates, similar to triradiates, with apical ray 0·06 to 0·09 by 0·007 mm.,
endosomal quadriradiates, sagittal, paired rays 0·14 to 0·19 by 0·008 to 0·01 mm., basal ray 0·22 to 0·26 by 0·008 to 0·01 mm., apical ray 0·065 to 0·1 by 0·006 to 0·008 mm.

Distribution: Japan (many localities); littoral.



Text-fig. 236. *Sycon matsushimense* after Tanita: spicules, ×100; external form, natural size.
a. tubar triradiates; b. subendosomal triradiates; c. subendosomal quadriradiates; d. endosomal quadriradiates; f–g. oxea.

Named form: **Leucandra mediocanellata** Hozawa

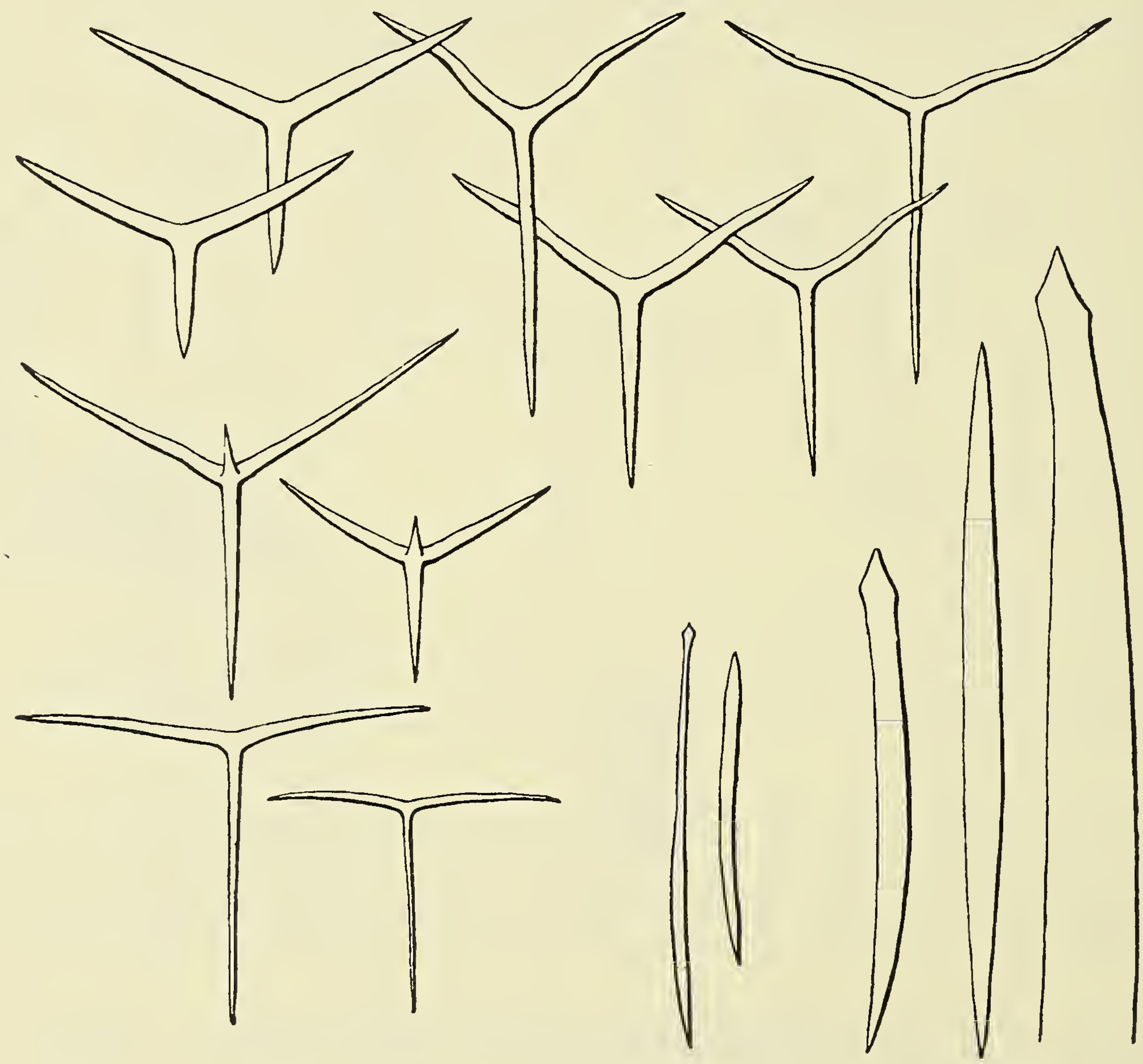
(text-fig. 237)

Leucandra mediocanellata Hozawa, 1940: 53, pl. iv, fig. 7, text-fig. 9; Tanita, 1941: 274, pl. xvii, fig. 8; Tanita, 1943: 443.

Description: Sponge subspherical; surface hispid; vent apical, fringed; texture soft, elastic; colour, in spirit, yellowish-white; ectosomal skeleton a tangential layer of triradiates with oxea and microxea projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton of triradiates and of quadriradiates with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·11 to 0·17 by 0·012 to 0·018 mm., basal ray 0·045 to 0·15 by 0·012 to 0·018 mm.,
oxea, 0·45 to 2·1 by 0·03 to 0·07 mm.,
microxea, 0·18 by 0·005 mm.,
triradiates of chamber layer, sagittal, paired rays 0·11 to 0·17 by 0·014 to 0·018 mm., basal ray 0·1 to 0·2 by 0·014 to 0·018 mm.,
endosomal triradiates, sagittal, paired rays 0·12 to 0·19 by 0·008 to 0·01 mm., basal ray 0·15 to 0·25 by 0·008 to 0·01 mm.,
endosomal quadriradiates, similar to triradiates, with apical rays 0·04 to 0·05 by 0·008 to 0·012 mm.

Distribution: Japan (Oshima, Onagawa Bay, Inubômisaki).



Text-fig. 237. *Leucandra mediocanellata*: spicules, after Hozawa, × 100, except for microxea, which are × 200.

Named form: **Sycon mexico** Hozawa

(text-fig. 238)

Sycon mexico Hozawa, 1940: 137, pl. vi, fig. 4, text-fig. 3.

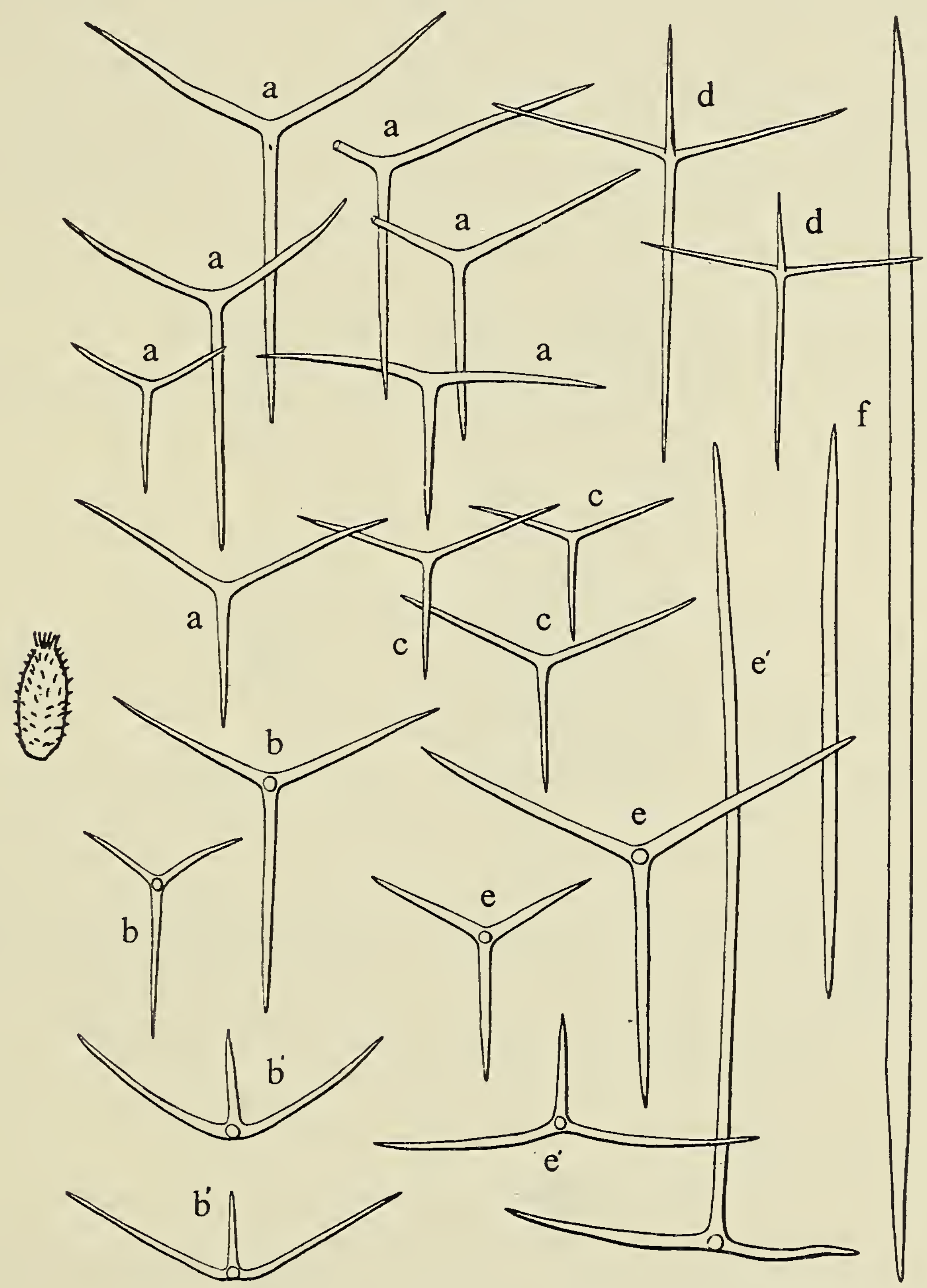
Description: Sponge tubular; surface papillate, hispid; vents apical, fringed; texture soft; colour, in spirit, greyish-white; tubar skeleton of centripetally-directed basal rays of subendosomal sagittal quadriradiates and several layers of tubar triradiates, rarely quadriradiates; distal ends of flagellated chambers crowned with long oxea; endosomal skeleton of paired rays of subendosomal quadriradiates and endosomal quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·078 to 0·18 by 0·008 to 0·01 mm., basal ray 0·1 to 0·235 by 0·008 to 0·01 mm.,

tubar quadriradiates, occasional, similar to triradiates, with apical ray 0·062 to 0·094 by 0·008 to 0·01 mm.,

oxea, 0·48 to 1·1 by 0·01 to 0·018 mm.,

trichoxea (dimensions not given),



Text-fig. 238. *Sycon mexico* after Hozawa: spicules, × 100; external form (left), natural size.

a. tubar triradiates; b–b′. tubar quadriradiates; c. ectosomal triradiates; d. subendosomal quadriradiates; e–e′. endosomal quadriradiates; f. oxea.

subendosomal sagittal quadriradiates, paired rays 0·125 to 0·156 by 0·008 mm., basal ray 0·168 to 0·224 by 0·006 mm., apical ray 0·078 by 0·095 to 0·006 mm.,
endosomal quadriradiates, sagittal, paired rays 0·095 (*sic*) to 0·063 to 0·01 by 0·012 mm., basal ray 0·112 to 0·2 by 0·01 to 0·012 mm., apical ray (dimensions not given).

Distribution: Mexico. [There is no indication whether the sponge was collected on the east or the west coast of Mexico.]

Leucilla minuta Tanita

Leucilla minuta Tanita, 1941: 4, pl. i, fig. 5, text-figs. 1–2; Tanita, 1943: 458.

Description: Sponge oval, small; surface strongly hispid; vent apical; texture (?); colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with the facial rays of large subectosomal quadriradiates and oxea projecting from surface; tubar skeleton of apical rays of subdermal quadriradiates, confused layers of tubar quadriradiates and basal rays of subendosomal quadriradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates, rays 0·15 to 0·24 by 0·012 to 0·016 mm.,
oxea, 0·57 to 1·5 by 0·025 to 0·037 mm.,
subectosomal quadriradiates, facial rays 0·11 to 0·22 by 0·012 to 0·016 mm., apical ray 0·18 to 0·33 by 0·012 to 0·016 mm.,
tubar quadriradiates, facial rays 0·2 to 0·36 by 0·015 to 0·02 mm., apical ray 0·09 by 0·012 to 0·018 mm.,
subendosomal quadriradiates similar to tubar radiates,
endosomal quadriradiates, facial rays 0·24 to 0·34 by 0·01 to 0·014 mm., apical ray similar.

Distribution: Japan (Mutsu Bay).

Named form: **Sycon misakiensis** Hozawa

Sycon misakiensis Hozawa, 1929: 300, pl. xiv, figs. 16, 17, text-fig. 9; Hozawa, 1940: 37; Tanita, 1942: 35, pl. ii, fig. 9; Tanita, 1943: 402, pl. xiv, figs. 35–36.

Description: Sponge tubular, solitary; surface minutely hispid; vent apical, with feebly-developed margin; texture rigid, elastic; colour, in spirit, white; tubar skeleton of centripetally-directed basal rays of subendosomal triradiates and several rows of triradiates; distal ends of chambers ornamented with oxea, of two kinds, and basal rays of outermost triradiates; endosomal skeleton of several layers of tangential triradiates and quadriradiates, with apical rays rarely projecting into cloacal cavity.

Spicules: tubar triradiates, sagittal, paired rays 0·09 to 0·15 by 0·008 to 0·016 mm., basal ray 0·12 to 0·17 by 0·008 to 0·016 mm.,
oxea, of two kinds, 0·23 to 0·5 by 0·006 to 0·012 and 0·12 to 0·15 by 0·002 to 0·003 mm. respectively,
subendosomal triradiates, sagittal, paired rays 0·06 to 0·12 by 0·006 to 0·01 mm., basal ray 0·11 to 0·18 by 0·008 to 0·012 mm.,
endosomal triradiates, sagittal, paired rays 0·08 to 0·15 by 0·006 to 0·008 mm., basal ray 0·12 to 0·19 by 0·008 to 0·012 mm.,
endosomal quadriradiates, sagittal, paired rays 0·08 to 0·12 by 0·016 mm., basal ray 0·14 to 0·26 by 0·016 mm., apical ray 0·08 to 0·11 by 0·016 mm.

Distribution: Japan (several localities).

Named form: **Sycon mundulum** Lambe

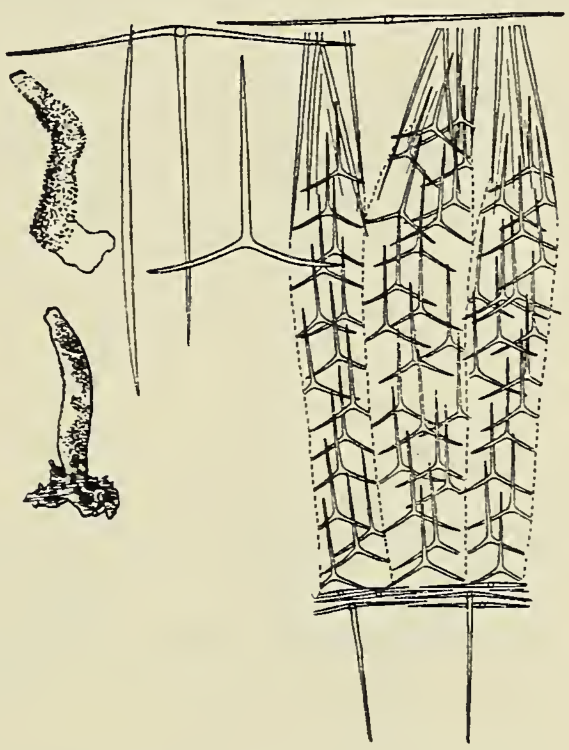
(text-fig. 239)

Sycon mundulum Lambe, 1900: 28, pl. iii, fig. 7; Lambe, 1900: 166; Dendy and Row, 1913: 747; Breitfuss, 1932: 245; Tanita, 1941: 269, pl. vii, fig. 4; Tanita, 1943: 402.

Description: Sponge solitary, tubular, sessile; surface hispid; vent terminal, naked; texture soft; colour, in spirit (?); tubar skeleton of centripetally-directed rays of subendosomal triradiates, with numerous rows of tubar triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and tufts of oxea; endosomal skeleton of paired rays of subendosomal triradiates and several tangential layers of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: triradiates of chambers, sagittal, paired rays 0·078 by 0·006 mm., basal rays 0·13 by 0·006 mm.,
oxea, 0·5 by 0·003 mm.,
trichoxea, 0·3 or more long by 0·002 mm. thick,
subendosomal triradiates, sagittal, of about same size as triradiates of chamber layer (?),
endosomal triradiates, regular, rays 0·124 by 0·003 mm.,
endosomal quadriradiates, regular, facial rays 0·117 by 0·003 mm., apical rays 0·23 by 0·005 mm.

Distribution: Arctic (Davis Strait); Japan (Wakasa-Takahama, Onagawa); 3–110 m.



Text-fig. 239. *Sycon mundulum* mainly after Lambe: spicules, ×100; section at right angles to surface, ×50; external form (holotype above, Tanita's (1943) specimen below), natural size.

Named form: **Sycon munitum** Jenkin

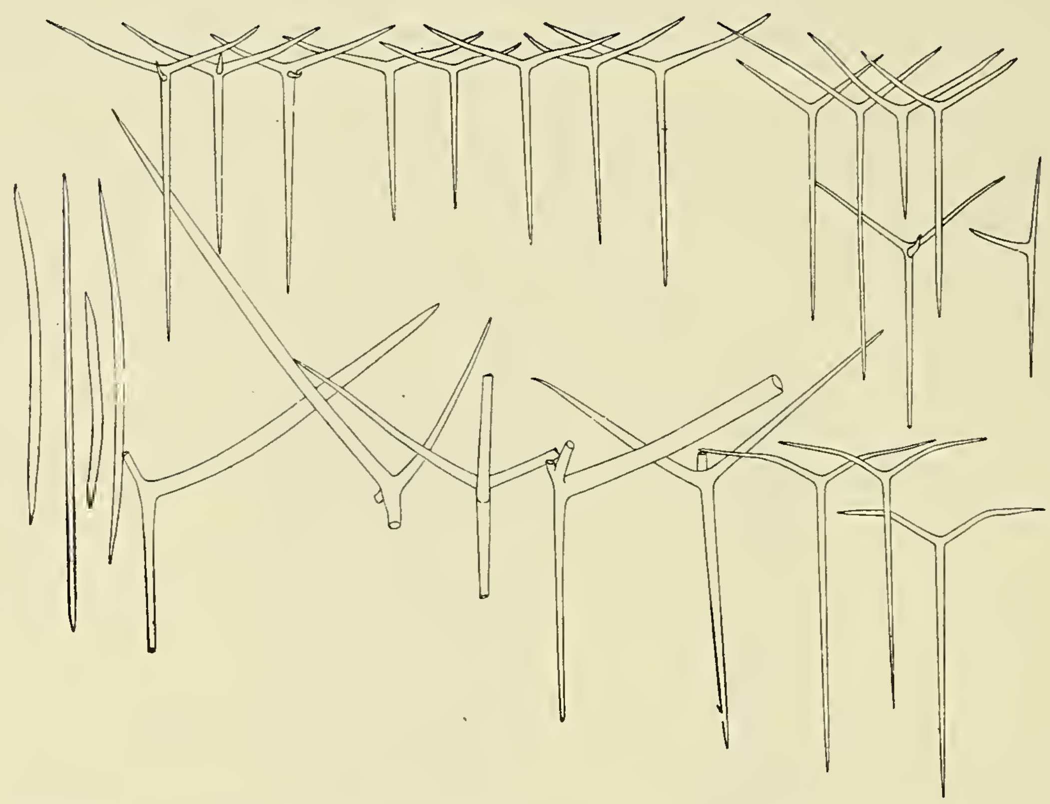
(text-fig. 240)

Sycon munitum Jenkin, 1908: 443, fig. 91; Dendy and Row, 1913: 747.

Description: Sponge solitary, cylindrical, sessile; surface hispid; vent terminal; texture soft, compressible; colour, in spirit, grey to greyish-yellow; tubar skeleton of basal rays of subendosomal triradiates and several rows of triradiates and quadriradiates; distal ends of chambers ornamented with oxea; endosomal skeleton of several layers of triradiates and quadriradiates, of two sizes, with apical rays projecting into cloacal cavity.

Spicules: tubar triradiates, sagittal, paired rays 0·06 to 0·1 by 0·005 to 0·007 mm., basal rays 0·11 to 0·17 by 0·005 to 0·006 mm.,
tubar quadriradiates, sagittal, paired rays 0·07 to 0·1 by 0·005 to 0·007 mm., basal rays 0·14 to 0·22 by 0·005 to 0·007 mm., apical rays 0·05 by 0·003 mm.,
oxea, 0·17 to 0·4 by 0·008 mm.,
subendosomal triradiates, sagittal, paired rays 0·08 to 0·1 by 0·004 to 0·006 mm., basal rays 0·18 to 0·23 by 0·006 mm.,
endosomal triradiates, sagittal, paired rays 0·07 to 0·13 by 0·006 to 0·008 mm., basal rays 0·08 to 0·12 by 0·006 to 0·008 mm.,
endosomal quadriradiates, sagittal, similar to triradiates but with addition of apical rays 0·06 by 0·006 mm.,
endosomal quadriradiates, sagittal, paired rays 0·18 by 0·009 to 0·01 mm., basal rays 0·2 by 0·01 mm., apical rays 0·32 to 0·38 by 0·008 to 0·016 mm.

Distribution: East Africa (Zanzibar); 13 m.



Text-fig. 240. *Sycon munitum* after Jenkin: spicules, ×100.

Named form: **Leucandra odawarensis** Hozawa

(text-fig. 241)

Leucandra odawarensis Hozawa, 1929: 347, pl. xix, figs. 48, 49, text-fig. 25; Tanita, 1943: 434.

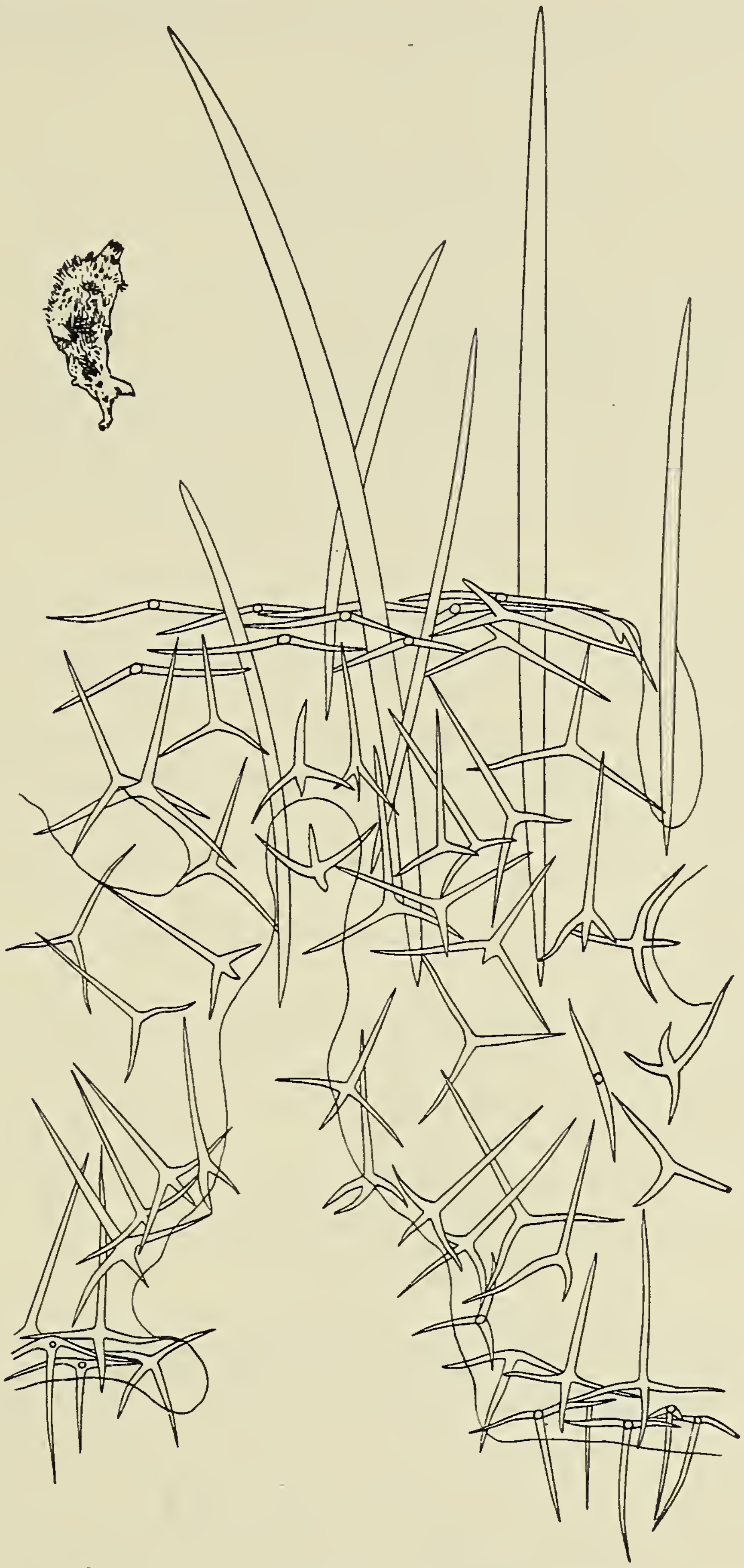
Description: Sponge ovoid, solitary; surface strongly hispid; fringe of vent well developed; texture firm; colour, in spirit, greyish-white; ectosomal skeleton of several layers of tangential triradiates, with large oxea projecting beyond surface; skeleton of chamber layer of centrifugally-directed basal rays of subendosomal quadriradiates, with irregularly-arranged triradiates and quadriradiates; endosomal skeleton of paired and apical rays of subendosomal quadriradiates, and a few layers of quadriradiates with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·15 to 0·27 by 0·016 to 0·032 mm., basal ray 0·18 to 0·3 by 0·02 to 0·036 mm.,
oxea, of two kinds, 1·1 to 1·8 by 0·03 to 0·05 and 0·9 by 0·002 mm.,
tubar triradiates, sagittal, paired rays 0·21 to 0·27 by 0·016 to 0·024 mm., basal ray 0·26 to 0·32 by 0·02 to 0·032 mm.,
tubar quadriradiates, similar to triradiates, apical ray 0·1 to 0·15 by 0·012 to 0·02 mm.,

endosomal quadriradiates, similar to tubar quadriradiates but having more widely divergent rays,

endosomal quadriradiates, sagittal, paired rays 0·13 to 0·25 by 0·012 to 0·014 mm., basal ray 0·11 to 0·25 by 0·012 to 0·014 mm., apical ray 0·45 by 0·016 mm.

Distribution: Japan (Sagami Sea); 172 m.



Text-fig. 241. *Leucandra odawarensis* after Hozawa: section at right angles to surface, × 50; external form, natural size.

Named form: **Sycon okadai** Hozawa

Sycon okadai Hozawa, 1929: 302, pl. xiv, figs. 18, 19, text-fig. 10; Tanita, 1940: 168, pl. viii, fig. 3; Tanita, 1941: 269; Sasaki, 1941: 365, figs. 1–12; Tanita, 1943: 403, pl. xiv, fig. 37.

Description: Sponge tubular, solitary, narrowing towards upper end; surface hispid; vent with membranous margin; texture soft, elastic; colour, in spirit, white tinged with grey; tubar skeleton of centripetally-directed basal rays of subendosomal triradiates and many rows of triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and with oxea; endosomal skeleton of paired rays of subendosomal triradiates and several layers of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·12 to 0·18 by 0·008 to 0·01 mm., basal ray 0·16 to 0·2 by 0·008 to 0·01 mm.,
oxea, 0·3 to 0·75 by 0·008 to 0·016 mm.,
subendosomal triradiates, sagittal, paired rays 0·1 to 0·18 by 0·006 to 0·008 mm., basal ray 0·19 to 0·25 by 0·006 to 0·008 mm.,
endosomal triradiates, sagittal, paired rays 0·2 by 0·008 mm., basal ray 0·3 by 0·008 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·07 by 0·008 mm.

Distribution: Japan (many localities); littoral.

Remarks: The external form of this species has been illustrated by photographs several times, and in every instance the form does not differ from that of specimens of *S. ciliatum* from Plymouth.

Named form: **Sycon ornatum** Kirk

(See text-fig. 243)

Sycon ornatum Kirk, 1897: 314, pl. xxxi, fig. 2, pl. xxxii, fig. 2; Dendy and Row, 1913: 747; Brøndsted, 1926: 303; Hozawa, 1940: 36; Tanita, 1941: 269; Tanita, 1942: 113, pl. vi, fig. 7; Tanita, 1943: 404, pl. xiv, fig. 38.

Description: Sponge tubular, sessile; surface hispid; vent apical, with long fringe; texture soft; colour (?); tubar skeleton of triradiates, with subendosomal sagittal triradiates and with distal cones ornamented with oxea; endosomal skeleton of quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·06 to 0·1 by 0·01 mm., basal ray 0·1 to 0·14 by 0·01 mm.,
oxea, of three sizes, 0·72 by 0·018 mm., 0·25 by 0·01 mm., and 0·25 by 0·003 mm., respectively,
subendosomal sagittal triradiates, paired rays 0·16 by 0·01 mm., basal ray 0·04 to 0·14 by 0·01 mm.,
subendosomal sagittal quadriradiates, rare, similar to subendosomal triradiates, with apical ray 0·04 by 0·01 mm.,
endosomal quadriradiates, sagittal, paired ray 0·1 by 0·01 mm., basal ray 0·16 by 0·015 mm., apical ray 0·07 by 0·015 mm.

Distribution: New Zealand (Cook Strait); Japan; Straits of Magellan.

Named form: **Sycon parvulum** (Preiwisch)

Sycandra parvula Preiwisch, 1904: 15, pl. iv, figs. 9–12; *Sycon parvulum*, Dendy and Row, 1913: 747.

Description: Sponge solitary, tubular, stipitate; surface hispid; vent apical, naked; texture soft (?); colour, in spirit, white; tubar skeleton of centrifugally-directed basal rays of subendosomal sagittal triradiates, with rows of tubar triradiates; distal ends of chambers ornamented with basal rays of outermost tubar triradiates, together with tufts of oxea of two sorts; endosomal skeleton of paired rays of subendosomal sagittal triradiates and one or more tangential layers of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·08 to 0·12 by 0·012 to 0·015 mm., basal rays 0·14 to 0·185 by 0·012 to 0·015 mm.,
oxea, 0·19 to 0·25 by 0·09 to 0·012 mm.,
oxea, 0·12 to 0·18 by 0·003 mm.,

subendosomal sagittal triradiates, paired rays 0·035 to 0·04 by 0·004 to 0·006 mm., basal rays 0·08 to 0·104 by 0·004 to 0·006 mm.,
endosomal triradiates, regular, rays 0·067 to 0·092 by 0·006 to 0·009 mm.,
endosomal triradiates, sagittal, paired rays 0·07 to 0·09 by 0·012 to 0·016 mm., basal rays 0·14 to 0·18 by 0·012 to 0·016 mm.,
endosomal quadriradiates, similar to regular triradiates, with apical rays 0·09 to 0·12 mm. long.

Distribution: Laysan.

Named form: **Leucandra paucispina** Hozawa

(text-fig. 242)

Leucandra paucispina Hozawa, 1929: 356, pl. xx, figs. 55, 56, text-fig. 28; Tanita, 1943: 445.

Description: Sponge sub-pyriform, narrowing towards upper end, solitary; surface hispid; margin of vent feebly developed; texture fragile; colour, in spirit, white; ectosomal skeleton of several layers of tangential triradiates with oxea projecting beyond surface; skeleton of chamber layer of centrifugally-directed basal rays of subendosomal triradiates and quadriradiates, and irregularly-arranged triradiates; exhalant canals lined with quadriradiates; endosomal skeleton of several layers of tangential quadriradiates, with apical rays projecting into cloacal cavity, and sparsely scattered tangential microxea.

Spicules: ectosomal triradiates, regular, rays 0·2 to 0·6 by 0·02 to 0·04 mm.,
oxea, 2·5 to 4·5 by 0·07 to 0·09 mm.,
triradiates of chamber layer, regular, rays 0·2 to 0·6 by 0·02 to 0·04 mm.,
quadriradiates of exhalant canals, sagittal, paired rays 0·3 to 0·4 by 0·02 to 0·04 mm.,
basal ray 0·35 to 0·51 by 0·028 to 0·04 mm., apical ray 0·08 to 0·13 by 0·016 to 0·03 mm.,
endosomal triradiates, sagittal, paired rays 0·35 by 0·05 mm., basal ray 0·5 by 0·05 mm.,
subendosomal quadriradiates, similar to triradiates, apical ray 0·1 by 0·02 to 0·025 mm.,
quadriradiates, sagittal, paired rays 0·22 to 0·31 by 0·02 to 0·028 mm., basal ray 0·2 to 0·35 by 0·02 to 0·028 mm., apical ray 0·12 to 0·18 by 0·016 to 0·024 mm.,
endosomal microxea, lanceolate, 0·09 to 0·11 by 0·006 mm.

Distribution: Japan (Sagami Bay).

Named form: **Sycon pedicellatum** Kirk

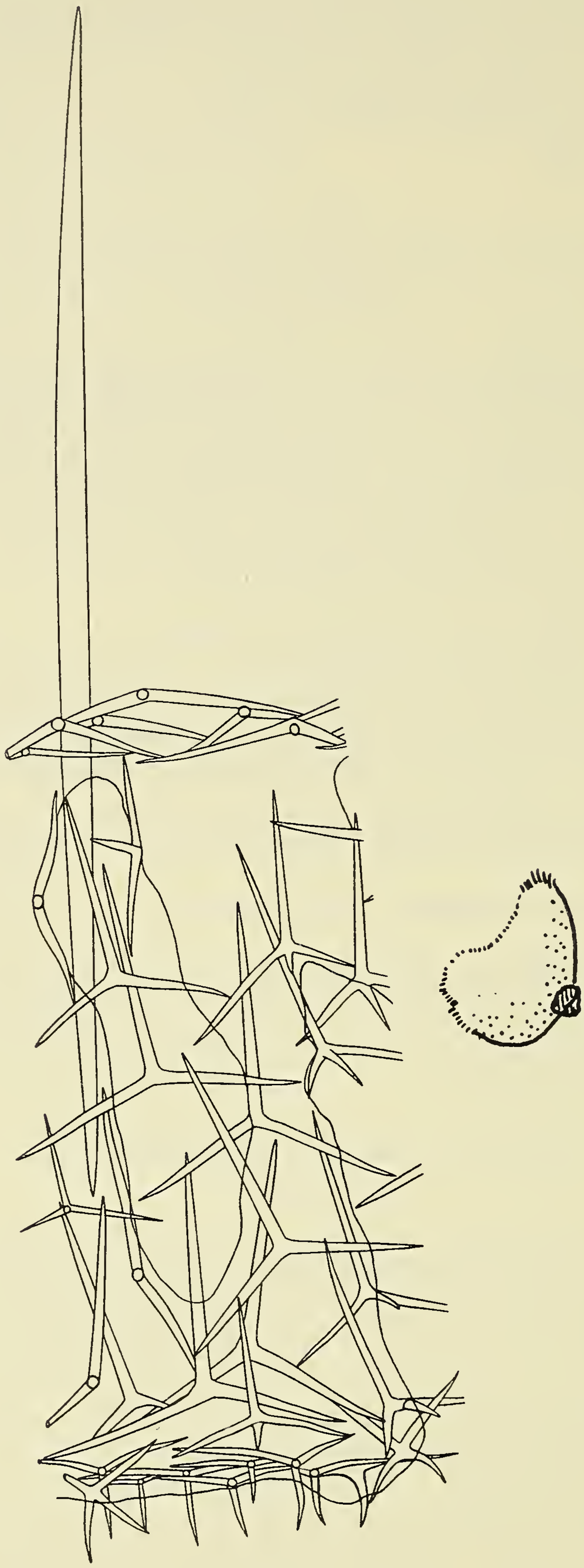
(text-fig. 243)

Sycon pedicellatum Kirk, 1911: 313, pl. xxxi, fig. 1, pl. xxxii, fig. 1; Dendy and Row, 1913: 747.

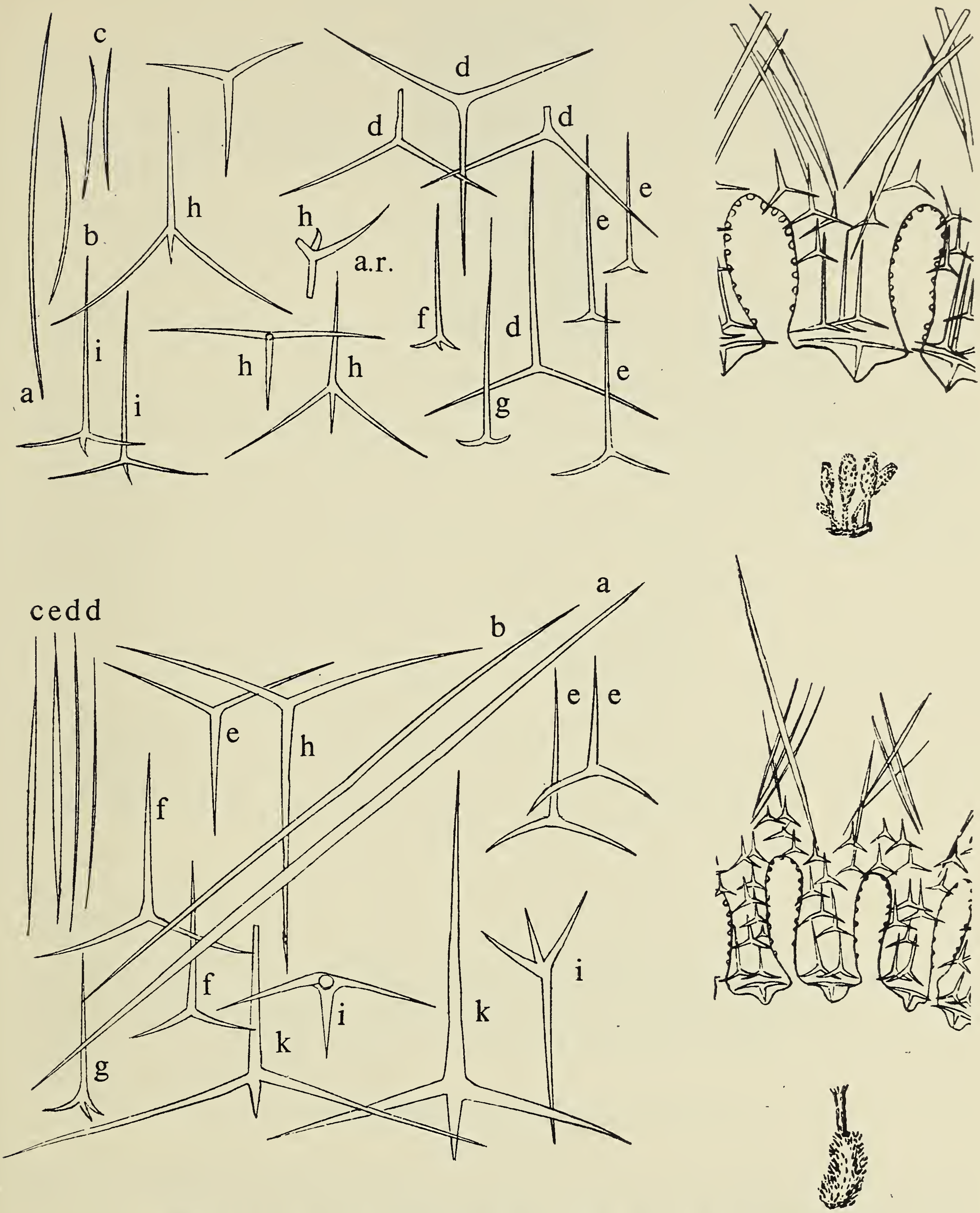
Description: Sponge tubular, stipitate, stoloniferous; surface minutely papillate, hispid; vent apical, fringed; texture soft; colour, in spirit, brownish-white; tubar skeleton of triradiates, with endosomal sagittal triradiates, and with distal cones ornamented with oxea; endosomal skeleton of quadriradiates.

Spicules: tubar triradiates, subregular to sagittal, paired rays 0·13 by 0·005 mm., basal ray 0·13 to 0·18 by 0·005 mm.,
oxea, 0·12 by 0·003 mm.,
oxea, 0·036 by 0·01 mm.,
subendosomal sagittal triradiates (sometimes quadriradiates), paired rays 0·03 by 0·008 mm., basal ray 0·17 by 0·008 mm.,
endosomal quadriradiates, subregular, facial rays 0·13 to 0·14 by 0·005 mm., apical ray 0·1 by 0·005 mm.

Distribution: New Zealand (Whangaruru); littoral.



Text-fig. 242. *Leucandra paucispina* after Hozawa: section across body wall with oxeote shown in full, × 50, external form, natural size.



Text-fig. 243. *Sycon pedicellatum* after Kirk: as it is impossible to reconcile the alleged magnifications of his drawings with the measurements given for the spicules by Kirk his illustrations are reproduced here as originally published: *S. pedicellatum* above, *S. ornatum* below.

Named form: **Grantia phillipsii** Lambe

(text-fig. 244)

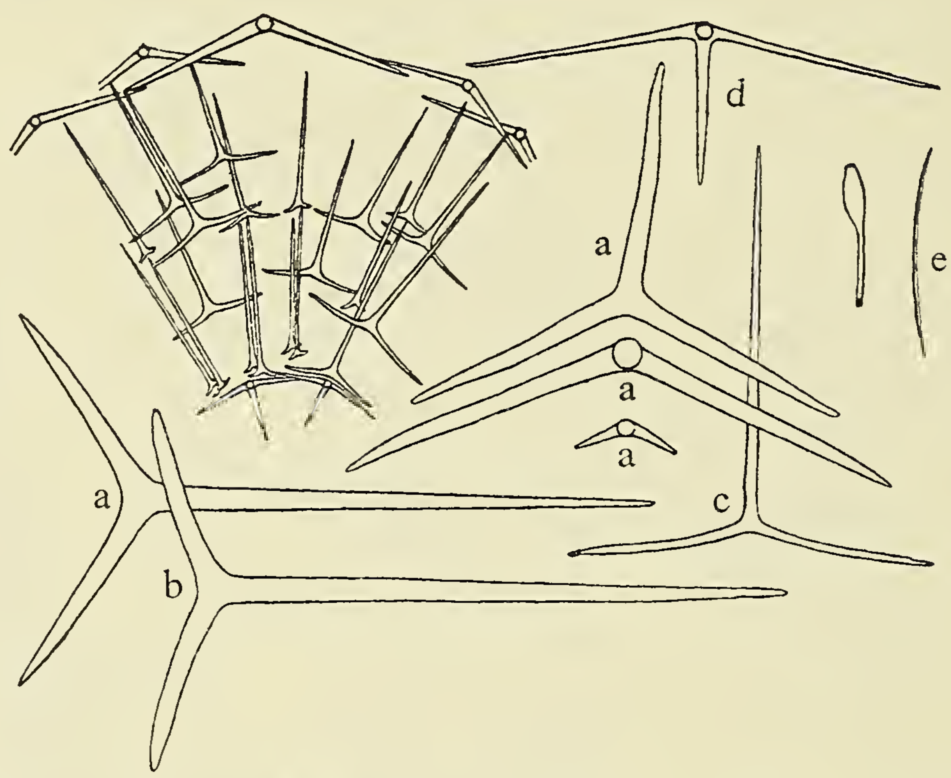
Grantia phillipsii Lambe, 1900: 30, pl. iv, fig. 9; Lambe, 1900, 167; Dendy and Row, 1913: 761; *G. phillipsi*, Breitfuss, 1932: 248.

Description: Sponge solitary, tubular, stipitate, small; surface even, smooth: vent terminal; texture soft; colour, in spirit, light brown; ectosomal skeleton a tangential layer of triradiates; tubar skeleton of triradiates; endosomal skeleton a tangential layer of quadriradiates; with microxea in stem.

Spicules: ectosomal triradiates, sagittal, paired rays 0·09 by 0·01 mm., basal rays 0·23 by 0·01 mm.,
tubar triradiates, sagittal, paired rays 0·078 by 0·005 mm., basal rays 0·16 by 0·005 mm.,
endosomal quadriradiates, facial rays 0·1 by 0·003 mm., apical rays 0·065 by 0·005 mm.,
microxea, echinating stalk, 0·078 by 0·002 mm.

Remarks: Lambe figures triradiates, in the chamber, with unusually short paired rays, but does not mention these in his written description. These seem to be directly comparable with the quadriradiates of *Leucandra cumberlandensis* from the same locality.

Distribution: Arctic (Davis Strait); 110 m.



Text-fig. 244. *Grantia phillipsii* after Lambe: spicules, ×100; section at right angles to surface, ×50; external form, ×⅔.
a. ectosomal triradiates; b. triradiate from stalk; c. triradiate of chamber layer; d. endosomal quadriradiate; e. oxeote from stalk.

Named form: **Sycetta primitiva** Haeckel

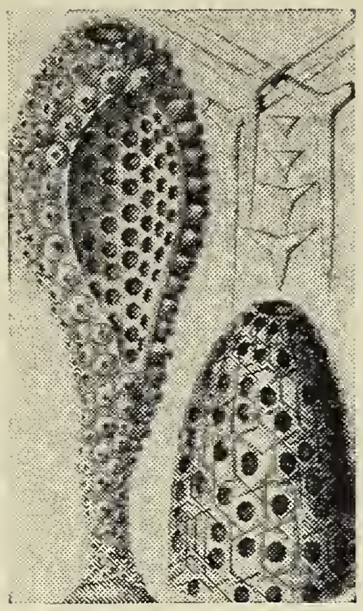
(text-fig. 245)

Sycetta primitiva Haeckel, 1872: 237, pl. xli, figs. 1–9; *Sycurus primitivus* Haeckel, 1872: 237, pl. xli, fig. 1; *Sycetta primitiva*, Dendy, 1892: 79; Dendy and Row, 1913: 743.

Description: Sponge tubular, stipitate; surface minutely papillate, non-hispid; vent simple, apical; texture soft; colour, in spirit, white; tubar and endosomal skeletons of regular triradiates.

Spicules: triradiates, of each body layer, regular, rays 0·1 to 0·2 by 0·01 to 0·012 mm.

Description: Australia (Bass Straits, Gulf of St. Vincent).



Text-fig. 245. *Sycetta primitiva* after Haeckel: spicules, ×100; external form, ×10; a single radial chamber, ×80.

Named form: **Grantia primitiva** Brøndsted

Grantia primitiva Brøndsted, 1926: 304, text-fig. 6.

Description: Sponge tubular; surface hispid; vent apical, fringed; texture hard; colour, in spirit, light grey; ectosomal skeleton a tangential layer of triradiates, with oxea set obliquely to surface; tubar skeleton of triradiates; endosomal skeleton of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, rays 0·08 to 0·17 by 0·009 mm.,
oxea, 0·6 by 0·025 mm.,
tubar triradiates (? similar to ectosomal triradiates),
endosomal quadriradiates, facial rays 0·12 by 0·004 to 0·005 mm., apical rays 0·3 by 0·004 to 0·005 mm.

Distribution: New Zealand (Hauraki Gulf); 9 m.

Remarks: Brøndsted (*l.c.*) comments: 'This species is evidently related to *Sycon*, the cortex being rather thin, and the radial chambers simple and many jointed.' It is, in fact, apart from the thin cortex, practically identical in form and spiculation with *S. ciliatum*.

Named form: **Sycon proboscideum** (Haeckel)

Syconella proboscidea Haeckel, 1870: 239; *Sycandra proboscidea* Haeckel, 1872: 313; *Sycon raphanus*, Row, 1909: 185; *S. proboscideum*, Dendy and Row, 1913: 747.

Description: Sponge ovate, tubular, solitary, sessile; surface hispid; vent terminal, with well-developed fringe; texture firm; colour, in spirit, white; tubar skeleton of centripetally-directed rays of subendosomal sagittal triradiates and several rows of tubar triradiates; distal ends of chambers ornamented with oxea, of two sizes, and basal rays of outermost rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of endosomal quadriradiates.

Spicules: tubar triradiates, subregular to sagittal, paired rays 0·12 to 0·175 by 0·007 mm., basal rays 0·105 to 0·12 by 0·007 mm.,
oxea, 1·0 by 0·012 mm.,
oxea, 0·35 to 0·5 by 0·004 to 0·007 mm.,
subendosomal sagittal triradiates, paired rays 0·105 by 0·007 mm., basal rays 0·175 by 0·007 mm.,
endosomal quadriradiates, regular, rays 0·07 to 0·11 by 0·007 mm., apical rays 0·04 to 0·09 mm.

Distribution: Red Sea.

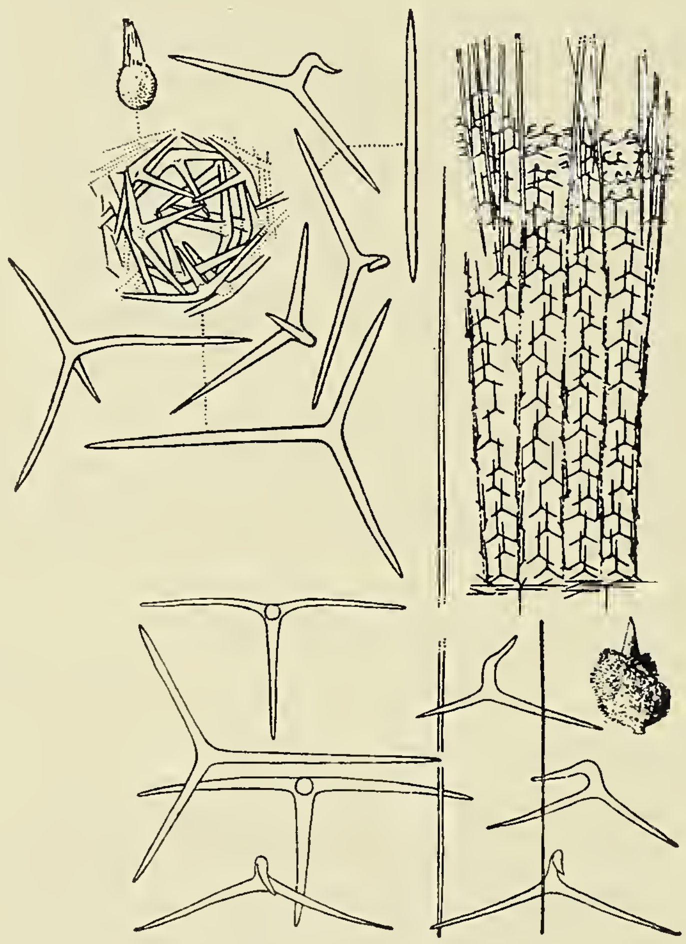
Named form: **Sycon protectum** Lambe

(text-fig. 246)

Sycon protectum Lambe, 1896: 204, pl. iii, fig. 6; Lambe, 1900: 27, pl. i, fig. 4; Lambe, 1900: 165; Dendy and Row, 1913: 747; Breitfuss, 1932: 245; *Scypha protecta*, de Laubenfels, 1949: 41.

Description: Sponge solitary, ovoid or irregularly ovoid, sessile; surface hispid; vent terminal, with well-developed fringe; texture firm; colour, in spirit, pale yellowish-grey; tubar skeleton of centripetally-directed rays of subendosomal triradiates, several rows of sagittal triradiates and several rows of quasi-ectosomal triradiates with basal ray bent at right angles; distal ends of chambers ornamented with basal rays of outermost triradiates and tufts of oxea; endosomal skeleton of paired rays of subendosomal triradiates, and several tangential layers of endosomal triradiates and quadriradiates.

Spicules: triradiates of chambers, sagittal, paired rays 0·11 by 0·006 to 0·009 mm., basal rays 0·21 by 0·005 to 0·009 mm.,
triradiates of outermost layers (quasi-ectosomal) with basal rays bent at right-angles, paired rays 0·11 by 0·006 to 0·009 mm., basal rays 0·065 by 0·006 to 0·009 mm.,
oxea, 1·0 by 0·019 mm.,
trichoxea, 1·0 by 0·002 mm.,



Text-fig. 246. *Sycon protectum* after Lambe: spicules, ×100, except for oxeote (top centre) which is ×50, and that to its right and below which is ×25; external form, about natural size; section at right angles to surface ×25.
Two specimens are represented here, both named by Lambe. The group to the top left represents the holotype, the rest represents a second specimen, remarkably similar but differing in small details of spiculation and, more especially, in the sizes of the oxea.
Note also the arrangement of the ectosomal triradiates at the entrance of one of the radial tubes, in the centre of group top left, indicating a grantioid condition of the skeleton.

subendosomal triradiates, sagittal, of same dimensions as normal triradiates of chamber layer (?),
endosomal triradiates, regular, facial rays 0·13 by 0·006 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·085 by 0·006 mm.

Distribution: Atlantic coast of Canada; Vancouver Island; 102–110 m.

Named form: **Sycon pulchrum** Tanita

(text-fig. 247)

Sycon pulchrum Tanita, 1943: 409, pl. xiv, fig. 41, text-figs. 12–13.

Description: Sponge tubular, very small; surface hispid; vent apical, with a slight fringe; texture soft; colour, in spirit, pure white; skeleton of chamber layer composed of basal rays of subendosomal triradiates and one or two layers of tubar triradiates, rarely quadriradiates, with distal ends of chambers ornamented with tufts of oxea and trichoxea; endosomal skeleton of paired rays of subendosomal triradiates and one or two layers of endosomal quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: tubar triradiates, sagittal, paired rays 0·08 to 0·095 by 0·008 to 0·01 mm., basal ray 0·11 to 0·14 by 0·008 to 0·01 mm.,
tubar quadriradiates, similar to triradiates, with apical ray 0·05 by 0·008 mm.,
oxea, 0·18 to 0·21 by 0·01 mm.,
trichoxea, 0·4 by 0·002 mm.,
subendosomal sagittal triradiates, paired rays 0·08 to 0·1 by 0·01 mm., basal ray 0·16 to 0·2 by 0·01 mm.,
endosomal quadriradiates, paired rays 0·1 to 0·13 by 0·01 mm., basal ray 0·15 to 0·18 by 0·01 mm., apical ray 0·14 to 0·25 by 0·008 to 0·01 mm.

Distribution: Japan (Kagosima Prefecture); 183 m.

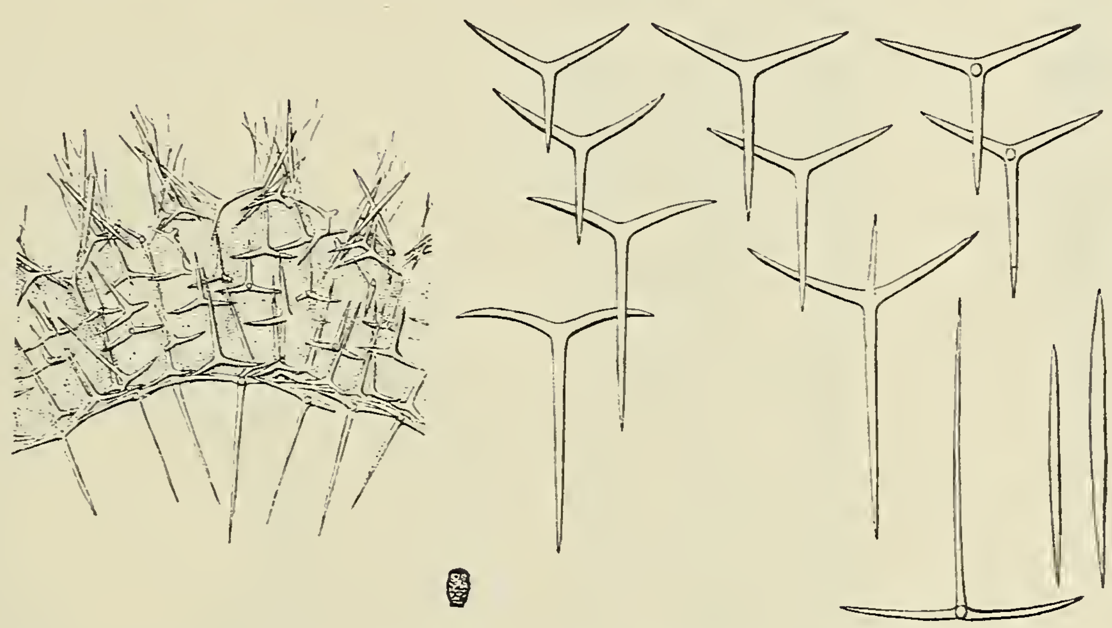


Fig. 247. *Sycon pulchrum* after Tanita: spicules, ×100; section at right angles to surface, ×50; external form (centre below), natural size.

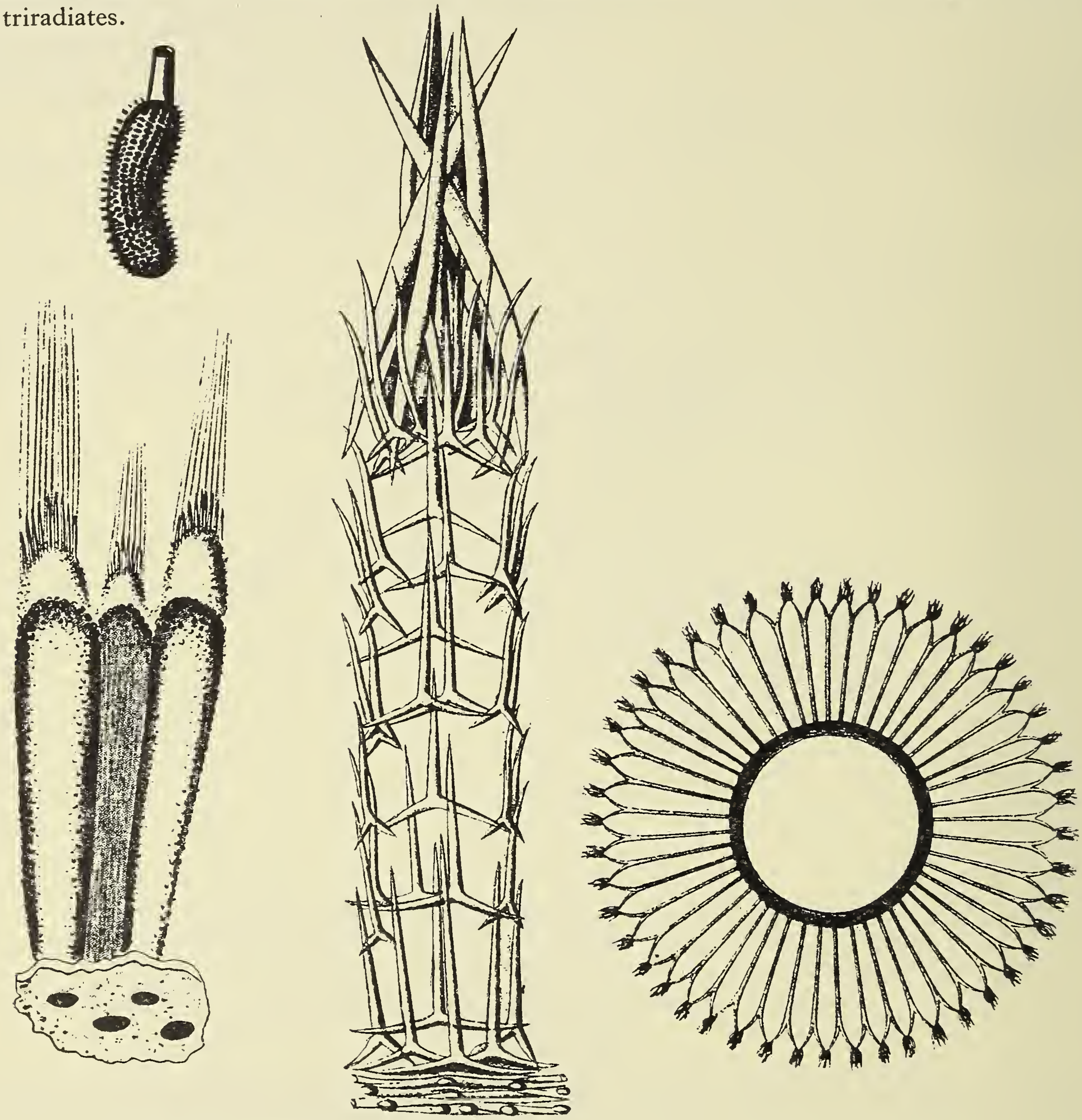
Named form: **Sycon quadrangulatum** (Schmidt)

(text-fig. 248)

Syconella quadrangulata Schmidt, 1868: 29, pl. v, fig. 9; Haeckel, 1870: 238; *Sycortis quadrangulata*, Haeckel, 1872: 280, pl. xlviii, figs. 3–8; *Sycurus quadrangulatus*, Haeckel, 1872: 280; *Syconella quadrangulata*, Haeckel, 1872: 281; *Sycarium quadrangulatum*, Haeckel, 1872: 281; *Sycocystis quadrangulata*, Haeckel, 1872: 281; *Sycortis quadrata* Haeckel, 1872: 281; *S. tetragona* Haeckel, 1872: 281; *S. tesseraria* Haeckel, 1872: 281; *Sycandra quadrangulata*, Haeckel, 1872: 281; *Sycortis quadrangulata*, Keller, 1876: 19; Bowerbank, 1882: 230; *Sycon quadrangulatum*, Poléjaeff, 1883:

24; *Sycandra quadrangulata*, Lendenfeld, 1891: 265, pl. xi, fig. 79; *Sycon quadrangulatum*, var. *tesseraria*, Levinsen, 1893: 425; *S. quadrangulatum*, et varr. *quadrata*, *tesseraria*, *tetragona*, Breitfuss, 1898: 25; *S. quadrangulatum*, Breitfuss, 1898: 9; Thacker, 1908: 766; Dendy and Row, 1913: 747; *S. tesserarium*, Dendy and Row, 1913: 749; *S. quadrangulatum*, var. *tesseraria*, Breitfuss, 1927: 29; *S. quadrangulatum*, Topsent, 1934: Arndt, 1935: 13, fig. 15; Breitfuss, 1935: 20; Arndt, 1941: 46.

Description: Sponge solitary, ovate to cylindrical, sessile; surface hispid; vent apical, with fringe; texture firm; colour, in spirit, white, yellow, brown or red; tubar skeleton of centrifugally-directed basal rays of subendosomal sagittal triradiates and rows of tubar triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates, together with tufts of oxea; endosomal skeleton of paired rays of subendosomal triradiates and one or more tangential layers of triradiates.



Text-fig. 248. *Sycon quadrangulatum*: external form (top left) and three radial chambers (bottom left), as originally figured by Schmidt (scales not stated); a radial chamber ×100 and a transverse section ×15, as figured by Haeckel (1872).

Spicules: tubar triradiates, sagittal, paired rays 0·05 to 0·08 by 0·01 mm., basal rays 0·1 to 0·15 by 0·01 mm.,
oxea, 0·3 to 0·5 by 0·023 to 0·05 mm.,
subendosomal sagittal triradiates, paired rays 0·06 to 0·1 by 0·01 mm., basal rays 0·12 to 0·18 by 0·01 mm.,
endosomal triradiates, regular to sagittal, rays 0·15 to 0·3 by 0·012 mm.

Distribution: Arctic; Atlantic coasts of Europe; Baltic; Mediterranean; Cape Verde Islands; 14–65 m.

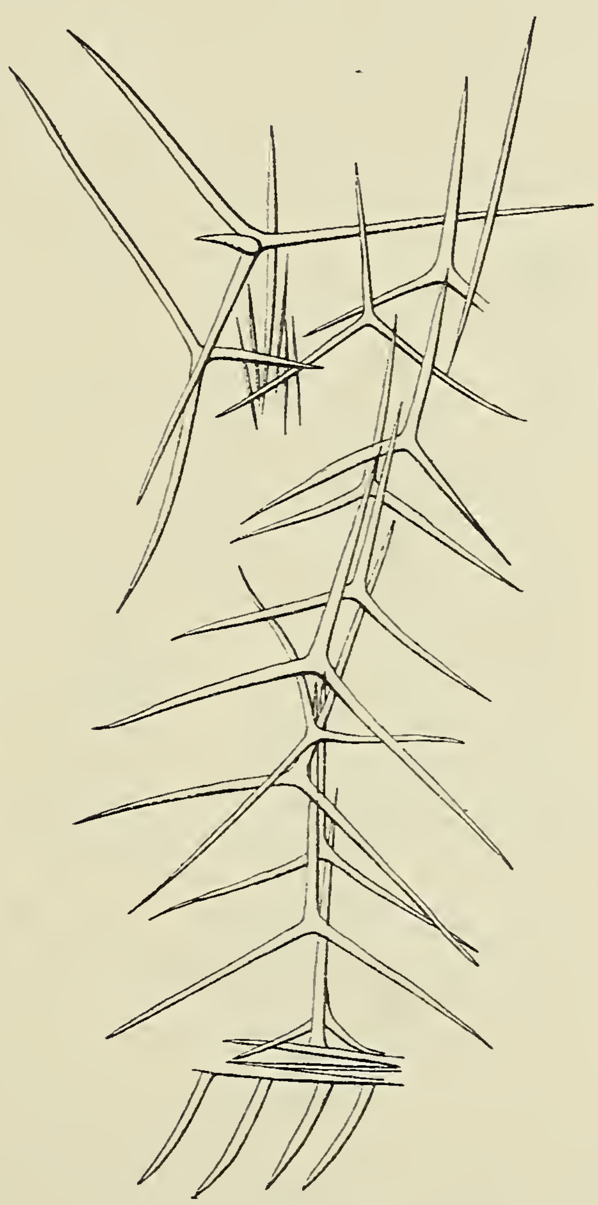
Named form: **Sycandra quadrata** Schuffner

(text-fig. 249)

Sycandra quadrata Schuffner, 1877: 425, pl. xxvi, fig. 12; *Sycon schuffneri* Dendy and Row, 1913: 748.

Description: Sponge solitary, tubular, slightly bent, sessile; surface hispid; vent apical, with well-developed fringe; texture soft, friable; colour, in spirit, white to pale brown; tubar skeleton of centripetally-directed rays of subendosomal sagittal triradiates and rows of triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and oxea of two sorts; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·13 mm. long, basal rays 0·18 mm. long,
oxea, 0·22 by 0·004 and 0·22 by 0·001 mm. respectively,



Text-fig. 249. *Sycandra quadrata* after Schuffner: spicules, × 100, arranged as in the wall of a radial tube.

subendosomal sagittal triradiates (?),
endosomal quadriradiates, sagittal, paired rays 0·2 by 0·009 mm., basal rays 0·25 by 0·009 mm., apical rays (?),
endosomal triradiates, of similar dimensions to quadriradiates.

Distribution: Norway.

Named form: **Sycetta quadriradiata** Hozawa

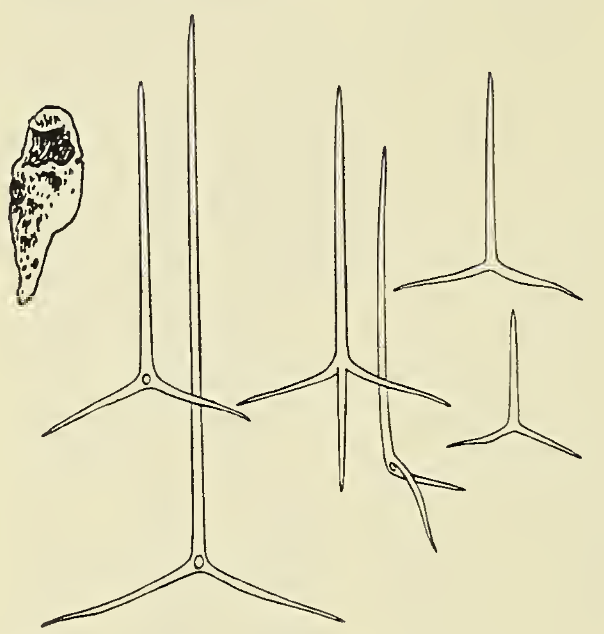
(text-fig. 250)

Sycetta quadriradiata Hozawa, 1929: 294, pl. xiii, figs. 12–13, text-fig. 7; Hozawa, 1940: 36; Tanita, 1943: 396.

Description: Sponge tubular (6 mm. greatest diameter), contracted below; (vent missing); surface even, granular; texture soft, elastic; colour, in spirit, greyish-white; tubar skeleton of several rows of triradiates and centripetally-directed basal rays of subendosomal quadriradiates; distal ends of chambers ornamented with converging rays of outermost triradiates; endosomal skeleton of paired and apical rays of subendosomal quadriradiates and a layer of quadriradiates with apical ray projecting into cloacal cavity.

Spicules: triradiates of chamber layer, sagittal, paired rays 0·08 to 0·1 by 0·006 mm., basal ray 0·12 to 0·2 by 0·006 mm.,
subendosomal quadriradiates, sagittal, paired rays 0·1 by 0·008 mm., basal ray 0·25 by 0·008 mm., apical ray 0·13 by 0·006 mm.,
endosomal quadriradiates, sagittal, paired rays 0·13 to 0·18 by 0·008 to 0·01 mm., basal ray 0·28 to 0·45 by 0·008 to 0·01 mm., apical ray 0·15 to 0·4 by 0·008 to 0·01 mm.

Distribution: Japan (Kagoshima Bay); 100 m.



Text-fig. 250. *Sycetta quadriradiata* after Hozawa: spicules, ×100; external form, natural size.

Named form: **Sycon raphanus** Schmidt

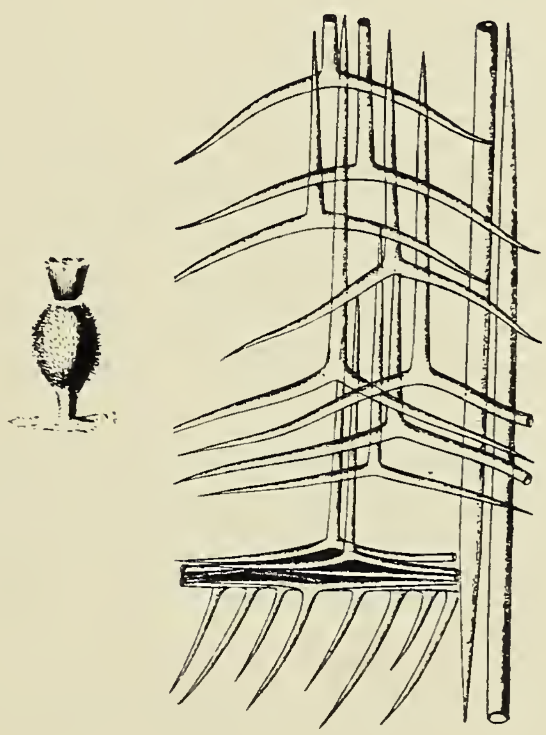
(text-fig. 251)

? *Spongia inflata* Chiaje, 1828: 114, pl. xxxvii, figs. 16–17; *Sycon ciliatum*, Lieberkühn, 1859: 373, pl. ix, fig. 3; Schmidt, 1862: 14, pl. i, fig. 1; *S. raphanus* Schmidt, 1862: 14, pl. i, fig. 2; *Grantia raphanus*, Gray, 1867: 554; *Sycon raphanus* Schmidt, 1868: 32; *Sycarium vesica* Haeckel, 1870: 238; *Sycum tergestinum* Haeckel, 1870: 239; *S. raphanus*, Haeckel, 1870: 239; *S. inflatum*, Haeckel, 1870: 239; *Sycodendrum procumbens* Haeckel, 1870: 245; *Sycandra raphanus*, Haeckel, 1872: 312, pl. liii, fig. 4, pl. lx, fig. 7; *Sycurus raphanus*, Haeckel, 1872: 312; *Syconella raphanus*, Haeckel, 1872: 312; *Sycarium raphanus*, Haeckel, 1872: 313; *Sycothamnus raphanus*, Haeckel, 1872: 313; *Sycinula raphanus*, Haeckel, 1872: 313; *Sycodendrum raphanus*, Haeckel, 1872: 313; *Sycandra tergestina* Haeckel, 1872: 313; *S. procumbens* Haeckel, 1872: 313; *Sycon raphanus*, Poléjaeff, 1883: 40; Lendenfeld, 1885: 1093; *Sycandra raphanus*, Lackschewitsch, 1886: 340; 1886: 302; *Sycon raphanus*, Dendy, 1892: 80; *S. minutum* Dendy, 1892: 80; *S. ensiferum* Dendy, 1892: 81; *S. setosum* Dendy, 1892: 81; *S. raphanus*, Breitfuss, 1896: 428; Breitfuss, 1896: 434; Breitfuss, 1898: 218; Breitfuss, 1898: 93; Breitfuss, 1898: 17; Breitfuss, 1898: 110; *S. raphanus*, et varr. *proboscidea*, *procumbens*, *tergestina*, *aquariensis*, Breitfuss, 1898: 25; *S. raphanus*, var. *proboscidea*, Breitfuss, 1898: 460; *Sycandra raphanus*, Arnesen, 1901: 69; 1901: 18; *S. raphanus*, var. *tergestina*, Arnesen, 1901: 19; *Sycon raphanus*, Breitfuss, 1911: 212; *S. ensiferum*, Dendy and Row, 1913: 746; *S. minutum*, Dendy and Row, 1913: 747; *S. procumbens*, Dendy and Row, 1913: 748; *S. tergestinum*, Dendy and Row, 1913: 748; *S. raphanus*, Ferrer, 1918: 11; Breitfuss, 1927: 29; Hozawa, 1929: 297; Row and Hozawa, 1931: 769; Topsent, 1934: 10; Arndt, 1935: 13, fig. 1b; Arndt, 1940: 4; Arndt, 1941: 46; Tanita, 1943: 412.

Description: Sponge tubular, cylindrical to spherical; surface minutely papillate, hispid; vent apical; texture soft; colour, in spirit, white, grey, yellow or brown; tubar skeleton of triradiates, with subendosomal triradiates and distal cones ornamented with oxea; endosomal skeleton of triradiates and quadriradiates.

Spicules: triradiates, sagittal, paired rays 0·1 to 0·18 by 0·01 to 0·012 mm., basal rays 0·15 to 0·25 mm.,
oxea, 1·0 to 3·0 by 0·02 to 0·024 mm.,
subendosomal sagittal triradiates, similar to tubar triradiates,
endosomal triradiates, regular to subregular, rays 0·15 to 0·25 by 0·008 to 0·01 mm.,
endosomal quadriradiates, similar to endosomal triradiates, with apical rays 0·06 to 0·12 mm. long.

Distribution: Arctic; Atlantic coasts of Europe; Mediterranean; Red Sea; Indian Ocean (Ceylon); Australia (Port Jackson, Port Phillip Heads); Philippines; Japan; Tristan da Cunha; Chile (Punta Arenas); littoral to 277 m.



Text-fig. 251. *Sycon raphanus*: spicules, ×100; external form, ×3. These are the only two published figures of this well-known species; that on the left from Schmidt (1862), and that on the right from Haeckel (1872).

Named form: **Sycon rotundum** Tanita

Sycon rotundum Tanita, 1941: 270, pl. xvii, fig. 5, text-fig. 2; Tanita, 1942: 36; Tanita, 1943: 412.

Description: Sponge spherical; surface papillate, hispid; vent apical, with well-developed fringe; texture (?); colour, in spirit, greyish-white; tubar skeleton composed of basal rays of subendosomal triradiates and of tubar triradiates and quadriradiates, with oxea ornamenting distal ends of flagellated chambers; endosomal skeleton of paired rays of subendosomal triradiates and of several tangential layers of triradiates and quadriradiates.

Spicules: oxea, 0·45 to 1·2 by 0·008 to 0·02 mm.,
tubar triradiates, slightly sagittal; rays 0·07 to 0·13 by 0·006 mm.,
tubar quadriradiates similar to triradiates, with apical ray 0·01 to 0·025 by 0·004 mm.,
subendosomal sagittal triradiates, paired rays 0·06 to 0·09 by 0·006 mm., basal ray 0·1 to 0·15 by 0·006 mm.,
endosomal triradiates, paired rays 0·11 to 0·13 by 0·006 mm., basal ray 0·17 to 0·21 by 0·006 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·045 to 0·075 by 0·006 mm.

Distribution: Japan (Onagawa Bay, Misaki, Awa-Kominato); littoral.

Named form: **Leucandra sagamiana** Hozawa

(text-fig. 252)

Leucandra sagamiana Hozawa, 1929: 353, pl. xx, figs. 53, 54, text-fig. 27; Tanita, 1943: 445.

Description: Sponge ovoid, solitary; surface strongly hispid; fringe of vent well developed; texture firm, elastic; colour, in spirit, greyish-white; ectosomal skeleton of several layers of tangential triradiates, with oxea, of two kinds, projecting at right angles to surface; skeleton of chamber layer of centrifugally-directed rays of subendosomal triradiates and quadriradiates, and irregularly-placed triradiates; endosomal skeleton of paired rays of subendosomal triradiates and paired and apical rays of subendosomal quadriradiates, and several layers of tangential triradiates, with sparsely distributed microxea.

Spicules: ectosomal triradiates, sagittal, paired rays 0·19 to 0·33 by 0·02 to 0·028 mm., basal ray 0·2 to 0·28 by 0·02 to 0·028 mm.,
oxea, of two kinds, 1·4 to 3·0 by 0·04 to 0·08 mm., and 2·0 to 3·0 (?) by 0·004 mm.,
triradiates of chamber layer, sagittal, paired rays, 0·16 to 0·24 by 0·012 to 0·02 mm., basal ray 0·19 to 0·32 by 0·016 to 0·024 mm.,
subendosomal triradiates, sagittal, paired rays 0·14 to 0·22 by 0·012 to 0·02 mm., basal ray 0·22 to 0·45 by 0·012 to 0·024 mm.,
subendosomal quadriradiates, sagittal, similar to triradiates, apical ray 0·08 by 0·012 mm.,
endosomal triradiates, sagittal, paired rays 0·17 to 0·25 by 0·01 to 0·016 mm., basal ray 0·27 to 0·42 by 0·01 to 0·016 mm.,
endosomal microxea, 0·09 to 0·17 by 0·004 to 0·006 mm.

Distribution: Japan (Sagami Sea); 171 m.

Named form: **Sycetta sagittata** de Laubenfels

Sycetta sagittata de Laubenfels, 1942: 268.

Description: Sponge tubular, subcylindrical; surface almost smooth; vent apical; texture soft; colour, in spirit, pale yellow; skeleton of tubar triradiates and endosomal quadriradiates.

Spicules: triradiates, sagittal, paired rays 0·1 by 0·004 mm., basal ray 0·3 by 0·005 mm.,
quadriradiates (dimensions not given).

Distribution: Fox Channel, Baffinland.

Text-fig. 252. *Leucandra sagamiana* after Hozawa: section at right angles to surface, ×50; external form, natural size.

Named form: **Sycetta sagittifera** Haeckel

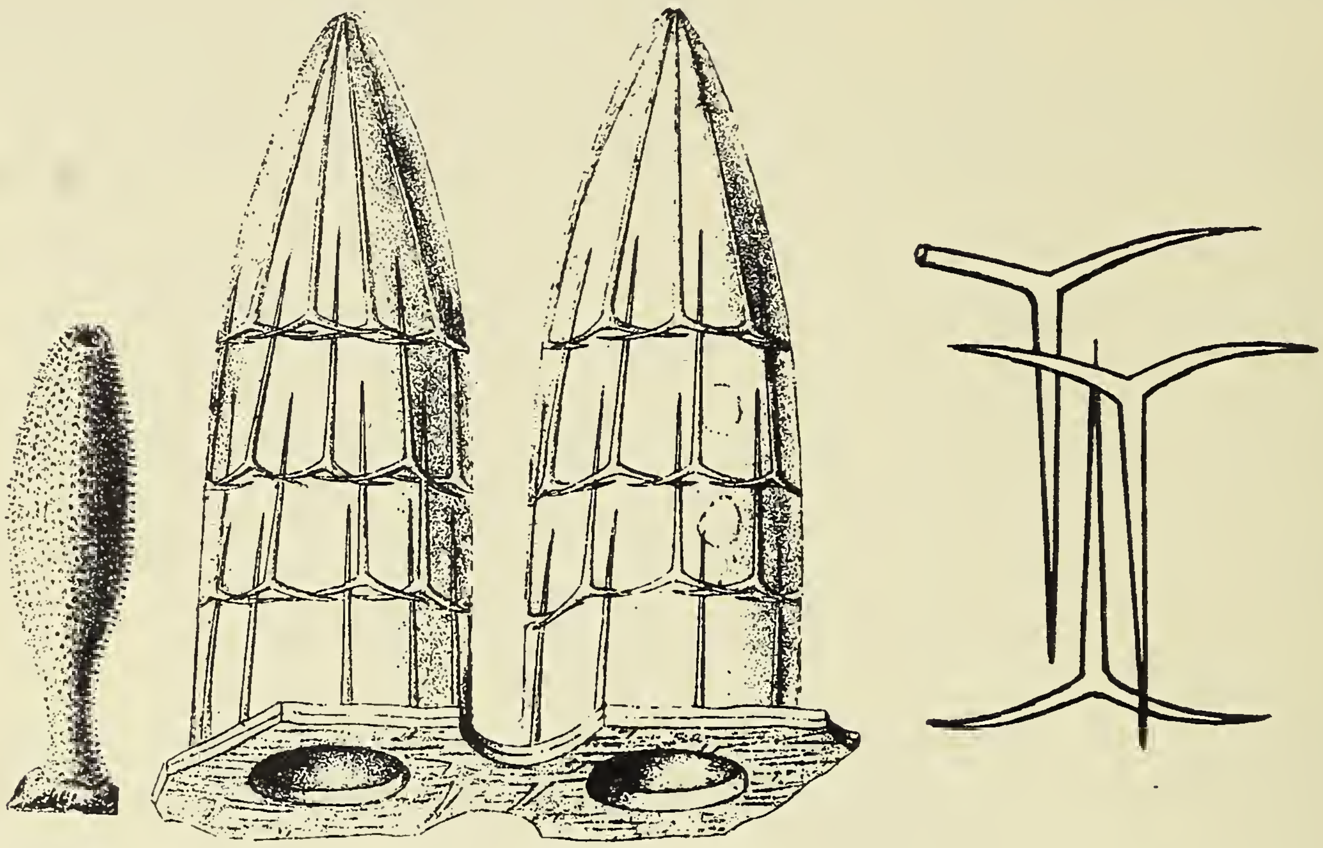
(text-fig. 253)

Sycetta sagittifera Haeckel, 1872: 240, pl. xlii, figs. 1–4; *Sycurus sagittifer* Haeckel, 1872: pl. xlii, fig. 1; *Sycetta sagittifera*, Dendy and Row, 1913: 743.

Description: Sponge tubular, substipitate; surface minutely papillate, non-hispid; vent small, apical; texture soft; colour, in spirit, white; tubar and endosomal skeletons of sagittal triradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·05 to 0·08 by 0·006 mm., basal ray 0·1 to 0·2 by 0·006 mm.,
endosomal triradiates, sagittal, paired rays 0·1 to 0·15 by 0·012 mm., basal ray 0·2 to 0·3 by 0·012 mm.

Distribution: Indian Ocean (Ceylon).



Text-fig. 253. *Sycetta sagittifera* after Haeckel: spicules, ×100; radial tubes shown diagrammatically (Haeckel gives the magnification as ×100, which is clearly incorrect); external form, ×2.

Named form: **Sycon satsumensis** Hozawa

Sycon satsumensis Hozawa, 1929: 310, pl. xv, figs. 24, 25, text-fig. 13; Tanita, 1943: 413.

Description: Sponge solitary, tubular, laterally-compressed, substipitate; surface uneven, hispid; vent apical, with well-developed margin; texture soft, delicate; colour, in spirit, greyish-white; tubar skeleton of centripetally-directed basal rays of subendosomal triradiates, with several rows of triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and dense tufts of slender oxea; endosomal skeleton of paired rays of subendosomal triradiates and one or more layers of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: tubar triradiates, sagittal, paired rays 0·08 to 0·19 by 0·008 mm., basal ray 0·17 to 0·28 by 0·008 mm.,
oxea, indistinctly lanceolate at distal end, 0·91 by 0·002 to 0·012 mm.,
subendosomal triradiates, sagittal, paired rays 0·13 to 0·19 by 0·006 to 0·008 mm., basal ray 0·15 to 0·36 by 0·006 to 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·16 to 0·25 by 0·006 to 0·008 mm., basal ray 0·24 to 0·42 by 0·006 to 0·008 mm.,
endosomal quadriradiates, sagittal, paired rays 0·21 to 0·24 by 0·008 to 0·01 mm., basal ray 0·33 to 0·4 by 0·01 to 0·012 mm., apical ray 0·09 to 0·2 by 0·01 mm.

Distribution: Japan (Kagoshima Bay).

Named form: **Sycon schmidtii** (Haeckel)

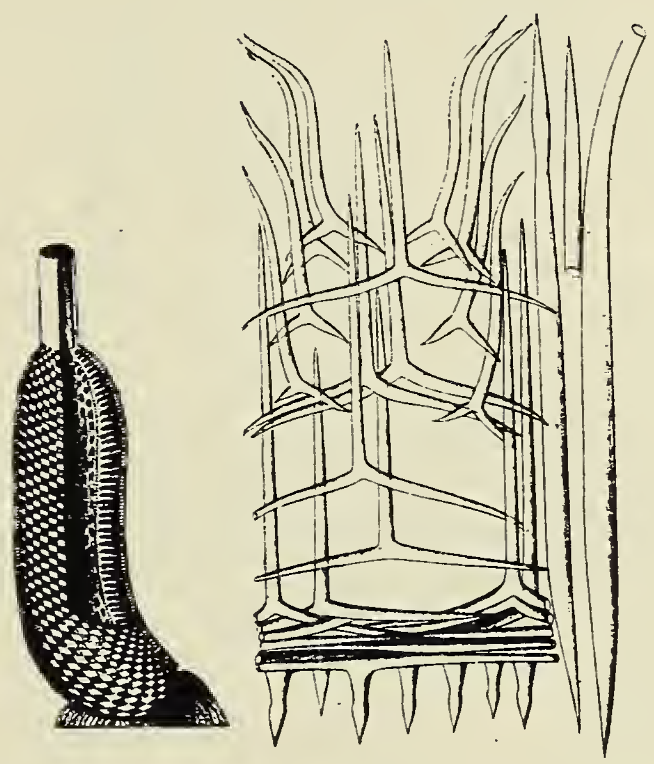
(text-fig. 254)

Sycandra schmidtii Haeckel, 1872: 328, pl. lii, fig. 1, pl. lviii, fig. 2; *Syconella schmidtii* Haeckel, 1872: 329, pl. viii, fig. 2; *Sycandra schmidtii*, Lackschewitsch, 1886: 340; 1886: 303; Lendenfeld, 1891: 263, pl. xi, fig. 64, pl. xiii, figs. 109–111; *Sycon schmidtii*, Dendy and Row, 1913: 748; Ferrer, 1923: 161; Topsent, 1934: 10.

Description: Sponge tubular, sessile; surface reticulate, hispid; vent apical, fringed; texture (?); colour, alive, white or grey; distal ends of radial chambers ornamented with oxea; tubar skeleton of basal rays of subendosomal triradiates and rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·1 to 0·15 by 0·01 mm., basal ray 0·2 to 0·3 by 0·01 mm.,
oxea, 0·1 to 0·5 by 0·02 to 0·03 mm.,
oxea, 0·1 to 0·3 by 0·01 mm.,
subendosomal sagittal triradiates, paired rays 0·15 by 0·01 mm., basal ray 0·3 by 0·01 mm.,
endosomal triradiates, regular to subregular, rays 0·2 to 0·4 by 0·01 to 0·015 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·04 to 0·05 by 0·012 to 0·016 mm.

Distribution: Mediterranean; littoral.



Text-fig. 254. *Sycon schmidtii* after Haeckel: spicules, ×100; external form, ×2½.

Named form: **Sycon setosum** Schmidt

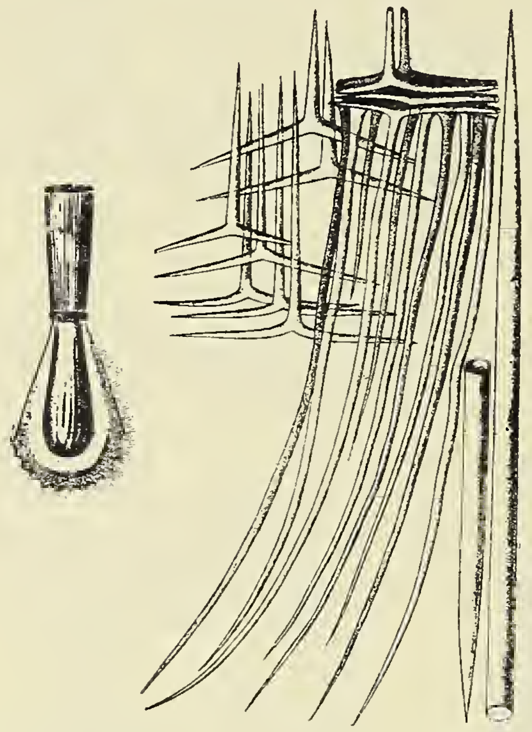
(text-fig. 255)

Sycon setosum Schmidt, 1862: 15, pl. i, fig. 3; *Grantia setosa*, Gray, 1867: 554; *Sycum setosum*, Haeckel, 1870: 239; *Sycandra setosa*, Haeckel, 1872: 322, pl. liii, fig. 3, pl. lx, fig. 11; *Sycarium setosum*, Haeckel, 1872: 322; *Sycandra setosa*, Lackschewitsch, 1886: 340; 1886: 303; Lendenfeld, 1891: 257, pl. xi, fig. 60, pl. xii, figs. 85–92; *Sycon setosum*, Stephens, 1912: 11; Dendy and Row, 1913: 748; Topsent, 1934: 10; *nec* Dendy, 1892.

Description: Sponge spherical or ovate, sessile; surface villose, hispid; vent apical, fringed; texture soft; colour, alive, white, grey or brown; ends of radial chambers ornamented with oxea; tubar skeleton of basal rays of subendosomal sagittal triradiates and rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·08 to 0·16 by 0·005 to 0·008 mm., basal ray 0·12 to 0·2 by 0·005 to 0·008 mm.,
oxea, 1·0 to 2·0 by 0·02 mm.,
oxea, 0·1 to 0·2 by 0·001 mm.,
subendosomal sagittal triradiates, paired rays 0·09 to 0·1 by 0·01 mm., basal ray 0·12 to 0·21 by 0·01 mm.,
endosomal triradiates, subregular, rays 0·1 to 0·2 by 0·005 mm.,
endosomal quadriradiates, similar to endosomal triradiates, apical ray 0·3 to 0·6 by 0·005 mm.

Distribution: Mediterranean; British Isles; littoral.



Text-fig. 255. *Sycon setosum*: spicules, ×100; external form, ×3. These two figures, that on the left from Schmidt (1862) and that on the right from Haeckel (1872), are the only known figures of this species, except for those of Lendenfeld (1891), which add very little to our knowledge of it.

Named form: **Sycon simushirensis** Hozawa

Sycon simushirensis Hozawa, 1918: 529, pl. lxxxiv, fig. 6, text-fig. 2; Hozawa, 1929: 297; Tanita, 1941: 273; Tanita, 1943: 413.

Description: Sponge tubular, laterally compressed; surface nearly smooth; texture moderately firm; colour, in alcohol, white; tubar skeleton of basal rays of endosomal triradiates and rows of sagittal triradiates; distal ends of radial chambers bearing tufts of spicules formed of oxea and basal rays of tubar triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates, in addition to tangential triradiates and quadriradiates, with facial rays projecting into cloacal cavity.

Spicules: tubar triradiates, slightly sagittal, paired rays 0·09 to 0·1 by 0·008 mm., basal ray 0·1 to 0·14 by 0·006 mm.,
oxea, 0·08 by 0·004 mm.,
subendosomal triradiates, sagittal, paired rays 0·08 to 0·12 by 0·006 to 0·008 mm., basal ray 0·2 by 0·006 to 0·008 mm.,

endosomal triradiates, sagittal, paired rays 0·07 to 0·18 by 0·008 mm., basal ray 0·11 to 0·33 by 0·008 mm.,

endosomal quadriradiates, of same dimensions as triradiates, apical ray, 0·04 to 0·08 mm. long.

Distribution: North-west Pacific (Kurile Islands); Japan (Onagawa Bay); 419 m.

Named form: **Vosmaeropsis spinosa** Tanita

(text-fig. 256)

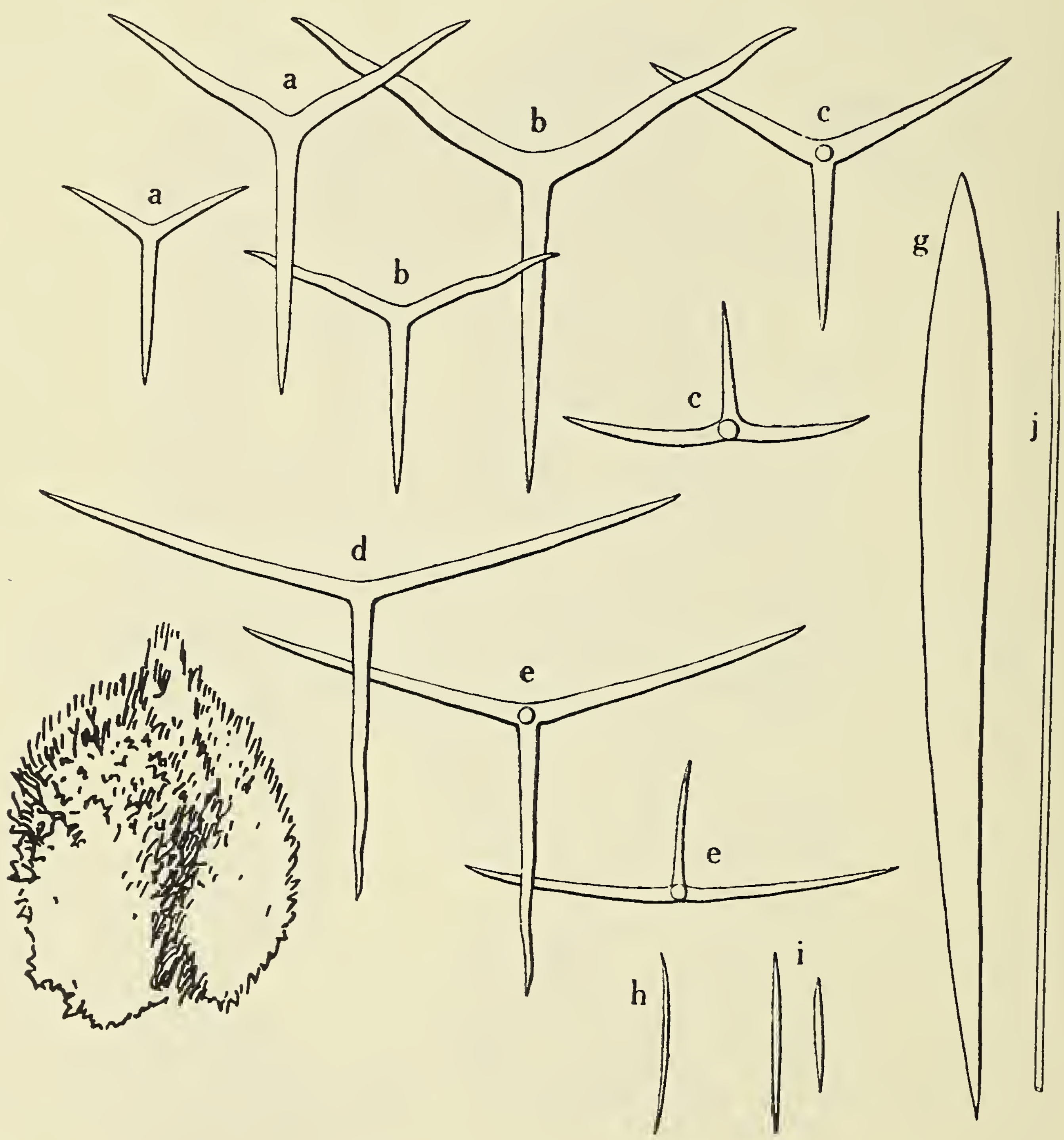
Vosmaeropsis spinosa Tanita, 1943: 423, pl. xv, fig. 53, text-figs. 16–17.

Description: Sponge ovate; surface strongly hispid; vent apical, slightly fringed; texture hard; colour, in spirit, white; ectosomal skeleton of several tangential layers of triradiates, together with paired rays of subectosomal triradiates, and oxea projecting at surface; skeleton of chamber layer of basal rays of subectosomal and subendosomal triradiates, with tubar triradiates irregularly and thickly packed between; endosomal skeleton of paired rays of subendosomal triradiates and quadriradiates and a tangential layer of endosomal quadriradiates.

Text-fig. 256. *Vosmaeropsis spinosa* after Tanita: section at right angles to surface, $\times 50$; external form, $\times \frac{5}{3}$.

Spicules: ectosomal triradiates, sagittal, paired rays 0·21 to 0·28 by 0·026 to 0·032 mm., basal ray 0·14 to 0·21 by 0·026 to 0·032 mm.,
oxea, 1·0 to 1·8 by 0·06 to 0·08 mm.,
subectosomal pseudosagittal triradiates, paired rays unequal 0·14 to 0·22 by 0·028 to 0·033 mm., basal ray 0·23 to 0·33 by 0·028 to 0·033 mm.,
tubar triradiates, subregular, rays 0·18 to 0·26 by 0·015 to 0·02 mm.,
subendosomal sagittal triradiates, paired rays 0·14 to 0·22 by 0·02 to 0·03 mm., basal ray 0·3 to 0·37 by 0·02 to 0·03 mm.,
subendosomal quadriradiates, similar to triradiates, with apical ray 0·06 by 0·014 mm.,
endosomal quadriradiates, sagittal, paired rays 0·2 to 0·26 by 0·01 to 0·013 mm., basal ray 0·15 to 0·21 by 0·008 mm., apical ray 0·075 by 0·008 mm.

Distribution: Japan (Kumamoto Prefecture).



Text-fig. 257. *Leucandra spinosa* after Hozawa: spicules, ×100 except for g and j which are ×50 and h and i which are ×200; external form, natural size.

Named form: **Leucandra spinosa** Hozawa

(text-fig. 257)

Leucandra spinosa Hozawa, 1940: 46, pl. iv, fig. 4, text-fig. 6; Tanita, 1943: 445.

Description: Sponge spherical; surface hispid; vent apical, with well-developed fringe; texture compact, hard; colour, in spirit, white; ectosomal skeleton of several tangential layers of triradiates and oxea projecting at surface; skeleton of chamber layer of triradiates arranged irregularly; endosomal skeleton of tangential layers of triradiates and quadriradiates, with microxea set at right angles to surface.

Spicules: ectosomal triradiates, sagittal, paired rays 0·065 to 0·2 by 0·008 to 0·022 mm., basal ray, 0·09 to 0·25 by 0·008 to 0·022 mm.,
oxea, 0·78 to 1·8 by 0·05 to 0·11 mm.,
microxea, 0·1 to 0·15 by 0·002 to 0·004 mm.,
triradiates of chamber layer, subregular, rays 0·15 to 0·27 by 0·018 to 0·025 mm.,
endosomal triradiates, sagittal, paired rays, 0·19 to 0·33 by 0·012 to 0·014 mm., basal ray 0·16 to 0·27 by 0·012 to 0·014 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·15 by 0·008 to 0·01 mm.

Distribution: Japan (Miye Prefecture).

Named form: **Sycon stauriferum** (Preiwisch)

(text-fig. 258)

Sycandra staurifera Preiwisch, 1904: 17, pl. iii, fig. 8; *Sycon stauriferum*, Dendy and Row, 1913: 748.

Description: Sponge solitary, ovate, sessile; surface hispid; vent apical, naked (?); texture firm (?); colour, in spirit, white; tubar skeleton of centrifugally-directed basal rays of subendosomal sagittal triradiates and quadriradiates, with rows of tubar triradiates; distal ends of chambers ornamented with basal rays of outermost tubar triradiates and oxea of three sorts; endosomal skeleton of one or more tangential layers of quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·084 to 0·14 by 0·008 too·o 15 mm., basal rays 0·082 to 0·22 by 0·008 to 0·015 mm.,
oxea, 0·165 to 0·75 by 0·014 to 0·032 mm.,
oxea, 0·22 to 0·5 by 0·014 to 0·032 mm.,
subendosomal sagittal triradiates, paired rays 0·09 to 0·11 by 0·006 mm., basal rays 0·11 by 0·006 mm.,

Text-fig. 258. *Sycon stauriferum* after Preiwisch: spicules, × 100.

subendosomal sagittal quadriradiates, similar to subendosomal triradiates, with a short apical ray,

endosomal quadriradiates, regular or sagittal, rays 0·04 to 0·12 by 0·005 to 0·012 mm.

Distribution: Laysan.

Named form: **Grantia strobilus** (Haeckel)

(text-fig. 259)

Sycetta strobilus Haeckel, 1872: 241, pl. xlii, figs. 5–8; *Sycurus strobilus* Haeckel, 1872: 242, pl. xlii, fig. 5; *Grantia strobilus,* Dendy and Row, 1913: 242.

Description: Sponge ovate, substipitate; surface even, non-hispid; vent apical, naked; texture firm; colour, in spirit, yellowish-brown; ectosomal skeleton a tangential layer of triradiates; tubar skeleton of basal rays of subendosomal sagittal triradiates and several rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and several tangential layers of endosomal triradiates.

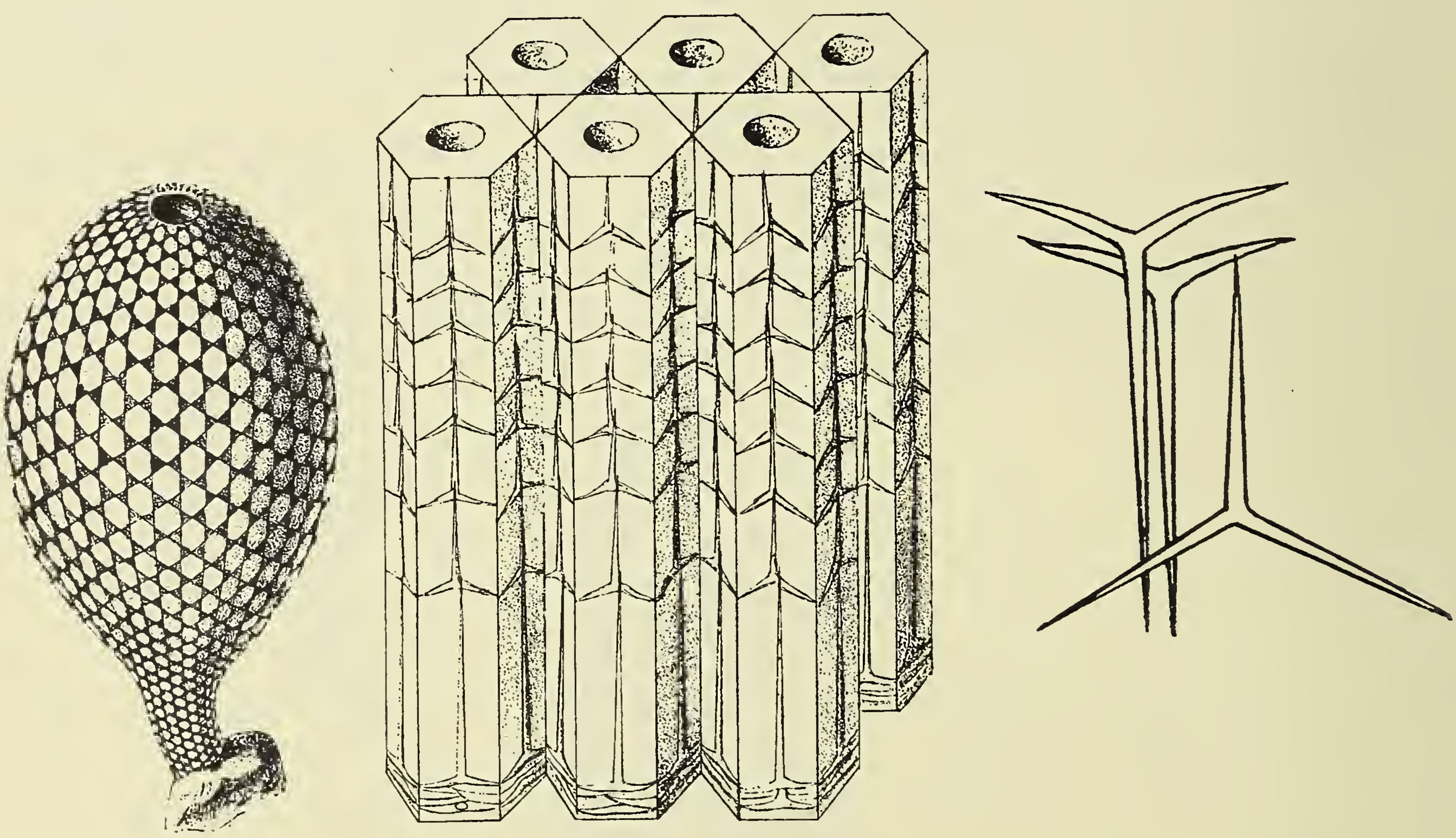
Spicules: ectosomal triradiates, sagittal, paired rays 0·15 by 0·012 mm., basal ray 0·3 by 0·012 mm.,

tubar triradiates, sagittal, paired rays 0·06 to 0·09 by 0·006 mm., basal ray 0·08 to 0·12 by 0·006 mm.,

subendosomal sagittal triradiates, paired rays 0·06 by 0·006 mm., basal ray 0·2 by 0·006 mm.,

endosomal triradiates, regular, rays 0·2 by 0·012 mm.

Distribution: Honolulu.



Text-fig. 259. *Grantia strobilus* after Haeckel: spicules, × 100; radial tubes shown diagrammatically (Haeckel gives the magnification as × 100, which is clearly incorrect); external form, × 10.

Named form: **Grantia stylata** Hozawa

Grantia stylata Hozawa, 1929: 331, pl. xvii, figs. 38, 39, text-fig. 20; Tanita, 1943: 429.

Description: Sponge tubular, laterally-compressed, stipitate, with apical vent; surface reticulate, minutely hispid; margin of vent feebly developed; texture soft, elastic; colour, in spirit, white; ectosomal skeleton of one or two layers of irregularly-placed triradiates and quadriradiates, with vertically-placed oxea; tubar skeleton of centrifugally-directed basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and one or two layers of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·08 by 0·006 mm., basal ray 0·1 by 0·006 mm.,
ectosomal quadriradiates, sagittal, paired rays 0·1 by 0·008 mm., basal rays 0·18 by by 0·008 mm., apical ray 0·06 by 0·006 mm.,
oxea, 0·2 by 0·001 mm.,
tubar triradiates, sagittal, paired rays 0·05 to 0·1 by 0·004 to 0·006 mm., basal ray 0·1 to 0·15 by 0·004 to 0·006 mm.,
subendosomal triradiates, similar to tubar triradiates but with widely divergent paired rays,
endosomal triradiates, sagittal, paired rays 0·1 by 0·006 mm., basal ray 0·12 by 0·006 mm.,
endosomal quadriradiates, similar to endosomal triradiates, apical ray short and thin.

Distribution: Japan (Kagoshima Bay).

Named form: **Sycon subhispidum** (Carter)

Grantia subhispidum Carter, 1886: 36; *Sycon subhispidum*, Dendy, 1882: 82; Dendy and Row, 1913: 748.

Description: Sponge sacciform, sessile; surface villose, hispid; vent apical, fringed; texture (?); colour (?); distal ends of radial chambers ornamented with oxea; tubar skeleton of basal rays of subendosomal triradiates and several rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·14 by 0·014 mm., basal ray 0·14 to 0·21 by 0·014 mm.,
oxea, 0·6 by 0·03 mm.,
subendosomal sagittal triradiates, indistinguishable from tubar triradiates,
endosomal quadriradiates, sagittal, paired rays 0·1 to 0·15 by 0·01 mm., basal ray 0·15 by 0·01 mm., apical ray 0·11 by 0·01 mm.,
(?) endosomal triradiates, similar to quadriradiates.

Distribution: Australia (Port Phillip Heads).

Named form: **Sycon sycandra** (Lendenfeld)

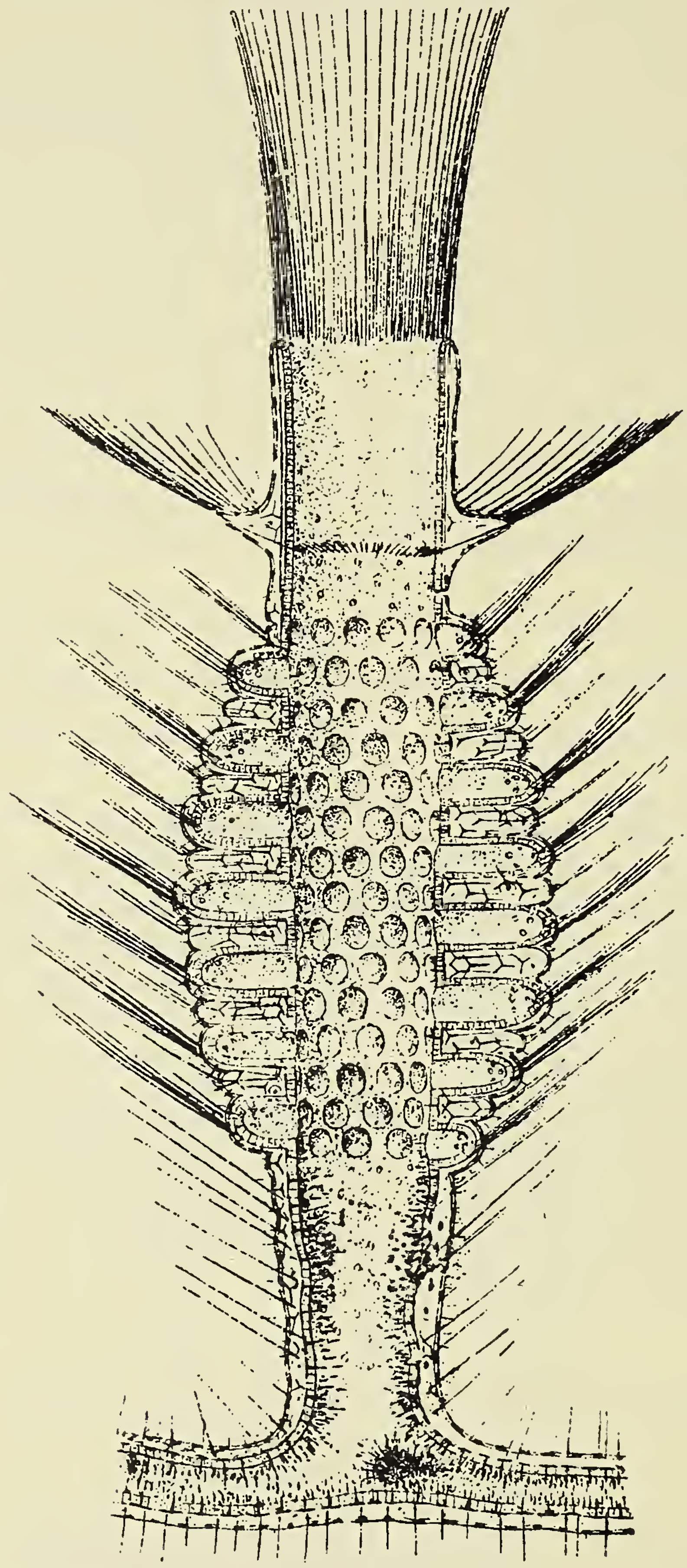
(text-fig. 260–261)

Homoderma sycandra Lendenfeld, 1885: 1088, pl. lx, fig. 14, pl. lxiii, figs. 16–21, pl. lxiv, fig. 15, pl. lxv, figs. 21–33; *Leucosolenia sycandra*, Dendy, 1891: 70; *Sycon sycandra*, Dendy and Row, 1913: 748.

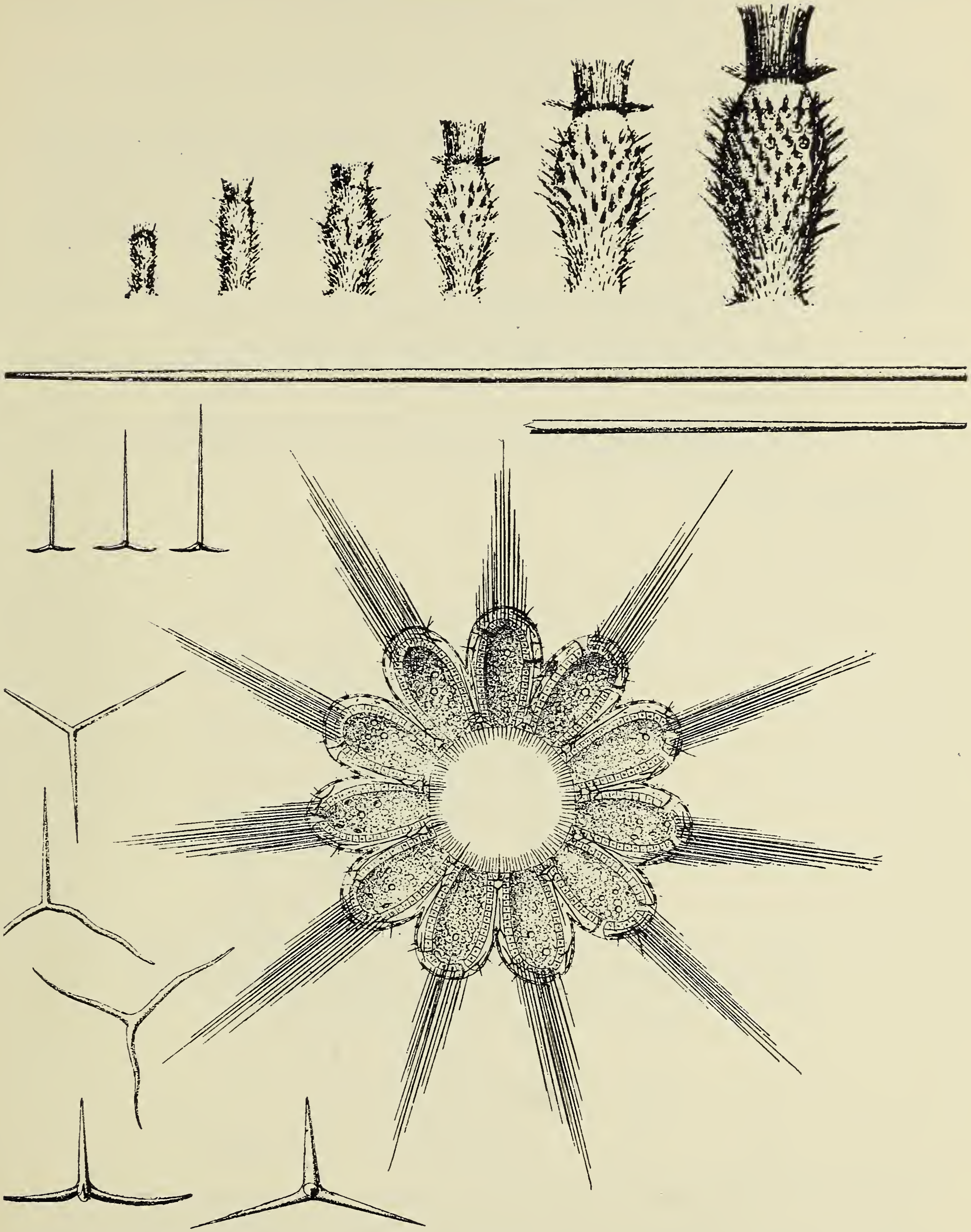
Description: Sponge tubular, sessile; surface subpapillate and hispid; vent apical, fringed; texture soft; colour, in spirit, white (?); tubar skeleton of triradiates, with endosomal sagittal quadriradiates and with distal cones ornamented with oxea; endosomal skeleton of quadriradiates.

Spicules: tubar triradiates, subregular, rays 0·048 by 0·005 mm.,
oxea, 0·7 by 0·007 mm.,
subendosomal sagittal quadriradiates, paired and apical rays 0·008 to 0·011 by 0·005 mm., basal ray 0·048 by 0·003 mm.,
endosomal quadriradiates, subregular, facial rays 0·04 to 0·05 by 0·004 mm., apical ray 0·02 to 0·04 by 0·003 mm.

Distribution: Australia (Port Jackson, Port Phillip Heads).



Text-fig. 260. *Sycon sycandra* after Lendenfeld: section through an individual, much enlarged and somewhat diagrammatic, showing the typical form of a *Sycon*. There is also a very close resemblance between this Australian form and a comparable example of *S. ciliatum* (i.e. one of small size and still attached to a stolon) from European waters.



Text-fig. 261. *Sycon sycandra* after Lendenfeld: showing a series of growth stages (above), a transverse section through an individual, and spicules.
Note: There is so much discrepancy between Lendefeld's written description of the spicules and his figures of them that it is impossible to give precise magnifications.

Named form: **Sycon tabulatum** (Schuffner)

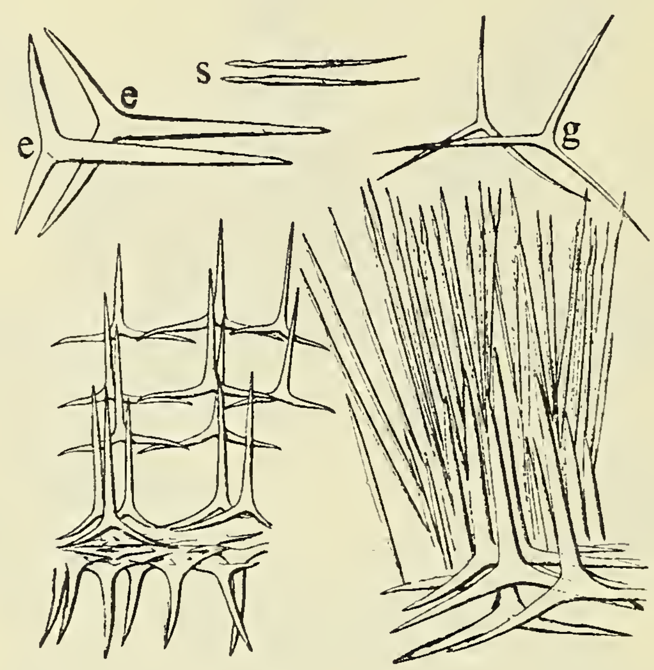
(text-fig. 262)

Sycandra tabulata Schuffner, 1877: 422, pl. xxv, fig. 11; *Sycon tabulatum*, Dendy and Row, 1913: 748.

Description: Sponge solitary, tubular, sessile; surface minutely hispid; vent apical, with double fringe; texture soft; colour, in spirit, brown; tubar skeleton of centrifugally-directed basal rays of subendosomal sagittal triradiates, with several rows of tubar triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and with microxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·08 by 0·008 (?) mm., basal rays 0·1 by 0·01 mm. (at distal ends of chambers triradiates are half as big again),
microxea, of two forms, oxeote and lanceolate, 0·14 by 0·004 mm.,
subendosomal sagittal triradiates, paired rays 0·08 by 0·008 mm., basal rays 0·12 by 0·01 mm.,
endosomal triradiates, subregular (?), rays 0·08 to 0·09 by 0·004 mm.,
endosomal quadriradiates, sagittal, paired rays 0·09 mm. long, basal rays 0·1 to 0·14 mm. long, apical rays 0·08 mm. long.

Distribution: Mauritius.



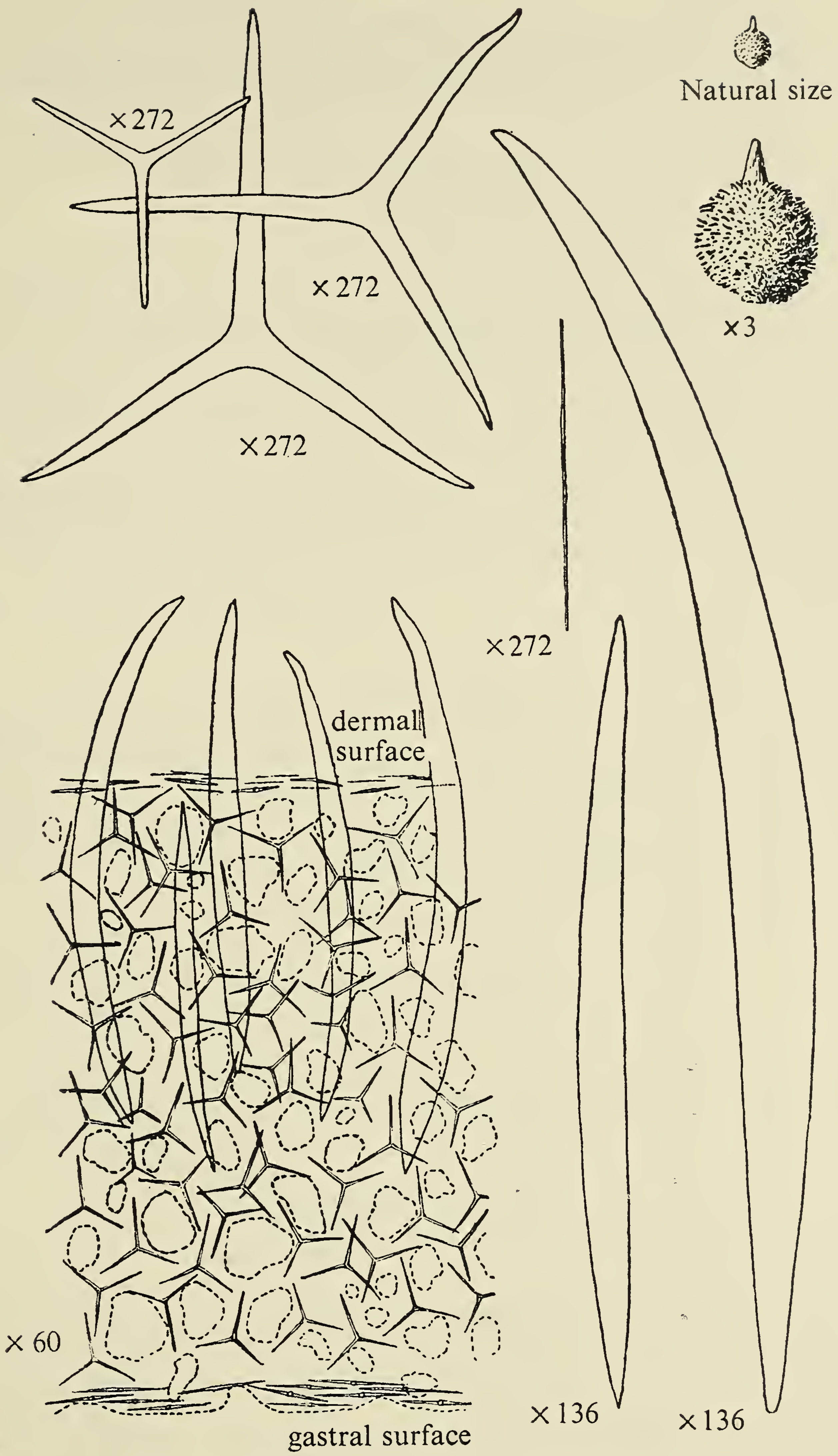
Text-fig. 262. *Sycon tabulatum* after Schuffner: spicules (above), ×100, showing e. triradiates from distal ends of radial chambers, s. microxea, and g. endosomal triradiates. Section of radial tube (bottom left) and distal end of radial tube (bottom right), ×150.

Named form: **Leucandra taylori** Lambe

(text-fig. 263)

Leucandra taylori Lambe, 1900: 261, pl. vi.

Description: Sponge spherical, terminating above in a well-developed fringe; surface hispid; texture (?); colour (?); ectosomal skeleton of tangential triradiates and slender rhabds; skeleton of chamber layer of irregularly-scattered triradiates; endosomal skeleton of tangential quadriradiates.



Text-fig. 263. *Leucandra taylori*: figures after Lambe.

Spicules: ectosomal triradiates, sagittal, paired rays 0·45 by 0·004 mm., basal ray 0·072 by 0·004 mm.,
oxea of chamber layer, 0·6 to 1·1 by 0·004 to 0·068 mm.,
ectosomal rhabds, 0·13 by 0·002 mm.,
triradiates of chamber layer, slightly sagittal, paired rays 0·09 by 0·01 mm., basal ray 0·117 by 0·01 mm.,
endosomal triradiates, slightly sagittal, paired rays 0·16 by 0·008 mm., basal ray 0·21 by 0·008 mm.

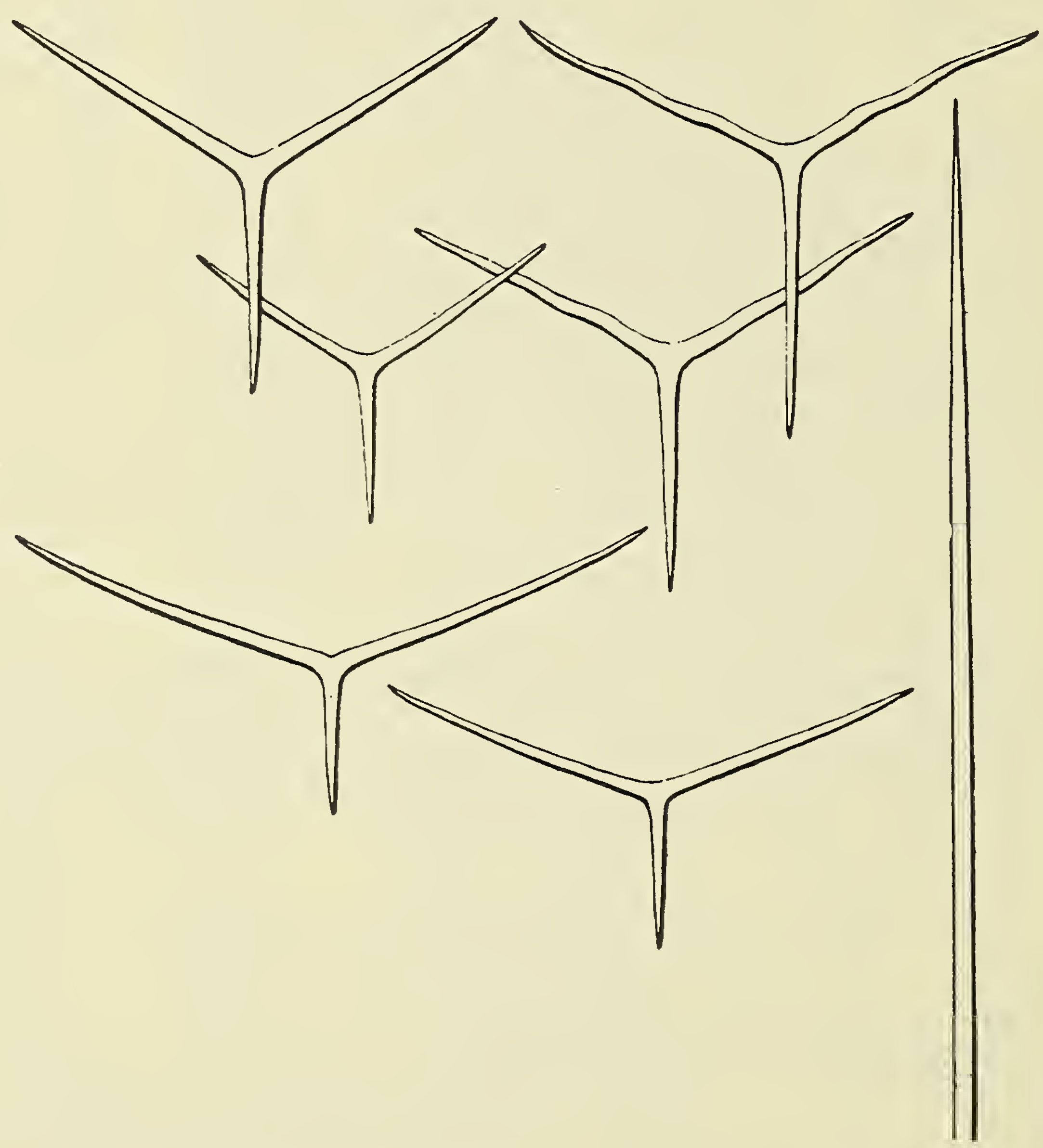
Distribution: Vancouver Island; littoral.

Named form: **Sycon tenellum** (Lendenfeld)

(see p. 69; Section I)

Sycantha tenella Lendenfeld, 1891: 235, pl. x, figs. 52–59, pl. xi, fig. 62; *Sycon tenellum,* Jenkin, 1908: 4; Dendy and Row, 1913: 748; Topsent, 1934: 10.

Description: Sponge tubular, sessile; surface irregularly conulose, hispid; vent apical, fringed; texture soft; colour, in spirit, yellowish-white; tubar skeleton of triradiates, with subendosomal sagittal triradiates and cones ornamented with oxea; endosomal skeleton of triradiates and quadriradiates.



Text-fig. 264. *Leucandra tomentosa* after Tanita: spicules, all by 100, except the portion of ectosomal diact, which is ×50.

Spicules: tubar triradiates, subregular, rays 0·27 to 0·29 by 0·008 to 0·011 mm.,
oxea, 0·8 to 1·0 by 0·011 mm.,
subendosomal sagittal triradiates, similar to tubar triradiates,
endosomal triradiates, subregular, rays 0·4 to 0·54 by 0·008 to 0·012 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·15 by 0·01 mm.

Distribution: Mediterranean (Adriatic).

Named form: **Leucandra tomentosa** Tanita

(text-fig. 264)

Leucandra tomentosa Tanita, 1940: 174, pl. viii, fig. 6, text-fig. 4; Tanita, 1943: 434.

Description: Sponge spherical; surface strongly hispid; vent apical, fringed; texture (?); colour, in spirit, grey; ectosomal skeleton of tangentially-arranged triradiates, with oxea and trichoxea projecting beyond surface; skeleton of chamber layer of densely-packed triradiates; endosomal skeleton of several tangential layers of triradiates.

Spicules: ectosomal triradiates, subregular, rays 0·15 to 0·27 by 0·008 to 0·012 mm.,
oxea, 5·0 by 0·025 to 0·03 mm.,
trichoxea, 5·0 by 0·002 (to 0·03 mm.),
tubar triradiates, subregular, 0·19 to 0·27 by 0·008 to 0·014 mm.,
endosomal triradiates, sagittal, paired rays 0·15 to 0·28 by 0·01 mm., basal ray 0·08 to 0·14 by 0·01 mm.

Distribution: Japan (Matsushima Bay); littoral.

Grantia transgrediens Brøndsted

Grantia transgrediens Brøndsted, 1931: 28, fig. 24.

Description: Sponge tubular; surface strongly hispid; vent apical, naked; texture (?); colour (?); ectosomal skeleton of 3 to 5 tangential layers of triradiates, with oxea projecting beyond surface; tubar skeleton of triradiates, and basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and tangential layers of endosomal quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·17 to 0·24 by 0·007 to 0·008 mm.,
oxea, 1·2 by 0·018 mm.,
tubar triradiates, similar to ectosomal triradiates,
subendosomal sagittal triradiates, paired rays 0·2 by 0·012 mm., basal ray 0·45 by 0·012 to 0·013 mm.,
endosomal quadriradiates, sagittal, paired rays 0·16 to 0·22 by 0·008 mm., basal ray 0·28 to 0·33 by 0·008 mm., apical ray 0·09 to 0·11 by 0·008 to 0·01 mm.

Distribution: Antarctic; 350–385 m.

Named form: **Sycon tuba** (Lendenfeld)

Sycandra tuba Lendenfeld, 1891: 244, pl. xi, fig. 67, pl. xii, figs. 81–84; *Sycon tuba*, Dendy and Row, 1913: 749.

Description: Sponge tubular, sessile; surface minutely papillate and hispid; vent apical, naked; texture soft; colour, in spirit, yellowish-white; tubar skeleton of triradiates, with subendosomal sagittal triradiates (?), with distal cones ornamented with oxea; endosomal skeleton of triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·28 by 0·07 mm., basal ray 0·22 (?) by 0·007 mm.,
oxea, 0·3 by 0·01 mm.,
subendosomal sagittal triradiates (?),

endosomal triradiates, sagittal, paired rays 0·28 by 0·007 mm., basal ray 0·32 by 0·007 mm.,
endosomal quadriradiates, similar to endosomal triradiates, with apical ray 0·2 to 0·26 by 0·007 mm.

Distribution: Mediterranean (Adriatic).

Named form: **Grantia tuberosa** Poléjaeff

Grantia tuberosa Poléjaeff, 1883: 42, pl. i, fig. 6, pl. iii, figs. 6–13; Dendy and Row, 1913: 761.

Description: Sponge solitary, tubular, sessile; surface even, minutely hispid; vent apical, naked; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates of two sorts, oxea lying in all directions and microxea; tubar skeleton of centrifugally-directed basal rays of subendosomal sagittal triradiates and quadriradiates, with irregular rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and quadriradiates and a tangential layer of quadriradiates

Spicules: ectosomal triradiates, subregular, rays 0·07 by 0·003 mm. (rare),
ectosomal triradiates, sagittal, paired rays 0·1 to 0·3 by 0·005 to 0·01 mm., basal rays 0.03 to 0·06 by 0·003 to 0·005 mm.,
oxea, 1·2 by 0·065 mm.,
microxea, 0·05 by 0·0025 mm.,
tubar triradiates, sagittal, paired rays 0·25 by 0·02 mm., basal rays 0·12 to 0·28 by 0·02 mm.,
subendosomal sagittal triradiates, paired rays 0·12 by 0·02 mm., basal rays 0·38 by 0·02 mm.,
subendosomal sagittal quadriradiates, similar to subendosomal triradiates, with apical rays 0·04 mm. long,
endosomal quadriradiates, regular, facial rays 0·3 by 0·012 mm., apical rays 0·08 by 0·012 mm.

Distribution: Cape Verde Islands.

Remarks: Although Poléjaeff (1883) describes the surface of the holotype as smooth, it is nevertheless somewhat hispid from the long oxea.

Named form: **Sycon urugamii** Tanita

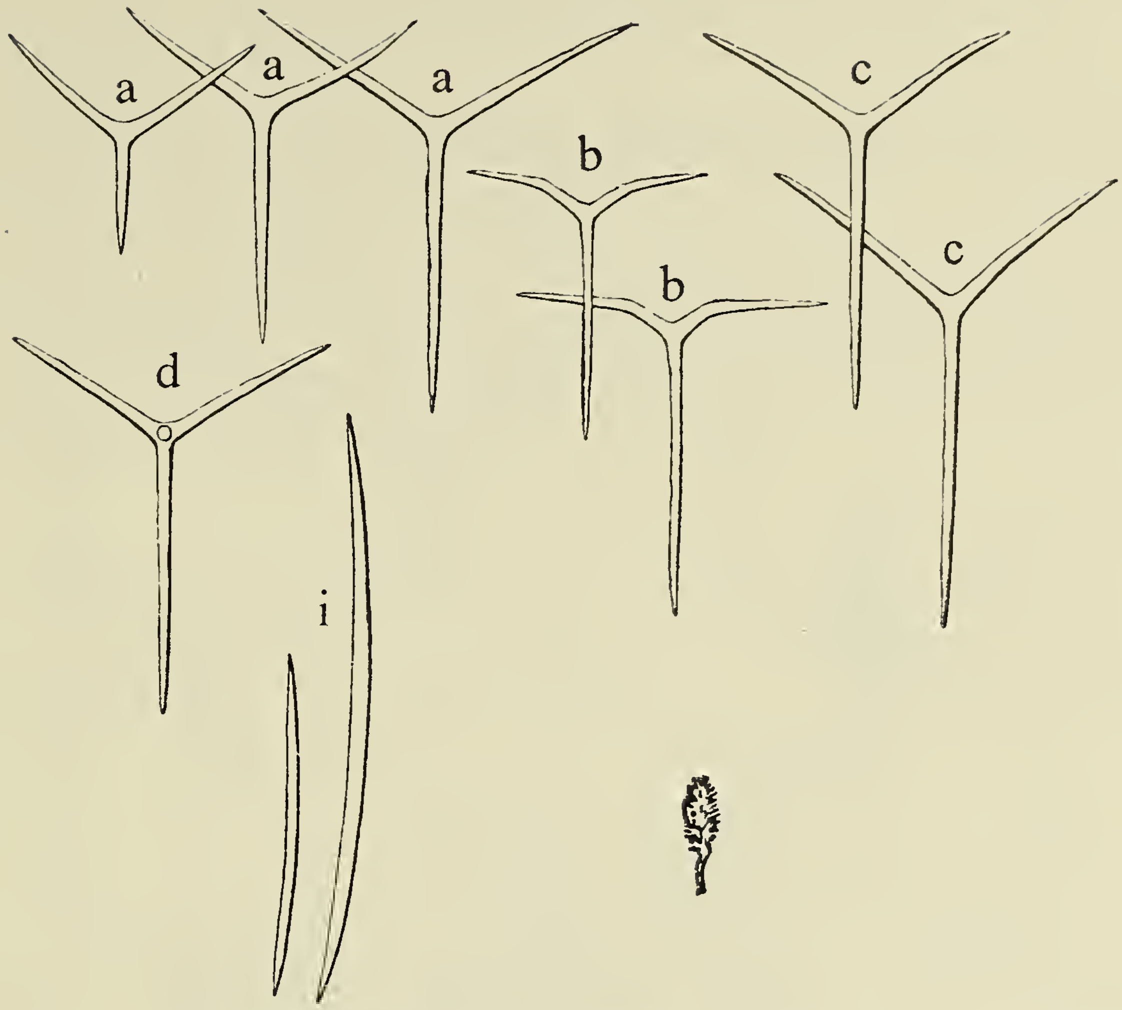
(text-fig. 265)

Sycon urugamii Tanita, 1940: 171, pl. viii, fig. 5, text-fig. 3.

Description: Sponge tubular, stipitate; surface papillate, hispid; vent apical, with a slight fringe; texture soft; colour, in spirit, greyish-white; tubar skeleton of basal rays of subendosomal sagittal triradiates and rows of tubar triradiates, with distal ends of chambers ornamented with tufts of oxea; endosomal skeleton of paired rays of subendosomal triradiates and tangential layers of triradiates and quadriradiates, latter with apical rays projecting into cloacal cavity.

Spicules: tubar triradiates, sagittal, paired rays 0·08 to 0·16 by 0·006 to 0·009 mm., basal ray 0·09 to 0·21 by 0·006 to 0·009 mm.,
oxea, 0·27 to 0·54 by 0·008 to 0·015 mm.,
subendosomal sagittal triradiates, paired rays 0·105 to 0·2 by 0·006 to 0·008 mm., basal ray 0·18 to 0·2 by 0·006 to 0·008 mm.
endosomal triradiates, sagittal, paired rays 0·15 to 0·17 by 0·007 to 0·008 mm., basal ray 0·17 to 0·25 by 0·007 to 0·008 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·06 to 0·09 by 0·007 mm.

Distribution: Japan (Matsushima Bay), shallow water.



Text-fig. 265. *Sycon uragamii* after Tanita: spicules, ×100; external form, natural size.
a. tubar triradiates; b. subendosomal triradiates; c. endosomal triradiates; d. endosomal quadriradiates; i. oxea.

Named form: **Leucandra valida** Lambe

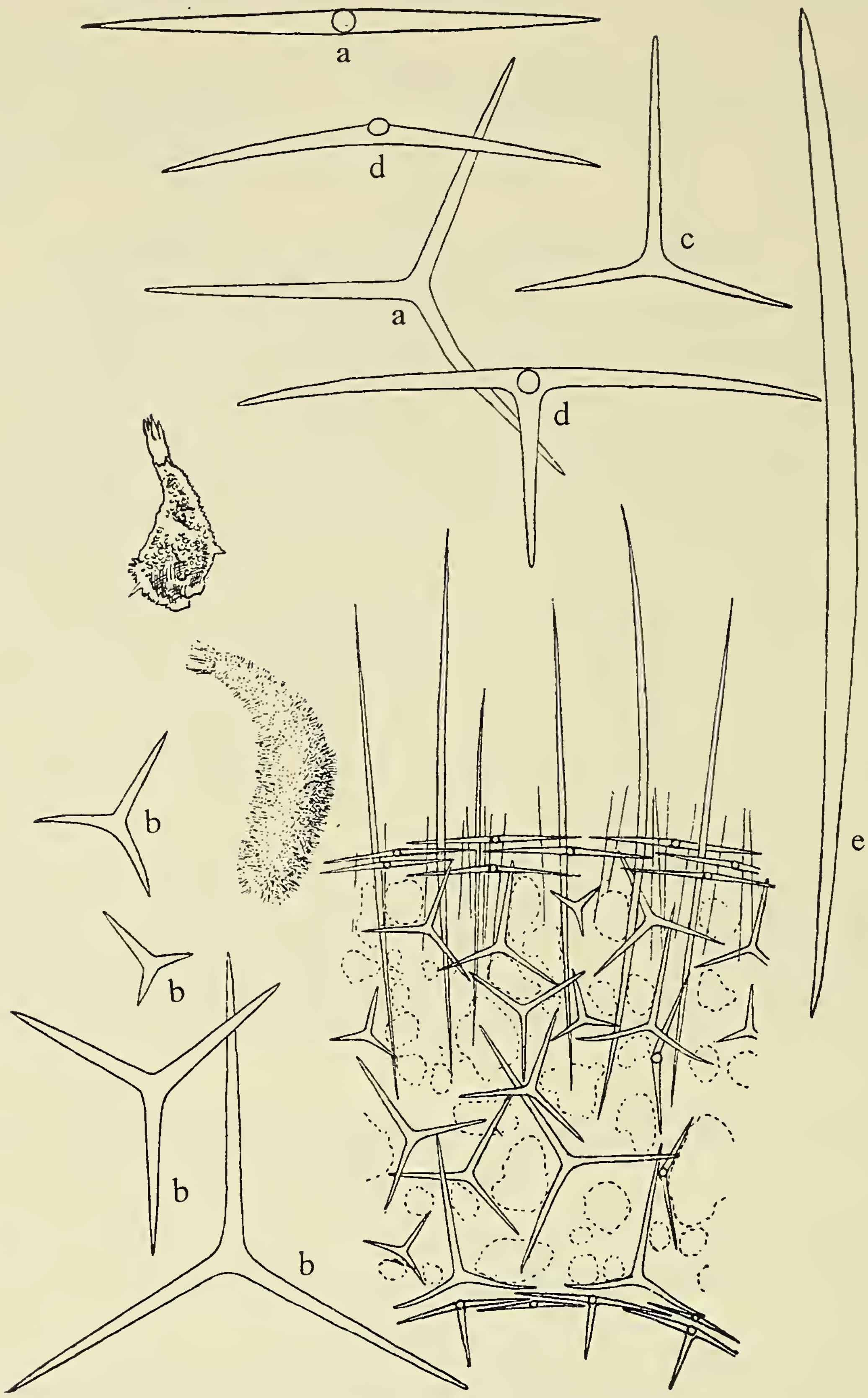
(text-fig. 266)

Leucandra valida Lambe, 1900: 32, pl. iv, fig. 10, pl. v, fig. 11; Lambe, 1900: 167; Dendy and Row, 1913: 771: Breitfuss, 1932: 250; Tanita, 1941: 275, pl. xvii, fig. 9, text-fig. 3; Tanita, 1942: 62; Tanita, 1943: 437.

Description: Sponge solitary, subcylindrical, sessile; surface hispid; vent terminal, with well-developed fringe; texture firm; colour, in spirit (?); ectosomal skeleton several tangential layers of triradiates, with oxea and trichoxea projecting beyond surface; skeleton of chamber layer of scattered triradiates and basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and one or two tangential layers of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, regular, rays 0·29 by 0·019 mm.,
oxea, 1·01 by 0·032 mm.,
trichoxea, 0·49 by 0·003 mm.,
triradiates of chamber layer, regular or slightly sagittal, rays 0·039 to 0·29 and up to 0·014 mm. thick,
subendosomal sagittal triradiates, paired rays 0·13 by 0·016 mm., basal rays 0·22 by 0·016 mm.,
endosomal triradiates, regular, rays 0·196 by 0·013 mm.,
endosomal quadriradiates, regular, facial rays 0·29 by 0·014 mm., apical rays 0·18 by 0·013 mm.

Distribution: Arctic (Davis Strait); Japan (Onagawa Bay, Bôsyû Sunosaki, Simoda); 18 m.



Text-fig. 266. *Leucandra valida* after Lambe: spicules, ×100; section at right angles to surface, ×50; external form of holotype (larger specimen), ×$\frac{5}{3}$, of Tanita's specimen, natural size.
a. ectosomal triradiate; b. triradiates of chamber layer; c. subendosomal sagittal triradiate; d. endosomal triradiate and quadriradiate; e. oxeote.

Named form: **Leucandra vermiformis** Tanita

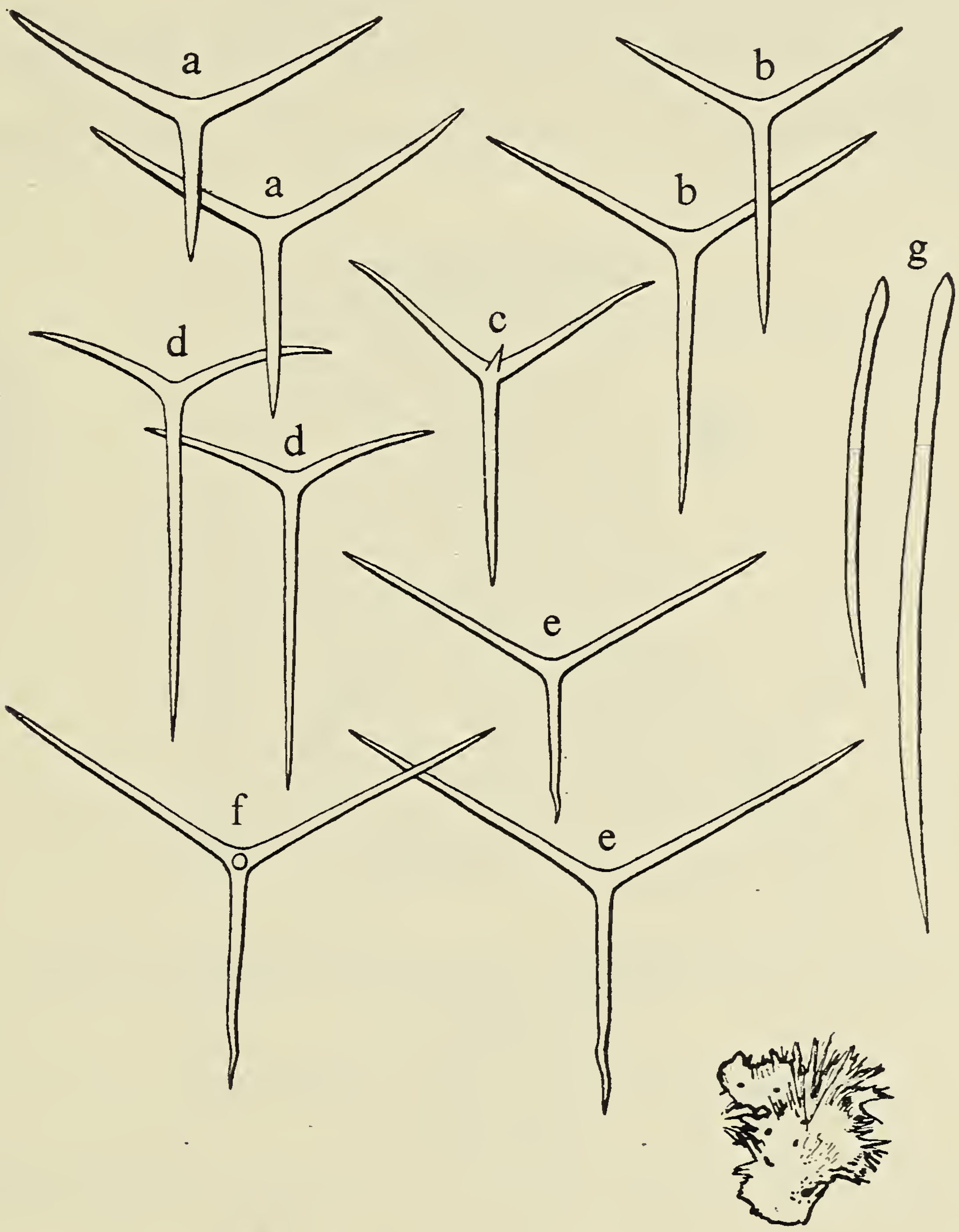
(text-fig. 267)

Leucandra vermiformis Tanita, 1941: 277, pl. xvii, fig. 10, text-fig. 4; Tanita, 1943: 438.

Description: Sponge tubular; surface strongly hispid; vent apical, nearly naked; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea and trichoxea set at right-angles to surface; tubar skeleton of triradiates and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a thin layer of endosomal triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·15 to 0·23 by 0·012 to 0·018 mm., basal ray 0·12 to 0·19 by 0·012 to 0·018 mm.,
oxea, 0·75 to 2·0 by 0·025 to 0·05 mm.,
trichoxea, 1·5 by 0·03 mm.,
tubar triradiates, sagittal, paired rays 0·18 to 0·22 by 0·012 to 0·016 mm., basal ray 0·21 to 0·26 by 0·012 to 0·016 mm.,
subendosomal sagittal triradiates, paired rays 0·14 to 0·175 by 0·01 to 0·014 mm., basal ray 0·2 to 0·3 by 0·01 to 0·014 mm.,
endosomal triradiates, sagittal, paired rays 0·22 to 0·26 by 0·008 to 0·01 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·07 by 0·008 mm.

Distribution: Japan (Onagawa Bay); 15 m.



Text-fig. 267. *Leucandra vermiformis* after Tanita: spicules, × 100 except oxea, which are × 50; external form, about natural size.

Named form: **Sycon villosum** (Haeckel)

(text-fig. 268)

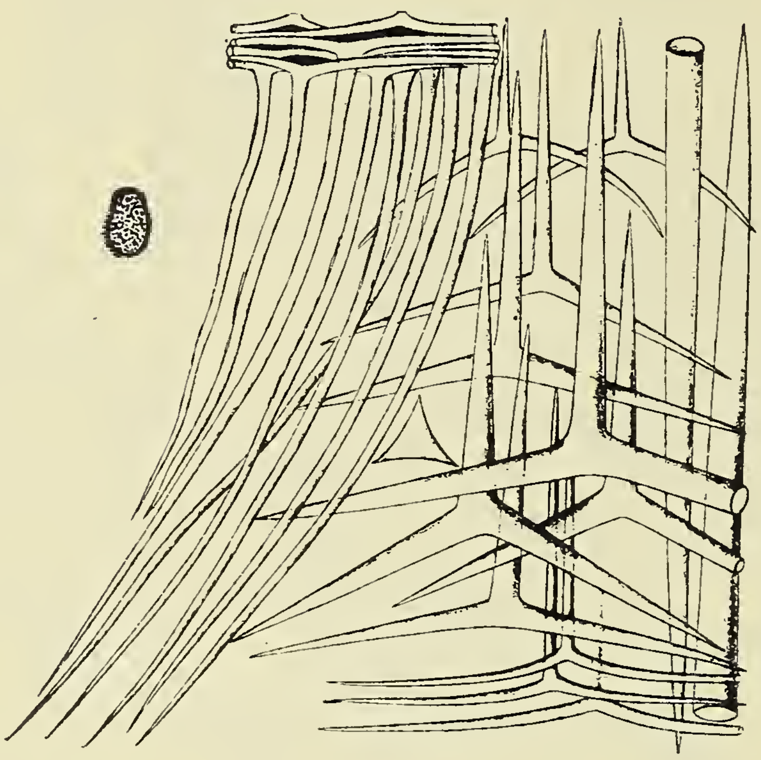
Sycarium villosum Haeckel, 1870: 238; *Sycum clavatum* Haeckel, 1870: 239; *Artynas villosus* Haeckel, 1870: 240; *Sycandra villosa* Haeckel, 1872: 325, pl. lii, fig. 3, pl. lviii, fig. 1, pl. lx, fig. 8; *Sycurus villosus* Haeckel, 1872: 325; *Sycarium villosum* Haeckel, 1872: 325; *Sycandra hirsuta*

(=*S. villosa* var. *hirsuta*) Haeckel, 1872: 325; *S. impletum* Haeckel, 1872: 326; *Sycon impletum* Dendy and Row, 1913: 746; *S. villosum*, Dendy and Row, 1913; 749; Breitfuss, 1927: 29.

Description: Sponge tubular or ovate, sessile or substipitate; surface minutely papillate, hispid; vent apical, naked or with fringe; texture soft; colour, in spirit, white or grey; distal ends of radial chambers ornamented with oxea; tubar skeleton of basal rays of subendosomal sagittal triradiates and rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: tubar triradiates, regular to sagittal, rays 0·1 to 0·3 by 0·01 to 0·03 mm.,
oxea, 1·0 to 3·0 by 0·01 to 0·03 mm.,
subendosomal sagittal triradiates, paired rays 0·2 by 0·01 mm., basal ray 0·25 by 0·01 mm.,
endosomal triradiates, subregular to sagittal, paired rays 0·1 to 0·2 by 0·005 to 0·008 mm., basal ray 0·1 to 0·4 by 0·005 to 0·008 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·5 to 1·5 by 0·005 to 0·01 mm.

Distribution: North Atlantic (Norway, British Isles, North coast of France); West Indies; Florida; Venezuela.



Text-fig. 268. *Sycon villosum* after Haeckel: spicules, ×100; external form, natural size.

Named form: **Leuconia vitrea** Urban
(text-fig. 269)

Leuconia vitrea Urban, 1908: 252; Urban, 1908: 37, pl. vi, figs. 20–38; *Leucandra vitrea*, Dendy and Row, 1913: 773.

Description: Sponge tubular, substipitate; surface even, hispid; vent apical, fringed; texture soft; colour, in spirit, yellowish-white; ectosomal skeleton a tangential layer of triradiates, with oxea and microxea projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates and quadriradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·35 to 0·4 by 0·014 mm., basal ray 0·32 to 0·58 by 0·014 to 0·015 mm.,
oxea, 0·4 by 0·02 to 0·03 mm.,
microxea, 0·055 to 0·09 by 0·003 to 0·005 mm.,

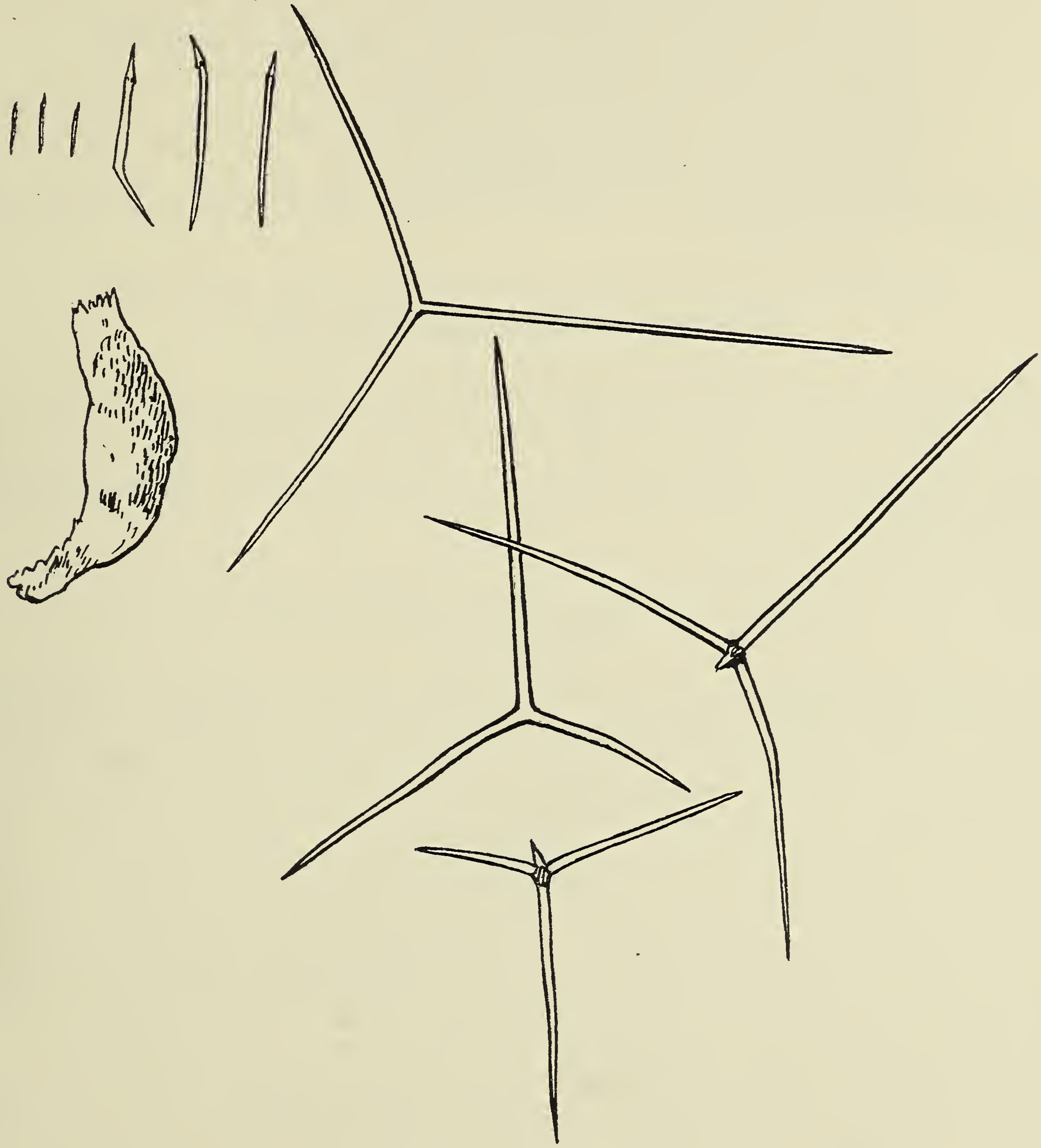
triradiates of chamber layer, sagittal, paired rays 0·3 to 0·5 by 0·021 to 0·026 mm., basal ray 0·34 to 0·65 by 0·021 to 0·026 mm.,

quadriradiates of chamber layer, similar to triradiates, with apical ray 0·1 to 0·14 mm. long,

endosomal triradiates, sagittal, paired rays 0·16 to 0·4 by 0·021 to 0·024 mm., basal ray 0·2 to 0·5 by 0·021 to 0·025 mm.,

endosomal quadriradiates, similar to endosomal triradiates, with apical ray 0·08 to 0·18 mm. long.

Distribution: North Atlantic (Thomson Ridge); 652 m.



Text-fig. 269. *Leuconia vitrea* after Urban: spicules, × 100, except for three large microxea (× 300), which are also shown (on their left) to the same scale as the remaining spicules; external form, natural size. Triradiate (top) from ectosome, a triradiate and a quadriradiate (centre) from chamber layer, and an endosomal quadriradiate (below).

Named form: **Sycon yatsui** Hozawa

Sycon yatsui Hozawa, 1929: 297, pl. xiv, figs. 14, 15, text-fig. 8; Tanita, 1943: 413.

Description: Sponge tubular, solitary, stipitate, body papillate at base; surface, except at base, granular; vent apical, with feebly-developed margin; texture soft, elastic; colour, in spirit, white tinged with grey; tubar skeleton of centrifugally-directed basal rays of subendosomal triradiates with several rows of triradiates; distal ends of chambers ornamented with basal rays of outermost triradiates and tufts of oxea; endosomal skeleton of paired rays of subendosomal triradiates, triradiates and quadriradiates, with apical ray projecting into cloacal cavity.

Spicules: tubar triradiates, sagittal, paired rays 0·06 to 0·12 by 0·006 to 0·012 mm., basal ray 0·09 to 0·13 by 0·004 to 0·008 mm.,
oxea, slightly curved and angulate, 0·1 to 0·15 by 0·004 to 0·006 mm.,
subendosomal triradiates, sagittal, paired rays 0·07 to 0·09 by 0·006 to 0·008 mm., basal ray 0·16 to 0·22 by 0·006 to 0·008 mm.,
endosomal triradiates, sagittal, paired rays 0·04 to 0·09 by 0·006 to 0·008 mm., basal ray 0·1 to 0·23 by 0·004 to 0·006 mm.,
endosomal quadriradiates, similar to triradiates, apical ray up to 0·08 mm. long.

Distribution: Japan (Misaki).

18. Scypha compressa (Fabricius)

Named form: **Sycon asperum** (Gibson)

Sycandra asperum Gibson, 1886: 365, pl. x, figs. 1–7; *Sycon asperum*, Dendy and Row, 1913: 744.

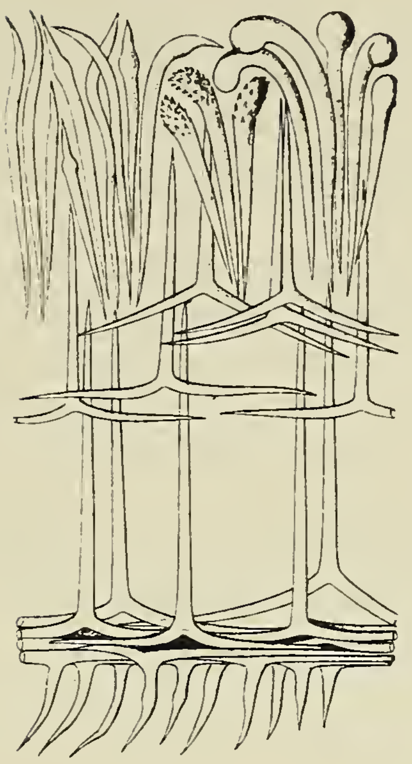
Species inadequately described, but is almost certainly a specimen of the common *Scypha* (*Grantia*) *compressa*.

Distribution: Isle of Man.

Named form: **Grantia compressa** (Fabricius)

(text-fig. 270)

Spongia compressa Fabricius, 1780: 488; *Spongia foliacea* Montagu, 1818: 92, pl. xii; *Scypha foliacea*, Gray, 1821: 358; *Spongia compressa*, Grant, 1826: 166; Grant, 1826: 122, pl. ii, figs. 11–13, 23; *Grantia compressa*, Fleming, 1828: 524; *Calcispongia compressa*, Blainville, 1834: 531; *Grantia compressa*, Johnston, 1838: 270; Bellamy, 1839: 268; Hassall, 1840: 174; *Leuconia compressa*, Grant, 1841: 7; *Grantia compressa*, Johnston, 1842: 174, pl. xx, fig. 1; McAndrew, 1861: 236; Fyfe, 1861: 7; Bowerbank, 1864: 10; Bowerbank, 1866: 17, figs. 38, 39, 312–314, 346b; *Artynes compressa* Gray, 1867: 555; *Sycinula clavigera* Schmidt, 1869: 92; *Grantia compressa*, Wright, 1869: 223; *Sycarium compressum*, Haeckel, 1870: 238; *Artynes compressus*, Haeckel, 1870: 240; *Sycidium compressum*, Haeckel, 1870: 245; *Artynium compressum*, Haeckel, 1870: 246; *Sycocystis compressa*, Haeckel, 1870: 249; *Artynella compressa*, Haeckel, 1870: 249; *Sycophyllum compressum*, Haeckel, 1870: 250; *Artynophyllum compressum*, Haeckel, 1870: 251; *Sycometra compressa*, Haeckel, 1870: 254; *Sycum lingua*, Haeckel, 1870: 239; *Sycarium rhopalodes*, Haeckel 1870: 238; *Artynas rhopalodes*, Haeckel, 1870: 240; *Artynella rhopalodes*, Haeckel, 1870: 249; *Dyssycum clavigerum*, Haeckel, 1870: 241; *Sycophyllum lobatum*, Haeckel, 1870: 250; *Sycinula clavigera* Schmidt, 1870: 74; *Sycandra compressa*, Haeckel, 1872: 360, pl. lv, fig. 2, pl. lvii, *Sycurus compressus*, Haeckel, 1872: 361, pl. lvii, figs. 1, 2; *Sycomella compressa*, Haeckel, 1872: 361, pl. lvii, figs. 3, 4; *Sycarium compressum*, Haeckel, 1872: 361, pl. lvii, figs. 5, 6; *Sycocystis compressa*, Haeckel, 1872: 361, pl. lvii, figs. 7, 8; *Sycothamnus compressus*, Haeckel, 1872: 361; pl. lvii, figs. 9–16; *Sycinula compressa*, Haeckel, 1872: 361, pl. lvii, figs. 17, 18; *Sycodendrum compressum*, Haeckel, 1872: 361, pl. lvii, figs. 19, 20; *Sycophyllum compressum*, Haeckel, 1872: 361,



Text-fig. 270. *Grantia compressa*: spicules, after Haeckel, to show range of form in surface diacts, ×100.

pl. lvii, figs. 21, 22; *Sycometra compressa*, Haeckel, 1872: 361, pl. lvii, figs. 23–25; *Sycandra foliacea* (= *Spongia foliacea*), Haeckel, 1872: 362, pl. lvii, fig. 2; *S. pennigera* (= *Grantia pennigera*) Haeckel, 1872: 362, pl. lv, fig. 2; *S. clavigera* (= *Sycinula clavigera*), Haeckel, 1872: 362, pl. lv, fig. 2; *S. rhopalodes* (= *Sycarium rhopalodes*) Haeckel, 1872: 362, pl. lv, fig. 2; *S. lobata* (= *Sycophyllum lobatum*) Haeckel, 1872: 362; *S. polymorpha* (= *Grantia polymorpha*) Haeckel, 1872: 362; *Sycortis compressa*, Haeckel, 1872: 362; *Grantia compressa*, Carter, 1872: 47; Bowerbank, 1874: 1; M'Intosh, 1874: 143; Leslie and Herdman, 1881: 59; *Sycandra compressa*, Vosmaer, 1882: 4; *Grantia compressa*, Bowerbank, 1882: 25; Koehler, 1886: 11, 34, 52; Koehler, 1886: 236, 301, 360; *Sycandra compressa*, Hanitsch, 1889: 172; Hanitsch, 1890: 195; *Grantia compressa*, Brunchorst, 1890: 31; Topsent, 1891: 525; Topsent, 1891: 128; *Sycon compressum*, Dendy, 1892: 85; Holt, 1892: 273; Hanitsch, 1894: 182; Topsent, 1894: 7; Vanstone, 1894: 229; Heider, 1894: 276; Duerden, 1894: 231; *Sycandra compressa*, Stieren, 1894: 290; *Grantia compressa*, Lameere, 1895: 4; *Sycon compressum*, Breitfuss, 1896: 429; *Grantia compressa*, Maitland, 1897: 55; *Sycandra compressa*, Vanhöffen, 1897: 249; *Grantia compressa*, Pruvot, 1897: 587; *G. pennigera*, Breitfuss, 1898: 22, pl. ii, fig. 14; *G. foliacea*, Breitfuss, 1898: 23, pl. ii, figs. 15, 18; *G. compressa*, Breitfuss, 1898: 219; Breitfuss, 1898: 302; Breitfuss, 1898: 103; *G. clavigera*, Breitfuss, 1898: 302; *G. compressa* var. *rhopalodes*, Breitfuss, 1898: 303; *G. compressa* var. *polymorpha*, Breitfuss, 1898: 303; *G. pennigera*, Breitfuss, 1898: 303; *G. clavigera*, Breitfuss, 1898: 26; *G. compressa* et varr. *fistulata*, *rhopaloides*, *polymorpha*, Breitfuss, 1898: 26–27; *Sycon compressum*, Allen and Todd, 1900: 314; Rankin, 1901: 372; *Grantia compressa*, Arnesen, 1901: 70; Arnesen, 1901, 21; *G. compressa* var. *rhopalodes*, Arnesen, 1901: 22; *G. compressa* var. *pennigera*, Arnesen, 1901: 22; *G. compressa* var. *polymorpha*, Arnesen, 1901: 22; *G. compressa*, Bidder, 1902: 375; Cotte, 1903: 422; Rousseau, 1903: 10, fig. 7; *Sycon compressum*, Allen, 1904: 185; Kirkpatrick, 1907: 86; *G. pennigera*, Lundbeck, 1909: 461; *G. pennigera*, Breitfuss, 1911: 212; *G. compressa*, Whitehead, 1911: 197; *G. clavigera*, Dendy and Row, 1913: 759; *G. compressa*, Dendy and Row, 1913: 760; *G. foliacea*, Dendy and Row, 1913: 760; *G. lobata*, Dendy and Row, 1913: 760; *G. pennigera*, Dendy and Row, 1913: 760; *Sycon compressum*, Walton, 1913: 106; *Grantia compressa*, Woods, 1913: 365; Preston, 1914: 354; *G. pennigera*, Derjugin, 1915: 290; *Sycon compressum*, Farran, 1915: 10; *G. compressa*, Breitfuss, 1927: 30; *G. compressa* var. *rhopaloides*, Breitfuss, 1927: 30; *G. compressa* var. *pennigera*, Breitfuss, 1927: 30; *G. compressa* var. *polymorpha*, Breitfuss, 1927: 30; *G. compressa*, Prenant, 1927: 6; Allen, 1931: 60; *G. clavigera*, Breitfuss, 1932: 247; *G. compressa*, Breitfuss, 1932: 247; *G. lobata*, Breitfuss, 1932: 248; *G. pennigera*, Breitfuss, 1932: 248; *G. polymorpha*, Breitfuss, 1932: 248; *G. foliacea*, Breitfuss, 1932: 248; *G. compressa*, Burton, 1932: 167; *G. compressa*, Topsent, 1934: 10; *G. compressa* et varr. *pennigera*, *rhopalodes*, Arndt, 1935: 15–16, fig. 19; *G. compressa*, Forrest, Waterson and Watson, 1936: 263; Moore, 1937: 32; Arndt, 1941: 46; Burton, 1951: 85; Lévi, 1951: 4.

Description: Sponge solitary, sac-shaped and laterally-compressed, sessile; surface minutely hispid; vent apical or marginal, naked; texture firm; colour, in spirit and alive, white to yellowish-grey; ectosomal skeleton a tangential layer of triradiates, with tufts of oxea projecting beyond surface; tubar skeleton of centripetally-directed basal rays of subendosomal sagittal triradiates and numerous rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of endosomal triradiates and quadriradiates.

Spicules: triradiates, subregular, rays 0·1 to 0·12 by 0·008 mm.,
oxea, of ectosomal skeleton, 0·1 to 0·3 by 0·008 to 0·024 mm.,
tubar triradiates, sagittal, paired rays 0·08 to 0·12 by 0·008 mm., basal rays 0·1 to 0·3 by 0·008 mm.,
subendosomal sagittal triradiates, paired rays 0·08 to 0·12 by 0·008 mm., basal rays 0·2 to 0·3 by 0·008 mm.,
endosomal triradiates, subregular, rays 0·1 to 0·15 by 0·005 to 0·008 mm.,
endosomal quadriradiates, similar to triradiates but with apical rays 0·04 to 0·08 by 0·008 to 0·012 mm.

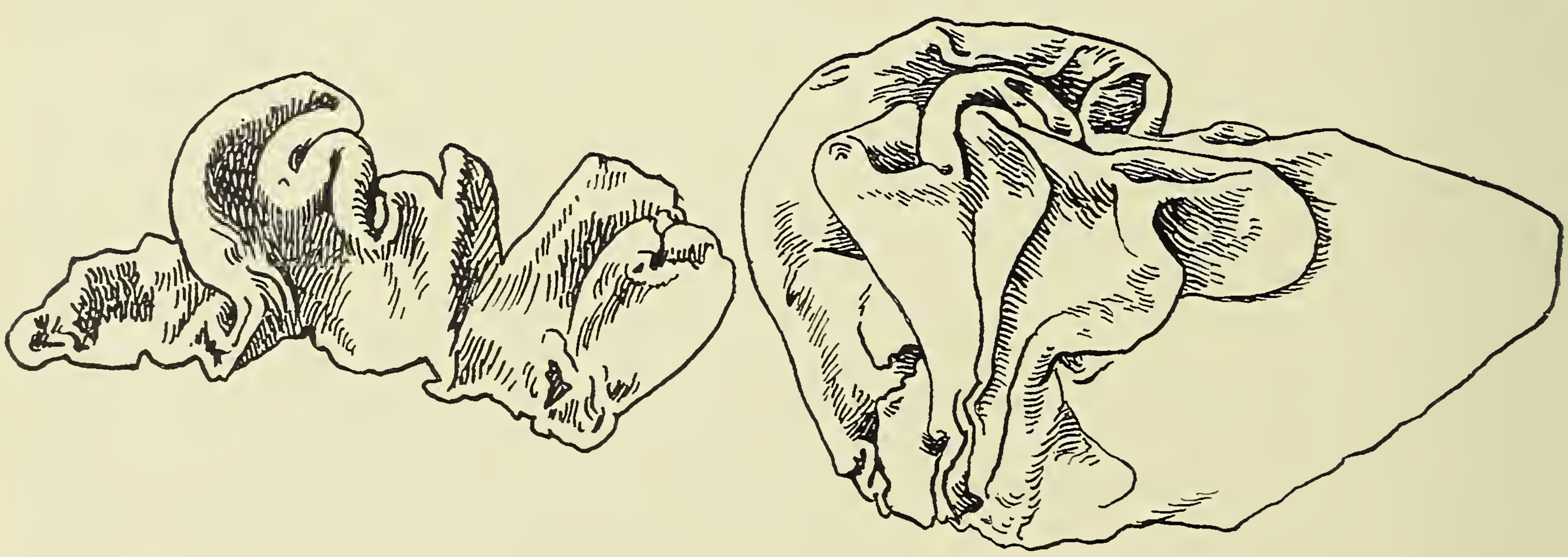
Distribution (*Summary*)*:* Arctic; Atlantic coasts of Europe, south to Channel Islands; littoral to 288 m., on seaweeds or on rocks, especially in sheltered places.

Named form: **Grantia foliacea** Breitfuss

(text-fig. 271)

Grantia foliacea Breitfuss, 1898: 23, pl. ii, figs. 15, 18; Breitfuss, 1932: 248.

Description: Sponge compound, sac-shaped and laterally-compressed, sessile; surface hispid; vent apical or marginal, naked (?); texture firm; colour, in spirit, yellowish-brown; ectosomal skeleton a tangential layer of triradiates, with oxea of two sizes projecting beyond surface; tubar skeleton of centrifugally-directed basal rays of subendosomal sagittal triradiates and numerous rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.



Text-fig. 271. *Grantia foliacea* after Breitfuss: natural size, and *G. monstruosa* Breitfuss (on right), natural size, to show similarity in form.

Spicules: ectosomal triradiates, subregular, rays 0·1 to 0·12 by 0·008 mm.,
oxea, 0·6 to 0·7 by 0·017 to 0·019 and 0·28 to 0·35 by 0·014 to 0·018 mm.,
tubar triradiates, sagittal, paired rays 0·08 to 0·12 by 0·008 mm., basal rays 0·1 to 0·3 by 0·008 mm.,
subendosomal sagittal triradiates, paired rays 0·08 to 0·12 by 0·008 mm., basal rays 0·2 to 0·3 by 0·008 mm.,
endosomal triradiates, subregular, rays 0·1 to 0·15 by 0·005 to 0·008 mm.,
endosomal quadriradiates, similar to triradiates, with apical rays 0·04 to 0·08 by 0·008 by 0·012 mm.

Distribution: Arctic (Barents Sea); 29–80 m.

Named form: **Grantia harai** Hozawa

(text-fig. 272)

Grantia harai Hozawa, 1929: 328, pl. xvii, figs. 36, 37, text-fig. 19; Tanita, 1943: 428.

Description: Sponge tubular, curved, laterally-compressed, stipitate, solitary, with elliptical, apical vent; surface minutely hispid; margin of vent feebly-developed; texture soft, delicate; colour, in spirit, white; ectosomal skeleton of a few layers of tangential triradiates, with densely distributed oxea projecting from surface; tubar skeleton of centrifugally-directed basal rays of subendosomal triradiates and a few rows of triradiates; endosomal skeleton of a few layers of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·16 to 0·2 by 0·008 mm., basal ray 0·2 to 0·32 by 0·008 mm.,
oxea, 0·9 by 0·004 mm.,
tubar triradiates, sagittal, paired rays 0·15 by 0·008 m., basal ray 0·22 by 0·008 mm.,
subendosomal triradiates, sagittal, paired rays 0·1 to 0·14 by 0·006 mm., basal rays 0·23 to 0·39 by 0·008 mm.,
endosomal quadriradiates, sagittal, paired rays 0·08 to 0·16 by 0·008 mm., basal ray 0·27 to 0·3 by 0·008 mm., apical ray 0·1 to 0·15 by 0·008 mm.

Distribution: Japan (Kagoshima Bay); 100 m.

Text-fig. 272. *Grantia harai* after Hozawa: natural size.

Named form: **Grantia monstruosa** Breitfuss

Grantia monstruosa Breitfuss, 1898: 24, pl. ii, fig. 16, pl. iii, fig. 19; Breitfuss, 1898: 303; Lambe, 1900: 166; Dendy and Row, 1913: 760; Breitfuss, 1932: 248.

Description: Sponge composed of several laterally-compressed individuals; surface hispid; vents apical, naked; texture firm; colour, in spirit, greyish-yellow; ectosomal skeleton a tangential layer of triradiates, with oxea of two sizes projecting beyond surface; tubar skeleton of triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, subregular or sagittal, rays 0·1 to 0·13 by 0·008 mm.,
oxea, 0·25 to 0·3 by 0·009 to 0·01 mm.,
oxea, 0·12 to 0·17 by 0·009 to 0·015 mm.,
tubar triradiates, sagittal, paired rays 0·1 by 0·008 mm., basal rays 0·12 to 0·16 by 0·008 mm.,
endosomal triradiates, regular, rays 0·09 to 0·113 by 0·007 to 0·008 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray up to 0·18 by 0·01 mm.

Distribution: Arctic (Behring Sea, Barents Sea); 36–288 m.

Named form: **Grantia nipponica** Hozawa

(text-fig. 272A)

Grantia nipponica Hozawa, 1918: 534, pl. lxxxiv, fig. 8, text-fig. 4; Hozawa 1929: 329; Tanita, 1943: 429.

Description: Sponge tubular, compressed; surface even, minutely hispid; vent with slight collar; texture firm; colour, in spirit, greyish-white; ectosomal skeleton of several layers of tangential triradiates, with oxea sparsely distributed and projecting from surface; tubar skeleton of centrifugal basal rays of subendosomal sagittal triradiates and rows of sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates, endosomal triradiates and quadriradiates, with apical rays projecting into cloacal cavity and quadriradiates of exhalant canals.

Spicules: ectosomal triradiates, sub-sagittal, irregular, rays 0·08 to 0·16 by 0·012 to 0·016 mm.,
oxea, 0·13 to 0·3 by 0·012 mm.,
tubar triradiates, sagittal, paired rays 0·07 to 0·09 by 0·012 mm., basal ray 0·13 to 0·16 by 0·012 mm.,
subendosomal triradiates, paired rays 0·19 by 0·016 mm., basal ray 0·35 to 0·5 by 0·012 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·33 to 0·7 by 0·016 mm.,
quadriradiates of exhalant canals, paired rays 0·08 by 0·006 mm., basal ray 0·11 by 0·01 mm., apical ray 0·03 by 0·004 mm.

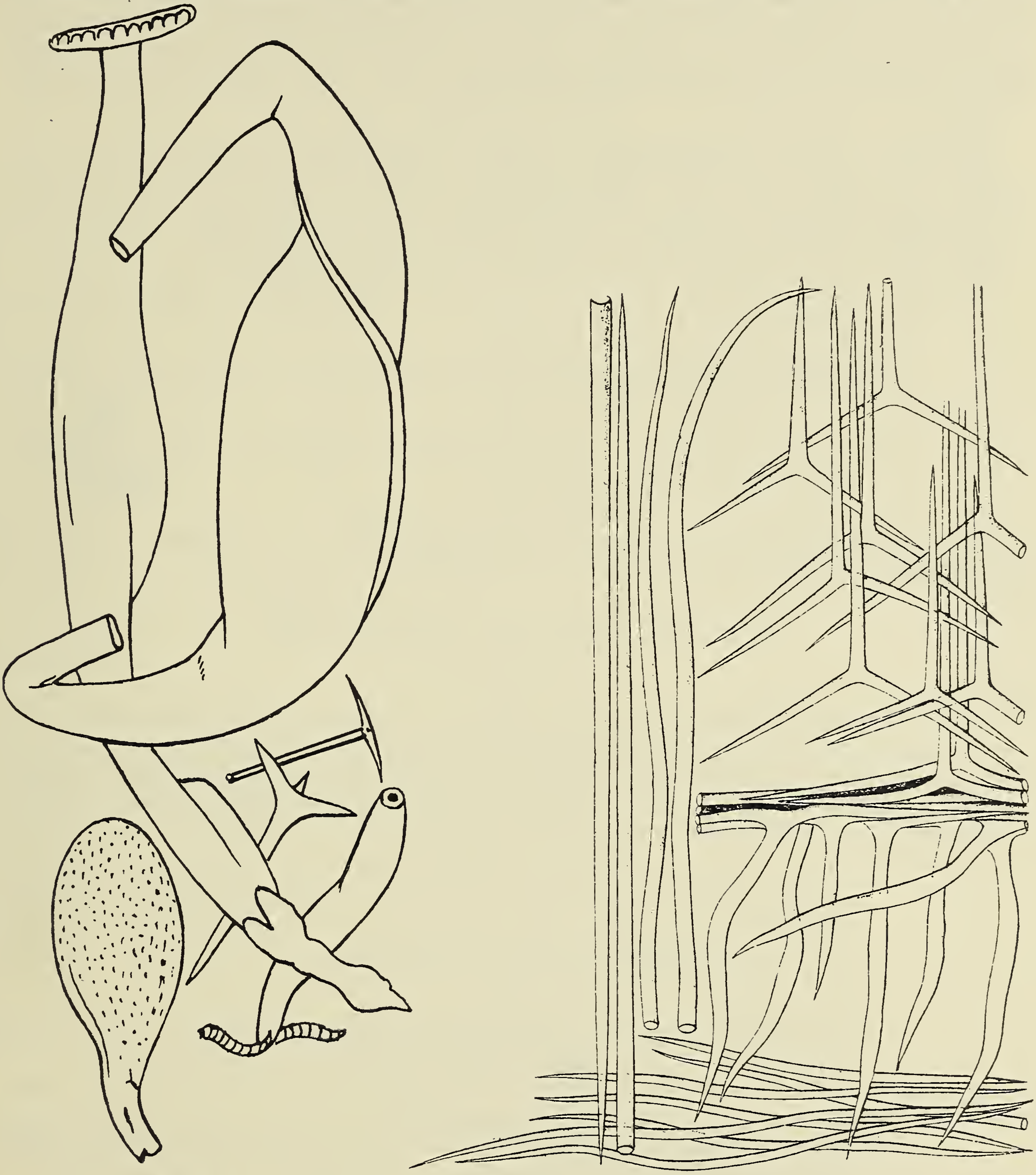
Distribution: Japan (Nosaki); Kurile Islands; 238–419 m.

Text-fig. 272A. *Grantia nipponica* after Hozawa: natural size.

Named form: **Sycandra utriculus** (Schmidt)

(text-fig. 273)

Ute utriculus Schmidt, 1869: 93; Schmidt, 1870: 74, pl. ii, fig. 27; *Sycarium utriculus*, Haeckel, 1870: 238; *Artynas utriculus*, Haeckel, 1870: 240; *Sycocystis utriculus*, Haeckel, 1870: 249; *Artynella utriculus*, Haeckel, 1870: 249; *Sycandra utriculus*, Haeckel, 1872: 370: pl. lv, fig. 3, pl.



Text-fig. 273. *Sycandra utriculus*: group of specimens (natural size) and two spicules (dimensions not given), as figured by Schmidt (1870). To right, spiculation as depicted by Haeckel (1872), based presumably on the fig-shaped specimen figured by Schmidt (bottom left).

lviii, fig. 4; *Sycurus utriculus*, Haeckel, 1872: 371; *Sycocystis utriculus*, Haeckel, 1872: 371, pl. lviii, fig. 4; *Sycandra monodora* (= *S. utriculus* var. *monodora*), Haeckel, 1872: 371; *S. polydora* (= *S. utriculus* var. *polydora*) Haeckel, 1872: 371; *S. monothalama* (= *S. utriculus* var. *monothalama*), Haeckel, 1872: 371; *S. polythalama* (= *S. utriculus* var. *polythalama*), Haeckel, 1872: 371; *S. utriculus*, Marenzeller, 1877: 16; Vosmaer, 1882: 4; Marenzeller, 1886: 14; Fristedt, 1887: 410; *Sycon utriculus*, Topsent, 1892: 23; *Ute utriculus*, Vanhöffen, 1897: 249; *Grantia utriculus*, Breitfuss, 1898: 22; Breitfuss, 1898: 303; *G. utriculus*, et varr. *momodora, polydora, monthalama, polythalama*, Breitfuss, 1898: 27–28; Arnesen, 1901: 22; Breitfuss, 1911: 212; *Sycandra utriculus*, Dendy and Row, 1913: 749; *Grantia utriculus*, Derjugin, 1915: 290; *Sycandra utriculus*, Breitfuss, 1932: 246.

Description: Sponge tubular, sometimes oval and laterally-compressed, substipitate; surface subpapillose, hispid; vent apical, naked; texture (?); colour, in spirit, brown; distal ends of chambers ornamented with oxea; tubar skeleton of several rows of triradiates and basal rays of subendosomal triradiates: endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of triradiates and quadriradiates; endocloacal skeleton of oxea.

Spicules: tubar triradiates, sagittal, paired rays 0·1 to 0·12 by 0·02 mm., basal ray 0·16 to 0·2 by 0·02 mm.,
oxea, 0·5 to 1·5 by 0·002 to 0·02 mm.,
subendosomal sagittal triradiates, paired rays, 0·12 to 0·16 by 0·02 mm.; basal ray 0·2 to 0·26 by 0·02 mm.,
endosomal triradiates, subregular, rays 0·05 to 0·3 by 0·006 to 0·016 mm.,
endosomal quadriradiates, subregular, facial rays 0·15 to 0·2 by 0·002 to 0·008 mm., apical ray 0·25 to 0·45 by 0·02 mm.,
endocloacal oxea, 0·2 to 0·4 by 0·003 to 0·005 mm.

Distribution (*Summary*): Arctic; Faroes; Norway; British Isles; Newfoundland; 2–260 m., on seaweeds and hydroids growing on sand, mud or pebbles.

Named form: **Paragrantia waguensis** Hozawa

(text-fig. 274)

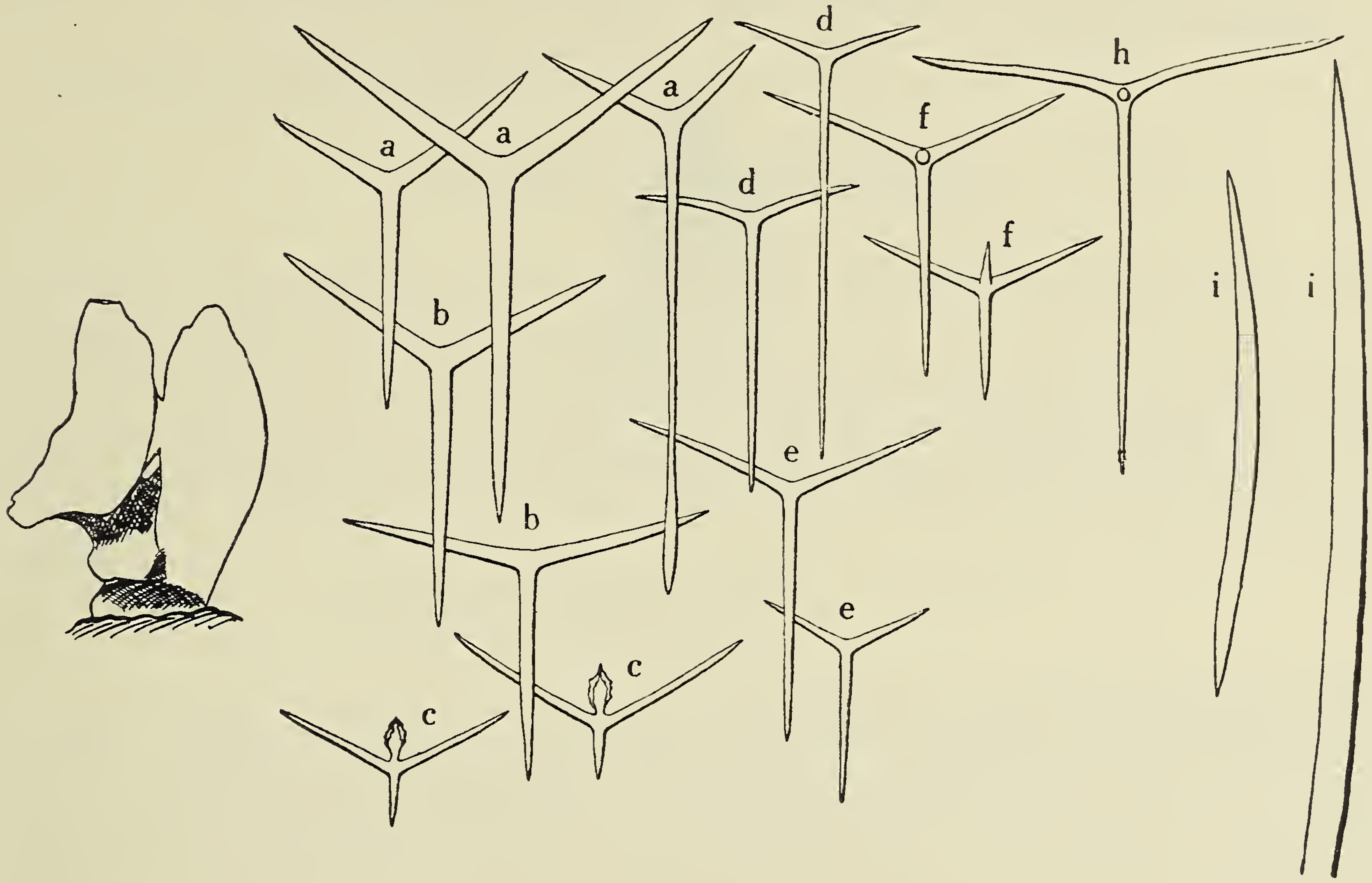
Paragrantia waguensis Hozawa, 1940: 40, pl. v, figs. 8–11, text-fig. 4; Tanita, 1943: 429.

Description: Sponge tubular, erect; surface smooth; vents apical; texture rigid; colour, in spirit, milky white; ectosomal skeleton of several tangential layers of triradiates; tubar skeleton articulate, composed of triradiates and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, of two kinds (i) paired rays 0·06 to 0·22 by 0·012 to 0·02 mm., basal ray 0·08 to 0·32 by 0·012 to 0·02 mm. (ii) paired rays of uneven length, 0·05 to 0·11 and 0·08 to 0·135 by 0·01 to 0·16 mm., basal ray 0·25 to 0·42 by 0·004 to 0·016 mm.,
tubar triradiates, sagittal, paired rays 0·09 to 0·16 by 0·01 to 0·016 mm., basal ray 0·14 to 0·225 by 0·01 to 0·016 mm.,
quadriradiates of apopyle, paired rays 0·056 to 0·07 by 0·004 mm., basal ray 0·02 to 0·025 by 0·004 mm., apical ray (torch-like), 0·02 by 0·012 to 0·018 mm.,
subendosomal triradiates, sagittal, paired rays 0·065 to 0·11 by 0·008 to 0·01 mm., basal ray 0·18 to 0·35 by 0·008 to 0·01 mm.,
endosomal triradiates, sagittal, paired rays, 0·07 to 0·2 by 0·008 to 0·01 mm., basal ray 0·1 to 0·39 by 0·008 to 0·01 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·04 to 0·09 by 0·012 mm.

Distribution: Japan (Miye Prefecture).

Remarks: The general appearance of the holotype of this species recalls strongly that of the common *Grantia compressa* of European waters. The presence of the spined apical rays on the quadriradiates of the apopyles, the chief characteristic of *Paragrantia waguensis*, has probably a similar relation to the typical form that the spined quadriradiates of certain individual specimens bear to the typical form of *Clathrina coriacea* (q.v.).



Text-fig. 274. *Paragrantia waguensis* after Hozawa: spicules, ×100, except c. which is ×200; external form, natural size.
a. ectosomal triradiates; b. tubar triradiates; c. quadriradiates of apopyle; d. subendosomal triradiates; e. endosomal triradiates; f. endosomal quadriradiates; i. oxea.

19. **Scypha antarctica** (Jenkin)

Named form: **Sycon antarcticum** (Jenkin)

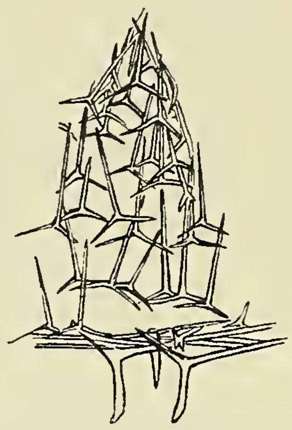
(text-fig. 275)

Tenthrenodes antarcticus Jenkin, 1908: 12, pl. xxix, figs. 28-32; *Sycon antarcticum,* Dendy and Row, 1913: 744.

Description: Sponge subspherical; surface even (?), minutely hispid; vent apical, naked; texture firm; colour, in spirit, white; tubar skeleton of basal rays of subendosomal sagittal triradiates and several rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of endosomal triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·07 by 0·006 to 0·008 mm., basal ray 0·1 to 0·14 by 0·006 to 0·007 mm.,
subendosomal triradiates, sagittal, paired rays 0·07 by 0·008 mm., basal ray 0·16 by 0·008 mm.,
endosomal triradiates, sagittal, paired rays 0·16 by 0·012 mm., basal ray 0·48 by 0·012 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·13 to 0·18 by 0·012 mm.

Distribution: Antarctic.



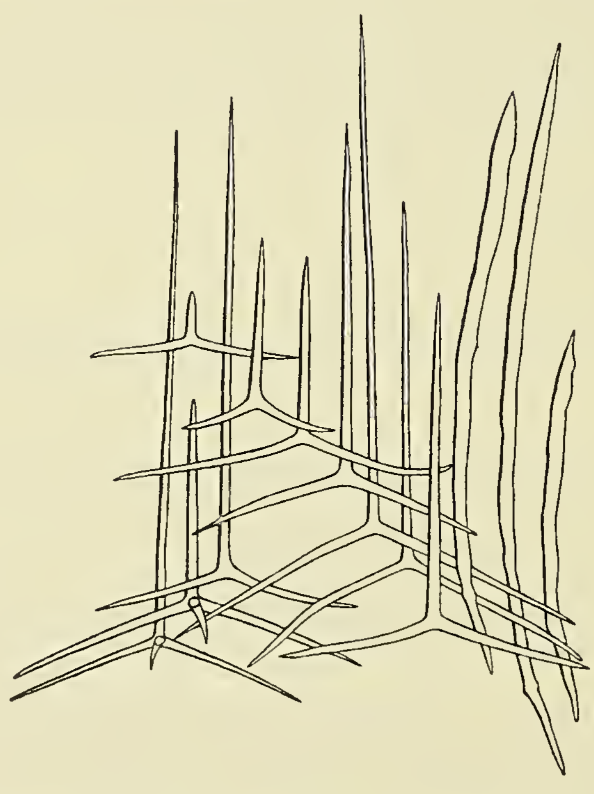
Text-fig. 275. *Sycon antarcticum* after Jenkin: skeleton of a radial tube, ×50.

Named form: **Jenkina articulata** Brøndsted

(text-fig. 276)

Jenkina articulata Brøndsted, 1931: 34, fig. 26.

Description: Sponge tubular; surface finely hispid; vent apical, slightly fringed; texture (?); colour, in spirit, brownish-white; ectosomal skeleton a tangential layer of triradiates, with oxea projecting at surface; tubar skeleton of basal rays of subendosomal sagittal triradiates, which reach nearly to ectosome, with one or two rows of tubar triradiates in lower half of sponge; endosomal skeleton of paired rays of subendosomal triradiates, together with a tangential layer of endosomal quadriradiates.



Text-fig. 276. *Jenkina articulata* after Brøndsted: spicules, ×100.

Spicules: ectosomal triradiates, sagittal, paired rays 0·1 to 0·3 by 0·009 to 0·012 mm., basal ray 0·3 to 0·4 by 0·009 to 0·012 mm.,
oxea, 0·5 to 0·8 by 0·012 to 0·017 mm.,
tubar triradiates, sagittal, paired rays 0·04 (or more?) by 0·009 to 0·012 mm., basal ray 0·4 to 0·6 mm. (?),
subendosomal sagittal triradiates, paired rays 0·1 to 0·3 by 0·009 to 0·012 mm., basal ray up to 0·6 mm. by 0·009 to 0·012 mm.,
endosomal quadriradiates, similar to subendosomal triradiates, with apical ray 0·04 to 0·05 by 0·007 to 0·01 mm.

Distribution: Antarctic; 350–385 m.

Named form: **Sycon australe** (Jenkin)

(text-fig. 277)

Streptoconus australis Jenkin, 1908: 25, pl. xxvii, fig. 3, pl. xxxii, fig. 75, pl. xxxiii, figs. 76–80; *Sycon australe*, Dendy and Row, 1913: 745.

Description: Sponge flask-shaped; surface strongly hispid; vent apical, with well-developed fringe; texture soft; colour, in spirit, white; tubar skeleton of basal rays of subendosomal quadriradiates and several rows of tubar quadriradiates and triradiates, with distal ends of radial chambers ornamented by basal rays of outermost radiates and by oxea, of three sizes; endosomal skeleton of paired and apical rays of subendosomal quadriradiates and a tangential layer of endosomal quadriradiates, more rarely triradiates.

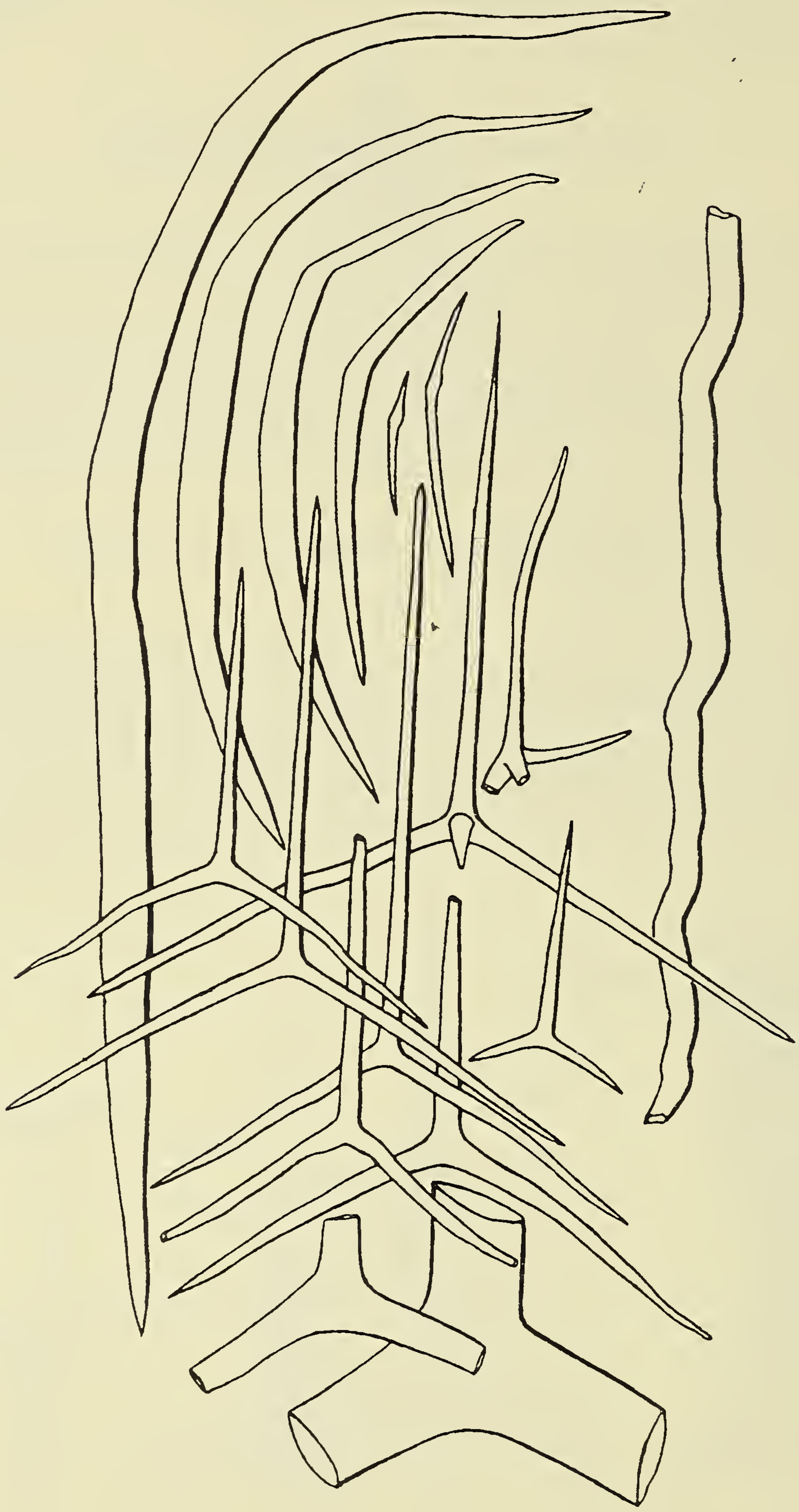
Spicules: oxea, 0·3 to 1·25 by 0·009 to 0·015 mm.,
oxea, 1·02 by 0·006 mm.,
oxea, 0·14 by 0·008 mm.,
tubar triradiates, sagittal, paired rays 0·07 by 0·006 mm., basal ray 0·1 by 0·006 mm.,
tubar quadriradiates, sagittal, paired rays 0·07 to 0·11 by 0·003 to 0·005 mm., basal ray 0·14 to 0·22 by 0·004 to 0·006 mm., apical ray 0·05 to 0·065 by 0·003 mm.,
subendosomal sagittal quadriradiates, paired rays 0·11 by 0·005 mm., basal ray 0·22 by 0·006 mm., apical ray 0·065 by 0·003 mm.,

Text-fig. 277. *Sycon australe* after Jenkin: spicules (right), ×100; skeleton of radial chamber (left), ×100.

endosomal quadriradiates, sagittal, paired rays 0·14 to 0·215 by 0·008 to 0·01 mm., basal rays 0·23 to 0·43 by 0·006 to 0·012 mm., apical ray 0·032 by 0·004 mm.,

endosomal triradiates, sagittal, paired rays 0·08 to 0·15 by 0·006 to 0·008 mm., basal ray 0·19 to 0·3 by 0·006 to 0·008 mm.

Distribution: Antarctic.



Text-fig. 278. *Leucandra comata* after Brøndsted: magnification not stated, but may be about × 100.

Named form: **Leucandra comata** Brøndsted

(text-fig. 278)

Leucandra comata Brøndsted, 1931: 43, figs. 33–35.

Description: Sponge ovate, with apical chimney-like vent; surface hispid; texture hard; colour, in spirit, greyish-yellow; ectosomal skeleton a tangential layer of triradiates, with curved oxea projecting beyond surface; skeleton of chamber layer of triradiates irregularly arranged; endosomal skeleton of a few triradiates, but mainly of quadriradiates with apical rays projecting into cloacal cavity.

Spicules: triradiates, subregular, rays 0·25 to 1·0 by 0·014 to 0·06 mm.,
oxea, 0·2 to 1·0 by 0·01 to 0·038 mm.,
endosomal quadriradiates, sagittal, paired rays 0·18 to 0·25 by 0·009 to 0·012 mm., basal ray 0·25 to 0·35 by 0·009 to 0·011 mm., apical ray 0·07 to 0·08 by 0·008 mm.

Distribution: Antarctic; 350–385 m.

Named form: **Leucandra gausapata** Brøndsted

Leucandra gausapata Brøndsted, 1931: 42, fig. 32.

Description: Sponge ovate; surface strongly hispid; vent apical, naked; texture (?); colour (?); ectosomal skeleton tangential layers of triradiates, with oxea projecting beyond surface; skeleton of chamber layer mainly of basal rays of subendosomal sagittal triradiates; endosomal skeleton of tangential layers of quadriradiates.

Spicules: triradiates, sagittal, paired rays 0·165 to 0·228 by 0·006 to 0·012 mm.,
quadriradiates, subregular, facial rays 0·228 to 0·312 by 0·008 to 0·012 mm., apical ray 0·07 by 0·009 to 0·01 mm.,
oxea, up to 1·0 by 0·026 mm.

Distribution: Antarctic; 350–385 m.

Named form: **Jenkina glabra** Brøndsted

Jenkina glabra Brøndsted, 1931: 37, fig. 27.

Description: Sponge small (juvenile?), tubular to flask-shaped; surface smooth, translucent; vent apical; texture (?); colour (?); ectosomal skeleton a few tangential layers of triradiates; tubar skeleton of basal rays of subendosomal sagittal triradiates, which reach nearly to ectosome; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of endosomal quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·16 to 0·28 by 0·008 to 0·011 mm., basal ray 0·24 to 0·32 by 0·009 to 0·012 mm.,
subendosomal sagittal triradiates, paired rays 0·15 by 0·01 mm., basal ray 0·38 by 0·01 mm.,
endosomal quadriradiates, similar to ectosomal triradiates, with apical ray 0·06 to 0·08 by 0·01 mm.

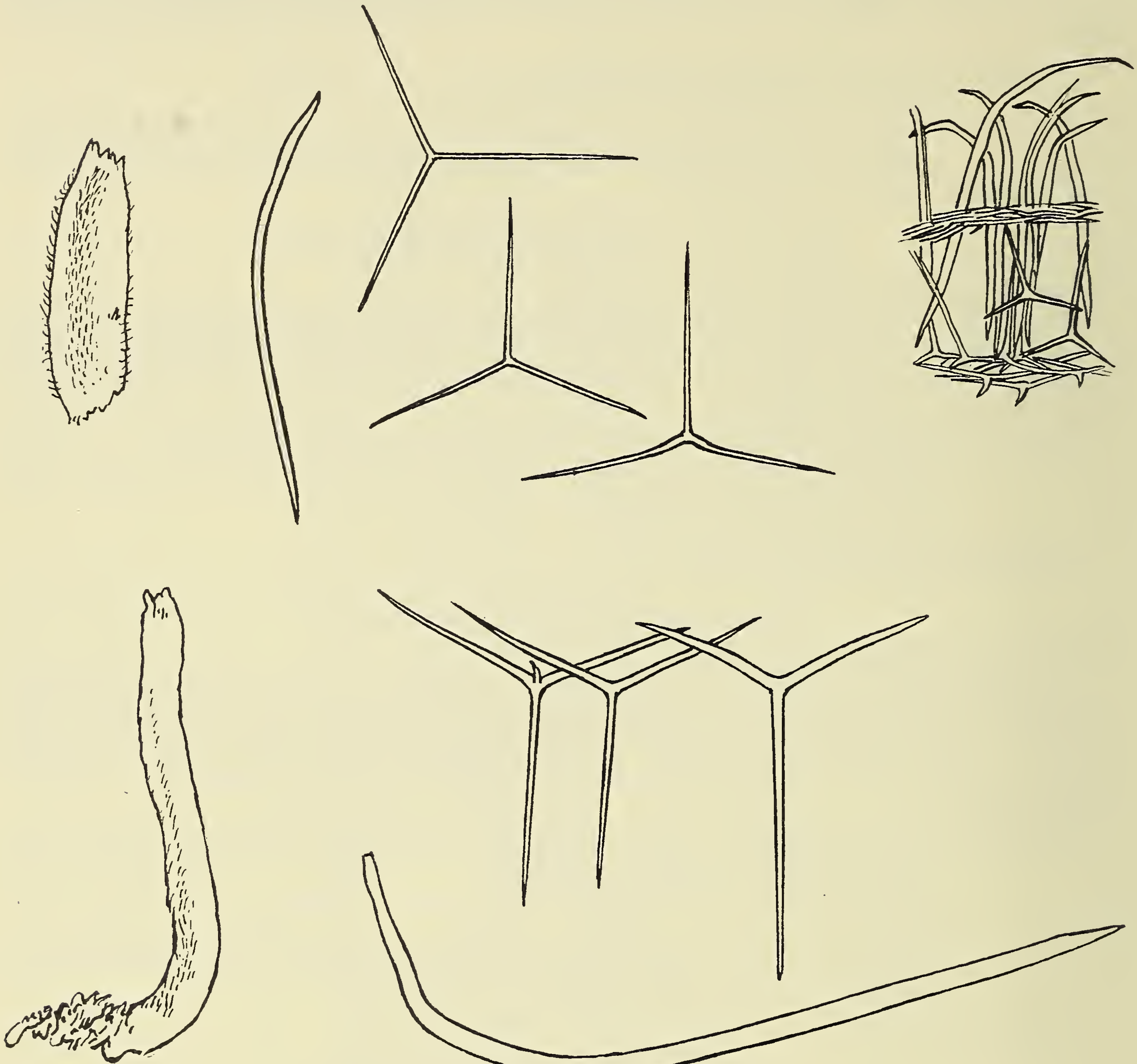
Distribution: Antarctic; 350–385 m.

Named form: **Grantia hirsuta** (Topsent)

(text-fig. 279)

Leucandra hirsuta Topsent, 1907: 541; Topsent, 1908: 7; *L. cirrata* Jenkin, 1908: 18, pl. xxxi, figs. 54–56; *Grantia tenuis* Urban, 1909: 14, pl. ii, figs. 43–55, pl. iii, figs. 1–2; *Grantia tenuis*, Dendy and Row, 1913: 760; *Leucandra cirrata*, Dendy and Row, 1913: 770; *L. hirsuta*, Dendy and Row, 1913: 770; *Grantia cirrata*, var. *aurorae* Dendy, 1918: 11, pl. 1, figs. 4, 9; *G. tenuis*, Dendy, 1918: 12; *G. hirsuta*, Burton, 1929: 402; *G. tenuis*, Brøndsted, 1931: 27; *Jenkina cirrata*, Brøndsted, 1931: 33; *Grantia cirrata*, var. *aurorae*, Burton, 1932: 262; *G. cirrata*, var. *tenuipilosa*, Burton, 1932: 262; *G. hirsuta*, Burton, 1934: 9.

Description: Sponge solitary, tubular, sessile; surface hispid; vent apical, naked; texture firm, brittle; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates with oxea projecting beyond surface; skeleton of chamber layer of centrifugally-directed rays of subendosomal sagittal triradiates and tubar triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.



Text-fig. 279. *Grantia hirsuta*, as represented by *G. tenuis* Urban and *Leucandra cirrata* Jenkin. also *G. aculeata* Urban.
G. tenuis: external form (bottom left), ×3; spicules (top centre), ×100.
L. cirrata: section at right angles to surface (top right), ×48; spicules (bottom right), ×100.
G. aculeata: external form (top left) ×3 (the spicules in this species are almost identical with those shown here, top centre, for *G. tenuis*, except in the shape of the oxea).

Spicules: ectosomal triradiates, rays 0·04 to 0·5 by 0·007 to 0·012 mm.,
oxea, 0·13 to 1·83 by 0·003 to 0·04 mm.,
tubar triradiates, rays 0·17 to 0·24 by 0·007 to 0·008 mm.,
endosomal sagittal triradiates, paired rays 0·08 to 0·3 by 0·006 to 0·014 mm., basal rays 0·16 to 0·6 by 0·006 to 0·014 mm.,
endosomal triradiates and quadriradiates, rays 0·1 to 0·5 by 0·008 to 0·012 mm., apical ray 0·04 to 0·11 by 0·007 to 0·01 mm.

Distribution: Kerguelen; Antarctic; littoral to 385 m.

Named form: **Sycon longstaffi** (Jenkin)

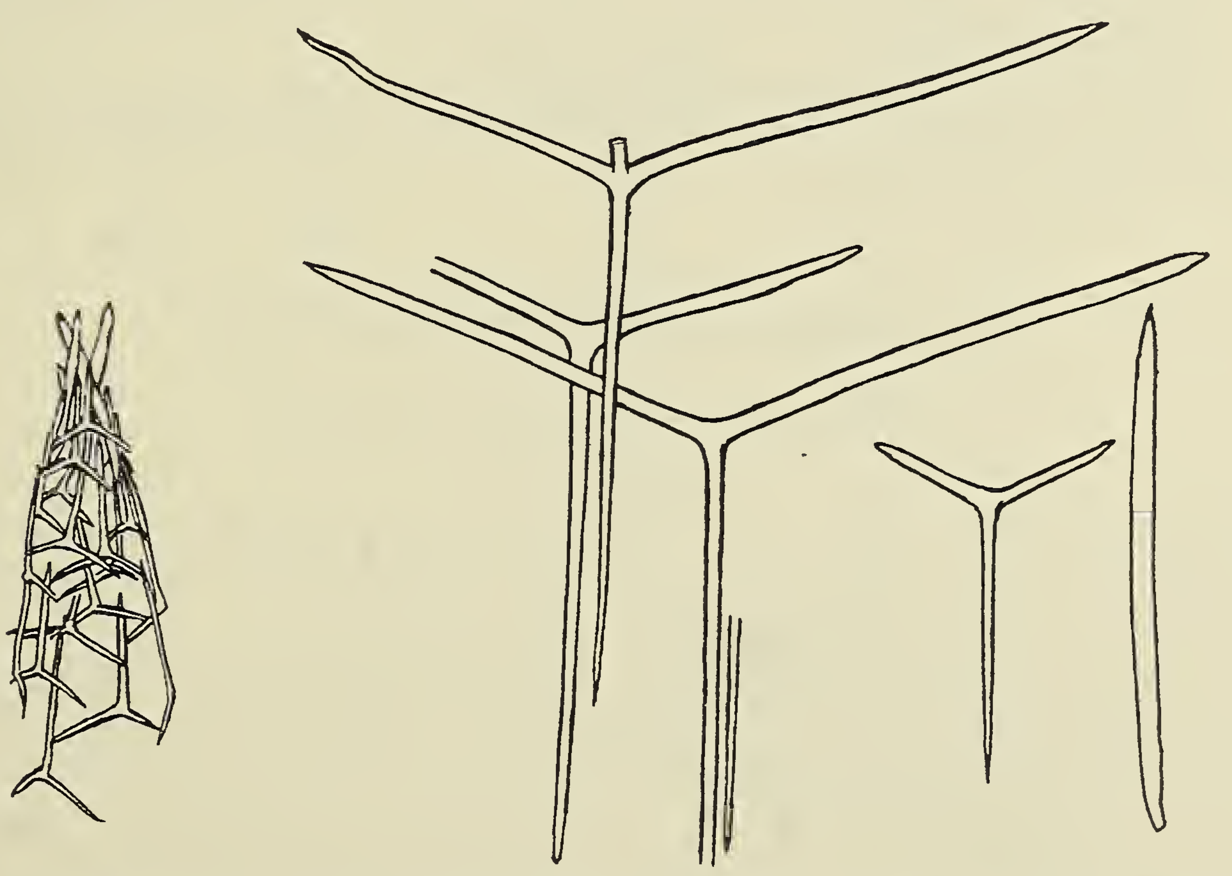
(text-fig. 280)

Hypodictyon longstaffi Jenkin, 1908: 27, pl. xxvii, fig. 10, pl. xxxiii, figs. 81–90, pl. xxxiv, figs. 91–97; *Sycon longstaffi*, Dendy and Row, 1913: 747.

Description: Sponge tubular, sessile; surface papillate, hispid; vent apical, with collar; texture soft; colour, in spirit, white; tubar skeleton of triradiates, with subendosomal sagittal quadriradiates (?), and with distal cones ornamented with oxea; endosomal skeleton of triradiates and quadriradiates.

Spicules: oxea, 0·1 to 0·9 by 0·012 to 0·026 mm.,
oxea, 'hair-like',
tubar triradiates, sagittal, paired rays 0·08 to 0·15 by 0·008 to 0·01 mm., basal ray 0·14 to 0·26 by 0·008 to 0·01 mm.,
subendosomal sagittal quadriradiates, similar to tubar triradiates, with apical ray 0·09 by 0·006 mm.,
endosomal triradiates, sagittal, paired rays 0·18 to 0·43 by 0·01 to 0·016 mm., basal rays 0·8 by 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·22 to 0·42 by 0·011 to 0·013 mm., basal rays 1·0 by 0·009 to 0·012 mm., apical ray 0·08 by 0·02 mm.

Distribution: Antarctic.



Text-fig. 280. *Sycon longstaffi* after Jenkin: spicules, ×100; section showing a radial chamber, ×50.

Grantia vitiosa Brøndsted

Grantia vitiosa Brøndsted, 1931 : 29, fig. 25.

Description: Sponge tubular; surface hispid; vent (?); texture (?); colour, in spirit, yellowish-white; ectosomal skeleton a tangential layer of triradiates, with bundles of oxea; tubar skeleton of basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates, with a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays, up to 0·1 by 0·008 mm. (corroded?), basal ray 0·3 to 0·42 by 0·01 to 0·014 mm.,
oxea, 0·25 by 0·008 to 0·009 mm. (corroded?),
subendosomal sagittal triradiates (?), paired rays up to 0·1 by 0·008 mm. (corroded?), basal ray 0·3 by 0·42 by 0·01 to 0·014 mm.,
endosomal quadriradiates, similar to subendosomal triradiates, with apical ray 0·01 to 0·04 by 0·008 mm.

Distribution: Antarctic; 350–385 m.

Remarks: Brøndsted refers to this as 'Die Art ist provisorisch. Ich betrachte nämlich das Individuum als pathologisch.' This is unsatisfactory. It would have been preferable to have had the fragmentary (and corroded?) specimen described but not made the holotype of a new species. In any event, it is difficult to see in it anything other than a specimen of *Scypha antarctica.*

Named form: Grantia transgrediens Brøndsted

Grantia transgrediens Brøndsted, 1931 : 28, fig. 24.

Description: Sponge tubular; surface strongly hispid; vent apical, naked; texture (?); colour (?); ectosomal skeleton of 3 to 5 layers of tangential triradiates, with oxea projecting beyond surface; tubar skeleton of triradiates, and basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and tangential layers of endosomal quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·17 to 0·24 by 0·007 to 0·008 mm.,
oxea, 1·2 by 0·018 mm.,
tubar triradiates, similar to ectosomal triradiates,
subendosomal sagittal triradiates, paired rays 0·2 by 0·012 mm., basal ray 0·45 by 0·012 to 0·013 mm.,
endosomal quadriradiates, sagittal, paired rays 0·16 to 0·22 by 0·008 mm., basal ray 0·28 to 0·33 by 0·008 mm., apical ray 0·09 to 0·11 by 0·008 to 0·01 mm.

Distribution: Antarctic; 350–385 m.

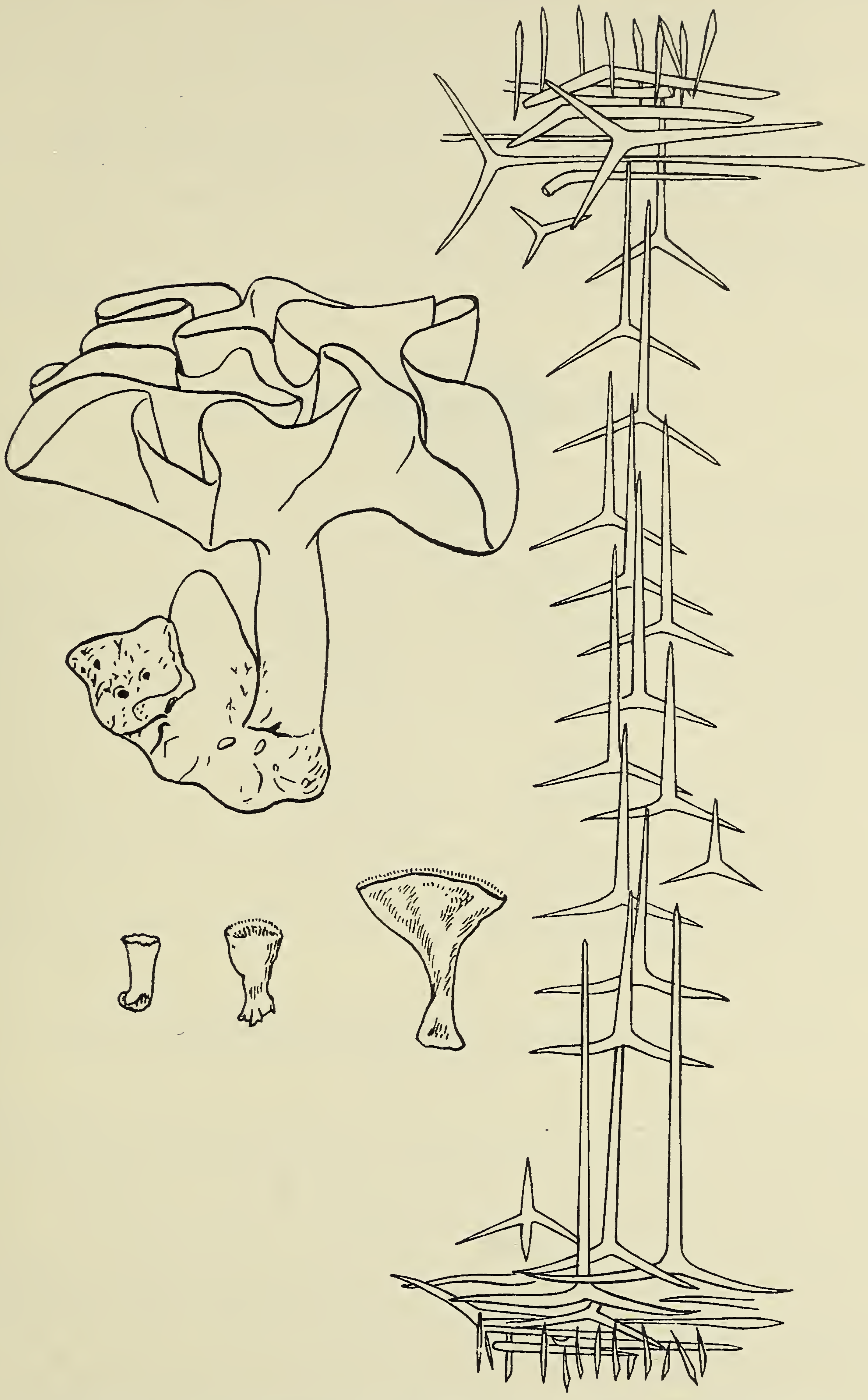
20. Scypha labyrinthica (Carter)

Teichonopsis labyrinthica (Carter)

(text-fig. 281)

Teichonella labyrinthica Carter, 1878: 37; Lendenfeld, 1885; 1142; *Grantia labyrinthica* Carter, 1886: 38; Dendy, 1891: 3, pl. i, figs. 1–5, pl. ii, figs. 7–22, pl. iii, figs. 23–27, pl. iv, figs. 28–38; 1892: 86; *Teichonopsis labyrinthica*, Dendy and Row, 1913: 762.

Description: Sponge caliculate when small, becoming infundibular and compressed, to lamellate and much folded, stipitate in all but early stages; surface even, non-hispid; vents small numerous, on inner surface; texture firm, brittle; colour, in spirit, white; ectosomal skeleton of several layers of triradiates, with microxea set at right angles to surface; tubar skeleton of subendosomal sagittal triradiates and numerous rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates, a tangential layer of quadriradiates, and microxea set at right-angles to surface.



Text-fig. 281. *Teichonopsis labyrinthica* after Dendy: section at right angles to surface, × 100; external form, natural size.

Spicules: ectosomal triradiates, sagittal, paired rays 0·07 to 0·12 by 0·01 mm., basal ray 0·19 to 0·38 by 0·01 mm.,
microxea, 0·07 to 0·15 by 0·003 to 0·008 mm.,
tubar triradiates, sagittal, paired rays 0·3 to 0·12 by 0·005 to 0·012 mm., basal ray 0·035 to 0·19 by 0·005 to 0·012 mm.,
subendosomal sagittal triradiates, paired rays 0·24 by 0·008 mm., basal ray 0·47 by 0·008 mm.,
endosomal quadriradiates, sagittal, paired rays 0·12 by 0·006 mm., basal ray 0·05 by 0·006 mm., apical ray 0·04 by 0·006 mm.,
endosomal microxea, 0·07 by 0·003 mm.

Distribution: Australia (Port Phillip Heads, Fremantle); dredged (no other details of depth).

21. **Scypha gelatinosa** (Blainville)

Named form: **Sycon carteri** Dendy

Sycon carteri Dendy, 1892: 79; Breitfuss, 1898: 216; *Sycandra tenella* Lendenfeld [in] Breitfuss, 1898: 216; *Sycon carteri*, Dendy and Row, 1913: 745.

Description: Sponge colonial, a mass of copiously branching, cylindrical individuals; surface minutely conulose, minutely hispid; vents apical, naked; texture firm; colour (?); tubar skeleton of basal rays of subendosomal sagittal triradiates and several rows of tubar triradiates, with distal cones ornamented with oxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of endosomal triradiates and quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·06 by 0·007 mm., basal ray 0·15 by 0·007 mm.,
oxea, 0·15 by 0·01 mm.,
subendosomal sagittal triradiates, paired rays 0·06 by 0·007 mm., basal ray 0·175 by 0·007 mm.,
endosomal triradiates, sagittal, paired rays 0·11 by 0·007 mm., basal ray 0·2 by 0·007 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·077 by 0·007 mm.

Distribution: Australia (St. Vincent Gulf).

Named form: **Sycon gelatinosum** (Blainville)

(text-fig. 282)

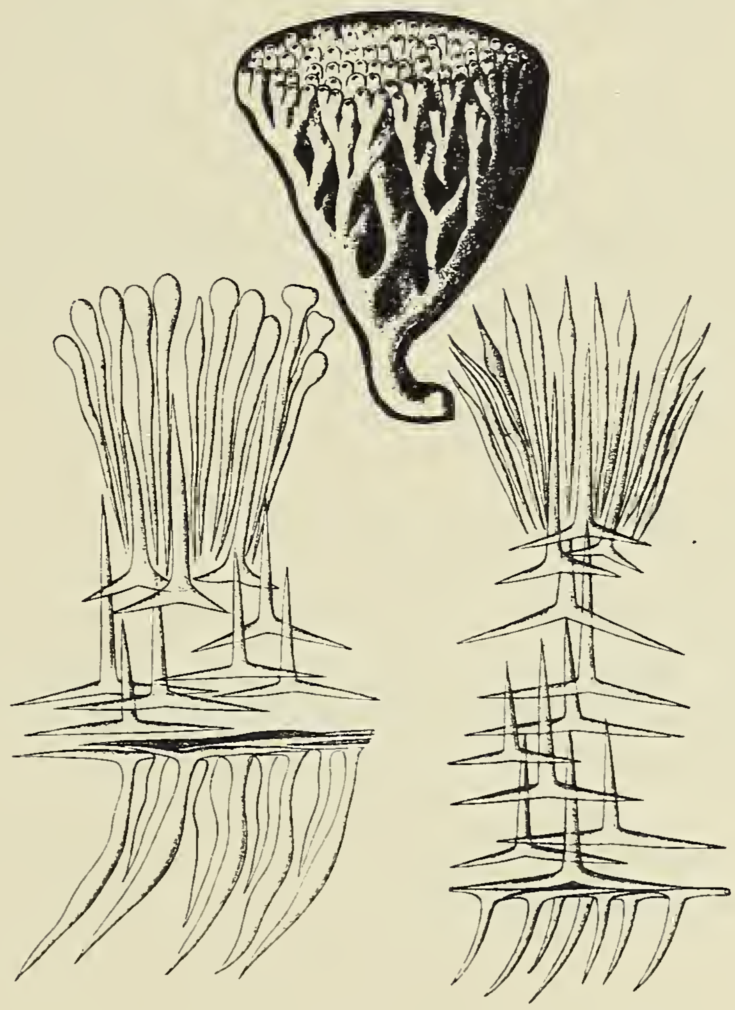
Alcyoncellum gelatinosum Blainville, 1834: 529, pl. xcii, fig. 5; Gray, 1867: 557; *Grantia gelatinosa*, Bowerbank, 1869: 84; *Sycidium gelatinosum*, Haeckel, 1870: 245; *Sycandra alcyoncellum*, Haeckel, 1872: 333, pl. liii, fig. 2, pl. lviii, fig. 5; *Grantia virgultosa* Bowerbank [in] Haeckel, 1872: 333; *Sycothamnus alcyoncellum* Haeckel, 1872: 334, pl. lviii, fig. 5; *Sycandra gelatinosa* (= *S. alcyoncellum*, var. *gelatinosa*), Haeckel, 1872: 334; *S. virgultosa* (= *S. alcyoncellum*, var. *virgultosa*), Haeckel, 1872: 334; *S. arborea* Haeckel, 1872: 331, pl. liii, fig. 1, pl. lviii, fig. 7; *Sycodendrum arboreum* Haeckel, 1872: 331, pl. lviii, fig. 7; *Sycon arboreum*, Poléjaeff, 1883: 41, pl. i, fig. 4; *S. gelatinosum*, Dendy, 1892: 83; *S. gelatinosum*, var. *whiteleggii* Dendy, 1892: 84; *S. gelatinosum*, Dendy and Frederick, 1924: 483; Burton, 1933: 84; Burton, 1933: 236.

Description: Sponge tubular, colonial, stipitate or sub-stipitate; surface minutely hispid; vents terminal, naked; texture firm; colour, in spirit, white, yellow or brown; tubar skeleton of centrifugally-directed rays of subendosomal sagittal triradiates, with numerous rows of triradiates;

distal ends of chambers ornamented with oxea and basal rays of outermost rows of tubar triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: tubar triradiates, subregular or sagittal, paired rays 0·04 to 0·09 by 0·007 to 0·008 mm., basal rays 0·06 to 0·15 by 0·008 to 0·016 mm.,
oxea, 0·08 to 0·15 by 0·004 to 0·01 mm.,
subendosomal sagittal triradiates, similar to larger sagittal tubar triradiates,
endosomal triradiates, sub-regular, facial rays 0·08 to 0·1 by 0·007 to 0·009 mm.,
endosomal quadriradiates, similar to triradiates but with apical ray 0·12 to 0·18 by 0·01 to 0·02 mm.

Distribution: Indian Ocean; Java; Australia (all coasts); South Africa (Port Elizabeth Bay); littoral to 73 m.



Text-fig. 282. *Sycon gelatinosum*: as represented by spicules of *Sycandra arborea* Haeckel (bottom right) and *S. alcyoncellum* Haeckel (bottom left), × 100, and by external form of *S. alcyoncellum*, × ½.

22. **Scypha ramsayi** (Lendenfeld)

Named form: **Leuconia australiensis** Carter

Leuconia fistulosa, var. *australiensis* Carter, 1886: 127; *Leucandra australiensis*, Dendy, 1892: 97; Dendy and Row, 1913: 769; Brøndsted, 1926: 312, fig. 9.

Description: Sponge sacciform, compressed, sessile; surface even, hispid; vent apical, fringed; texture (?); colour, alive (?), brown; ectosomal skeleton a tangential layer of triradiates, with facial rays of subectosomal quadriradiates; skeleton of chamber layer of centripetal rays of subectosomal quadriradiates and several rows of irregularly-arranged quadriradiates and triradiates of varying sizes; endosomal skeleton a tangential layer of triradiates.

Spicules: ectosomal triradiates, subregular, rays 0·14 to 0·21 by 0·01 by 0·018 mm.,
subectosomal pseudosagittal quadriradiates, facial rays 0·32 to 0·48 by 0·024 to 0·048 mm., apical ray 0·42 to 0·64 by 0·024 to 0·048 mm.,
quadriradiates and triradiates of chamber layer, subregular, rays 0·16 to 0·52 by 0·018 to 0·068 mm.,
endosomal triradiates, sagittal, paired rays 0·22 by 0·018 mm., basal ray 0·1 to 0·18 by 0·018 mm.

Distribution: Australia (Port Phillip Heads); New Zealand (Little Barrier Island); South Georgia.

Named form: **Grantessa erinaceus** (Carter)

Leuconia erinaceus Carter, 1886: 130; *Grantessa erinaceus*, Dendy, 1892: 108; Dendy and Row, 1913: 752.

Description: Sponge tubular, sessile; surface even, hispid in tufts; vent apical, fringed; texture soft; colour, in spirit, whitish-yellow; ectosomal skeleton a tangential layer of triradiates, with outer rays of subectosomal triradiates, brushes of long oxea, and irregularly-scattered short oxea; tubar skeleton of centripetal rays of subectosomal triradiates, irregularly-arranged tubar triradiates and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of endosomal triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·09 by 0·006 mm., basal ray 0·14 by 0·006 mm.,
oxea, 2·0 by 0·006 mm.,
oxea, 0·8 by 0·05 mm.,
subectosomal pseudosagittal triradiates, outer rays 0·14 by 0·01 mm., centripetal ray 0·3 by 0·012 mm.,
tubar triradiates, subregular to sagittal, rays 0·2 to 0·5 by 0·017 to 0·02 mm.,
subendosomal sagittal triradiates, paired rays 0·21 by 0·02 mm., basal ray 0·35 by 0·02 mm.,
endosomal triradiates, subregular, rays 0·21 by 0·014 mm.

Distribution: Australia (Port Phillip Heads).

Named form: **Grantia gracilis** (Lendenfeld)

Vosmaeria gracilis Lendenfeld, 1885: 1111; *Grantia gracilis*, Dendy, 1892: 87; Dendy and Row, 1913: 760.

Description: Sponge tubular, cylindrical or ovate; surface hispid; vent apical, fringed; texture (?); colour (?); ectosomal skeleton a tangential layer of triradiates (?), with oxea projecting at surface; tubar skeleton of triradiates, with subendosomal sagittal triradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates (?),
oxea, 1·0 by 0·007 mm.,
tubar triradiates, regular, rays 0·1 by 0·005 mm.,
subendosomal sagittal triradiates, sagittal, paired rays 0·08 by 0·004 mm., basal rays 0·15 by 0·005 mm.,
endosomal quadriradiates, sagittal, paired rays 0·05 to 0·06 by 0·003 mm., basal rays 0·15 by 0·005 mm., apical ray 0·1 by 0·007 mm.

Distribution: Australia (Port Jackson).

Named form: **Grantessa hirsuta** (Carter)

Hypograntia hirsuta Carter, 1886: 41; *Grantessa hirsuta*, Dendy, 1892: 106; Dendy and Row, 1913: 752.

Description: Sponge oval to subspherical, sessile; surface even, hispid; vent apical, fringed; texture firm; colour, in spirit, light brown; ectosomal skeleton a tangential layer of triradiates, with tufts of oxea projecting at surface, and outer rays of subectosomal triradiates; tubar skeleton of centripetal rays of subectosomal triradiates, irregularly-arranged tubar triradiates, and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·1 by 0·007 mm.,
oxea, 0·5 to 1·0 by 0·014 mm.,
subectosomal pseudosagittal triradiates, outer rays 0·1 by 0·007 mm., centripetal ray 0·14 by 0·007 mm.,
tubar triradiates, subregular to sagittal, rays 0·14 to 0·2 by 0·007 mm.,
subendosomal sagittal triradiates, paired rays 0·18 by 0·007 mm., basal ray 0·21 by 0·007 mm.,
endosomal quadriradiates, sagittal, paired rays 0·14 by 0·008 mm., basal ray 0·1 by 0·008 mm., apical ray 0·035 to 0·1 by 0·006 mm.

Distribution: Australia (Port Phillip Heads, King Island); Tasmania.

Named form: **Leucandra phillipensis** Dendy

Leucandra phillipensis Dendy, 1892: 100; Dendy and Row, 1913: 771.

Description: Sponge irregularly sacciform, sessile; surface hispid; vent apical, fringed; texture (?); colour (?); ectosomal skeleton a tangential layer of triradiates, with oxea projecting beyond surface; skeleton of chamber layer of scattered triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·3 by 0·01 mm.,
oxea, 1·4 by 0·03 mm.,
oxea, 1·0 by 0·001 mm.,
triradiates, of chamber, regular (?), rays 0·33 by 0·016 mm.,
endosomal quadriradiates, sagittal, paired rays 0·4 by 0·01 mm., basal ray 0·3 by 0·01 mm., apical ray 0·16 by 0·01 mm.

Distribution: Australia (Port Phillip Heads).

Remarks: The external form in this species recalls that of *Sycon ramsayi*. The skeleton also is similar except that the rays of the radiates are somewhat longer and the oxea fewer in number.

Named form: **Sycon plumosum** Tanita

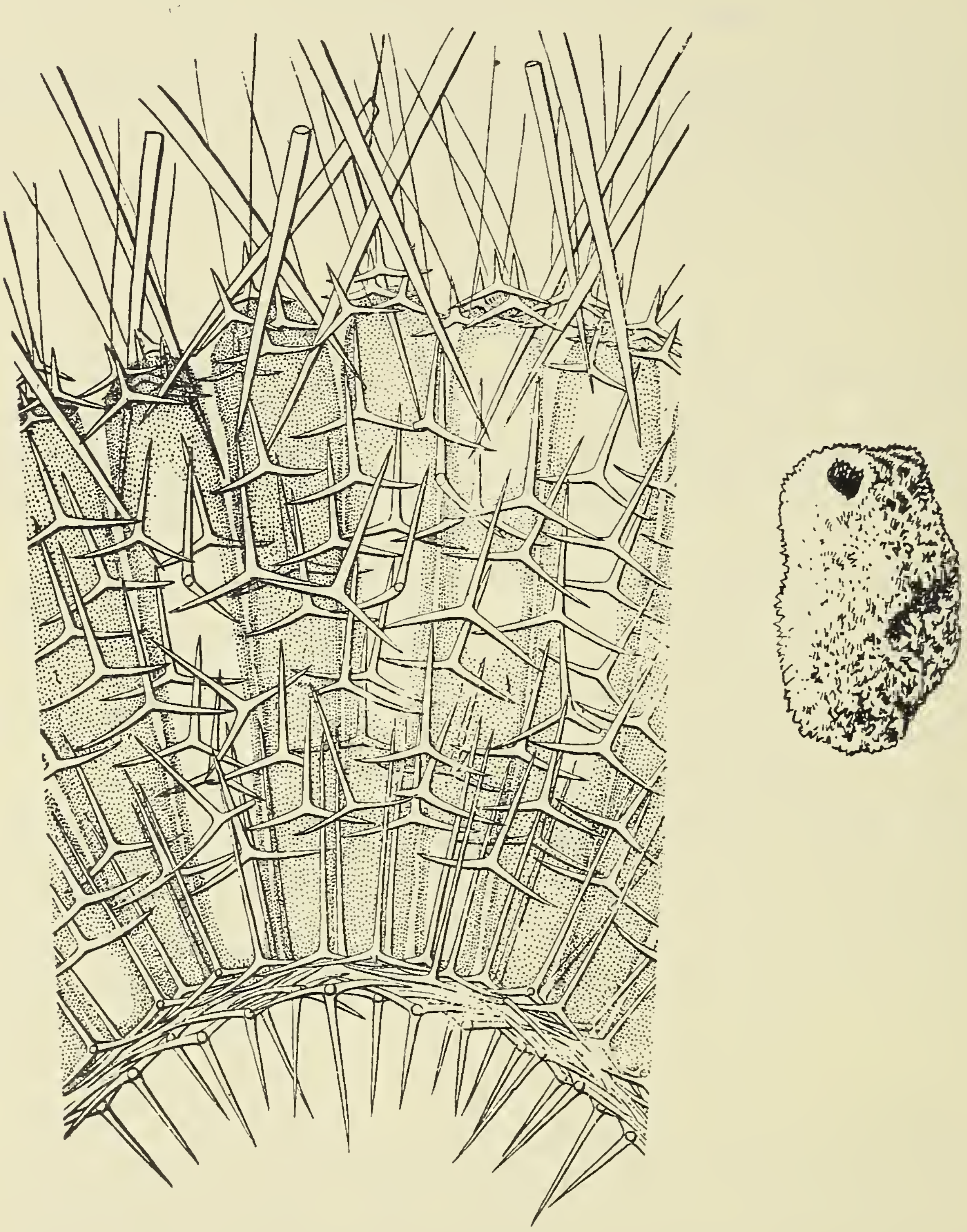
(text-fig. 283)

Sycon plumosum Tanita, 1943: 404, pl. xiv, figs. 39–40, text-figs. 10–11.

Description: Sponge tubular to ovate; surface strongly hispid; vent apical; texture elastic; colour, in spirit, greyish-white; skeleton of chamber layer of several rows of tubar triradiates, together with basal rays of subendosomal tri- and quadriradiates, with distal ends of chambers ornamented with oxea and trichoxea; endosomal skeleton of paired rays of subendosomal radiates and several layers of endosomal quadriradiates.

Spicules: tubar triradiates, sagittal, paired rays 0·17 to 0·24 by 0·015 to 0·018 mm., basal ray 0·27 to 0·36 by 0·015 to 0·018 mm.,
oxea, 0·8 to 3·0 by 0·03 to 0·035 mm.,
trichoxea, 4·5 by 0·003 mm.,
subendosomal sagittal triradiates, paired rays 0·12 to 0·18 by 0·008 to 0·01 mm., basal ray 0·25 to 0·36 by 0·008 to 0·01 mm.,
subendosomal quadriradiates, similar to triradiates, with apical ray 0·07 to 0·1 by 0·008 to 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·17 to 0·2 by 0·012 to 0·016 mm., basal ray 0·22 to 0·28 by 0·012 to 0·016 mm., apical ray 0·13 to 0·35 by 0·012 to 0·016 mm.

Distribution: Caroline Islands (Palao); littoral.



Text-fig. 283. *Sycon plumosum* after Tanita: section at right angles to surface, ×50; external form, natural size.

Named form: **Sycon ramsayi** (Lendenfeld)

Sycandra ramsayi Lendenfeld, 1885: 1097, pl. lix, figs. 35–36, pl. lxii, figs. 38–39, pl. lxvi, fig. 37; *Baeria ramsayi*, Maclay [in] Lendenfeld, 1885: 1098; *Sycandra ramsayi*, Carter, 1886: 35; *Sycon ramsayi*, Dendy, 1892: 82; *Grantessa hispida* Dendy, 1892: 106; *Sycon ramsayi*, Dendy and Row, 1913: 748; *Grantessa hispida*, Dendy and Row, 1913: 752; *Grantia genuina* Row and Hozawa, 1931: 781, pl. xx, fig. 12, text-fig. 11; *Leucandra thulakomorpha* Row and Hozawa, 1931: 791, pl. xxi, fig. 15, text-fig. 14; *Leucilla lanceolata* Row and Hozawa, 1931: 795, pl. xxi, fig. 16, text-fig, 15; *L. princeps* Row and Hozawa, 1931: 799, pl. xxi, fig. 17, text-fig. 16; *Grantia genuina*, Tanita, 1942: 118, pl. vii, fig. 10.

Description: Sponge spherical, sessile; surface strongly hispid; vent apical, fringed; texture firm; colour (?); tubar skeleton of triradiates and quadriradiates, with subendosomal sagittal triradiates (?) and with distal cones ornamented with oxea; endosomal skeleton of quadriradiates.

Spicules: tubar triradiates and quadriradiates, regular, all rays 0·12 to 0·18 by 0·002 to 0·005 mm.,
oxea, 1·8 to 2·5 by 0·021 mm.
subendosomal sagittal triradiates (?),
endosomal quadriradiates, sagittal, paired rays, 0·2 by 0·005 mm., basal ray 0·1 by 0·004 mm., apical ray 0·22 by 0·005 mm.

Distribution: Australia (Port Jackson, Port Phillip Heads, Shark's Bay); Straits of Magellan; 18 m.

Remarks: It is difficult to interpret *Grantia genuina* as other than a young individual of *Sycon ramsayi*, having similar morphology and almost identical spiculation to the older species, but showing a grantioid condition of the ectosomal skeleton. It is interesting that Tanita should have identified a specimen from the Straits of Magellan with *Grantia genuina*, especially as the same author was responsible for extending to the same area the range of *Leuconia australiensis*, a species here regarded as a synonym of *Sycon ramsayi*. The only difference is that Tanita's specimen of *Leuconia australiensis* is more nearly related to Carter's *Leuconia compacta*. On the other hand, *Leucandra thulakomorpha*, *Leucilla princeps* and *L. lanceolata*, all described from south-west Australia by Row and Hozawa, who also described *Grantia genuina* from the same area, appear to be individuals of this last species in which the subectosomal spicules are quadriradiate instead of triradiate. In this respect they resemble *Leuconia australiensis*, and, indeed, differ from that species only in the presence of oxea. Finally, *Grantessa hispida* is merely an immature individual of *Sycon ramsayi* having a grantioid ectosomal skeleton.

Named form: **Grantessa sacca** Lendenfeld

Gra(n)tessa sacca Lendenfeld, 1885: 1098, pl. lx, fig. 41, pl. lxiii, fig. 42; *Hypograntia sacca*, Carter, 1886: 42; *Grantia sacca*, Breitfuss, 1898: 220; *Grantessa sacca*, Dendy 1892: 106; Dendy and Row, 1913: 753; Row and Hozawa, 1931: 775.

Description: Sponge sac-shaped or cylindrical; surface even, but bearing isolated tufts of oxea; vent (?); texture firm; colour, (?); ectosomal skeleton a sparse layer of tangential triradiates, paired rays of subectosomal pseudosagittal triradiates, and tufts of oxea projecting from surface; tubar skeleton of basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates, with numerous intermediate rows of subregular triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and several layers of endosomal quadriradiates.

Spicules: ectosomal triradiates, with unequal rays, 0·035, 0·07 and 0·1 mm. long respectively and 0·007 mm. thick,
subectosomal pseudosagittal triradiates, paired rays 0·08 to 0·11 by 0·007 mm., basal rays 0·4 by 0·008 mm.,
oxea, 2·0 to 3·0 by 0·014 mm.,
intermediate tubar triradiates, subregular, rays 0·17 by 0·011 mm.,

subendosomal sagittal triradiates, paired rays 0·12 to 0·17 by 0·007 mm., basal rays 0·3 by 0·007 mm.,
endosomal quadriradiates, facial rays 0·3 by 0·007 mm., apical rays 0·11 by 0·007 mm.

Distribution: Australia.

Named form: **Leucandra villosa** Lendenfeld

Leucandra villosa Lendenfeld, 1885: 1131; *Leucilla villosa*, Dendy, 1892: 160; *Leucandra villosa*, Dendy and Row, 1913: 771.

Description: Sponge sacciform, sessile; surface strongly hispid; vent large, naked; texture (?); colour (?); ectosomal skeleton of triradiates (?), with oxea projecting at surface; choanosomal skeleton of triradiates and quadriradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates (?);
oxea, 2·0 to 3·5 by 0·035 mm.,
oxea, 1·0 by 0·006 mm.,
triradiates of choanosome, regular, rays 0·35 by 0·02 mm.,
quadriradiates of choanosome, similar to triradiates, with apical ray,
endosomal quadriradiates, regular, facial rays 0·28 by 0·01 mm., apical ray 0·2 to 0·55 by 0·01 mm.

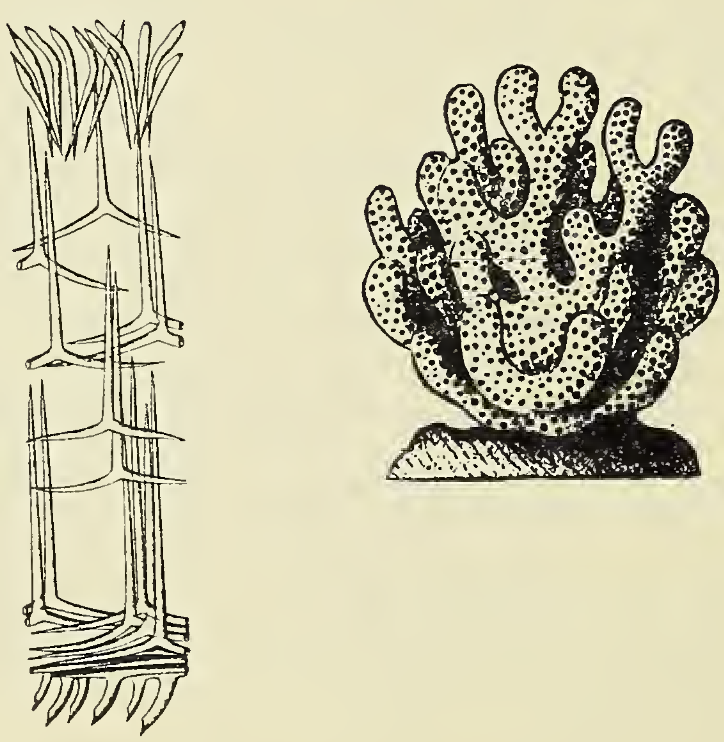
Distribution: Australia (Port Jackson).

23. Scypha ramosa (Smith)

Named form: **Sycon ramosum** (Smith in Haeckel)

(text-fig. 284)

Grantia ramosa Smith [in] Haeckel, 1872: 358; *Leuckartea natalensis* Maclay [in] Haeckel, 1872: 358; *Sycandra ramosa*, Haeckel, 1872: 358, pl. liv, fig. 1, pl. lviii, fig. 8; *Sycophyllum ramosum*, Haeckel, 1872: 358, pl. liv, fig. 1, pl. lviii, fig. 8; *Sycon ramosum*, Dendy and Row, 1913: 748.



Text-fig. 284. *Sycon ramosa* after Haeckel: spicules, arranged as in body wall, × 100; external form, natural size.

Description: Sponge ramose, compound, sessile; surface even, non-hispid, porose; vents not apparent; texture (?); colour, in spirit, brown; distal ends of chambers ornamented with oxea; tubar skeleton of several rows of triradiates and basal rays of subendosomal triradiates; endosomal skeleton a tangential layer of paired rays of subendosomal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: oxea, 0·6 to 0·8 by 0·01 mm.,
tubar triradiates, sagittal, paired rays 0·04 to 0·08 by 0·006 to 0·008 mm., basal ray 0·08 to 0·15 by 0·006 to 0·008 mm.,
subendosomal sagittal triradiates, paired rays 0·05 to 0·08 by 0·006 to 0·008 mm., basal ray 0·16 to 0·2 by 0·006 to 0·008 mm.,
endosomal triradiates, sagittal, paired rays 0·05 to 0·08 by 0·006 to 0·008 mm., basal ray 0·1 to 0·12 by 0·006 to 0·008 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·02 to 0·03 by 0·008 mm.

Distribution: South Africa (Algoa Bay, Port Natal).

24. **Scypha capillosa** (Schmidt)

(Despite the remarks on p. 87, this is retained provisionally as a distinct species)

Named form: **Grantia beringiana** Hozawa

(text-fig. 285)

Grantia beringiana Hozawa, 1918: 537, pl. lxxxv, fig. 9, text-fig. 5.

Description: Sponge cylindrical, slightly compressed laterally; surface hispid; vent apical, with margin; texture firm, elastic; colour, in spirit, whitish; ectosomal skeleton of several layers of tangential triradiates, with groups of oxea placed obliquely to and projecting beyond surface; tubar skeleton of centrifugal rays of subendosomal triradiates and quadriradiates; endosomal skeleton of paired rays of subendosomal radiates and quadriradiates with apical ray projecting into cloacal cavity.

Spicules: ectosomal triradiates, slightly sagittal, paired rays 0·18 to 0·26 by 0·02 mm., basal ray 0·09 to 0·26 by 0·02 mm.,
tubar triradiates, sagittal, paired rays 0·16 to 0·22 by 0·022 to 0·024 mm., basal ray 0·29 to 0·37 by 0·024 to 0·028 mm.,
oxea, 0·5 to 1·0 by 0·008 to 0·012 mm.,
subendosomal triradiates, sagittal, paired rays 0·13 to 0·17 by 0·016 to 0·02 mm., basal ray 0·15 to 0·24 by 0·012 to 0·016 mm.,
subendosomal quadriradiates, similar to triradiates, apical rays 0·05 by 0·008 mm.,
endosomal quadriradiates, sagittal, paired rays 0·11 to 0·17 by 0·016 mm., basal ray 0·15 to 0·24 by 0·012 to 0·016 mm., apical ray 0·1 to 0·21 by 0·012 to 0·016 mm.

Distribution: N.W. Pacific (Comandorski Islands); 104 m.

Text-fig. 285. *Grantia beringiana* after Hozawa: natural size.

Named form: **Grantia canadensis** Lambe

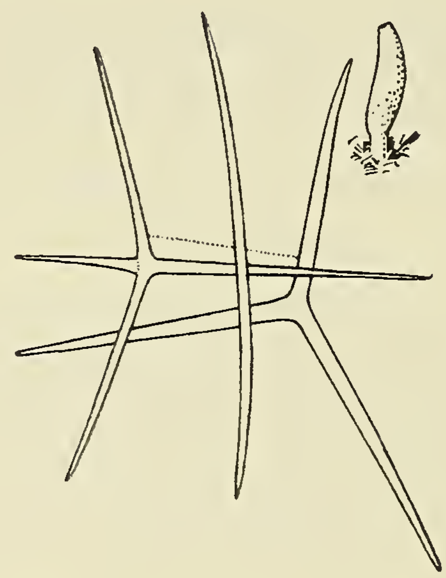
(text-fig. 286)

Grantia canadensis Lambe, 1896: 206, pl. iii, fig. 7; Lambe, 1900: 166; Dendy and Row, 1913: 759; Breitfuss, 1932: 247; de Laubenfels, 1949: 42.

Description: Sponge solitary, tubular, substipitate; surface slightly hispid; vent terminal, with marginal fringe; texture firm, compact; colour, in spirit, pale reddish-brown; ectosomal skeleton a tangential layer of triradiates with oxea projecting beyond surface; tubar skeleton of triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·2 mm. long, basal rays 0·29 mm. long,
oxea, 0·7 by 0·013 mm.
tubar triradiates, sagittal, similar to ectosomal triradiates,
endosomal quadriradiates, sagittal, similar to tubar triradiates but with apical rays 0·026 to 0·065 by 0·006 to 0·013 mm.

Distribution: Atlantic coast of Canada (Gulf of St. Lawrence).



Text-fig. 286. *Grantia canadensis* after Lambe: spicules, ×100 except for oxeote which is ×60; external form, about natural size.

Named form: **Grantia capillosa** (Schmidt)

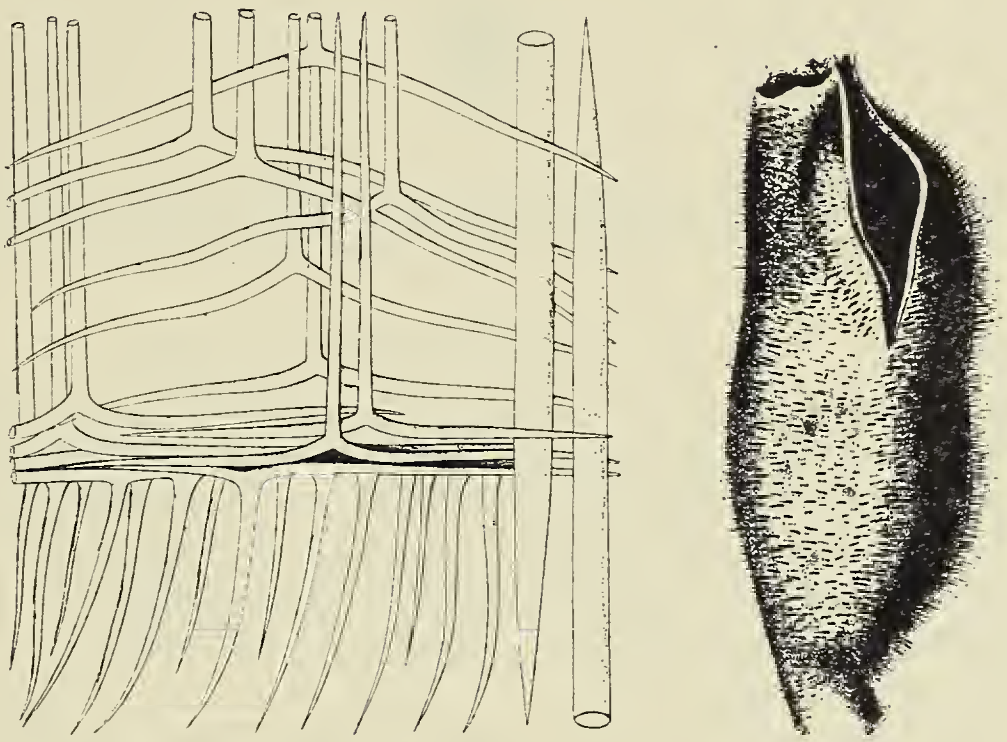
(text-fig. 287)

Ute capillosa Schmidt, 1862: 17, pl. i, fig. 6; *Sycon capillosus* Schmidt, 1864: 22; *Ute capillosa*, Gray, 1867: 554; *Sycum capillosum*, Haeckel, 1870: 239; *Sycandra capillosa*, Haeckel, 1872: 317, pl. li, fig. 3, pl. lx, figs. 9–10; *Sycurus capillosus*, Haeckel, 1872: 318; *Syconella capillosa*, Haeckel, 1872: 318; *Sycarium capillosum*, Haeckel, 1872: 318; *Sycandra brevipilis* (=*S. capillosa* var. *brevipilis*), Haeckel, 1872: 318; *S. longipilis* (=*S. capillosa* var. *longipilis*), Haeckel, 1872: 318; *Grantia capillosa*, Lendenfeld, 1891: 277, pl. xi, fig. 73, pl. xiv, figs. 112–116; Breitfuss, 1896: 435; 1898: 21; 1898: 302; Lundbeck, 1909: 460; Stephens, 1912: 12; *G. brevipilis*, Dendy and Row, 1913: 759; *G. capillosa*, Dendy and Row, 1913: 759; *G. longipilis*, Dendy and Row, 1913: 760; *G. capillosa*, Breitfuss, 1930: 276; Topsent, 1934: 10; Burton, 1934: 5; Breitfuss, 1935: 25; Arndt, 1940: 4; Arndt, 1941: 46.

Description: Sponge tubular, sessile; surface even, hispid; vent apical, naked or fringed; texture (?); colour, alive, white, yellow or grey; ectosomal skeleton a tangential layer of triradiates, with oxea projecting beyond surface; tubar skeleton of basal rays of subendosomal sagittal triradiates and several rows of triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of quadriradiates and triradiates.

Spicules: ectosomal triradiates, subregular, rays 0·08 to 0·35 by 0·006 to 0·02 mm.,
oxea, 1·0 to 10·0 by 0·02 to 0·04 mm.,
oxea, 0·2 to 0·5 by 0·002 to 0·005 mm.,
tubar triradiates, sagittal, paired rays 0·04 to 0·4 by 0·005 to 0·028 mm., basal ray 0·04 to 0·4 by 0·005 to 0·028 mm.,
subendosomal sagittal triradiates, paired rays 0·1 to 0·25 by 0·006 to 0·02 mm., basal ray 0·15 to 0·39 by 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·1 to 0·15 by 0·01 mm., basal ray 0·2 to 0·008 by 0·016 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·1 to 0·2 by 0·01 mm.

Distribution: Arctic; Mediterranean; North Atlantic.



Text-fig. 287. *Sycon capillosa*: spicules, after Haeckel, × 100; external form, after Schmidt, natural size.

Named form: **Grantia comoxensis** Lambe

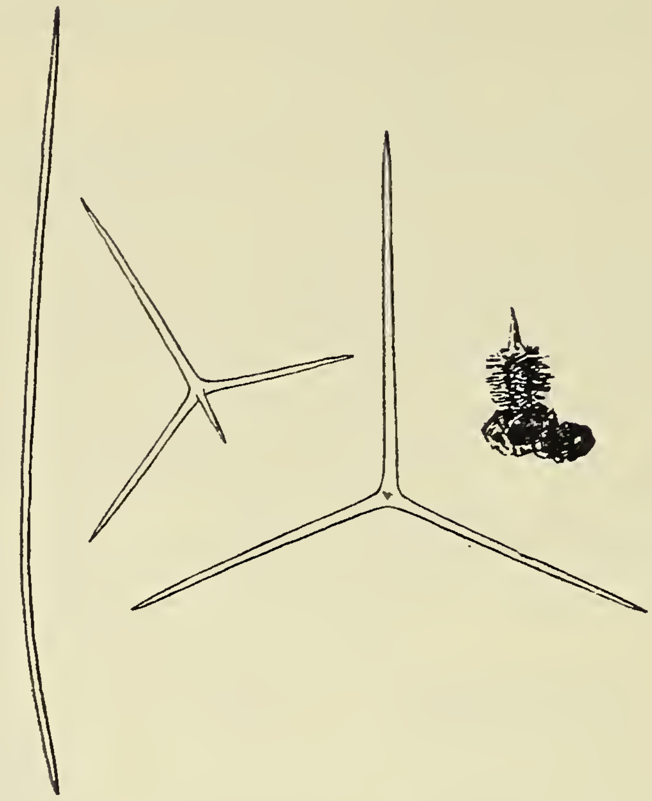
(text-fig. 288)

Grantia comoxensis Lambe, 1893: 39, pl. iii, fig. 3; Lambe, 1900: 166; Dendy and Row, 1913: 759.

Description: Sponge solitary, tubular, sessile; surface strongly hispid; vent terminal, with well-developed fringe; texture firm; colour, in spirit, greyish-yellow; ectosomal skeleton a tangential layer of triradiates, with oxea projecting at right-angles to surface; tubar skeleton of sagittal triradiates, with basal rays directed mainly centripetally; endosomal skeleton a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, slightly sagittal, paired rays 0·33 by 0·013 mm., basal rays 0·35 by 0·013 mm.,
oxea, 2·2 by 0·013 mm.,
tubar triradiates, sagittal, similar to ectosomal triradiates,
endosomal quadriradiates, sagittal, paired rays 0·22 by 0·01 mm., basal rays 0·25 by 0·01 mm., apical rays 0·09 by 0·01 mm.

Distribution: Vancouver Island; 73 m.



Text-fig. 288. *Grantia comoxensis* after Lambe: oxeote, ×50, triradiate and quadriradiate, ×100; external form, ×$\frac{3}{2}$.

Named form: **Grantia indica** Dendy

Grantia indica Dendy, 1913: 20, pl. ii, fig. 3, pl. iv, figs. 4–5; Dendy and Row, 1913: 761.

Description: Sponge tubular, sessile; surface hispid; vent apical, fringed; texture firm; colour, in spirit, pale yellow; ectosomal skeleton of several layers of triradiates, with oxea projecting beyond surface; tubar skeleton of subendosomal sagittal quadriradiates, with several rows of tubar triradiates; endosomal skeleton of quadriradiates and microxea.

Spicules: ectosomal triradiates, subregular, rays 0·22 by 0·02 mm.,
oxea, 2·6 by 0·04 mm.,
tubar triradiates, sagittal, paired rays 0·15 by 0·01 mm., basal ray 0·35 by 0·01 mm.,
subendosomal sagittal quadriradiates, paired rays 0·15 by 0·01 mm., basal ray 0·35 by 0·01 mm., apical ray vestigial,
endosomal quadriradiates, sagittal, paired rays 0·25 by 0·01 mm., basal ray 0·62 by 0·008 mm., apical ray 0·075 by 0·006 mm.,
quadriradiates, of exhalant canals, sagittal, paired rays 0·07 by 0·006 mm., basal rays 0·05 by 0·006 mm., apical ray 0·025 by 0·003 mm.,
microxea, 0·09 by 0·003 mm.

Distribution: Indian Ocean.

Remarks: Except for the presence of subendosomal quadriradiates instead of triradiates, this would be a typical *Scypha capillosa*.

Named form: **Grantia kujiensis** Hozawa

(text-fig. 289)

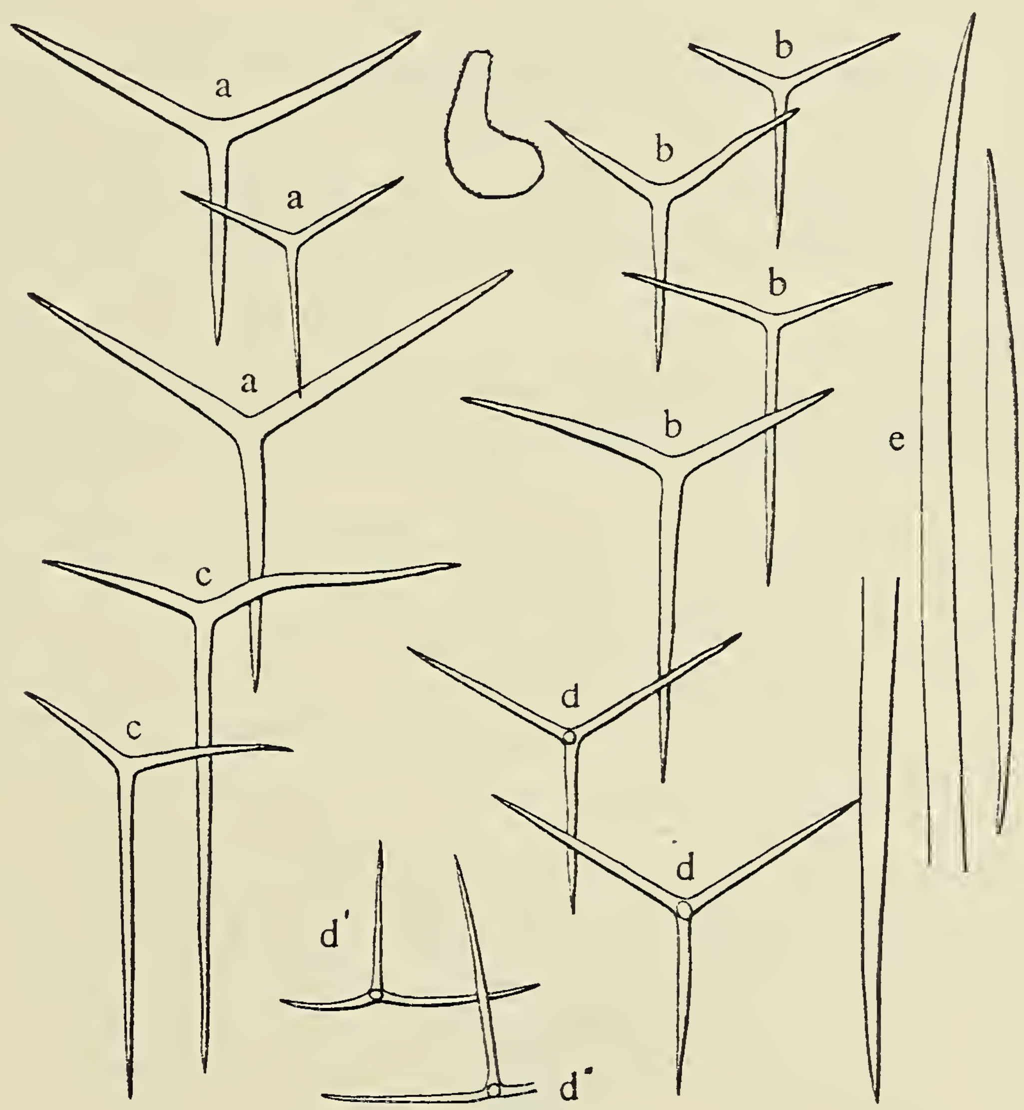
Grantia kujiensis Hozawa, 1933: 12, pl. i, fig. 6, text-fig. 3; Tanita, 1943: 428.

Description: Sponge ovoid, substipitate; surface strongly hispid; margin of vent feebly developed; texture firm, elastic; colour, in spirit, greyish-white; ectosomal skeleton hardly distinguishable from tubar skeleton, of irregularly-disposed triradiates in a few tangential layers, with large oxea projecting irregularly from surface; tubar skeleton composed of several rows of triradiates with a few slightly sagittal quadriradiates; endosomal skeleton of triradiates and quadriradiates, with apical ray projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·08 to 0·11 by 0·012 to 0·016 mm., basal ray 0·1 to 0·13 by 0·012 to 0·013 mm.,
oxea, 0·4 to 1·5 by 0·025 to 0·07 mm.,
tubar triradiates, sagittal, paired rays 0·07 to 0·09 by 0·01 to 0·012 mm., basal ray 0·11 to 0·13 by 0·01 to 0·012 mm.,
tubar quadriradiates, sagittal, similar to tubar triradiates, apical ray 0·3 to 0·06 by 0·008 mm.,
endosomal triradiates, sagittal, paired rays 0·15 by 0·016 mm., basal ray 0·18 by 0·016 mm.,
endosomal quadriradiates, similar to endosomal triradiates, apical ray 0·7 by 0·012 mm.,

Distribution: Japan (Iwate); 150 m.

Text-fig. 289. *Grantia kujiensis* after Hozawa: natural size.



Text-fig. 289A. *Grantia mexico* after Hozawa: spicules, × 100; external form, natural size.
a. ectosomal triradiates; b. tubar triradiates; c. subendosomal triradiates; d. endosomal quadriradiates; e. oxea.

Named form: **Grantia mexico** Hozawa

(text fig. 289A)

Grantia mexico Hozawa, 1940: 152, pl. viii, fig. 11, text-fig. 8.

Description: Sponge tubular, sub-ovate; surface hispid; vent apical; texture firm; colour, in spirit, greyish white; ectosomal skeleton of a few layers of triradiates, with oxea and trichoxea projecting at right angles; tubar skeleton of rows of triradiates together with basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a layer of endosomal quadriradiates.

Spicules: ectosomal triradiates, paired rays 0·09 to 0·19 by 0·008 to 0·016 mm., basal ray 0·112 to 0·235 by 0·006 to 0·014 mm.,
oxea, 0·526 to 1·11 by 0·02 to 0·024 mm.,
trichoxea, (length?) by 0·002 mm.,
tubar triradiates, paired rays 0·073 to 0·151 by 0·008 to 0·014 mm., basal ray 0·112 to 0·25 by 0·008 to 0·014 mm.,
subendosomal sagittal triradiates, paired rays 0·084 to 0·2 by 0·008 to 0·014 mm., basal ray 0·24 to 0·3 by 0·008 to 0·014 mm.,
endosomal quadriradiates, subregular, facial rays 0·12 to 0·14 by 0·008 to 0·01 mm., apical ray 0·11 to 0·173 by 0·008 to 0·01 mm.

Distribution: Mexico.

Named form: **Grantia mirabilis** (Fristedt).

(text-fig. 290)

Ascandra mirabilis Fristedt, 1887: 406, pl. xxii, figs. 3–13, pl. xxvi, figs. 1–2; Breitfuss, 1898: 22; Breitfuss, 1898: 26; *Grantia mirabilis*, Lundbeck, 1909: 460; Dendy and Row, 1913; Breitfuss, 1932: 248; Burton, 1934: 5.

Description: Sponge tubular, (?) sessile; surface reticulate, hispid; vent apical, with well-marked fringe; texture soft; colour, in spirit, greyish-white; tubar skeleton composed of several rows of triradiates; ectosomal skeleton hardly distinguishable from tubar skeleton; endosomal skeleton of triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·1 by 0·005 mm., basal rays 0·15 by 0·006 mm.,
oxea, 1·0 to 5·0 by 0·005 to 0·007 mm.,
microxea, 0·07 by 0·005 to 0·006 mm.,
tubar triradiates, paired rays unequal, 0·04 and 0·1 mm. long respectively, basal rays 0·11 by 0·005 mm.,
subendosomal triradiates (?),
endosomal triradiates (?).

Distribution: Arctic (East Greenland); 46–300 m.

Text-fig. 290. *Grantia mirabilis* (after Fristedt): external form, natural size.

25. **Scypha laevigata** (Haeckel)

Named form: **Sycon boomerang** Dendy

Sycon boomerang Dendy, 1892: 82; Dendy and Row, 1913: 745.

Description: Sponge ovoid, compressed, stipitate; surface even, porose, non-hispid; vent apical, naked; texture soft; colour, in spirit, white; tubar skeleton of basal rays of subendosomal sagittal triradiates and numerous rows of tubar triradiates, with distal cones ornamented with clavate oxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates and endosomal triradiates and quadriradiates.

Spicules: tubar triradiates, paired rays 0·1 by 0·007 mm., basal rays 0·17 by 0·007 mm.,
tubar quadriradiates rare,
oxea, 0·08 by 0·008 mm.,
subendosomal sagittal triradiates, similar to tubar triradiates,
endosomal triradiates, sagittal or subregular, rays 0·15 by 0·007 mm.,
endosomal quadriradiates, sagittal, paired rays 0·06 to 0·1 by 0·007 mm., basal ray 0·2 by 0·007 mm., apical ray (boomerang-shaped), 0·16 by up to 0·028 mm.

Distribution: Australia (Port Phillip Heads).

Named form: **Grantia extusarticulata** (Carter)

Hypograntia extusarticulata Carter, 1886: 43; *Grantia extusarticulata*, Dendy, 1892: 86; Dendy and Row, 1913: 761.

Description: Sponge sacciform, sessile; surface even, hispid; vent apical, naked; texture soft; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with microxea projecting beyond surface; tubar skeleton of basal rays of subendosomal sagittal triradiates and several rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·15 by 0·014 mm., basal ray 0·25 by 0·014 mm.,
microxea, 0·05 by 0·005 mm.,
tubar triradiates, sagittal, paired rays 0·15 by 0·014 mm., basal ray 0·2 by 0·014 mm.,
subendosomal sagittal triradiates, paired rays 0·15 by 0·014 mm., basal ray 0·35 by 0·014 mm.,
endosomal triradiates, sagittal, paired rays 0·12 by 0·01 mm., basal ray 0·2 by 0·01 mm.,
endosomal quadriradiates, similar to endosomal triradiates, with apical ray 0·06 by 0·01 mm.

Distribution: Australia (Port Phillip Heads).

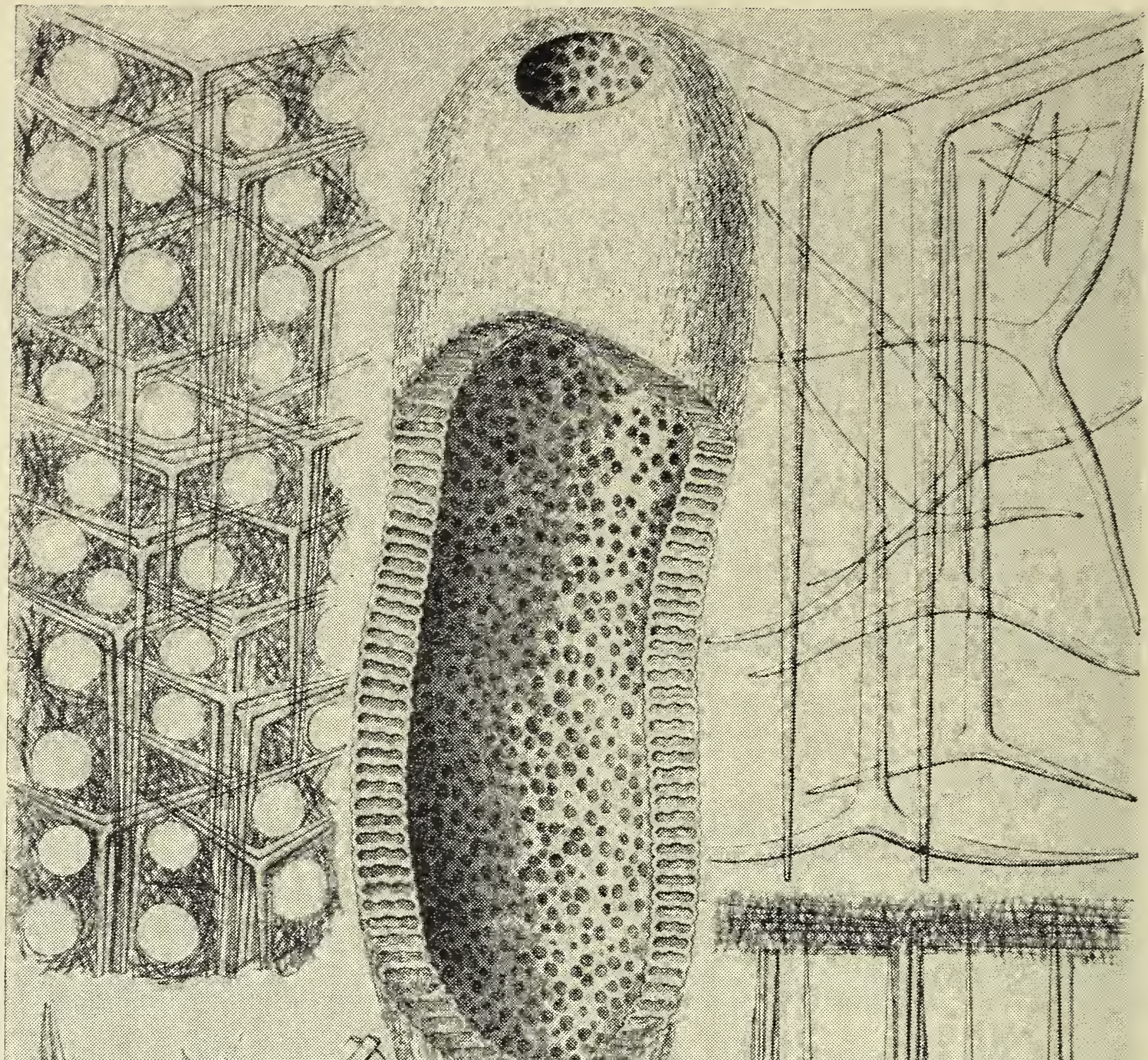
Named form: **Sycon giganteum** Dendy

Sycon giganteum Dendy, 1892: 84; Dendy and Row, 1913: 746.

Description: Sponge tubular, substipitate or sessile; surface tessellated, hispid; vent apical, naked; texture firm; colour (?); tubar skeleton of triradiates and quadriradiates, without distinguishable subendosomal sagittal radiates, and with distal cones ornamented with oxea; endosomal skeleton of quadriradiates.

Spicules: tubar triradiates, regular to subregular, rays 0·084 by 0·009 mm.,
tubar quadriradiates, similar to tubar triradiates, with 'short' apical ray,
oxea, 0·17 by 0·007 mm.,
endosomal quadriradiates, sagittal, paired rays 0·04 by 0·005 mm., basal ray 0·03 to 0·12 by 0·005 mm., apical ray 0·05 by 0·005 mm.

Distribution: Australia (Gulf St. Vincent).



Text-fig. 291. *Grantia laevigata* after Haeckel: spicules (top right), ×300; section across body wall (bottom right), ×100; ectosomal skeleton (top left), ×100; endosomal skeleton (bottom left), ×100; external form, ×6.

Named form: **Grantia laevigata** (Haeckel)

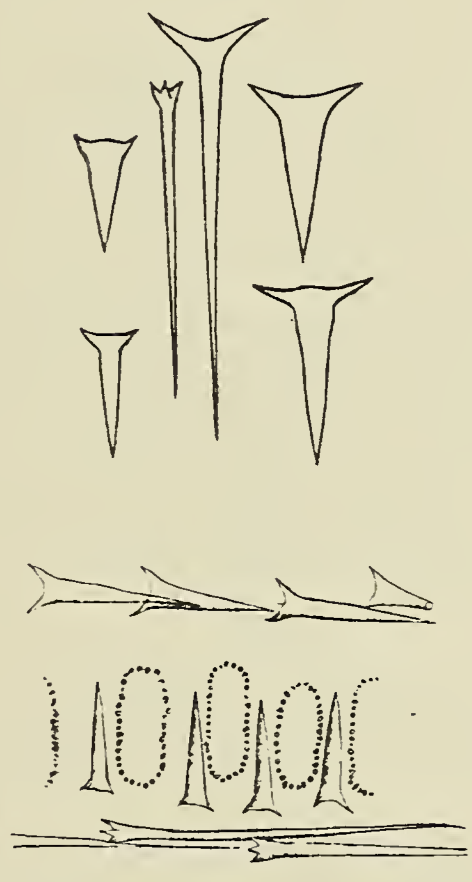
(text-fig. 291)

Sycortis laevigata Haeckel, 1872: 285, pl. xlix, figs. 1–13; *Sycurus laevigatus* Haeckel, 1872: 285, pl. xlix, fig. 1; *Sycortusa laevigata*, Lendenfeld, 1885: 1102; *Grantia laevigata*, Dendy, 1892: 89; Dendy and Row, 1913: 761.

Description: Sponge tubular, stipitate; surface even, minutely hispid; vent apical, naked; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with microxea set at right angles to surface; tubar skeleton of basal rays of subendosomal sagittal triradiates and several rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of endosomal triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·1 to 0·13 by 0·012 mm., basal ray 0·3 to 0·4 by 0·012 mm.,
microxea, 0·05 to 0·06 by 0·002 mm.,
tubar triradiates, sagittal, paired rays 0·1 by 0·012 mm., basal ray 0·2 to 0·3 by 0·012 mm.,
subendosomal sagittal triradiates, paired rays 0·1 by 0·012 mm., basal ray 0·3 by 0·012 mm.,
endosomal triradiates, regular to sagittal, rays 0·08 to 0·16 by 0·012 mm.

Distribution: Australia (Gulf St. Vincent).



Text-fig. 292. *Grantia singularis* after Breitfuss: spicules, more or less × 100 (?); section at right angles to surface, more or less × 50 (?).
Note: the discrepancies between the measurements given by Breitfuss in his text, and the magnifications given by him in the legends to his plates, make it almost impossible to be sure of the magnifications of the spicules.

26. **Scypha singularis** (Breitfuss)

Named form: **Grantia singularis** (Breitfuss)

(text-fig. 292)

Sphenophorus singularis Breitfuss, 1898: 4; *Sphenophorina singularis*, Breitfuss, 1898: 29, pl. iii, fig. 22, pl. iv, fig. 23; Breitfuss, 1898, 305; *Sphenophorina singularis*, Arnesen, 1901: 25; *Grantia singularis*, Dendy and Row, 1913: 761; Breitfuss, 1932: 248.

Description: Sponge tubular (fragmentary); surface smooth; vent (?); texture (?); colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates; tubar skeleton of subendosomal sagittal triradiates only; endosomal skeleton of quadriradiates, with much-elongated apical ray, not projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·02 to 0·03 by 0·007 mm., basal rays 0·07 to 0·09 by 0·01 mm.,
subendosomal sagittal triradiates, of similar dimensions to ectosomal triradiates,
endosomal quadriradiates, facial rays 0·015 by 0·005 mm., apical (or basal?) rays 0·3 to 0·4 by 0·007 mm.

Distribution: Arctic (Barents Sea); Norway.

27. **Scypha lunulata** (Haeckel)

(for text-fig. see p. 454)

[*For a more complete survey of this species, descriptions of three hitherto unrecorded specimens from South Africa are included.*]

Named form: **Grantia aculeata** Urban

Grantia aculeata Urban, 1908: 248; Urban, 1909: 10, pl. ii, figs. 9–42; Dendy and Row, 1913: 761.

Description: Sponge solitary, tubular, sessile (?); surface hispid; vent apical, with well-developed fringe; texture firm; colour, in spirit, white; ectosomal skeleton of several tangential layers of triradiates, with oxea, trichoxea and microxea projecting at surface; skeleton of chamber layer of centrifugally-directed basal rays of subendosomal sagittal quadriradiates and several rows of tubar triradiates and quadriradiates; endosomal skeleton of paired and apical rays of subendosomal quadriradiates and of one or more tangential layers of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·16 to 0·3 by 0·012 to 0·023 mm., basal rays 0·2 to 0·43 by 0·012 to 0·029 mm.,
oxea, 1·0 to 2·5 by 0·03 to 0·05 mm.,
trichoxea, 'hair-like',
microxea, 0·08 to 0·17 by 0·003 to 0·005 mm.,
tubar triradiates, sagittal, paired rays 0·15 by 0·016 to 0·018 mm., basal rays 0·22 to 0·35 by 0·018 mm.,
tubar quadriradiates, sagittal, paired rays 0·1 to 0·2 by 0·013 to 0·018 mm., basal rays 0·22 to 0·35 by 0·013 to 0·018 mm., apical rays 0·018 by 0·005 to 0·006 mm.,
subendosomal sagittal quadriradiates, paired rays 0·11 to 0·18 by 0·009 to 0·016 mm., basal rays 0·15 to 0·55 by 0·01 to 0·018 mm., apical rays 0·05 to 0·15 by 0·005 to 0·012 mm.,
endosomal quadriradiates, sagittal, paired rays 0·14 to 0·2 by 0·01 to 0·016 mm., basal rays 0·18 to 0·26 by 0·008 to 0·019 mm., apical rays 0·07 to 0·1 by 0·012 to 0·014 mm.

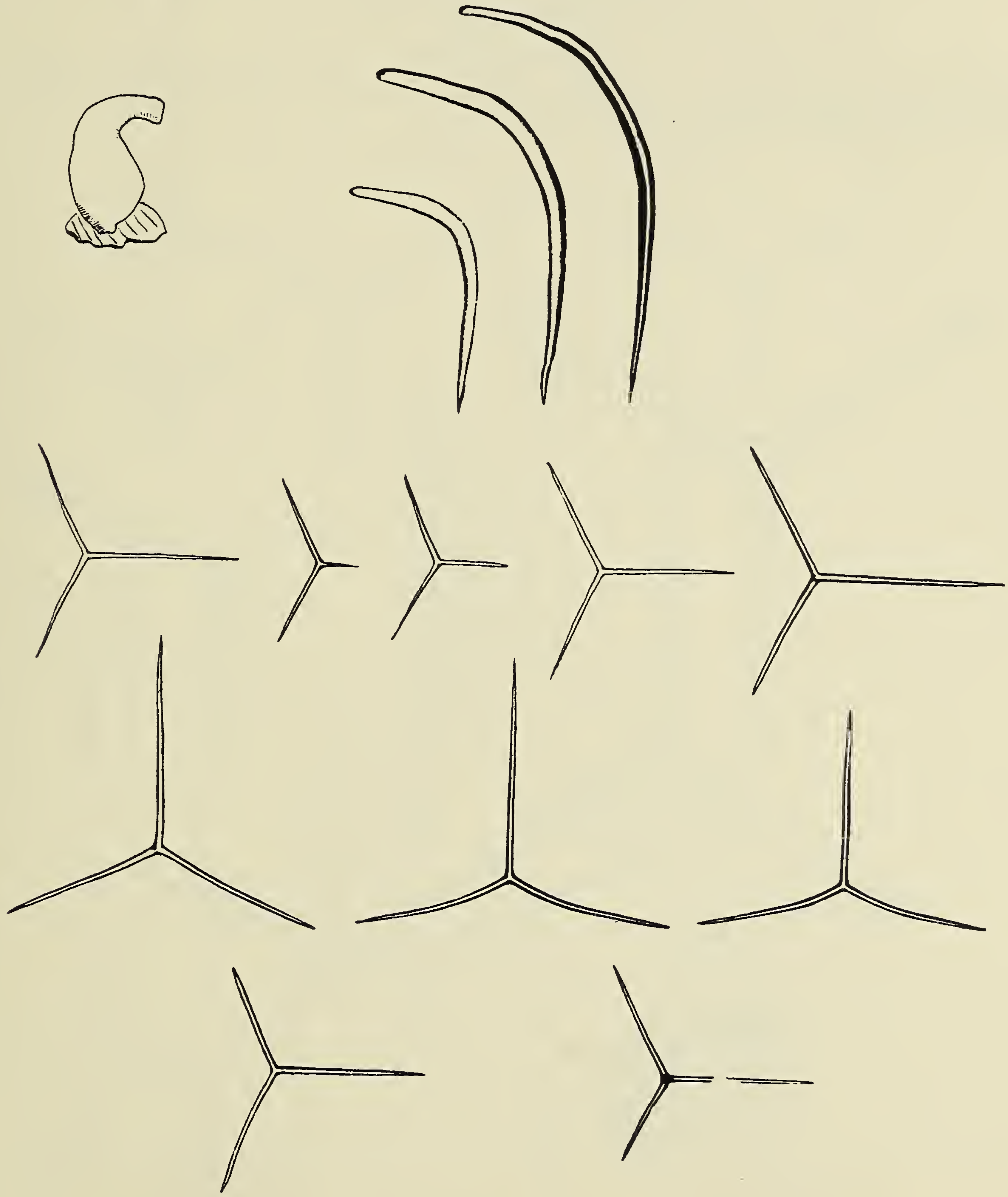
Distribution: Kerguelen, 9–33 m.

Named form: **Leuconia anfracta** Urban

(text-fig. 293)

Leuconia anfracta Urban, 1908: 251; Urban, 1908; 34, pl. v, fig. 46, pl. vi, figs. 39–62; *Leucandra anfracta*, Dendy and Row, 1913: 772; Brøndsted, 1931: 38, fig. 28.

Description: Sponge bulbous, sessile; surface even, hispid; vent apical, naked; texture soft; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea and microxea projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.



Text-fig. 293. *Leucandra anfracta* after Urban: spicules, × 100, arranged (schematically) as in a section at right angles to surface; external form, × 3.

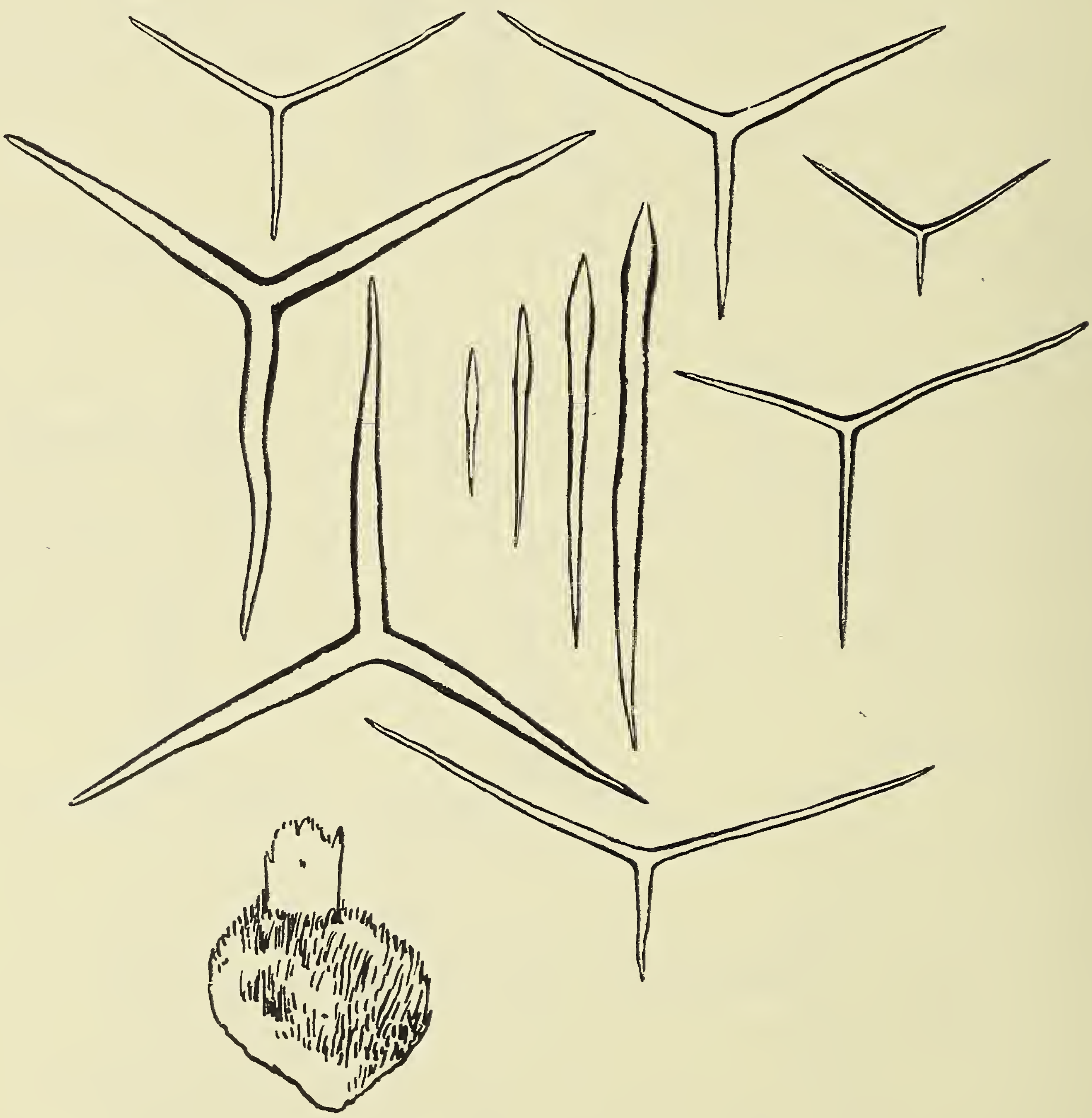
Spicules: ectosomal triradiates, sagittal, paired rays 0·11 to 0·18 by 0·008 to 0·009 mm., basal ray 0·08 to 0·23 by 0·007 to 0·009 mm.,
oxea, 0·7 by 0·028 mm.,
microxea, 0·1 by 0·003 to 0·004 mm.,
triradiates of chamber layer, subregular, rays 0·13 to 0·25 by 0·01 to 0·011 mm.,
endosomal triradiates, subregular, rays 0·1 to 0·3 by 0·01 to 0·011 mm.,
endosomal quadriradiates, similar to endosomal triradiates, with apical ray 0·071 to 0·086 by 0·01 mm.

Distribution: Kerguelen; 9–33 m.

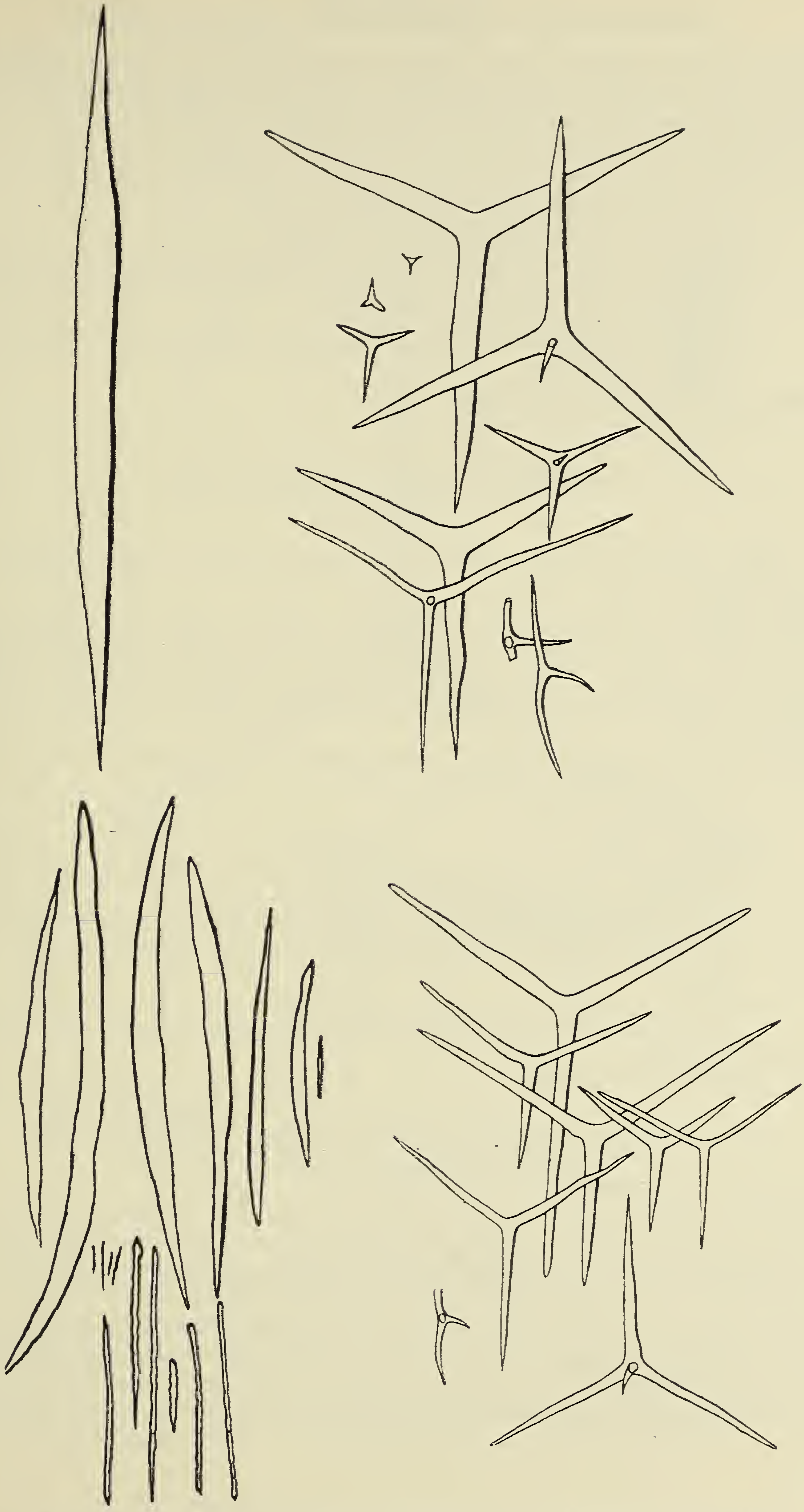
Leuconia armata Urban

(text-fig. 294)

Leuconia armata Urban, 1908: 250; Urban, 1909: 24, pl. v, figs. 1–16; *Leucandra armata*, Dendy and Row, 1913: 769; Brøndsted, 1931: 38, figs. 29, 30.



Text-fig. 294. *Leucandra armata*: spicules from holotype, × 100; external form, × 3, both after Urban.



Text-fig. 294. *Leucandra armata*: spicules from two specimens identified by Brøndsted (1931), scale not given.

Description: Sponge spherical, sessile; surface strongly hispid; vent apical, fringed; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·13 to 0·28 by 0·016 to 0·025 mm., basal ray 0·16 to 0·32 by 0·019 to 0·027 mm.,
oxea, up to 3·5 by 0·06 to 0·01 mm.,
triradiates of chamber layer, subregular, rays 0·22 to 0·42 by 0·033 to 0·056 mm.,
endosomal triradiates, sagittal, paired rays 0·15 to 0·374 by 0·019 to 0·032 mm., basal ray 0·068 to 0·31 by 0·019 to 0·032 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·068 to 0·078 by 0·016 to 0·021 mm.

Distribution: South Africa (Francis Bay), 100 m.

Named form: **Leuconia cirrhosa** Urban

(text-fig. 295)

Leuconia cirrhosa Urban, 1908: 250; Urban, 1909: 26, pl. iv, figs. 27–42; *Leucandra cirrhosa*, Dendy and Row, 1913: 770.

Description: Sponge tubular, oval, substipitate; surface hispid; vent apical, fringed; texture soft; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates and quadriradiates; endosomal skeleton a tangential layer of quadriradiates, with other quadriradiates lining exhalant canals.

Spicules: ectosomal triradiates, sagittal, paired rays 0·15 to 0·29 by 0·007 to 0·013 mm., basal ray 0·12 to 0·47 by 0·008 to 0·014 mm.,
oxea, 1·0 by 0·03 mm.,
oxea, (hair-like),
triradiates, of chamber layer, sagittal, paired rays 0·25 to 0·5 by 0·016 to 0·04 mm. basal ray 0·25 to 0·59 by 0·018 to 0·042 mm.,
quadriradiates, of chamber layer, sagittal, paired rays 0·13 to 0·19 by 0·01 to 0·013 mm., basal ray 0·08 to 0·54 by 0·011 to 0·015 mm., apical ray 0·065 to 0·112 mm. long,
endosomal quadriradiates, sagittal, paired rays 0·18 to 0·21 by 0·012 to 0·016 mm., basal ray 0·12 to 0·13 by 0·013 to 0·014 mm., apical ray 0·135 to 0·183 mm. long.

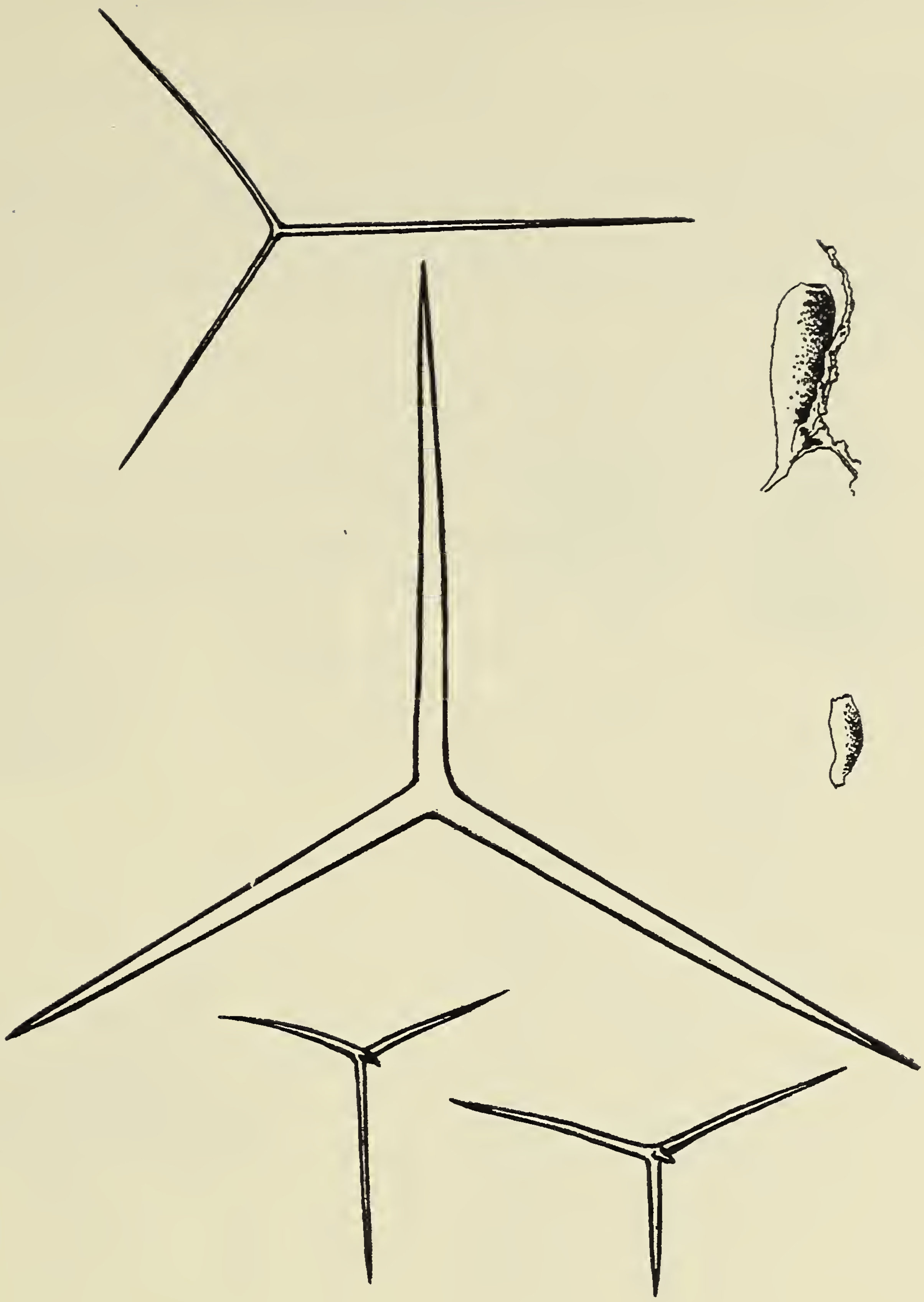
Distribution: Kerguelen, 9–33 m.

Named form: **Leucandra hentschelii** Brøndsted

Leucandra hentschelii Brøndsted, 1931: 40, fig. 31.

Description: Sponge irregularly massive; surface smooth: vents scattered on upper surface; texture hard; colour, in spirit, brownish; ectosomal skeleton a tangential layer of triradiates; skeleton of chamber layer of irregularly scattered triradiates; endosomal skeleton a tangential layer of triradiates; small quadriradiates are of occasional occurrence.

Spicules: ectosomal triradiates, subregular, rays 0·22 to 0·8 by 0·03 to 0·05 mm.,
triradiates of chamber layer, similar to and hardly distinguishable from those of ectosome,
endosomal triradiates, sagittal, paired rays 0·18 to 0·22 by 0·016 to 0·02 mm., basal ray 0·14 to 0·16 by 0·014 to 0·018 mm.



Text-fig. 295. *Leuconia cirrhosa* after Urban: spicules, ×100; external form, natural size.
Ectosomal triradiate (above), triradiate of chamber layer (centre) and two endosomal quadriradiates (below).

[Quadriradiates apparently occur in all parts of sponge, but only infrequently, and are triradiates of ordinary form with an apical ray 0·02 to 0·04 mm. long.]

Distribution: South Africa (Simonstown).

Remarks: As in species described in the same work, Brøndsted (1931) has adopted unusual methods of describing the spiculation. He makes too little distinction between the spicules in the different layers of the body wall, and we are left to guess, very often, how to relate his words to orthodox methods of description.

Named form: **Leucandra hiberna** Jenkin

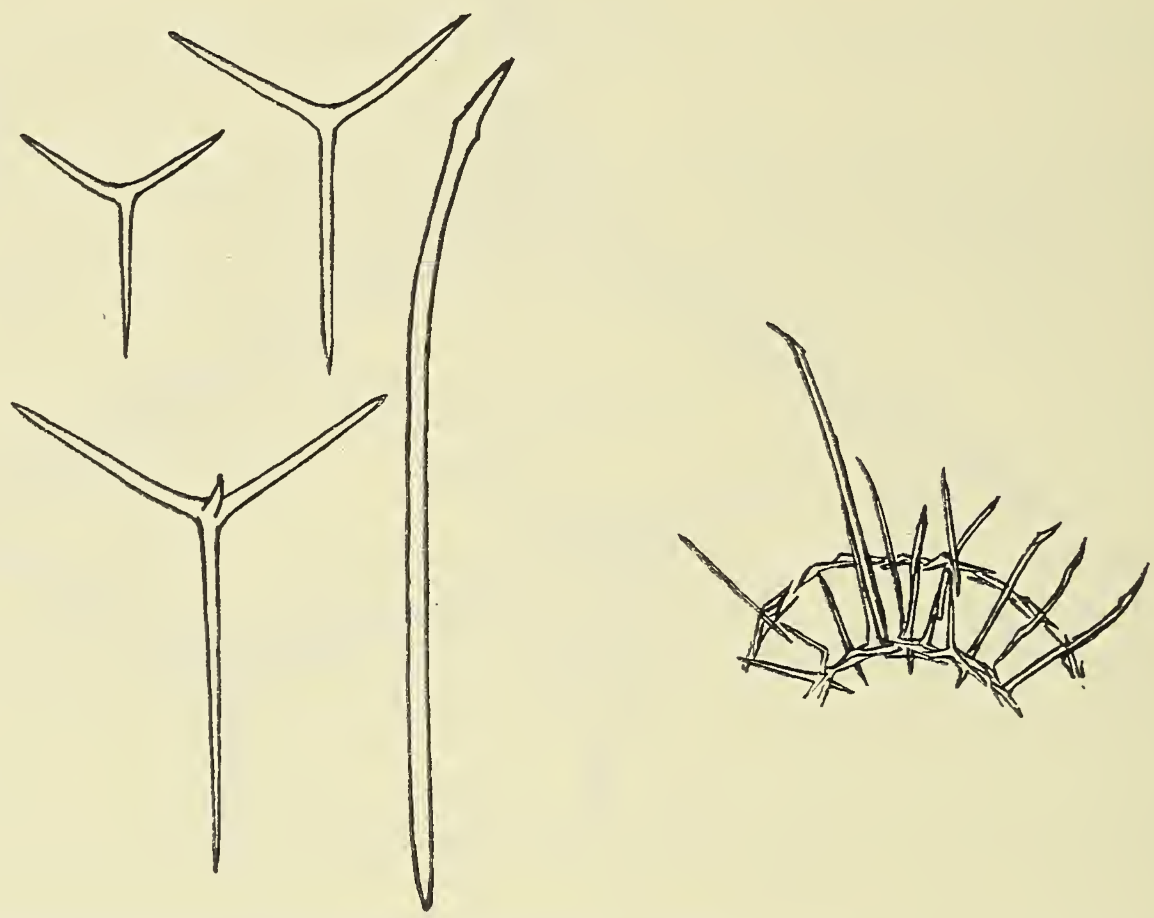
(text-fig. 296)

Leucandra hiberna Jenkin, 1908: 19, pl. xxxi, figs. 57–58; Dendy and Row, 1913: 770; *Jenkina hiberna*, Brøndsted, 1931: 34.

Description: Sponge vasiform, sessile; surface even, hispid; vent apical, fringed; texture firm; colour, in spirit, dull yellow; ectosomal skeleton a tangential layer of triradiates, with oxea projecting beyond surface; skeleton of chamber layer of basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and tangential layer of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·1 to 0·14 by 0·009 to 0·012 mm., basal ray 0·06 to 0·2 by 0·008 to 0·011 mm.,
oxea, 0·26 to 0·67 by 0·012 to 0·024 mm.,
subendosomal sagittal triradiates, paired rays 0·08 by 0·006 to 0·008 mm., basal ray 0·16 to 0·2 by 0·006 mm.,
endosomal quadriradiates, sagittal, paired rays 0·08 to 0·18 by 0·009 to 0·013 mm., basal ray 0·1 to 0·3 by 0·008 to 0·012 mm., apical ray 0·08 by 0·008 mm.

Distribution: Antarctic.



Text-fig. 296. *Leucandra hiberna* after Jenkin: spicules, ×100; section across body wall, ×50.

Named form: **Leuconia joubini** (Topsent)

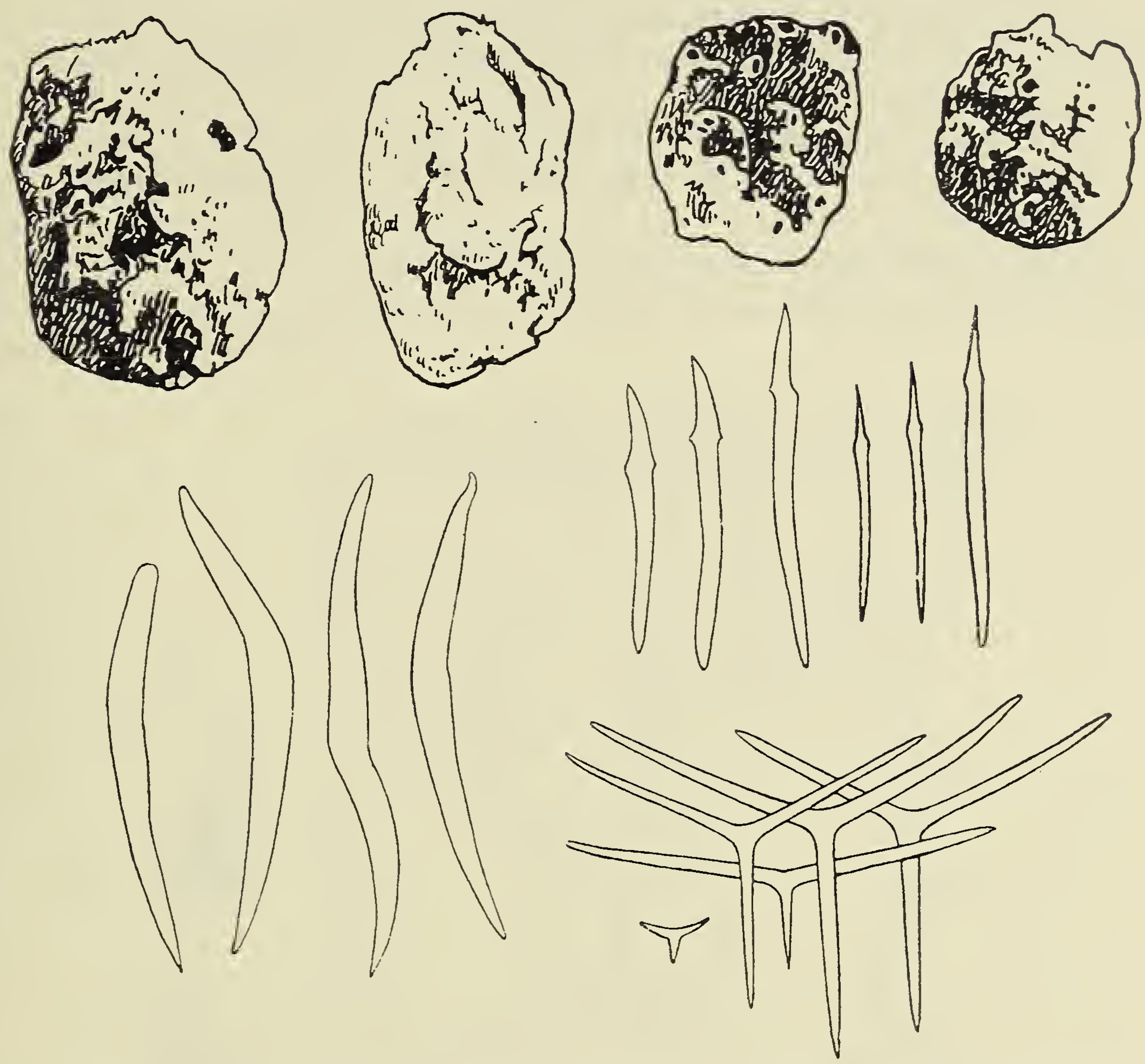
(text-fig. 297)

Leucandra joubini Topsent, 1907: 542; Topsent, 1908; 9; Dendy and Row, 1913: 772; *Leucetta macquariensis* Dendy, 1918: 9, pl. i, figs. 3, 8; *Leuconia joubini*, Burton, 1929: 403.

Description: Sponge tubular, sessile, with apical vent, or massive, compound, sessile, with several scattered vents; surface even, hispid; vents naked; texture soft; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with microxea and oxea of two sizes set at right angles to surface; skeleton of chamber layer of scattered triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·19 by 0·012 mm., basal ray 0·24 by 0·012 mm.,
oxea, 0·43 to 0·9 by 0·03 to 0·034 mm.,
oxea, 0·35 to 0·39 by 0·002 mm.,
microxea, 0·08 to 0·1 by 0·001 to 0·006 mm.,
triradiates of chamber layer, sagittal, paired rays 0·19 by 0·012 to 0·018 mm., basal rays 0·28 by 0·012 to 0·018 mm.,
endosomal triradiates, similar to triradiates of chamber layer,
endosomal quadriradiates, similar to triradiates, with apical ray 0·05 to 0·08 by 0·012 mm.

Distribution: Subantarctic; Antarctic.



Text-fig. 297. *Leucandra joubini* Topsent: as represented by *Leucetta macquariensis* Dendy (1918); spicules, ×100, except the microxea, which are ×400; external form, slightly less than natural size.

Named form: **Leuconia kerguelensis** Urban

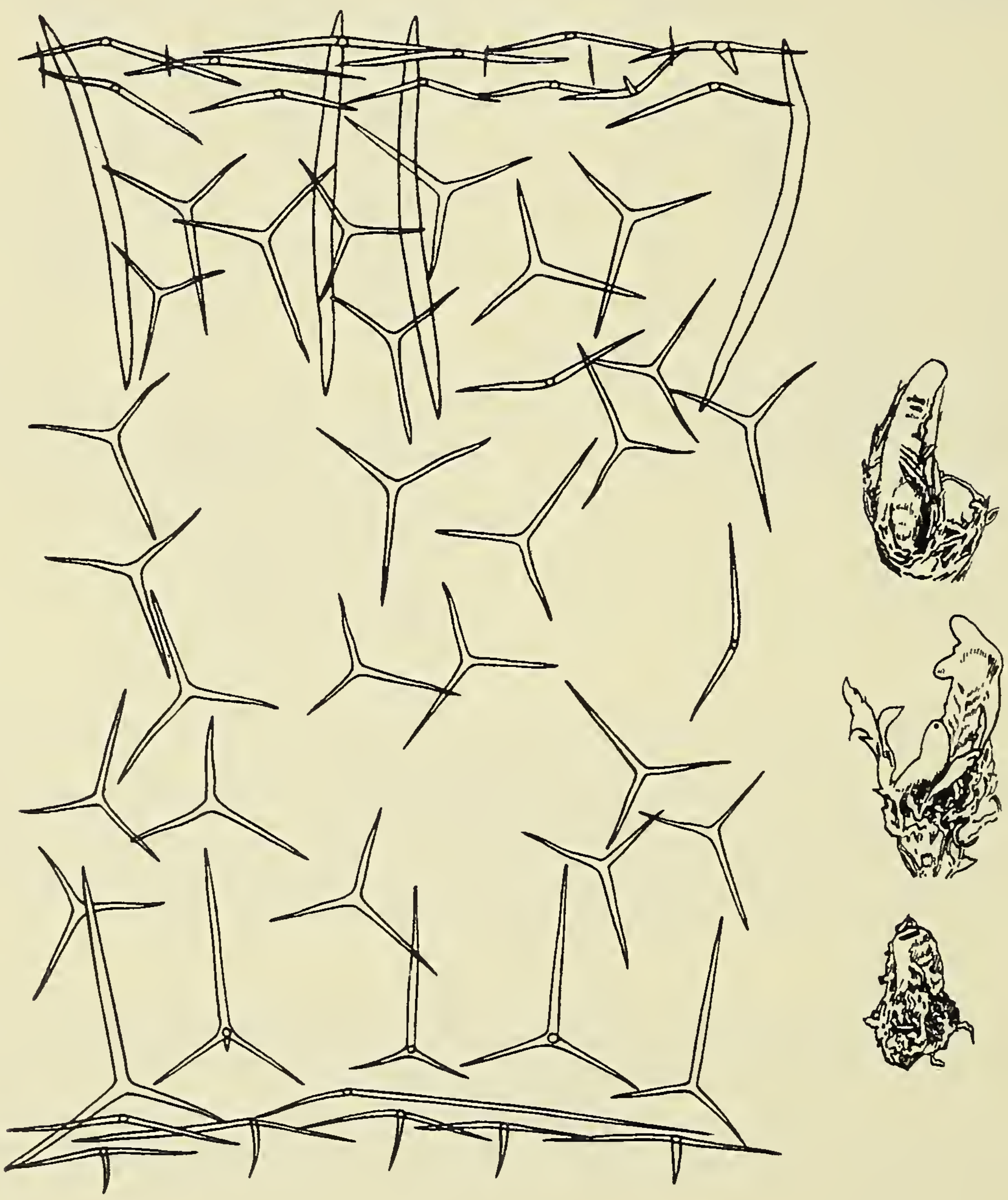
(text-fig. 298)

Leuconia kerguelensis Urban, 1908: 251; Urban, 1909: 29, pl. v, figs. 17–45; *Leucandra kerguelensis*, Dendy and Row, 1913: 771.

Description: Sponge tubular, sessile; surface hispid; vent apical, naked; texture soft; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with a subectosomal layer of triradiates and with oxea and microxea projecting at surface; skeleton of chamber layer of irregularly-arranged triradiates and subendosomal sagittal triradiates; endosomal skeleton a tangential layer of quadriradiates, rarely triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·078 to 0·183 by 0·008 to 0·014 mm., basal ray 0·042 to 0·28 by 0·009 to 0·016 mm.,
oxea, 0·5 by 0·013 to 0·03 mm.,
microxea, 0·08 to 0·14 by 0·002 to 0·005 mm.,
ectosomal triradiates, sagittal, paired rays 0·1 to 0·176 by 0·01 to 0·016 mm., basal ray 0·13 to 0·32 by 0·01 to 0·016 mm.,
triradiates, of chamber layer, sagittal, paired rays 0·1 to 0·162 by 0·01 to 0·016 mm., basal ray 0·12 to 0·278 by 0·01 to 0·015 mm.,
subendosomal sagittal triradiates, paired rays 0·1 to 0·176 by 0·01 to 0·016 mm., basal ray 0·12 to 0·362 by 0·008 to 0·016 mm.,
subendosomal sagittal quadriradiates, similar to triradiates, with apical ray 0·05 by 0·007 mm.,
endosomal quadriradiates, sagittal, paired rays 0·1 to 0·2 by 0·009 to 0·016 mm., basal ray 0·085 to 0·32 by 0·008 to 0·013 mm., apical ray 0·07 to 0·23 by 0·012 to 0·013 mm.,
endosomal triradiates, similar to quadriradiates.

Distribution: Kerguelen, 9–33 m.



Text-fig. 298. *Leuconia kerguelensis* after Urban: section at right angles to surface, × 50; external form, natural size.

Named form: **Leuconia levis** Poléjaeff

(text-fig. 299)

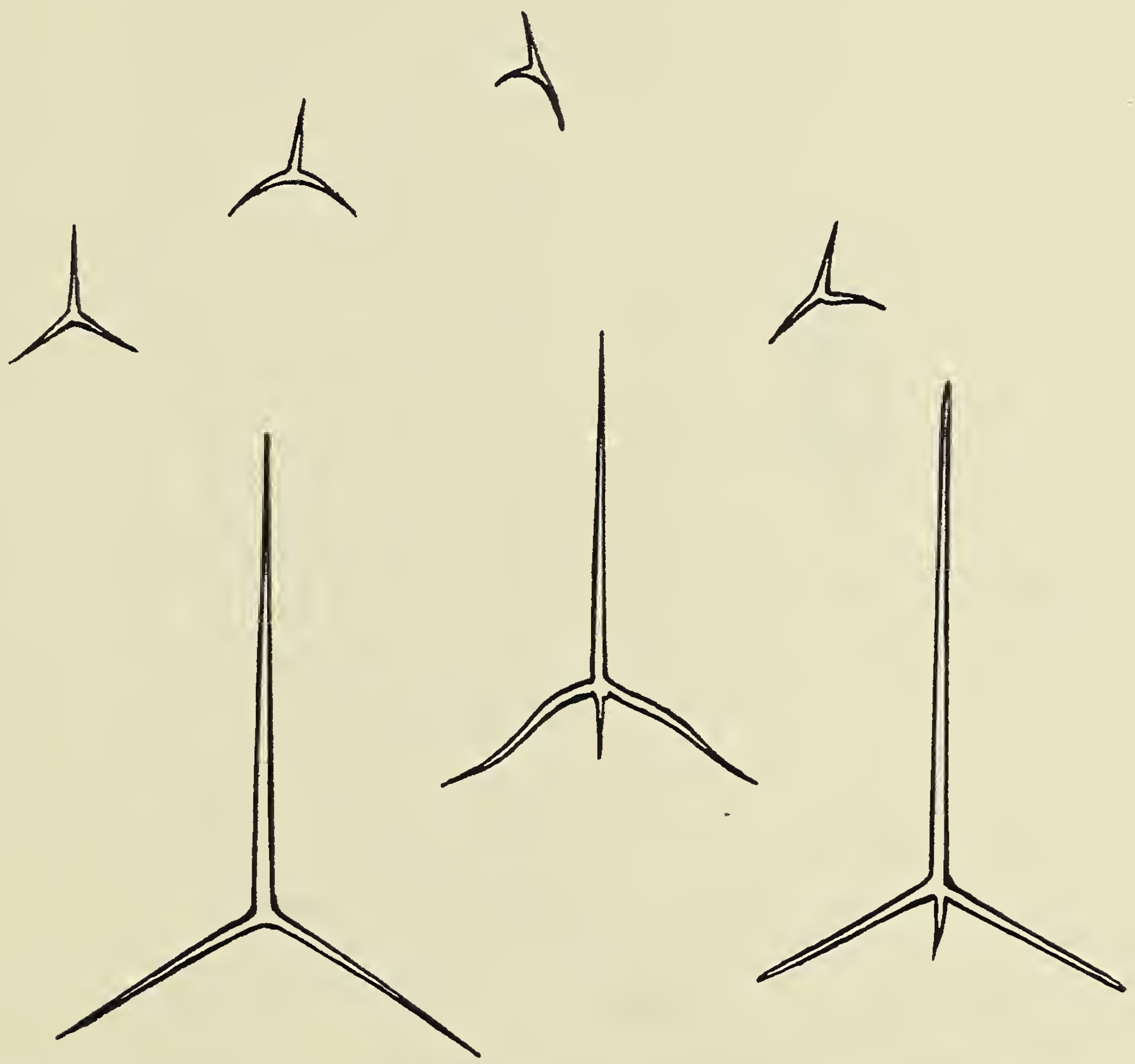
Leuconia levis Poléjaeff, 1884: 59, pl. vii, fig. 4; *Leucandra levis*, Dendy and Row, 1913: 774; *Leuconia levis*, Burton, 1929: 403.

Description: Sponge tubular, sessile; surface even, non-hispid; vent apical, naked (?); texture soft; colour, in spirit, yellowish; ectosomal skeleton a tangential layer of triradiates; skeleton of chamber layer of large and small triradiates and subendosomal quadriradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·2 by 0·015 mm., basal ray 0·38 by 0·02 mm.,
triradiates of chamber layer, similar to ectosomal triradiates,
[triradiates, small, of chamber layer, subregular, rays 0·075 by 0·007 mm.,]
subendosomal sagittal quadriradiates, paired rays 0·2 by 0·013 mm., basal ray 0·3 by 0·013 mm., apical ray 0·1 by 0·012 mm.,
endosomal quadriradiates, sagittal, paired rays 0·18 by 0·015 mm., basal ray 0·35 to 0·45 by 0·015 mm., apical ray 0·09 by 0·015 mm.

Distribution: Antarctic (McMurdo Sound); Subantarctic (Prince Edward Islands); 256–275 m.

Remarks: Having re-examined the holotype I cannot understand what Poléjaeff meant by the 'smaller triradiate . . . of the parenchyma'. The measurements are included here, but only because they are given in the original text.



Text-fig. 299. *Leuconia levis* after Poléjaeff: reproduced here are the only illustrations published of this species. In the bottom row (left to right) are a triradiate from the chamber layer, a subendosomal quadriradiate and an endosomal quadriradiate. Above are figured four small triradiates, which, although figured by Poléjaeff, do not appear in preparations made from the holotype.

Named form: **Leucandra lunulata** Haeckel

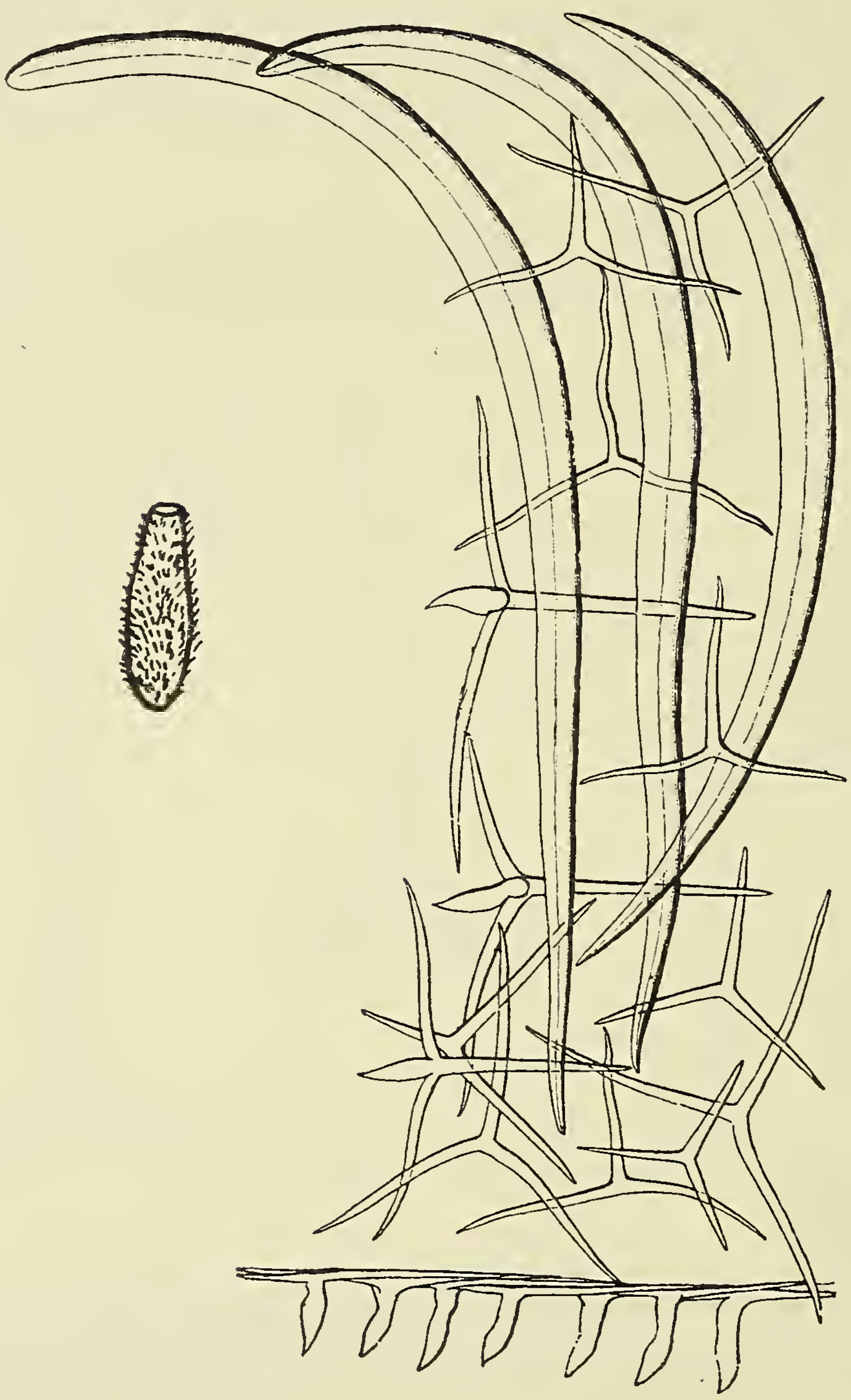
(text-fig. 300–302)

Leucandra lunulata Haeckel, 1872: 189, pl. xxxi, fig. 2, pl. xxxvii, fig. 1; *Dyssycus lunulatus* Haeckel, 1872: 189; *Leucandra lunulata*, Dendy and Row, 1913: 771.

Description: Sponge tubular; surface even, strongly hispid; vent apical, fringed; texture soft (?); colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates (?), with oxea projecting at surface; skeleton of chamber layer of triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates (?), similar to triradiates of chamber layer (?),
oxea, 0·6 to 0·9 by 0·04 to 0·06 mm.,
triradiates of chamber layer, subregular, rays 0·1 to 0·2 by 0·006 to 0·01 mm.,
endosomal quadriradiates, subregular, facial rays 0·2 to 0·25 by 0·008 mm., apical ray 0·05 to 0·08 by 0·016 to 0·02 mm.

Distribution: South Africa (Cape Town).



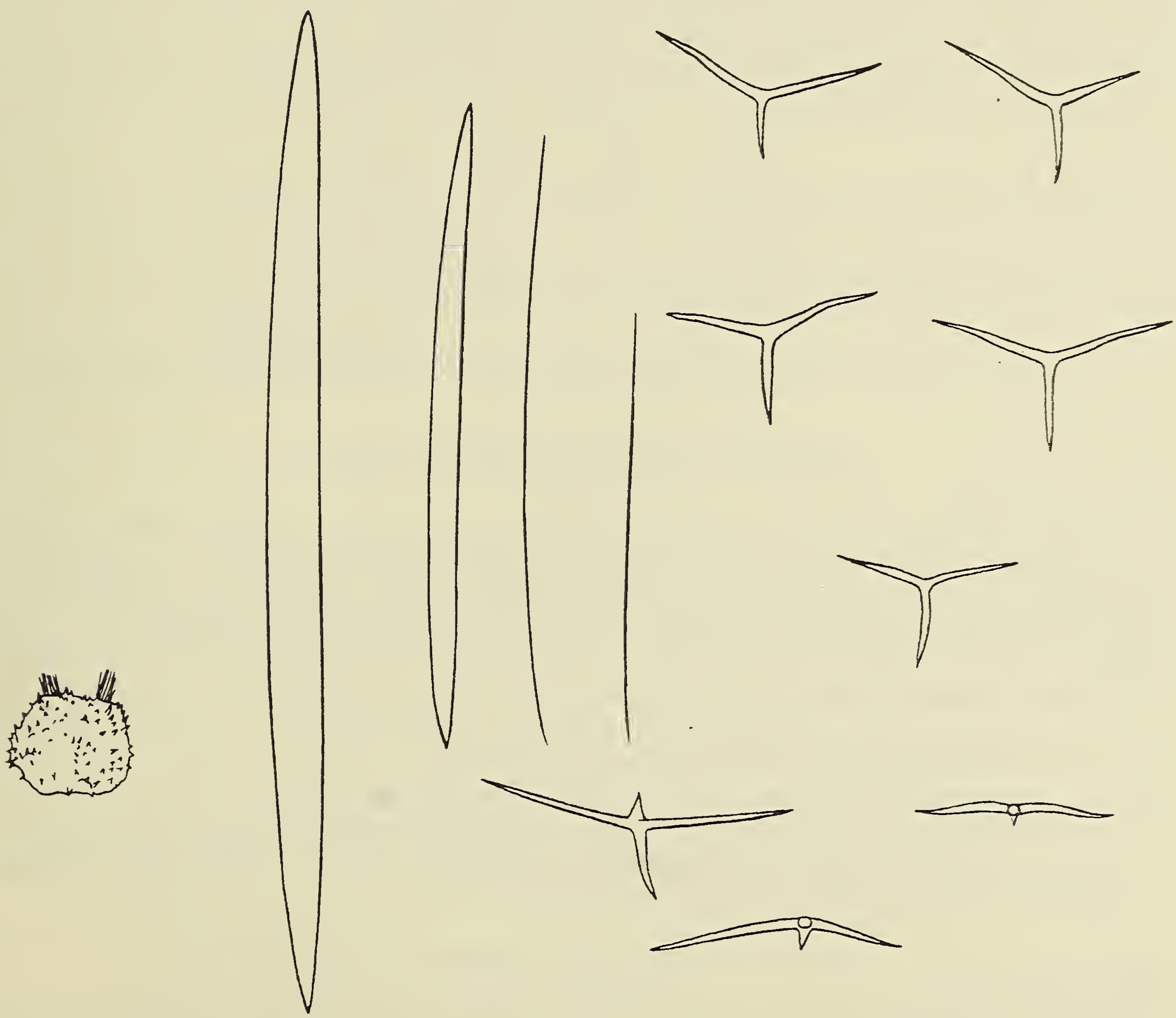
Text-fig. 300. *Leucandra lunulata* after Haeckel: spicules, × 100; external form, reconstructed from the original description, natural size.

Named form: **Leuconia lunulata** (Haeckel)

B.M. 1938.3.26.84.

Description: Sponge tubular, fusiform, sessile; surface even, hispid; vent apical, naked; texture soft; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea projecting at surface, and paired rays of subectosomal pseudosagittal triradiates; skeleton of chamber layer of oppositely-directed basal rays of subectosomal pseudosagittal and subendosomal sagittal triradiates and numerous rows of irregularly-arranged tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of quadriradiates.

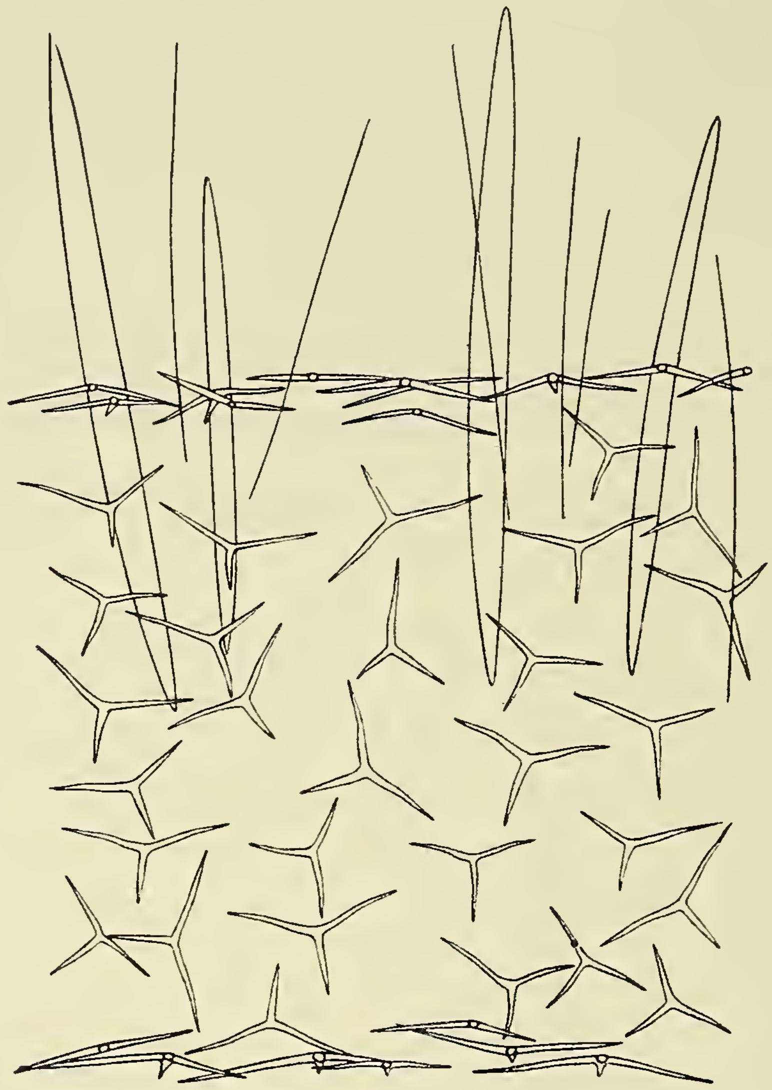
Spicules: ectosomal triradiates, subregular, rays 0·11 to 0·14 by 0·007 to 0·009 mm.,
oxea, 0·4 to 1·1 by 0·032 to 0·05 mm.,
subectosomal pseudosagittal triradiates, paired rays 0·15 by 0·007 mm., basal ray 0·24 by 0·007 mm.,
tubar triradiates, subregular, rays 0·11 to 0·15 by 0·007 to 0·011 mm.,
tubar quadriradiates, similar to tubar triradiates, with apical rays 0·021 to 0·14 by 0·006 to 0·007 mm.,
subendosomal sagittal triradiates, paired rays 0·14 to 0·18 by 0·008 to 0·01 mm., basal ray 0·21 to 0·28 by 0·008 to 0·01 mm.,



Text-fig. 301. *Leuconia lunulata* (Haeckel): from a specimen from South Africa; spicules, ×100; external form, natural size.

endosomal quadriradiates, sagittal, paired rays 0·11 to 0·13 by 0·006 to 0·007 mm., basal ray 0·16 to 0·18 by 0·006 to 0·007 mm., apical ray 0·05 to 0·1 by 0·008 to 0·012 mm.

Distribution: South Africa (St. James).



Text-fig. 302. *Leuconia lunulata*: section at right angles to surface, × 50, from specimen B.M. 1938.3.26.91.

Named form: **Leuconia lunulata** (Haeckel)

B.M. 1938.3.26.91.

Description: Sponge sessile, subspherical; surface even, hispid; vents usually two in number, strongly fringed; texture firm; colour, in spirit, pale brown; ectosomal skeleton a tangential layer of triradiates, with oxea and trichoxea projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·05 to 0·14 by 0·007 to 0·012 mm.,
oxea, 0·7 to 1·1 by 0·03 to 0·06 mm.,
trichoxea, 0·48 to 0·7 by 0·003 to 0·004 mm.,
triradiates of chamber layer, similar to ectosomal triradiates,
endosomal triradiates, subregular to sagittal, rays 0·09 to 0·18 by 0·008 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·02 by 0·008 mm.

Distribution: South Africa (Isipingo Beach).

Named form: **Leuconia lunulata** (Haeckel)

B.M. 1938.3.26.92.

Description: Sponge obconical, sessile; surface uneven, sparingly hispid; vent apical, fringed; texture firm, almost incompressible; colour, in spirit, greyish-white; ectosomal skeleton a tangential layer of triradiates, with tufts of microxea set at right angles to surface, and oxea hardly projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of quadriradiates and microxea with clubbed ends.

Spicules: ectosomal triradiates, regular to subregular, rays 0·16 to 0·48 by 0·011 to 0·028 mm.,
microxea, 0·09 by 0·003 mm.,
oxea, 0·9 to 1·5 by 0·064 mm.,
triradiates of chamber layer, regular to subregular, rays 0·24 to 0·56 by 0·024 to 0·045 mm.,
endosomal quadriradiates, sagittal, paired rays 0·09 to 0·19 by 0·012 mm., basal ray 0·1 to 0·27 by 0·012 mm., apical ray 0·06 to 0·077 by 0·008 to 0·012 mm.,
microxea, endosomal, 0·1 by 0·002 mm.

Distribution: South Africa (Bats Cave Rocks).

Named form: **Leuconia masatierrae** Breitfuss

Leuconia massatierrae Breitfuss, 1898: 467, pl. xxvii, figs. 10–11; *Leucandra masatierrae*, Dendy and Row, 1913: 771.

Description: Sponge subspherical, solitary, sessile; surface hispid; vents apical, with well-developed fringe; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates (?) with oxea set at right angles to surface; skeleton of chamber layer of quadriradiates and a few triradiates irregularly-arranged; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, regular to sagittal, rays 0·17 to 0·238 by 0·017 to 0·02 mm.,
oxea, 0·8 to 1·2 by 0·05 mm.,
oxea, 1·0 by 0·025 mm.,
quadriradiates of chamber layer, regular to sagittal, rays 0·17 to 0·238 by 0·017 to 0·02 mm., apical rays (?);
triradiates of chamber layer, similar to quadriradiates, but without apical rays,
endosomal quadriradiates, regular, facial rays 0·145 by 0·012 mm., apical rays 0·252 to 0·288 by 0·012 mm.

Distribution: Juan Fernandez.

Named form: **Grantia scotti** (Jenkin)

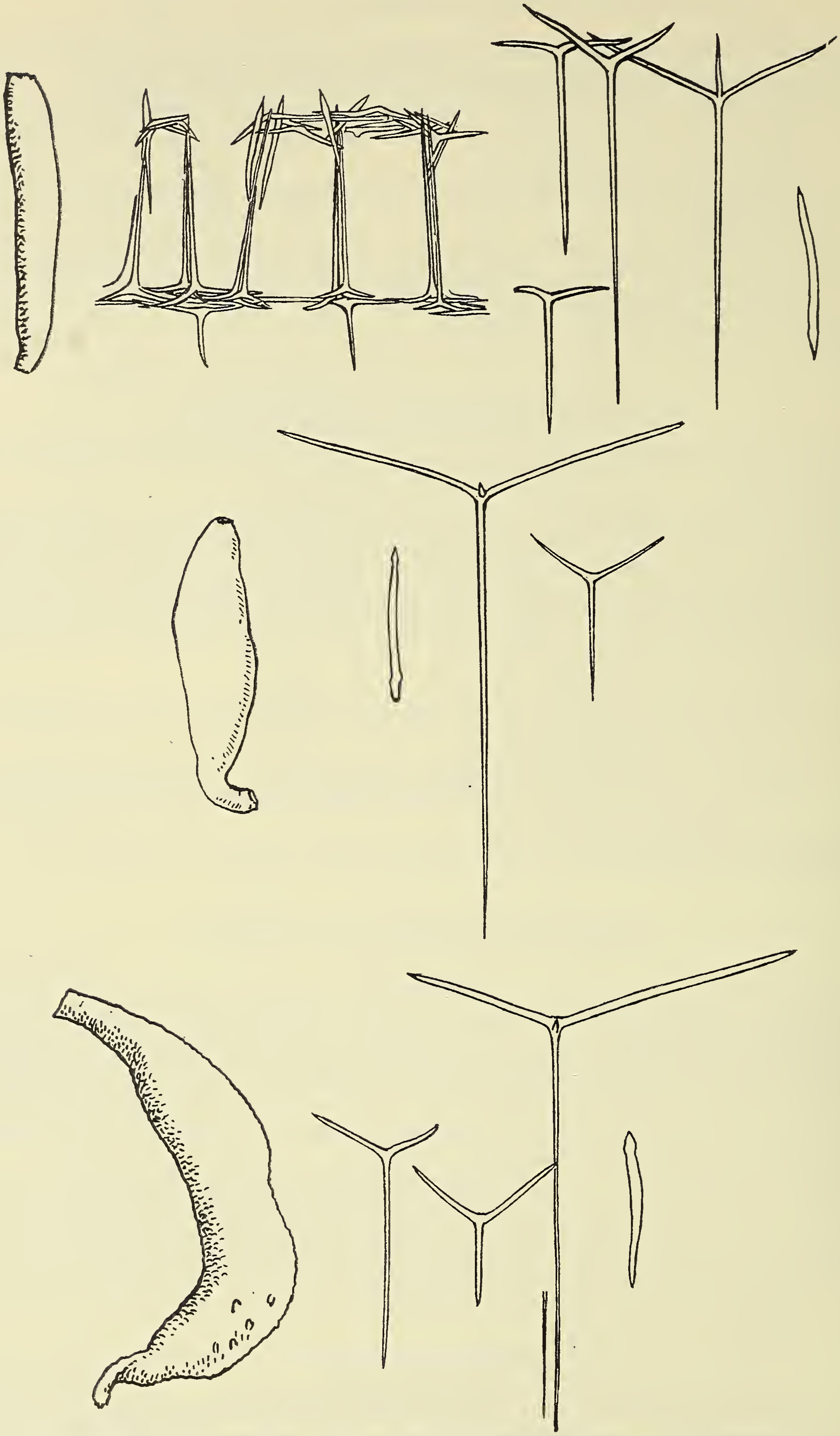
(text-fig. 303)

Tenthrenodes scotti Jenkin, 1908: 10, pl. xxvii, fig. 9, pl. xxviii, figs. 16–20, pl. xxix, figs. 26–27; *Dermatreton chartaceum* Jenkin, 1908: 22, pl. xxvii, fig. 5, pl. xxxi, figs. 59–62, pl. xxxii, figs. 63–64; *D. hodgsoni* Jenkin, 1908: 23, pl. xxvii, fig. 1, pl. xxxii, figs. 65–74; *Grantia chartacea*, Dendy and Row, 1913: 759; *G. hodgsoni*, Dendy and Row, 1913: 760; *G. scotti*, Dendy and Row, 1913: 760; *G. ramulosa* Dendy, 1924: 281, pl. ii; *G. chartacea*, Burton, 1929: 402; *Dermatreton chartaceum*, Brøndsted, 1931: 31; *D. hodgsoni*, Brøndsted, 1931: 31.

Description: Sponge tubular, sessile; surface reticulate, minutely hispid; vent apical, with slight fringe; texture soft; colour, in spirit, white; ectosomal skeleton of triradiates, with oxea projecting beyond surface; tubar skeleton of triradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·065 to 0·15 by 0·008 to 0·01 mm.,
oxea, 0·13 to 0·27 by 0·01 to 0·016 mm.,
oxea, 0·4 by 0·001 mm.,
subendosomal sagittal triradiates, paired rays 0·1 to 0·16 by 0·009 to 0·012 mm., basal ray 0·32 to 0·7 by 0·009 to 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·1 to 0·4 by 0·008 to 0·012 mm., basal ray 0·42 to 0·7 by 0·1 to 0·011 mm., apical ray 0·05 to 0·007 to 0·012 mm.

Distribution: Antarctic; 350–385 m.



Text-fig. 303. *Grantia scotti* after Jenkin: top row (left to right), external form of *Dermatreton chartaceum*, $\times 2$, section across body wall and spicules, $\times 100$; middle row, *Tenthrenodes scotti*, external form, $\times \frac{2}{3}$, spicules, $\times 100$, bottom row, *Dermatreton hodgsoni*, external form, natural size, spicules, $\times 100$.

Named form: **Leuconia spissa** Urban

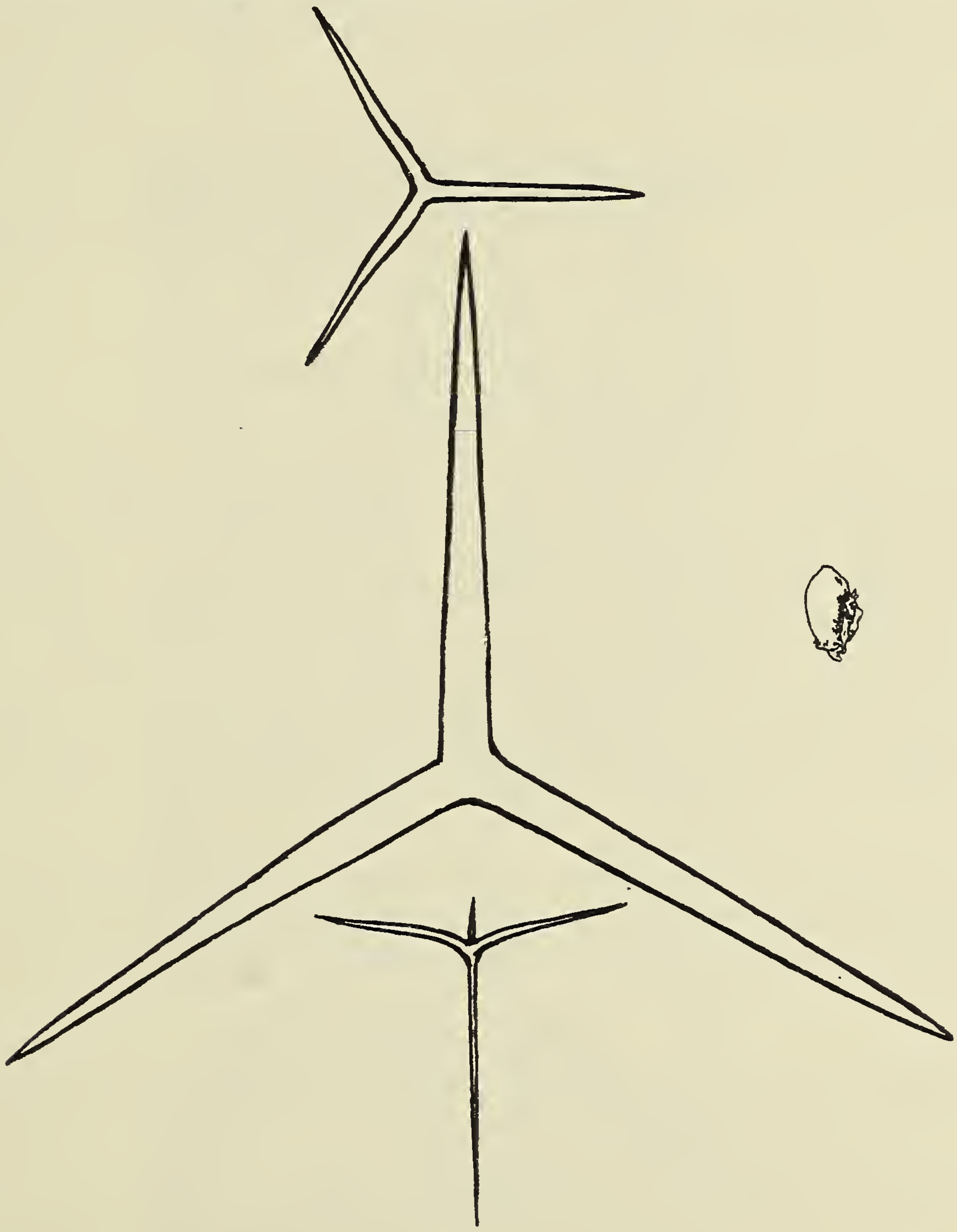
(text-fig. 304)

Leuconia spissa Urban, 1908: 249; Urban, 1909: 21, pl. iv, figs. 1–26; *Leucandra spissa*, Dendy and Row, 1913: 773.

Description: Sponge subspherical, stipitate; surface even, hispid; vent apical, fringed; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with oxea and microxea projecting beyond surface; skeleton of chamber layer of triradiates irregularly-arranged; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·09 to 0·54 by 0·01 to 0·049 mm., basal ray 0·11 to 0·305 by 0·013 to 0·049 mm.,
oxea, 1·0 to 2·0 by 0·05 mm.,
microxea, 0·06 to 0·09 mm. long,
triradiates of chamber layer, sagittal, paired rays 0·4 to 0·51 by 0·049 to 0·052 mm., basal ray 0·45 to 0·6 by 0·046 to 0·052 mm.,
endosomal quadriradiates, sagittal, paired rays 0·1 to 0·32 by 0·01 to 0·026 mm., basal ray 0·1 to 0·38 by 0·009 to 0·026 mm., apical ray 0·03 to 0·49 by 0·008 to 0·024 mm.

Distribution: South Africa (Agulhas Bank); 565 m.

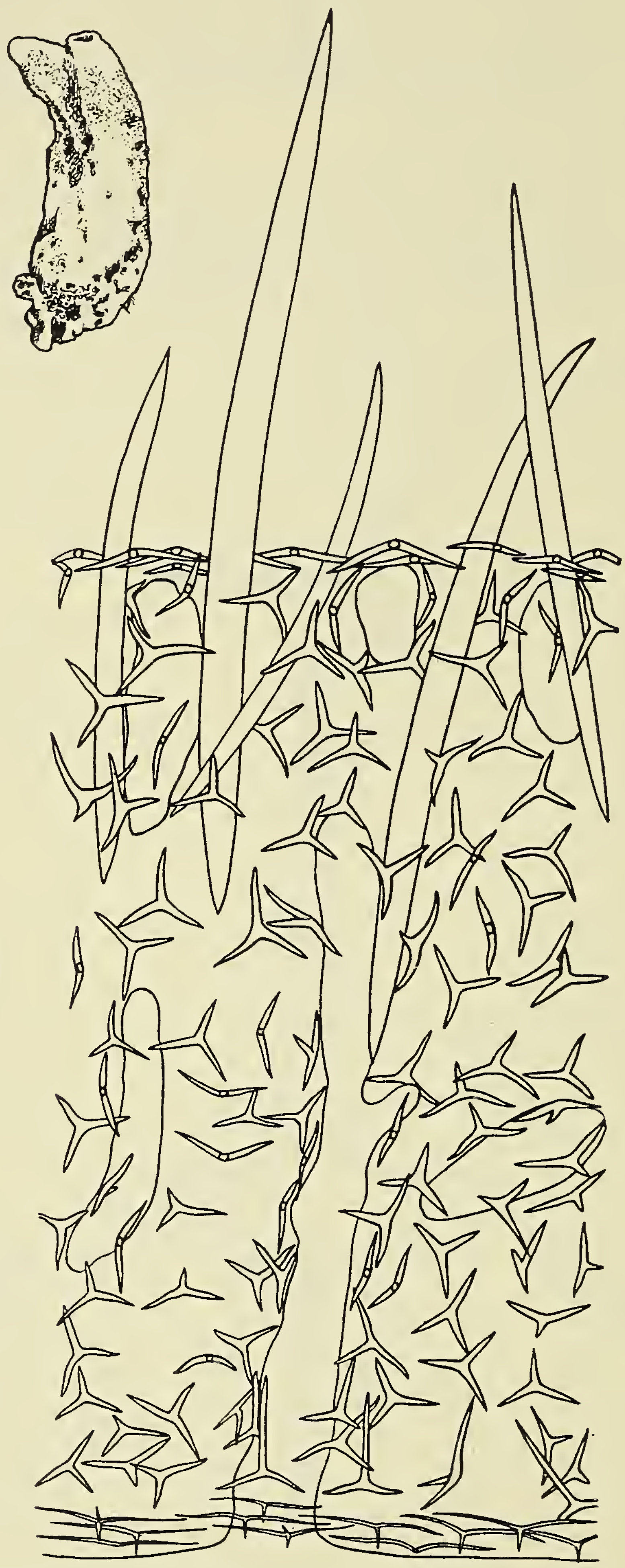


Text-fig. 304. *Leuconia spissa* after Urban: spicules, ×100; external form, natural size.

Genus **Aphroceras** Gray

Aphroceras Gray, 1858: 113; *Leucogypsia* Bowerbank, 1864: 1092; *Cyathiscus* Haeckel, 1870: 240; *Leucandrena* Haeckel, 1872: 172; *Artynandrus* Haeckel, 1872: 406; *Heteropia* Carter, 1886: 94; *Synute* Dendy, 1891: 1; *Sycute* Dendy and Row, 1913: 763.

Type-species: Grantia ensata Bowerbank, 1858: 295.



Text-fig. 305. *Leucandra abratsbo* after Hozawa: section across body wall, ×50; external form, from Tanita's (1941) specimen, natural size.

28. **Aphroceras ensata** (Bowerbank)

Named form: **Leucandra abratsbo** Hozawa

(text-fig. 305)

Leucandra abratsbo Hozawa, 1929: 359, pl. xx, figs. 57, 58, text-fig. 29; Hozawa, 1940: 53; Tanita, 1941: 273, pl. xvii, fig. 7; Tanita, 1942: 46; Tanita, 1943: 438, pl. xvii, figs. 63–64.

Description: Sponge cylindrical, irregularly curved, laterally compressed, solitary; surface uneven, hispid; margin of vent feebly developed; texture compact, elastic; colour, in spirit, greyish-white; ectosomal skeleton feebly developed, of a few layers of tangential triradiates, with microxea and large oxea projecting beyond surface; skeleton of chamber layer of centrifugally-directed basal rays of subendosomal triradiates, with irregularly-scattered triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a few layers of tangential triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·07 to 0·13 by 0·08 to 0·02 mm., basal ray 0·05 to 0·11 by 0·008 to 0·02 mm.,
oxea, 0·7 to 1·6 by 0·06 to 0·12 mm.,
microxea, 0·05 to 0·08 by 0·004 mm.,
triradiates of chamber layer, similar to ectosomal triradiates,
subendosomal triradiates, sagittal, paired rays 0·1 by 0·016 mm., basal ray 0·15 by 0·016 mm.,
endosomal triradiates, sagittal, paired rays 0·07 to 0·16 by 0·008 to 0·016 mm., basal ray 0·05 to 0·13 by 0·008 to 0·012 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·02 to 0·04 by 0·008 mm.

Distribution: Japan (numerous localities).

Named form: **Aphroceras alcicornis** Gray

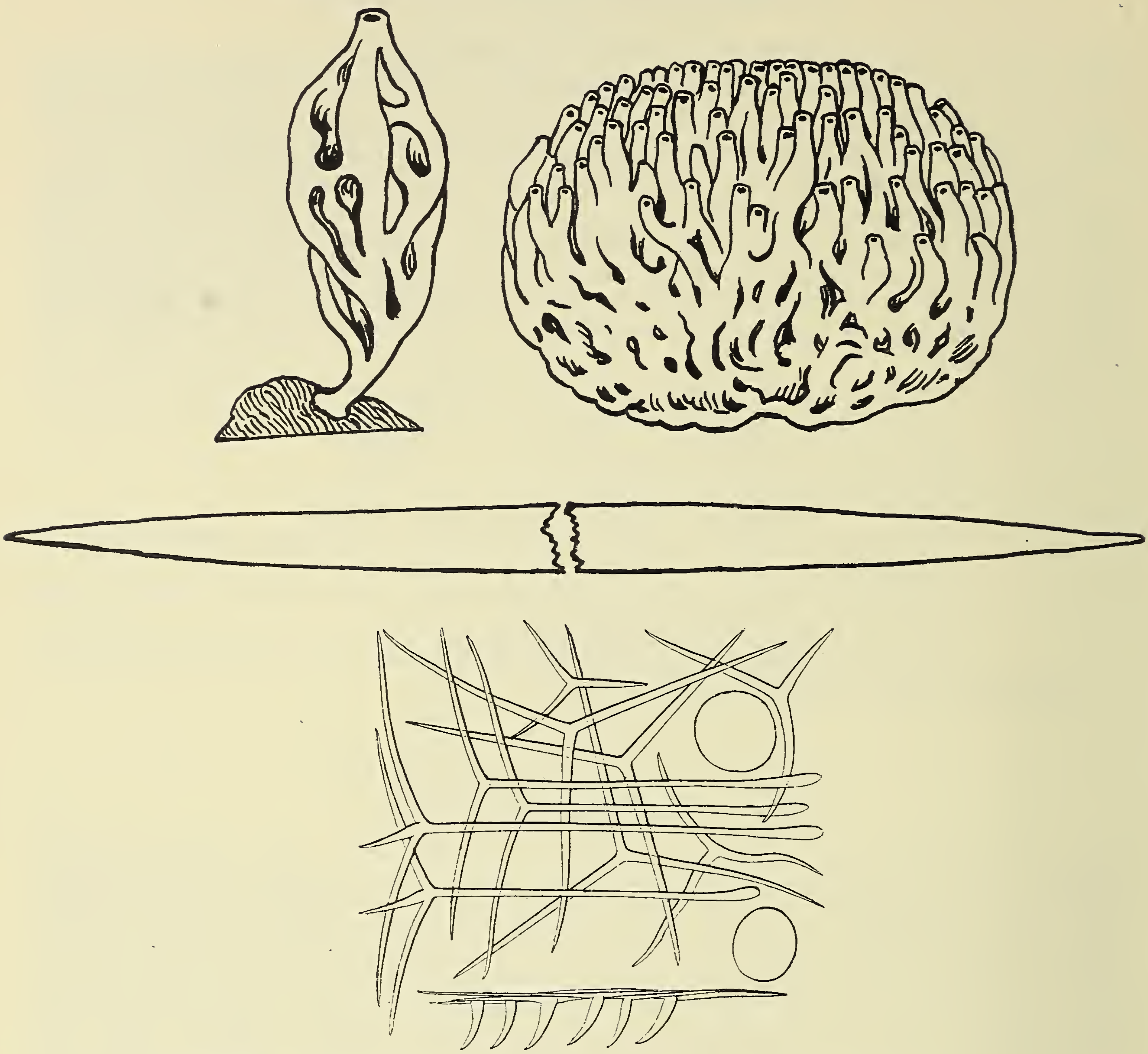
(text-fig. 306)

Aphroceras alcicornis Gray, 1858: 114, pl. x, figs. 1–2; Gray, 1867: 558; *Cyathiscus actinia* Haeckel, 1870: 241; *Aphroceras alcicornis*, Haeckel, 1870: 246; *Leucandra alcicornis*, Haeckel, 1872: 184, pl. xxxii, fig. 4, pl. xxxvii, figs. 3–4; *Dyssycus alcicornis*, Haeckel, 1872: 185; *Lipostomella alcicornis*, Haeckel, 1872: 185; *Amphoriscus alcicornis*, Haeckel, 1872: 185; *Coenostomus alcicornis*, Haeckel, 1872: 185, pl. xxxvii, fig. 3; *Artynas alcicornis*, Haeckel, 1872: 185, pl. xxxvii, fig. 4; *Aphroceras alcicornis*, Haeckel, 1872: 185; *Leucandra cladocora* (=*L. alcicornis*, var. *cladocora*), Haeckel, 1872: 185; *L. caespitosa* (=*L. alcicornis*, var. *caespitosa*) Haeckel, 1872: 185; *L. alcicornis*, Dendy, 1892: 97; *L. caespitosa*, Ferrer, 1912: 10, text-figs.; *Aphroceras alcicornis*, Dendy and Row, 1913: 777; *A. caespitosa*, Dendy and Row, 1913: 777; *Aphroceras caespitosa*, Ferrer, 1923: 161.

Description: Sponge clathrate, erect, substipitate; surface even, non-hispid; vent subtubular, apical, naked; texture (?); colour, dried, grey or brown; ectosomal skeleton of colossal longitudinal oxea; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of triradiates.

Spicules: oxea, 1·0 to 3·0 by 0·07 to 0·1 mm.,
triradiates of chamber layer, subregular, rays 0·2 to 0·4 by 0·012 to 0·02 mm., or sagittal, paired rays 0·21 to 0·25 by 0·012 mm., basal ray 0·36 to 0·47 by 0·012 mm.,
endosomal quadriradiates, sagittal, paired rays 0·25 by 0·012 mm., basal ray 0·5 by 0·012 mm., apical ray 0·05 by 0·012 mm.

Distribution: Pacific Ocean (Hong Kong, Honolulu, Philippines); Indian Ocean; South Australia; South Africa; Spain (Santander).



Text-fig. 306. *Aphroceras alcicornis*: spicules, ×100; external form, natural size. (All figures after Haeckel.)

Named form: **Ute armata** Hozawa

(text-fig. 307)

Ute armata Hozawa, 1929: 337, pl. xviii, figs. 42, 43, text-fig. 22; Tanita, 1943: 430, pl. xvi, fig. 56.

Description: Sponge tubular, solitary; surface hispid; vent apical, fringe well developed; texture (?); colour (?); ectosomal skeleton of longitudinal oxea, with hair-like oxea projecting from surface; tubar skeleton ofcentrifugally-directed rays of subendosomal triradiates and quadriradiates, with many rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and paired and apical rays of subendosomal quadriradiates, together with a few layers of tangential triradiates and quadriradiates, with rays projecting into cloacal cavity.

Spicules: longitudinal oxea, up to 3·5 by 0·2 mm.,
hair-like oxea, up to 1·0 by 0·002 to 0·004 mm.,
tubar triradiates, sagittal, paired rays 0·06 to 0·11 by 0·008 to 0·012 mm., basal ray 0·04 to 0·1 by 0·006 to 0·011 mm.,
subendosomal triradiates, sagittal, paired rays 0·05 to 0·1 by 0·006 to 0·01 mm., basal rays 0·08 to 0·13 by 0·006 to 0·01 mm.,
subendosomal quadriradiates, similar to triradiates, apical ray short,
endosomal triradiates, sagittal, paired rays 0·08 to 0·15 by 0·008 to 0·012 mm., basal ray 0·16 to 0·3 by 0·006 to 0·01 mm.,
endosomal quadriradiates, similar to triradiates, apical 0·06 to 0·13 by 0·008 mm.

Distribution: Japan (Kagoshima, Sagami Sea); 183–286 m.

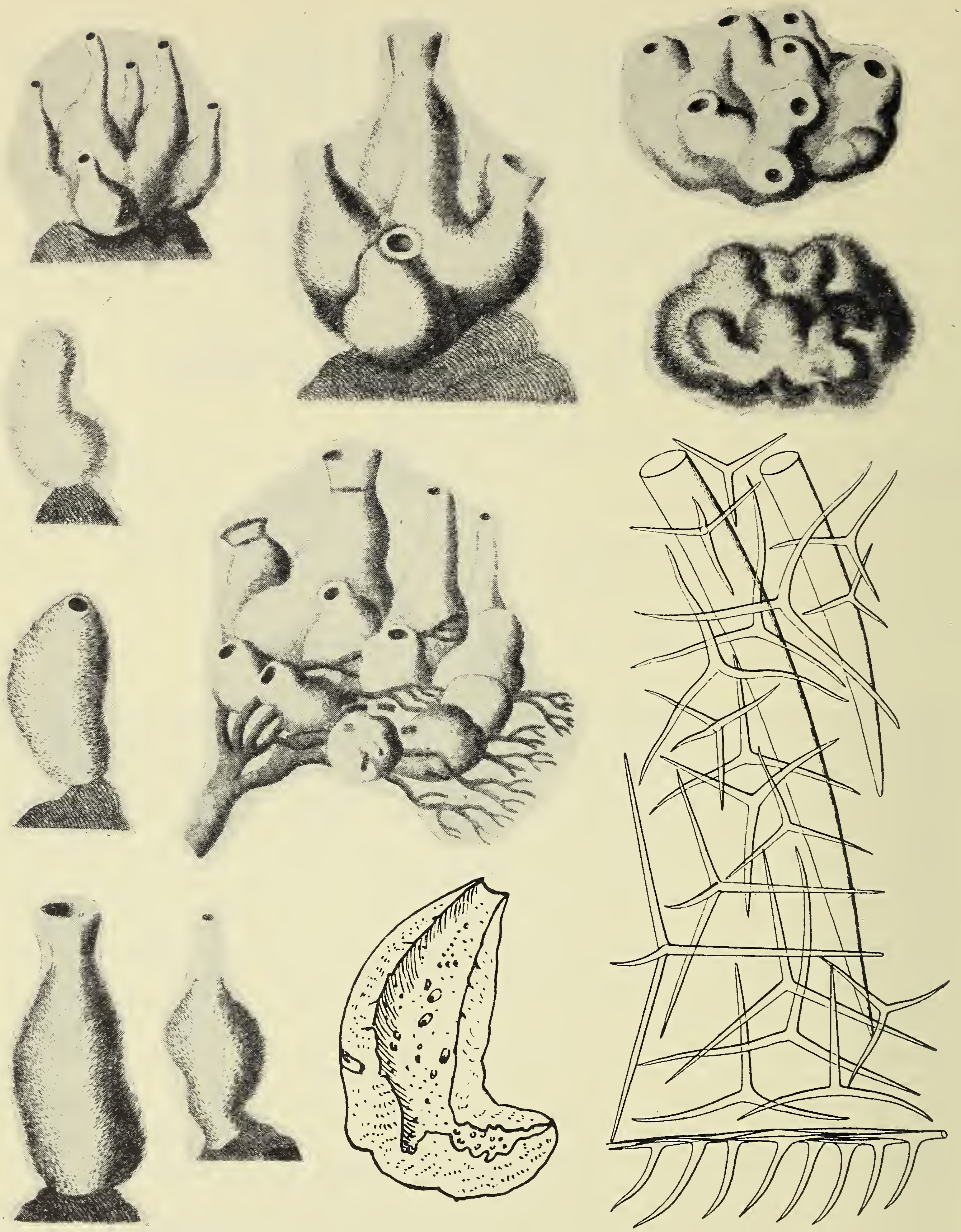
Text-fig. 307. *Ute armata*: external form of holotype (right), Tanita's specimen (left), natural size.

Named form: **Leuconia aspera** (Schmidt)

(text-figs. 308–309)

Sycon asperum Schmidt, 1862: 15, pl. i, fig. 4; *Grantia aspera* Schmidt, 1866: 4, fig. 5; *Sycon asperum*, Gray, 1867: 554; *Sycinula aspera* Schmidt, 1868: 35; *Sycinula aspera*, Haeckel, 1870: 242; *Leucandra aspera*, Haeckel, 1872: 191, pl. xxxi, fig. 3, pl. xxxv, figs. 1–9, pl. xxxvi, figs. 4–6; *Dyssycus asper*, Haeckel, 1872: 192, pl. xxxv, figs. 1A–B; *Dyssyconella aspera*, Haeckel, 1872: 192, pl. xxxv, figs. 2A–B; *Dyssycarium asperum*, Haeckel, 1872: 192, pl. xxxv, figs. 3A–B, pl. xxxvi, figs. 5–6; *Lipostomella aspera*, Haeckel, 1872: 192, pl. xxxv, figs. 4A–B, pl. xxxvi, fig. 4; *Amphoriscus asper*, Haeckel, 1872: 192, pl. xxxv, fig. 5; *Amphorula aspera*, Haeckel, 1872: 192, pl. xxxv, fig. 6; *Amphoridium asperum*, Haeckel, 1872: 192, pl. xxxv, figs. 7A–B; *Aphroceras asperum*, Haeckel, 1872: 192, pl. xxxv, figs. 8A–B; *Leucometra aspera*, Haeckel, 1872: 192, pl. xxxv, figs. 9A–B; *Leucandra lesinensis* (=*L. aspera*, var. *lesinensis*), Haeckel, 1872: 192; *L. messinensis* (=*L. aspera*, var. *messinensis*), Haeckel, 1872: 192; *L. nicaeensis* (=*L. aspera*, var. *nicaeensis*), Haeckel, 1872: 192; *L. aspera*, Keller, 1876: 19, pls. i–ii; Vosmaer, 1881: 5; Vosmaer, 1884: 483, pls. xxviii, xxix; Lackschewitsch, 1886: 339; *Leuconia aspera*, Lackschewitsch, 1886: 305; *Leucandra aspera*, Lendenfeld, 1891: 306, pl. xi, fig. 80; *Leuconia aspera*, Topsent, 1891: 11; Topsent 1892: 23; *Leucandra aspera*, Hanitsch, 1895: 206; Breitfuss, 1897: 223; *Leucandra aspera*, Breitfuss, 1898: 95; *Leuconia aspera*, Lo Bianco, 1899: 455; *Leucandra aspera*, Arnesen, 1901: 72; 1901: 26; Row, 1909: 186; Breitfuss, 1911: 212; Dendy and Row, 1913: 769; Ferrer, 1916: 6; Burton, 1926: 72; Breitfuss, 1927: 30; 1929: 265; Breitfuss, 1932: 249; Topsent, 1934: 11; Breitfuss, 1935: 27; Burton, 1936: 5; Arndt, 1935: 17, fig. 22; Arndt, 1940: 5; Arndt, 1941: 47.

Description: Sponge oval to massive and lobulate (compound), sessile; surface even, strongly hispid; vents apical, fringed (or naked ?); texture firm; colour, alive, white, yellow or brown, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with large oxea projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of quadriradiates.



Text-fig. 308. *Leucandra aspera*: external form as portrayed by Haeckel, natural size, and by Schmidt (bottom centre), twice natural size; with spicules as drawn by Haeckel, × 100.

Text-fig. 309. *Leucandra aspera*: external form as portrayed by Vosmaer (1884), natural size.

Spicules: ectosomal triradiates, subregular, rays 0·2 by 0·012 mm.,
oxea, 0·5 to 3·0 by 0·01 to 0·08 mm.,
triradiates of chamber layer, subregular, rays 0·12 to 0·25 by 0·01 to 0·015 mm.,
quadriradiates of chamber layer, rare, similar to triradiates, with apical ray 0·05 to 0·12 by 0·01 to 0·015 mm.,
endosomal quadriradiates, sagittal, paired rays 0·18 to 0·3 by 0·015 mm., basal ray 0·25 to 0·32 by 0·015 mm., apical ray 0·1 to 0·15 by 0·015 mm.

Distribution: Arctic; Atlantic coasts of Europe; Mediterranean; Azores; Canaries; Red Sea; littoral to 550 m.

Named form: **Leucandra astricta** Tanita

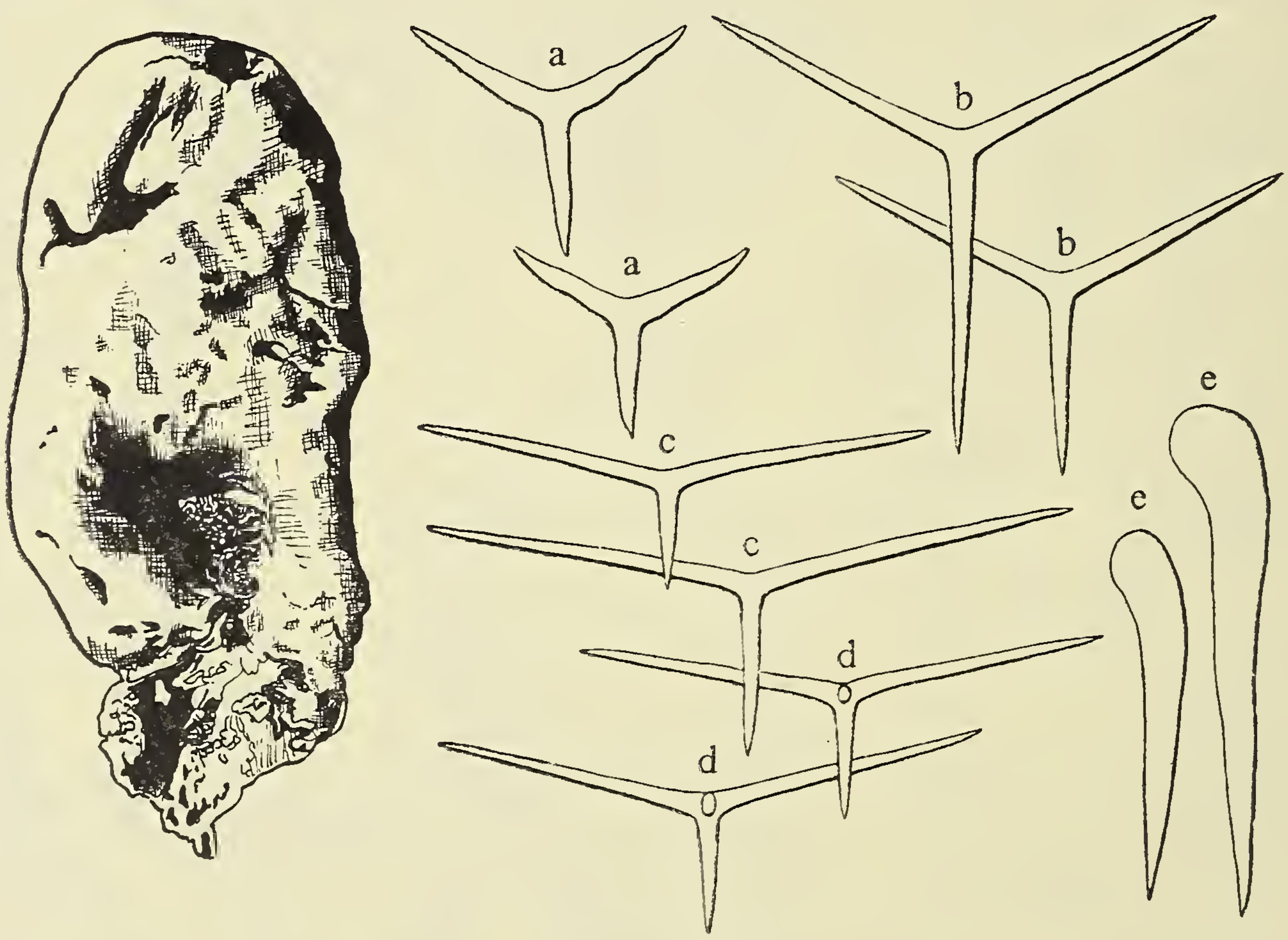
(text-fig. 310)

Leucandra astricta Tanita, 1942: 119, pl. vii, fig. 11, text-fig. 4.

Description: Sponge massively sacciform; surface smooth, uneven; vent apical; texture firm; colour, in spirit, dirty white; ectosomal skeleton of a few tangential layers of triradiates with a dense palisade of oxea; skeleton of chamber layer of densely and irregularly-arranged tubar triradiates; endosomal skeleton of several tangential layers of triradiates and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·11 to 0·15 by 0·02 to 0·022 mm.,
oxea, club-shaped, 0·21 to 0·38 by 0·04 to 0·07 (maximum thickness) mm.,
tubar triradiates, subregular, rays 0·17 to 0·22 by 0·014 to 0·018 mm.,
endosomal triradiates, paired rays 0·2 to 0·22 by 0·01 to 0·014 mm., basal ray 0·1 to 0·11 by 0·01 to 0·014 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·045 to 0·05 mm.

Distribution: South Georgia.



Text-fig. 310. *Leucandra astricta* after Tanita: spicules, ×100; external form, ×$\frac{4}{3}$.
Spicules: a. ectosomal triradiates; b. tubar triradiates; c. endosomal triradiates; d. endosomal quadriradiates; e. oxea.

Named form: **Leucandra bulbosa** Hanitsch

Leucandra bulbosa Hanitsch, 1895: 206; Dendy and Row, 1913: 772; Arndt, 1941: 47.

Description: Sponge tubular to bulbous, sessile; surface corrugated, hispid; vent apical, fringed; texture (?); colour, in spirit, white to yellowish-grey; ectosomal skeleton a tangential layer of triradiates, with oxea of two sizes and microxea; skeleton of chamber layer of triradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·17 by 0·018 mm., basal ray 0·2 by 0·018 mm.,
oxea, 1·4 by 0·075 mm.,
oxea, 0·45 to 0·75 by 0·05 mm.,
microxea, 0·07 by 0·002 mm.,
triradiates, of chamber layer, sagittal, paired rays 0·34 by 0·022 mm., basal ray 0·4 by 0·022 mm.,
endosomal quadriradiates, sagittal, paired rays 0·39 to 0·45 by 0·01 mm., basal ray 0·17 to 0·27 by 0·01 mm., apical ray 0·1 by 0·01 mm.

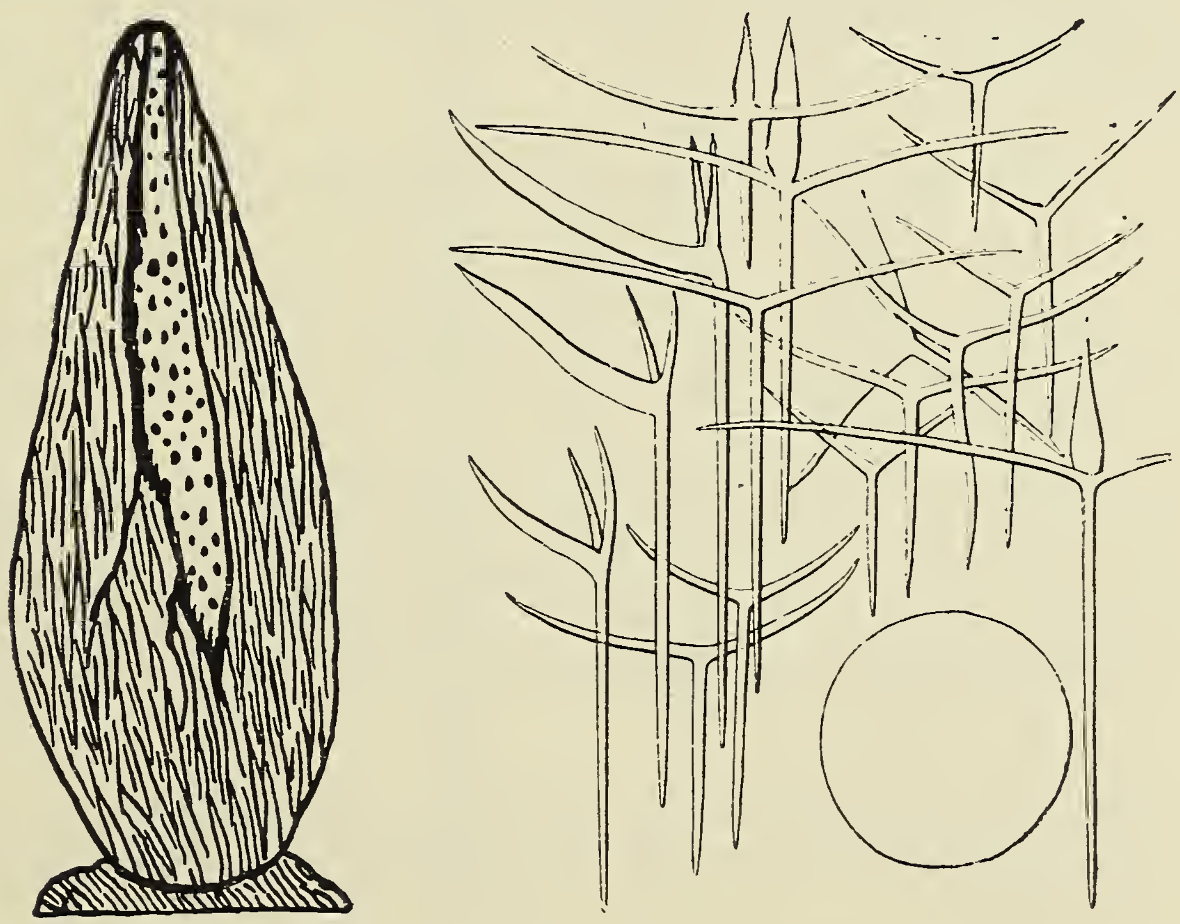
Distribution: Portugal.

Named form: **Aphroceras cataphracta** (Haeckel)

(text-fig. 311)

Leucandra cataphracta Haeckel, 1872: 203, pl. xxxii, fig. 6, pl. xxxvii, fig. 2; *Dyssycus cataphractus*, Haeckel, 1872: 203; *Leucandra cataphracta*, Dendy, 1892: 97; *Aphroceras cataphracta*, Dendy and Row, 1913: 777.

Description: Sponge subovate, sessile; surface even, non-hispid; vent apical, naked; texture firm; colour, in spirit, white; ectosomal skeleton of longitudinal colossal oxea; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of quadriradiates.



Text-fig. 311. *Aphroceras cataphracta* after Haeckel: spicules, ×100; external form (an individual cut longitudinally), ×4.

Spicules: oxea, 1·0 to 3·0 by 0·15 to 0·2 mm.,
microxea, 0·2 by 0·004 mm.,
triradiates of chamber layer, sagittal, paired rays 0·1 to 0·12 by 0·005 to 0·008 mm., basal ray 0·15 to 0·2 by 0·005 to 0·008 mm.,
endosomal quadriradiates, sagittal, paired rays 0·35 by 0·005 mm., basal ray 0·2 to 0·3 by 0·005 mm., apical ray 0·1 to 0·4 by 0·01 to 0·03 mm.

Distribution: Australia (Sydney, Port Jackson, Port Denison).

Named form: **Leuconia coimbrae** Breitfuss

(text-fig. 312)

Leuconia coimbrae Breitfuss, 1898: 99, pl. xi, figs. 1, 2, 20–31; *Leucandra coimbrae*, Dendy and Row, 1913: 772.

Description: Sponge solitary, irregularly-subspherical, sessile; surface very minutely hispid; vent apical, conspicuous, naked; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates and quadriradiates, with oxea and microxea set at right angles to surface and projecting slightly beyond; skeleton of chamber layer of triradiates and quadriradiates irregularly-arranged; endosomal skeleton of a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, subregular or sagittal, paired rays 0·09 to 0·13 by 0·013 to 0·019 mm., basal rays 0·1 to 0·17 by 0·013 to 0·019 mm.,
ectosomal quadriradiates, similar to triradiates but with apical rays 0·052 by 0·013 mm.,
oxea, 0·63 to 2·5 by 0·032 to 0·069 mm.,
microxea, 0·042 to 0·063 by 0·002 mm.,
triradiates of chamber layer, subregular, rays 0·35 to 0·45 by 0·041 to 0·045 mm.,
quadriradiates of chamber layer, sagittal, of rare occurrence, paired rays 0·47 by 0·026 mm., basal rays 0·78 by 0·039 mm., apical rays 0·13 by 0·028 mm.,
endosomal triradiates, similar to ectosomal triradiates,
endosomal quadriradiates, similar to ectosomal quadriradiates.

Distribution: Portugal.

Named form: **Leuconia compacta** Carter

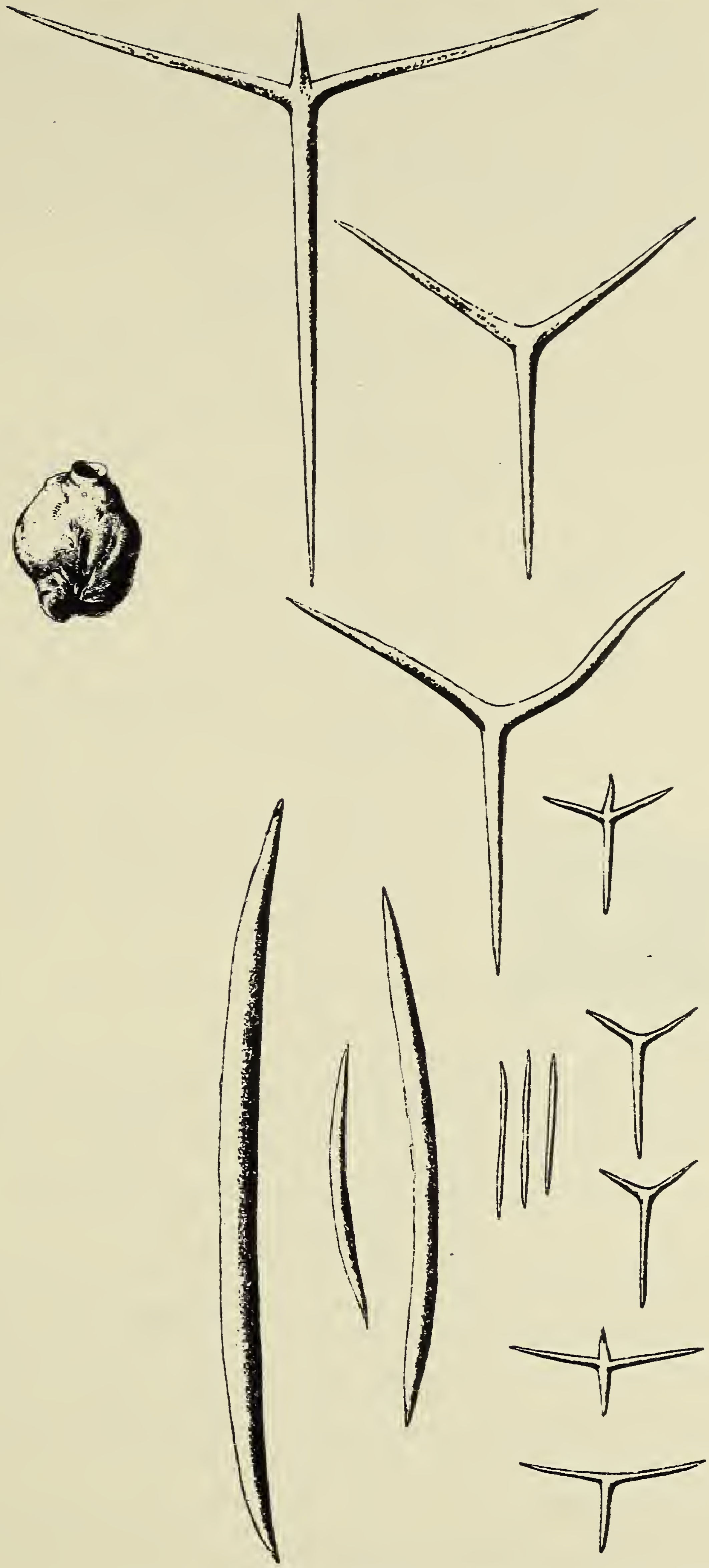
(text-fig. 313)

Leuconia compacta Carter, 1886: 144; *Leucandra compacta*, Dendy, 1892: 100; Dendy and Row, 1913: 770; *L. australiensis*, Tanita, 1942: 121, pl. vii, fig. 12, text-fig. 9; *L. compacta*, Tanita, 1942: 124, pl. vii, fig. 13, text-fig. 6.

Description: Sponge massive, lobate; surface even, hispid; vents apical on lobes, naked; texture firm; colour, in spirit, pale yellowish-white; ectosomal skeleton of outermost triradiates of chamber layer and of oxea projecting beyond surface; skeleton of chamber layer a dense mass of triradiates; endosomal skeleton a tangential layer of triradiates, with rare quadriradiates.

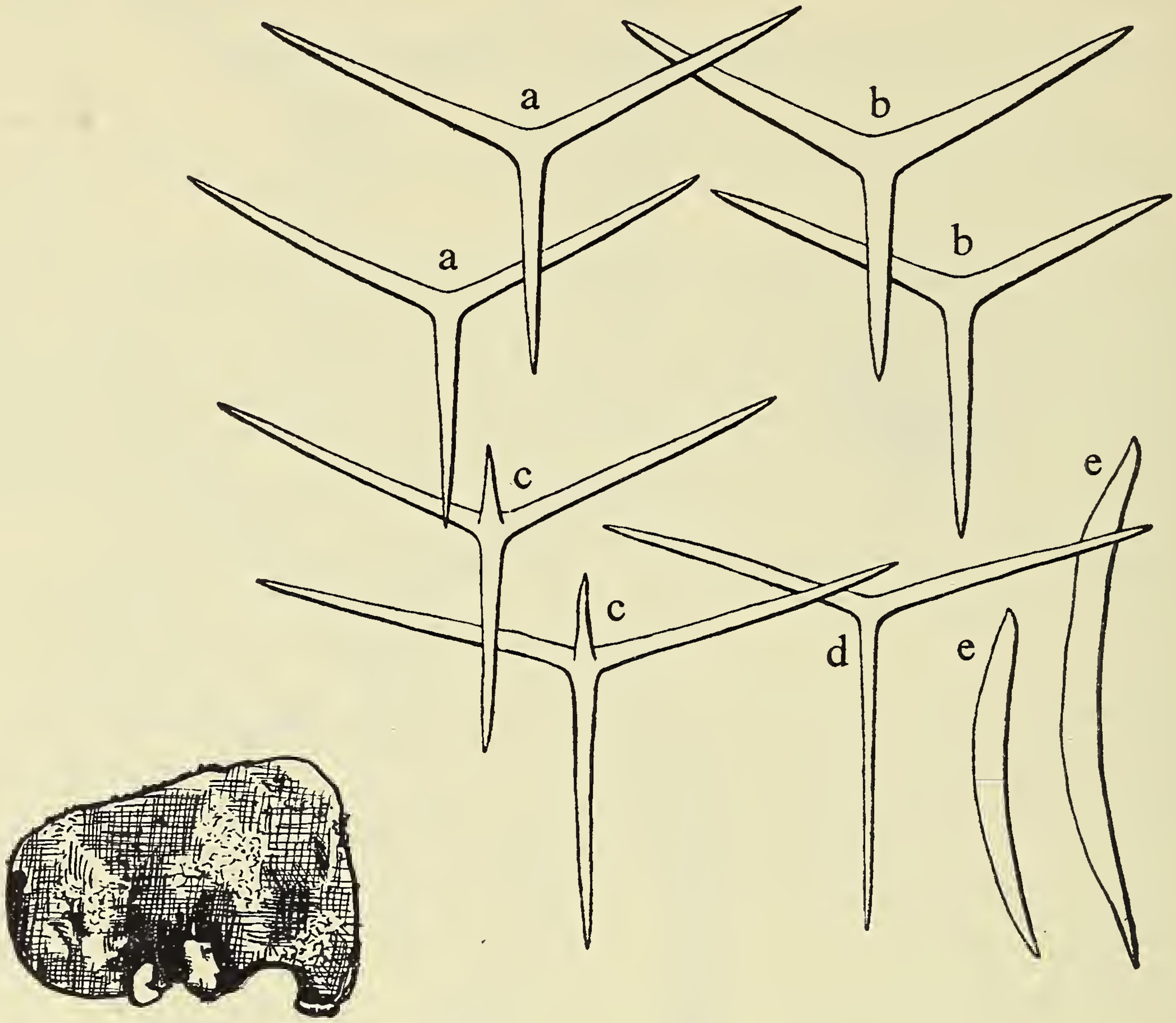
Spicules: ectosomal and chamber layer triradiates, regular or subregular, rays 0·1 to 0·15 by 0·01 to 0·018 mm.,
oxea, 0·72 by 0·08 mm.,
endosomal triradiates, similar to triradiates of chamber layer,
endosomal quadriradiates, similar to triradiates of chamber layer, but with a short apical ray.

Distribution: Strait of Magellan; Australia (Port Phillip Heads); New Zealand; depths not recorded.



Text-fig. 312. *Leuconia coimbrae* after Breitfuss: spicules, ×75, except for microxea (×350) and oxea (×50) external form, natural size.

Remarks: There are three species having so much in common that it is difficult to regard them as other than identical. These are *Leuconia compacta* Carter, from Australia, and *Leucandra abratsbo* Hozawa and *L. multituba* Hozawa, both from Japan. The spicules of all three differ in minor details only, including the presence of microxea in the Japanese forms and their absence from the Australian specimen. The external form of the latter is, however, remarkably like that of *L. multituba*. There are several instances of related species occurring off Japan and Australia, notably the species of *Lelapia*, that we must regard the Japanese sponge-fauna as comprising strong affinities with the Australian.



Text-fig. 313. *Leucandra compacta* (Carter): spicules, ×100; external form, ×$\frac{5}{3}$. (All after Tanita, 1942.)
Spicules: a. ectosomal triradiates; b. tubar triradiates; c. endosomal quadriradiates; d. triradiate from margin of vent; e. oxea.

Named form: **Aphroceras corticata** (Lendenfeld)

(text-fig. 314)

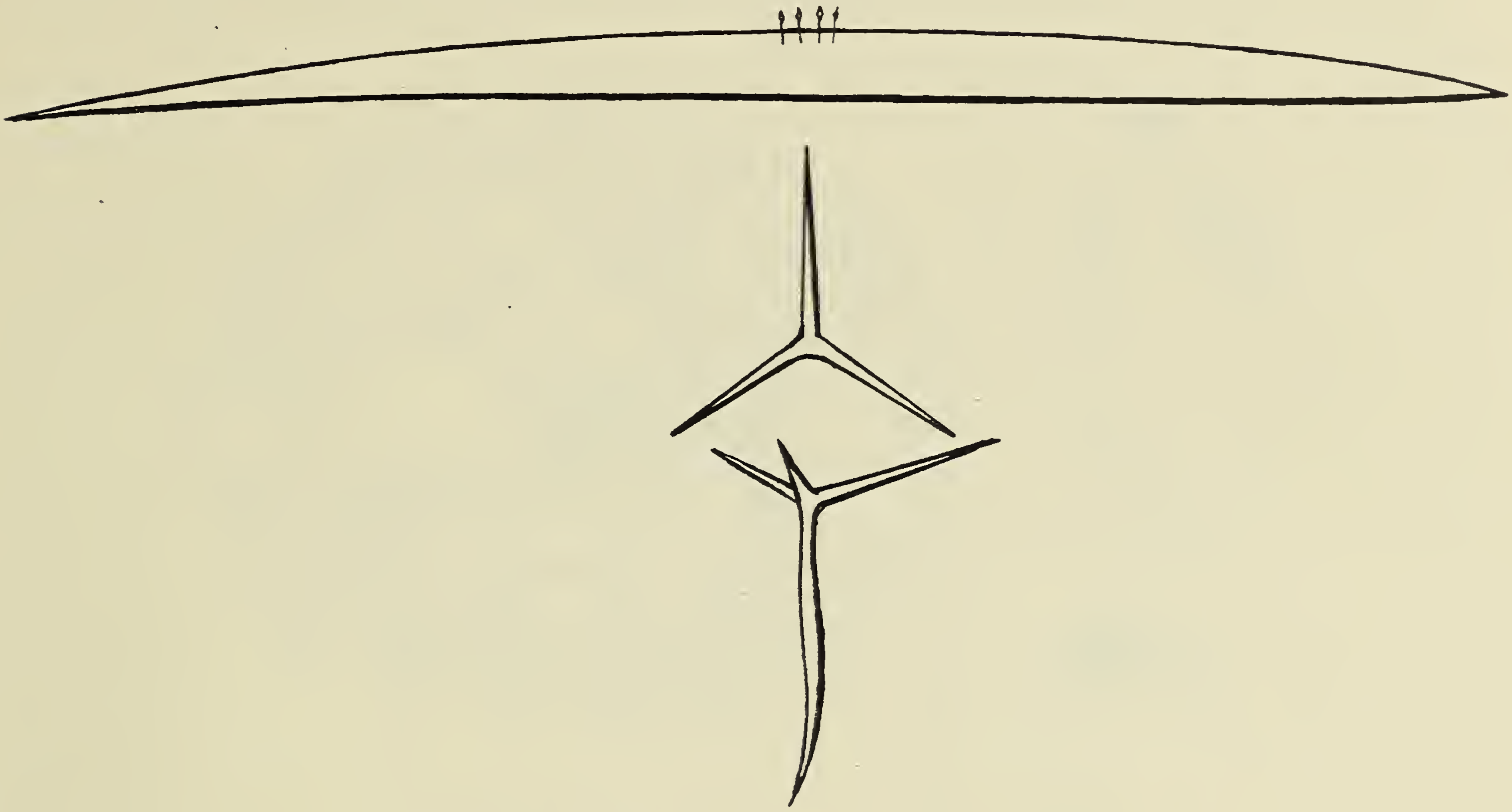
Vosmaeria corticata Lendenfeld, 1891: 297, pl. xi, fig. 77, pl. xv, figs. 124–129; *Aphroceras corticata*, Dendy and Row, 1913; 777; Topsent, 1934: 11; Breitfuss, 1935: 29.

Description: Sponge oval, sessile; surface even, minutely hispid; vent apical, fringed; texture (?); colour, alive and in spirit, (?) white; ectosomal skeleton a tangential layer of triradiates, with longitudinal oxea and microxea set at right angles to surface; skeleton of chamber layer of (?) subectosomal triradiates, irregularly-arranged tubar triradiates and (?) subendosomal triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: of body wall, ectosomal triradiates, subregular rays 0·14 to 0·18 by 0·012 mm.,
oxea, 1·6 by 0·056 mm.,
microxea, 0·07 to 0·1 by 0·001 mm.,
subectosomal pseudosagittal triradiates (?),

tubar triradiates, subregular to sagittal, rays 0·14 to 0·18 by 0·012 mm.,
subendosomal sagittal triradiates (?),
endosomal quadriradiates, subregular, facial rays 0·14 to 0·18 by 0·012 mm., apical ray 0·3 by 0·008 mm.

Distribution: Mediterranean (Lesina, Minorca); littoral.



Text-fig. 314. *Aphroceras corticata* after Lendenfeld: spicules, ×100 arranged as in a section across body wall, with tangential oxea and microxea set at right angles to it, tubar triradiate and endosomal quadriradiate.

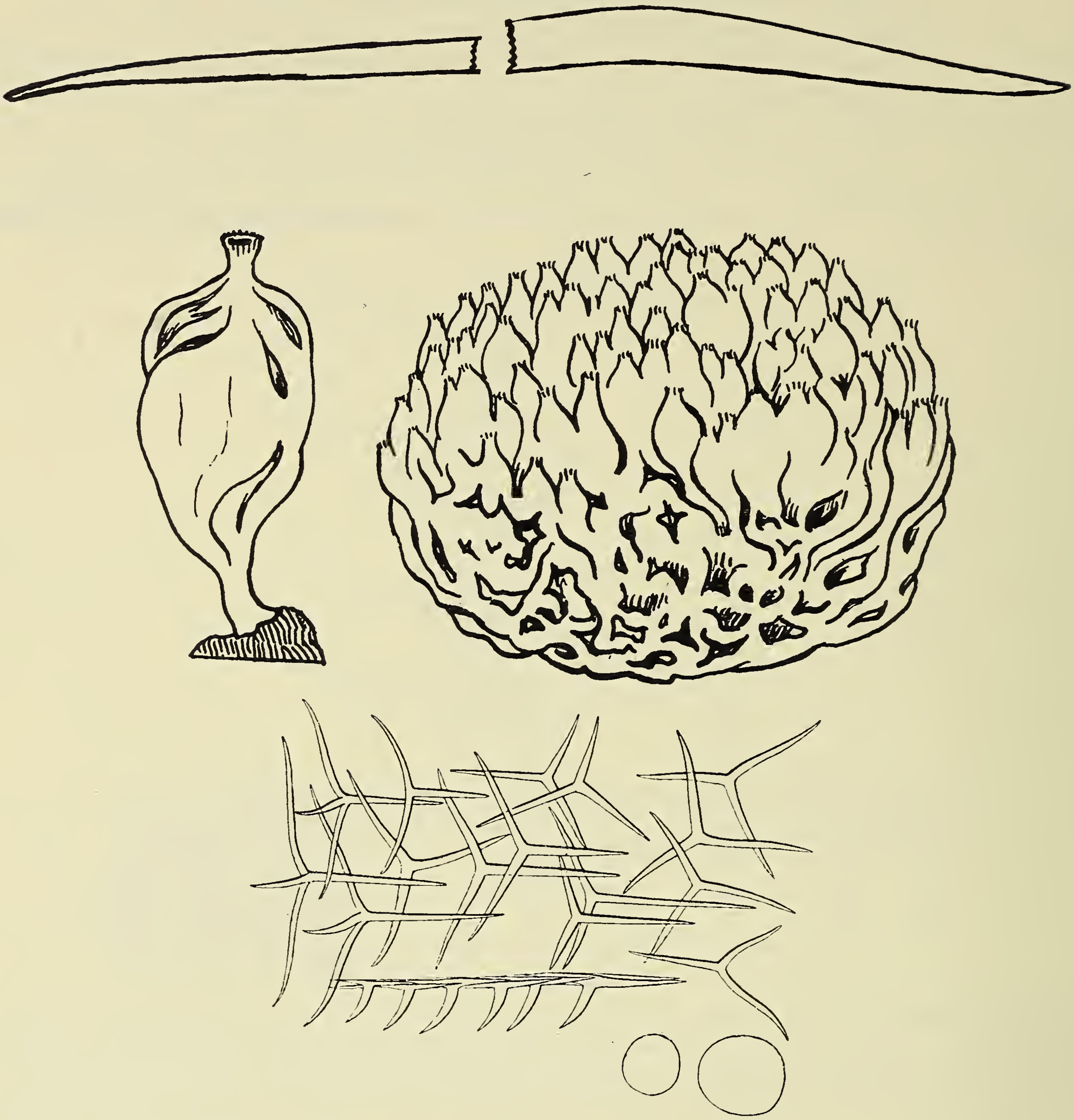
Named form: **Leucandra crambessa** Haeckel
(text-fig. 315)

Leucandra crambessa Haeckel, 1872: 182, pl. xxxii, fig. 3, pl. xxxvii, figs. 7–8; *Dyssycarium crambessa* Haeckel, 1872: 182; *Amphoridium crambessa* Haeckel, 1872: 182; *Coenostomium crambessa* Haeckel, 1872: 183, pl. xxxvii, fig. 7; *Artynium crambessa* Haeckel, 1872: 182, pl. xxxvii, fig. 8; *Leucandra cristata* (=*L. crambessa* var. *cristata*) Haeckel, 1872: 182; *L. callaea* (=*L. crambessa* var. *callaea*, Haeckel, 1872 : 181 ; *L. crambessa*, Breitfuss, 1898: 96; Dendy and Row, 1913: 770: *L. callaea*, Dendy and Row, 1913: 772; *L. crambessa*, Arndt, 1941: 47.

Description: Sponge oval, clathrate, substipitate; surface even, non-hispid; vent apical, fringed; texture (?); colour, in spirit, white, yellowish or grey; ectosomal skeleton a tangential layer of triradiates (?), with oxea projecting at surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates (?),
oxea, 1·0 to 2·0 by 0·06 to 0·09 mm.,
oxea, 0·1 to 0·2 by 0·001 mm. (not constant in occurrence),
triradiates of chamber layer, regular to (rarely) sagittal, rays 0·08 to 0·16 by 0·008 to 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·15 to 0·2 by 0·006 to 0·008 mm., basal ray 0·1 to 0·25 by 0·006 to 0·008 mm., apical ray 0·05 by 0·006 mm.

Distribution: Mediterranean (Nizza, Genoa, Naples).



Text-fig. 315. *Leuconia crambessa* after Haeckel: spicules, ×100: external form, natural size.

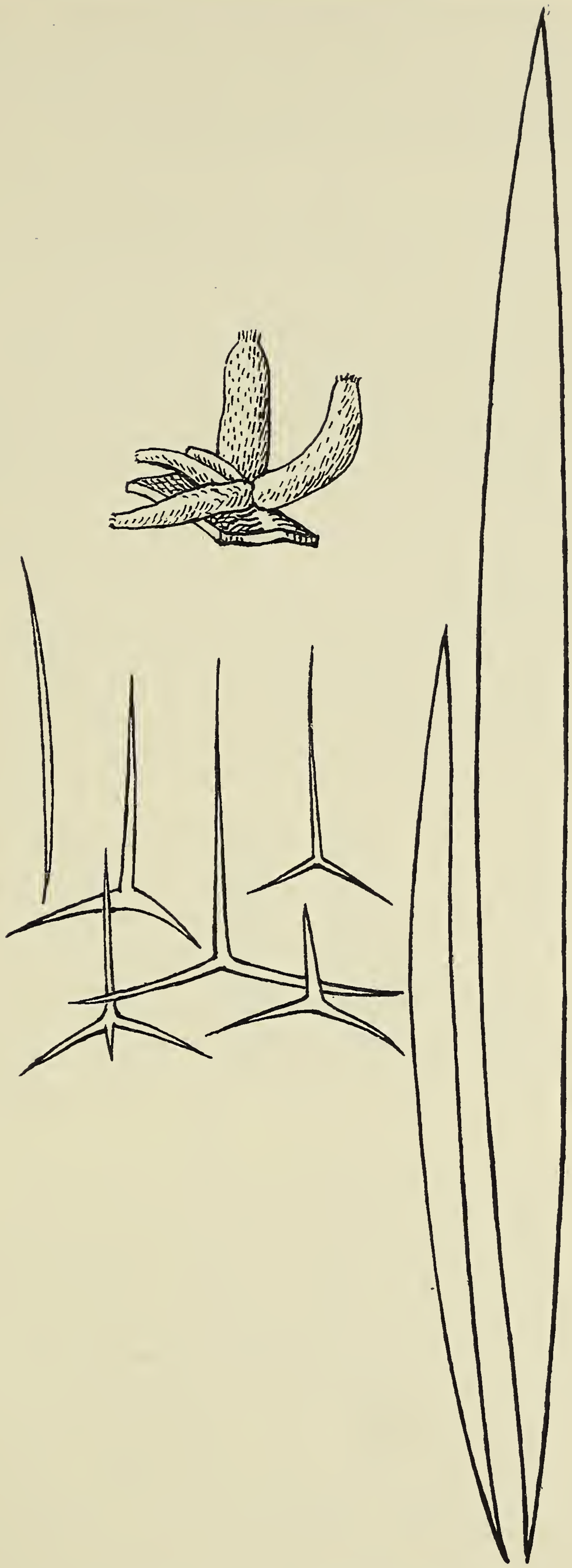
Named form: **Sycute dendyi** (Kirk)

(text-figs. 316–317)

Sycon dendyi Kirk, 1895: 287, pl. xxiv, figs. 1–16; *Sycute dendyi*, Dendy and Row, 1913: 763.

Description: Sponge tubular, sessile; surface hispid in tufts; vent apical, fringed; texture (?); colour, alive, white or dull purple; ectosomal skeleton of longitudinally-placed oxea, with tufts of small oxea; skeleton of chamber layer of triradiates; endosomal skeleton of quadriradiates.

Spicules: oxea, longitudinally-placed, 1·18 by 0·06 mm.,
oxea, of tufts, 0·11 by 0·01 mm.,



Text-fig. 316. *Sycute dendyi* after Kirk: external form, natural size; spicules, × 150.

triradiates, of chamber layer, sagittal, paired rays 0·13 by 0·015 mm., basal ray 0·23 by 0·018 mm.,

endosomal quadriradiates, sagittal, paired rays 0·08 by 0·008 mm., basal ray 0·14 by 0·01 mm., apical ray (?).

Distribution: New Zealand (Cook Straits, Hokianga Heads).

Named form: **Aphroceras elongata** (Schuffner)

Leucandra elongata Schuffner, 1877: 418, pl. xxv, fig. 7; *Aphroceras elongata*, Dendy and Row, 1913: 777.

Description: Sponge solitary, tubular, substipitate, broader above than below; surface smooth; vent terminal, naked; texture soft; colour, in spirit, white to greyish-yellow; ectosomal skeleton a tangential layer of triradiates, with longitudinally-placed oxea; skeleton of chamber layer of irregularly-scattered triradiates and centrifugally-directed basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·13 by 0·009 mm., basal rays 0·29 by 0·013 mm.,

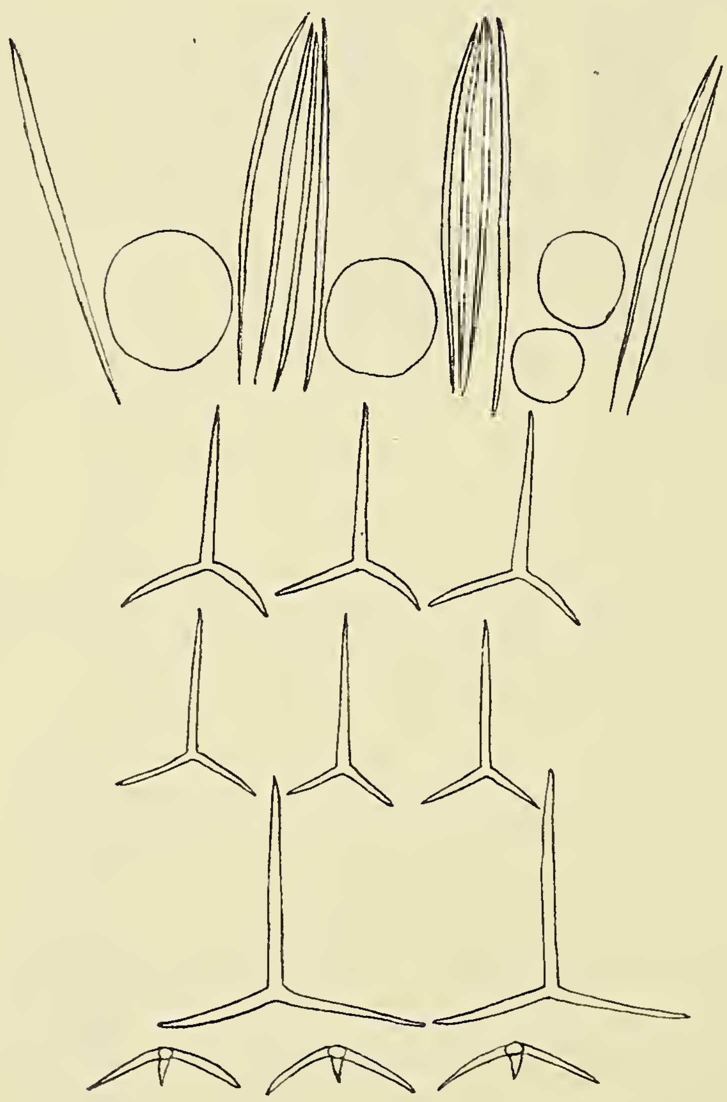
oxea, 1·5 by 0·06 mm.,

triradiates of chamber layer similar to those of ectosomal skeleton,

subendosomal sagittal triradiates (?),

endosomal quadriradiates, sagittal, similar to triradiates of chamber layer, with apical rays 0·06 mm. long.

Distribution: Norway.



Text-fig. 317. *Sycute dendyi* after Kirk: schematic representation of skeleton, × 100.

Named form: **Ute ensata** (Bowerbank)

Grantia ensata Bowerbank, 1858: 295; McAndrew, 1861: 236; Bowerbank, 1862: 772; Bowerbank, 1864: 29; Bowerbank, 1864: 29, pl. iv, fig. 85; *Ute ensata*, Schmidt, 1864: 23, pl. iii, fig. 1; *Grantia ensata* Bowerbank, 1866: 25; *Ute glabra*, Gray, 1867: 554; *U. ensata*, Gray, 1867: 555; *U. glabra*, Haeckel, 1870: 240; *U. ensata*, Haeckel, 1870: 240; *Sycandra glabra*, Haeckel, 1872: 349, pl. lvi, fig. 1, pl. lx, fig. 14; *Sycurus glaber*, Haeckel, 1872: 350; *Sycandra rigida* (= *S. glabra* var. *rigida*) Haeckel, 1872: 350; *S. ensata* (= *S. glabra* var. *ensata*), Haeckel, 1872: 350; *S. glabra*, Schmidt, 1875: 127, pls. viii–ix; *Grantia ensata* Bowerbank, 1874: 4, pl. ii, figs. 16–20; *Sycandra glabra*, Vosmaer, 1881: 5; *Grantia ensata* Bowerbank, 1882: 25, 232; *Ute glabra*, Marion, 1883: 79; Poléjaeff, 1883: 25; *Sycandra glabra*, Fristedt, 1885: 12, pl. ii, fig. 1; *Grantia ensata*, Koehler, 1886: 31, 34; Koehler, 1886: 299, 301; *Ute glabra*, Vosmaer, 1887: 372; Bianco, 1888: 386; Topsent, 1890: 232; Lendenfeld, 1891: 282, pl. xi, fig. 63; Topsent, 1891: 525; Topsent, 1891: 128; Topsent, 1892: 23; Hanitsch, 1894: 182; Topsent, 1894: 7; Heider, 1895: 285: Pruvot, 1895: 641; Pruvot, 1897: 587; Vanhöffen, 1897: 247; Breitfuss, 1898: 220; Bianco, 1899: 456; Radde, 1899: 518; Arnesen, 1901: 71; Arnesen, 1901: 23; Rousseau, 1903: 10; Bianco, 1909: 538; Arndt, 1912: 112; *U. ensata*, Dendy and Row, 1913: 763; *U. glabra*, Dendy and Row, 1913: 764; *U. rigida*, Dendy and Row, 1913: 764; *U. glabra*, Brøndstedt, 1914: 535; *U. ensata*, Ferrer, 1918: 260; *U. glabra*, Ferrer, 1918: 260; Derjugin, 1924: 63; Prenant, 1927: 7; Breitfuss, 1927: 30; Rezvoi, 1928: 73; Gislén, 1930: 351; Burton, 1930: 488; Burton, 1932: 167; *U. ensata*, Breitfuss, 1932: 248; *U. glabra*, Breitfuss, 1932: 249; Topsent, 1934: 10; Breitfuss, 1935: 26; Arndt, 1935: 16, fig. 20; Topsent, 1937: 1; Lévi, 1951: 4.

Description: Sponge tubular, elongate, sessile or substipitate; surface even, non-hispid; vent apical, naked; texture firm; colour, in spirit, white or yellowish-white; ectosomal skeleton a layer of longitudinally-placed oxea; tubar skeleton of row of triradiates and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of triradiates and quadriradiates.

Spicules: oxea, 1·0 to 3·0 by 0·05 to 0·07 mm.,
tubar triradiates, sagittal, paired rays 0·05 to 0·07 by 0·005 to 0·008 mm., basal ray 0·15 to 0·2 by 0·005 to 0·008 mm.,
subendosomal sagittal triradiates, paired rays 0·07 to 0·09 by 0·006 to 0·008 mm., basal ray 0·18 to 0·24 by 0·006 to 0·008 mm.,
endosomal triradiates, regular to sagittal, rays 0·04 to 0·3 by 0·005 mm.;
endosomal quadriradiates, similar to triradiates, apical ray 0·12 to 0·2 by 0·007 mm.

Distribution (*Summary*): Arctic; Atlantic coasts of Europe; Mediterranean; littoral to 366 m., on mud, sand, gravel, shells, rock.

Named form: **Leuconia gossei** (Bowerbank)

Leucogypsia gossei Bowerbank, 1862: 1092, pl. xxxii, fig. 4; Bowerbank, 1864: 165, pl. xxvi, figs. 349–350; *Leuconia gossei*, Schmidt, 1864: 8; *Leucogypsia gossei* Bowerbank, 1866: 42; Gray, 1867: 557; *Leuconia gossei*, Haeckel, 1870: 247; *Leucandra gossei*, Haeckel, 1872: 177, pl. xxxii, fig. 2, pl. xxxvii, figl 9; *Dyssycus gossei*, Haeckel, 1872: 178; *Dyssyconella gossei*, Haeckel, 1872: 178; *Lipostomella gossei*, Haeckel, 1872: 178; *Amphoriscus gossei*, Haeckel, 1872: 178; *Amphorula gossei*, Haeckel, 1872: 178; *Coenostomus gossei*, Haeckel, 1872: 178; *Coenostomella gossei*, Haeckel, 1872: 178; *Aphroceras gossei*, Haeckel, 1872: 178, pl. xxxvii, fig. 9; ? *Leuconia nivea*, M'Intosh, 1874: 143; *Leucogypsia gossei* Bowerbank, 1874: 13, pl. vi, figs. 6–8; Bowerbank, 1882: 26; Koehler, 1886: 53; Koehler, 1886: 360; *Leuconia gossei*, Topsent, 1891: 128; Topsent, 1891: 526; *Leucandra gossei*, Hanitsch, 1894: 182; Breitfuss, 1898: 98; Dendy and Row, 1913: 770; Prenant, 1927: 6; Breitfuss, 1929: 265; *Leuconia gossei*, Burton, 1932: 167; Moore, 1937: 33; *Leucandra gossei*, Topsent, 1937: 9; Arndt, 1941: 47; *Leuconia gossei*, Lévi, 1950: 4.

[*Leucogypsia algoaensis* Bowerbank, 1864: 166, is probably a synonym of *Leuconia gossei*.]

Description: Sponge irregularly massive, sessile; surface uneven, irregularly subcerebriform, non-hispid; vents on upper surface, subfistulose, naked; texture firm; colour, alive and in spirit, white or yellowish white; ectosomal skeleton a tangential layer of triradiates, with oxea, not projecting beyond surface; skeleton of chamber layer of irregularly-arranged triradiates, rarely quadriradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, regular or subregular, rays 0·07 to 0·1 by 0·007 to 0·009 mm.,
oxea, 0·7 to 1·2 by 0·05 to 0·07 mm.,
ectosomal microxea present,
triradiates of chamber layer, regular or subregular rays 0·07 to 0·2 (rarely 0·3) by 0·007 to 0·028 mm.,
quadriradiates of chamber layer, similar to triradiates, with apical ray 0·05 to 0·1 by 0·01 mm.,
endosomal quadriradiates, regular: facial rays 0·1 to 0·12 by 0·007 to 0·01 mm., apical ray 0·1 to 0·2 by 0·01 mm.

Distribution (Summary): British Isles; Atlantic coasts of France and Portugal; littoral, at extreme low-water springs, under stones (always?).

Named form: **Leucandra haurakii** Brøndsted

Leucandra haurakii Brøndsted 1926: 311; Tanita, 1942: 126, pl. vii, fig. 14, text-fig. 7.

Description: Sponge tubular; surface uneven, slightly hispid; vent apical; texture firm; colour, in spirit, grey; ectosomal skeleton a sparse layer of tangential triradiates, with large oxea implanted obliquely in choanosome with distal ends projecting at surface; choanosomal skeleton of triradiates, rarely quadriradiates, with traces of a tubar skeleton; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates (dimensions presumably as in choanosomal spicules),
oxea, 0·6 to 1·0 by 0·04 mm.,
triradiates of choanosome, regular to sagittal, rays 0·15 to 0·25 by 0·013 mm.,
quadriradiates, similar to triradiates, with apical ray from 'vestigial' to 0·05 mm. long,
endosomal quadriradiates, facial rays 0·12 to 0·13 by 0·011 mm., apical ray up to 0·05 mm.

Distribution: New Zealand (Hauraki Gulf); Tierra del Fuego; 9 m.

Named form: **Leucandra hozawai** Tanita

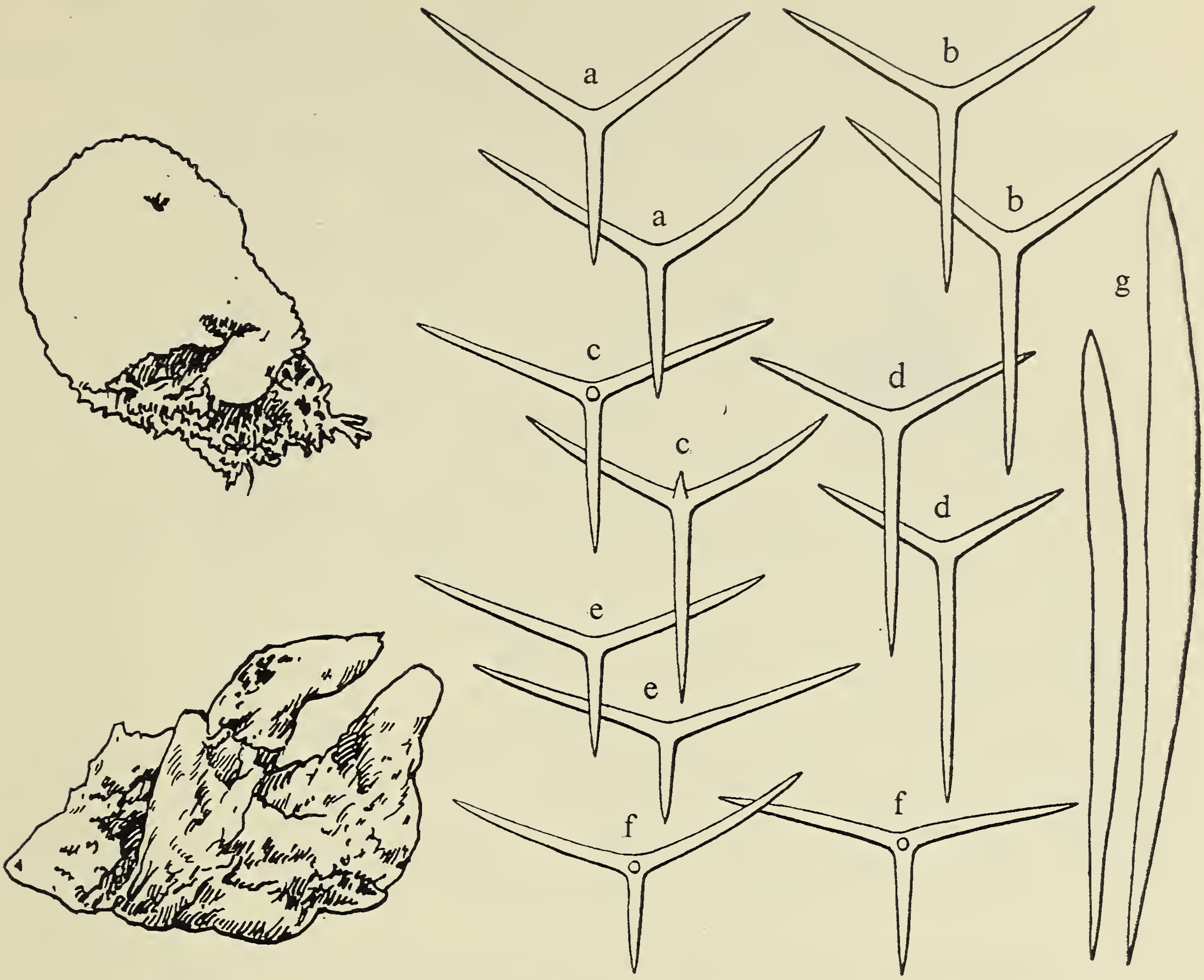
(text-fig. 318)

Leucandra hozawai Tanita, 1942: 48, pl. iv. fig. 22, text-fig. 8; Tanita, 1943: 432, pl. xvi, figs. 59–60.

Description: Sponge oval; surface hispid; vent apical, fringed; texture hard, elastic; colour, in spirit, white; ectosomal skeleton of a few tangential layers of triradiates, with oxea projecting at surface; skeleton of chamber layer of triradiates irregularly arranged, together with basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and tangential layers of endosomal triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·13 to 0·19 by 0·01 to 0·014 mm., basal ray 0·08 to 0·13 by 0·01 to 0·014 mm.,
oxea, 0·43 to 1·4 by 0·04 to 0·07 mm.,
triradiates of chamber layer, subregular, rays 0·16 to 0·25 by 0·012 to 0·018 mm.,
subendosomal sagittal triradiates, paired rays 0·13 to 0·22 by 0·014 to 0·017 mm., basal ray 0·18 to 0·29 by 0·014 to 0·017 mm.,
endosomal triradiates, sagittal, paired rays 0·22 to 0·28 by 0·012 mm., basal ray 0·12 to 0·14 by 0·012 mm.,
endosomal quadriradiates, similar to triradiates, 0·05 to 0·06 by 0·01 to 0·012 mm.

Distribution: Japan (several localities); 18 m.



Text-fig. 318. *Leucandra hozawai* after Tanita: spicules, $\times 100$; external form (after Tanita, 1943), upper specimen, $\times\frac{5}{3}$, lower specimen, $\times\frac{5}{6}$. a. ectosomal triradiates; b. tubar triradiates; c. quadriradiates of larger exhalant canals; d. subendosomal triradiates; e. endosomal triradiates; f. endosomal quadriradiates; g. oxea.

Named form: **Leucandra impigra** Tanita

(text-fig. 319)

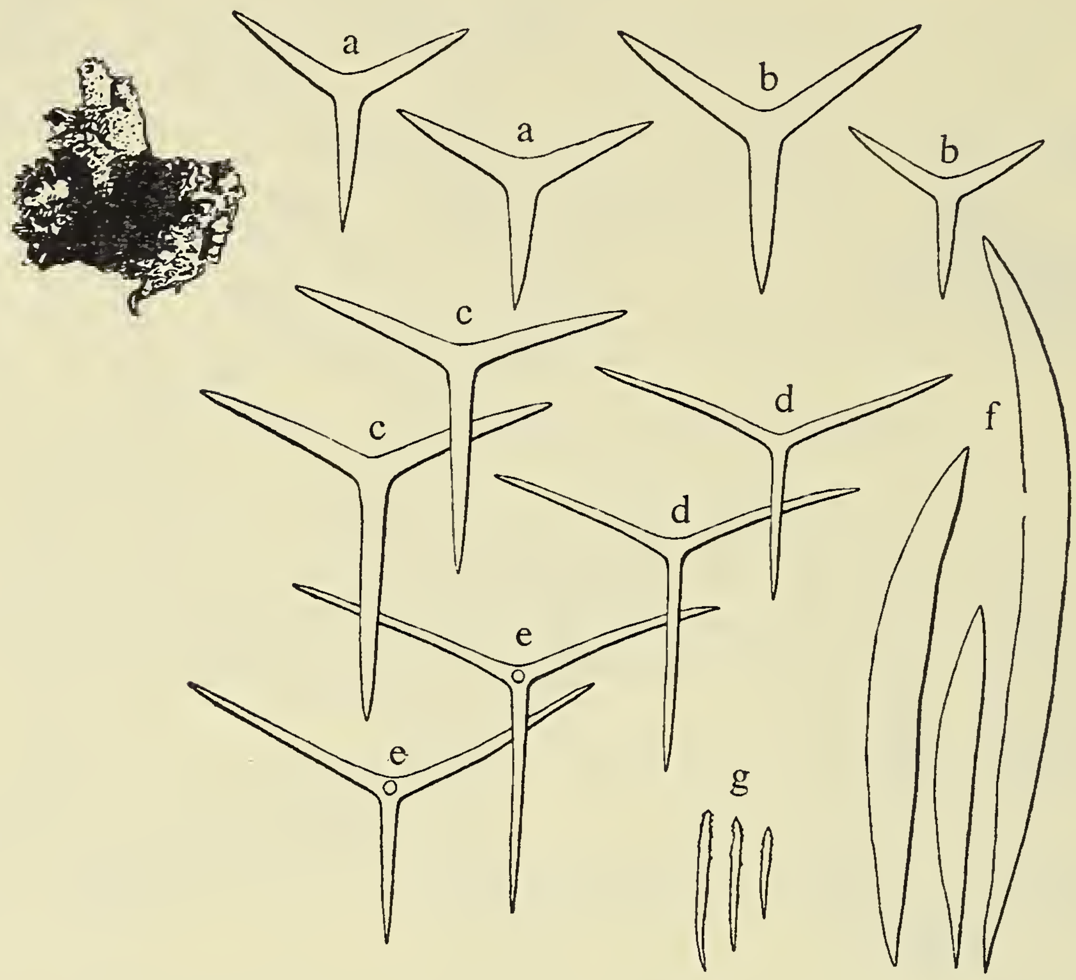
Leucandra impigra Tanita, 1942: 50, pl. iv, fig. 23, text-fig. 9; Tanita, 1943: 442, pl. xvii, fig. 66.

Description: Sponge tubular; surface strongly hispid; vent apical, slightly fringed; texture very hard; colour, in spirit, dirty white; ectosomal skeleton of a few tangential layers of triradiates, with scattered microxea and large oxea projecting at surface; skeleton of chamber layer of irregularly-arranged triradiates; together with basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and tangentially-arranged triradiates and quadriradiates, and microxea.

Spicules: ectosomal triradiates, subregular, rays 0·085 to 0·16 by 0·014 to 0·022 mm.,
oxea, 0·8 to 1·7 by 0·04 to 0·12 mm.,
microxea, 0·055 to 0·08 by 0·004 to 0·006 mm.,
triradiates of chamber layer similar to ectosomal triradiates,

subendosomal sagittal triradiates, paired rays 0·1 to 0·16 by 0·014 to 0·022 mm., basal ray 0·12 to 0·18 by 0·014 to 0·022 mm.,
endosomal triradiates, paired rays 0·13 to 0·21 by 0·01 to 0·012 mm., basal ray 0·15 to 0·185 by 0·01 to 0·012 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·04 by 0·008 mm.

Distribution: Japan (several localities).



Text-fig. 319. *Leucandra impigra* after Tanita: spicules, ×100, except f and g, which are ×40 and ×160 respectively; external form, $\times\frac{4}{3}$.
a. ectosomal triradiates; b. tubar triradiates; c. subendosomal triradiates; d. endosomal triradiates; e. endosomal quadriradiates; f. oxea; g. microxea.

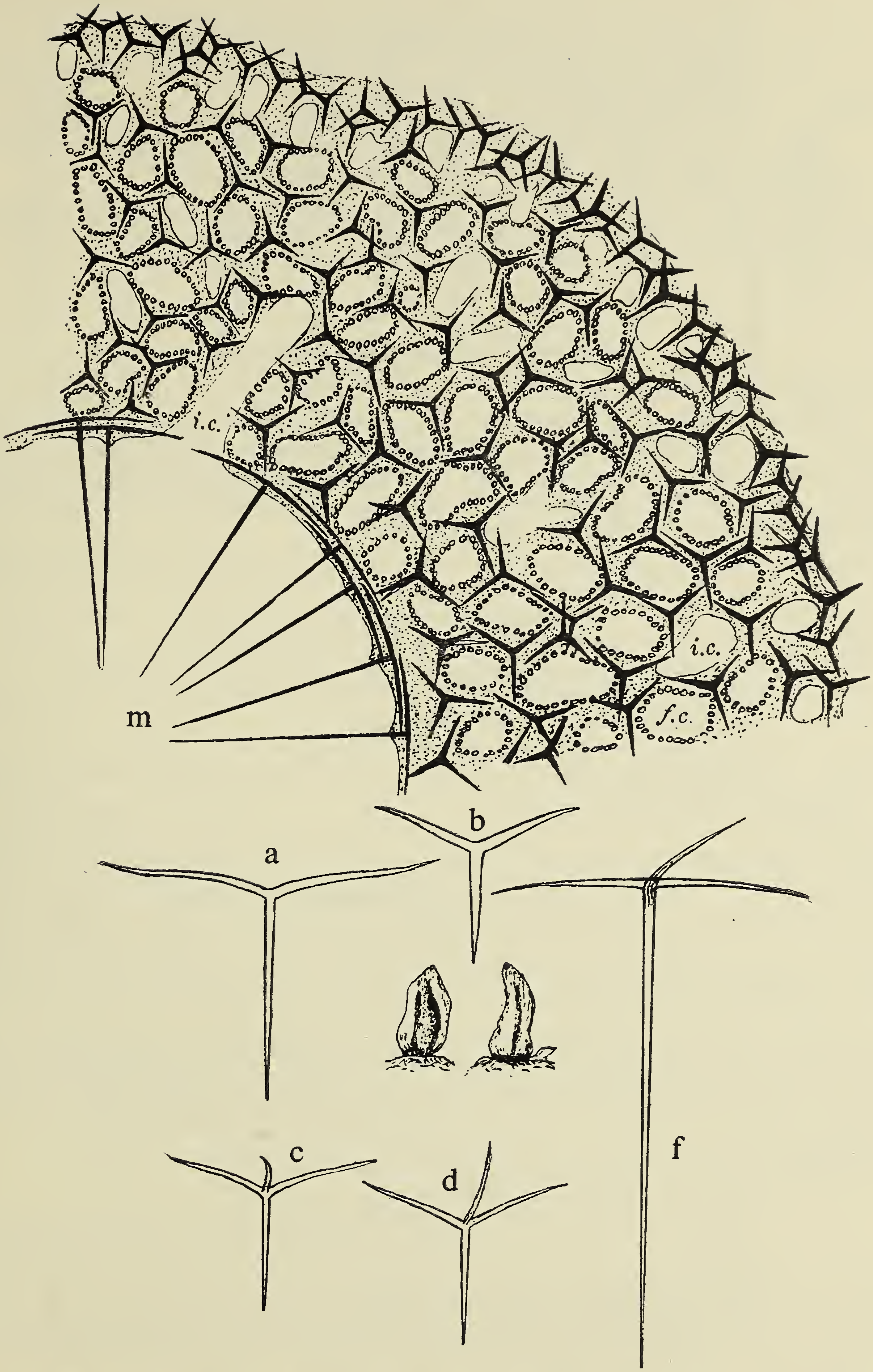
Named form: **Leucaltis impressa** Hanitsch

(text-fig. 320)

Leucaltis impressa Hanitsch, 1890: 234, pl. xv, figs. 1–3; *Leucandra cliarensis* Stephens, 1912: 14, pl. i, figs. 1–6; *L. impressa*, Dendy and Row, 1913: 774; *Aphroceras cliarensis*, Dendy and Row, 1913: 777.

Description: Sponge cylindrical or oval, with apical vent, or irregularly massive with several vents; surface even, mainly non-hispid; oscules naked; texture hard; colour, alive and in spirit, white; ectosomal skeleton a tangential layer of oxea, with brushes of microxea at right angles to surface; skeleton of chamber layer of irregularly arranged triradiates, rarely quadriradiates, and subendosomal sagittal triradiates and quadriradiates; endosomal skeleton a tangential layer of quadriradiates and triradiates.

Spicules: oxea, up to 1·3 by 0·05 to 0·07 mm.,
microxea, 0·1 to 0·18 by 0·003 mm.,
triradiates of chamber layer, sagittal, paired rays 0·1 to 0·14 by 0·01 to 0·013 mm. basal ray 0·12 to 0·16 by 0·01 to 0·013 mm.,



Text-fig. 320. *Leucaltis impressa* after Hanitsch, from the original by Hanitsch: a–d. 'triacts and tetracts of the body wall', f. 'gastral tetract', ×150; section through body wall, ×80; external form, natural size.

quadriradiates of chamber layer, sagittal, paired rays 0·08 to 0·1 by 0·01 mm., basal ray 0·1 to 0·15 by 0·01 mm., apical ray 0·03 by 0·01 mm.,
subendosomal sagittal triradiates and quadriradiates similar to radiates of chamber layer, but with basal ray 0·225 mm. long,
endosomal quadriradiates, sagittal, paired rays 0·1 to 0·14 by 0·01 to 0·012 mm., basal ray 0·13 to 0·25 by 0·008 mm., apical ray 0·02 to 0·37 by 0·013 to 0·02 mm.

Distribution: Puffin Island, off N.W. England; Ireland; littoral zone.

Remarks: There can be no doubt that *Leucaltis impressa* is an individual of the better-known *Aphroceras cliarensis* in which oxea are lacking. It has been judged advisable to give here the description of the latter species, since it contains the more normal spiculation.

Named form: **Vosmaeropsis inflata** Tanita

Vosmaeropsis inflata Tanita, 1942: 113, pl. vi, fig. 8, text-fig. 2.

Description: Sponge small, irregularly massive; surface smooth; vent apical, naked; texture soft; colour, in spirit, yellowish-white; ectosomal skeleton of a few tangential layers of triradiates, together with paired rays of subectosomal pseudosagittal triradiates; tubar skeleton of basal rays of subectosomal triradiates and of irregularly-arranged tubar triradiates; endosomal skeleton of tangentially-arranged triradiates and quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·2 to 0·265 by 0·018 to 0·023 mm., basal ray 0·13 to 0·21 by 0·018 to 0·023 mm.,
subectosomal pseudosagittal triradiates, paired rays unequal, 0·15 to 0·26 by 0·02 to 0·025 mm., basal ray 0·23 to 0·3 by 0·02 to 0·025 mm.,
tubar triradiates, subregular, rays 0·25 to 0·33 by 0·025 to 0·034 mm.,
endosomal triradiates, sagittal, paired rays 0·19 to 0·26 by 0·012 to 0·015 mm., basal ray 0·09 to 0·14 by 0·012 to 0·015 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·08 to 0·13 by 0·008 to 0·01 mm.

Distribution: Chile (Puntas Arenas).

Named form: **Leuconia lendenfeldi** Breitfuss

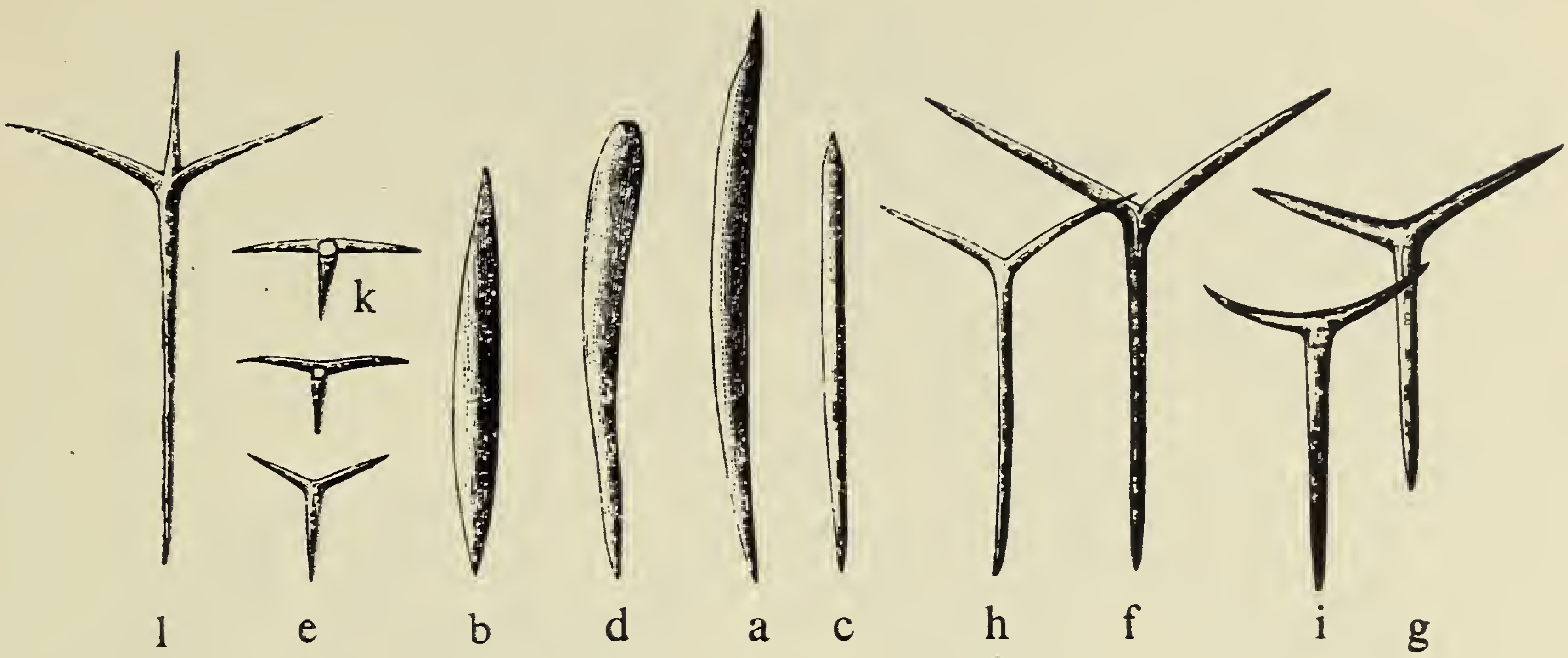
(text-fig. 321)

Leuconia lendenfeldi Breitfuss, 1898: 208, fig. 2; *Leucortis elegans* Lendenfeld [in] Breitfuss, 1898: 208; *Leucandra lendenfeldi*, Dendy and Row, 1913: 771.

Description: Sponge encrusting; surface smooth, convoluted; vents few, scattered, naked; texture firm; colour, in spirit, greyish-brown; ectosomal skeleton of a tangential layer of triradiates, with oxea of two sizes projecting from surface; skeleton of chamber layer of irregularly-arranged triradiates; endosomal skeleton a tangential layer of quadriradiates, with occasional triradiates.

Spicules: ectosomal triradiates, regular, rays 0·085 by 0·009 mm.,
oxea, 0·54 to 0·85 by 0·032 to 0·053 mm.,
triradiates of chamber layer, sagittal or regular, rays 0·17 to 0·52 by 0·009 to 0·038 mm.,
endosomal quadriradiates, regular, facial rays 0·14 to 0·18 by 0·009 to 0·013 mm., apical ray 0·057 by 0·009 to 0·013 mm.,
endosomal triradiates, subregular, rays 0·17 to 0·21 by 0·009 to 0·015 mm.

Distribution: East coast of Australia.



Text-fig. 321. *Leuconia lendenfeldi* after Breitfuss: spicules, ×100. a–d. diacts; e. ectosomal triradiate; f–i. triradiates of chamber layer; k. quadriradiates from the larger exhalant canals; l. occasional quadriradiate in the chamber layer.

Named form: **Leucandra mitsukurii** Hozawa

(text-fig. 322)

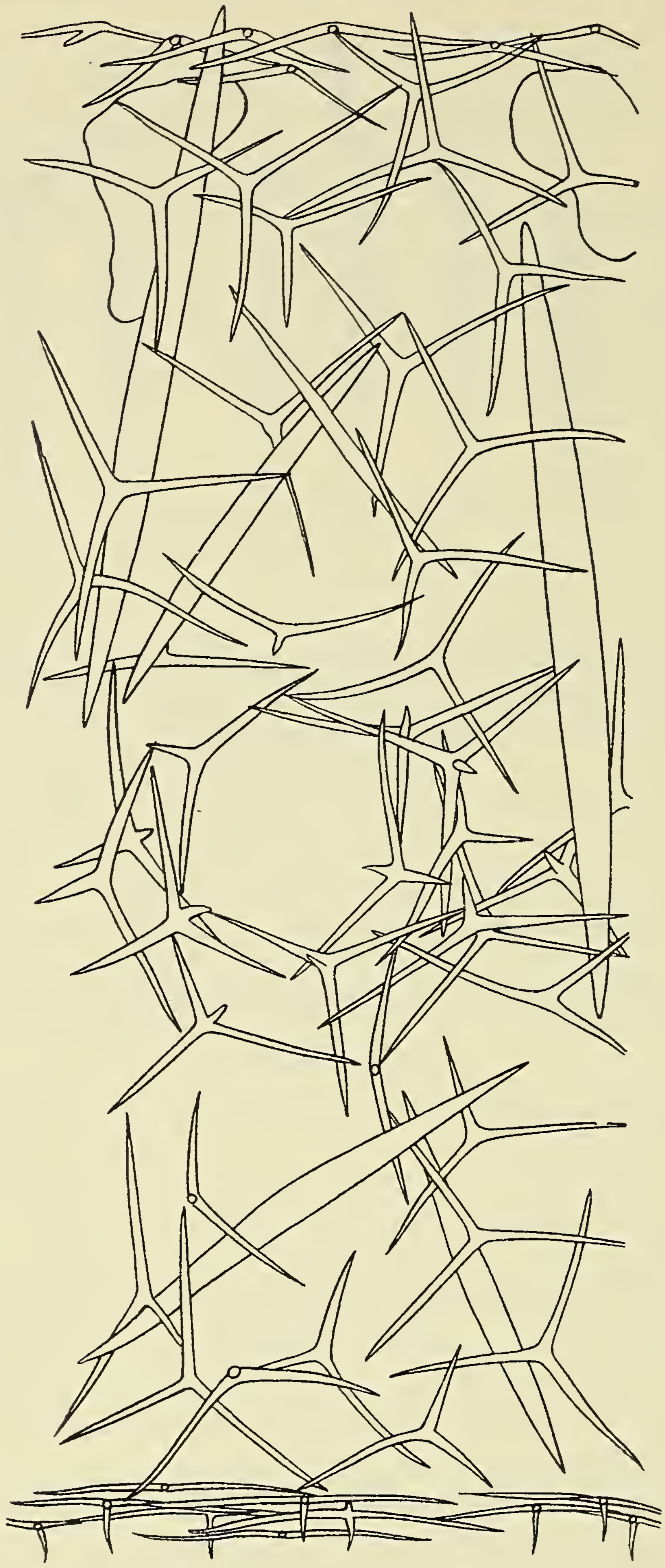
Leucandra mitsukurii Hozawa, 1929: 350, pl. xix, figs. 50–52, text-fig. 26; Tanita, 1942: 55; Tanita, 1943: 443, pl. xvii, fig. 67.

Description: Sponge ranging from small, sac-shaped and laterally compressed to large and irregularly ovoid or spherical; surface uneven, smooth; vents, one or more at summit of body, circular, oval or slit-like; texture compact, hard; colour, in spirit, greyish-white; ectosomal skeleton of a layer of tangential triradiates; skeleton of chamber layer of triradiates and oxea irregularly arranged; exhalant canals lined by quadriradiates; endosomal skeleton of tangential triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sub-regular rays 0·07 to 0·22 by 0·008 to 0·016 mm.,
oxea, 0·5 to 1·8 by 0·03 to 0·1 mm.,
triradiates of chamber layer, sagittal, paired rays 0·1 to 0·21 by 0·012 to 0·02 mm., basal ray 0·08 to 0·2 by 0·012 to 0·02 mm.,
quadriradiates of exhalant canals, similar to triradiates of chamber layer, apical ray 0·016 to 0·08 by 0·008 to 0·026 mm.,
endosomal triradiates, sagittal, paired rays 0·15 to 0·28 by 0·02 mm., basal ray 0·07 to 0·15 by 0·016 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·05 by 0·012 mm.

Distribution: Japan (Misaki, Simoda, Tomioka).

Remarks: The spiculation is very like that of *Ute ensata* (Bowerbank), except for the form of the endosomal quadriradiates and the disposition of the large oxea. The external form is, on the contrary, atypical and it can only be supposed that it represents a modified form of the massive specimens, such as that figured by Stephens (1912) under *Leucandra cliarensis*.



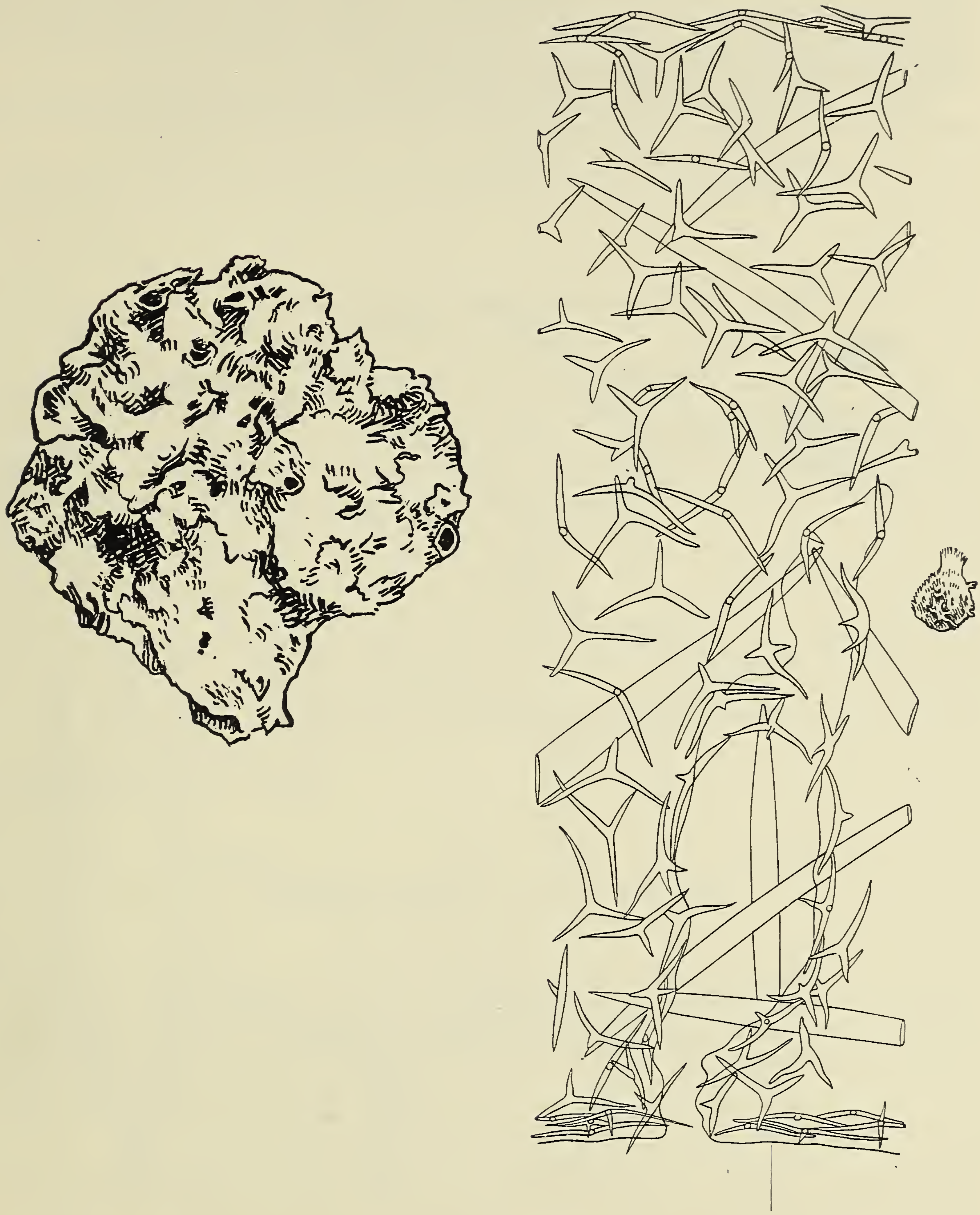
Text-fig. 322. *Leucandra mitsukurii* after Hozawa: section of body wall at right angles to surface, ×50.

Named form: **Leucandra multituba** Hozawa

(text-fig. 323)

Leucandra multituba Hozawa, 1929: 365, pl. xxi, figs. 61, 62, text-fig. 31; Tanita, 1942: 55, pl. iv, fig. 25; Tanita, 1943: 444, pl. xvii, figs. 68–69.

Description: Sponge a hemispherical mass of oval individuals fused at their bases, each bearing an apical vent; surface corrugated, hispid; fringe round vent well-developed; texture firm,



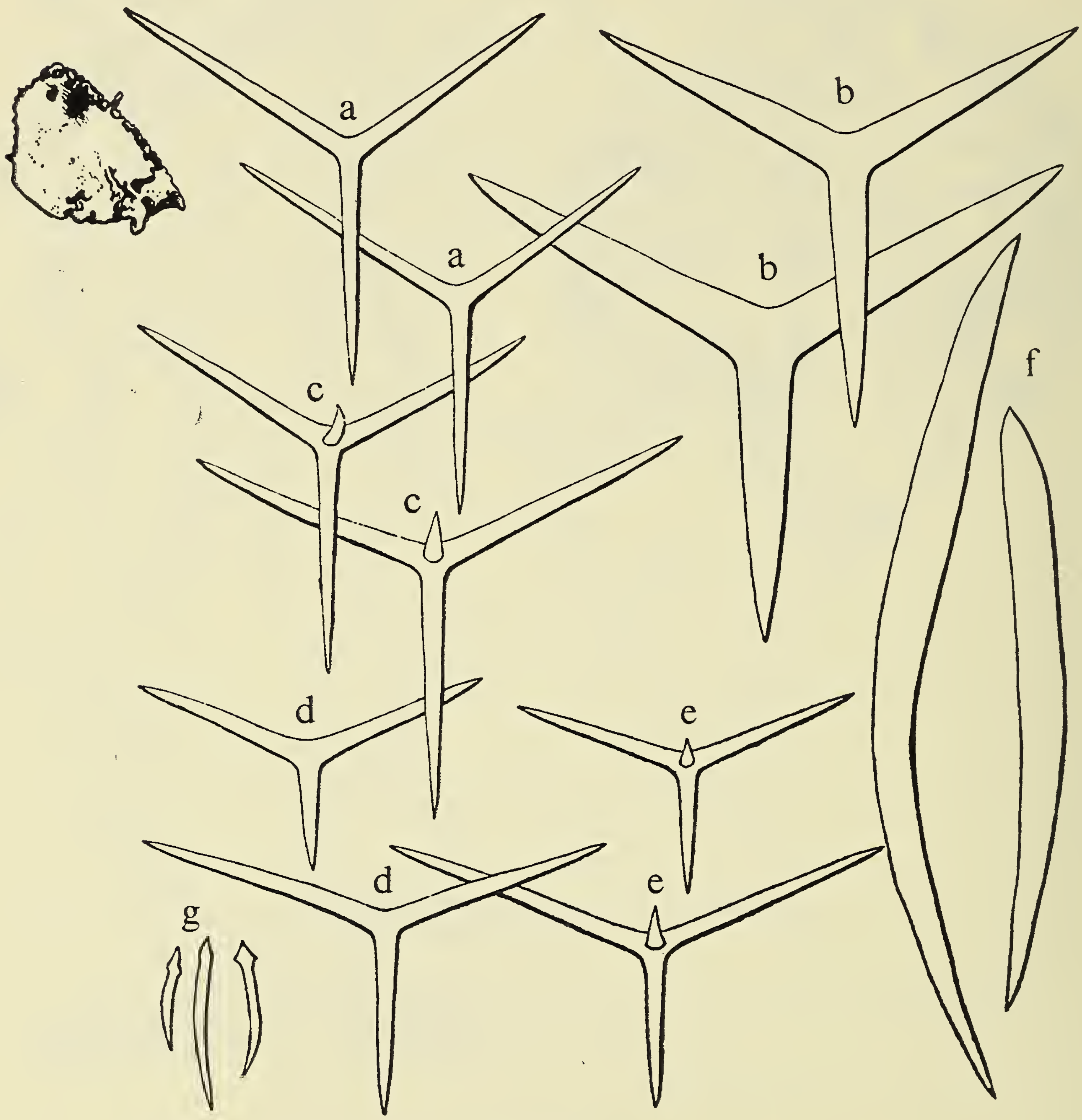
Text-fig. 323. *Leucandra multituba* after Hozawa: section at right angles to surface, ×50; external form left, holotype; right, Tanita's (1943) specimen, both natural size.

elastic; colour, in spirit, brownish-white; ectosomal skeleton of one or two layers of tangential triradiates, numerous microxea set at right angles to surface, and with occasional oxea from chamber layer projecting through surface; skeleton of chamber layer of triradiates and oxea irregularly scattered; exhalant canals lined with quadriradiates; endosomal skeleton of one or two layers of tangential triradiates, with a few quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·08 to 0·19 by 0·012 to 0·024 mm., basal ray 0·08 to 0·17 by 0·022 to 0·023 mm.,

microxea, 0·08 to 0·1 by 0·004 mm.,

oxea of chamber layer, 0·7 to 2·8 by 0·05 to 0·15 mm.,



Text-fig. 324. *Leucandra nakamurai* after Tanita: spicules, ×100, except for microxea g., which are ×200; external form, ×2.
a. ectosomal triradiates; b. tubar triradiates; c. quadriradiates of larger exhalent canals; d. endosomal triradiates; e. endosomal quadriradiates; f. oxea; g. microxea.

triradiates of chamber layer, sagittal, paired rays 0·13 to 0·23 by 0·012 to 0·036 mm., basal ray 0·1 to 0·21 by 0·012 to 0·03 mm.,
quadriradiates of exhalant canals, similar to triradiates of chamber layer, apical ray 0·05 to 0·08 by 0·016 to 0·02 mm.,
endosomal triradiates, sagittal, paired rays 0·17 to 0·27 by 0·02 to 0·028 mm., basal ray 0·08 to 0·12 by 0·016 to 0·024 mm.,
endosomal quadriradiates, similar to triradiates, apical ray 0·03 to 0·06 by 0·016 to 0·02 mm.

Distribution: Japan (several localities); littoral.

Named form: **Leucandra nakamurai** Tanita

(text-fig. 324)

Leucandra nakamurai Tanita, 1942: 56, pl. iv, fig. 26, text-fig. 11; Tanita, 1943: 444.

Description: Sponge massive (? tubular), laterally compressed; surface papillate (?), hispid; vent apical, naked; texture rigid; colour, in spirit, yellowish-white; ectosomal skeleton of a few tangential layers of triradiates, with sparse oxea projecting from surface and with scattered microxea; skeleton of chamber layer of densely scattered triradiates; endosomal skeleton of a few layers of tangentially-arranged triradiates and quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·17 to 0·35 by 0·016 to 0·03 mm.,
oxea, 0·5 to 0·85 by 0·045 to 0·06 mm.,
microxea, 0·06 to 0·09 by 0·004 to 0·006 mm.,
triradiates of chamber layer, regular, rays 0·18 to 0·35 by 0·03 to 0·06 mm.,
endosomal triradiates, sagittal, paired rays 0·19 to 0·28 by 0·015 to 0·02 mm., basal ray 0·12 to 0·22 by 0·015 to 0·02 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·035 to 0·06 by 0·015 mm.

Distribution: Japan (Shimoda).

Named form: **Vosmaeropsis oruetai** Ferrer

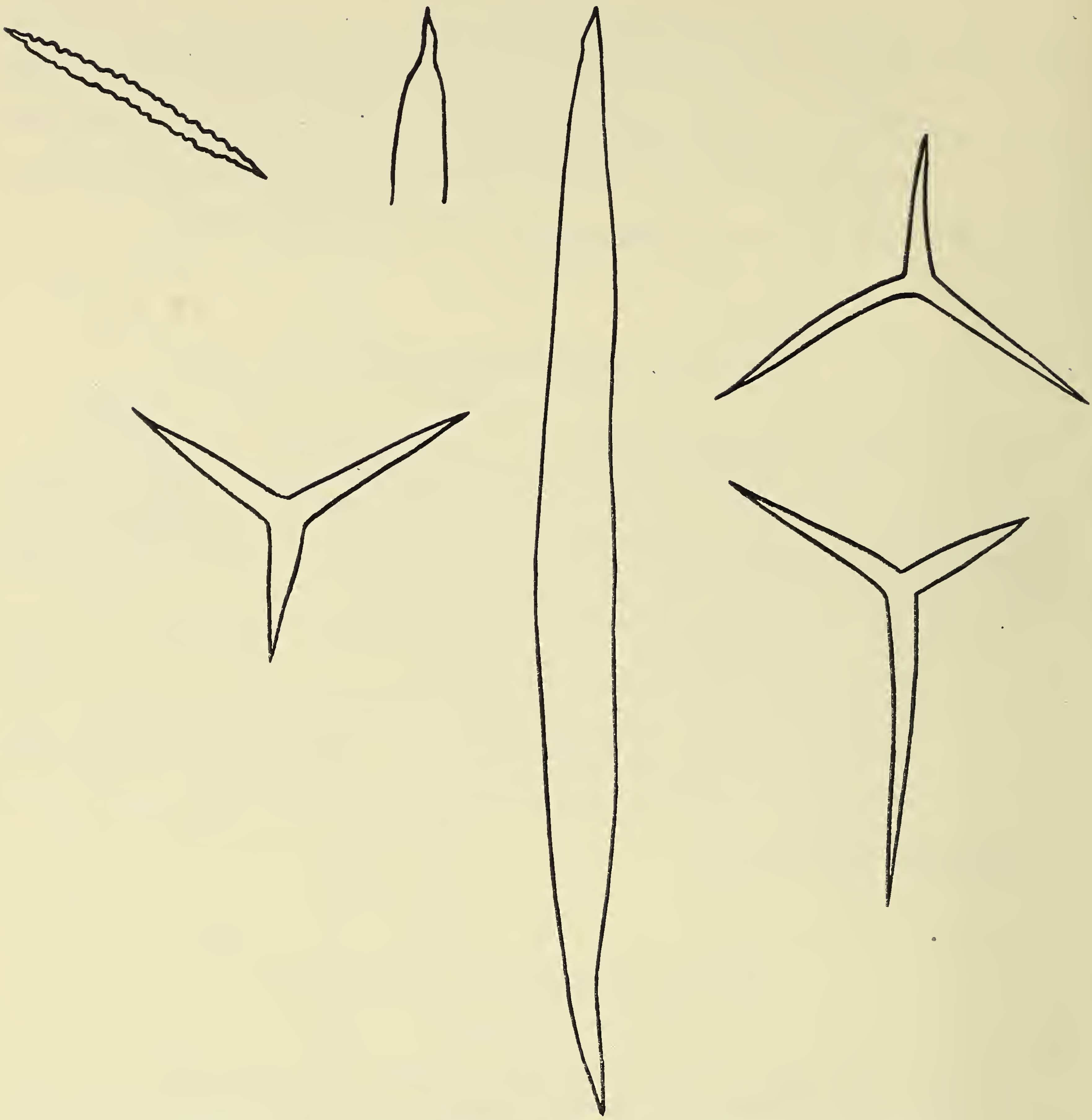
(text-fig. 325)

Vosmaeropsis oruetai Ferrer, 1918: 13, fig. 2; *Aphroceras oruetai* Ferrer, 1922: 248.

Description: (External form similar to that of *Leuconia aspera*); ectosomal skeleton of tangentially-arranged triradiates, paired rays of subectosomal pseudosagittal triradiates, oxea and microxea; skeleton of chamber layer of triradiates and (?) subendosomal triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·2 to 0·3 by 0·003 mm.,
oxea, 1·4 by 0·015 mm.,
microxea, 0·05 by 0·003 mm.,
subectosomal pseudosagittal triradiates, outer rays 0·1 to 0·2 by 0·005 mm., centripetal ray 0·24 by 0·005 mm.,
tubar triradiates, subregular, rays 0·24 by 0·005 mm.,
subendosomal sagittal triradiates, (?) indistinguishable from tubar triradiates,
endosomal quadriradiates, similar to tubar triradiates, with apical ray 0·16 mm. long.

Distribution: Spain (Santander, Asturias); littoral.



Text-fig. 325. *Vosmaeropsis oruetai* after Ferrer: spicules, ×100, except for microxeote (top left), which is ×880.

Named form: **Ute pedunculata** Hozawa

(text-fig. 326)

Ute pedunculata Hozawa, 1929: 334, pl. xvii, figs. 40, 41, text-fig. 21; Tanita, 1942: 45, pl. iii, fig. 19; Tanita, 1943: 430.

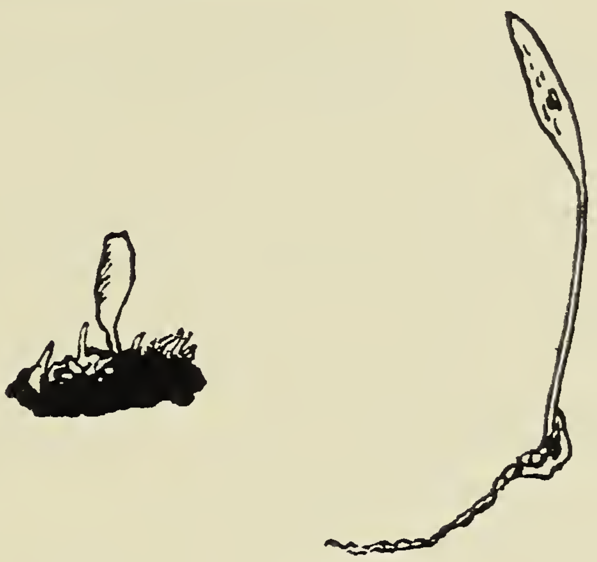
Description: Sponge composed of a spindle-shaped body with a long stalk; surface striated longitudinally, finely hispid; vent apical, naked; texture delicate; colour, in spirit, white; ectosomal skeleton of tangential triradiates, longitudinal oxea and tufts of hair-like oxea projecting from surface; tubar skeleton of centrifugally-directed rays of subendosomal triradiates, with several

[*Vosmaeropsis ovata* (see p. 279) should have been included here.]

rows of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates with a few layers of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·03 to 0·07 by 0·006 to 0·008 mm., basal rays 0·07 to 0·22 by 0·006 to 0·008 mm.,
oxea, 0·33 to 0·5 by 0·008 to 0·016 mm.,
hair-like oxea, 0·2 by 0·002 mm.,
tubar triradiates, sagittal, paired rays 0·05 to 0·07 by 0·006 to 0·008 mm., basal rays 0·07 to 0·17 by 0·006 mm.,
subendosomal triradiates, sagittal, paired rays 0·07 by 0·008 mm., basal ray 0·2 by 0·008 mm.,
endosomal quadriradiates, sagittal, paired rays 0·05 to 0·08 by 0·006 to 0·008 mm., basal ray 0·16 to 0·21 by 0·004 to 0·008 mm.,
endosomal triradiates (dimensions not recorded: presumably similar to quadriradiates).

Distribution: Japan (Sagami Sea); 114–183 m.



Text-fig. 326. *Ute pedunculata* Hozawa: holotype (right), natural size; Tanita's (1942) specimen, left, ×2.

Named form: **Synute pulchella** Dendy

Synute pulchella Dendy, 1892: 1; Dendy, 1892: 96; Dendy and Row, 1913: 764.

Description: Sponge composed of anastomosing, nearly vertical, lamellae; surface even, striated; vents small, in linear series on upper margins of lamellae; texture firm; colour, in spirit, greyish-white; ectosomal skeleton of longitudinally-arranged oxea, tangential triradiates, and microxea set at right angles to surface; tubar skeleton of subendosomal sagittal triradiates and several layers of tubar triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of quadriradiates and triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·072 by 0·01 mm., basal ray 0·05 to 0·09 by 0·01 mm.,
oxea, 3·0 by 0·14 mm.,
microxea, 0·07 by 0·003 mm.,
tubar triradiates, sagittal to regular, paired rays 0·084 by 0·01 mm., basal ray 0·07 to 0·14 by 0·01 mm.,
subendosomal sagittal triradiates, paired rays 0·084 by 0·01 mm., basal ray 0·14 by 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·15 by 0·014 mm., basal ray 0·084 by 0·014 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·056 by 0·014 mm.

Distribution: Australia (Port Phillip Heads); depth unknown.

Named form: **Heteropia ramosa** (Carter)

Aphroceras ramosa Carter [in] Higgin, 1886: 92; *Heteropia ramosa*, Dendy and Row, 1913: 754.

Description: Sponge ramose, sessile; surface even, non-hispid; vents terminal, naked; texture firm; colour, in spirit, whitish-yellow; ectosomal skeleton a tangential layer of small triradiates and large, longitudinally-placed oxea; skeleton of chamber layer of triradiates; endosomal skeleton a tangential layer of small triradiates and (near vent only?) large quadriradiates.

Spicules: ectosomal triradiates, sagittal, small (dimensions not recorded),
oxea, 2·8 by 0·11 mm.,
triradiates of chamber layer, sagittal, paired rays 0·25 by 0·014 mm., basal ray 0·16 by 0·014 mm.,
endosomal triradiates, sagittal, small, similar to ectosomal triradiates,
endosomal quadriradiates, sagittal, paired rays 0·25 by 0·014 mm., basal ray 0·16 by 0·014 mm., apical ray 0·042 by 0·014 mm.

Distribution: British Isles.

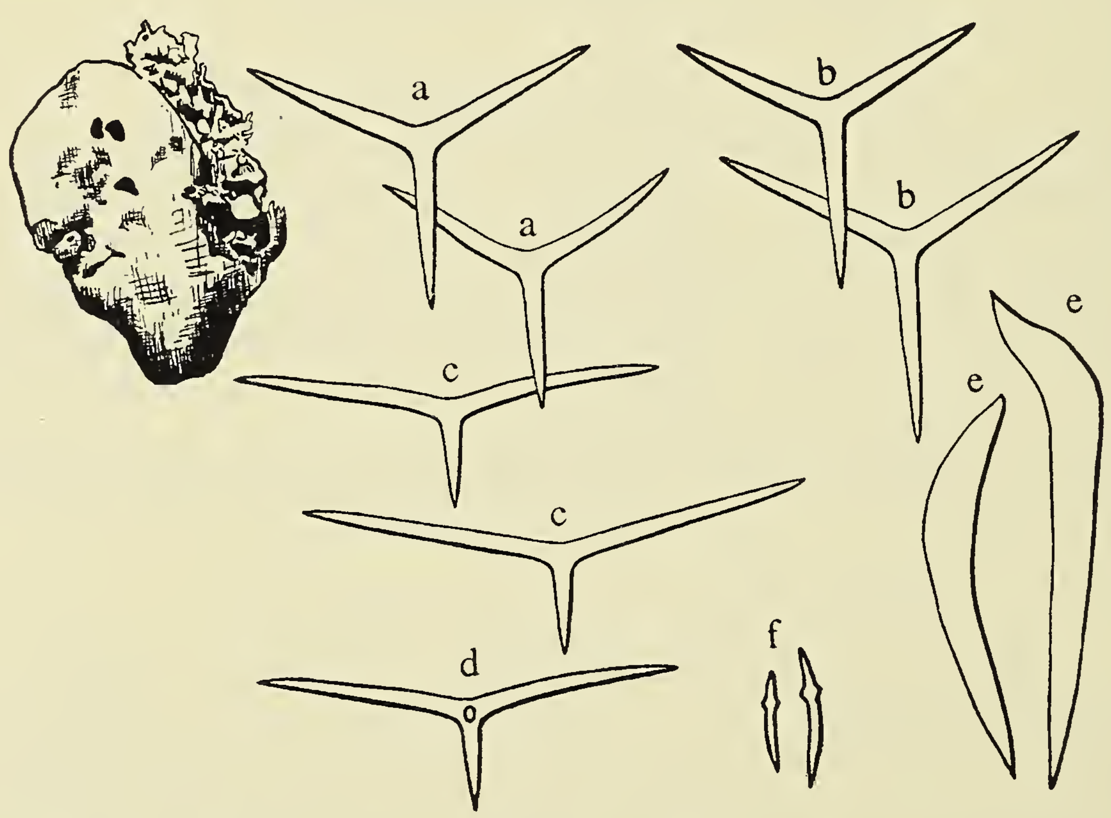
Named form: **Leucandra reniformis** Tanita

(text-fig. 327)

Leucandra reniformis Tanita, 1943: 128, pl. vii, fig. 15, text-fig. 8.

Description: Sponge massive, oval, dorso-ventrally compressed; surface slightly hispid; vents small, naked, grouped on upper surface; texture firm, elastic; colour, in spirit, nearly white; ectosomal skeleton a few tangential layers of triradiates, with oxea projecting at surface and densely-packed microxea; skeleton of chamber layer of triradiates irregularly arranged; endosomal skeleton of tangential layers of tri- and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·1 to 0·18 by 0·013 to 0·018 mm.,
oxea, 0·23 to 0·45 by 0·028 to 0·045 mm.,
microxea, 0·06 to 0·07 by 0·006 mm.,
triradiates of chamber layer similar to ectosomal triradiates,



Text-fig. 327. *Leucandra reniformis* after Tanita: spicules, × 100. except for microxea (f) which are × 180; external form, × 2.
Spicules: a. ectosomal triradiates; b. tubar triradiates; c. endosomal triradiates; d. endosomal quadriradiates; e. oxea; f. microxea.

endosomal triradiates, sagittal, paired rays 0·15 to 0·17 by 0·013 to 0·018 mm., basal ray 0·08 to 0·09 by 0·013 to 0·018 mm.,

endosomal quadriradiates, similar to triradiates, with apical ray 0·045 to 0·055 by 0·01 to 0·015 mm.

Distribution: Picton Island.

Named form: **Leucandra seychellensis** Hozawa

(text-fig. 327A)

Leucandra seychellensis Hozawa, 1940: 158, pl. vii, fig. 13, text-fig. 10.

Description: Sponge oval; surface smooth, uneven; vent apical; texture firm, elastic; colour, in spirit, greyish-white; ectosomal skeleton a few layers of triradiates, with large oxea arranged tangentially; skeleton of chamber layer of triradiates with a few quadriradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·07 to 0·26 by 0·006 to 0·02 mm.,

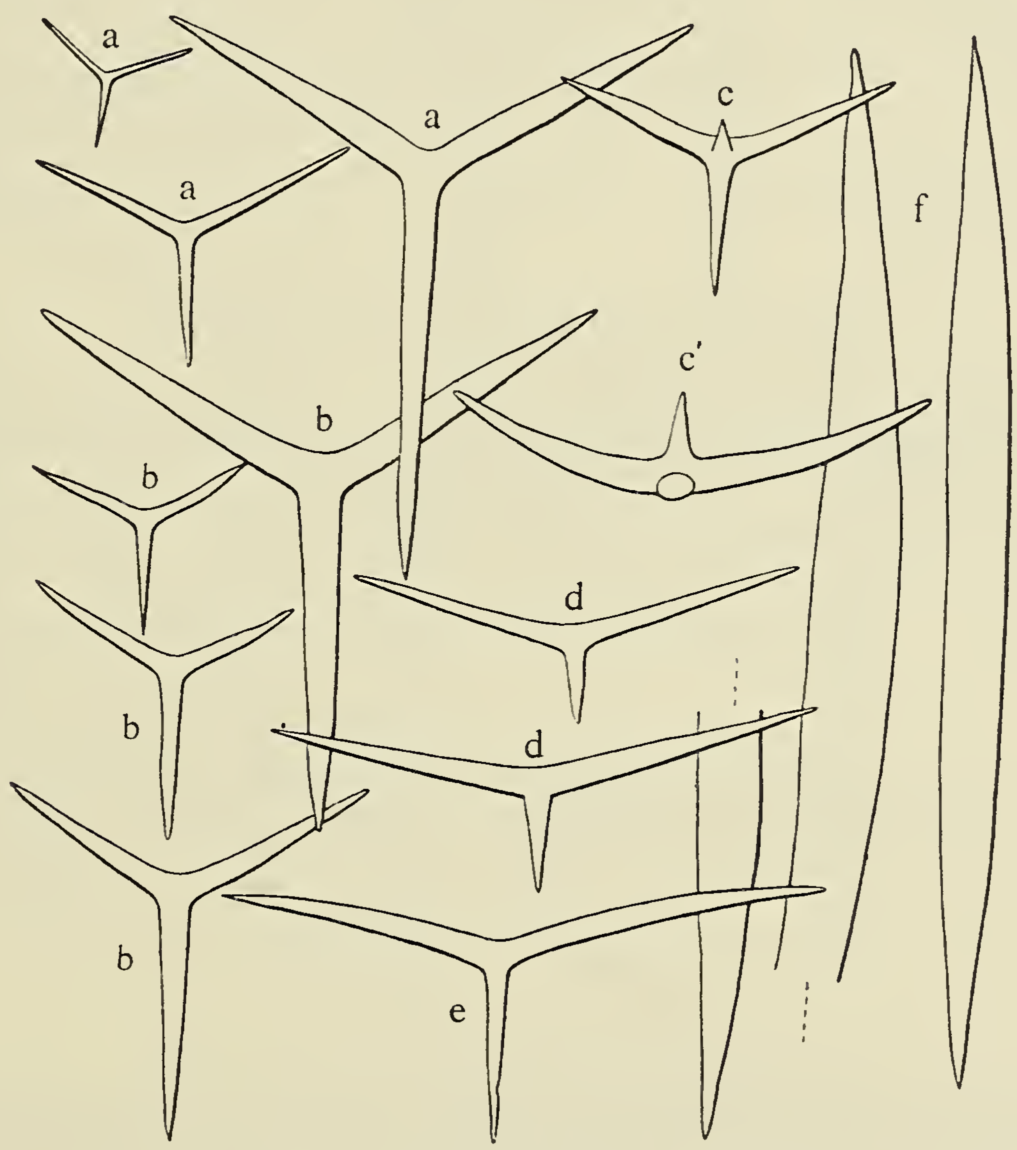
oxea, 0·8 to 1·05 by 0·045 to 0·065 mm.,

triradiates of chamber layer, subregular, rays 0·13 to 0·24 by 0·012 to 0·03 mm.,

quadriradiates of chamber layer, similar to triradiates, with apical rays, 0·05 by 0·014 mm.,

endosomal quadriradiates, sagittal, paired rays 0·13 to 0·18 by 0·008 to 0·01 mm., basal ray 0·05 to 0·09 by 0·006 to 0·008.

Distribution: Seychelles.



Text-fig. 327A. *Leucandra seychellensis* after Hozawa: spicules, ×100. a. ectosomal triradiates; b. triradiates of chamber layer; c. quadriradiates of larger exhalant canals; d. endosomal triradiates; f. oxea.

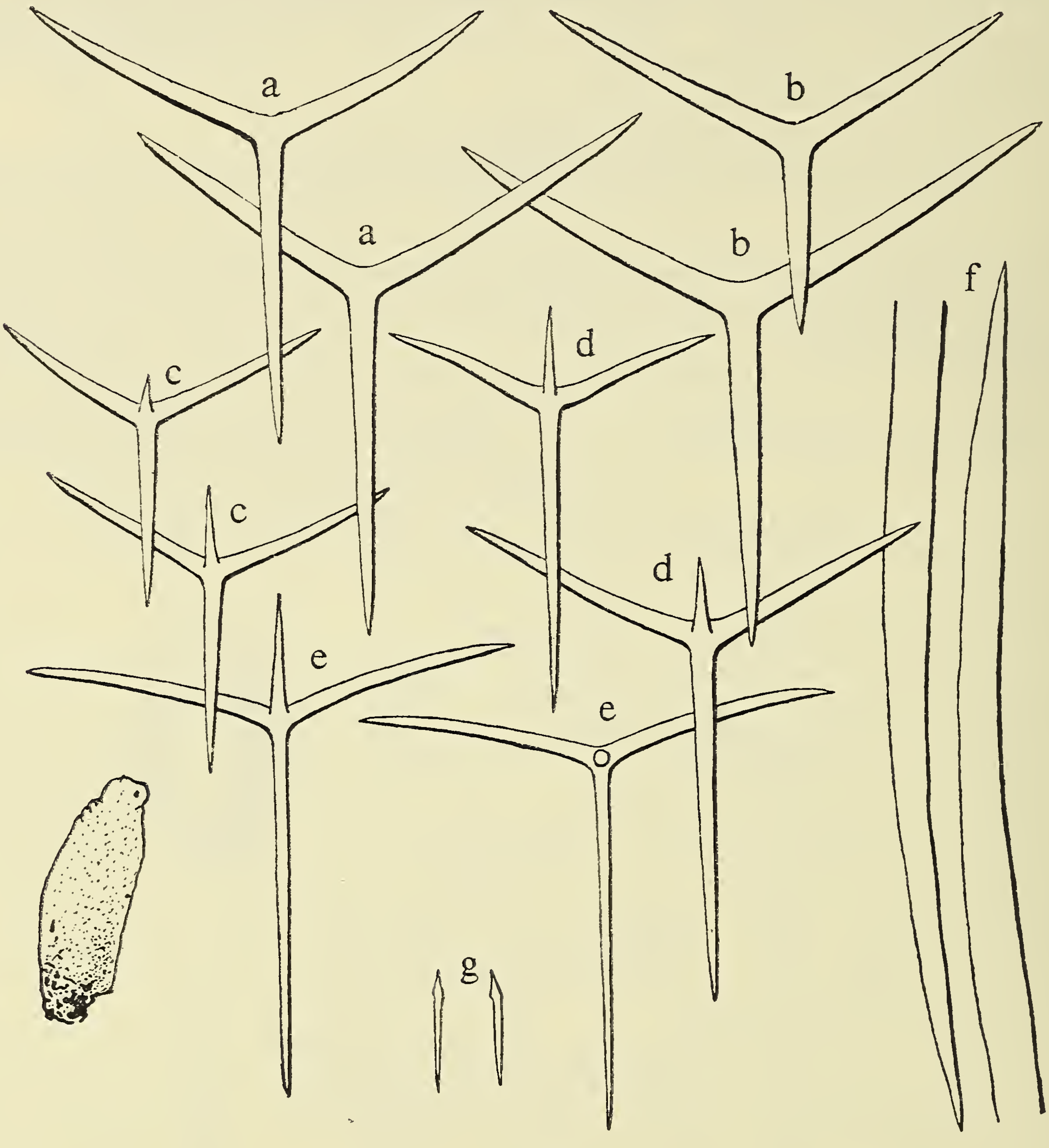
Named form: **Leucandra sola** Tanita

(text-fig. 328)

Leucandra sola Tanita, 1942: 59, pl. iv, fig. 28, text-fig. 12; Tanita, 1943: 445.

Description: Sponge tubular; surface slightly hispid; vent apical, with a feeble collar; texture hard and brittle; colour (dried?), white; ectosomal skeleton of tangentially-arranged triradiates and scattered microxea; tubar skeleton of triradiates thickly and irregularly packed; endosomal skeleton of several tangential layers of quadriradiates.

Spicules: ectosomal triradiates, subregular, 0·29 to 0·38 by 0·02 to 0·026 mm.,
oxea, up to 1·5 by 0·045 mm.,
microxea, 0·06 to 0·08 by 0·003 to 0·005 mm.,



Text-fig. 328. *Leucandra sola* after Tanita: spicules, × 100, except for g. which is × 200; external form, × 2.
a. ectosomal triradiates; b. tubar triradiates; c. quadriradiates of larger exhalant canals; d. endosomal quadriradiates; e. quadriradiates from margin of vent; f. oxea; g. microxea.

tubar triradiates, subregular, rays 0·27 to 0·41 by 0·017 to 0·025 mm.,
endosomal quadriradiates, sagittal, paired rays 0·18 to 0·23 by 0·01 to 0·02 mm., basal ray 0·23 to 0·35 by 0·01 to 0·02 mm., apical ray 0·16 to 0·35 by 0·008 to 0·012 mm.

Distribution: Japan (Shimoda).

Named form: **Ute spenceri** Dendy

Ute spenceri Dendy, 1892: 94; Dendy and Row, 1913: 764.

Description: Sponge spherical or subspherical, sessile; surface uneven, roughened; vent apical, naked; texture firm; colour (?); ectosomal skeleton of longitudinal oxea, tangential triradiates and groups of microxea; skeleton of chamber layer of an outer tubar skeleton of triradiates and an inner irregular layer of triradiates and quadriradiates of exhalant canals; endosomal skeleton of several tangential layers of quadriradiates, and sparsely-scattered microxea.

Spicules: ectosomal triradiates, sagittal to subregular, rays 0·16 by 0·02 mm.,
oxea, 1·4 by 0·1 mm.,
microxea, 0·04 by 0·003 mm.,
tubar triradiates, sagittal, paired rays 0·05 to 0·09 by 0·009 mm., basal rays 0·16 by 0·009 mm.,
triradiates of inner chamber layer, sagittal, paired rays 0·09 by 0·009 mm., basal ray 0·16 by 0·009 mm.,
quadriradiates of exhalant canals, paired rays 0·08 by 0·003 mm., basal ray reduced to a tubercle, apical ray 0·025 by 0·003 mm.,
endosomal quadriradiates, sagittal, paired rays 0·09 by 0·008 mm., basal ray 0·07 to 0·11 by 0·008 mm., apical ray 0·08 by 0·008 mm.,
endosomal microxea, 0·04 by 0·003 mm.

Distribution: Australia (Port Jackson).

Named form: **Ute spiculosa** Dendy

Ute spiculosa Dendy, 1892: 92; Dendy and Row, 1913: 764.

Description: Sponge colonial, individuals ovoid, sessile; surface even, sparingly hispid; vent apical, slightly fringed; texture firm; colour, (?); ectosomal skeleton of tangential triradiates and oxea, with microxea at right angles to surface; skeleton of chamber layer a subarticulate tubar skeleton of triradiates; endosomal skeleton of several sub-tangential layers of triradiates.

Spicules: ectosomal triradiates, subregular, rays 0·1 by 0·01 mm.,
oxea, 1·8 by 0·1 mm.,
microxea, 0·24 by 0·008 mm.,
tubar triradiates, subregular, rays 0·12 by 0·016 mm.,
endosomal triradiates, sagittal, paired rays 0·18 by 0·02 mm., basal rays 0·12 by 0·016 mm.

Distribution: Australia (Port Jackson).

Named form: **Ute syconoides** (Carter)

Aphroceras syconoides Carter, 1886: 135; *Ute syconoides*, Dendy, 1892: 92; Breitfuss, 1898: 220; Dendy and Row, 1913: 764; Burton and Srinivasa Rao, 1932: 305.

Description: Sponge tubular, sessile; surface even, minutely hispid; vent apical, naked; texture firm; colour, in spirit, brown; ectosomal skeleton a tangential layer of triradiates and longitudinal oxea, with microxea set at right angles to surface; tubar skeleton of several rows of triradiates, and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of endosomal quadriradiates, rarely triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·04 by 0·006 mm., basal ray 0·07 by 0·006 mm.,
oxea, 0·6 by 0·024 mm.,
microxea, 0·052 by 0·004 mm.,
tubar triradiates, sagittal, paired rays 0·08 by 0·007 mm., basal ray 0·18 by 0·007 mm.,
subendosomal sagittal triradiates, indistinguishable from tubar triradiates,
endosomal quadriradiates, subregular, facial rays 0·08 by 0·006 mm., apical ray 0·08 to 0·14 by 0·007 to 0·008 mm.,
endosomal triradiates, rare, subregular, rays 0·08 by 0·006 mm.

Distribution: Australia (Port Jackson, Port Phillip Heads); Indian Ocean (Tuticorin).

Named form: **Leucandra topsenti** Breitfuss

Leucandra topsenti Breitfuss, 1929: 261, figs. 1–4; *L. gossei*, var. *topsenti*, Topsent, 1937: 1; *L. gossei*, var. *mahonica* Topsent, 1937: 1, fig. 1.

Diagnosis: Sponge irregularly massive; surface smooth; vents, few, scattered, naked; texture firm; colour, in spirit, yellowish-grey; ectosomal skeleton a tangential layer of triradiates and quadriradiates; skeleton of chamber layer of irregularly-arranged triradiates and quadriradiates; endosomal skeleton absent (?).

Spicules: ectosomal triradiates, subregular, rays 0·019 to 0·152 by 0·006 to 0·036 mm.,
ectosomal quadriradiates, similar to triradiates, with apical rays 0·03 by 0·008 mm.,
triradiates of chamber layer, subregular, rays 0·048 to 0·164 by 0·008 to 0·02 mm.,
quadriradiates of chamber layer, similar to triradiates but with apical rays 0·064 by 0·01 mm.

Distribution: Bay of Biscay.

Named form: **Leucandra uschuariensis** Tanita

(text-fig. 329)

Leucandra uschuariensis Tanita, 1942: 131, pl. vii, fig. 16, text-fig. 9.

Description: Sponge massively tubular; surface slightly hispid; vent apical; texture hard, elastic; colour, in spirit, nearly white; ectosomal skeleton of a few tangential layers of triradiates, with oxea projecting at surface, and densely-packed microxea; skeleton of chamber layer of triradiates irregularly disposed; endosomal skeleton of several tangential layers of tri- and quadriradiates.

Spicules: ectosomal triradiates, subregular, rays 0·145 to 0·2 by 0·01 to 0·015 mm.,
oxea, 0·47 to 0·7 by 0·025 to 0·045 mm.,
microxea, 0·055 to 0·085 by 0·004 to 0·007 mm.,
triradiates of chamber layer, subregular, rays 0·12 to 0·22 by 0·018 to 0·023 mm.,
endosomal triradiates, sagittal, paired rays 0·18 to 0·22 by 0·014 to 0·018 mm., basal ray 0·09 to 0·14 by 0·014 to 0·018 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·05 to 0·065 by 0·01 to 0·014 mm.

Distribution: Tierra del Fuego (Uschuaria).

Text-fig. 329. *Leucandra uschuariensis* after Tanita: spicules, × 100, except f. which is × 160; external form, × $\frac{4}{3}$.
a. ectosomal triradiates; b. tubar triradiates; c. endosomal triradiates; d. endosomal quadriradiates; e. oxea; f. microxea.

Named form: **Leucandra vaginata** Lendenfeld

Leucandra vaginata Lendenfeld, 1885: 1133; Dendy, 1892: 98; Dendy and Row, 1913: 771.

Description: Sponge tubular, ovate, sessile; surface even, minutely hispid; vent apical, naked or fringed; texture (?); colour (?); ectosomal skeleton of triradiates (?), with oxea projecting from surface; choanosomal skeleton of triradiates and quadriradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates (?),
oxea, 1·7 by 0·035 mm.,
triradiates of choanosome, sagittal, paired rays 0·22 by 0·014 mm., basal ray 0·28 by 0·014 mm.,
quadriradiates of choanosome, rare, similar to triradiates, with apical ray,
endosomal quadriradiates, sagittal, paired rays 0·12 by 0·008 mm., basal ray 0·08 by 0·006 mm., apical ray 0·1 by 0·008 mm.

Distribution: Australia (Port Jackson).

Genus **Achramorpha** Jenkin

Achramorpha Jenkin, 1908: 30.

Type-species: Achramorpha truncata Topsent, 1907: 540.

29. **Achramorpha truncata** (Topsent)

Named form: **Achramorpha glacialis** Jenkin

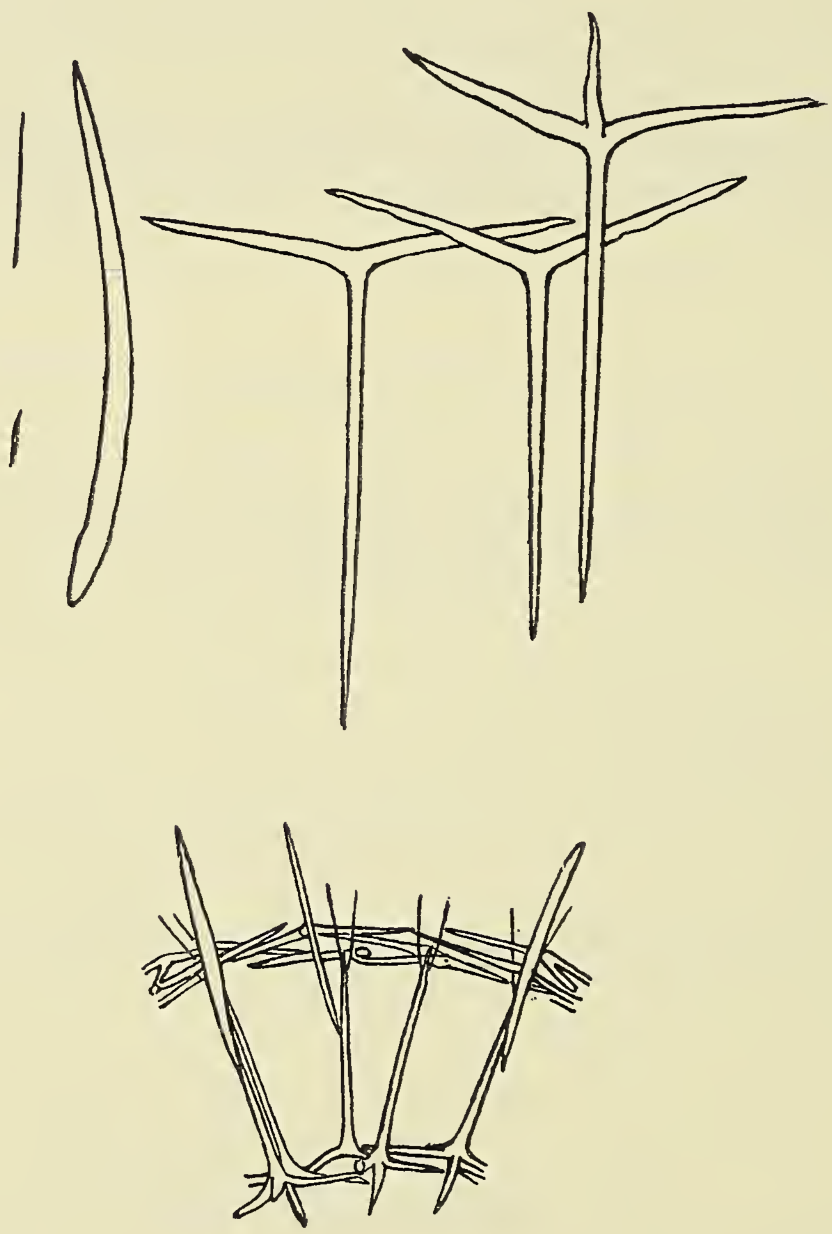
(text-fig. 330)

Achramorpha glacialis Jenkin, 1908: 31, pl. xxxiv, figs. 98–102; Dendy and Row, 1913: 765; Hozawa, 1918: 542.

Description: Sponge a thin-walled tube; surface hispid; margin of vent well-developed; texture (?); colour, in spirit, white tinged with orange; ectosomal skeleton a single layer of triradiates, with projecting oxea, hair-like oxea and microxea; tubar skeleton of basal rays of subendosomal sagittal quadriradiates and inner portions of dermal oxea; endosomal skeleton formed of paired and apical rays of subendosomal quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·13 to 0·18 by 0·01 to 0·014 mm., basal ray 0·2 to 0·38 by 0·012 mm.,
oxea, 0·28 to 0·44 by 0·012 to 0·024 mm.,
hair-like oxea, 0·4 mm. long,
microxea, hastate, 0·035 to 0·04 by 0·002 to 0·003 mm.,
subendosomal quadriradiates, sagittal, paired rays 0·13 to 0·18 by 0·016 mm., basal ray 0·34 to 0·4 by 0·015 mm., apical ray 0·07 to 0·1 by 0·012 mm.

Distribution: Antarctic.



Text-fig. 330. *Achramorpha glacialis* after Jenkin: spicules, ×100; section at right angles to surface, ×50.

Named form: **Achramorpha grandinis** Jenkin

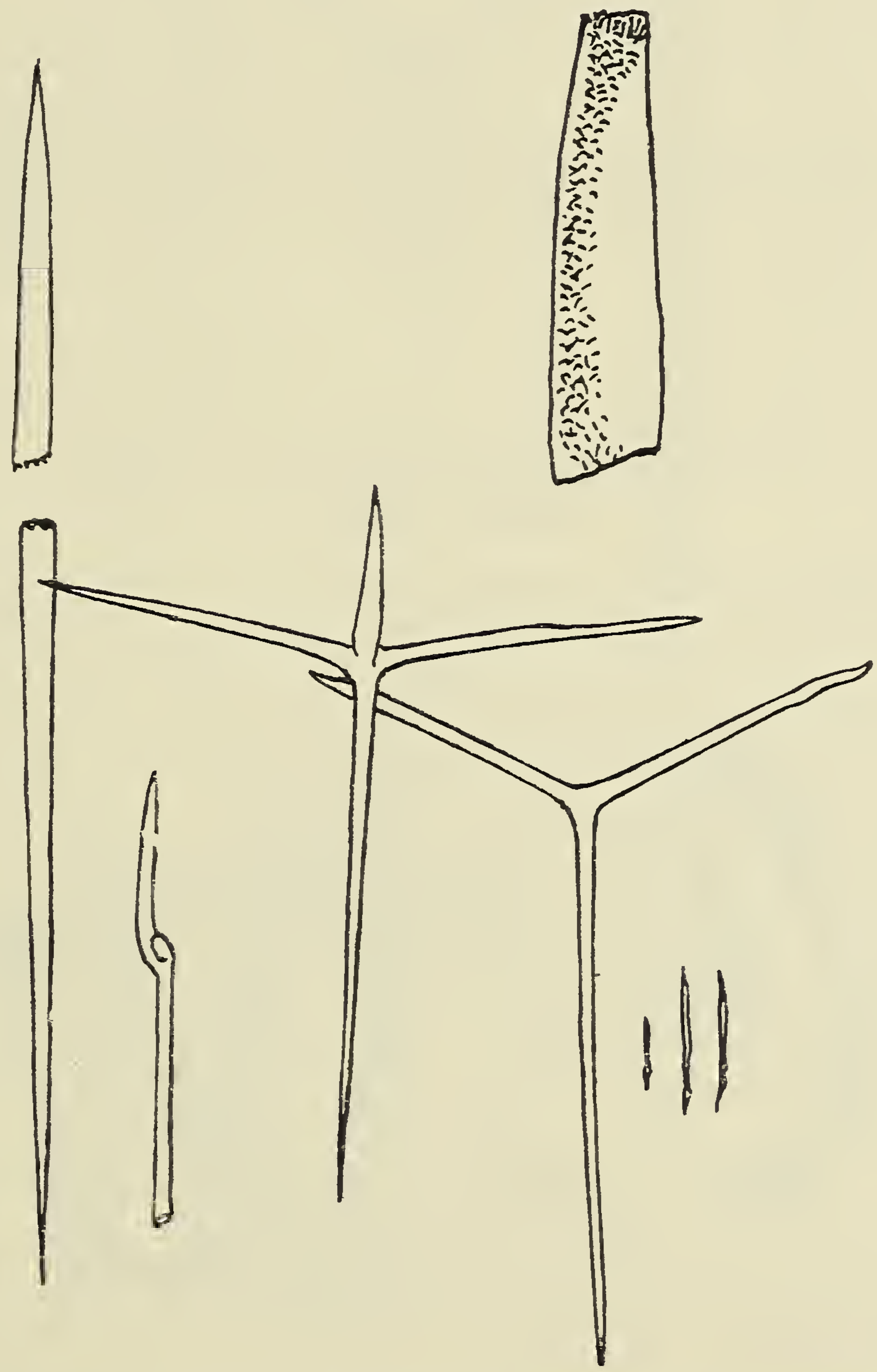
(text-fig. 331)

Achramorpha grandinis Jenkin, 1908: 32, pl. xxvii, fig. 4, pl. xxxiv, 103, pl. xxxv, fig. 104; Dendy and Row, 1913: 765; Hozawa, 1918: 542.

Description: Sponge tubular; surface even, minutely hispid; margin of vent feebly developed; texture (?); colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, large oxea and microxea; tubar skeleton of basal rays of subendosomal sagittal quadriradiates and proximal portions of dermal oxea; endosomal skeleton of paired and apical rays of subendosomal quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·22 to 0·26 by 0·012 to 0·014 mm.,
oxea, 3·5 or more by 0·023 mm.,
microxea, hastate, smooth or spined, 0·065 to 0·12 by 0·003 to 0·006 mm.,
subendosomal quadriradiates, sagittal, paired rays 0·24 to 0·27 by 0·012 to 0·014 mm., basal ray 0·45 to 0·55 by 0·012 to 0·016 mm., apical ray 0·16 by 0·014 to 0·016 mm.

Distribution: Antarctic.



Text-fig. 331. *Achramorpha grandinis* after Jenkin: spicules, ×100; external form, ×2.

Named form: **Achramorpha nivalis** Jenkin

(text-fig. 332)

Achramorpha nivalis Jenkin, 1908: 33, pl. xxvii, figs. 7–8, pl. xxxv, figs. 105–111, pl. xxxvi, fig. 112; Dendy and Row, 1913: 765; Hozawa, 1918: 542.

Description: Sponge pyriform, with lower end rounded and bulbous, upper end narrowing and terminating in a well-developed fringe round vent; surface hispid; texture (?); colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with projecting oxea and microxea of two sizes; tubar skeleton of basal rays of subendosomal sagittal quadriradiates and proximal parts of ectosomal oxea; skeleton of vent of quadriradiates and long slender oxea.

Text-fig. 332. *Achramorpha nivalis* after Jenkin: spicules, ×100; section at right angles to surface, ×50; external form, ×2.

Spicules: ectosomal triradiates, sagittal, paired rays 0·14 to 0·21 by 0·008 mm., basal ray 0·2 to 0·38 by 0·008 to 0·01 mm.,
oxea, 2·7 by 0·014 mm.,
microxea, of two sizes, hastate, smaller crooked, 0·12 to 0·14 by 0·004 and 0·075 to 0·085 by 0·005 to 0·006 mm.,
subendosomal quadriradiates, sagittal, paired rays, 0·16 to 0·2 by 0·008 to 0·012 mm., basal ray 0·4 to 0·6 by 0·008 to 0·01 mm., apical ray 0·11 to 0·13 by 0·008 to 0·012 mm.

Distribution: Antarctic.

Named form: **Achramorpha truncata** (Topsent)

Grantia truncata Topsent, 1907: 540; Topsent, 1908, 6, pl. v, fig. 4; *Achramorpha truncata*, Dendy and Row, 1913: 765; Hozawa, 1918: 542; Burton, 1929: 402.

Description: Sponge tubular, wider below and narrowing above to a circular vent; surface even, rough; margin of vent not developed; texture (?); colour, in spirit, white; ectosomal skeleton of a tangential layer of triradiates, with obliquely-placed microxea; tubar skeleton of subendosomal sagittal quadriradiates; endosomal skeleton of paired and apical rays of subendosomal quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·16 to 0·17 by 0·013 mm., basal ray 0·22 by 0·013 mm.,
microxea, lanceolate, 0·4 by 0·025 mm.,
subendosomal quadriradiates (rarely triradiate), sagittal, paired rays 0·18 to 0·2 by 0·015 mm., basal ray 0·25 by 0·015 mm., apical ray 0·05 by 0·01 mm.

Distribution: Antarctic; 40 m.

Named form: **Megapogon villosus** Jenkin

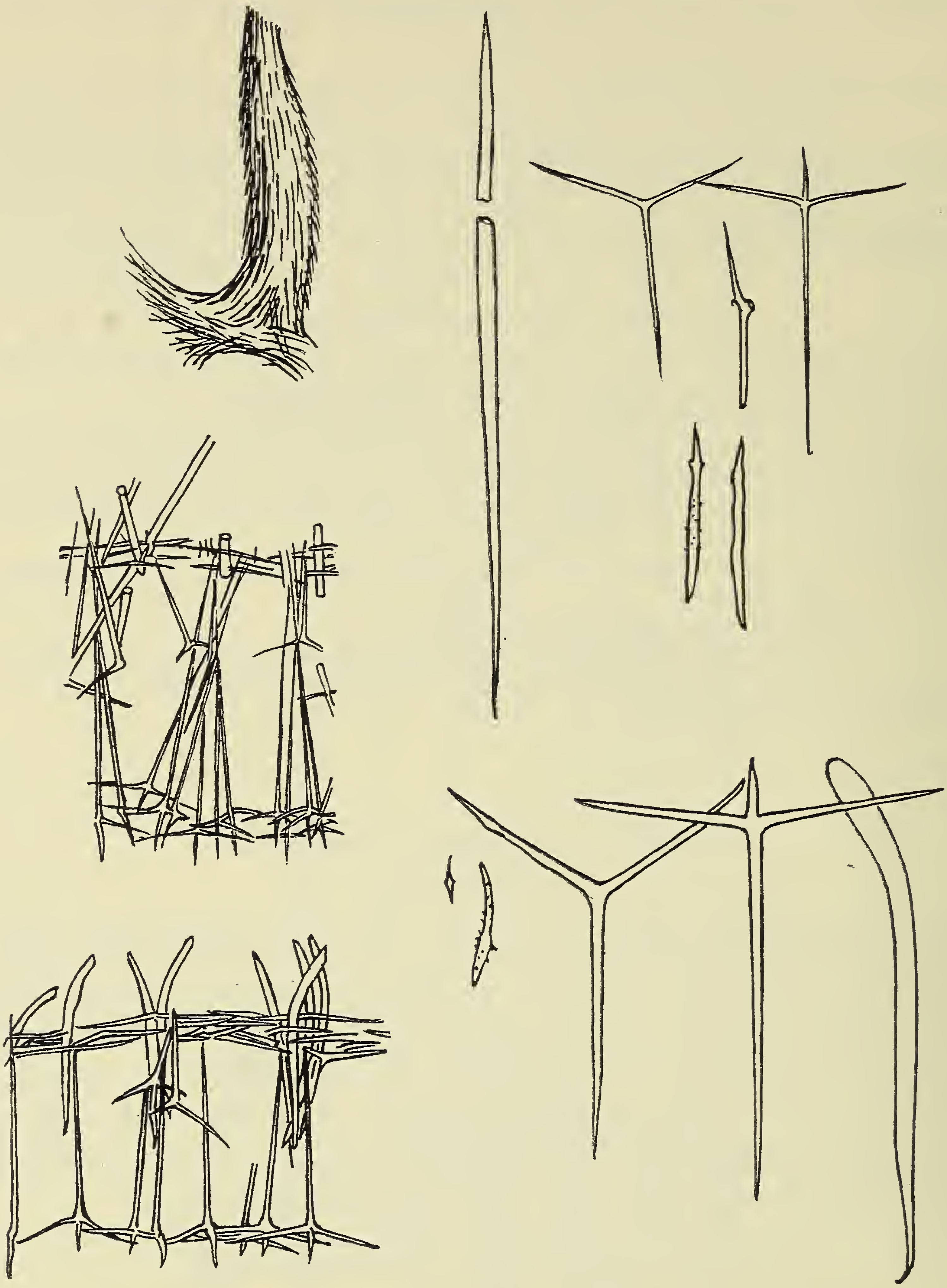
(text-figs. 333–334)

Megapogon villosus Jenkin, 1908: 37, pl. xxxvi, figs. 115–119; *M. raripilus* Jenkin, 1908: 38, pl. xxxvii, figs. 120–124; *M. pollicaris* Jenkin, 1908: 40, pl. xxxvii, figs. 125–129, pl. xxxviii, figs. 125–130; *M. crispatus* Jenkin, 1908: 41, pl. xxvii, fig. 2, pl. xxxviii, figs. 131–136; *M. crispatus*, Dendy and Row, 1913: 768; *M. pollicaris*, Dendy and Row, 1913: 768; *M. raripilus*, Dendy and Row, 1913: 768; *M. villosus*, Dendy and Row, 1913: 768; Burton, 1929: 403.

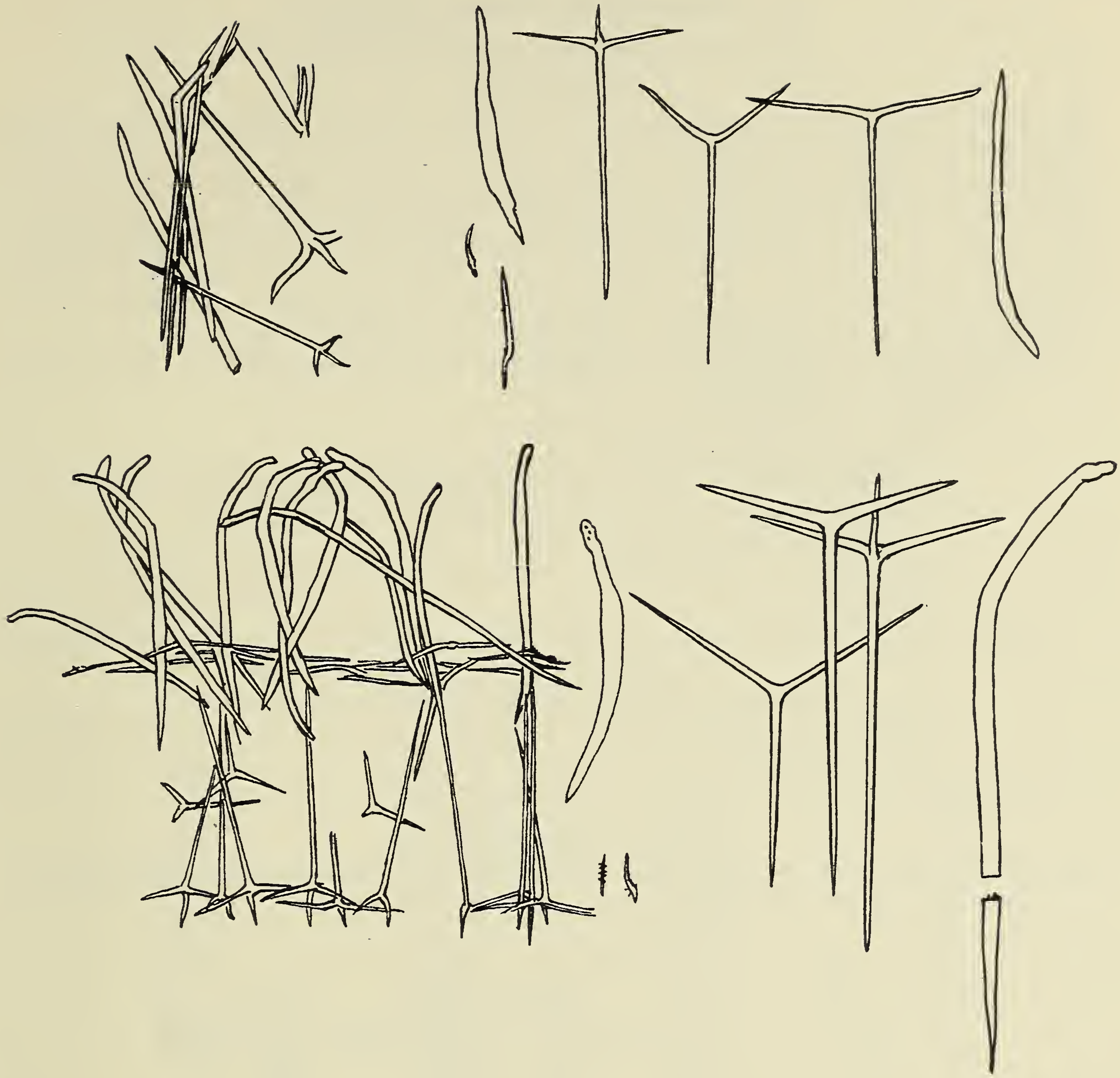
Description: Sponge solitary, tubular to sac-shaped, sessile; surface hispid; vents apical, with well-developed fringe; texture firm; colour, in spirit, white, yellow or brownish; ectosomal skeleton of triradiates, with oxea, microxea and, sometimes, trichoxea; skeleton of chamber layer of centrifugally-directed basal rays of subendosomal quadriradiates, with scattered triradiates; endosomal skeleton of paired and apical rays of subendosomal quadriradiates.

Spicules: ectosomal triradiates, subregular to sagittal, paired rays 0·09 to 0·32 by 0·008 to 0·016 mm., basal rays 0·11 to 0·7 by 0·008 to 0·016 mm.,
oxea, 0·47 to 15·0 by 0·02 to 0·043 mm.,
microxea, 0·05 to 0·16 by 0·001 to 0·006 mm.,
trichoxea, of rare occurrence, 0·5 by 0·001 mm.,
triradiates, of chamber layer, similar to ectosomal triradiates,
subendosomal quadriradiates, sagittal, paired rays 0·12 to 0·28 by 0·01 to 0·02 mm., basal rays 0·3 to 1·12 by 0·01 to 0·018 mm., apical rays 0·08 to 0·22 by 0·008 to 0·012 mm.

Distribution: Antarctic.



Text-fig. 333. *Megapogon villosus* (after Jenkin); as represented by the type of *Megapogon villosus* Jenkin and *M. pollicaris* Jenkin.
M. villosus: external form (top left), $\times\frac{1}{2}$; spicules (top right) $\times 50$, except microxea, which are $\times 200$; section at right angles to surface (centre left), $\times 24$.
M. pollicaris: section at right angles to surface, $\times 50$; spicules, $\times 100$, except that a microxeote is shown $\times 100$ and (to its right) $\times 250$.



Text-fig. 334. *Megapogon villosus* (after Jenkin); as represented by *Megapogon raripilus* Jenkin (above) and *M. crispatus* Jenkin (below).
M. raripilus: section at right angles to surface (top left), ×100; spicules (top right), ×48.
M. crispatus: section at right angles to surface (bottom left), ×50; spicules (bottom right), ×100.

Genus **Uteopsis** Dendy and Row

Uteopsis Dendy and Row, 1913: 766.

Type-species: Ute argentea Poléjaeff, 1883: 43, pl. i, fig. 3, pl. iv, fig. 3, pl. v, fig. 1.

30. **Uteopsis argentea** (Poléjaeff)

Named form: **Uteopsis argentea** (Poléjaeff)

(text-fig. 335)

Ute argentea Poléjaeff, 1883: 43, pl. i, fig. 3, pl. iv, fig. 3, pl. v, fig. 1; Dendy, 1891: 92; *Uteopsis argentea*, Dendy and Row, 1913: 766.

Description: Sponge solitary, tubular, substipitate; surface smooth, striated; vent apical, naked; texture firm; colour, in spirit, white; ectosomal skeleton of triradiates, oxea and microxea; tubar skeleton of centrifugally-directed basal rays of subendosomal sagittal triradiates, tubar quadriradiates and bundles of distally-directed oxea; endosomal skeleton of paired rays of subendosomal sagittal triradiates, an inner layer of endosomal triradiates and quadriradiates, and an outer layer of endosomal quadriradiates, with microxea irregularly-scattered.

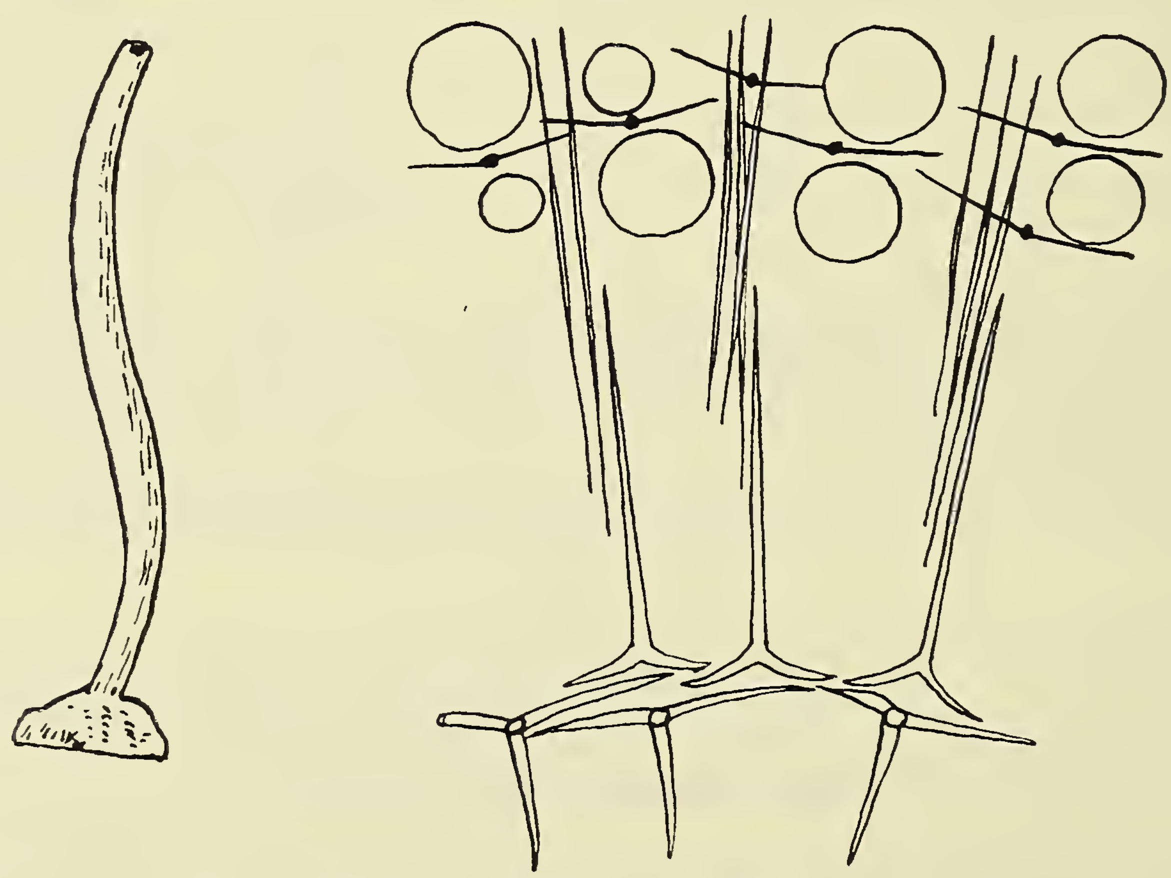
Spicules: ectosomal triradiates, sagittal, paired rays 0·025 to 0·12 by 0·005 mm., basal rays up to 0·75 by 0·005 mm.,
oxea, 1·0 to 3·0 by 0·05 to 0·12 mm.,
microxea, 0·15 by 0·003 mm.,
tubar quadriradiates, sagittal, paired rays 0·05 by 0·002 mm., basal rays 0·03 by 0·003 mm., apical rays 0·14 by 0·002 mm.,
tubar oxea, 0·3 by 0·005 mm.,
subendosomal sagittal triradiates, paired rays 0·15 by 0·013 mm., basal rays 0·3 by 0·013 mm.,
endosomal quadriradiates (inner), sagittal, paired rays 0·3 by 0·013 mm., basal rays 0·18 to 0·5 by 0·013 mm., apical rays up to 0·2 by 0·013 mm.,
endosomal triradiates, similar to quadriradiates but without apical ray,
endosomal quadriradiates (outer), regular, facial rays 0·25 by 0·01 mm., apical rays 0·15 by 0·01 mm.

Distribution: Eastern Australia (off Twofold Bay); Indonesia; 32–220 m.

Genus **Hypograntia** Carter

Hypograntia Carter, 1886, 39; *Grantiopsis* Dendy, 1892, 73; *Hippograntia* Breitfuss, 1898: 220.

Type-species: Hypograntia infrequens Carter, 1886, 39.

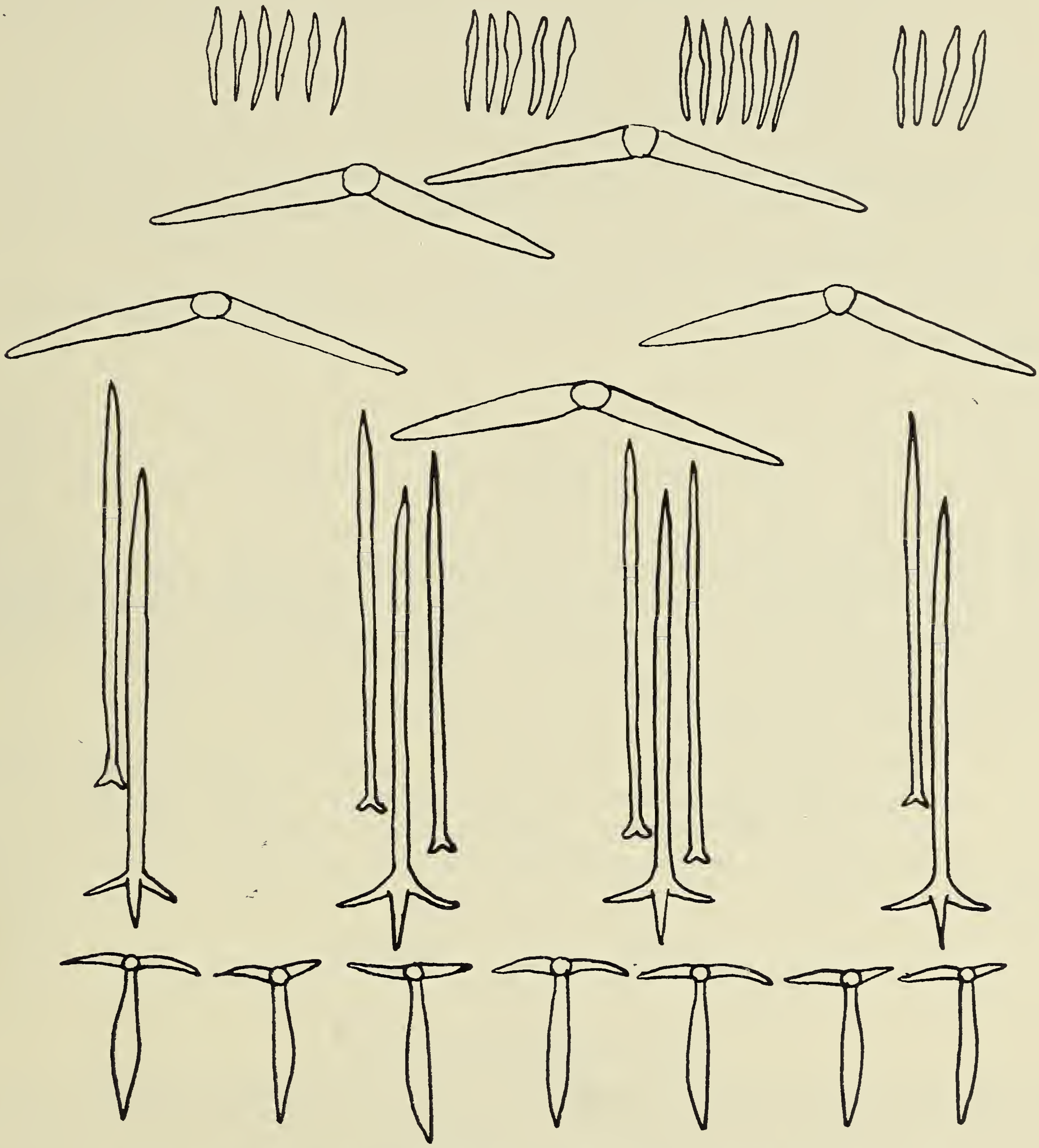


Text-fig. 335. *Uteopsis argentea* after Poléjaeff: section at right angles to surface, ×50; external form, ×$\frac{3}{2}$.

31. **Hypograntia infrequens** Carter

Named form: **Hypograntia infrequens** Carter
(text-fig. 336)

Hypograntia infrequens Carter, 1886: 37; *Grantia infrequens*, Dendy, 1892: 89; *Grantiopsis cylindrica* Dendy, 1892: 90; Dendy, 1893: 173, figs. 11, 52–57; Dendy and Row, 1913: 763; *G. infrequens*, Dendy and Row, 1913: 763; *G. cylindrica*, et var. *fruticosa* Dendy and Frederick, 1924: 485, pl. xxv, figs. 5–8, pl. xxvi, fig. 7; Row and Hozawa, 1931: 784.



Text-fig. 336. *Hypograntia infrequens* after Carter: diagrammatic representation of skeleton across body wall (above); spicules including ectosomal triradiates, ×60, microxea, ×150, endosomal quadriradiates, ×150, reduced tubar triradiate, ×150, and subendosomal quadriradiates, ×150.

Description: Sponge tubular, sessile; surface even, roughened; vent apical, naked; texture firm; colour, in spirit, white; ectosomal skeleton of several tangential layers of triradiates, with oxea projecting at surface; tubar skeleton of basal rays of subendosomal sagittal quadriradiates and several rows of tubar triradiates with reduced paired rays; endosomal skeleton of paired and apical rays of subendosomal quadriradiates and a tangential layer of endosomal quadriradiates.

Spicules: ectosomal triradiates, subregular to sagittal, paired rays 0·35 to 0·54 by 0·01 to 0·07 mm., basal ray 0·5 by 0·06 mm.,
oxea, 0·1 by 0·004 to 0·006 mm.,
tubar triradiates, sagittal, paired rays 0·03 mm. long, basal ray 0·3 by 0·008 mm.,
subendosomal sagittal quadriradiates, paired rays 0·056 by 0·008 mm., basal ray 0·17 to 0·28 by 0·007 to 0·01 mm., apical ray 0·04 to 0·09 by 0·007 to 0·008 mm.
endosomal quadriradiates, subregular, facial rays 0·04 to 0·056 by 0·007 mm., apical ray 0·14 to 0·17 by 0·01 to 0·014 mm.

Distribution: South and West Australia (Port Phillip Heads; Geraldton; Abrolhos Islands).

Remarks: Comparison of the several specimens of *Grantiopsis cylindrica* identified by Dendy and Dendy and Frederick with the holotype of *Hypograntia infrequens* leaves no doubt that they represent a single species. Their respective spicules may differ in size but that is all, but even as between the various specimens named *Grantiopsis cylindrica* there is a great deal of variation in detail, especially in the sizes of the cortical triradiates.

It should be noted that the subendosomal spicules in the holotype are quadriradiates, not triradiates as Carter suggests.

Named form: **Grantia vosmaeri** Dendy

Grantia vosmaeri Dendy, 1892: 88; Dendy and Row, 1913: 760.

Description: Sponge sacciform, sessile; surface even, hispid; vent apical, naked; texture hard; colour (?); ectosomal skeleton of several tangential layers of triradiates, with oxea projecting beyond surface; tubar skeleton of subendosomal sagittal triradiates and several rows of tubar triradiates; endosomal skeleton a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, regular to subregular, rays 0·24 by 0·028 mm.,
oxea, 1·8 by 0·07 mm.,
tubar triradiates, sagittal, paired rays 0·1 by 0·015 mm., basal ray 0·28 by 0·015 mm.,
subendosomal sagittal triradiates, indistinguishable from tubar triradiates,
endosomal triradiates, regular to sagittal, rays 0·2 to 0·25 by 0·025 mm.,
endosomal quadriradiates, similar to triradiates, with apical ray 0·07 by 0·025 mm.

Distribution: Australia.

Genus **Amphoriscus** Haeckel

Amphoriscus Haeckel, 1870: 238; *Leucilla* Haeckel, 1872: 132; *Leuculmis* Haeckel, 1872: 167; *Sycilla* Haeckel, 1872: 248; *Syculmis* Haeckel, 1872: 287; *Dyssycillus* Haeckel, 1872: 386; *Sycurilla* Haeckel, 1872: 388; *Dyssyculmus* Haeckel, 1872: 386; *Syculmarium* Haeckel, 1872: 390; *Lipostomella* Haeckel, 1872: 393; *Leoculmis*, Ganin, 1879: 21; *Polejna* Lendenfeld, 1885: 1115; *Ebnerella* Lendenfeld, 1891: 289; *Paraleucilla* Dendy, 1892: 77; *Rhabdodermella* Urban, 1902: 268; *Lenculmis*, Allemand, 1907: 18.

Type-species: Ute chrysalis Schmidt, 1864: 23.

32. **Amphoriscus chrysalis** (Schmidt)

Named form: **Leucilla amphora** Schmidt [in] Haeckel

(text-figs. 337–338)

Leucilla amphora Haeckel, 1872: 132, pl. xxiv, figs. 4–15; *Ute amphora* Schmidt [in] Haeckel, 1872: 132; *Dyssycus amphora* Haeckel, 1872: 133, pl. xxiv, figs. 4–7; *Leucilla amphora*, Dendy and Row, 1913: 783; Arndt, 1927: 136, pl. ii, fig. 2.

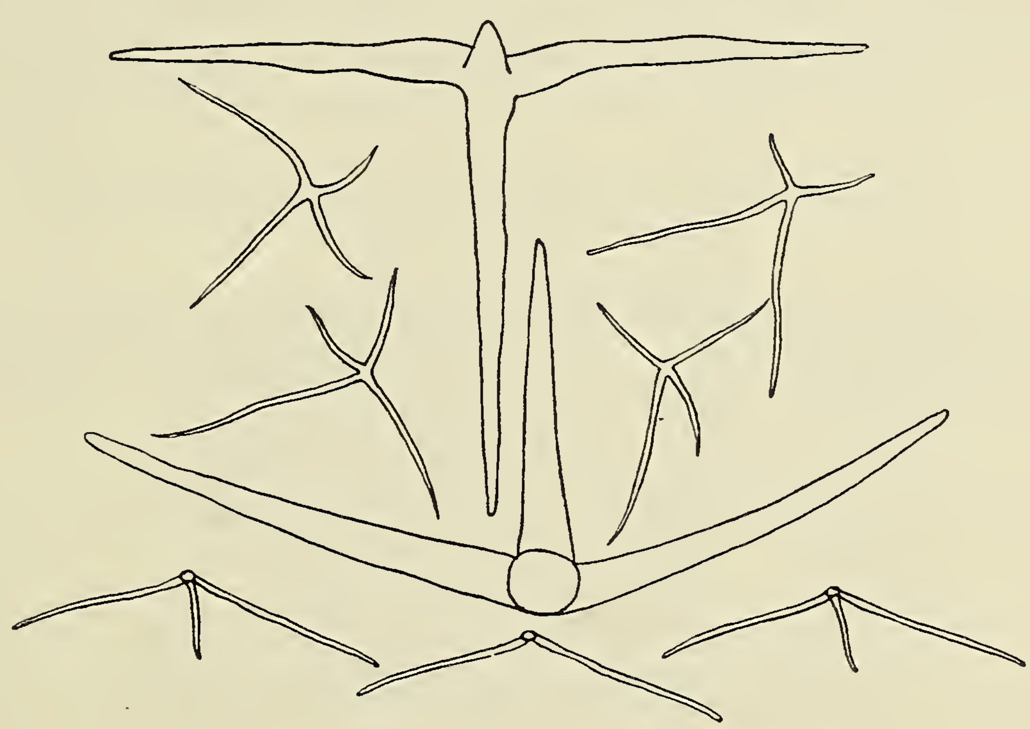
Description: Sponge tubular, sessile; surface even, non-hispid; vent apical, naked; texture (?); colour, in spirit, brown; ectosomal skeleton of facial rays of ectosomal quadriradiates; skeleton of chamber layer of apical rays of ectosomal quadriradiates and basal rays of subendosomal quadriradiates, with small irregular quadriradiates scattered between them; endosomal skeleton of paired and apical rays of subendosomal quadriradiates and the facial rays of a tangential layer of endosomal quadriradiates.

Spicules: ectosomal quadriradiates, facial rays 0·7 by 0·04 mm., apical ray 1·0 by 0·04 mm., quadriradiates of chamber layer similar in size to endosomal quadriradiates but more irregular in form,
subendosomal sagittal quadriradiates, paired rays 0·6 by 0·035 mm., basal ray 0·8 by 0·035 mm., apical ray 0·6 by 0·035 mm.,
endosomal quadriradiates, sagittal, paired rays 0·15 to 0·3 by 0·012 mm., basal ray 0·3 by 0·012 mm., apical ray 0·12 to 0·2 by 0·012 mm.

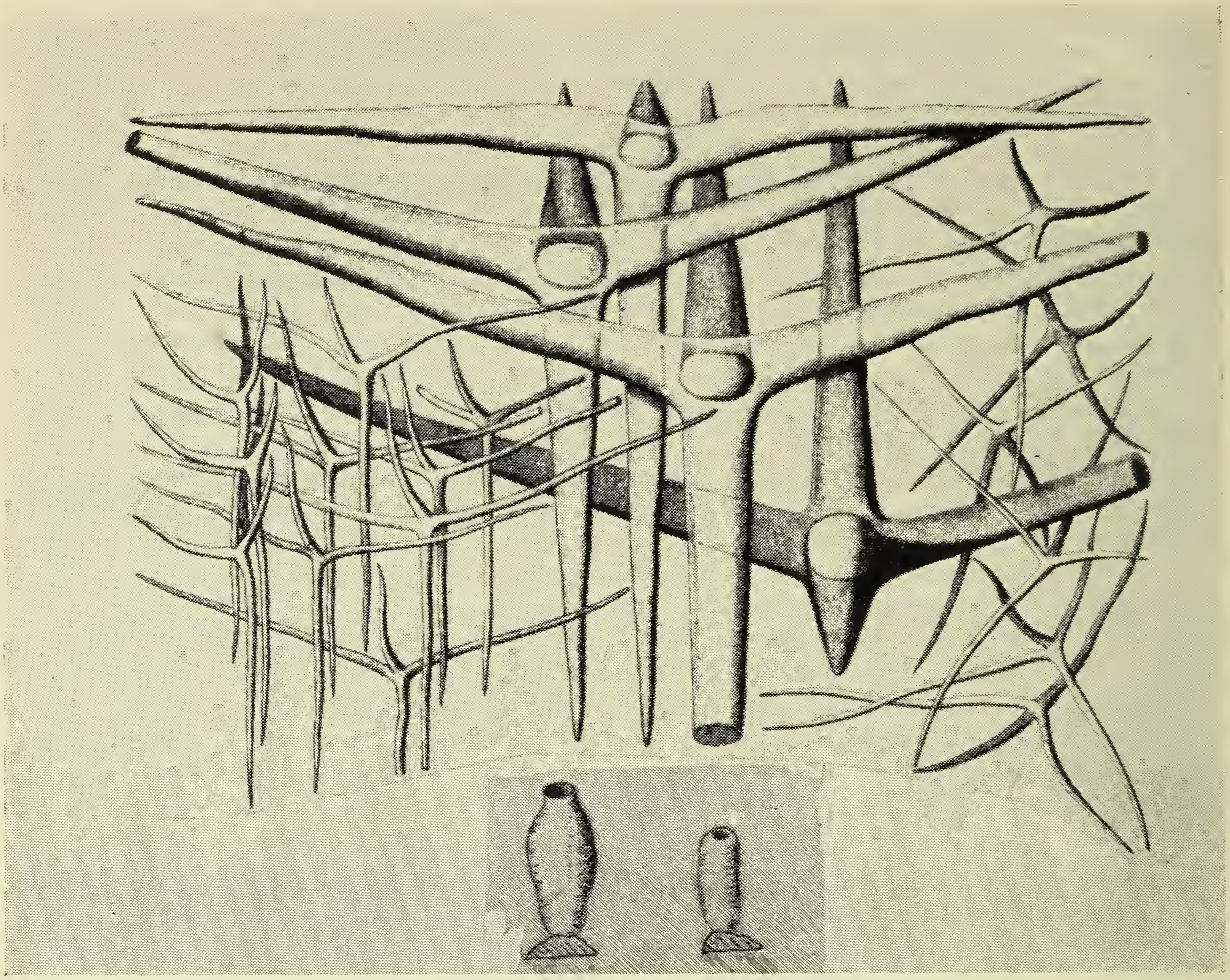
Remarks: The species has not been seen since it was described by Haeckel in 1872. His written description is clear but his illustrations leave much to be desired. The text-fig. included here is a reconstruction from part of Haeckel's figure 8, the shapes of the spicules being based upon his figures 9, 13, 14 and 15. His figures 10, 11 and 12 are difficult to relate to those appearing in his figure 8.

The probability is that this is nothing more than a specimen of *Amphoriscus chrysalis* (Schmidt).

Distribution: Gulf of Mexico (Vieques, Porto Rico, Curaçao and Barbados); littoral.



Text-fig. 337. *Leucilla amphora* after Haeckel: spicules (above), arranged as in section at right angles to surface, reconstructed from Haeckel's figures and description.

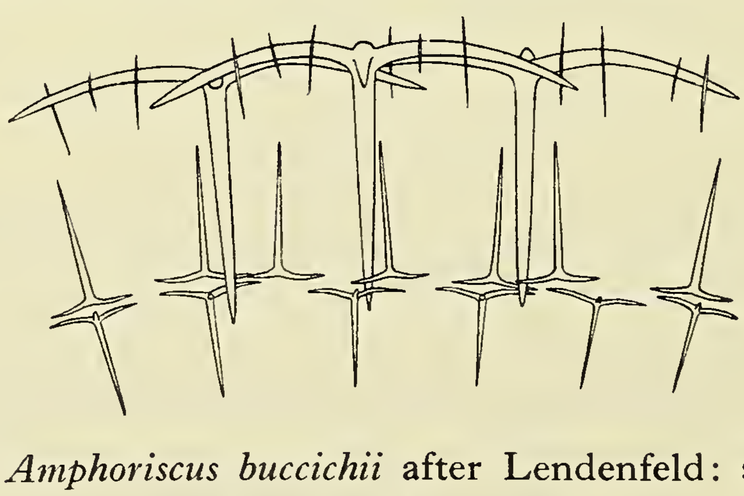


Text-fig. 338. *Leucilla amphora* (after Haeckel): spicules, including large quadriradiates, ectosomal quadriradiates (left) and quadriradiates of body wall (right), × 100; external form, natural size.

Named form: **Amphoriscus buccichii** Ebner

(text-fig. 339)

Amphoriscus buccichii Ebner, 1887: 981; *Ebnerella buccichii*, Lendenfeld, 1891: 289, pl. xi, fig. 72; *Amphoriscus buccichii*, Dendy and Row, 1913: 782; Topsent, 1934: 11; Breitfuss, 1935: 29.



Text-fig. 339. *Amphoriscus buccichii* after Lendenfeld: section at right angles to surface, × 50.

Description: Sponge tubular, sessile; surface even, minutely hispid; vent apical, naked (?); texture (?); colour, alive (?), white; ectosomal skeleton of facial rays of dermal quadriradiates, with microxea set at right angles to surface; skeleton of chamber layer of oppositely-directed apical rays of ectosomal quadriradiates and basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of endosomal quadriradiates.

Spicules: ectosomal quadriradiates, sagittal, paired rays 0·36 to 0·42 by 0·03 to 0·04 mm., basal ray 0·36 to 0·54 by 0·03 to 0·04 mm., apical ray 0·3 to 0·42 by 0·03 to 0·04 mm.,
microxea, 0·06 to 0·2 by 0·003 to 0·005 mm.,
endosomal sagittal triradiates, paired rays 0·1 to 0·12 by 0·006 to 0·007 mm., basal ray 0·2 to 0·26 by 0·006 to 0·007 mm.,
endosomal quadriradiates, sagittal, paired rays 0·15 to 0·2 by 0·007 to 0·01 mm., basal ray 0·3 to 0·4 by 0·007 to 0·01 mm., apical ray 0·1 to 0·15 by 0·006 mm.

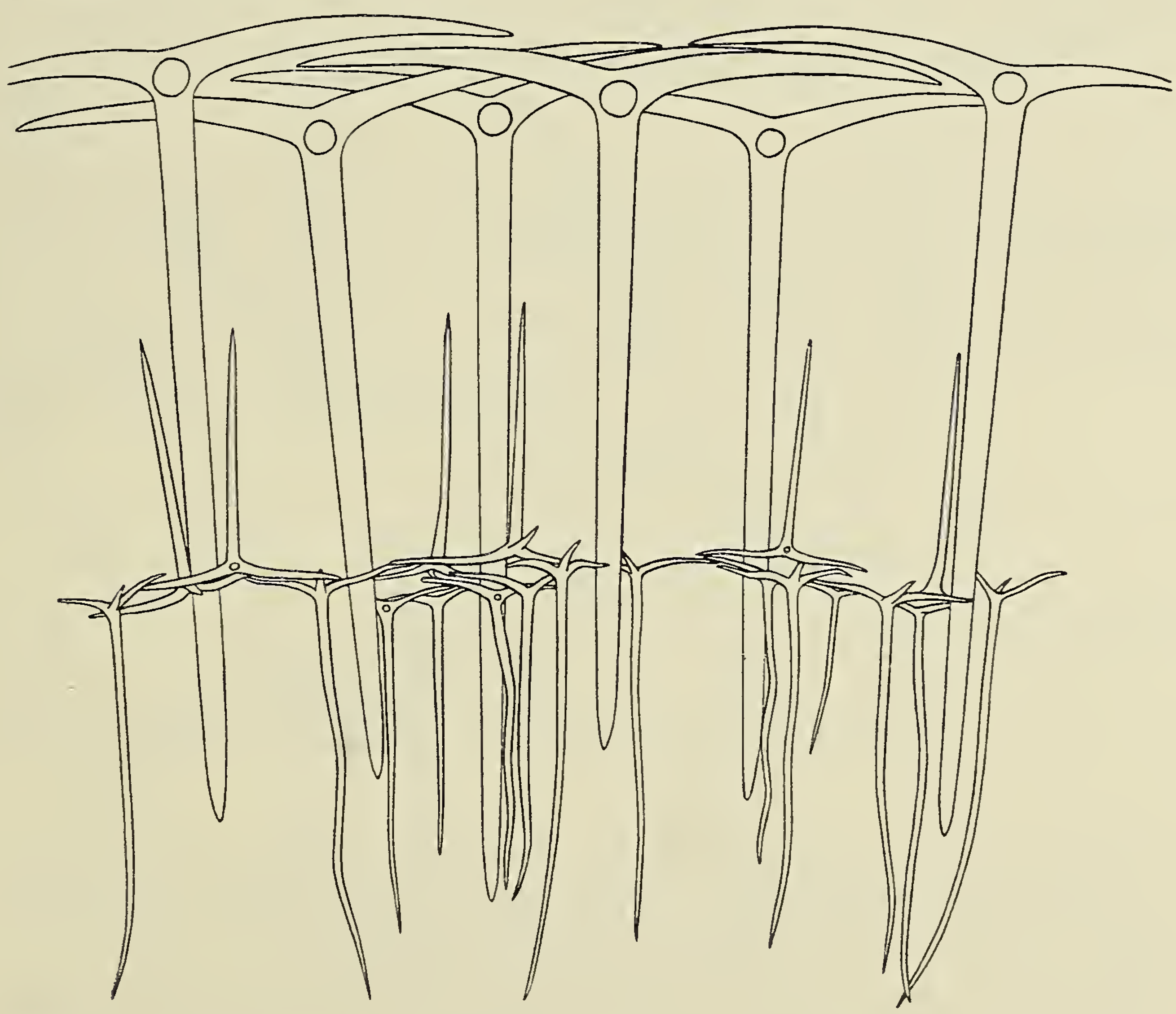
Distribution: Mediterranean (Lesina); 18 m.

Named form: **Amphoriscus chrysalis** (Schmidt)

(text-fig. 340)

Ute chrysalis Schmidt, 1864: 23, pl. iii, fig. 2; *Amphoriscus chrysalis*, Haeckel, 1870: 238; *Sycilla chrysalis*, Haeckel, 1872: 256, pl. xliii, figs. 1–4; *Sycurus chrysalis*, Haeckel, 1872: 256, pl. xliii, fig. 1; *Amphoriscus chrysalis*, Dendy and Row, 1913: 782; Breitfuss, 1935: 29.

Description: Sponge solitary, tubular, stipitate; surface smooth; vent terminal, naked; texture (?); colour, in spirit, yellowish-white to yellowish-brown; ectosomal skeleton of tangentially-arranged facial rays of large quadriradiates; tubar skeleton of apical rays of ectosomal quadriradiates and subendosomal quadriradiates; endosomal skeleton of facial rays of subendosomal quadriradiates and endosomal quadriradiates.



Text-fig. 340. *Amphoriscus chrysalis* after Haeckel: section at right angles to surface, × 100.

Spicules: ectosomal quadriradiates, sagittal, paired rays 0·4 to 0·5 by 0·03 to 0·05 mm., basal rays 0·5 to 0·6 by 0·03 to 0·05 mm., apical rays 1·2 to 1·4 by 0·03 to 0·05 mm.,
subendosomal quadriradiates, sagittal, paired rays 0·2 by 0·008 to 0·012 mm., basal rays 0·3 by 0·008 to 0·012 mm.,
endosomal quadriradiates, sagittal, paired rays, 0·1 to 0·15 by 0·01 to 0·015 mm., basal rays 0·2 to 0·3 by 0·01 to 0·015 mm., apical rays 0·3 to 1·2 by 0·01 to 0·015 mm.

Distribution: Mediterranean (Lesina, Lissa).

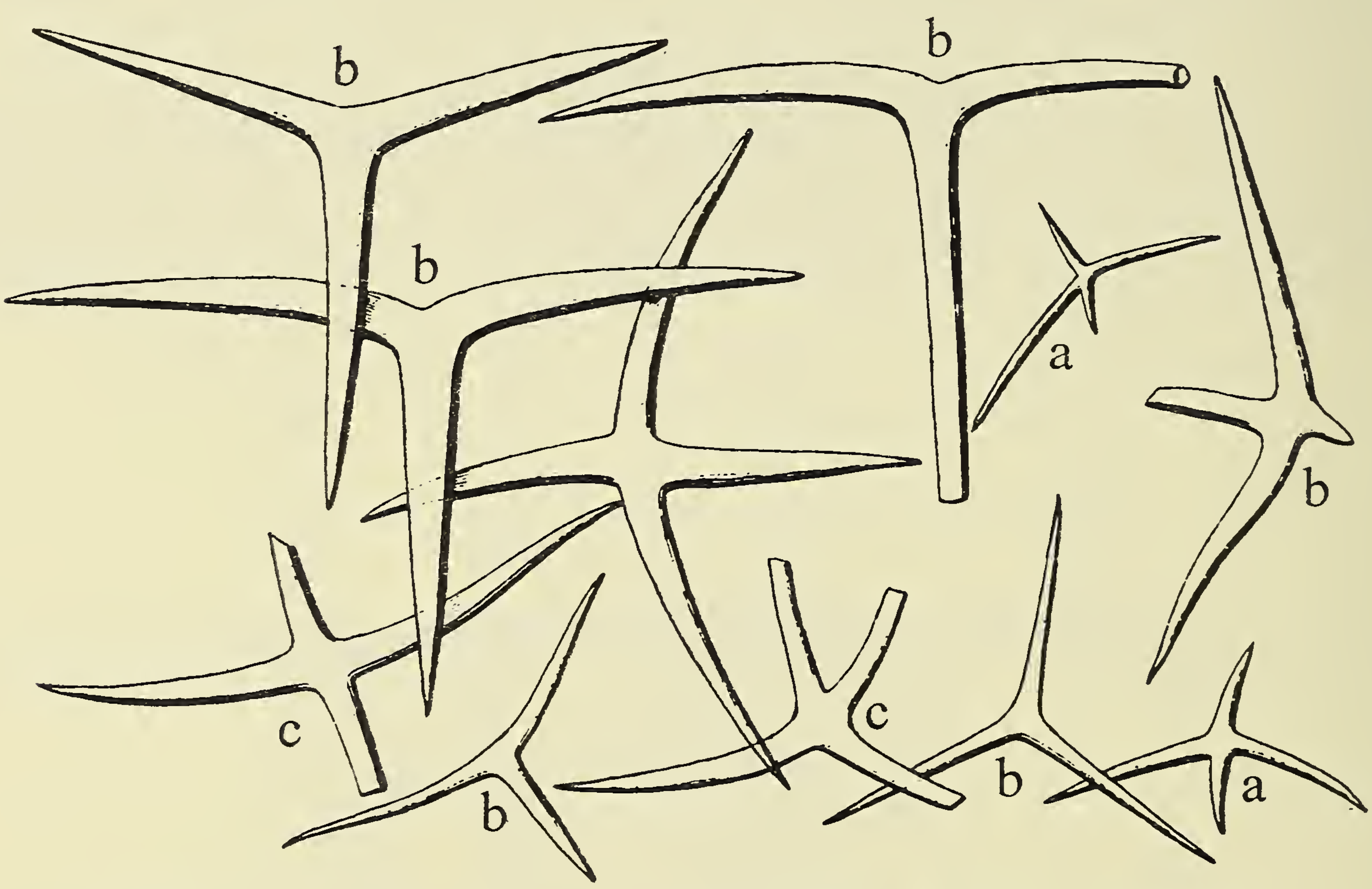
Named form: **Leucandra crustacea** Haeckel

Leucaltis crustacea Haeckel, 1872: 146, pl. xxviii, fig. 1; *Lipostomella crustacea* Haeckel, 1872: 146; *Aphroceras crustaceum* Haeckel, 1872: 146; *Leucandra crustacea* Haeckel, 1872: 146; Dendy and Row, 1913: 770.

Description: Sponge encrusting; surface even, non-hispid; vents not apparent; texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of scattered triradiates; skeleton of chamber layer of scattered triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal quadriradiates, sagittal to subregular, rays 0·1 to 0·3 by 0·05 to 0·06 mm.,
triradiates of chamber layer, subregular to irregular, rays 0·1 to 0·3 by 0·01 to 0·02 mm.,
(oxea, (?) occasional, of same dimensions as rays of triradiates),
endosomal triradiates, sagittal, paired rays 0·2 by 0·02 mm., basal ray 0·3 by 0·02 mm.

Distribution: Venezuela (West Indies).



Text-fig. 341. *Leucandra curva* after Schuffner: spicules, × 100 (circa). a. endosomal quadriradiates; b. triradiates of chamber layer; c. ectosomal quadriradiates.
[The names of the spicules given here are merely translations of Schuffner's names. Thus, b. should probably be called, more correctly, subendosomal sagittal triradiates, but re-examination of the type is needed to confirm this.]

Named form: **Leucandra curva** (Schuffner)

(text-fig. 341)

Leucaltis curva Schuffner, 1877: 409, pl. xxiv, fig. 2; *Leucandra curva*, Dendy and Row, 1913: 774.

Description: Sponge solitary, tubular, sessile; surface smooth; vent terminal, naked; texture (?); colour, in spirit, grey; ectosomal skeleton of quadriradiates, with a few triradiates; skeleton of chamber layer of triradiates; endosomal skeleton a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal quadriradiates, sagittal, paired rays 0·6 by 0·058 mm., basal rays 0·45 by 0·058 mm., apical rays 0·45 by 0·058 mm.,
ectosomal triradiates, rare, with similar dimensions to ectosomal quadriradiates,
triradiates of chamber layer, sagittal, paired rays 0·8 by 0·025 mm., basal rays 0·41 by 0·025 mm.,
endosomal quadriradiates, sagittal, paired rays 0·33 by 0·016 mm., basal rays 0·2 to 0·35 by 0·016 mm., apical rays 0·15 by 0·016 mm.

Distribution: Barbados.

Named form: **Amphoriscus cyathiscus** Haeckel

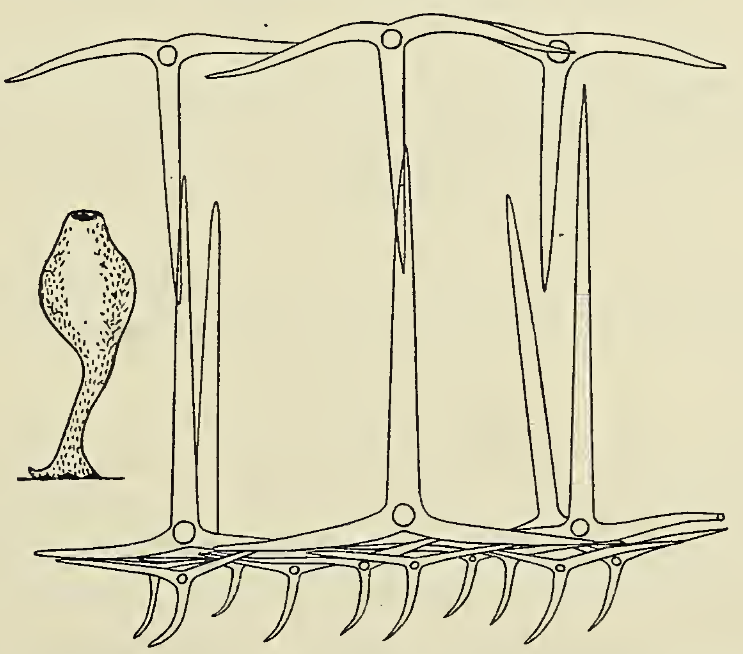
(text-fig. 342)

Amphoriscus cyathiscus Haeckel, 1870: 238; *Sycilla cyathiscus* Haeckel, 1872: 250, pl. xliii, figs. 8–11; *Sycurus cyathiscus* Haeckel, 1872: 250; *Amphoriscus cyathiscus*, Dendy, 1892: 114; Dendy and Row, 1913: 782.

Description: Sponge ovate, stipitate; surface even, non-hispid; vent apical, naked; texture (?); colour, in spirit, white; ectosomal skeleton a layer of quadriradiates; tubar skeleton of apical rays of ectosomal quadriradiates and basal rays of subendosomal sagittal quadriradiates; endosomal skeleton of paired and apical rays of subendosomal quadriradiates and a tangential layer of endosomal quadriradiates.

Spicules: ectosomal quadriradiates, sagittal, paired rays 0·2 to 0·3 by 0·03 to 0·04 mm., basal ray 0·3 to 0·4 by 0·03 to 0·04 mm., apical ray 0·3 to 0·4 by 0·03 to 0·04 mm.,
subendosomal sagittal quadriradiates, paired rays 0·2 by 0·03 to 0·04 mm., basal ray 0·6 to 0·8 by 0·03 to 0·04 mm., apical ray 0·3 by 0·03 to 0·04 mm.,
endosomal quadriradiates, sagittal, paired rays 0·1 to 0·15 by 0·007 to 0·01 mm., basal ray 0·2 to 0·3 by 0·007 to 0·01 mm., apical ray 0·1 to 0·12 by 0·007 to 0·01 mm.

Distribution: Australia (Port Phillip Heads).



Text-fig. 342. *Amphoriscus cyathiscus* after Haeckel; section at right angles to surface, ×50; external form, natural size.

Named form: **Amphoriscus cylindrus** (Haeckel)

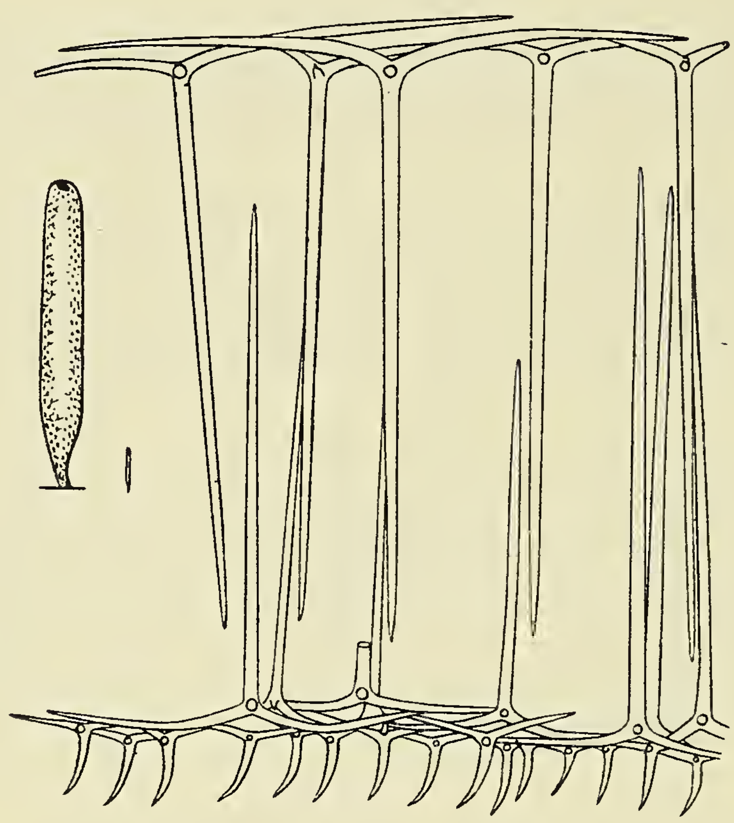
(text-fig. 343)

Sycilla cylindrus Haeckel, 1872: 254, pl. xliii, figs. 5–7; *Sycurus cylindrus* Haeckel, 1872: 254, pl. xliii, fig. 5; *Amphoriscus cylindrus*, Lendenfeld, 1886: 1103; Lendenfeld, 1891: 286, pl. xi, fig. 55; Dendy, 1892: 114; Dendy and Row, 1913: 782; Topsent, 1934: 11; Breitfuss, 1935: 30.

Description: Sponge tubular, substipitate; surface even, non-hispid; vent apical, naked; texture (?); colour, alive, grey; ectosomal skeleton a tangential layer of quadriradiates; tubar skeleton of basal rays of ectosomal and subendosomal sagittal quadriradiates; endosomal skeleton of paired and apical rays of subendosomal quadriradiates and a tangential layer of endosomal quadriradiates.

Spicules: ectosomal quadriradiates, sagittal, paired rays 0·3 by 0·024 mm., basal ray 0·5 by 0·024 mm., apical ray 0·8 by 0·024 mm.,
subendosomal sagittal quadriradiates, paired rays 0·2 by 0·016 mm., basal ray 0·5 to 0·6 by 0·016 mm., apical ray 0·3 by 0·016 mm.,
endosomal quadriradiates, sagittal, paired rays 0·16 by 0·008 to 0·012 mm., basal ray 0·24 by 0·008 to 0·012 mm., apical ray 0·06 to 0·09 by 0·008 to 0·012 mm.

Distribution: Adriatic; Australia (Port Jackson).



Text-fig. 343. *Amphoriscus cylindrus* after Haeckel: section at right angles to surface, ×100; external form, ×7, with natural size shown to its right.

Named form: **Amphoriscus elongatus** Poléjaeff

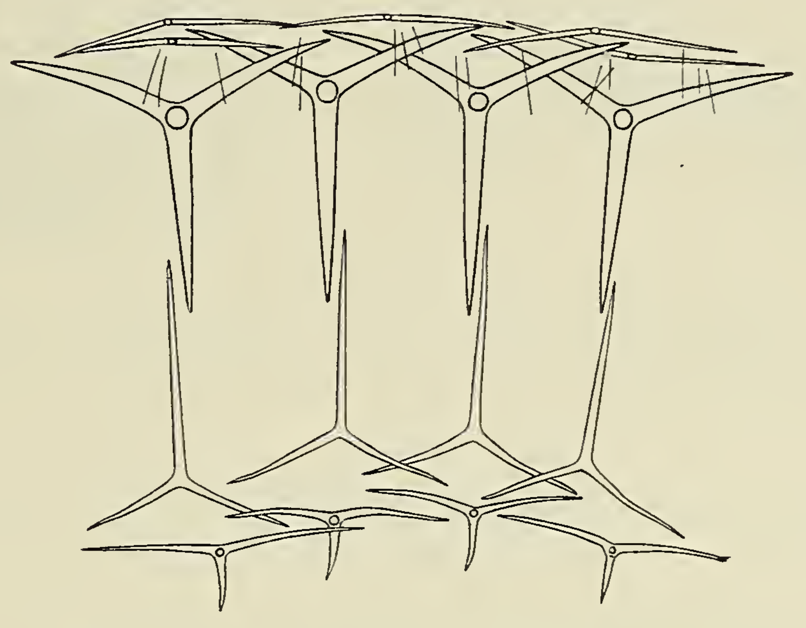
(text-fig. 344)

Amphoriscus elongatus Poléjaeff, 1883: 48, pl. iv, fig. 5, pl. v, fig. 4; Dendy and Row, 1913: 782.

Description: Sponge solitary, tubular, sessile; surface minutely hispid; vents apical, naked; texture firm; colour, in spirit, pale yellowish; ectosomal skeleton a tangential layer of triradiates, with tangentially-arranged facial rays of subectosomal quadriradiates and microxea; tubar skeleton of centripetally-directed apical rays of subectosomal quadriradiates and centrifugally-directed basal rays of subendosomal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·25 by 0·022 mm., basal rays up to 0·45 by 0·015 mm.,
microxea, 0·1 by 0·0025 mm.,
subectosomal quadriradiates, subregular, facial rays 0·6 by 0·07 mm., apical rays 0·6 to 0·7 by 0·07 mm.,
subendosomal sagittal triradiates, paired rays up to 0·3 by 0·02 mm., basal rays 0·38 to 0·45 by 0·02 mm.,
endosomal quadriradiates, sagittal, paired rays 0·25 by 0·016 to 0·02 mm., basal rays up to 0·45 by 0·016 to 0·02 mm., apical rays 0·18 by 0·016 to 0·02 mm.

Distribution: Prince Edward Island; 275–567 m.



Text-fig. 344. *Amphoriscus elongatus* after Poléjaeff: section at right angles to surface, ×50.

Named form: **Amphoriscus gregorii** (Lendenfeld)

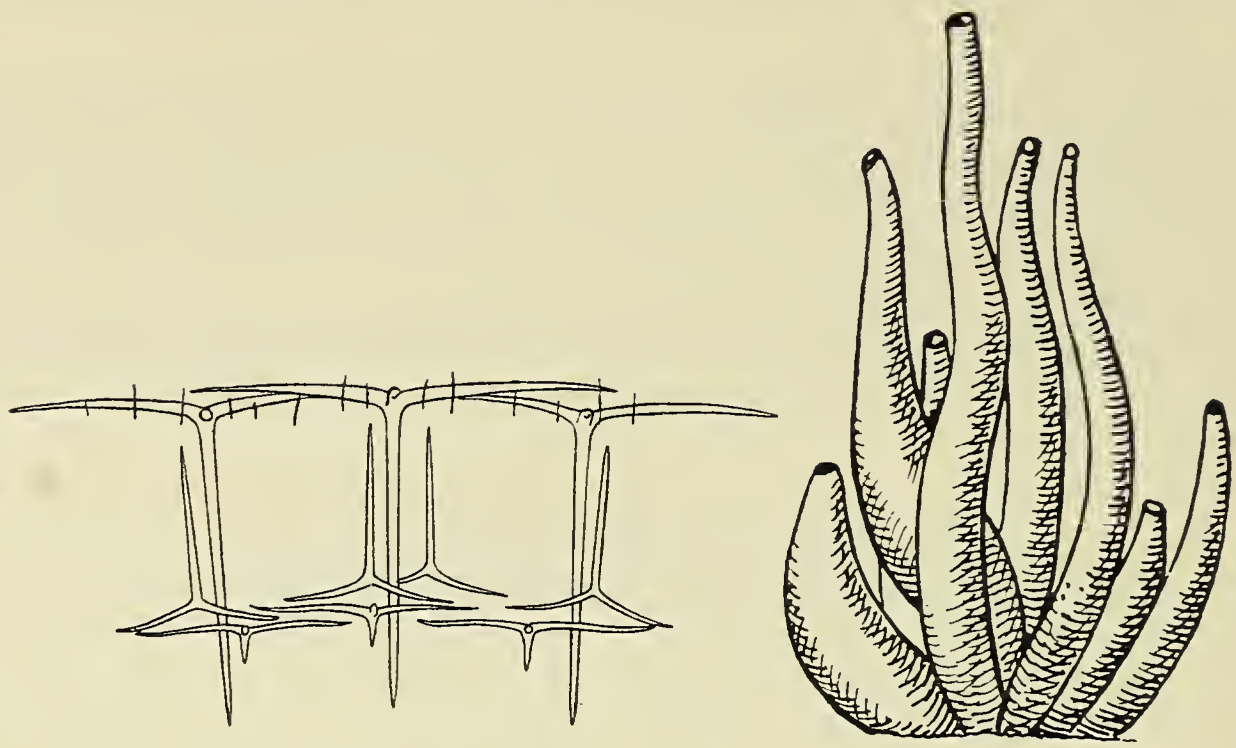
(text-fig. 345)

Ebnerella gregorii Lendenfeld, 1891: 290, pl. xi, fig. 66, xiv, figs. 117–123; *Amphoriscus gregorii*, Dendy and Row, 1913: 782; Topsent, 1934: 11; Breitfuss, 1935: 30.

Description: Sponge tubular, compound, sessile; surface even, minutely hispid; vents apical, naked; texture (?); colour, alive (?), light brown; ectosomal skeleton of facial rays of quadriradiates and microxea; skeleton of chamber layer of oppositely-directed basal rays of ectosomal quadriradiates and subendosomal triradiates; endosomal skeleton of paired rays of subendosomal triradiates and a tangential layer of quadriradiates (and triradiates?).

Spicules: ectosomal quadriradiates, sagittal, paired rays 0·35 to 0·4 by 0·02 to 0·026 mm., basal ray 0·4 to 0·45 by 0·02 to 0·026 mm., apical ray 0·48 to 0·52 by 0·02 to 0·026 mm.,
microxea, 0·025 to 0·04 by 0·001 mm.,
subendosomal sagittal triradiates, paired rays 0·2 by 0·016 mm., basal ray 0·22 to 0·26 by 0·016 mm.,
endosomal quadriradiates, sagittal, paired rays 0·2 by 0·012 mm., basal ray 0·22 to 0·26 by 0·012 mm., apical ray 0·055 by 0·012 mm.,
endosomal triradiates similar to quadriradiates.

Distribution: Mediterranean (Adriatic).



Text-fig. 345. *Amphoriscus gregorii* after Lendenfeld: section at right angles to surface, × 50; external form, natural size.

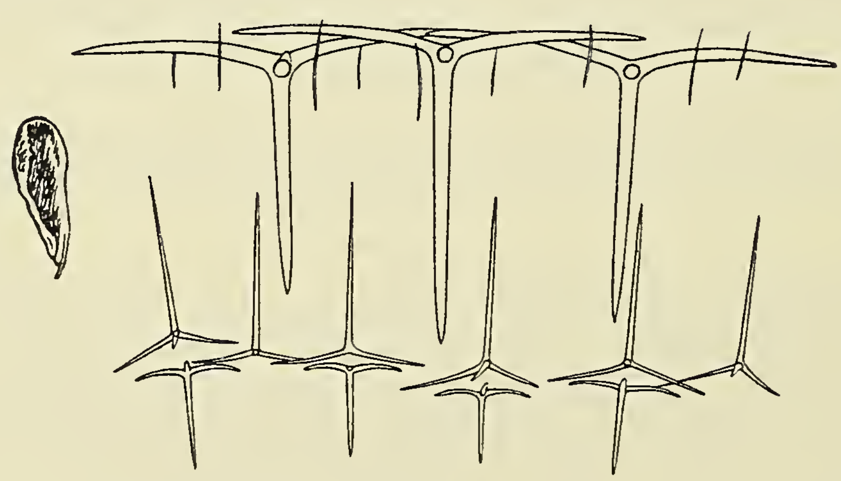
Named form: **Amphoriscus kryptoraphis** Urban

(text-fig. 346)

Amphoriscus kryptoraphis Urban, 1908: 249; Urban, 1909: 16, pl. iii, figs. 3–16; Dendy and Row, 1913: 782; *A. salfii* Sarà, 1951: 11, pl. i, fig. 1, text-fig. 4.

Description: Sponge clavate, substipitate; surface even, minutely hispid; vent apical, fringed; texture (?); colour, in spirit, white; ectosomal skeleton of facial rays of several layers of quadriradiates and of microxea; tubar skeleton of apical rays of ectosomal quadriradiates and basal rays of subendosomal triradiates and quadriradiates; endosomal skeleton of facial rays of subendosomal radiates and a tangential layer of quadriradiates.

Spicules: ectosomal quadriradiates, paired rays 0·25 to 0·45 by 0·015 to 0·038 mm., basal ray 0·34 to 0·54 by 0·015 to 0·038 mm., apical ray 0·23 to 0·5 by 0·014 to 0·037 mm.,
microxea, 0·03 to 0·23 by 0·001 to 0·003 mm.,
subendosomal sagittal triradiates, paired rays 0·07 to 0·12 by 0·005 to 0·007 mm , basal ray 0·25 to 0·37 by 0·006 to 0·009 mm.,
subendosomal sagittal quadriradiates, similar to subendosomal triradiates with apical ray 0·05 to 0·1 by 0·005 mm.,



Text-fig. 346. *Amphoriscus kryptoraphis* after Urban: section at right angles to surface, × 50; external form, × $\frac{3}{2}$.

endosomal quadriradiates, sagittal, paired rays 0·1 to 0·18 by 0·006 to 0·013 mm., basal ray 0·2 to 0·4 by 0·006 to 0·011 mm., apical ray 0·06 to 0·13 by 0·006 to 0·014 mm.

Distribution: Mediterranean; South Africa (Agulhas).

Remarks: A. salfii, from the Mediterranean, differs from *A. cryptoraphis*, from South Africa, in minor details of its spiculation.

Named form: **Leucilla nuttingi** (Urban)

(text-fig. 347)

Rhabdodermella nuttingi Urban, 1902: 268, pl. xiv, figs. 1–7; *Leucilla nuttingi*, Dendy and Row, 1913: 784; *Rhabdodermella nuttingi*, de Laubenfels, 1932: 15, fig. 7.

Description: Sponge tubular, substipitate to stipitate; surface even, minutely hispid; vent apical, naked (or slightly fringed?); texture soft; colour, in spirit, white; ectosomal skeleton of tangential triradiates and quadriradiates, with a palisade of microxea; skeleton of chamber layer of apical rays of ectosomal quadriradiates and basal rays of subendosomal pseudosagittal triradiates; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·2 to 0·4 by 0·04 mm., basal ray 0·38 to 0·6 by 0·04 mm.,

ectosomal quadriradiates, similar to ectosomal triradiates, with apical ray 0·4 to 0·45 by 0·04 mm.,

microxea, 0·08 to 0·1 by 0·002 to 0·004 mm.,

subendosomal sagittal triradiates, paired rays 0·2 to 0·23 by 0·02 mm., basal ray 0·28 to 0·38 by 0·03 mm.,

endosomal quadriradiates, sagittal, paired rays 0·12 by 0·01 mm., basal ray 0·15 by 0·01 mm., apical ray 0·059 to 0·061 by 0·008 mm.

Distribution: California; littoral to 27 m.

Text-fig. 347. *Leucilla nuttingi* after Urban: section at right angles to surface, ×50; external form (left), natural size.

Named form: **Amphoriscus oviparus** (Haeckel)

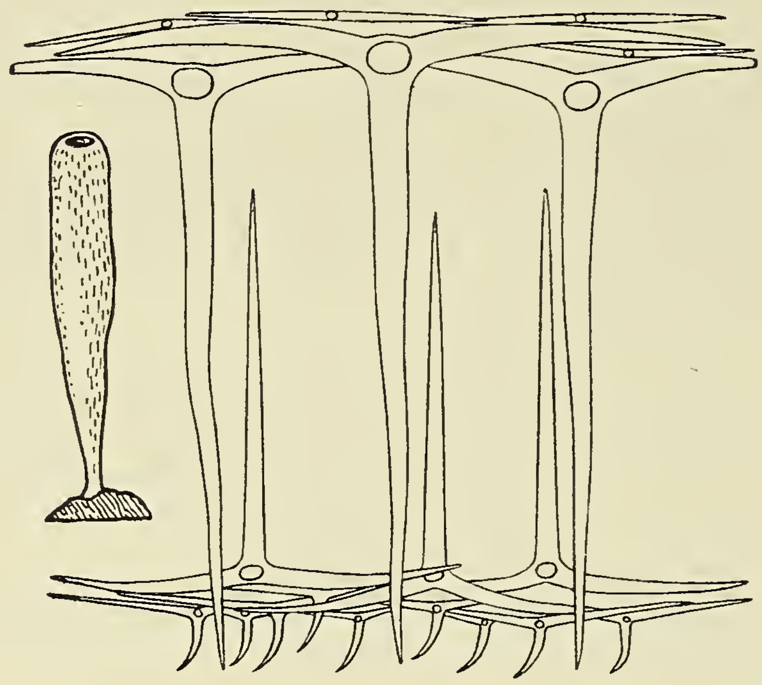
(text-fig. 348)

Sycaltis ovipara Haeckel, 1872: 274, pl. xlvii, figs. 7–10; *Sycurus oviparus* Haeckel, 1872: 274, pl. xlvii, fig. 7; *Amphoriscus oviparus*, Dendy and Row, 1913: 782; Levi, 1950: 4.

Description: Sponge tubular, stipitate; surface even, non-hispid; vent apical, naked; texture (?); colour, in spirit, brown; ectosomal skeleton a tangential layer of triradiates, with a subectosomal layer of quadriradiates; tubar skeleton of basal rays of subectosomal and subendosomal quadriradiates; endosomal skeleton of several layers of quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·2 to 0·4 by 0·01 to 0·025 mm., basal ray 0·3 to 0·5 by 0·01 to 0·025 mm.,
subectosomal quadriradiates, sagittal, paired rays 0·4 to 0·6 by 0·04 to 0·06 mm., basal ray 0·6 to 0·8 by 0·04 to 0·06 mm., apical ray 0·8 to 1·2 by 0·04 to 0·06 mm.,
subendosomal sagittal quadriradiates, paired rays 0·2 to 0·3 by 0·02 to 0·03 mm., basal ray 0·5 to 0·6 by 0·02 to 0·03 mm., apical ray 0·2 to 0·3 by 0·02 to 0·03 mm.,
endosomal quadriradiates, regular, facial rays 0·2 to 0·3 by 0·02 to 0·03 mm., apical ray 0·03 to 0·06 by 0·02 to 0·03 mm.

Distribution: Florida; Roscoff.



Text-fig. 348. *Amphoriscus oviparus* after Haeckel: section at right angles to surface, ×50; external form, natural size.

Named form: **Amphoriscus semoni** Breitfuss

Amphoriscus semoni Breitfuss, 1896: 435; Dendy and Row, 1913: 782.

Description: Sponge solitary, tubular, stipitate; surface smooth; vent terminal, naked (?); texture (?); colour, in spirit, white; ectosomal skeleton of tangentially-arranged facial rays of ectosomal quadriradiates; tubar skeleton of apical rays of ectosomal quadriradiates and basal rays of subendosomal sagittal triradiates; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal quadriradiates, facial rays 0·34 to 0·51 by 0·01 to 0·02 mm., apical ray 0·52 to 0·79 by 0·019 to 0·027 mm.,
subendosomal sagittal triradiates, paired rays 0·11 to 0·15 by 0·01 mm., basal ray 0·29 to 0·37 by 0·02 mm.,
endosomal quadriradiates, facial rays 0·18 to 0·2 by 0·009 to 0·016 mm., apical ray 0·1 to 0·13 by 0·009 mm.

Distribution: Amboina.

Named form: **Syculmis synapta** Schmidt [in] Haeckel

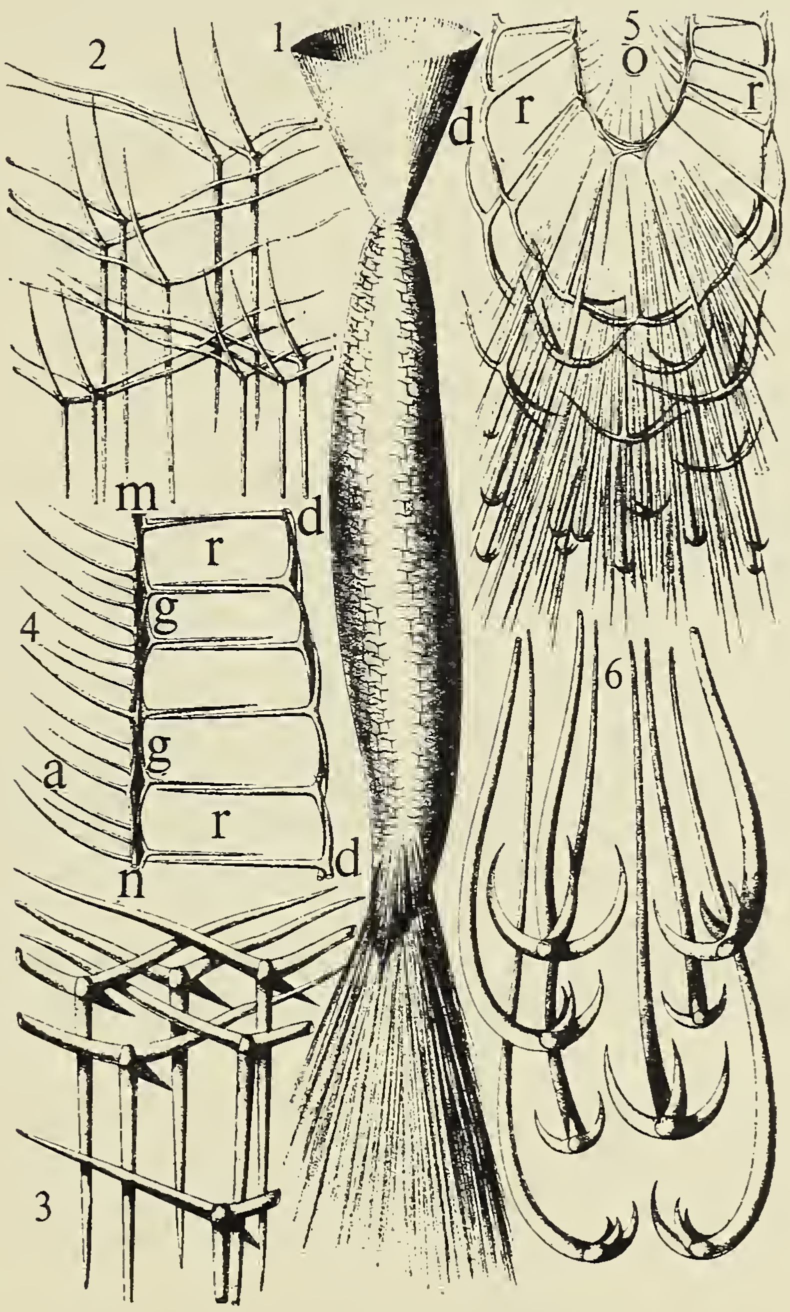
(text-fig. 349)

Syculmis synapta Haeckel, 1872: 288, pl. 1, figs. 1–6; *Sycurus synapta* Schmidt [in] Haeckel, 1872: 288, *Sycarium synapta*, Haeckel, 1872: 288, pl. 1, fig. 1; *Syculmis synapta*, Dendy and Row, 1913: 783.

Description: Sponge tubular, sessile, with root-tuft; surface even, non-hispid; vent apical, fringed; texture (?); colour, in spirit, white; ectosomal skeleton of facial rays of quadriradiates; skeleton of chamber layer of apical rays of ectosomal quadriradiates and basal rays of subendosomal sagittal quadriradiates; endosomal skeleton of paired and apical rays of subendosomal quadriradiates and a tangential layer of endosomal quadriradiates; skeleton of root-tuft of oxea and anchoring radiates.

Spicules: ectosomal quadriradiates, subregular to sagittal, facial rays 0·2 to 0·25 by 0·015 mm., apical ray 0·2 to 0·3 by 0·015 mm.,
subendosomal sagittal quadriradiates, paired rays 0·2 to 0·25 by 0·005 mm., basal ray 0·2 by 0·005 mm., apical ray 0·2 to 0·25 by 0·005 mm.,
endosomal quadriradiates, subregular, rays 0·2 by 0·005 mm.

Distribution: Brazil.



Text-fig. 349. *Syculmis synapta* after Haeckel: spicules (top left) of endosomal skeleton and (bottom left) of ectosomal skeleton, × 100; section through body wall (centre left), × 50; spicules at base of sponge (top right), × 50; anchoring spicules (bottom right) more highly magnified, × 300; external form (centre), × 5. This figure is taken entire from Haeckel's original description.

Named form: **Amphoriscus testiparus** (Haeckel)

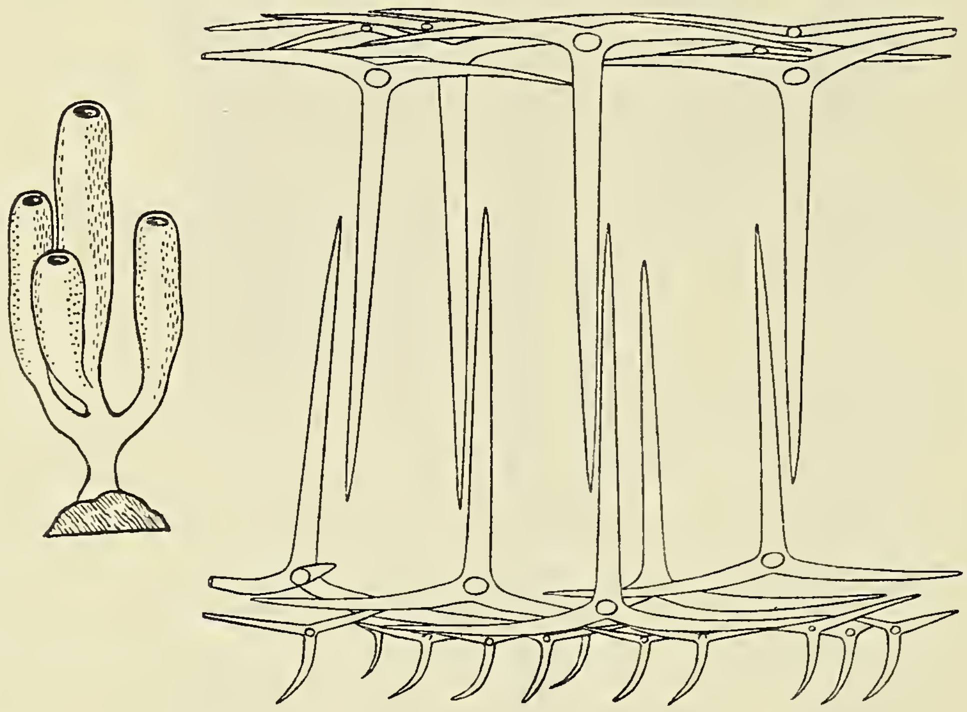
(text-fig. 350)

Sycaltis testipara Haeckel, 1872: 271, pl. xlvii, figs. 1–6; *Sycurus testiparus* Haeckel, 1872: 272, pl. xlvii, figs. 1–2; *Sycothamnus testiparus* Haeckel, 1872: 272, pl. xlvii, fig. 3; *Amphoriscus testiparus*, Dendy and Row, 1913: 782.

Description: Sponge tubular, stipitate; surface even, non-hispid; vent apical, naked; texture (?); colour, in spirit, brown; ectosomal skeleton a tangential layer of triradiates and a subectosomal layer of quadriradiates; tubar skeleton of basal rays of subectosomal and subendosomal quadriradiates; endosomal skeleton of paired and apical rays of subendosomal quadriradiates and a tangential layer of endosomal quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·15 to 0·2 by 0·01 to 0·015 mm., basal rays 0·2 to 0·3 by 0·01 to 0·015 mm.,
subectosomal quadriradiates, sagittal, paired rays 0·3 to 0·5 by 0·04 to 0·06 mm., basal ray 0·5 to 0·7 by 0·04 to 0·6 mm., apical ray 0·6 to 0·8 by 0·04 to 0·06 mm.,
subendosomal quadriradiates, regular, all rays 0·4 to 0·5 by 0·04 to 0·06 mm.,
endosomal quadriradiates, subregular, facial rays 0·2 to 0·3 by 0·02 to 0·03 mm., apical ray 0·05 to 0·07 by 0·02 to 0·03 mm.

Distribution: Cuba.



Text-fig. 350. *Amphoriscus testiparus* after Haeckel: section at right angles to surface, ×50; external form, natural size.

Named form: **Amphoriscus urna** Haeckel

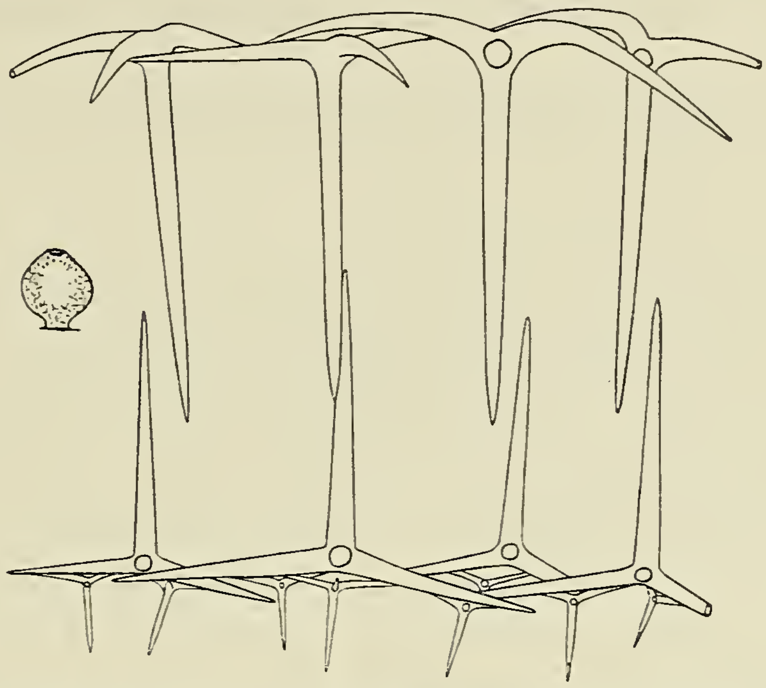
(text-fig. 351)

Amphoriscus urna Haeckel, 1870: 238; *Sycilla urna* Haeckel, 1872: 252, pl. xliii, figs. 12–14; *Sycurus urna* Haeckel, 1872: 252, pl. xliii, fig. 12; *Amphoriscus urna*, Dendy and Row, 1913: 782.

Description: Sponge spherical, substipitate; surface even, non-hispid; vent apical, naked; texture (?); colour, in spirit, white; ectosomal skeleton a tangential layer of quadriradiates; tubar skeleton of apical rays of ectosomal quadriradiates and basal rays of subendosomal sagittal quadriradiates; endosomal skeleton of paired rays and apical rays of subendosomal quadriradiates and a tangential layer of endosomal quadriradiates.

Spicules: ectosomal quadriradiates, sagittal, paired rays 0·2 to 0·3 by 0·04 mm., basal ray 0·1 to 0·15 by 0·04 mm., apical ray 0·5 to 0·6 by 0·04 mm.,
subendosomal sagittal quadriradiates, paired rays 0·2 to 0·3 by 0·02 mm., basal ray 0·3 to 0·4 by 0·02 mm., apical ray 0·2 to 0·3 by 0·02 mm.,
endosomal quadriradiates, sagittal, paired rays 0·15 by 0·004 to 0·008 mm., basal ray 0·2 by 0·004 to 0·008 mm., apical ray 0·1 by 0·004 to 0·008 mm.

Distribution: Venezuela.



Text-fig. 351. *Amphoriscus urna* after Haeckel: section at right angles to surface, ×50; external form, natural size.

Named form: **Leucilla uter** Poléjaeff

Leucilla uter Poléjaeff, 1883: 53, pl. vi, fig. 2; Dendy and Row, 1913: 784.

Description: Sponge solitary, tubular or sac-shaped, sessile; surface even, roughened; vents apical, naked; texture firm; colour, in spirit, white or yellowish; ectosomal skeleton of tangentially-disposed paired and apical rays of subectosomal quadriradiates, with tufts of trichoxea; tubar skeleton of oppositely-directed basal rays of subectosomal quadriradiates and subendosomal sagittal triradiates, with tubar quadriradiates irregularly scattered; endosomal skeleton of paired rays of subendosomal sagittal triradiates and a tangential layer of quadriradiates.

Spicules: ectosomal trichoxea, 0·4 by 0·0025 mm.,
subectosomal quadriradiates, sagittal, paired and apical rays 0·4 to 0·6 by 0·05 mm., basal rays 0·4 to 1·2 by 0·05 mm.,
tubar quadriradiates, similar to subectosomal quadriradiates,
subendosomal sagittal triradiates, paired rays 0·42 by 0·035 mm., basal rays 0·6 by 0·035 mm.,
endosomal quadriradiates, sagittal, paired rays 0·4 by 0·02 mm., basal rays 0·25 to 0·35 by 0·02 mm., apical rays 0·2 by 0·02 mm.

Distribution: Bermudas; Philippines; 59–183 m.

33. **Amphoriscus capsula** (Haeckel)

Named form: **Leucilla capsula** (Haeckel)

Lipostomella capsula Haeckel, 1870: 249; *Leucilla capsula* Haeckel, 1872: 134, pl. xxiv, figs. 1–3; *Lipostomella capsula* Haeckel, 1872: 135; *Leucilla capsula*, Dendy and Row, 1913: 784.

Description: Sponge irregularly massive; surface uneven, irregular, non-hispid; vents not apparent; texture soft; colour, in spirit, brown; ectosomal skeleton a tangential layer of quadriradiates; skeleton of chamber layer of apical rays of ectosomal and endosomal quadriradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal quadriradiates, subregular, rays 0·2 to 0·4 by 0·03 to 0·04 mm.,
endosomal quadriradiates, subregular, rays 0·2 to 0·4 by 0·01 to 0·013 mm.

Distribution: South Africa (Cape of Good Hope and Algoa Bay).

34. **Amphoriscus cucumis** (Haeckel)

Named form: **Amphoriscus saccharata** (Haeckel)

Leucandra saccharata Haeckel, 1872: 228, pl. xxxiii, fig. 3, pl. xxxviii, figs. 7–14; *Dyssycus saccharatus* Haeckel, 1872: 228, pl. xxxviii, figs. 7–8; *Lipostomella saccharata* Haeckel, 1872: 228, pl. xxxviii, figs. 9–10; *Amphoriscus saccharatus* Haeckel, 1872: 228, pl. xxxviii, fig. 11; *Aphroceras saccharatum* Haeckel, 1872: 228, pl. xxxviii, fig. 12; *Leuconia saccharata*, Ridley, 1884: 482; *Leucandra saccharata*, Lendenfeld, 1886: 1137; *Leuconia johnstoni*, var. *australiensis* Carter, 1886: 133; *Leucilla australiensis*, Dendy, 1892: 115; *L. saccharata*, Dendy, 1892: 116; *L. crosslandi* Row, 1909: 267, text-fig. 6; *L. proteus* Dendy, 1913: 25, pl. ii, fig. 7, pl. v, fig. 5; *Leucandra innominata* Dendy and Row, 1913: 774; *Leucilla australiensis*, Dendy and Row, 1913: 783; *L. proteus*, Dendy and Row, 1913: 784; *L. saccharata*, Dendy and Row, 1913: 784; Shaw, 1927: 422; *L. australiensis*, Burton, 1930: 7, text-fig. 6; *L. oblata* Row and Hozawa, 1931: 802, pl. xxi, fig. 18, text-fig. 17.

Diagnosis: Sponge ovate, massive and lobulate, or tubular; surface even, non-hispid or sparingly hispid; vent apical on lobes, naked or fringed; texture soft or firm, brittle; colour, in spirit, white or brown; ectosomal skeleton of a tangential layer of triradiates and facial rays of subectosomal quadriradiates, with or without microxea; skeleton of chamber layer of apical rays of subectosomal quadriradiates, scattered triradiates and quadriradiates, and basal rays of subendosomal tri- or quadriradiates; endosomal skeleton of facial rays of subendosomal tri- or quadriradiates and a tangential layer of endosomal tri- or quadriradiates.

Spicules: ectosomal triradiates, sagittal or subregular, rays 0·1 to 0·32 by 0·01 to 0·018 mm., microxea, 0·06 by 0·004 mm.;
subectosomal quadriradiates, facial rays 0·28 to 0·9 by 0·02 to 0·1 mm., apical ray 0·4 to 0·7 by 0·02 to 0·1 mm.,
triradiates and quadriradiates of chamber layer, regular or subregular, rays 0·16 to 0·8 by 0·02 to 0·1 mm., apical ray of quadriradiates 0·2 to 0·8 by 0·02 to 0·08 mm.,
subendosomal sagittal triradiates and quadriradiates, paired rays 0·12 to 0·24 by 0·01 to 0·024 mm., basal rays 0·64 by 0·01 to 0·024 mm.,
endosomal triradiates and quadriradiates, regular to sagittal, rays 0·16 to 0·5 by 0·015 to 0·24 mm., apical ray of quadriradiates 0·035 to 0·14 by 0·006 mm.

Distribution: Australia (Port Denison, Port Jackson, Port Phillip, Bass Strait, Maria Island, Tasmania); Banda Sea; Indian Ocean (Amirante), 0–90 m.; Red Sea (Suez).

Named form: **Paraleucilla cucumis** (Haeckel)

Leucandra cucumis Haeckel, 1872: 205, pl. xxxiii, fig. 1, pl. xxxvi, figs. 1–3; *Dyssycus cucumis* Haeckel, 1872: 205, pl. xxxvi, fig. 1; *Dyssyconella cucumis* Haeckel, 1872: 205, pl. xxxvi, fig. 2; *Dyssycarium cucumis* Haeckel, 1872: 205; *Leucandra bassensis* (= *L. cucumis* var. *bassensis*) Haeckel, 1872: 206; ? *L. palcensis* (= *L. cucumis* var. *palcensis*) Haeckel, 1872: 206; *Leucaltis cucumis* Haeckel, 1872: 206; *Paraleucilla cucumis*, Dendy, 1892: 116; Dendy and Row, 1913: 778.

Description: Sponge ovate, sessile; surface even, non-hispid; vent apical, naked or fringed; texture (?); colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates and oxea; subectosomal skeleton of two layers of quadriradiates with apical rays oppositely-directed; skeleton of chamber layer of scattered quadriradiates; endosomal skeleton a tangential layer of triradiates.

Spicules: ectosomal triradiates, regular to sagittal, rays 0·15 to 0·25 by 0·02 mm.,
oxea, 0·1 to 1·5 by 0·01 to 0·06 mm.,
subectosomal quadriradiates of outer layer, facial rays 0·6 by 0·05 mm., apical ray 0·75 by 0·05 mm.,
subectosomal quadriradiates of inner layer, facial rays 0·43 by 0·05 mm., apical rays 0·45 by 0·05 mm.,
quadriradiates of chamber layer, subregular, rays 0·1 to 0·6 by 0·02 to 0·05 mm.,
endosomal triradiates, sagittal, paired rays 0·2 to 0·3 by 0·02 to 0·03 mm., basal ray 0·1 to 0·4 by 0·02 to 0·03 mm.

Distribution: Indian Ocean (Palk Strait, Ceylon); Australia (Gulf St. Vincent and Bass Strait).

35. **Amphoriscus echinus** (Haeckel)

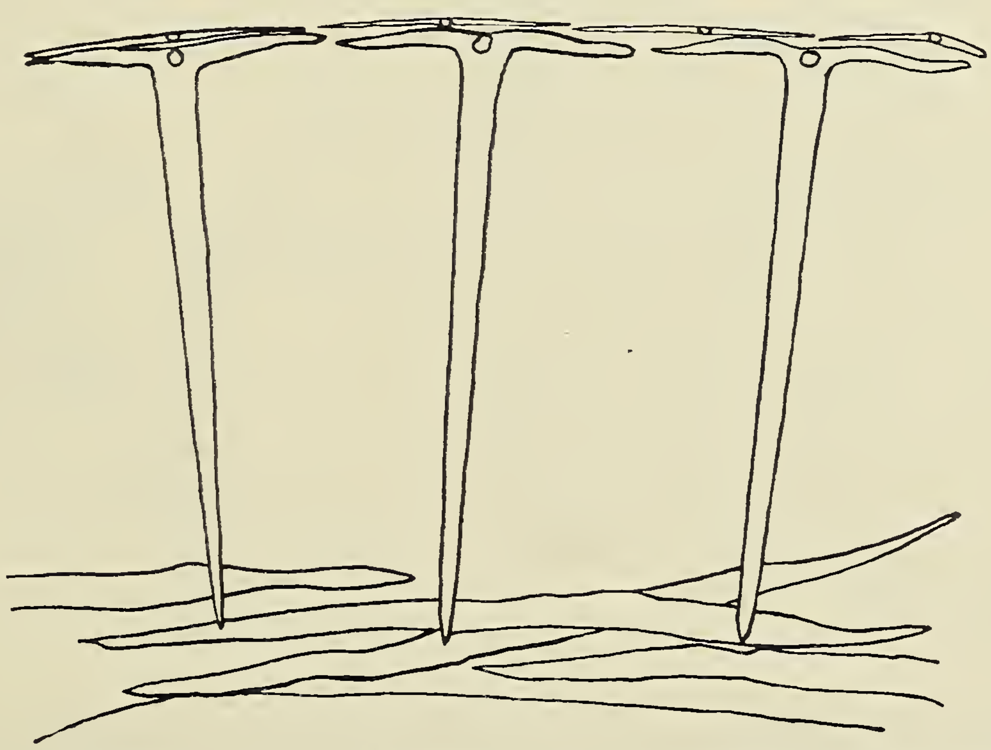
Named form: **Leucilla echinus** (Haeckel)

Leuculmis echinus Haeckel, 1872: 167, pl. xxx, figs. 1–11; *Dyssycus echinus* Haeckel, 1872: 168, pl. xxx, fig. 1; *Leucandra echinus*, Arnesen, 1901: 72; Arnesen, 1901: 27; *Leucilla echinus*, Dendy and Row, 1913: 784; Breitfuss, 1927: 31.

Description: Sponge spherical, unattached; surface even, hispid; vent apical, naked; texture (?); colour, alive and in spirit, (?) grey; ectosomal skeleton of facial rays of quadriradiates, with oxea projecting beyond surface; skeleton of chamber layer of apical rays of ectosomal quadriradiates and basal rays of subendosomal quadriradiates with small quadriradiates scattered between; endosomal skeleton of paired and apical rays of subendosomal quadriradiates.

Spicules: ectosomal quadriradiates, facial rays 0·4 to 0·5 by 0·05 to 0·07 mm., apical ray 0·6 to 0·8 by 0·05 to 0·07 mm.,
oxea, 1·0 to 3·0 by 0·06 to 0·08 mm.,
quadriradiates of chamber layer, regular, rays 0·1 to 0·2 by 0·01 to 0·012 mm.,
subendosomal sagittal quadriradiates, paired rays 0·4 to 0·5 by 0·05 to 0·07 mm., basal ray 0·6 to 0·8 by 0·05 to 0·07 mm., apical ray 0·4 to 0·5 by 0·05 to 0·07 mm.

Distribution: Norway (Bergen); 92 m.



Text-fig. 352. *Leucaltis gastrorhabdifera* Burton: section across body wall to show arrangement of skeleton, × 100.

36. **Amphoriscus ? gastrorhabdifera** (Burton)

Named form: **Leucaltis gastrorhabdifera** Burton

(text-fig. 352)

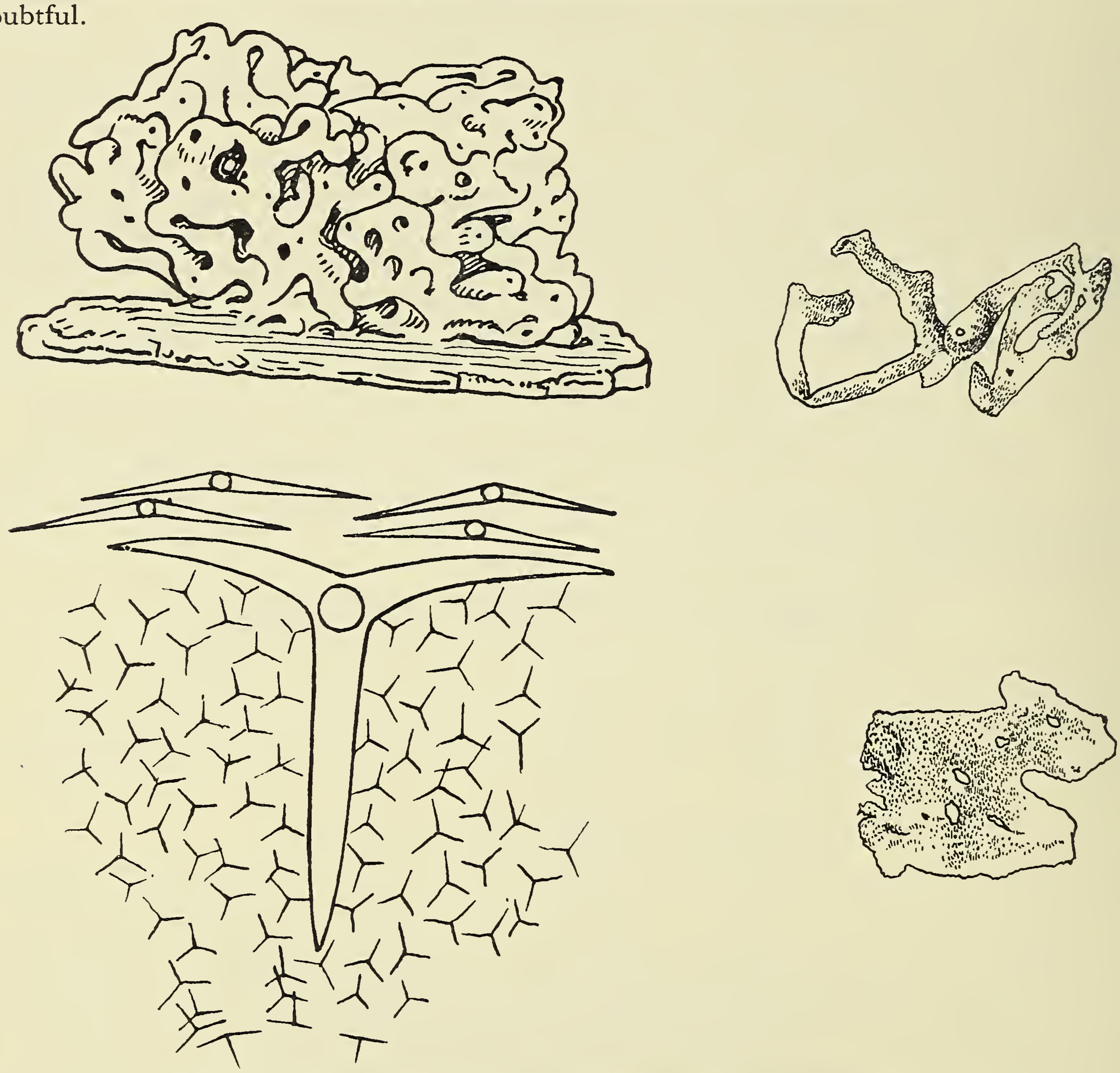
Leucaltis gastrorhabdifera Burton, 1932: 259, figs. 4–5.

Description: Sponge tubular; surface minutely and sparingly roughened; vent apical, naked; texture soft; colour, in spirit, pale yellow; ectosomal skeleton a single tangential layer of triradiates; skeleton of chamber layer formed by subectosomal quadriradiates; with a subendosomal skeleton of large rhabds.

Spicules: ectosomal triradiates, regular, rays 0·18 by 0·01 mm.,
subectosomal quadriradiates, with facial rays 0·18 by 0·02 mm., and basal rays 0·28 to 0·42 by 0·024 mm.,
subendosomal rhabds 0·59 by 0·022 mm. (similar rhabds occasionally project at the ectosomal surface).

Distribution: Tristan da Cunha; 80–140 m.

Remarks: The holotype is small and sufficiently aberrant in spiculation to make its relationships doubtful.



Text-fig. 353. *Leucaltis clathria*: section at right angles to surface, ×50 (?); external form (top left, after Poléjaeff, and remaining two specimens after Dendy (1913)), natural size.

Genus **Leucettusa** Haeckel

Leucettusa Haeckel, 1872: 117; *Leucaltis* Haeckel, 1872: 142; *Leucaltusa* Haeckel, 1872: 143; *Artynaltis* Haeckel, 1872: 406; *Heteropegma* Poléjaeff, 1883: 45.

Type-species: Leucettusa corticata Haeckel, 1872: 129, pl. xxii, figs. 4–8.

37. **Leucettusa corticata** (Haeckel)

Named form: **Leucaltis clathria** Haeckel

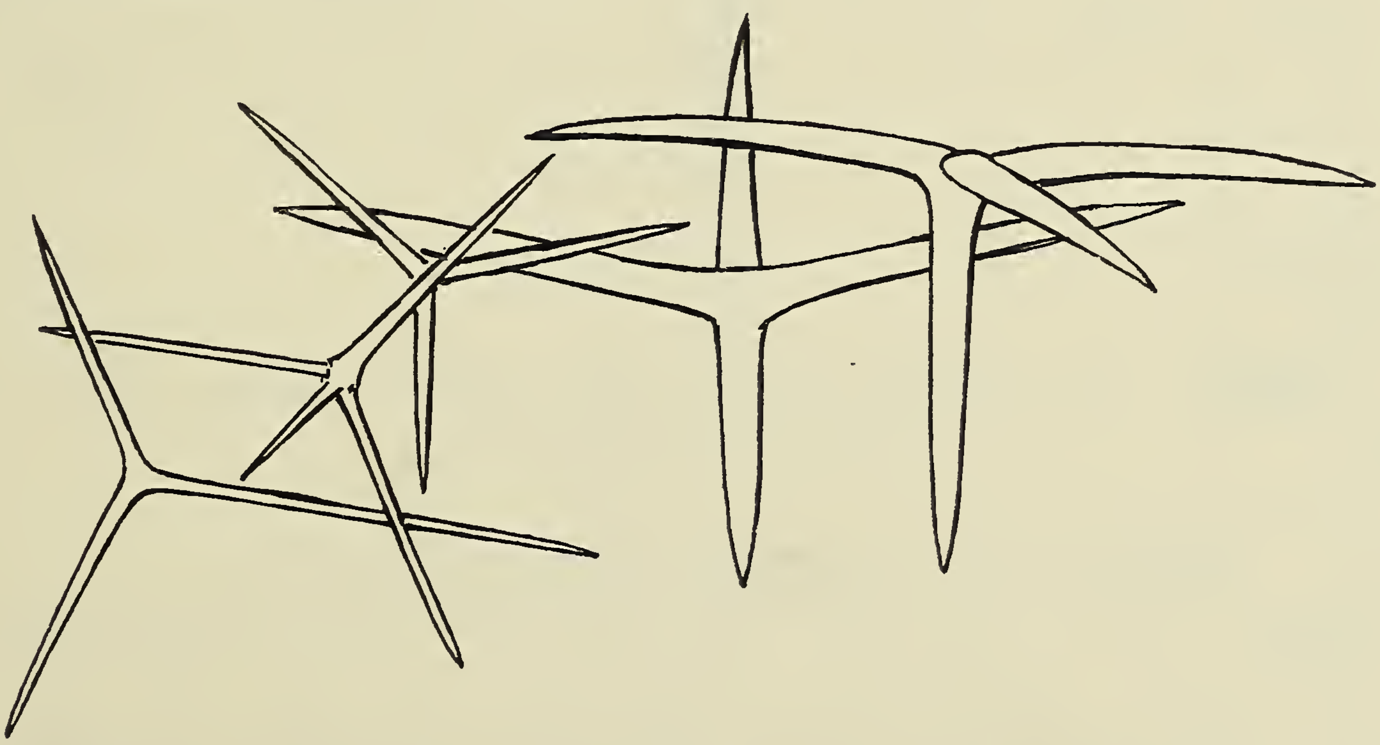
(text-fig. 353–354)

Leucaltis clathria Haeckel, 1872: 159, pl. xxviii, fig. 3; *Artynas clathria* Haeckel, 1872: 159; *Heteropegma nodus gordii* Poléjaeff, 1883: 45, pl. i, fig. 7, pl. iv, fig. 1; *Leucaltis bathybia*, var. *mascarenica* Ridley, 1884: 628, pl. liv, fig. A; *Heteropegma nodus gordii*, Lendenfeld, 1885: 1107; *Clathrina latitubulata* Carter, 1886: 515; *Heteropegma nodus gordii*, Dendy, 1892: 113; *H. latitubulata*, Dendy, 1892: 114; *H. nodus gordii*, Dendy 1893: 204, pl. xiii, fig. 20; Hanitsch, 1895: 209; Bidder, 1898: 75; Dendy, 1905: 230; Jenkin, 1908: 453, fig. 103; *Leucaltis clathria*, Dendy and Row, 1913: 738; Dendy, 1913: 16, pl. ii, figs. 1–2; Hozawa, 1940: 136, pl. vi, fig. 3; Arndt, 1941: 46; Tanita, 1943: 394, pl. xiii, fig. 27.

Description: Sponge a clathrate mass of anastomosing tubes, sessile; surface even, smooth; vents small, scattered, naked; texture firm, friable; colour, in spirit, white to yellowish-grey; ectosomal skeleton of several tangential layers of triradiates, with facial rays of subectosomal quadriradiates; skeleton of chamber layer of centripetally-directed apical rays of subectosomal quadriradiates and small, irregularly-scattered quadriradiates; endosomal skeleton of several tangential layers of quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·4 to 0·6 by 0·03 to 0·05 mm.,
subectosomal quadriradiates, regular, all rays 0·8 to 1·2 by 0·1 to 0·15 mm.,
triradiates and quadriradiates of endosomal and chamber layer skeletons, regular to sagittal, rays 0·03 to 0·07 by 0·002 to 0·003 mm.

Distribution: Florida; Bermudas; West coast of Portugal; Indian Ocean (Ceylon, Amirante, Cargados Carajos, Egmont Reef); East Africa (Wasin); Australia (Torres Straits, Port Phillip Heads); Japan (Okinawa); littoral to 82 m



Text-fig. 354. *Leucaltis bathybia* var. *mascarenica* after Ridley: the three spicules to the left, ×370; the two to the right, ×38.

Named form: **Leucettusa corticata** (Haeckel)

(text-fig. 355)

Leucetta corticata Haeckel, 1872: 129, pl. xxii, figs. 4–8; *Aphroceras corticatum* Haeckel, 1872: 130, pl. xxii, fig. 4; *Leucettusa corticata*, Dendy and Row, 1913: 739.

Description: Sponge a clathrate mass of anastomosing tubes, sessile; surface smooth; vents not apparent; texture (?); colour, in spirit, brown; ectosomal skeleton of several tangential layers of triradiates; skeleton of chamber layer and of endosomal surfaces of small triradiates.

Spicules: ectosomal triradiates, regular, rays 0·4 to 0·6 by 0·04 to 0·06 mm.,
triradiates of chamber layer and endosomal surfaces, sagittal, paired rays 0·05 to 0·07 by 0·002 mm., basal rays 0·03 to 0·04 by 0·002 mm. (those of inner parts of chamber layer with swollen ends to rays).

Distribution: Cuba.

Text-fig. 355. *Leucettusa corticata* after Haeckel: spicules, ×100; external form, natural size.

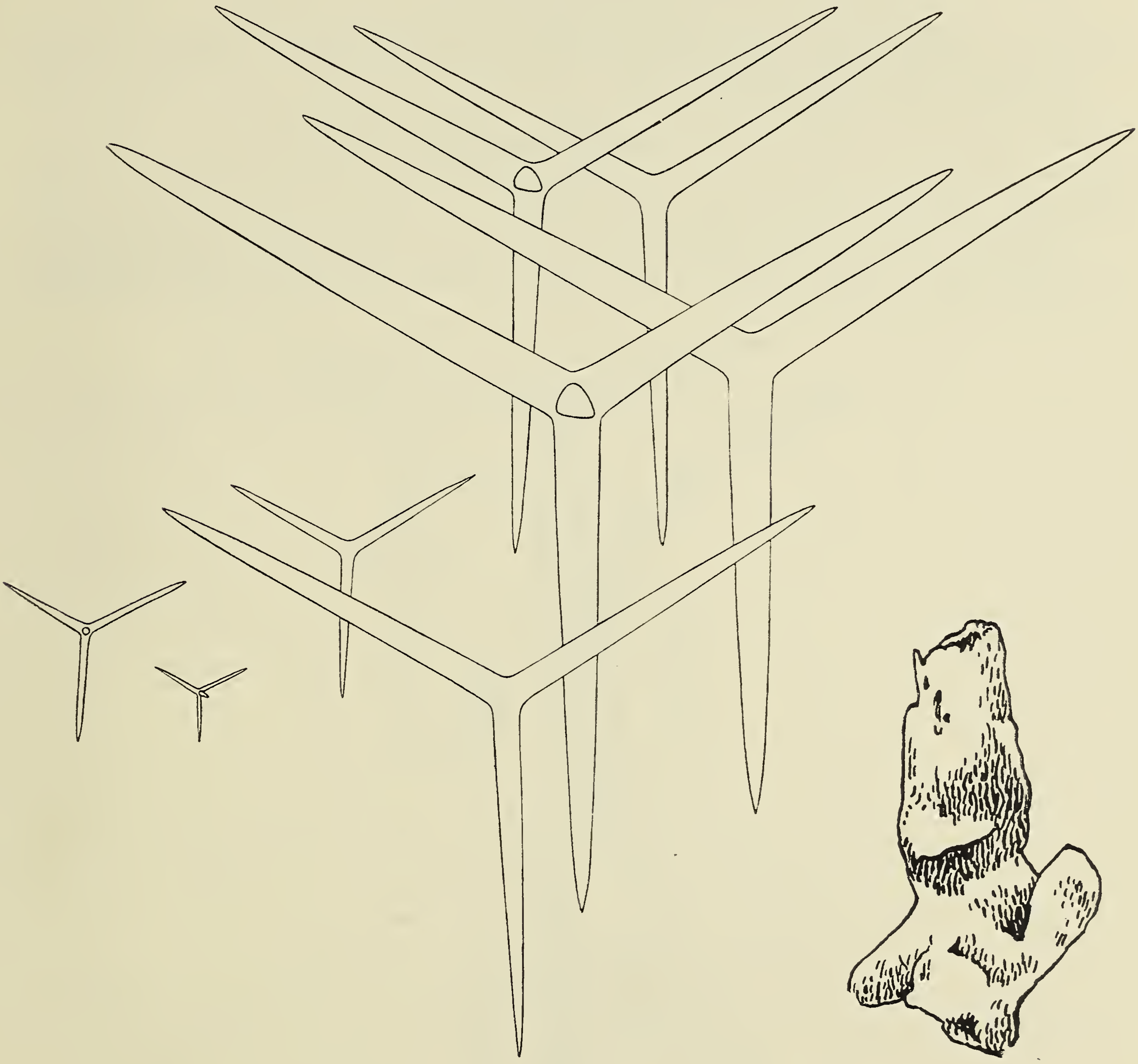
Named form: **Leucettusa sambucus** (Preiwisch)

Leucetta sambucus Preiwisch, 1904: 12, pl. iii, fig. 7; *Leucettusa sambucus*, Dendy and Row, 1913: 739.

Description: Sponge a clathrate mass of anastomosing tubes, sessile; surface smooth; vents not apparent; texture soft; colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates; skeleton of chamber layer of small quadriradiates, and a few large quadriradiates; endosomal skeleton of small quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·085 to 0·38 by 0·01 to 0·033 mm.,
small quadriradiates of chamber layer, regular to subregular, rays 0·01 to 0·06 by 0·003 to 0·008 mm.,
large quadriradiates of chamber layer, sagittal, paired rays 0·12 to 0·2 by 0·02 to 0·03 mm., basal rays 0·1 to 0·16 by 0·016 to 0·021 mm., apical rays 0·1 to 0·16 by 0·016 to 0·021 mm.,
endosomal quadriradiates, similar to small quadriradiates of chamber layer.

Distribution: Chatham Islands.



Text-fig. 356. *Leucaltis tenuis* after Hozawa: spicules, ×100; external form, natural size.

Named form: **Leucaltis tenuis** Hozawa

(text-fig. 356)

Leucaltis tenuis Hozawa, 1929: 289, pl. xiii, figs. 10, 11, text-fig. 5; Tanita, 1943: 395.

Description: Sponge composed of branching and anastomosing tubes (15 mm. diameter) mainly blind but largest bearing a terminal vent; surface even, smooth; margin of vent irregular in outline; texture brittle, friable; colour, in spirit, white; ectosomal skeleton of large, densely-packed triradiates and quadriradiates; skeleton of chamber layer of centrifugally-directed rays of ectosomal quadriradiates and sparsely scattered quadriradiates; endosomal skeleton of a few layers of tangential triradiates.

Spicules: ectosomal quadriradiates, variable in size, regular, facial rays 0·25 to 0·7 by 0·03 to 0·08 mm., apical ray 0·4 to 0·97 mm. long,
ectosomal triradiates, regular, rays 0·3 to 0·57 by 0·02 to 0·06 mm.,
quadriradiates of chamber layer, regular, all rays 0·05 to 0·15 by 0·004 to 0·008 mm.,
endosomal triradiates, regular, rays 0·2 to 0·55 by 0·016 to 0·04 mm.

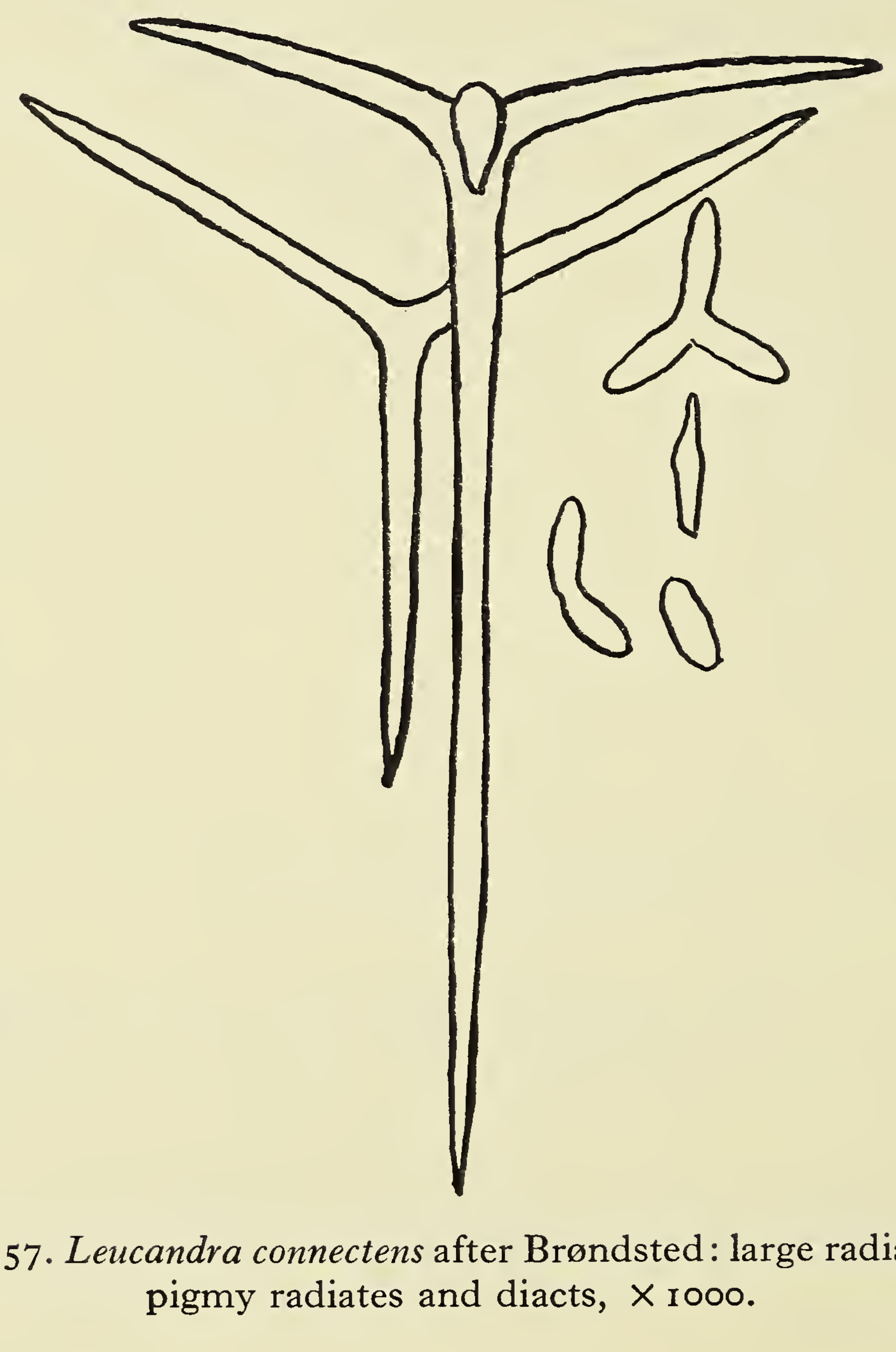
Distribution: Japan (Kagoshima); 100 m.

Named form: **Leucandra connectens** Brøndsted

(text-fig. 357)

Leucandra connectens Brøndsted, 1926: 308, text-fig. 8.

Description: Sponge tubular, digitate; surface even, smooth; vent apical; texture firm; colour, in spirit, whitish; ectosomal skeleton a dense tangential layer of triradiates, with quadriradiates



Text-fig. 357. *Leucandra connectens* after Brøndsted: large radiates, × 100, pigmy radiates and diacts, × 1000.

of similar size having the apical ray directed into choanosome; choanosomal and endosomal skeletons of pigmy triradiates, quadriradiates and diradiates.

Spicules: ectosomal triradiates, rays up to 0·4 by 0·025 to 0·03 mm.,
ectosomal quadriradiates, with facial fays 0·35 to 0·4 by 0·035 to 0·04 mm., apical ray 0·7 by 0·06 mm.,
pigmy radiates, rays 0·01 to 0·015 by 0·003 to 0·004 mm.

Distribution: New Zealand (Cape Maria van Diemen), 92 m.

38. **Leucettusa imperfecta** (Poléjaeff)

Named form: **Leucettusa haeckeliana** (Poléjaeff)

(text-fig. 358)

Leucetta haeckeliana Poléjaeff 1883, 69, pl. ii, fig. 6, pl. viii, figs. 1–6; *Leucettusa haeckeliana*, Dendy and Row, 1913: 739; Burton, 1932: 261.

Description: Sponge solitary, tubular, substipitate; surface smooth; vents apical, naked; texture firm; colour, in spirit, white; ectosomal skeleton of several tangential layers of triradiates and facial rays of subectosomal quadriradiates; skeleton of chamber layer of centripetally-directed apical rays of subectosomal quadriradiates, together with small quadriradiates irregularly-scattered, chiefly in linings of canals; endosomal skeleton of a tangential layer of small quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·55 by 0·03 mm.,
subectosomal quadriradiates, regular, all rays 0·75 by 0·075 mm. (very rare),
quadriradiates of chamber layer, regular to sagittal, facial rays 0·02 by 0·005 mm., apical rays 0·02 to 0·08 by 0·005 mm.,
endosomal quadriradiates, similar to quadriradiates of chamber layer.

Distribution: Australia (Port Jackson); Falkland Islands; 55–144 m.

Text-fig. 358. *Leucettusa haeckeliana* after Poléjaeff: external form, natural size.

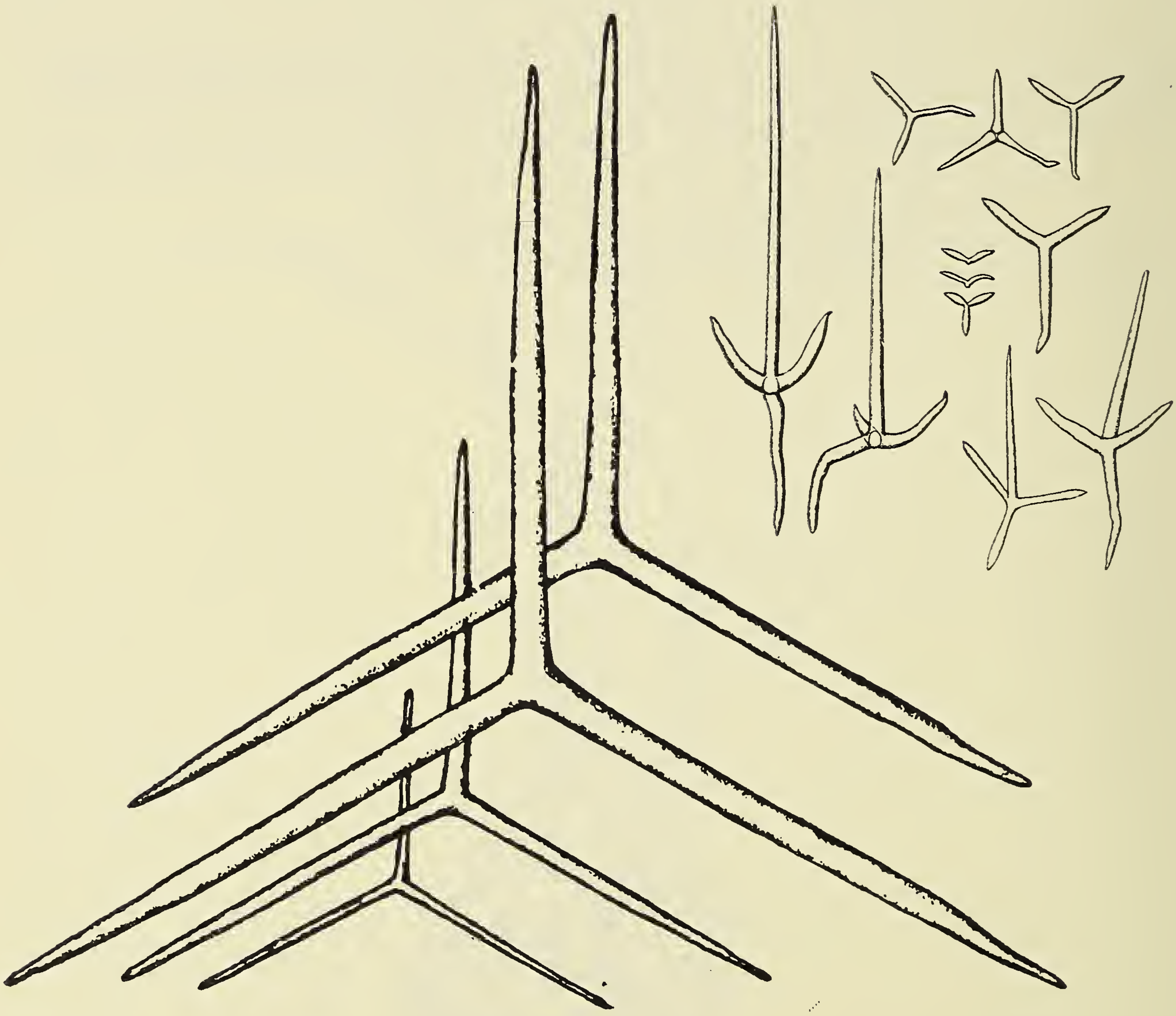
Named form: **Leucettusa imperfecta** (Poléjaeff)

Leucetta imperfecta Poléjaeff, 1883: 67, pl. vii, fig. 9; *Vosmaeria imperfecta*, Lendenfeld, 1885; 1113; *Leucilla imperfecta*, Dendy, 1892: 115; *Leucettusa imperfecta*, Dendy and Row, 1913: 739.

Description: Sponge solitary, tubular, sessile; surface even, rough to touch; vent apical, naked; texture firm; colour, in spirit, yellowish; ectosomal skeleton a tangential layer of triradiates (perhaps with some quadriradiates?); skeleton of chamber layer of large quadriradiates and small quadriradiates and triradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·6 by 0·03 to 0·06 mm.,
? ectosomal quadriradiates, regular, rays 0·3 to 1·0 by 0·03 to 0·1 mm.,
large quadriradiates of chamber layer, regular, all rays 0·3 to 1·0 by 0·03 to 0·1 mm.,
small quadriradiates of chamber layer, regular, all rays 0·06 to 0·08 by 0·006 to 0·008 mm.,
small triradiates of chamber layer, rays 0·025 by 0·002 mm.,
quadriradiates, regular, all rays 0·06 to 0·08 by 0·006 to 0·008 mm.

Distribution: Australia (Port Jackson); 55–64 m.



Text-fig. 359. *Leucettusa lancifer* after Dendy: large triradiates, ×100, pigmy radiates, ×200; external form, natural size.

Named form: **Leucettusa lancifer** Dendy

(text-fig. 359)

Leucettusa lancifer Dendy, 1924: 278, pl. i, figs. 11–18; Burton, 1929: 402.

Description: Sponge spherical, stipitate; surface even, non-hispid; vent apical, naked; texture firm, compressible; colour, in spirit, white; ectosomal skeleton of several layers of triradiates; skeleton of chamber layer of small scattered triradiates and quadriradiates; endosomal skeleton absent; oscular skeleton absent;.

Spicules: ectosomal triradiates, subregular, rays 1·0 by 0·062 mm.,
triradiates of chamber layer, sagittal, paired rays 0·04 by 0·006 mm., basal ray 0·05 by 0·006 mm.,
quadriradiates of chamber layer, sagittal, paired rays 0·044 by 0·009 mm., basal ray 0·077 by 0·007 mm., apical ray 0·18 by 0·007 mm.

Distribution: New Zealand (Three Kings Isle); Antarctic (Cape Adair, McMurdo Sound); 82–457 m.

Named form: **Leucettusa mariae** Brøndsted

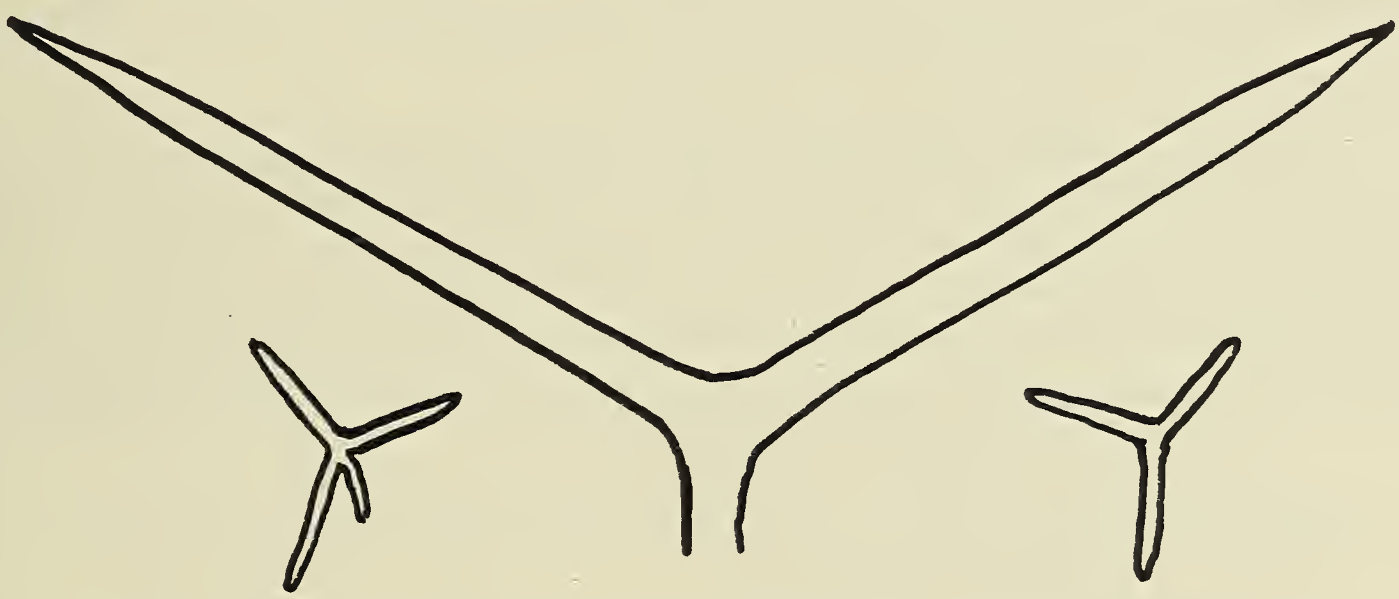
(text-fig. 360)

Leucettusa mariae Brøndsted, 1926: 302, text-fig. 5.

Description: Sponge spherical, substipitate; surface even, harsh to touch; vent apical; texture loose, 'like felt'; colour (?); skeleton a dense ectosomal layer of triradiates, occasionally quadriradiates; choansosomal skeleton (and endosomal ?) of pigmy radiates.

Spicules: triradiates (and occasional quadriradiates), rays up to 0·9 by 0·065 mm.,
pigmy radiates, rays 0·025 mm. long.

Distribution: New Zealand (Cape Maria van Dieman), 92 m.



Text-fig. 360. *Leucettusa mariae* after Brøndsted: large triradiates, ×70; pigmy triradiates, ×500.

Named form: **Leucettusa pyriformis** Brøndsted

Leucettusa pyriformis Brøndsted, 1926: 301, text-fig. 4.

Description: Sponge pyriform; surface even, roughened; oscules small; texture firm; colour, in spirit, grey; skeleton of large and small triradiates, larger spicules found especially in tangentia layers in ectosome.

Spicules: large triradiates, rays up to 0·7 by 0·055 mm.,
small triradiates (dimensions not given).

Distribution: New Zealand (Cape Maria van Diemen), 92 m.

Named form: **Leucandra schauinslandi** (Preiwisch)

Leucetta schauinslandi Preiwisch, 1904: 10, pl. ii, figs. 1–6; *Leucandra schauinslandi*, Dendy and Row, 1913: 774.

Description: Sponge solitary, ovate, sessile; surface smooth; vent apical, naked (?); texture firm; colour, in spirit, white; ectosomal skeleton a tangential layer of quadriradiates, with some triradiates; skeleton of chamber layer of triradiates and quadriradiates, irregularly-scattered; endosomal skeleton a tangential layer of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal quadriradiates, sagittal, paired rays 0·03 to 0·16 by 0·02 to 0·03 mm., basal rays 0·1 to 0·25 by 0·02 to 0·03 mm., apical rays (dimensions not given),
ectosomal triradiates, subregular, rays 0·09 to 0·12 by 0·02 to 0·033 mm.,
triradiates of chamber layer, regular or subregular, rays 0·04 to 0·17 by 0·003 to 0·01 mm.,
quadriradiates of chamber layer, sagittal, paired rays 0·12 to 0·23 by 0·003 to 0·01 mm., basal rays 0·062 to 0·17 by 0·003 to 0·01 mm., apical rays 0·04 to 0·17 by 0·003 to 0·01 mm.,
endosomal quadriradiates, subregular, facial rays 0·05 to 0·23 by 0·008 to 0·012 mm., apical rays 0·05 to 0·2 by 0·08 to 0·012 mm.,
endosomal triradiates, irregular, rays varying from 0·03 to 0·18 by 0·006 mm.

Distribution: Chatham Islands.

Named form: **Leucandra tuberculata** Hozawa

(text-fig. 361)

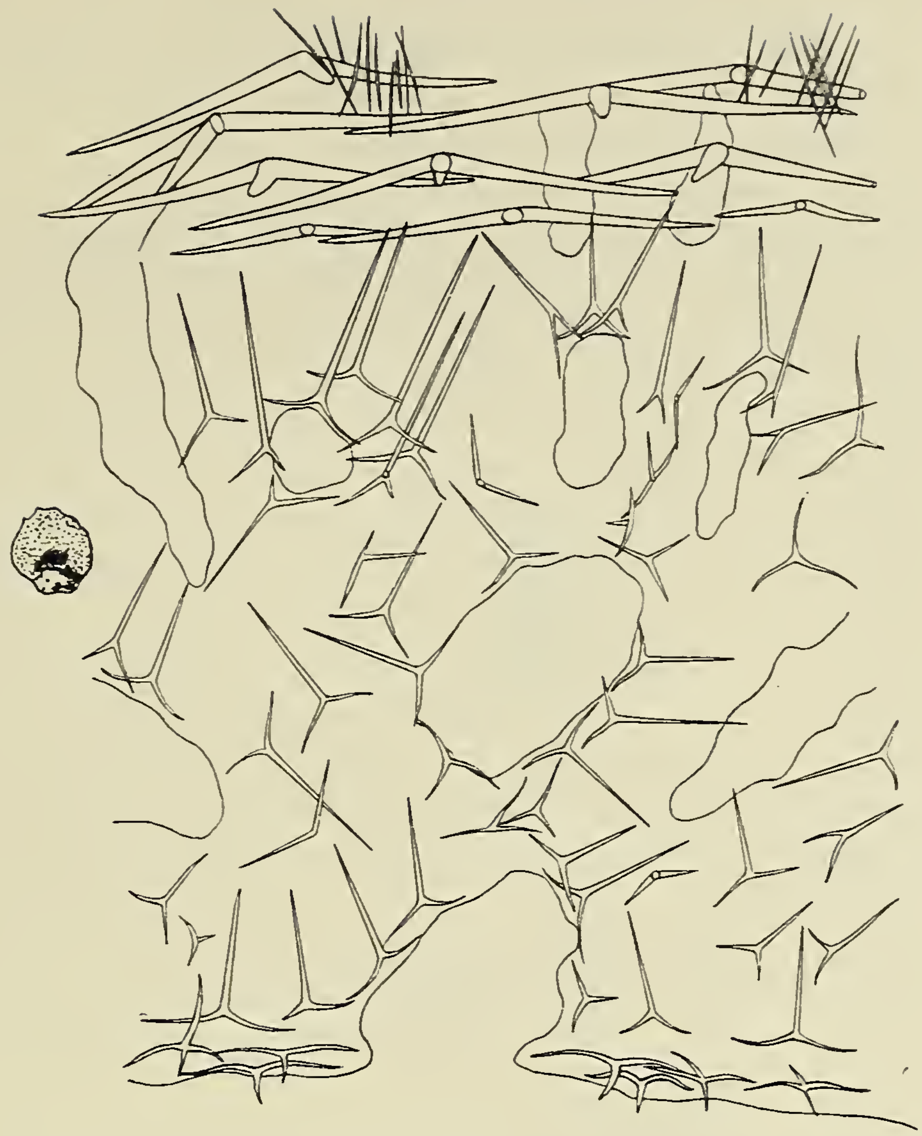
Leucandra tuberculata Hozawa, 1929: 342, pl. xviii, figs. 44–45, text-fig. 23; Tanita, 1942: 61, pl. iv, fig. 29; Tanita, 1943: 447, pl. xviii, figs. 73–74.

Description: Sponge oval, narrowing towards base; surface tuberculate, minutely hispid; margin of vent well developed; texture hard, elastic; colour, in spirit, white; skeleton of chamber layer of triradiates, with a few quadriradiates, with centrifugally-directed basal rays of subendosomal triradiates; ectosomal skeleton of many layers of large tangential triradiates, with tufts of oxea vertical to surface; endosomal skeleton of paired rays of subendosomal triradiates, and one or two layers of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·27 to 0·57 by 0·02 to 0·05 mm., basal ray 0·16 to 0·46 by 0·02 to 0·05 mm.,
oxea, 0·2 by 0·006 mm.,
tubar triradiates, sagittal, paired rays 0·07 to 0·09 by 0·01 to 0·012 mm., basal ray 0·1 to 0·18 by 0·08 to 0·01 mm.,
tubar quadriradiates, similar to triradiates, with apical ray 0·023 by 0·006 mm.,
subendosomal triradiates, sagittal, paired rays 0·08 by 0·012 m., basal ray 0·16 by 0·012 mm.,
endosomal triradiates, sagittal, paired rays 0·07 by 0·01 mm., basal ray 0·1 by 0·01 mm.,
endosomal quadriradiates, subregular, paired rays 0·11 by 0·012 mm., basal ray 0·1 by 0·012 mm., apical ray 0·06 by 0·012 mm.

Distribution: Japan.

Remarks: The external form, especially as illustrated by the holotype, recalls strongly the subantarctic forms of *Leucettusa*. In spiculation, the main difference between this *Leucandra tuberculata* and the southern forms of *Leucettusa imperfecta* lies in the presence of small oxea in the ectosome.



Text-fig. 361. *Leucandra tuberculata* after Hozawa: section at right angles to surface, ×50; external form, ×½.

Named form: **Leucettusa vera** (Poléjaeff)

Leucetta vera Poléjaeff, 1883: 68, pl. vii, figs. 7–10; *Leucettusa vera*, Dendy and Row, 1913: 739.

Description: Sponge solitary, tubular, substipitate; surface even, rough; vent apical, naked; texture firm; colour, in spirit, greyish; ectosomal skeleton a tangential layer of triradiates, with tangentially-placed facial rays of subectosomal quadriradiates; skeleton of chamber layer of centripetally-directed apical rays of subectosomal quadriradiates and irregularly-scattered quadriradiates; endosomal skeleton a tangential layer of quadriradiates.

Spicules: ectosomal triradiates, regular, rays 0·45 by 0·038 mm.,
ectosomal quadriradiates, sagittal, facial rays 0·8 by 0·08 mm., apical rays 0·6 to 2·0 by 0·08 mm.,
quadriradiates of chamber layer, regular, all rays 0·05 to 0·1 by 0·005 to 0·01 mm.,
endosomal quadriradiates, regular, all rays 0·05 to 0·1 by 0·005 to 0·01 mm.

Distribution: Kerguelen; 18–183 m.

39. **Lamontia zona** Kirk

Named form: **Lamontia zona** Kirk

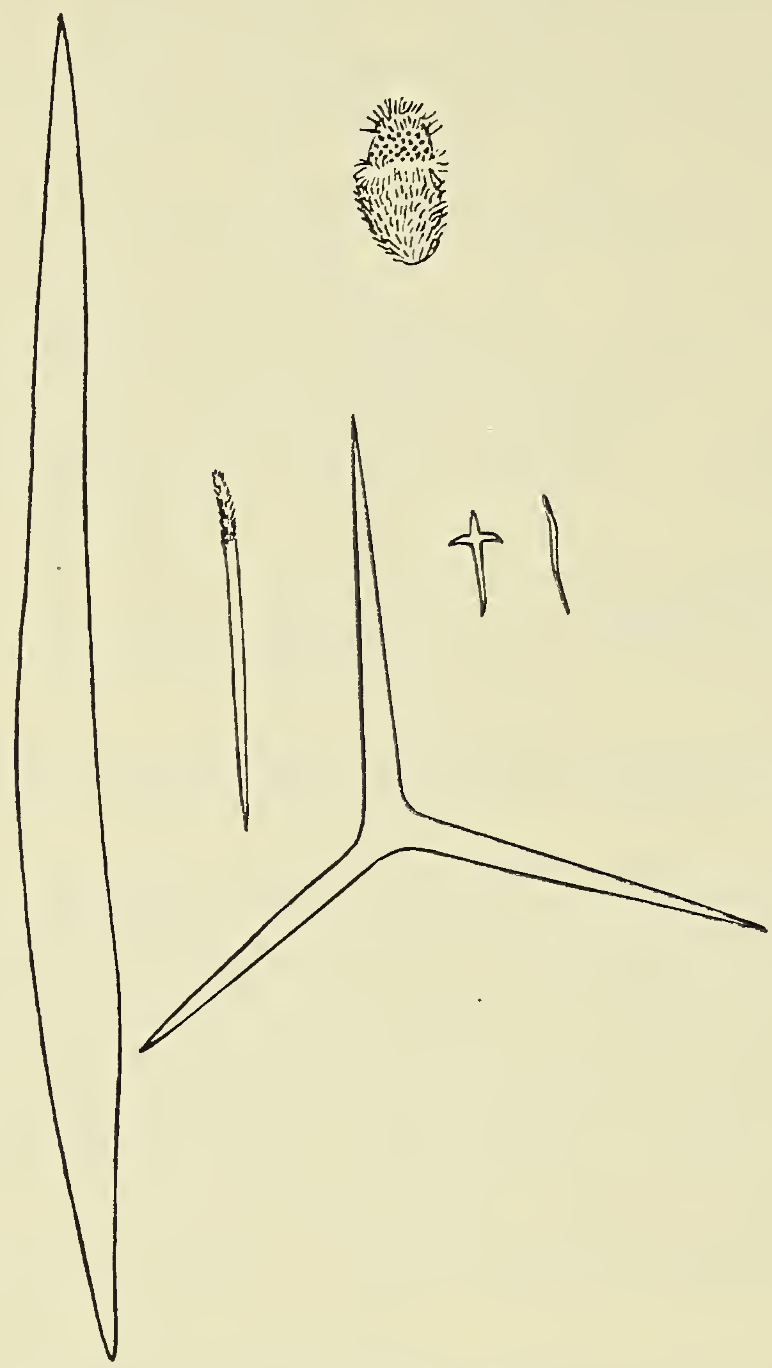
(text-fig. 362)

Lamontia zona Kirk, 1894: 289, pl. xxv, figs. 1–8, pl. xxvi, figs. 1–8; Dendy and Row, 1913: 779.

Description: Sponge tubular, sessile; surface hispid; vent apical, fringed; pores in special area, usually a subterminal, equatorial zone, but may be irregular or longitudinal; texture (?); colour, in spirit, white; ectosomal skeleton a tangential layer of triradiates, with projecting oxea and microxea; skeleton of chamber layer of microxea; endosomal skeleton of quadriradiates.

Spicules: ectosomal triradiates, subregular rays 0·35 by 0·035 mm.,
oxea, 0·9 by 0·051 mm.,
ectosomal microxea, distally-spined, 0·28 by 0·01 mm.,
microxea of chamber layer, 0·07 to 0·1 by 0·005 to 0·01 mm.,
endosomal quadriradiates, subregular, facial rays 0·02 by 0·008 mm.

Distribution: New Zealand (Cook Strait), depth not given.



Text-fig. 362. *Lamontia zona* after Kirk: spicules, × 100, showing (left to right) large oxeote, ectosomal microxeote, ecotosmal triradiate, endosomal 'dagger' quadriradiate and microxeote of chamber layer; external form, natural size.

Genus **Lelapia** Gray

Lelapia Gray, 1867:557; *Leucettaga* Haeckel, 1872: 117; *Kebira* Row, 1909: 210; *Paralelapia* Hozawa, 1923: 185.

Type-species: Lelapia australis Gray, 1867, 557.

40. **Lelapia australis** Gray

Named form: **Lelapia australis** Gray

Lelapia australis Gray, 1867: 557; Carter, 1886: 138; Carter, 1886: 148; Dendy, 1892: 105; Dendy, 1893: 237; Dendy and Row, 1913: 785.

Description: Sponge tubular, sessile; surface even, non-hispid; vent apical, fringed; texture (?); colour, dried (?), whitish-yellow; ectosomal skeleton a tangential layer of triradiates, with microxea set at right angles to surface; skeleton of chamber layer of large, scattered oxea, bundles of 'tuning-fork' spicules and (more rarely) bundles of slender oxea, and subendosomal sagittal triradiates; endosomal skeleton of several tangential layers of triradiates rarely quadriradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·17 by 0·012 mm., basal ray 0·3 by 0·012 mm.,
microxea, 0·07 to 0·1 by 0·003 to 0·004 mm.,
oxea, 1·0 to 2·0 by 0·036 to 0·08 mm.,
'tuning-fork' spicules, 0·6 to 0·8 by 0·01 mm.,
oxea (modified 'tuning-fork' spicules?), 0·6 to 0·8 by 0·01 mm.,
subendosomal sagittal triradiates, paired rays 0·26 by 0·024 mm., basal ray 0·5 by 0·024 mm.,
endosomal quadriradiates, sagittal, paired rays 0·3 by 0·01 mm., basal ray 0·035 to 0·1 by 0·01 mm., apical ray 0·035 to 0·1 by 0·01 mm.

Distribution: Australia (Port Phillip Heads).

Named form: **Lelapia antiqua** Dendy and Frederick

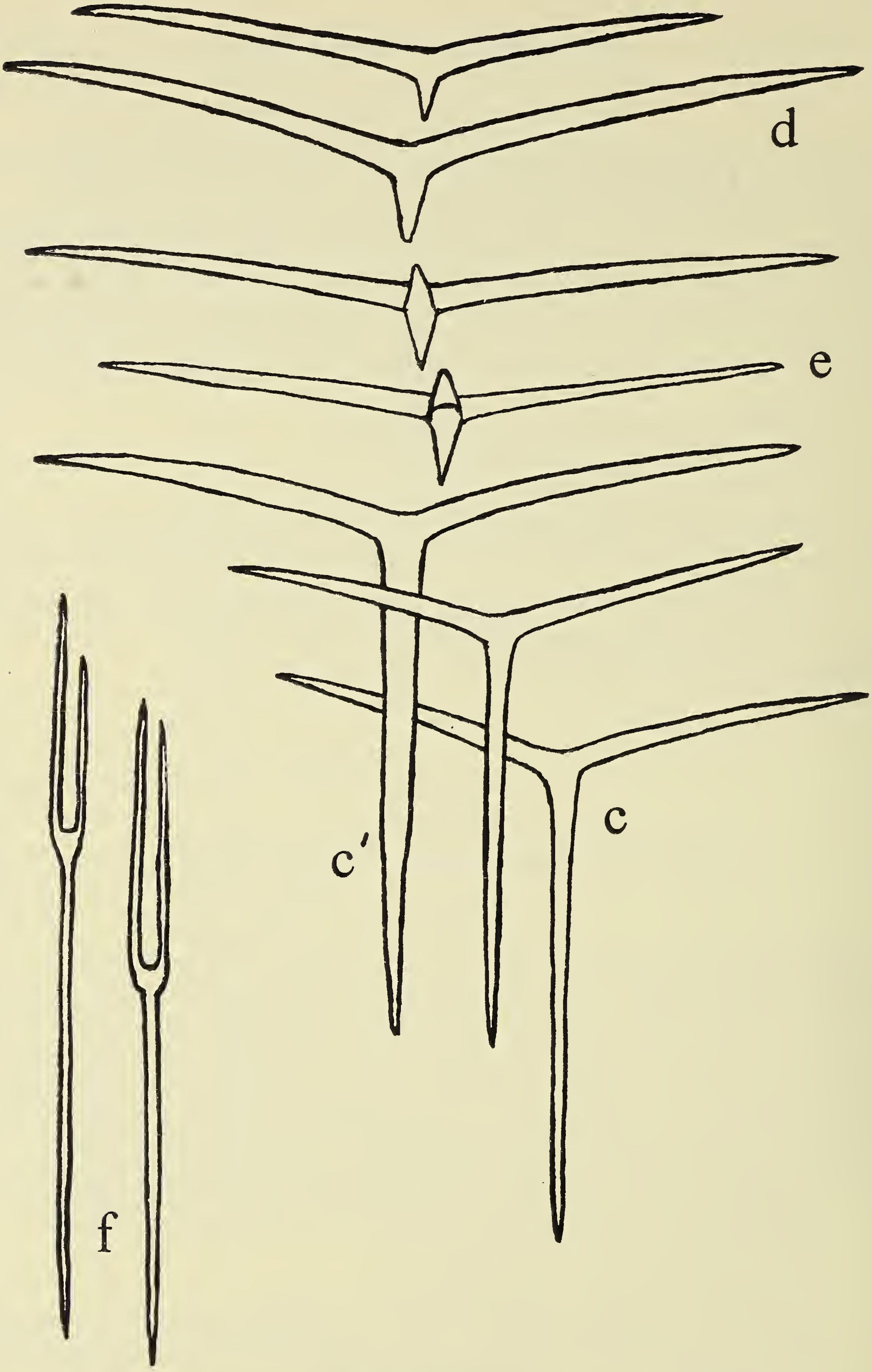
(text-fig. 363)

Lelapia antiqua Dendy and Frederick, 1924: 487, pl. xxv, fig. 10, pl. xxvi, fig. 8.

Description: Sponge tubular, clavate, sessile; surface smooth in lower part, hispid in upper part of body; vent apical, naked; texture firm; colour, in spirit, light greyish-yellow; ectosomal skeleton of several tangential layers of triradiates, with an inner layer of longitudinal oxea and oxea projecting at surface; skeleton of chamber layer of irregularly-arranged oxea, fibres of 'tuning-fork' spicules and centrifugal rays of subendosomal triradiates; endosomal skeleton of several tangential layers of triradiates and paired rays of subendosomal triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·23 by 0·014 mm., basal ray 0·4 by 0·013 mm.,
tangential oxea, 2·0 by 0·09 mm.,
projecting oxea, 1·6 by 0·007 mm.,
oxea of chamber layer, 2·0 by 0·09 mm.,
'tuning-fork' spicules, paired rays 0·21 by 0·006 mm., basal ray 0·4 by 0·009 mm.,
subendosomal sagittal triradiates, inner rays 0·3 by 0·026 mm., centrifugal ray 0·5 by 0·03 mm.,
endosomal triradiates, sagittal, paired rays 0·31 by 0·016 mm., basal ray 0·04 by 0·01 mm.

Distribution: Australia (Abrolhos Islands).



Text-fig. 363. *Lelapia antiqua* after Dendy and Frederick: spicules, ×200. c. ectosomal triradiates: c′. subendosomal sagittal triradiates; d. endosomal triradiates; e. quadriradiates from margin of vent; f. tuning-fork spicules.

Named form: **Lelapia nipponica** Hara

(text-fig. 364)

Lelapia nipponica Hara, 1894: 359, pl. viii, figs. 1–13; *Paralelapia nipponica*, Hozawa, 1923: 185, figs. 1–3; *Lelapia nipponica*, Hozawa, 1929: 379; Tanita, 1943: 459.

Description: Sponge cylindrical, elongate, substipitate; surface even, smooth, with sub-spiral striation; margin of vent feebly-developed; texture firm, elastic; colour in spirit, greyish-white; ectosomal skeleton of tangential layers of triradiates and vertical tufts of microxea overlaying several layers of longitudinal oxea; skeleton of chamber layer of centrifugally-directed basal rays of subendosomal triradiates and loose fibres of tuning-fork spicules; endosomal skeleton of paired rays of subendosomal triradiates, several layers of triradiates and quadriradiates, with apical rays projecting into cloacal cavity.

Spicules: ectosomal triradiates, sagittal, paired rays 0·09 to 0·17 by 0·006 to 0·008 mm., basal ray 0·26 to 0·47 by 0·006 to 0·008 mm.,
oxea, 1·1 to 3·2 by 0·03 to 0·083 mm.,
microxea, lanceolate, 0·1 to 0·21 by 0·005 to 0·008 mm.,
subendosomal triradiates, sagittal, paired rays 0·12 to 0·18 by 0·01 to 0·012 mm., basal ray 0·26 to 0·35 by 0·012 to 0·016 mm.,
tuning-fork spicules, paired rays, often unequal, 0·03 to 0·2 by 0·004 to 0·008 mm., basal ray 0·07 to 0·4 by 0·006 to 0·01 mm.,
endosomal triradiates, sagittal, paired rays 0·1 to 0·15 by 0·008 to 0·01 mm., basal ray 0·012 to 0·024 by 0·008 to 0·01 mm.,
endosomal quadriradiates, sagittal, paired rays 0·025 to 0·06 by 0·01 to 0·012 mm., basal ray 0·22 to 0·59 by 0·008 to 0·012 mm., apical ray 0·04 to 0·09 by 0·01 to 0·012 mm.,
triradiates of stalk, sagittal, paired rays 0·08 by 0·01 mm., basal ray 0·5 by 0·008 mm.

Distribution: Japan (Sagami Sea).

Text-fig. 364. *Paralelapia nipponica* after Hozawa: external form, natural size.

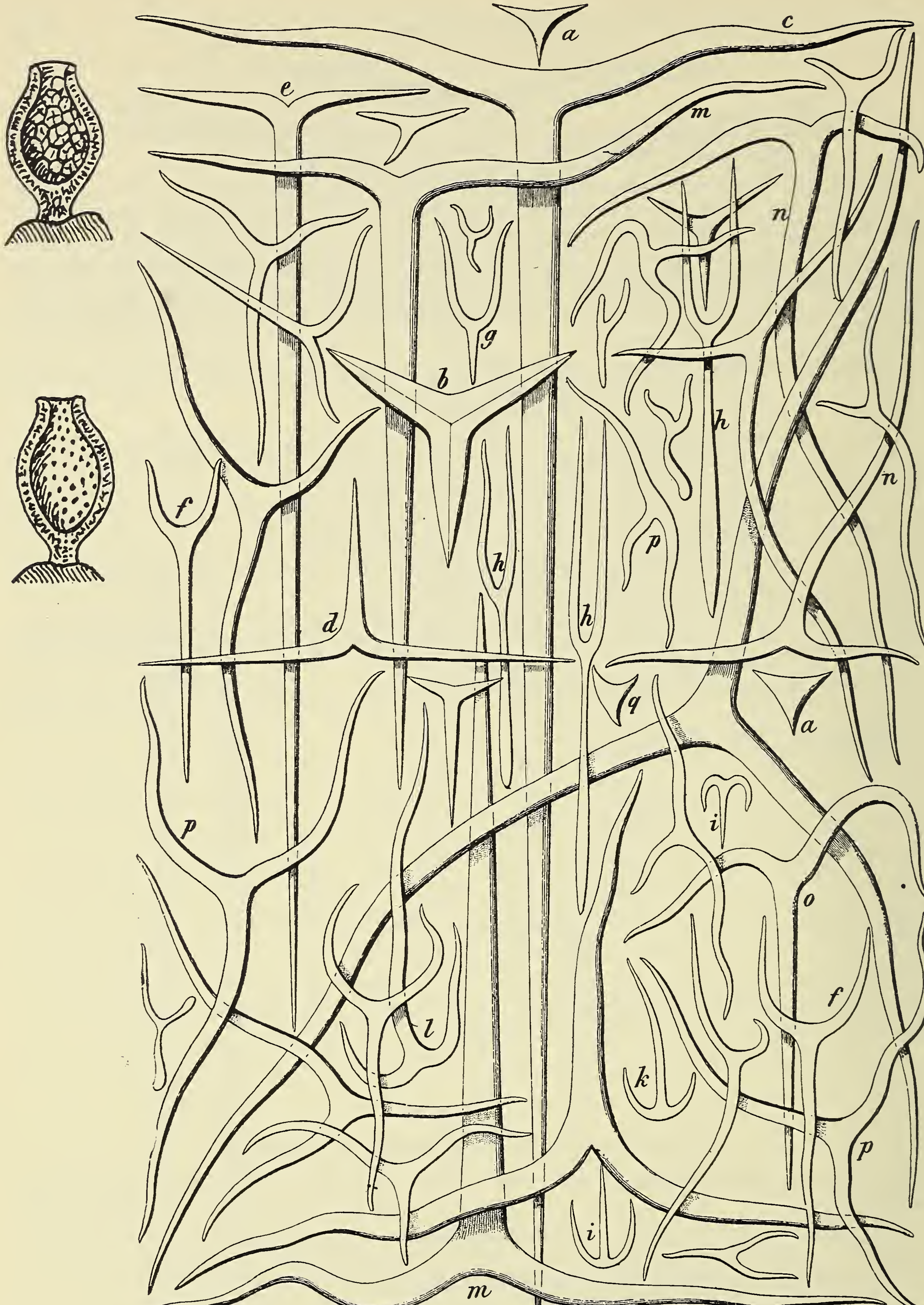
Named form: **Leucettaga loculifera** (Haeckel)

Leucetta pandora, var. *loculifera* Haeckel, 1872: 127, pl. xxii, fig. 3; *Leucettaga loculifera*, Dendy and Row, 1913: 127.

Description: Sponge spherical, substipitate; surface even, non-hispid; vent apical, naked; texture (?); colour, in spirit, brown.

(The spicular characters of this species are obscure.)

Distribution: Australia (Bass Strait).



Text-fig. 365. *Leucandra pandora* (after Haeckel): spicules, ×200; external form, natural size.
Of the two specimens shown in section, one has the so-called endogastric septa used elsewhere (e.g. *Sycandra*) as a generically diagnostic feature. The numerous spicules shown here, as drawn by Haeckel, when carefully examined resolve themselves into the typical spicules of *Lelapia australis* but with a number of intermediates portrayed.

Named form: **Leucandra pandora** (Haeckel)

(text-fig. 365)

Leucetta pandora Haeckel, 1872: 127, pl. xxii, fig. 3, pl. xxiii; *Dyssycus pandora* Haeckel, 1872: 127, pl. xxii, fig. 3; *Leucetta omnibus* (=*L. pandora* var. *omnibus*) Haeckel, 1872: 127, pl. xxiii; ? *L. intermedia* (=*L. pandora* var. *intermedia*) Haeckel, 1872: 127; ? *L. anomala* (=*L. pandora* var. *anomala*) Haeckel, 1872: 127, pl. xxii, fig. 3; *Leucaltis pandora* Haeckel, 1872: 128; *Leucortis pandora* Haeckel, 1872: 128; *Leucandra pandora* Haeckel, 1872: 128; Dendy, 1892: 104; ? *L. anomala*, Dendy and Row, 1913: 769; ? *L. intermedia*, Dendy and Row, 1913: 774; *L. pandora*, Dendy and Row, 1913: 774.

Description: Sponge spherical to oval, substipitate; surface even, non-hispid; vent apical, naked; texture soft (?); colour, in spirit, brown.

(The spicular characters of this species are obscure.)

Distribution: Australia (Bass Strait and Gulf St. Vincent).

Named form: **Leucandra pulvinar** (Haeckel)

Sycolepis pulvinar Haeckel, 1870: 251; *Leucortis pulvinar* Haeckel, 1782: 162, pl. xxix; *Mlea dohrnii* Maclay in Haeckel, 1872: 162; *Dyssycus pulvinar* Haeckel, 1872: 163, pl. xxix, fig. 1; *Lipostomella pulvinar* Haeckel, 1872: 163; *Amphoriscus pulvinar* Haeckel, 1872: 163; *Coenostomus pulvinar* Haeckel, 1872: 163; *Artynas pulvinar* Haeckel, 1872: 163; *Aphroceras pulvinar* Haeckel, 1872: 163; *Leucometra pulvinar* Haeckel, 1872: 163; *Leucortis semitica* (=*L. pulvinar* var. *semitica*), Haeckel, 1872: 163, pl. xxix, figs. 3–10; *L. indica* (=*L. pulvinar* var. *indica*) Haeckel, 1872: 163, pl. xxix, figs. 11–18; *Leucandra pulvinar* Haeckel, 1872: 164; Dendy, 1892: 103; Dendy and Row, 1913: 771.

Description: Sponge subspherical with apical vents to irregularly massive with scattered vents; surface even, non-hispid; vents naked; texture firm; colour, in spirit, white or yellowish-brown; ectosomal skeleton a tangential layer of triradiates and large oxea; skeleton of chamber layer of irregularly arranged triradiates; endosomal skeleton a tangential layer of triradiates.

Spicules: ectosomal triradiates, sagittal, paired rays 0·22 to 0·32 by 0·01 to 0·018 mm., basal rays 0·1 to 0·18 by 0·01 to 0·018 mm.,
oxea, 1·0 to 2·0 by 0·05 to 0·1 mm.,
triradiates of chamber layer, subregular, to subsagittal, rays 0·15 to 0·35 by 0·015 to 0·02 mm.,
endosomal triradiates, similar to ectosomal triradiates.

Distribution: Red Sea; Indian Ocean (Ceylon); West coast of Australia.

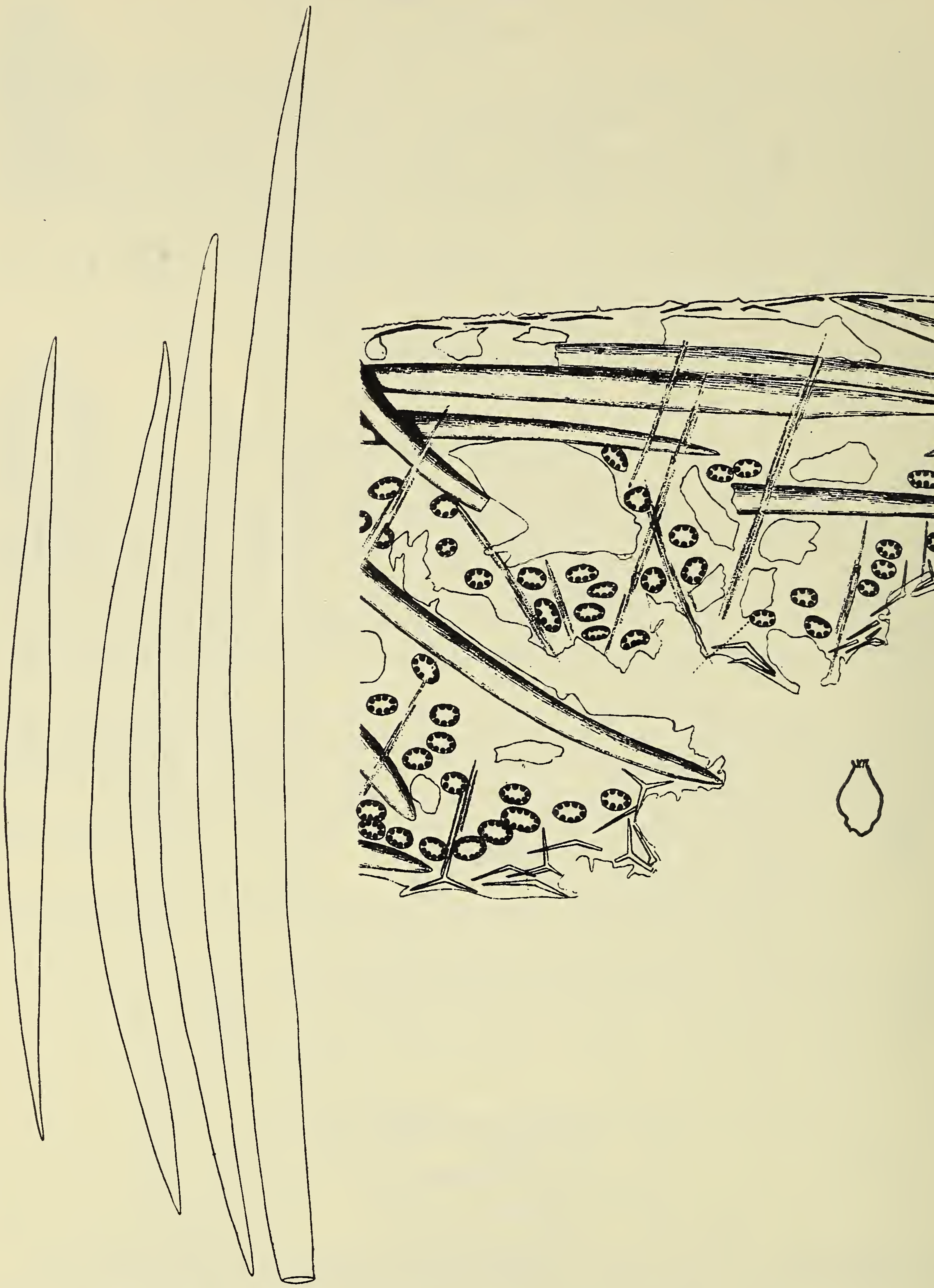
41. **Lelapia uteoides** (Row)

Kebira uteoides Row

(text-fig. 366)

Kebira uteoides Row, 1909: 210, pl. xx, figs. 8–9, text-figs. 7–8; Dendy and Row, 1913: 785.

Description: Sponge solitary, flask-shaped, sessile; surface smooth, even; vent apical, naked (?); texture firm; colour, in spirit, white; ectosomal skeleton of a tangential layer of triradiates, with longitudinally-arranged oxea in several layers; skeleton of chamber layer of radially-arranged fibres of triradiates with vestigial rays; endosomal skeleton a tangential layer of triradiates.



Text-fig. 366. *Kebira uteoides* after Row: large oxea, ×50; section at right angles to surface, ×50; external form, natural size.

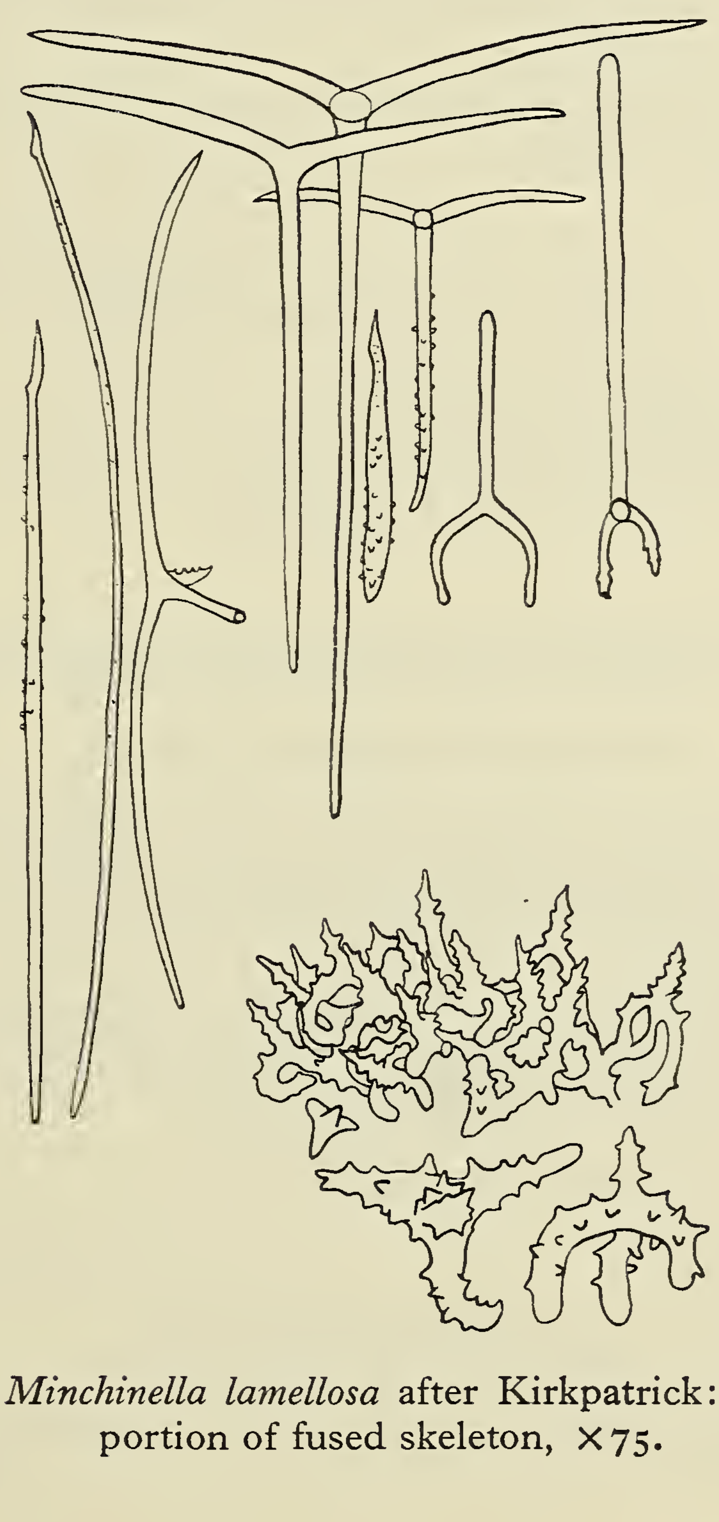
Spicules: ectosomal triradiates, sagittal, paired rays 0·22 to 0·24 by 0·015 mm., basal rays 0·076 to 0·091 by 0·014 mm.,
oxea, up to 4·0 by 0·15 to 0·18 mm.,
triradiates of chamber layer, sagittal, with vestigial paired rays, up to 0·02 mm. long, basal rays 0·18 to 0·22 by 0·003 to 0·004 mm.,
endosomal triradiates, sagittal, paired rays 0·13 to 0·2 by 0·016 to 0·03 mm., basal rays 0·15 to 0·4 by 0·016 to 0·03 mm.

Distribution: Red Sea; 4 m.

Remarks: Although this species is here treated as distinct from *L. australis*, it is more probable that the two are at best varietally distinct. The position is probably best expressed by Haeckel's two varieties of *Leucortis pulvinar*, the var. *semitica* representing, most likely, the present species and the var. *indica* representing *Lelapia australis*. Almost certainly when sufficient material is available for close study, *L. uteoides* and the various forms here included under *L. australis* will prove to be normal variations of one species.

Genus **Minchinella** Kirkpatrick

Minchinella Kirkpatrick, 1908: 504.



Text-fig. 367. *Minchinella lamellosa* after Kirkpatrick: spicules, ×260; portion of fused skeleton, ×75.

42. **Minchinella lamellosa** Kirkpatrick

Minchinella lamellosa Kirkpatrick

(text-fig. 367)

Minchinella lamellosa Kirkpatrick, 1908: 504, pl. xiii, figs. 1–13, pl. xiv, figs. 1–16, pl. xv, figs. 1–9; Dendy and Row, 1913: 740.

Description: Sponge flabellate; surface even, minutely hispid; vents papillate, pores on fistular processes; texture hard; colour, in spirit, pale yellow to brown; main skeleton of fused quadriradiates, with ectosomal skeleton of microxea; with triradiates and quadriradiates in vent- and pore-bearing processes.

Spicules: of pore-bearing surface:

triradiates, paired rays 0·087 mm. long, basal ray 0·156 by 0·01 mm.,
quadriradiates, similar to triradiates, with apical rays 0·017 mm. long,
microxea, of three sizes, 0·3 by 0·001, 0·234 by 0·004 and 0·087 by 0·008 mm. respectively,
'tuning-fork', paired rays 0·025 mm. long, basal ray 0·133 mm. long;

of vent-bearing surface:

triradiates, paired rays 0·05 mm. long, basal ray 0·104 by 0·005 mm.,
quadriradiates, paired rays 0·075 mm. long, basal ray 0·104 by 0·005 mm.,
microxea, 0·2 by 0·005 mm.,
'tuning-fork', paired rays 0·025 mm., basal ray 0·133 mm. long.

Distribution: New Hebrides; 128 m.

Genus **Petrostroma** Döderlein

Petrostroma Döderlein, 1892: 15.

Type-species: Petrostroma schulzei Döderlein, 1892: 143.

43. **Petrostroma schulzei** Döderlein

Petrostroma schulzei Döderlein

Petrostroma schulzei Döderlein, 1892: 143; Döderlein, 1897: 15, pls. ii–vi; Tanita, 1943: 396.

Description: Sponge composed of digitate processes arising from a common base; surface even; texture hard; vents not apparent; colour light brown.

Spicules of ectosomal skeleton:

triradiates, subregular to sagittal, rays 0·13 to 0·26 by 0·008 to 0·01 mm.,
quadriradiates, similar to triradiates, with apical rays up to 0·04 mm.,
'tuning-fork' spicules 0·23 to 0·37 mm. long.

Distribution: Japan (Sagami Bay); 200–400 m.

Genus **Plectroninia** Hinde

Plectroninia Hinde, 1900: 51.

Type-species: †*Plectroninia halli* Hinde, 1900: 51, pl. iii, figs. 1–83, pl. iv, figs. 1–11.

44. **Plectroninia deansii** Kirkpatrick

Plectroninia deansii Kirkpatrick

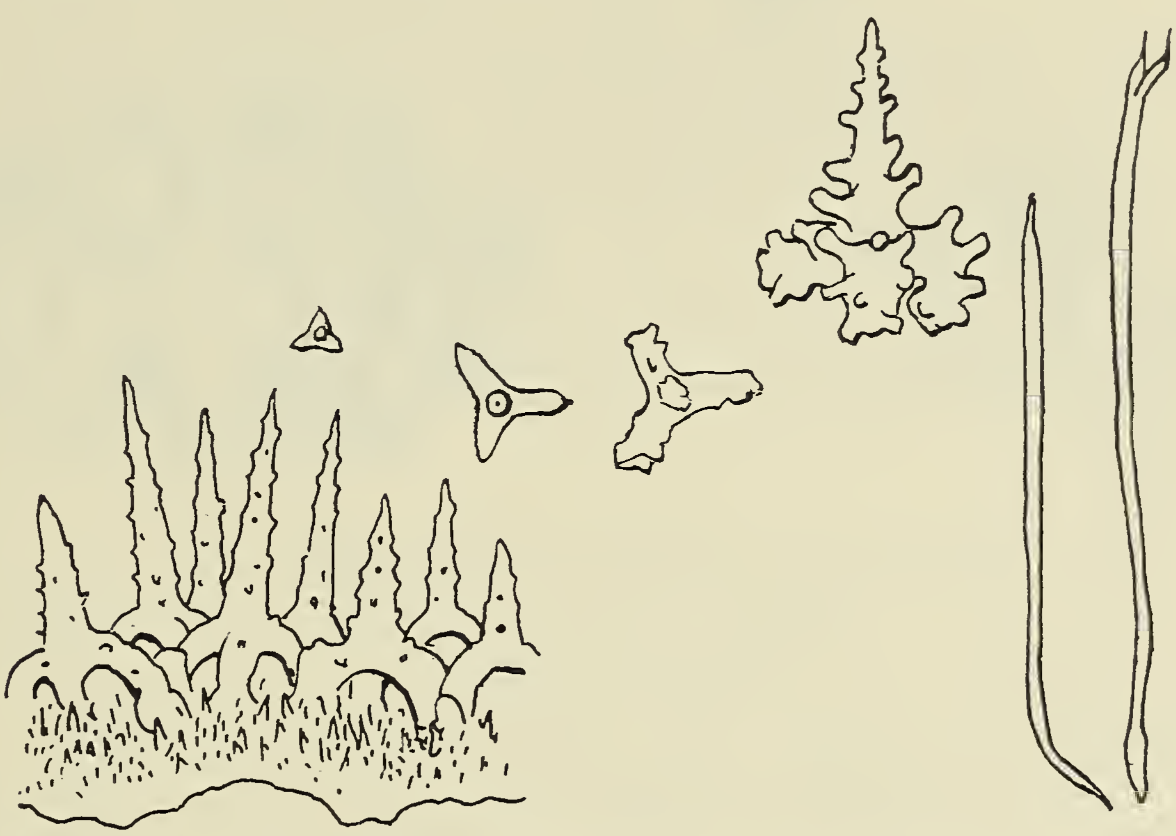
(text-fig. 368)

Plectroninia deansii Kirkpatrick, 1911: 177, figs. 1–10; Dendy and Row, 1913: 741.

Description: Sponge encrusting; surface (?); vents (?); texture hard; colour, in spirit, white; skeleton of fused quadriradiates, with ectosomal microxea and, more rarely, reduced triradiates.

Spicules: microxea, and triradiates with vestigial paired rays, 0·12 by 0·004 mm.

Distribution: Indian Ocean (Christmas Island); 92 m.



Text-fig. 368. *Plectroninia deansii* after Kirkpatrick: side view near edge of sponge (bottom left), × 115; small quadriradiates of varying size, × 400; monaxons, × 400.

45. **Plectroninia hindei** Kirkpatrick

Plectroninia hindei Kirkpatrick

Plectroninia hindei Kirkpatrick, 1900: 347, pl. xiii, fig. 1; Dendy and Row, 1913: 741.

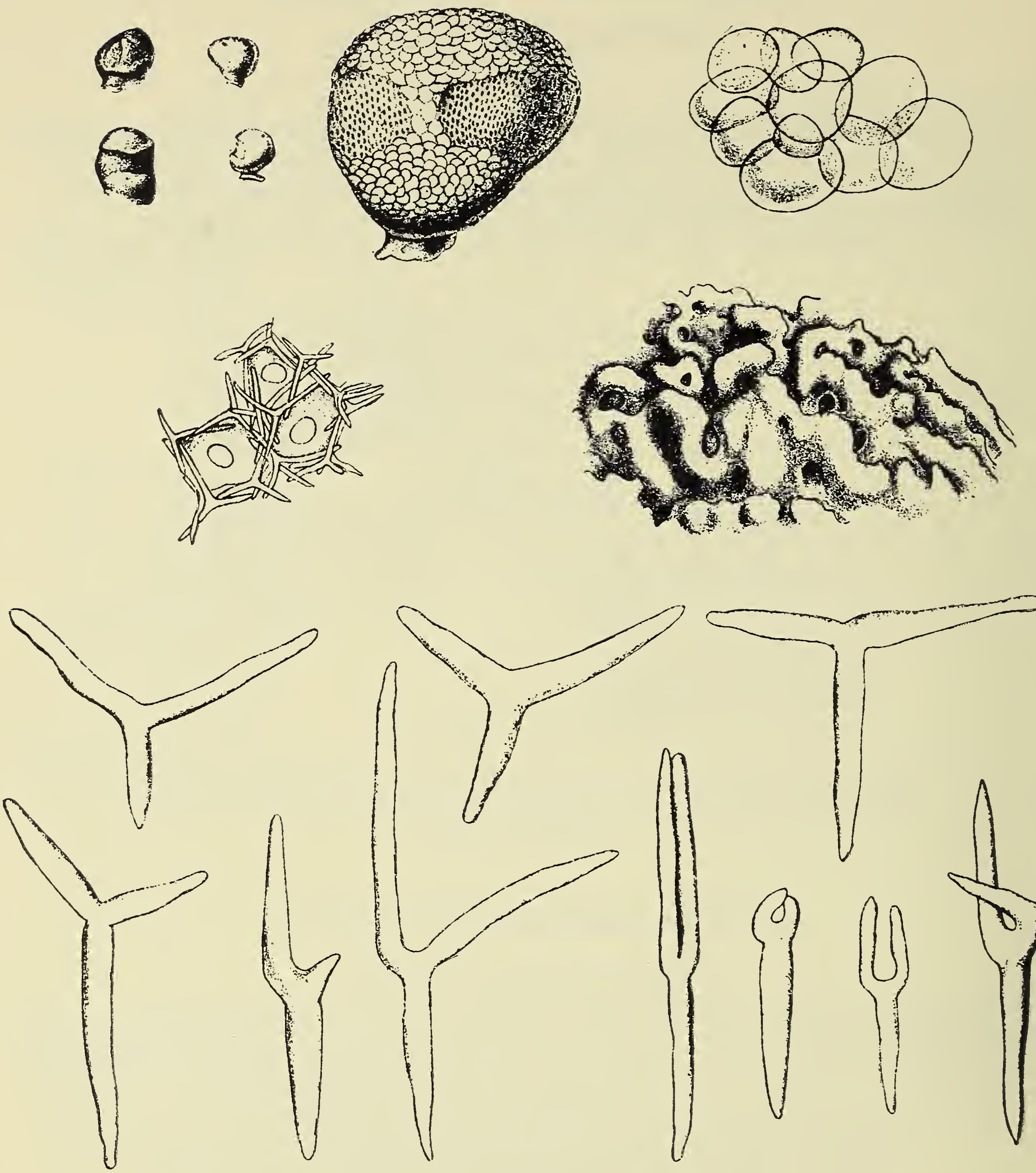
Description: Sponge encrusting; surface even, granular; vents not apparent; texture hard; colour, in spirit, whitish-yellow; main skeleton of fused quadriradiates, with a basal layer of triradiates, and with triradiates, spined microxea and spined 'pin-shaped' spicules.

Spicules: quadriradiates, of basal layer, rays 0·018 to 0·035 mm. long,
triradiates, sagittal, paired rays 0·06 by 0·007 mm., basal ray 0·12 by 0·007 mm.,
triradiates, irregular, 0·075 to 0·2 by 0·01 to 0·015 mm.,
'tuning-fork' spicules, 0·3 to 0·4 mm. long,
spined microxea, 0·2 to 0·4 by 0·007 mm.,
spined 'pin-shaped' spicules, 0·2 to 0·5 by 0·006 mm.

Distribution: Malay (Funafuti); 55–265 m.

Genus **Murrayona** Kirkpatrick

Murrayona Kirkpatrick, 1910: 127.



Text-fig. 369. *Murrayona phanolepis* after Kirkpatrick: external form (top left) showing natural size and one specimen enlarged ×4; a group of surface scales (top right), ×10; part of a pore-area, showing three pores (centre left), ×100; part of fused skeleton, (centre right), ×15; group of spicules, ×350.

46. **Murrayona phanolepis** Kirkpatrick

Murrayona phanolepis Kirkpatrick

(text-fig. 369)

Murrayona phanolepis Kirkpatrick, 1910: 127, pl. x, figs. 1–9, pl. xi, figs. 1–26; Dendy and Row, 1913: 741.

Description: Sponge subspherical to pyriform; surface even, imbricated; vents small, lateral, pores in equatorial groove; texture hard; colour, in spirit, white; ectosomal skeleton a layer of subcircular scales, with an ectosomal layer of triradiates and 'tuning-fork' spicules and a main skeleton composed of a stout reticulation of calcareous fibres.

Spicules: ectosomal scales, 0·37 to 0·53 mm. diameter,
triradiates, subectosomal, irregular, rays 0·065 by 0·01 mm.,
triradiates, of poral groove, regular, rays 0·055 by 0·01 mm.,
'tuning-fork' spicules, irregular, 0·09 mm. long.

Distribution: Indian Ocean (Christmas Island); 84 m.

Genus **Sycodorus** Haeckel

Sycodorus Haeckel, 1872: 295; *Sycodorussa* Haeckel, 1872: 295; *Utella* Dendy, 1892: 74.

Type-species: Sycandra (Sycodorus) hystrix Haeckel, 1872: [295] 275, pl. lvi, fig. 2, pl. lix, pl. lx, fig. 16.

47. **Sycodorus hystrix** (Haeckel)

Sycodorus hystrix (Haeckel)

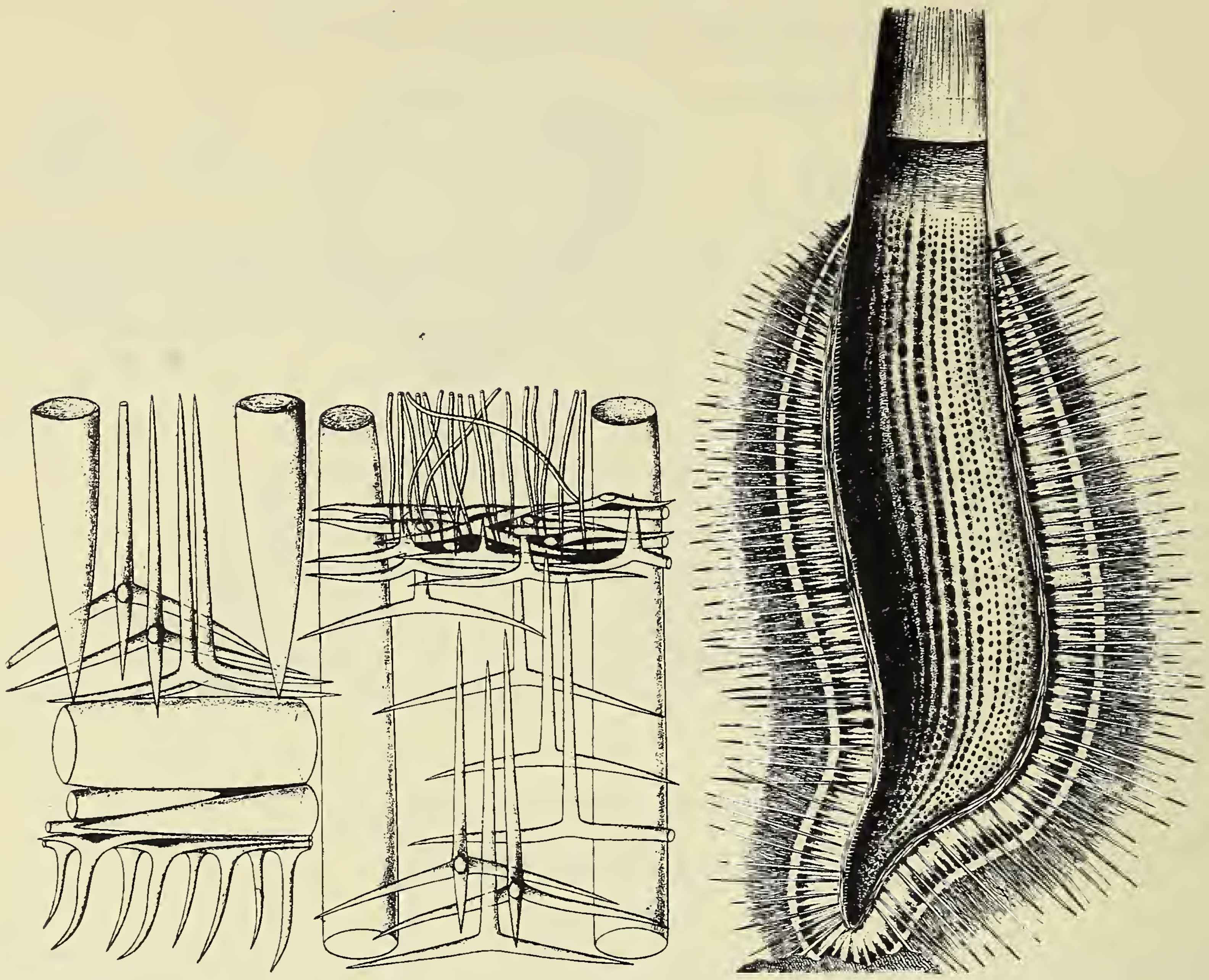
(text-fig. 370)

Sycandra (Sycodorus) hystrix Haeckel, 1872: [295] 375, pl. lvi, fig. 2, pl. lix, pl. lx, fig. 16; *Sycarium hystrix* Haeckel, 1872: 376, pl. lix; *Sycandra hystrix*, Vosmaer, 1881: 5; *Sycodorus hystrix*, Dendy and Row, 1913: 765; Topsent 1934: 11.

Description: Sponge tubular, sessile; surface even, hispid; vent apical, fringed; texture firm; colour, in spirit, grey; ectosomal skeleton of several tangential layers of triradiates, with oxea, of two sizes, projecting beyond surface; tubar skeleton of several rows of triradiates and quadriradiates and basal rays of subendosomal triradiates and quadriradiates; endosomal skeleton of paired rays of subendosomal triradiates, with longitudinal oxea and a tangential layer of triradiates and quadriradiates.

Spicules: ectosomal triradiates, regular rays 0·1 to 0·12 by 0·01 to 0·02 mm.,
oxea, 1·0 to 1·5 by 0·004 mm.,
oxea, 4·0 to 5·0 by 0·07 to 0·1 mm.,
tubar triradiates, sagittal, paired rays 0·1 to 0·2 by 0·015 mm., basal rays 0·2 to 0·4 by 0·015 mm.,
tubar quadriradiates, similar to tubar triradiates, with apical ray 0·05 by 0·015 mm.,
subendosomal sagittal triradiates, paired rays 0·2 by 0·015 mm., basal ray 0·4 by 0·015 mm.,
subendosomal sagittal quadriradiates, similar to subendosomal triradiates, with apical ray 0·06 to 0·12 by 0·006 mm.,
endosomal oxea, 3·0 to 5·0 by 0·06 to 0·1 mm.,
endosomal triradiates, sagittal, paired rays 0·3 to 0·5 by 0·02 mm., basal ray 0·5 to 0·8 by 0·008 to 0·015 mm.,
endosomal quadriradiates, similar to endosomal triradiates, with apical ray 0·1 by 0·012 mm.

Distribution: South Africa (Cape Agulhas); Mediterranean (Naples).



Text-fig. 370. *Sycodorus hystrix* after Haeckel: details of skeleton, the two parts representing a section at right angles to surface, ×100; section through holotype (right), ×3.

Incertae sedis

Genus **Sycyssa** Haeckel

Sycyssa Haeckel, 1872: 259; *Sycyssarium* Haeckel, 1872: 390; *Sycissa*, Lendenfeld, 1886: 576.

Type-species: Sycyssa huxleyi Haeckel, 1872: 260, pl. xliv, figs. 1–16.

Description: Skeleton entirely composed of oxea; ectosomal cortex well developed, but without colossal longitudinal oxea; endosomal cortex with a subendosomal layer of oxea, arranged longitudinally.

Sycyssa huxleyi Haeckel

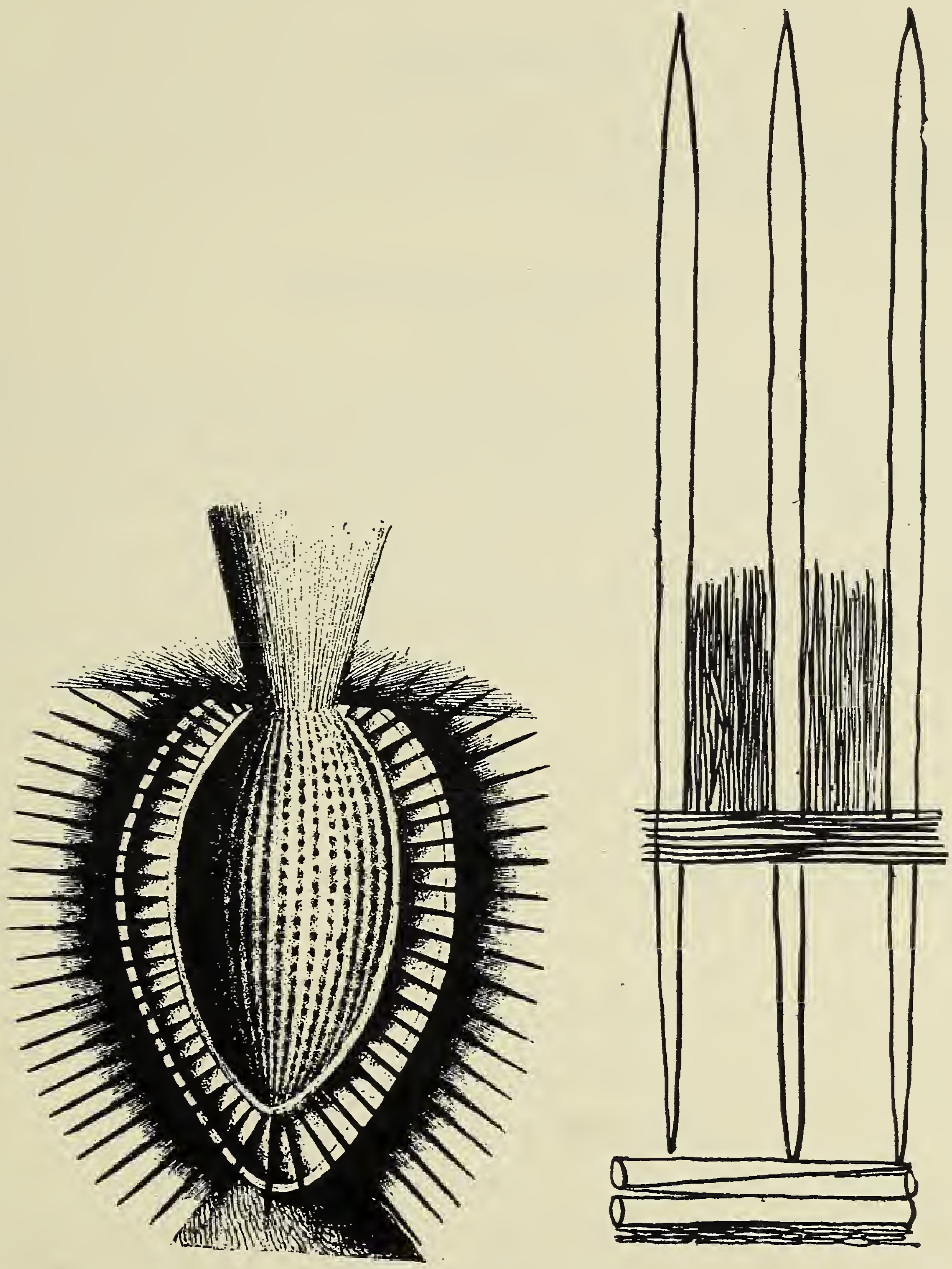
(text-fig. 371)

Sycyssa huxleyi Haeckel, 1872: 260, pl. xliv, figs. 1–16; *Sycarium huxleyi* Haeckel, 1872: 260, pl. xliv, fig. 10; *Sycyssa huxleyi*, Dendy and Row, 1913: 767; Topsent, 1934: 11; Breitfuss, 1935: 27.

Description: Sponge oval, sessile; surface even, strongly hispid; vent apical, fringed; texture (?); colour, alive, grey; ectosomal skeleton a tangential layer of oxea, with a palisade of oxea set at right angles to surface, and with large oxea projecting beyond; skeleton of chamber layer of proximal parts of large oxea; endosomal skeleton a tangential layer of oxea and a subendosomal layer of large oxea.

Spicules: of body wall: oxea of ectosomal palisade, 0·4 to 0·6 by 0·002 to 0·004 mm.,
ectosomal tangential oxea, 0·1 to 0·3 by 0·002 to 0·005 mm.,
large oxea, 2·0 to 3·0 by 0·04 to 0·07 mm.,
large tangential subendosomal oxea, 1·0 to 3·0 by 0·04 to 0·06 mm.,
endosomal tangential oxea, 0·2 to 0·4 by 0·002 to 0·004 mm.

Distribution: Mediterranean (Lesina); 107–120 m.



Text-fig. 371. *Sycyssa huxleyi* after Haeckel: section through holotype, ×2; section at right angles to surface, ×50.

Genera inquirandae

Genus **Leucyssa** Haeckel

Leucyssa Haeckel, 1872: 136; *Artynyssium* Haeckel, 1872: 406; [*Coenostomyssium* Haeckel, 1872: viii]; *Leucissa*, Lendenfeld, 1886: 577.

Type-species: Leucyssa spongilla Haeckel, 1872: 137, pl. xxv, figs. 11–13.

[See also under *species inquirendae*.]

Homocoelidae

Species inquirendae

Ascetta primordialis Preiwisch, 1904: 10.

[This specimen needs re-examination.]

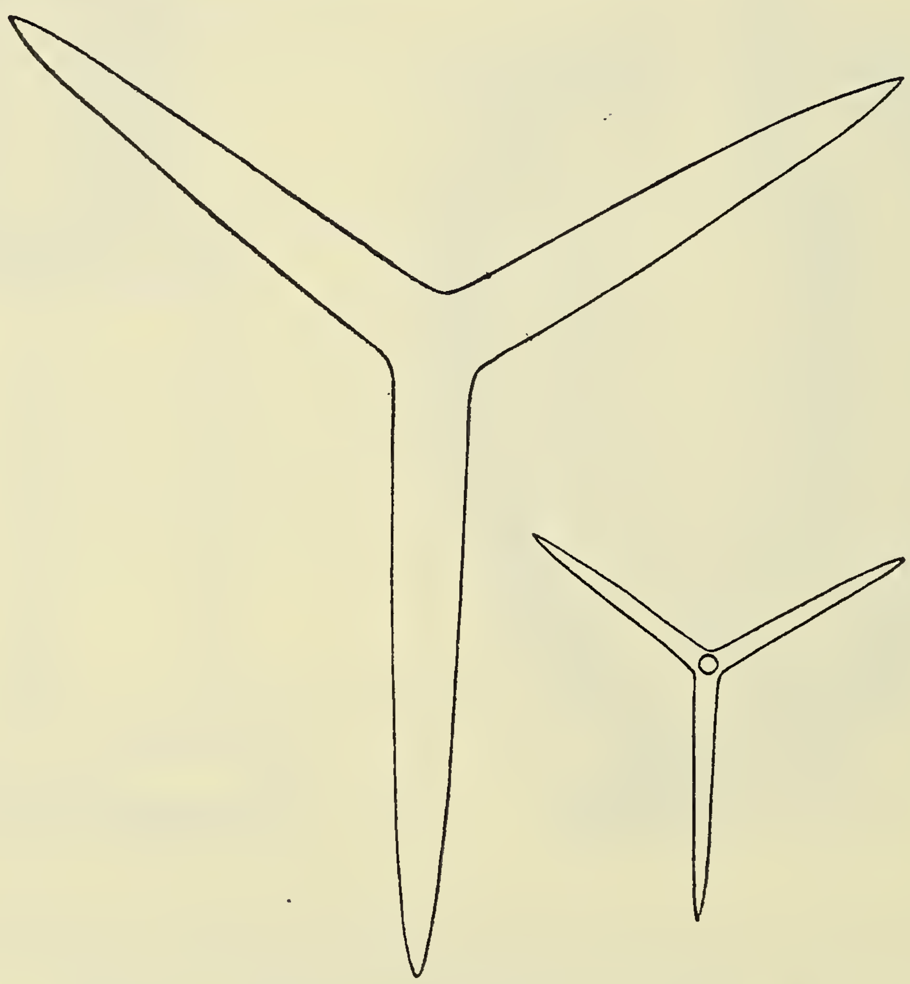
Leucosolenia agassizii (Haeckel)

(text-fig. 372)

Ascaltis agassizii (= *A. lamarckii* var. *agassizii*) Haeckel, 1872: 60, pl. ix, fig. 5; *Leucosolenia lamarckii* Poléjaeff, 1883: 36; ? *Ascaltis lamarckii*, Carter, 1884: 208; *Leucosolenia lamarckii* var. *agassizii*, Breitfuss, 1898: 297; *L. agassizii*, Dendy and Row, 1913: 724.

Diagnosis: Sponge composed of rounded masses of anastomosing tubes; without pseudoscula (?); texture (?); colour (?); skeleton of triradiates, sagittal, rays up to 0·5 by 0·06 mm., and quadriradiates, sagittal, with rays up to 0·2 by 0·02 mm. (?).

Distribution: Australia (Port Jackson); Florida (?); 55–64 m.



Text-fig. 372. *Leucosolenia agassizii* (after Haeckel): spicules, × 100.

Leucosolenia cyathus (Haeckel)

Olynthus cyathus Haeckel, 1870: 237; *Leucosolenia echinoides* Haeckel, 1870 : 244; *Ascandra echinoides* Haeckel, 1872: 98, pl. xv, fig. 3, pl. xvii, figs. 1, 4; *Olynthus echinoides* Haeckel, 1872: 98, pl. xvii, fig. 1; *Clistolynthus echinoides* Haeckel, 1872: 98, pl. xvii, fig. 4; *Soleniscus echinoides* Haeckel, 1872: 98; *Ascandra abyla* Haeckel, 1872: 98; *A. cyathus* Haeckel, 1872: 99; *Leucosolenia echinoides*, Dendy and Row, 1913: 722.

Description: Sponge spherical, stipitate, solitary; surface even, strongly hispid; vent terminal; texture firm; colour, in spirit, yellowish-brown; skeleton of triradiates, quadriradiates and oxea.

Spicules: triradiates, sagittal, paired rays 0·12 by 0·006 to 0·007 mm., basal rays 0·06 by 0·006 to 0·007 mm.,
quadriradiates, similar to triradiates, with apical rays 0·08 mm. long,
oxea, 0·16 to 0·2 by 0·01 to 0·012 mm.

Distribution: Straits of Gibraltar.

Remarks: The holotype was found on a fragment of floating *Sargassum*. It is very small and may be a young individual of a better-known species. Re-examination is needed to ascertain this.

Leucosolenia vesicula (Haeckel)

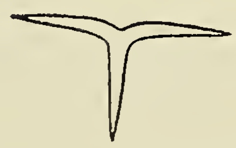
(text-fig. 373)

Clistolynthus vesicula Haeckel, 1870: 248; *Ascetta vesicula* Haeckel, 1872: 41, pl. v, fig. 6; *Clistolynthus vesicula* Haeckel, 1872: 41; *Leucosolenia vesicula*, Dendy and Row, 1913: 727.

Diagnosis: Sponge small, solitary, subspherical, sessile; surface smooth; vent not apparent; texture (?); colour, in spirit, brown; skeleton of triradiates only, sagittal, rays 0·08 to 0·09 by 0·01 to 0·012 mm.

Distribution: North Pacific (Sandwich Islands).

Remarks: The holotype was found on a fragment of floating *Sargassum*. It may well be aberrant, for this reason alone. Its relationship to better-known species cannot be deduced from the inadequate original description.



Text-fig. 373. *Leucosolenia vesicula* (after Haeckel): spicules, ×100.

Heterocoelidae

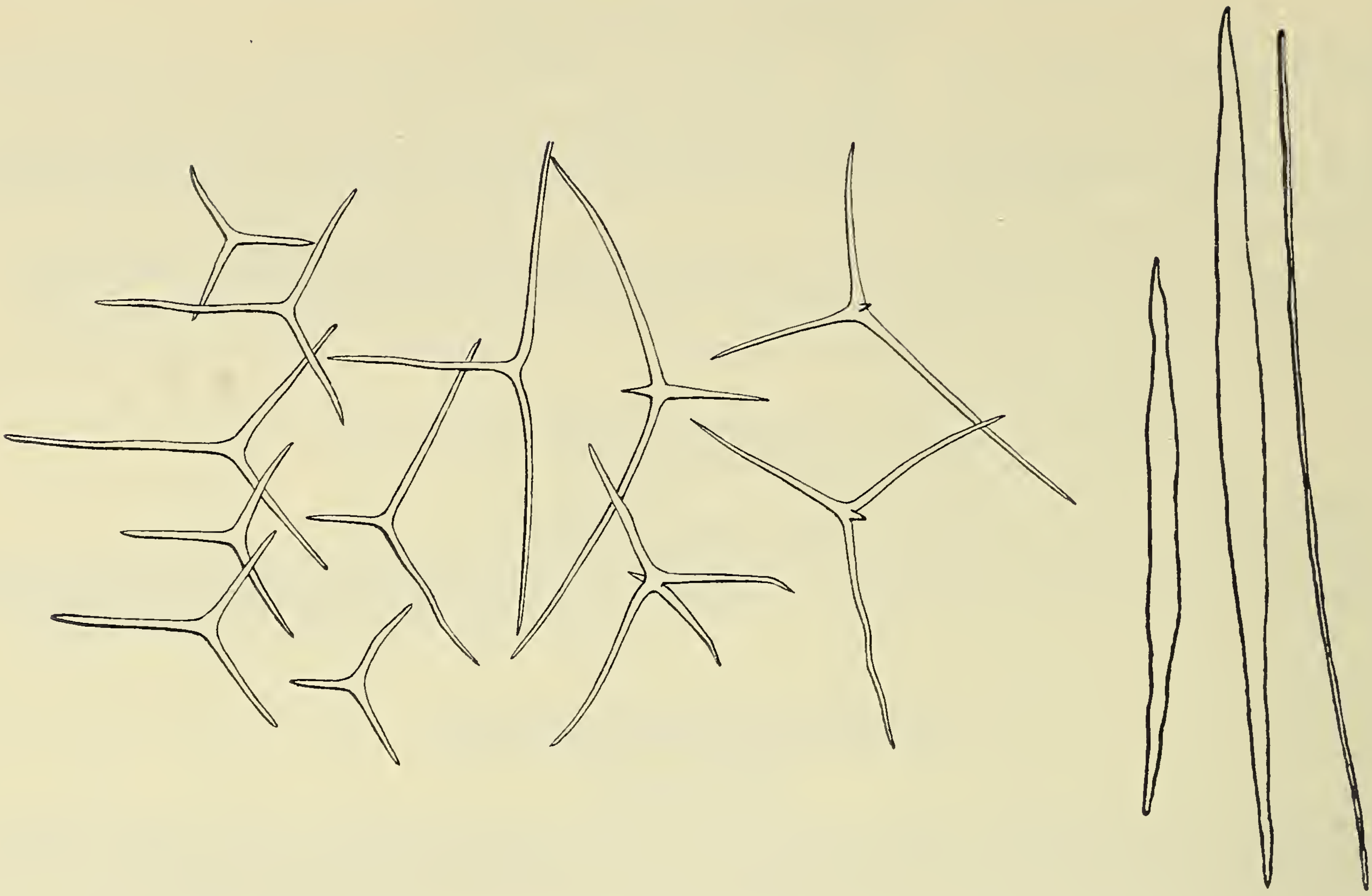
Species inquirendae

Aphroceras caespitosa (Haeckel)

(text-fig. 374)

Leucandra caespitosa (=*L. alcicornis* var. *caespitosa*) Haeckel, 1872: 185; *L. caespitosa*, Ferrer, 1912: 10, figs.; Dendy and Row, 1913: 777; *Aphroceras caespitosa*, Ferrer, 1921: 161; Topsent, 1934, p. 11.

Remarks: There is no clue to the characters or place of origin of this species, although Topsent and Ferrer have recorded it from the Mediterranean and Bay of Biscay.



Text-fig. 374. *Leucandra caespitosa* Haeckel: spicules, after Ferrer, × 100.

Grantia uchidai Hozawa and Tanita

Grantia uchidai Hozawa and Tanita, 1941: 422, figs. 2–4; Tanita, 1943: 429.

Distribution: Japan.

Remarks: I have not had access to the paper in which this species was described.

Leucandra cerebrum Hozawa and Tanita

Leucandra cerebrum Hozawa and Tanita, 1941: 426, figs. 5–6; Tanita, 1943: 445.

Distribution: Japan.

Remarks: I have not had access to the paper in which this species is described.

Leucettusa usa de Laubenfels

Leucettusa usa de Laubenfels, 1942: 268, text-fig. D.

Description: Sponge irregularly cylindrical; surface smooth; vent apical; texture soft; colour, in spirit, white; skeleton an ectosomal tangential layer of triradiates, with large subectosomal quadriradiates, and with small diacts in chamber layer.

Spicules: ectosomal triradiates, occasionally quadriradiates, with rays 0·45 by 0·003 mm.,
quadriradiates, with rays 1·1 by 0·085 mm.,
diacts, 0·1 by 0·003 mm.

Distribution: Fox Basin; Baffinland; 62–68 m.

Remarks: There is nothing in the original description to ally this species with the genus *Leucettusa*, which has not before been recorded for the Arctic. *L. usa* may be a form of *Leuconia nivea* (= *L. barbata*) but re-examination of the holotype is needed to settle this.

Leuconia panicea (Esper)

Dendy and Row (1913: 775) say of this: 'Esper's original reference to this species has not been found by us, but Haeckel [1872] states that the species is possibly identical with *Leucandra aspera*.'

Leucaltis bleeki Haeckel

Leucaltis bleekii (= *L. pumila* var. *bleekii*) Haeckel, 1872: 149.

Remarks: Haeckel leaves some doubt as to the characters of this variety, except that it differs in small details from *Leuconia pumila*.

Distribution: Australia (Bass Straits).

Leucyssa spongilla Haeckel

(text-fig. 375)

Leucyssa spongilla Haeckel, 1872: 137, pl. xxv, figs. 11–13; *Artynium spongilla* Haeckel, 1872: 137, pl. xxv, figs. 11–12; *Leucyssa spongilla*, Dendy and Row, 1913: 779.

Description: Sponge a clathrate mass of anastomosing tubes; stipitate; surface even, non-hispid; vent apical, strongly fringed; texture (?); colour, in spirit, white; skeleton of body of oxea only, 0·6 to 0·8 by 0·03 to 0·04 mm., oscular fringe of oxea, 3·0 to 7·0 by 0·001 to 0·004 mm.

Distribution: Japan (coast of Yeddo); depth not given.

Remarks: This species has the external form of the *lacunosa*-form of *Leucosolenia coriacea* and the reduced form of skeleton seen in *Ascyssa troglodytes* (here regarded as a synonym of *Leucosolenia botryoides*), yet its canal-system is said to be Leuconoid. The type-locality is 'Japan (Jeddo)', and the only person to have examined it is Haeckel himself. Until further information can be obtained, this extraordinary sponge must be treated as enigmatic.

Text-fig. 375. *Leucyssa spongilla* after Haeckel: spicules, ×100; external form, ×2.

Leucilla leuconoides (Bidder)

Sycaltis leuconoides Bidder, 1891: 628 (= *Leucilla leuconoides* Dendy and Row, 1913, 784).

(Characters not defined)

Sycandra hebe de Laubenfels

Sycandra hebe de Laubenfels, 1942: 267.

The holotype, from Baffinland, is tubular and stipitate, 11 mm. high and perhaps 2 mm. diameter, with a terminal vent. The canal system is syconoid. The skeleton consists of triradiates 0·05 to 0·12 by 0·005 to 0·008 mm., and diacts 0·3 by 0·02 mm.

The description is inadequate. The holotype may be a young *Sycon ciliatum* or a young *Leuconia fistulosa.*

Sycon proboscideum (Haeckel)

Sycon raphanus var. *proboscidea* Breitfuss, 1898: 460; *nec S. proboscideum* (Haeckel) Dendy and Row, 1913.

(Characters not defined.)

Distribution: Punta Arenas.

Vosmaeropsis cyathus (Verrill)

Leucandra cyathus Verrill, 1873: 392; *Vosmaeropsis cyathus*, Dendy and Row, 1913: 756.

Diagnosis: Sponge cup- or goblet-shaped, stipitate; surface even, hispid; texture firm; colour, in spirit, yellowish-white; 'The external wall is filled with an intricate network of moderately large, mostly tri-radiate spicula, part of which are sagittate, with a straight shaft, and two long, slender, widely divergent, slightly curved branches; partly regular, with the angles nearly equal; all have long, moderately slender rays, tapering regularly to a sharp point; in some, one ray is considerably longer than the others. A few straight, fusiform spicula, with acute tips, project from the surface; they are about as large as one of the branches of the triradiate ones. The walls of the irregularly divided radiating tubes are supported by the long, straight shafts of triradiate sagittate spicula, having their branches widely divergent, curved and mostly imbedded in the outer or inner walls, and usually about half as long as the shaft. The inner wall is supported by triradiate spicules, similar to those of the outer wall, and by quadriradiate sagittate spicula, mostly smaller, and with unequal curved branches, the apical one short, projecting beyond the inner surface, and directed upwards.'

Distribution: U.S.A. (Atlantic).

Ute viridis Schmidt

Ute viridis Schmidt, 1868: 32.

Remarks: The very brief written description given by Schmidt suggests an affinity with *Aphroceras* (probably *alcicornis*).

Nomina nuda

The following names appeared in Dendy and Row (1913) as 'Row MS' names. Some were later republished, with descriptions, in Row and Hozawa (1931). The full list of these *nomina nuda* is given here in alphabetical order.

Amphoriscus oblatus, p. 782
Grantia genuina, p. 760
Heteropia simplex, p. 754
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IV

A Catalogue of Specimens and Slides in the British Museum Collection

(arranged according to the classification in Dendy and Row, 1913, except that the name *Leuconia* is substituted for *Leucandra* in the titles on pp. 622–633)

Explanation to catalogue of specimens

Types are indicated in bold lettering:

(H) = holotype	(C) = Co-type
(P) = paratype	(L) = lectotype

Special collections are indicated by Coll., e.g. Norman Coll. This is used for special collections especially historical collections; elsewhere only the name of the donor or collector is given. [In some instances the name of the collector is not available.]

Specimens are described as:

sp (spirit), dry, or sl (slide).

Where the type of a species is in another museum, but a slide is possessed by the British Museum, that slide is described as a paratype. The slides (microscope preparations) enumerated in this list are those for which there is no corresponding specimen in the British Museum collection. The great majority of these have been made in the course of identifying collections for other institutions. A few bear combinations of generic and specific names that have not been published.

LEUCOSOLENIA ASCONOIDES

dry	**Aphroceras asconoides (H)**	1887.7.12.73	South coast of Australia
dry	*Leucosolenia asconoides*	1887.7.12.29	(From spirit specimen: no other information)

LEUCOSOLENIA ATLANTICA

sl	**Leucosolenia atlantica (H)**	1924.7.2.6	Cape Verde Islands; A. G. Thacker
sl	,, ,,	1924.7.2.5	,, ,, ,, ,, ,,

LEUCOSOLENIA BLANCA

sp	*Leucosolenia blanca*	1884.4.22.9–10	Azores; 'Challenger' Coll.
sp	,, ,,	1895.12.30.1	Naples; Marine Zoological Station
sp	,, ,,	1925.11.1.31	Naples; Dendy Coll.
sp	,, ,,	1957.16.8.2	Wembury Bay, Plymouth; L. R. Crawshay

sp	*Clathrina blanca*	1929.10.1.1	Naples; Marine Zoological Station
sl	*Ascetta blanca*	1910.1.1.1508, 1509, 1510, 2684	Naples; Marine Zoological Station
sl	*Clathrina blanca*	1908.9.25.8	Red Sea; Crossland Coll.

LEUCOSOLENIA BOTRYOIDES

sp	**Ascandra botrys (H)**	1908.9.24.1	Heligoland; Berlin Museum Exchange
sp	*Leucosolenia botryoides*	1882.3.6.6.	Jersey
sp	,, ,,	1895.4.6.1–2	Locality unknown; Bowerbank Coll.
sp	,, ,,	1895.12.20.1	Plymouth
sp	,, ,,	1897.8.9.1–6	Outside Swanage Bay; R. Kirkpatrick
sp	,, ,,	1931.5.6.2	Isle of Man; H. B. Moore
sp	,, ,,	1931.5.6.3	Port Erin, Isle of Man; H. B. Moore
sp	,, ,,	1931.10.28.6	Bolga; Trondheim Museum Coll.
sp	,, ,,	1931.10.28.7	Troena; Trondheim Museum Coll.
sp	,, ,,	1931.10.28.8	Toftög; Trondheim Museum Coll.
sp	,, ,,	1931.10.28.9	Halten; Trondheim Museum Coll.
sp	,, ,,	1931.10.28.10	Skorgsa; Trondheim Museum Coll.
sp	,, ,,	1931.10.28.11	Melandijo; Trondheim Museum Coll.
sp	,, ,,	1932.1.9.25, 30, 31, 32	Port Erin, Isle of Man; H. B. Moore
sp	,, ,,	1932.7.17.5	Isle of Man; H. B. Moore
sp	,, ,,	1932.8.10.3	River Alde, Suffolk; D. L. Serventy
sp	,, ,,	1936.2.8.2	Rottingdean; M. Burton
sp	,, ,,	1936.5.14.3	Greenisland, Co. Antrim; N. Fisher
sp	,, ,,	1936.9.21.2	Porth Oer, Lleyn Penn, North Wales
sp	,, ,,	1936.9.21.3–4	Aberdaron Bay, North Wales
sp	,, ,,	1937.8.9.5	Greenisland, Co. Antrim; N. Fisher
sp	,, ,,	1937.8.11.6	Malin Head, Co. Donegal; N. Fisher
sp	,, ,,	1938.6.30.1	Horn Bay, Newfoundland; 'Rosaura' Exped. 1937
sp	,, ,,	1939.1.12.2, 7	Cullercoats Bay, Northumberland; J. E. Hamilton
dry	*Ascaltis botryoides*	1910.1.1.414	Berwick Bay; Norman Coll.
dry	,, ,,	1847.9.7.107–109, 113	Johnston Coll.
dry	*Leucosolenia botryoides*	1872.5.4.1	Vigo Bay, Spain; Bowerbank Coll.
dry	,, ,,	1906.12.1.11, 12, 90	Berlin Museum; Minchin Coll.
dry	,, ,,	1906.12.1.95	Plymouth; Minchin Coll.
dry	,, ,,	1910.1.1.413	Westport Bay; Norman Coll.
dry	,, ,,	1910.1.1.869	Dalkey; W. J. Sollas
dry	,, ,,	1934.9.10.1	Herne Bay; J. E. Cooper
dry	,, ,,	1955.11.2.2	Sark; Bowerbank Coll.
dry	,, ,,	1955.11.2.3	Fowey, Cornwall; Bowerbank Coll.
dry	,, ,,	1955.11.2.4	Guernsey; Bowerbank Coll.
dry	,, ,,	1955.11.2.5	Scarborough (Mr. Bean); Bowerbank Coll.
dry	,, ,,	1955.11.2.7	Peterhead; Bowerbank Coll.
dry	,, ,,	1955.11.2.22	United Kingdom, Bowerbank Coll.

dry	*Leucosolenia botryoides*	1955.11.2.109	From H.M.S. 'Affray' sunk in Herd Deep, English Channel
sl	*Grantia botryoides*	1847.9.7.112	Minchin Coll.
sl	*Ascandra botrys*	1906.12.1.35	Collected by E. P. Wright; identified by Haeckel; Minchin Coll.
sl	*Leucosolenia botryoides*	1882.3.6.36	Minchin Coll. (Brit. Mus. 33)
sl	,, ,,	1887.6.25.4	Minchin Coll. (Brit. Mus. 77)
sl	,, ,,	1925.11.1.1671	Australia; Dendy Coll.
sl	,, ,,	1932.12.20.1	River Deben, Suffolk; D. L. Serventy
sl	,, ,,	1938.6.16.78–79	South Rona, Inverness-shire; King's Coll. Exped.
sl	,, ,,	1954.8.12.76–77	Remy Rocks, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.123	Asia Shoal, Plymouth; M.B.L. Coll.
sl	,, ,,	1956.4.26.1	Shetland; (from A. M. Norman) Bowerbank Coll.
sl	,, ,,	1956.4.26.2	Wick; (from C. M. Peach) Bowerbank Coll.
sl	**Leucosolenia botryoides** var. **macquariensis (L)**	1956.4.26.3	Dendy Coll. (I. 10)
sl	**Leucosolenia botryoides** var. **macquariensis (C)**	1956.4.26.4	Dendy Coll. (I. 13)
sl	**Leucosolenia botryoides** var. **macquariensis (C)**	1956.4.26.5	Dendy Coll. (I. 12)
sl	**Leucosolenia botryoides** var. **macquariensis (C)**	1956.4.26.6	Dendy Coll. (I. 11)

LEUCOSOLENIA CANARIENSIS

sp	**Leucosolenia canariensis** var. **compacta (H)**	1912.2.1.3	Red Sea; Crossland Coll.
sp	*Leucosolenia canariensis*	1935.10.21.50	St. James; T. A. Stephenson, South Africa
sp	,, ,,	1938.6.30.2–3	Horn Bay, Newfoundland; 'Rosaura' Exped. 1937
dry	,, ,,	1938.3.28.6–7	Turneffe, British Honduras; J. H. Borley
dry	,, ,,	1948.8.6.61	Bermuda; M. W. de Laubenfels
sl	,, ,,	1924.7.2.9, 12A, 13, 18, 21A, 22, 25, 28	Cape Verde Islands; A. G. Thacker
sl	,, ,,	1936.7.8.65	Tortugas; M. W. de Laubenfels
sl	,, ,,	1936.9.22.9	Spitzbergen; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.276	Spitzbergen; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1949.7.5.2, 29	'Manihine' Akaba Coll.

LEUCOSOLENIA CAVATA

sp	**Clathrina cavata (L)**	1887.7.12.1	South coast of Australia; J. B. Wilson Coll.
sp	,, ,, (C)	1887.7.12.2	South coast of Australia; J. B. Wilson Coll.

sp	*Leucosolenia cavata*	1891.9.19.9	Near Port Phillip Heads, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.16	Near Port Phillip Heads, Australia; Dendy Coll. (R.N.35)
sp	,, ,,	1925.11.1.25	Port Phillip Heads, Australia; Dendy Coll.
sp	*Clathrina cavata*	1956.4.26.7–8	South coast of Australia; J. B. Wilson Coll.
dry	,, ,,	1887.7.12.36	South coast of Australia; J. B. Wilson Coll.
sl	*Leucosolenia cavata*	1924.2.6.2	J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1672	Near Port Phillip Heads; Australia; Dendy Coll. (R.N.56a)
LEUCOSOLENIA CEREBRUM			
sp	*Ascaltis cerebrum*	1883.12.4.30	Lesina, Adriatic; F. E. Schulze
sp	*Ascetta cerebrum*	1897.3.25.1	Lesina, Adriatic; R. von Lendenfeld
sp	*Nardoa cerebrum*	1896.9.15.7–12	Banyuls-sur-Mer; E. A. Minchin
sp	*Leucosolenia cerebrum*	1932.7.25.8	Stil Bay, South Africa; T. A. Stephenson
dry	,, ,,	1906.12.1.7	Received from Berlin Museum; Minchin Coll.
dry	,, ,,	1938.8.24.53	New Zealand; L. B. Moore
dry	*Clathrina cerebrum*	1910.1.1.432	Lesina, Adriatic; Lendenfeld specimen in Norman Coll.
LEUCOSOLENIA CHALLENGERI			
sp	**Leucosolenia challengeri (H)**	1884.4.22.11	Cape York, Australia; 'Challenger' Coll.
dry	,, ,,	1938.8.24.74	Cook Strait, New Zealand; L. B. Moore
LEUCOSOLENIA CLATHRATA			
dry	**Clathrina tripodifera** var. **gravida (H)**	1887.7.12.41	Port Phillip, Australia; J. B. Wilson Coll.
dry	**Leucetta clathrata (H)**	1955.11.2.21	South West Australia; Bowerbank Coll.
sl	**Grantia cliftoni (H)**	1956.4.26.9	Fremantle, Australia; Bowerbank Coll.
LEUCOSOLENIA CLATHRUS			
sp	*Leucosolenia clathrus*	1898.5.7.2	Norman Coll.
sp	,, ,,	1925.11.1.2	Naples; Dendy Coll.
sp	,, ,,	1949.4.22.1	Mediterranean Sea; Dr. Eger
sp	*Ascetta clathrus*	1883.12.4.16	Lesina, Adriatic; F. E. Schulze
sp	,, ,,	1897.3.25.2	Lesina, Adriatic; R. von Lendenfeld
sp	*Clathrina clathrus*	1955.11.2.115	No information
sp	*Grantia clathrus*	1925.11.1.981	Budleigh Salterton, Devon; (from H. J. Carter) Dendy Coll.
dry	*Ascetta clathrus*	1910.1.1.433	Lesina, Adriatic; Norman Coll.
dry	*Clathrina clathrus*	1956.4.26.1	Budleigh Salterton, Devon; H. J. Carter
sl	*Clathrina clathrus*	1882.3.6.7–10	E. A. Minchin (Brit. Mus. No. 23)
sl	*Ascetta clathrus*	1910.1.1.1528	Naples, Marine Zoological Station; Norman Coll.
sl	*Leucosolenia clathrus*	1932.11.17.84	Sea of Japan; Leningrad Museum

LEUCOSOLENIA COMPLICATA

sp	*Leucosolenia complicata*	1895.12.19.1	Jersey; purchased Sinel
sp	,, ,,	1897.8.9.7–12	Near Swanage Bay; R. Kirkpatrick
sp	,, ,,	1903.7.27.1	Plymouth; M. B. L. Coll.
sp	,, ,,	1907.8.6.4	National Antarctic Exped.
sp	,, ,,	1910.1.1.675	Scilly Islands; (E. A. Minchin) Norman Coll.
sp	,, ,,	1934.11.7.3	Tustna; Trondheim Museum Coll.
sp	,, ,,	1934.11.7.4, 6	Støff; Trondheim Museum Coll.
sp	,, ,,	1934.11.7.5	Sula; Trondheim Museum Coll.
sp	,, ,,	1934.11.7.7	Gurvikdal; Trondheim Museum Coll.
sp	,, ,,	1938.3.9.1	Malin Head, Co. Donegal, Ireland; N. F. McMillan
sp	,, ,,	1938.3.16.1	Barra, Outer Hebrides; N. F. McMillan
sp	,, ,,	1938.8.16.6	Greenisland, Co. Antrim, Ireland; N. F. McMillan
sp	,, ,,	1946.10.3.8	Plymouth; M. W. Jepps
sp	,, ,,	1946.10.8.2, 15, 22, 29, 36, 42, 45, 51, 54, 63, 77, 81, 88, 98, 101, 106, 110, 115, 125, 128, 133, 138, 147, 158	Flotta; A. J. Cobham
sp	,, ,,	1946.11.15.16 21, 23	Plymouth Sound; M. Burton
sp	,, ,,	1946.11.15.40	Paignton, Devon; M. Burton
sp	,, ,,	1946.11.15.52	Floating Wharf, Millbay; M. Burton
sp	,, ,,	1947.6.30.4–11	Portsmouth; M. Burton
sp	,, ,,	1947.6.30.33–34, 36	Fountain Lake, Portsmouth; A. J. Cobham
sp	,, ,,	1947.10.3.170	English Channel; 'Manihine' Coll.
sp	,, ,,	1948.7.10.4, 20, 29, 49, 58, 93, 101, 104, 109	English Channel; 'Manihine' Coll.
sp	,, ,,	1949.5.3.2	Tollesbury, Essex; H. A. Cole
sp	,, ,,	1949.5.3.14	Althorne Creek; H. A. Cole
sp	,, ,,	1954.9.17.1–2	Emsworth Harbour; N. I. Hendey
sp	,, ,,	1955.1.12.1	Flotta; A. J. Cobham
sp	,, ,,	1955.1.13.5	Portsmouth; M. Burton
sp	,, ,,	1955.1.19.4	Cobham's 'Barham' Coll.
sp	*Leucosolenia coriacea*	1948.7.10.94	English Channel; 'Manihine' Coll.
sp	*Ascandra complicata* var. *hispida*	1908.9.24.2	Heligoland; Berlin Museum Exchange
dry	*Grantia botryoides*	1847.9.7.111	Holy Island; Johnston Coll.
dry	,, ,,	1955.11.2.12	River Orwell, Suffolk; Bowerbank Coll.
dry	*Grantia botryoides* var.	1847.9.7.112	Holy Island; Johnston Coll.
dry	*Leucosolenia complicata*	1906.12.1.8	Berlin Museum; Minchin Coll.
dry	,, ,,	1906.12.1.85	Roscoff; Minchin Coll.
dry	,, ,,	1906.12.1.89	Plymouth; Minchin Coll.

dry	*Leucosolenia complicata*	1906.12.1.92	Cremyll; Minchin Coll.
dry	,, ,,	1906.12.1.93	Duke Rock, Plymouth; Minchin Coll.
dry	,,	1906.12.1.97	Millbay Docks, Plymouth; Minchin Coll.
dry	,, ,,	1910.1.1.416	Scilly Islands; (det. E. A. Minchin) Norman Coll.
dry	,, ,,	1946.11.15.16, 23	Plymouth Sound; M. Burton
dry	*Ascandra complicata*	1910.1.1.415	Scarborough; Norman Coll.
dry	*Leucosolenia botryoides*	1954.8.12.226	Heligoland; M. B. L. Coll.
dry	,, ,,	1955.11.2.8–11	Shetland; Bowerbank Coll.
dry	,, ,,	1955.11.2.13	Scarborough; Bowerbank Coll.
sl	*Leucosolenia complicata*	1885.1.9.32–34	E. A. Minchin; (Brit. Mus. No. 80)
sl	,, ,,	1906.12.1.98	Minchin Coll.; (3b)
sl	,, ,,	1934.11.7.2	Tømmering; Trondheim Museum Coll.
sl	,, ,,	1938.6.16.67–73	South Rona Island, Inverness-shire; King's College Exped.
sl	,, ,,	1954.3.17.90	Plymouth; L. R. Crawshay
sl	,, ,,	1954.8.12.15	Turnchapel Pier, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.72	Remy Rocks, Plymouth; M.B.L. Coll.
sl	,, ,,	1956.4.26.33	Plymouth; R. W. H. Row
sl	*Ascandra complicata*	1910.1.1.1514	Scarborough; (from Mr. Bean) Norman Coll.

LEUCOSOLENIA CONTORTA

dry	**Ascandra contorta (H)**	1910.1.1.434B	Guernsey; Norman Coll.
dry	**Leucosolenia contorta (H)**	1950.10.12.6	Guernsey; Bowerbank Coll.
sp	*Clathrina contorta*	1906.12.1.102–3	Banyuls; Minchin Coll.
sp	*Leucosolenia contorta*	1925.11.1.744	Wood's Hole, Massachusetts; Dendy Coll.
sp	*Nardoa contorta*	1896.9.15.1–6	Banyuls-sur-Mer, Marine Zoological Station; Minchin Coll.
sp	*Leucosolenia contorta*	1955.1.25.2	The Lizard, Cornwall; A. J. Cobham
sp	,, ,,	1957.16.8.4	Wembury Bay, Plymouth; L. R. Crawshay
dry	*Leucosolenia contorta*	1910.1.1.434A	Guernsey; Norman Coll.
dry	,, ,,	1950.10.12.1–5, 7	Guernsey; Bowerbank Coll.
sl	*Clathrina contorta*	1908.9.25.16	Zanzibar, Crossland Coll.
sl	,, ,,	1954.2.11.20.21, 25	Zanzibar, Crossland Coll.
sl	*Leucosolenia contorta*	1906.12.1.101	Roscoff; (from E. Topsent) Minchin Coll.
sl	,, ,,	1954.8.12.234	Looe Island; Plymouth Coll.
sl	,, ,,	1956.4.26.10	Jersey; Hornell Biological Station
sl	,, ,,	1956.4.26.11	Scarborough; (from Mr. Bean) Bowerbank Coll.

LEUCOSOLENIA CORIACEA

sp	*Leucosolenia coriacea*	1887.9.2.5	Firth of Lorne; J. Murray
sp	,, ,,	1895.5.31.1	Port Erin, Isle of Man; W. A. Herdman
sp	,, ,,	1910.1.1.789 (iv)	Lang Fiord, Norway; Norman Coll.
sp	,, ,,	1910.1.1.790 (ii)	Lang Fiord, Norway; Norman Coll.

sp	*Leucosolenia coriacea*	1925.11.1.10	Plymouth; Dendy Coll.
sp	,, ,,	1926.2.11.50	Suez Canal; H. Munro Fox
sp	,, ,,	1926.8.1.22, 28	Lough Ine, South-west Ireland; L. P. W. Renouf
sp	,, ,,	1927.2.14.152	Christmas Island; R. Kirkpatrick
sp	,, ,,	1929.8.22.49	California; M. W. de Laubenfels
sp	,, ,,	1930.11.10.1	Bowerbank Coll.
sp	,, ,,	1931.10.28.4	Lofoten; Trondheim Museum Coll.
sp	,, ,,	1932.1.9.27–29	Port Erin, Isle of Man; H. B. Moore
sp	,, ,,	1932.7.25.9–12	Stil Bay, S. Africa; T. A. Stephenson
sp	,, ,,	1933.1.2.29	Plymouth; J. A. Kitching
sp	,, ,,	1933.1.10.7, 16	Plymouth; J. A. Kitching
sp	,, ,,	1933.3.1.16	Naples; H. Srinivasa Rao
sp	,, ,,	1933.3.9.10, 12, 23	Lough Ine, South-west Ireland; L. P. W. Renouf
sp	,, ,,	1933.7.20.7	South Georgia; Hamburg Museum
sp	,, ,,	1935.10.21.47	Oude Kraal, South Africa; T. A. Stephenson
sp	,, ,,	1935.10.21.48	St. James, South Africa; T. A. Stephenson
sp	,, ,,	1938.3.28.2–4	Turneffe, British Honduras; J. H. Borley
sp	,, ,,	1938.4.5.1	Isle of Man; N. B. Eales
sp	,, ,,	1938.5.26.11	Atlit, Palestine; K. Reich
sp	,, ,,	1939.1.24.1	Isle of Man; G. I. Crawford
sp	,, ,,	1939.1.26.1	Glazebury Island, Bermuda; J. F. G. Wheeler
sp	,, ,,	1946.10.3.7	Plymouth; M. W. Jepps
sp	,, ,,	1946.10.8.7, 16, 25, 31, 32, 39, 43a, 49, 53, 62, 64, 84, 92, 107, 116, 120, 152	Flotta; A. J. Cobham
sp	,, ,,	1947.7.1.11, 47–48, 53, 66	Torbay; M. Burton
sp	,, ,,	1947.10.3.10–15, 174	English Channel; 'Manihine' Coll.
sp	,, ,,	1948.7.10.64, 75, 94	English Channel; 'Manihine' Coll.
sp	,, ,,	1949.10.19.45–46	English Channel; 'Manihine' Coll.
sp	,, ,,	1949.12.6.8	Porsanger Fjiord, Norway; G. I. Crawford
sp	,, ,,	1955.1.19.1–2	Cobham's 'Barham' Coll.
sp	,, ,,	1955.11.2.121	Torquay; M. Burton
sp.	,, ,,	1957.16.8.3	Plymouth; L. R. Crawshay
sp	**Leucosolenia coriacea** var. **ceylonensis (H)**	1907.2.1.101	Ceylon; W. A. Herdman
sp	*Clathrina coriacea*	1912.2.1.1	Red Sea; Crossland Coll.
sp	*Grantia coriacea*	1847.10.11.24	British; Johnston Coll.

sp	*Leucosolenia primordialis*	1954.8.12.235	Wembury Bay, Plymouth; M.B.L. Coll.
dry	*Leucosolenia coriacea*	1910.1.1.427	Strangford Lough, Ireland; Norman Coll.
dry	,, ,,	1910.1.1.428	Tobermory, Hebrides; Norman Coll.
dry	,, ,,	1938.3.28.5	Turneffe, British Honduras; J. H. Borley
dry	,, ,,	1955.11.2.14, 18	Hebrides; ? Bowerbank Coll.
dry	,, ,,	1955.11.2.15, 19	Guernsey; Bowerbank Coll.
dry	,, ,,	1955.11.2.16, 17	Scarborough; Bowerbank Coll.
dry	*Leucosolenia coriacea* var. *himantia*	1847.9.7.110	Holy Isle; Johnston Coll.
dry	*Clathrina coriacea*	1882.3.6.7–10	Budleigh Salterton, Devon; H. J. Carter
dry	,, ,,	1896.12.28.1	Sark; M. Woodward
dry	,, ,,	1910.1.1.426, 426a	Bantry; Norman Coll.
dry	,, ,,	1910.1.1.431	Shetland; Norman Coll.
dry	*Grantia coriacea*	1847.9.7.105–6	Berwick Bay; Johnston Coll.
dry	*Ascetta coriacea*	1910.1.1.423	Gouliot Caves, Sark; Norman Coll.
dry	,, ,,	1910.1.1.424	Herm; Norman Coll.
dry	,, ,,	1910.1.1.425	Britain; Norman Coll.
dry	,, ,,	1910.1.1.429	Bergen; Norman Coll.
dry	,, ,,	1910.1.1.430	Channel Isles; Norman Coll.
dry	*Clathrina clathrus*	1886.3.25.2–3	Budleigh Salterton, Devon; H. J. Carter
dry	,, ,,	1955.11.2.124	Locality unknown; Bowerbank Coll.
sl	*Leucosolenia coriacea*	1891.8.22.1	Tangier; history unknown
sl	,, ,,	1928.6.18.1–2, 11–12	'Siboga' Exped.
sl	,, ,,	1933.7.20.37	South Georgia; Hamburg Museum
sl	,, ,,	1934.11.24.133–134	Indian Museum Coll.
sl	,, ,,	1936.9.22.321	Franz Josef Land and Leninland; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1938.5.26.68, 65,	Haifa Hafen, Palestine; K. Reich
sl	,, ,,	1938.5.26.61, 75	Atlit, Palestine; K. Reich
sl	,, ,,	1938.6.16.74–77	South Rona, Inverness-shire; King's College Exped.
sl	,, ,,	1947.10.3.177	English Channel; 'Manihine' Coll.
sl	,, ,,	1954.2.24.9–11	Red Sea; Crossland Coll.
sl	,, ,,	1954.8.12.10, 18, 78	Wembury Bay, Plymouth; M.B.L. Coll.
sl	**Leucosolenia coriacea** var. **ceylonensis** (C)	1954.2.23.121–122	Ceylon; Dendy Coll. (R.N. 377, 378)
sl	*Clathrina coriacea*	1879.12.27.41	Tom Bay, S.W. Chile
sl	,, ,,	1880.12.31.21	Franz Josef Land; Leigh Smith
sl	,, ,,	1907.8.6.1–2	National Antarctic Exped.
sl	*Ascetta primordialis*	1896.11.5.1	Lesina, Adriatic; R. von Lendenfeld

LEUCOSOLENIA DARWINII

sp	*Leucosolenia darwinii*	1938.3.26.37	St. James, South Africa; T. A. Stephenson
sl	*Clathrina darwinii*	1908.9.25.17	Zanzibar; Crossland Coll.
sl	,, ,,	1954.2.11.32, 36	Zanzibar; C. F. Jenkin

LEUCOSOLENIA DECIPIENS

sp	*Leucosolenia decipiens*	1938.3.26.35	Bats Cave Rocks, E. London, South Africa; T. A. Stephenson

LEUCOSOLENIA DEPRESSA

sp	**Leucosolenia depressa** (H)	1891.9.19.11	Near Port Phillip Heads, Australia; A. Dendy
dry	*Clathrina depressa*	1900.10.19.5	Funafuti Atoll; R. Kirkpatrick

LEUCOSOLENIA DICTYOIDES

sp	*Leucosolenia dictyoides*	1908.9.24.3	Juan Fernandez; Platé Coll., Berlin Museum Exchange
sp	,, ,,	1936.11.26.29	Isipingo Beach, South Africa; T. A Stephenson
sp	,, ,,	1936.11.26.30	St. James, South Africa; T. A. Stephenson

LEUCOSOLENIA DISCOVERYI

sp	**Leucosolenia discoveryi** (L)	1907.8.6.5	National Antarctic Exped.
sl	,, ,, (C)	1907.8.6.6–13	National Antarctic Exped.
sl	*Leucosolenia discoveryi*	1928.2.15.294	'Discovery' Exped., 1926–7

LEUCOSOLENIA DUBIA

sp	**Leucosolenia dubia** (L)	1891.9.19.2	Near Port Phillip Heads, Australia; Dendy Coll.
sp	,, ,, (C)	1891.9.19.3	Near Port Phillip Heads, Australia; Dendy Coll.
sl	*Leucosolenia dubia*	1924.2.6.9	J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1682	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 10)
sl	,, ,,	1925.11.1.1683	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 19)
sl	,, ,,	1925.11.1.1684	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 12)
sl	,, ,,	1925.11.1.1685	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 57a)

LEUCOSOLENIA ECHINATA

dry	*Leucosolenia echinata*	1938.8.24.58	Stewart Island, New Zealand; L. B. Moore
dry	,, ,,	1938.8.24.61	Ohiro Bay, New Zealand; L. B. Moore
sl	,, ,,	1956.4.26.17	Wellington Heads; H. B. Kirk
sl	,, ,,	1956.4.26.19	Stewart Island, New Zealand; H. B. Kirk

LEUCOSOLENIA ELEANOR

sp	*Leucosolenia eleanor*	1929.8.22.46	California; M. W. de Laubenfels

LEUCOSOLENIA FALKLANDICA

sp	*Leucosolenia falklandica*	1933.3.17.1	South Georgia; Swedish Antarctic Exped.

dry	*Leucosolenia falklandica*	1955.11.2.123	Falkland Islands
sl	,, ,,	1933.3.17.124	South Georgia; Swedish Antarctic Exped.

LEUCOSOLENIA FALCATA

sp	*Ascandra falcata*	1883.12.4.31	Trieste; F. E. Schulze
sp	,, ,,	1896.9.15.18–20	Banyuls; E. A. Minchin
sp	,, ,,	1906.12.1.78	Naples; Minchin Coll.
sp	*Leucosolenia falcata*	1897.3.25.4	Lesina, Adriatic; R. von Lendenfeld
sl	*Homandra falcata*	1896.11.5.6	Trieste; R. von Lendenfeld
sl	*Leucosolenia falcata*	1910.1.1.1542	Roscoff; (from E. Topsent) Norman Coll.
sl	*Ascandra falcata*	1955.12.13.6–7	Minchin Coll.

LEUCOSOLENIA GARDINERI

sp	**Leucosolenia gardineri (L)**	1920.12.9.47	'Sealark' Exped.; Dendy Coll. (CXX. 7)
sp	,, ,, (C)	1920.12.9.48	'Sealark' Exped.; Dendy Coll. (CXX. 11)
sp	*Leucosolenia gardineri*	1935.10.21.49	St. James, South Africa; T. A. Stephenson
sp	,, ,,	1936.3.4.95	Indian Ocean; John Murray Exped.

LEUCOSOLENIA GOETHEI

sl	*Leucosolenia goethei*	1896.11.5.5	Rovigno, Adriatic; R. von Lendenfeld

LEUCOSOLENIA GRISEA

sp	**Leucosolenia grisea (H)**	1924.9.1.1	Abrolhos Island; Dendy Coll. (R.N. VI.21)
sp	,, ,, (C)	1925.11.1.1	Abrolhos Island; Dendy Coll. (R.N. IV.3A)

LEUCOSOLENIA INTERMEDIA

sp	*Leucosolenia intermedia*	1938.8.24.17	New Zealand; L. B. Moore
dry	,, ,,	1938.8.24.52	New Zealand; L. B. Moore

LEUCOSOLENIA IRREGULARIS

sl	*Leucosolenia irregularis*	1908.9.25.6	Wasin, E. Africa; C. F. Jenkin

LEUCOSOLENIA LACUNOSA

dry	**Grantia lacunosa (H)**	1847.9.7.117–118	Scarborough; Johnston Coll.
sl	**Leucosolenia lacunosa (C)**	1906.12.1.36	Norway; Minchin Coll.
sp	,, ,,	1910.1.1.583	Lervig Bay, Norway; Norman Coll.
sp	,, ,,	1910.1.1.677	Oban; Norman Coll.
sp	,, ,,	1931.10.28.5	Locality unknown; Trondheim Museum Coll.
sp	,, ,,	1934.11.7.1	Trondheimor, Lofoten Island; Trondheim Museum Coll.
sp	,, ,,	1938.6.16.3	South Rona, Inverness-shire; King's College Exped.
sp	,, ,,	1948.7.10.53, 73	English Channel; 'Manihine' Coll.
sp	,, ,,	1957.16.8.5	Plymouth; L. R. Crawshay
dry	,, ,,	1910.1.1.1076	Norway, 1879; Norman Coll.
dry	,, ,,	1955.11.2.29	Scarborough; Bowerbank Coll.

dry	*Leucosolenia lacunosa* var. *hilliari*	1886.6.25.1–8	Locality unknown
dry	*Leucosolenia lacunosa* var. *hilliari*	1955.11.2.23	Ramsgate; B. J. Priest
dry	*Grantia lacunosa*	1870.6.7.26A	Cornwall; J. Couch
dry	*Ascortis lacunosa*	1910.1.1.435	Scarborough; Norman Coll.
sl	*Leucosolenia lacunosa*	1936.3.10.34	Sea of Japan; Exped. Acad. Sci. Mus., U.S.S.R.
sl	,, ,,	1936.9.22.294–295	Novaya Zemlya; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.296, 320	Between Franz Josef Land and Leningrad; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.357–373	Leninland; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1956.4.26.16	Shetland; (from Mr. Peach) Bowerbank Coll.
sl	*Grantia striatula*	1956.4.26.28	Bowerbank Coll.
sl	*Sycandra angulata*	1956.4.26.34	Lesina, Adriatic; R. von Lendenfeld

LEUCOSOLENIA LAMARCKII

sp	*Leucosolenia lamarckii*	1882.4.22.7–8	Port Jackson, Australia; 'Challenger' Coll.
dry	*Ascaltis lamarckii*	1887.7.11.40	West coast of Florida

LEUCOSOLENIA LAMINOCLATHRATA

dry	**Clathrina laminoclathrata** (L)	1887.7.12.42	South coast of Australia; J. B. Wilson Coll.
dry	,, ,, (C)	1887.7.12.43	Port Phillip Heads, Australia; J. B. Wilson Coll.

LEUCOSOLENIA LIEBERKÜHNII

dry	*Leucosolenia lieberkühnii*	1906.12.1.79–83	Naples; Minchin Coll.
dry	,, ,,	1906.12.1.84	Banyuls; Minchin Coll.

LEUCOSOLENIA LUCASI

sp	**Leucosolenia lucasi (H)**	1925.11.1.19	Outside Port Phillip Heads, Australia; Dendy Coll.
sp	*Leucosolenia lucasi*	1891.9.19.1	Port Phillip Heads, Australia
sp	,, ,,	1925.11.1.20	St. Vincent's Gulf, Australia; Dendy Coll.
sl	,, ,,	1925.11.1.19	Near Port Phillip Heads, Australia; Dendy Coll.
sl	,, ,,	1925.11.1.1839	Australia; Dendy Coll.

LEUCOSOLENIA MACLEAYI

sl	**Ascetta macleayi (H?)**	1886.6.7.6	Port Jackson, Australia; R. von Lendenfeld
sp	*Leucosolenia macleayi*	1891.8.22.1	Tangier; B. Woodward

sp	*Leucosolenia macleayi*	1938.3.26.36	E. London, South Africa; T. A. Stephenson
dry	,, ,,	1910.1.1.1085	Norman Coll.
sl	,, ,,	1936.9.22.241	Spitzbergen; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.378–9	Leninland; Zool. Inst. Acad. Sci., Leningrad

LEUCOSOLENIA MINCHINI

sp	**Leucosolenia minchini (L)**	1907.8.6.14	National Antarctic Exped.
sp	,, ,, (C)	1907.8.6.15	National Antarctic Exped.
sl	*Leucosolenia minchini*	1907.8.6.16–21	National Antarctic Exped.

LEUCOSOLENIA NANSENI

sp	**Leucosolenia nanseni (P)**	1908.9.24.5	Spitzbergen; Berlin Museum Exchange
sl	*Leucosolenia nanseni*	1954.2.10.5	Iceland Exped., André, 1896; Dendy Coll. (Apparently a preparation from the holotype, made by Breitfuss)

LEUCOSOLENIA NAUTILIA

sp	**Leucosolenia nautilia (P)**	1929.8.22.11	California; M. W. de Laubenfels

LEUCOSOLENIA NITIDA

sp	*Leucosolenia nitida*	25.11.1.1342	Plymouth; Dendy Coll.

LEUCOSOLENIA OSCULUM

dry	**Clathrina osculum (H)**	1887.7.12.37	Port Phillip, Australia; J. B. Wilson Coll.

LEUCOSOLENIA PANIS

sl	*Leucosolenia panis*	1924.7.2.1	Cape Verde Islands; A. G. Thacker

LEUCOSOLENIA PEDUNCULATA

sl	*Leucopsis pedunculata*	1886.6.7.11	Port Jackson, Australia; R. von Lendenfeld

LEUCOSOLENIA PELLICULATA

sp	**Leucosolenia pelliculata (H)**	1891.9.19.8	Near Port Phillip Heads, Australia; Dendy Coll.
sp	*Leucosolenia pelliculata*	1891.9.19.5	Near Port Phillip Heads, Australia; Dendy Coll.
sl	,, ,,	1924.2.6.13	J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1693–8	Near Port Phillip Heads, Australia; Dendy Coll.

LEUCOSOLENIA PINUS

sp	*Leucosolenia pinus*	1910.1.1.676	Banyuls: (from Topsent); Norman Coll.
sl	,, ,,	1906.12.1.104	Banyuls; Minchin Coll. (B.M. No. 17)
sl	,, ,,	1910.1.1.1517	Roscoff: (from Topsent); Norman Coll.

LEUCOSOLENIA POTERIUM

sp	*Leucosolenia poterium*	1884.4.22.1–4	N. of Cape Howe, New South Wales; 'Challenger' Coll.

sp	*Leucosolenia poterium*	1884.4.22.5–6	Port Jackson, Australia; 'Challenger' Coll.
sl	*Ascandra conulata*	1925.11.1.1676	Port Jackson, Australia; Dendy Coll.
sl	*Clathrina poterium*	1879.12.27.6	Tom Bay, Chile; 'Alert' Coll.

LEUCOSOLENIA PRIMORDIALIS

sp	*Leucosolenia primordialis*	1887.7.12.4–5	South coast of Australia; J. B. Wilson Coll.
sp	,, ,,	1895.12.30.2	Naples, Marine Zoological Station
sp	,, ,,	1898.5.7.3	Naples, Marine Zoological Station; Norman Coll.
sp	,, ,,	1898.12.20.1	Christmas Island; C. W. Andrews
sp	,, ,,	1910.1.1.678	Naples; Norman Coll.
sp	,, ,,	1925.11.1.23	Naples; Dendy Coll.
sp	,, ,,	1931.10.28.1	Lofoten Island; Trondheim Museum Coll.
sp	,, ,,	1931.10.28.2	Kristiansund; Trondheim Museum Coll.
sp	,, ,,	1933.3.1.29	Naples; H. Srinivasa Rao
sp	,, ,,	1957.16.8.1	Plymouth; L.R. Crawshay
sp	*Clathrina primordialis*	1886.12.15.7, 29	Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	*Ascetta primordialis*	1897.3.25.3	Lesina, Adriatic; R. von Lendenfeld
sp	*Ascetta primordialis* var. *protogenes*	1878.6.8.3	Swain Bay, Kerguelen Island
dry	*Clathrina primordialis*	1887.7.12.44	Port Phillip, Australia; J. B. Wilson Coll.
dry	,, ,,	1895.12.30.2	Naples
dry	*Leucosolenia primordialis*	1912.2.1.2	Red Sea; Crossland Coll.
sl	*Leucosolenia primordialis*	1910.1.1.1534–1535, 2685	Naples, Marine Zoological Station; Norman Coll.
sl	,, ,,	1954.2.24.12	Red Sea; Crossland Coll.
sl	*Clathrina primordialis*	1867.7.26.4	History unknown
sl	,, ,,	1907.8.6.3	National Antarctic Exped.
sl	,, ,,	1925.11.1.1699	South coast of Australia; Dendy Coll. (B.M. No. 5)
sl	,, ,,	1954.2.11.40, 45	Wasin, E. Africa; C. F. Jenkin

LEUCOSOLENIA PROCUMBENS

sp	***Ascetta procumbens (L)**	1886.6.7.1–3	'Port Jackson and Port Phillip'
sl	,, ,,	1886.6.7.4	Port Jackson, Australia; R. von Lendenfeld
sl	,, ,,	1886.6.7.5	Port Jackson, Australia; R. von Lendenfeld
sl	*Clathrina procumbens*	1930.8.11.9	Campbell Island

* There are three specimens in one jar, which had not been previously numbered separately. The label outside the jar reads: 'Port Phillip ? this massive spec^{n}. Port Jackson, the 2 others'. The specimen that best fits Lendenfeld's original description has now been labelled 86.6.7.1, and named the lectotype.

LEUCOSOLENIA PROTOGENES

sp	*Leucosolenia protogenes*	1925.11.1.3	Abrolhos Island; Dendy Coll. (R.N. VIII 4)
sp	,, ,,	1925.11.1.5	Victoria; Dendy Coll.
sp	,, ,,	1925.11.1.29	Australia; Dendy Coll.
sl	,, ,,	1924.2.6.16	J. B. Wilson Coll.
sl	,, ,,	1924.2.6.19	J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1700–1702	Near Port Phillip Heads, Australia; Dendy Coll.

LEUCOSOLENIA PROXIMA

sp	**Leucosolenia proxima (L)**	1891.9.19.6	Near Port Phillip Heads, Australia; Dendy Coll.
sp	,, ,,	1891.9.19.10	Near Port Phillip Heads, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.14	Near Port Phillip Heads, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.27	Near Port Phillip Heads, Australia; Dendy Coll.
sl	,, ,,	1925.11.1.1703	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 49)
sl	,, ,,	1925.11.1.1704	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 48)
sl	,, ,,	1925.11.1.1705	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 31)
sl	,, ,,	1925.11.1.1706	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 28)

LEUCOSOLENIA PSAMMOPHILA

sp	**Leucosolenia psammophila (P)**	1925.11.1.30	Hamburg S.W. Australia Exped., 1905; Dendy Coll.

LEUCOSOLENIA PULCHERRIMA

sp	**Leucosolenia pulcherrima (L)**	1891.9.19.7	Near Port Phillip Heads, Australia; Dendy Coll.
sl	,, ,,	1924.2.6.22	J. B. Willson Coll. (This is probably a preparation from the type, but this cannot be proven)
sl	,, ,,	1925.11.1.1689	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 23)
sl	,, ,,	1925.11.1.1690	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 22)
sl	,, ,,	1925.11.1.1691	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 21)

LEUCOSOLENIA RETICULUM

sp	**Nardoa reticulum** (? **C**)	1867.7.26.4	Adriatic; O. Schmidt
sp	,, ,,	1896.9.15.13–17	Banyuls-sur-Mer; Minchin Coll.
dry	**Leucosolenia reticulum** (? **C**)	1855.11.2.27	(From O. Schmidt) Bowerbank Coll.
sl	**Nardoa reticulum** (? **from H**)	1867.3.11.87	(From O. Schmidt) Bowerbank Coll.
sl	,, ,,	1910.1.1.1537	Hillswick, Shetland, 1867; (named by Haeckel) Norman Coll.
sl	*Ascandra reticulum*	1910.1.1.1539	Norman Coll.

LEUCOSOLENIA STIPITATA

sl	*Leucosolenia stipitata*	1925.11.1.1673	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 29)
sl	,, ,,	1925.11.1.1674	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 34)
sl	,, ,,	1925.11.1.1675	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 33)
sl	,, ,,	1928.6.18.3	'Siboga' Exped.

[1925.11.1.1674 and 1675 are microscope preparations bearing specimens mounted entire. 1925.11.1.1673 includes four preparations, presumably all from the specimen figured by Dendy (1891: pl. 1, figs. 4, 6) and here taken as the lectotype.]

LEUCOSOLENIA STOLONIFER

sp	**Leucosolenia stolonifer (L)**	1891.9.19.4	Near Port Phillip Heads, Australia; Dendy Coll.
sp	,, ,,	1923.10.1.1	New Zealand; 'Terra Nova' Exped. (XLVII 2)
sp	,, ,,	1925.11.1.13	Near Port Phillip Heads, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.28	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 42)
sl	,, ,,	1925.11.1.1707	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 41)
sl	,, ,,	1925.11.1.1708	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 57)
sl	,, ,,	1925.11.1.1709	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 56)

LEUCOSOLENIA TENUIPILOSA

sp	**Leucosolenia tenuipilosa (H)**	1907,2.1.102	Ceylon; Herdman Coll.
sp	*Clathrina tenuipilosa*	1912.2.1.4	Red Sea; Crossland Coll.
sp	*Leucosolenia tenuipilosa*	1947.7.21.23, 25, 33	Malta; A. J. Cobham
sp	,, ,,	1949.7.5.3	'Manihine' Akaba Coll.
sp	,, ,,	1949.7.5.4	'Manihine' Akaba Coll.
sl	,, ,,	1954.2.23.117	Ceylon; Dendy Coll. (R.N. 158)
sl	,, ,,	1954.2.23.118	Ceylon; Dendy Coll. (R.N. 158a)
sl	,, ,,	1954.2.23.119	Ceylon; Dendy Coll. (R.N. 380)
sl	,, ,,	1954.2.23.120	Ceylon; Dendy Coll. (R.N. 381)
sl	,, ,,	1954.2.24.13–21	Red Sea; Crossland Coll.

LEUCOSOLENIA VARIABILIS

sl	**Leucosolenia variabilis (?C)**	1906.12.1.40, 50	(Collected by Norman, identified by Haeckel); Minchin Coll.
sp	*Leucosolenia variabilis*	1883.12.4.17	Trieste; F. E. Schulze
sp	,, ,,	1908.1.30.1	Roscoff; Minchin Coll.
sp	,, ,,	1910.1.1.421	Bergen, Norway; Norman Coll.
sp	,, ,,	1935.10.21.51	St. James, South Africa; T. A. Stephenson
sp	,, ,,	1947.7.1.61	Torbay; M. Burton

dry	*Leucosolenia variabilis*	1906.12.1.13	(from Berlin Museum); Minchin Coll.
dry	,, ,,	1906.12.1.86–88	Roscoff; Minchin Coll.
dry	,, ,,	1906.12.1.91, 94, 96	Minchin Coll.
dry	,, ,,	1908.1.30.1	Roscoff; Minchin Coll.
dry	,, ,,	1910.1.1.418	Polperro, Cornwall; Norman Coll.
dry	*Ascandra variabilis*	1910.1.1.417	England; Norman Coll.
dry	,, ,,	1910.1.1.419	Shetland; Norman Coll.
dry	,, ,,	1910.1.1.420	Bantry Bay, Ireland; Norman Coll.
dry	,, ,,	1910.1.1.421	Bergen, Norway; Norman Coll.
dry	,, ,,	1910.1.1.422	Lough Strangford, Ireland; Norman Coll.
dry	**Leuconia somesii (H)**	1955.11.2.24–26	Brighton Aquarium; Bowerbank Coll.
sl	,, ,,	1901.12.27.1	Cape Adare, Antarctic; Minchin Coll.
sl	*Leucosolenia variabilis*	1906.12.1.2–4	Minchin Coll.
sl	,, ,,	1939.2.20.12	Point Noire, Belgian Congo; E. Dartevelle
sl	*Ascandra angulata*	1910.1.1.1532	Norman Coll.
sl	**Leucosolenia somesii (? H)**	1956.4.26.36–40	Brighton Aquarium; Bowerbank Coll.

LEUCOSOLENIA VENTRICOSA

sp	**Clathrina ventricosa (H)**	1886.7.12.6	South coast of Australia; J. B. Wilson Coll.
sp	*Leucosolenia ventricosa*	1886.6.7.1–3	Port Phillip Heads, Australia; J. W. Wilson Coll.
sp	,, ,,	1886.12.15.32	Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1925.11.1.26	Port Phillip Heads, Australia; Dendy Coll.
dry	*Clathrina ventricosa*	1886.12.15.30–31	Port Phillip Heads, Australia; J. B. Wilson Coll. (part of spirit specimen)
dry	,, ,,	1887.7.12.6,7, 45–46	Port Phillip, Australia; J. B. Wilson Coll.
sl	,, ,,	1924.2.6.33	J. B. Wilson Coll.
sl	*Leucosolenia ventricosa*	1920.12.9.104	Mawson Coll. (VII 1)
sl	,, ,,	1924.2.6.30, 35, 36	J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1710	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 52)
sl	,, ,,	1925.11.1.1711	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 96.S.5)
sl	,, ,,	1925.11.1.1713	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 104A)
sl	,, ,,	1925.11.1.1714	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 55A)
sl	,, ,,	1925.11.1.1715	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 51)
sl	,, ,,	1925.11.1.1716	Near Port Phillip Heads, Australia; Dendy Coll.

sl	*Leucosolenia ventricosa*	1925.11.1.1717	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 274: Series B)
sl	,, ,,	1925.11.1.1718	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 357 S.5)
sl	,, ,,	1925.11.1.1719	Near Port Phillip Heads, Australia; Dendy Coll. (No. 7)
sl	,, ,,	1956.4.26.41	Mawson Coll. (VII 2)
sl	**Leucosolenia ventricosa var. solida (H)**	1925.11.1.1712	Near Port Phillip Heads, Australia; Dendy Coll.

LEUCOSOLENIA VITREA

sp	**Leucosolenia vitrea (P)**	1925.11.1.15	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.

LEUCOSOLENIA WILSONI

sp	**Leucosolenia wilsoni (H)**	1891.9.19.12	Near Port Phillip Heads, Australia; Dendy Coll.

DENDYA PROLIFERA

sp	**Dendya prolifera (H)**	1920.12.9.49	'Sealark' Coll.
sp	,, ,,	1928.6.18.4	'Siboga' Exped.
sl	,, ,,	1928.6.18.5	'Siboga' Exped.

DENDYA TRIPODIFERA

sp	**Clathrina tripodifera (H)**	1886.12.15.2	Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1886.12.15.12	Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1887.7.12.3	South coast of Australia; J. B. Wilson Coll.
sp	*Leucosolenia tripodifera*	1891.9.19.13	Western Port, Australia; Dendy Coll.
dry	**Clathrina tripodifera (L & C)**	1886.12.15.2–12	Port Phillip, Australia; J. B. Wilson Coll.
dry	,, ,,	1887.7.12.38–39	Port Phillip, Australia; J. B. Wilson Coll.
dry	*Leucosolenia tripodifera*	1955.11.2.28	Port Phillip Heads, Australia
sl	*Clathrina tripodifera*	1925.11.1.1723	South coast of Australia
sl	*Dendya tripodifera*	1925.11.1.1720	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 121)
sl	,, ,,	1925.11.1.1721	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 30)
sl	,, ,,	1925.11.1.1722	Kent Islands; Dendy Coll.
sl	*Leucosolenia tripodifera*	1924.2.6.25	J. B. Wilson Coll.

ASCUTE ASCONOIDES

sl	*Ascute asconoides*	1887.7.12.29	No information

ASCUTE UTEOIDES

sp	**Ascute uteoides (H)**	1893.6.9.33	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1724	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 258)
sl	,, ,,	1925.11.1.1725	Port Phillip, Australia; Dendy Coll.

LEUCASCUS CLAVATUS

sp	**Leucascus clavatus (H)**	1893.6.9.2	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sl	,, ,,	1924.2.6.53	J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1726	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 196)
sl	,, ,,	1925.11.1.1727	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 240)
sl	,, ,,	1925.11.1.1728	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 241)

LEUCASCUS SIMPLEX

sp	*Leucascus simplex*	1887.7.12.7	South coast Australia; J. B. Wilson Coll.
sp	,, ,,	1893.6.9.1	Port Phillip, Australia; J. B. Wilson Coll.
sp	,, ,,	1920.12.9.50	'Sealark' Coll. (XIX 4)
sp	,, ,,	1925.11.1.32	Providence; 'Sealark' Coll.
sp	,, ,,	1925.11.1.34	Port Phillip, Australia; Dendy Coll. (R.N. 230)
dry	,, ,,	1925.11.1.1399	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.
sl	,, ,,	1925.11.1.1730	Port Jackson, Australia; Dendy Coll. (R.N. 217)
sl	,, ,,	1925.11.1.1729	Near Port Phillip, Australia; Dendy Coll. (R.N. 229)
sl	,, ,,	1925.11.1.1731	Near Port Phillip, Australia; Dendy Coll. (R.N. 226)
sl	,, ,,	1956.4.26.18	Cook Strait, New Zealand

ASCOLEUCETTA COMPRESSA

sp	**Ascoleucetta compressa (H)**	1924.9.1.3	Abrolhos Island; Dendy Coll. (R.N. III 12)

LEUCETTA ANTARCTICA

sl	*Leucetta antarctica*	1920.12.9.100	Australian Antarctic Exped. (R.N. VI)

LEUCETTA CARTERI

sp	**Leucaltis floridiana** var. **australiensis (H)**	1886.12.15.3	Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1886.12.15.4–6	Port Phillip Heads, Australia; J. B. Wilson Coll.
dry	,, ,,	1887.7.12.25	Port Phillip, Australia; J. B. Wilson Coll.
dry	,, ,,	1887.7.12.79	Port Phillip, Australia; J. B. Wilson Coll.

LEUCETTA CHAGOSENSIS

sp	**Leucetta chagosensis (H)**	1920.12.9.51	'Sealark' Coll. (CXIX 11)
sp	,, ,,	1925.11.1.43	Abrolhos Island; Dendy Coll. (R.N. II 5b)
sp	,, ,,	1925.11.1.44	Indian Ocean; Dendy Coll. (LXIII)
sp	,, ,,	1925.11.1.1122	'Sealark' Coll (CX 10)
sp	,, ,,	1925.11.1.1563	Abrolhos Island; Dendy Coll. (R.N. II 4)
sl	,, ,,	1925.11.1.1121	'Sealark' Coll. (CXII 5)

LEUCETTA FLORIDANA

sp	*Leucetta floridana*	1948.8.6.60	Bermuda; M. W. de Laubenfels

LEUCETTA HOMORHAPHIS

sp	**Pericharax carteri** var. **homorhaphis (H)**	1884.4.22.58	Off Tristan da Cunha; 'Challenger' Coll.
sp	,, ,,	1925.11.1.35	Tristan da Cunha (from 'Challenger' Coll.) Dendy Coll.

LEUCETTA INSIGNIS

sp	**Leucetta insignis (P)**	1925.11.1.41	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.

LEUCETTA LEPTORAPHIS

sp	*Leucetta leptoraphis*	1926.10.26.34–40	'Terra Nova' Exped.
sp	,, ,,	1928.2.15.43–49	'Discovery' Exped., 1926–7
dry	,, ,,	1938.2.16.1	'Terra Nova' Exped.

LEUCETTA LOSANGELENSIS

sp	**Leuconia losangelensis (P)**	1929.8.22.40	California; M. W. de Laubenfels
sl	*Leucetta losangelensis*	1936.7.8.63	Mexico; M. W. de Laubenfels

LEUCETTA MACQUARIENSIS

sp	*Leucetta macquariensis*	1928.2.15.79–89	'Discovery' Exped., 1926–7
sp	,, ,,	1933.7.20.8–14	South Georgia; Hamburg Museum
sl	,, ,,	1920.12.9.89–92	Australian Antarctic Exped.
sl	,, ,,	1933.7.20.16–28	South Georgia; Hamburg Museum
sl	,, ,,	1935.10.20.152, 155, 163	Australian Antarctic Exped.
sl	,, ,,	1956.4.26.54–64	Australian Antarctic Exped.
sl	,, ,,	1957.7.17.7	Macquarie Island; A.N.A.R.E.

LEUCETTA MICRORAPHIS

sp	*Leucetta microraphis*	1886.6.7.38–40	Port Jackson, Australia; R. von Lendenfeld
sp	,, ,,	1925.11.1.39, 1464	Victoria, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.40	Abrolhos Island; Dendy Coll. (R.N. VI 17b)
sp	,, ,,	1925.11.1.1391, 1406, 1415, 1473, 1489	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.
sp	,, ,,	1925.11.1.1407	Champion Bay, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.1419	Near Port Phillip Heads, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.1440, 1587	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.
sp	*Leucetta primigenius* var. *megaraphis*	1882.10.17.59	Seychelles; 'Alert' Coll.
sp	,, ,,	1955.11.2.122	Alert Island, Torres Straits; 'Alert' Coll.

sp	**Leuconia dura (L)**	1884.4.22.55	Torres Straits; 'Challenger' Coll.
sp	,, ,,	1884.4.22.51–54	Off Bermuda; 'Challenger' Coll.
sp	,, ,,	1885.8.13.3	Tahiti Reefs; 'Challenger' Coll.
sp	*Leuconia fruticosa*	1884.4.22.48–49	Balfour Bay, Kerguelen Island; 'Challenger' Coll.
sp	,, ,,	1884.4.22.50	'Challenger' Coll.
sp	,, ,,	1885.8.13.1–2	Royal Sound, Kerguelen Island; 'Challenger' Coll.
sp	*Leucetta megaraphis*	1886.6.7.41	Broughton Island, Queensland; R. von Lendenfeld
sp	*Leucandra microraphis*	1893.6.9.22	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1910.2.9.1	Antarctic; 'Belgica' Exped.
sp	**Leucandra primigenia** var. **leptoraphis (H)**	1907.8.6.65	McMurdo Bay; National Antarctic Exped.
sp	*Leucandra primigenia* var. *microraphis*	1912.2.1.5	Red Sea; Crossland Exped.
dry	*Leucetta microraphis*	1925.11.1.1398, 1530	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.
sl	,, ,,	1925.11.1.1732	Port Phillip Heads, Australia; Dendy Coll. (R.N. 250)
sl	,, ,,	1925.11.1.1733-1739	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 222, 227, 237, 235, 252, 238, 236)
sl	,, ,,	1925.11.1.1740	Outside Port Phillip Heads, Australia; Dendy Coll. (R.N. 233)
sl	*Leucandra primigenia*	1926.2.11.91	Suez Canal; H. Munro Fox
sl	,, ,,	1954.2.24.41	Red Sea; Crossland Coll.

LEUCETTA PROLIFERA

sp	**Teichonella prolifera (H)**	1886.12.15.10, 23	Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1887.7.12.35	South coast Australia; J. B. Wilson Coll.
sp	*Leucilla prolifera*	1893.6.9.31	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1925.11.1.94	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 245)
sp	*Leucetta prolifera*	1925.11.1.42	Near Port Phillip Heads, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.1404	Outside Port Phillip Heads, Australia; Dendy Coll. (R.N. 249)
sp	,, ,,	1925.11.1.1405	Victoria, Australia; Dendy Coll.
dry	**Teichonella prolifera (H)**	1846.8.19.101	Australia
dry	,, ,,	1887.7.12.80	South coast Australia; J. B. Wilson Coll.
dry	,, ,,	1955.11.2.95	Fremantle, Australia; Bowerbank Coll.
sl	*Leucilla prolifera*	1924.2.6.89	Near Port Phillip Heads, Australia; Dendy Coll.
sl	,, ,,	1924.2.6.90	J. B. Wilson Coll.
sl	*Leucetta prolifera*	1925.11.1.1741, 1743	Near Port Phillip Heads, Australia; Dendy Coll.

LEUCETTA PYRIFORMIS

sp	**Leucetta pyriformis (H)**	1920.12.9.52	'Sealark' Coll. (XC5b)
sp	*Leucetta pyriformis*	1936.3.4.94	Indian Ocean; John Murray Exped.
sl	,, ,,	1925.11.1.1120	'Sealark' Coll. (XC5a)

LEUCETTA SOLIDA

sp	**Grantia solida (C)**	1867.7.26.6	Adriatic; O. Schmidt
sp	*Leucaltis solida*	1898.5.7.58	Naples, Marine Zoological Station; Norman Coll.
dry	,, ,,	1910.1.1.476	Lesina, Adriatic; Norman Coll.

PERICHARAX CANALICULATA

sl	**Pericharax canaliculata (P)**	1934.11.24.150	Indian Museum Coll.

PERICHARAX HETERORAPHIS

sp	**Pericharax carteri** var. **heteroraphis (H)**	1884.4.22.56–57	Tristan da Cunha; 'Challenger' Coll.
sp	*Pericharax heteroraphis*	1925.11.1.36	'Sealark' Sponges; Dendy Coll. (R.N. CXV. III)
sp	,, ,,	1928.6.18.6	'Siboga' Exped.
sp	,, ,,	1929.8.30.9	'Siboga' Exped.
sp	,, ,,	1930.8.13.4–7	Great Barrier Reef Exped.
sp	,, ,,	1936.1.24.27	Ghardaga, Red Sea; C. Bertram
sl	,, ,,	1928.6.18.8, 10, 16, 17	'Siboga' Exped.
sl	,, ,,	1934.11.24.151	Indian Museum Coll.

PERICHARAX PEZIZA

sp	**Pericharax peziza (H)**	1920.12.9.53	'Sealark' Coll.
sl	,, ,,	1956.4.26.96	'Siboga' Exped.

PERICHARAX PROLIFERA

sp	**Pericharax prolifera (P)**	1928.6.18.15	'Siboga' Exped.

PERICHARAX PYRIFORMIS

sp	**Pericharax pyriformis (H)**	1928.2.15.36	'Discovery' Exped., 1926–7
sp	,, ,, (C)	1928.2.15.37	'Discovery' Exped., 1926–7

LEUCALTIS CLATHRIA

sp	*Leucaltis clathria*	1920.12.9.54–56	'Sealark' Sponges; Dendy Coll. (R.N. CXIII. 2, XXXIX 1, CV 1)
sp	,, ,,	1925.11.1.45–46, 105	Abrolhos Island; Dendy Coll. (R.N. IV 3c, II 5c, III 3)
sp	,, ,,	1925.11.1.107	Amirante Island; Dendy Coll. (R.N. LXXVI 3)
sp	**Leucaltis bathybia** var. **australiensis (H)**	1881.10.21.351	Port Jackson, Australia; 'Alert' Coll.
sp	**Leucaltis bathybia** var. **mascarenica (L)**	1882.10.17.83–85	Seychelles; 'Alert' Coll.

sp	*Heteropegma nodus-gordii*	1884.4.22.22	Off Bermuda; 'Challenger' Coll.
sp	,, ,,	1884.4.22.23	Torres Straits; 'Challenger' Coll.
sp	**Clathrina latitubulata (L)**	1887.7.12.8	South coast of Australia; J. B. Wilson Coll.
sp	*Heteropegma clathria*	1925.11.1.108	'Sealark' Sponges; Dendy Coll. (R.N. CX 11)
dry	**Clathrina latitubulata (C)**	1887.7.12.48	Port Phillip Heads, Australia; J. B. Wilson Coll.
dry	**Heteropegma nodus-gordii (L)**	1884.4.22.23	'Challenger' Coll.
sl	,, ,,	1908.9.25.66,72, 77	Zanzibar; Crossland Coll.
sl	,, ,,	1954.2.11.2	Red Sea; Crossland Coll.
sl	,, ,,	1954.2.11.5	Wasin, E. Africa; C. F. Jenkin
sl	,, ,,	1954.2.23.18	Ceylon Sponges; W. A. Herdman (R.N. 155)
sl	*Heteropegma clathria*	1925.11.1.1125	'Sealark' Sponges; Dendy Coll. (R.N. XCII 2)
sl	*Heteropegma latitubulata*	1925.11.1.1744	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 58)
sl	*Leucaltis clathria*	1925.11.1.1275	Abrolhos; Dendy Coll. (R.N. IV 2)
sl	**Leucaltis (Heteropegma) clathria (H)**	1956.4.26.42	(from Haeckel's type); R. W. H. Row
sl	*Leucaltis bathybia* var. *mascarenica*	1956.4.26.53	Mascarenes; 'Alert' Coll.

LEUCALTIS FLORIDIANA

sl	*Leucilla floridiana*	1908.9.25.55	Zanzibar; Crossland Coll. (Z. 21)

LEUCALTIS GASTRORHABDIFERA

sp	**Leucaltis gastrorhabdifera (H)**	1928.2.15.833	'Discovery' Exped., 1926–7

LEUCETTUSA HAECKELIANA

sp	**Leucetta haeckeliana (H)**	1844.4.22.62–64	Near Port Jackson, Australia; 'Challenger' Coll.
sp	*Leucettusa haeckeliana*	1928.2.15.711–714, 847	'Discovery' Exped., 1926–7
sl	,, ,,	1934.11.20.33	South Africa; Th. Mortensen

LEUCETTUSA IMPERFECTA

sp	**Leucetta imperfecta (H)**	1884.4.22.59	New South Wales; 'Challenger' Coll.
sp	*Leucettusa impefecta*	1926.10.26.41–42	'Terra Nova' Exped.

LEUCETTUSA LANCIFER

sp	**Leucettusa lancifer (L)**	1923.10.1.5	'Terra Nova' Exped. (R.N. XIV 2)
sp	,, ,, **(C)**	1923.10.1.6	'Terra Nova' Exped. (R.N. XLIII)

LEUCETTUSA SIMPLICISSIMA

sp	**Leucettusa simplicissima (H)**	1928.2.15.35	'Discovery' Exped., 1926–7

LEUCETTUSA TUBULOSA

sp	**Leucettusa tubulosa** (L)	1923.10.1.2	'Terra Nova' Exped. (R.N. XIX 2)
sp	,, ,, (C)	1923.10.1.3	'Terra Nova' Exped. (R.N. XIX. 3)
sp	,, ,, (C)	1923.10.1.4	'Terra Nova' Exped. (R.N. LV 1b)

LEUCETTUSA VERA

sp	**Leucetta vera** (H)	1884.4.22.60	Off Kerguelen Island; 'Challenger' Coll.

MINCHINELLA LAMELLOSA

sp	**Minchinella lamellosa** (H)	1900.10.22.1A	New Hebrides; 'Challenger' Coll.
sp	,, ,, (C)	1900.10.22.1B	New Hebrides; 'Challenger' Coll.
sp	,, ,,	1925.11.1.75	New Hebrides; Dendy Coll.

[The specimen from the Dendy Coll. must belong either to the holotype or the co-type. It is difficult to say to which it belongs.]

PETROSTROMA SCHULZEI

dry	**Petrostroma schulzei** (P)	1899.7.14.1	Sagami Bay, Japan; pres. by Dr. Döderlein

PLECTRONINIA DEANSII

sl	**Plectroninia deansii** (H)	1936.3.2.1	Christmas Island; R. Kirkpatrick

PLECTRONINIA HINDEI

sl	**Plectroninia hindei** (H)	1900.10.19.4	Funafuti; R. Kirkpatrick

MURRAYONA PHANOLEPIS

sp	**Murrayona phanolepis** (H)	1937.8.6.1	Christmas Island; R. Kirkpatrick

SYCON AMPULLA

sp	*Sycon ampulla*	1938.3.26.28–29	Isipingo, South Africa; T. A. Stephenson
sp	,, ,,	1939.1.26.8	Bermuda; J. F. G. Wheeler
sl	*Sycon ampullum*	1908.9.25.20	Wasin, E. Africa; C. F. Jenkin

SYCON ANTARCTICUM

sl	**Tenthrenodes antarcticus** (H)	1907.8.6.22	National Antarctic Exped.

SYCON ARCTICUM

sp	*Sycon arcticum*	1884.4.22.14	Off Bermuda Island; 'Challenger' Coll.
sp	,, ,,	1884.4.22.25	Philippine Islands; 'Challenger' Coll.
sp	,, ,,	1910.1.1.624	Proven, Greenland; Norman Coll.

SYCON ASPERUM

sp	*Sycon asperum*	1932.1.9.35	Port Erin, Isle of Man; H. B. Moore

SYCON AUSTRALE

sp	**Streptoconus australis** (L)	1907.8.6.86	National Antarctic Exped. (F. 48)
sp	,, ,, (C)	1907.8.6.85	National Antarctic Exped. (F. 32)
sl	,, ,, (C)	1907.8.6.82	National Antarctic Exped. (F. 21)

SYCON BARBADENSE

sp	*Sycon barbadense*	1948.8.6.62	Bermuda; M. W. de Laubenfels
sl	,, ,,	1939.1.26.7	Walsingham Pond, Bermuda; J. F. G. Wheeler

SYCON BOOMERANG

sl	**Sycon boomerang (H)**	1925.11.1.1677	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 255)

SYCON CAMINATUM

sl	**Sycon caminatum (L)**	1924.7.2.35	Cape Verde Islands; A. G. Thacker
sl	,, ,, (C)	1924.7.2.36	Cape Verde Islands; A. G. Thacker
sp	*Sycon caminatum*	1948.3.8.1	West Africa; 'Atlantide' Exped.

SYCON CARTERI

sp	**Sycon carteri (C)**	1893.6.9.3	St. Vincent's Gulf, South Australia (from collection of Adelaide Museum); Dendy Coll.
sp	,, ,, (C)	1925.11.1.56	St. Vincent's Gulf, South Australia; Dendy Coll.
sl	,, ,, (C)	1925.11.1.1745	St. Vincent's Gulf, South Australia; Dendy Coll.
dry	,, ,,	1925.11.1.1395	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.

SYCON CILIATUM

sp	*Sycon ciliatum*	1883.8.9.3	Lough Foyle, Ireland; 'Porcupine' Coll.
sp	,, ,,	1897.8.9.13–24	Weymouth Bay, Dorset; R. Kirkpatrick
sp	,, ,,	1897.8.9.25–36	Swanage Bay; R. Kirkpatrick
sp	,, ,,	1897.8.9.39–48	Poole Harbour; R. Kirkpatrick
sp	,, ,,	1910.1.1.775 iii	Norway; Norman Coll.
sp	,, ,,	1910.1.1.1052	Norman Coll.
sp	,, ,,	1910.1.1.1100	Vardo, East Finmark; Norman Coll.
sp	,, ,,	1929.11.4.55	Plymouth; H. Srinivasa Rao
sp	,, ,,	1931.5.6.4–7	Port Erin, Isle of Man; H. B. Moore
sp	,, ,,	1932.1.9.26	Harbour Buoy, Port Erin; H. B. Moore
sp	,, ,,	1932.7.17.1	Fleshwick, Isle of Man; H. B. Moore
sp	,, ,,	1932.7.17.2–3	Isle of Man; H. B. Moore
sp	,, ,,	1932.7.25.13	Stil Bay, South Africa; T. A. Stephenson
sp	,, ,,	1932.12.20.3, 5	River Deben, Suffolk; D. L. Serventy
sp	,, ,,	1933.1.2.30–32, 42	Plymouth; J. A. Kitching
sp	,, ,,	1933.3.4.14	Banyuls; H. Srinivasa Rao
sp	,, ,,	1934.9.26.6, 18–20	Loch Swen, Argyllshire; J. A. Kitching
sp	,, ,,	1934.9.26.11	Carsaig Island, Argyllshire; J. A. Kitching
sp	,, ,,	1934.11.7.9	Skoysa; Trondheim Museum Coll.
sp	,, ,,	1934.11.7.10	Vaerog; Trondheim Museum Coll.
sp	,, ,,	1934.11.7.11, 13	Røst; Trondheim Museum Coll.

sp	*Sycon ciliatum*	1934.11.7.8, 12	Lofoten Island; Trondheim Museum Coll.
sp	,, ,,	1934.11.7.14	Støff; Trondheim Museum Coll.
sp	,, ,,	1934.11.20.1	False Bay, South Africa; Th. Mortensen
sp	,, ,,	1936.2.8.1	Rottingdean, Sussex; M. Burton
sp	,, ,,	1936.5.1.2	Greenisland, Co. Antrim; N. Fisher
sp	,, ,,	1936.5.14.1–2	Greenisland, Co. Antrim; N. Fisher
sp	,, ,,	1936.9.21.5–7	Aberdaron Bay, North Wales; F. C. Fraser, D. D. John
sp	,, ,,	1936.9.21.8	Lleyn Penn, North Wales; F. C. Fraser, D. D. John
sp	,, ,,	1936.11.16.19	Moville, Co. Donegal; N. Fisher
sp	,, ,,	1936.11.16.23	Greenisland, Co. Antrim; N. Fisher
sp	,, ,,	1937.7.14.5	Greenisland, Co. Antrim; N. Fisher
sp	,, ,,	1937.8.11.17	Malin Head, Co. Donegal; N. Fisher
sp	,, ,,	1937.9.8.6	Robin Hood's Bay, Yorkshire; N. B. Eales
sp	,, ,,	1938.2.5.2	Shoreham Harbour; G. J. Lockley
sp	,, ,,	1938.4.18.3–4	Off Wooton Creek, Isle of Wight; A. J. Cobham
sp	,, ,,	1938.5.26.14	Haifa Haifen, Palestine; K. Reich
sp	,, ,,	1938.8.4.2	Rottingdean, Sussex; M. Burton
sp	,, ,,	1938.8.22.11, 14	Concarneau, France; E. Croom-Johnson
sp	,, ,,	1939.1.12.5,15	Cullercoats, Northumberland; J. E. Hamilton
sp	,, ,,	1946.2.22.5	Plymouth
sp	,, ,,	1946.10.8.21, 30, 38, 46, 65, 83, 109, 112, 117, 124, 132, 137, 148, 150, 156	Flotta; A. J. Cobham
sp	,, ,,	1946.11.15.6	Salcombe Estuary, Devon; M. Burton
sp	,, ,,	1946.11.15.15, 28	Plymouth Sound; M. Burton
sp	,, ,,	1946.11.15.33, 35	Paignton, Devon; M. Burton
sp	,, ,,	1946.11.15.42	Phoenix Wharf, Plymouth; M. Burton
sp	,, ,,	1946.11.15.44	Millbay Wharf, Plymouth; M. Burton
sp	,, ,,	1946.11.15.51	Millbay, Plymouth; M. Burton
sp	,, ,,	1947.6.30.3	Portsmouth; M. Burton
sp	,, ,,	1947.6.30.20	Portsea Pier; M. Burton
sp	,, ,,	1947.6.30.28, 31, 35, 37	Fountain Lake, Portsmouth; A. J. Cobham
sp	,, ,,	1947.7.1.9, 29, 35, 65, 68, 70	Torbay; M. Burton
sp	,, ,,	1947.7.22.2	Millbay Docks, Plymouth; E. J. Batham
sp	,, ,,	1947.10.3.183	English Channel; 'Manihine' Coll.
sp	,, ,,	1947.12.16.1–2, 4	Plymouth; M.B.L. Coll.
sp	,, ,,	1948.7.10.23 A & B, 54, 74, 86, 87, 91, 100, 103	English Channel; 'Manihine' Coll.

sp	*Sycon ciliatum*	1948.8.6.82	Bermuda; M. W. de Laubenfels
sp	,, ,,	1949.5.3.1	Tollesbury, Essex; H. A. Cole
sp	,, ,,	1949.10.19.43, 58	English Channel; 'Manihine' Coll.
sp	,, ,,	1951.1.23.1	Off Isle of Arran; R. B. Pike
sp	,, ,,	1954.1.13.2	Torbay; M. Burton
sp	,, ,,	1954.9.27.3	Emsworth Harbour, near Hayling Island; M. Burton
sp	,, ,,	1955.1.19.6	Cobham's 'Barham' Coll.
sp	,, ,,	1955.2.1.1	Plymouth; M.B.L. Coll.
sp	*Sycon ciliatum* var. *australe*	1938.8.24.75	Locality unknown; L. B. Moore
sp	*Grantia ciliata*	1882.7.28.49	Between Shetland and Faroe Islands; 'Porcupine' Coll.
sp	,, ,,	1888.3.7.4–6	Loch Foil; J. Murray
sp	,, ,,	1892.2.13.4	Between Plockton and Loch Airaig; J. Murray
sp	,, ,,	1896.8.25 (Ii–Iv)	Newark; Bowerbank Coll.
sp	,, ,,	1925.11.1.749	Woods Hole, Massachusetts; Dendy Coll.
sp	**Grantia ciliata** var. **spinispiculum (H)**	1882.7.28.36	Shetland; 'Porcupine' Coll.
dry	*Sycon ciliatum*	1847.9.7.114–116	Johnston Coll.
dry	,, ,,	1872.5.4.1	Cies Island, Portugal; S. Kent
dry	,, ,,	1897.8.9.37–38	Poole Harbour; R. Kirkpatrick
dry	,, ,,	1902.12.4.2	Jersey
dry	,, ,,	1910.1.1.1080	Lervig, Norway; Norman Coll.
dry	,, ,,	1947.12.16.3	Plymouth; M.B.L. Coll.
dry	,, ,,	1955.11.2.77	Swanage; R. Kirkpatrick
dry	*Grantia ciliata*	1847.9.7.79	Johnston Coll.
dry	,, ,,	1895.12.19.2	Jersey
dry	,, ,,	1910.1.1.437	Tobermory, Hebrides; Norman Coll.
dry	,, ,,	1910.1.1.454A	Strangford Lough, Ireland; Norman Coll.
dry	,, ,,	1955.11.2.61–62, 65, 71	Locality unknown; Bowerbank Coll.
dry	,, ,,	1955.11.2.63	River Orwell, Suffolk; Bowerbank Coll.
dry	,, ,,	1955.11.2.64, 69	Swanage Bay; Bowerbank Coll.
dry	,, ,,	1955.11.2.66	River Orwell, Suffolk (W. Barnard-Clarke); Johnston Coll.
dry	,, ,,	1955.11.2.67	Vigo Bay, Spain; S. Kent
dry	,, ,,	1955.11.2.70	Great Britain
dry	,, ,,	1955.11.2.72	Hebrides; Bowerbank Coll.
dry	,, ,,	1955.11.2.73	Locality unknown; H. J. Carter
dry	,, ,,	1955.11.2.74	Sark; Bowerbank Coll.
dry	,, ,,	1955.11.2.75	Weymouth Bay, Dorset; Bowerbank Coll.
dry	,, ,,	1955.11.2.98	Guernsey; Bowerbank Coll.
dry	*Grantia compressa*	1955.11.2.76	Great Britain; Bowerbank Coll.
dry	*Grantia pulverulenta*	1955.11.2.68	Locality unknown; Johnston Coll.

dry	*Sycortis quadrangularis*	1910.1.1.450	Guernsey; Norman Coll.
sl	*Sycon ciliatum*	1908.9.25.23, 28	Zanzibar; Crossland Coll.
sl	,, ,,	1932.11.17.118	Okhotsk Sea; Leningrad Museum
sl	,, ,,	1932.12.20.2, 4	River Deben, Suffolk; D. L. Serventy
sl	,, ,,	1933.3.1.40	Naples; H. Srinivasa Rao
sl	,, ,,	1936.9.22.286–291	Between Franz Josef Land and Leninland; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.292	Leninland; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.293	Spitzbergen Sea; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1938.5.26.54–55, 57	Haifa Hafen, Palestine; K. Reich
sl	,, ,,	1953.11.9.120	Banyuls; H. Srinivasa Rao
sl	,, ,,	1954.3.17.296–297	Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.44	Duke Rock, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.58	New Grounds, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.70	Remy Rocks, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.147	Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.204	English Channel; M.B.L. Coll.
sl	*Grantia ciliata*	1893.8.7.1	Berry Head, Brixham; R. Kirkpatrick
sl	,, ,,	1910.1.1.1556	Lang Fiord, Finmark; Norman Coll.
sl	,, ,,	1956.4.26.20	Shetland; Bowerbank Coll.
sl	,, ,,	1956.4.26.21	Burrafirth Cave; Norman Coll.
sl	,, ,,	1956.4.26.22	Firth of Forth
sl	,, ,,	1956.4.26.43	Locality unknown; Bowerbank Coll.
sl	*Sycandra ciliata*	1910.1.1.1549	Tobermory, Hebrides; Norman Coll.
sl	,, ,,	1910.1.1.1553	Cornwall; Norman Coll.
sl	,, ,,	1954.2.10.3	Norway (from Berlin Museum); Dendy Coll.

SYCON COMPACTUM

sp	*Sycon compactum*	1911.6.1.28	Departure Bay, Vancouver; Miss Pixell
sl	,, ,,	1932.11.17.66	Sea of Japan; Leningrad Museum
sl	,, ,,	1936.3.10.31	Sea of Japan; Exped. Acad. Sci. Museum, U.S.S.R.

SYCON CORONATUM

sp	*Sycon coronatum*	1895.12.19.2	Jersey; purchased Sinel
sp	,, ,,	1910.1.1.1061	Lervig Bay, Norway; Norman Coll.
sp	,, ,,	1910.1.1.1062	Bog Fiord, East Finmark; Norman Coll.
sp	,, ,,	1910.1.1.1069	Norman Coll.
sp	,, ,,	1910.1.1.1079	Lang Fiord, Norway; Norman Coll.
sp	,, ,,	1936.1.8.1	Blyth Harbour, Northumberland; A. D. Hobson
sp	,, ,,	1947.6.30.1, 2	Portsmouth; M. Burton
sp	,, ,,	1947.6.30.29, 39	Fountain Lake, Portsmouth; A. J. Cobham
sp	,, ,,	1947.10.3.147–149	English Channel; 'Manihine' Coll.
sp	,, ,,	1948.7.9.1	Aquarium tank; M.B.L. Coll.

sp	*Grantia coronata*	1955.11.2.111	History unknown
sp	*Grantia ciliata*	1955.11.2.113	Sado River, Portugal
dry	*Grantia coronata*	1910.1.1.438	Polperro, Cornwall; Norman Coll.

SYCON DENDYI

sp	**Sycon dendyi (P)**	1925.11.1.984	Cook Strait, New Zealand (presented by Mr. Kirk); Dendy Coll.
dry	,, ,, (P)	1925.11.1.1027	Cook Strait, New Zealand; Dendy Coll.
dry	,, ,,	1938.8.24.62	Chatham Island, New Zealand; L. B. Moore
sl	,, ,,	1956.4.26.44–46	Lyall Bay, New Zealand; H. B. Kirk
sl	,, ,,	1956.4.26.47	Happy Valley, New Zealand; H. B. Kirk
sl	,, ,,	1956.4.26.48	Island Bay, New Zealand; H. B. Kirk

SYCON ELEGANS

sp	*Sycandra elegans*	1910.1.1.679	Naples; Norman Coll.
sl	,, ,,	1910.1.1.1569	Abbazia, Italy; Norman Coll.

SYCON ENSIFERUM

sp	**Sycon ensiferum (H)**	1893.6.9.6	Port Phillip Heads, Australia; J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1746	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 145)
sl	,, ,,	1925.11.1.1747	Port Phillip Heads, Australia; Dendy Coll. (R.N. 144)

SYCON GELATINOSUM

sp	*Sycon gelatinosum*	1893.6.9.8, 11	Watson's Bay, Port Jackson, Australia; T. Whitelegge
sp	,, ,,	1893.6.9.9, 10	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1893.6.9.12	St. Vincent's Gulf, South Australia (from Adelaide Museum); Dendy Coll.
sp	,, ,,	1925.11.1.52, 1416, 1427, 1457, 1507	Abrolhos Islands; Dendy Coll. (R.N. II 5A, III 2, VII 1D, III 13A, II 2)
sp	,, ,,	1925.11.1.1387–1388, 1414, 1425–1426, 1428, 1523–1525, 1541	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.
sp	,, ,,	1925.11.1.1410, 1441	Port Jackson, Australia; Dendy Coll. (R.N. 165, 169)
sp	,, ,,	1925.11.1.1412, 1447, 1476, 1526	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 254, 161, 154, 170)
sp	,, ,,	1925.11.1.1424, 1459, 1509	Watson's Bay, Port Jackson, Australia; Dendy Coll. (R.N. 166, 168, 153)
sp	,, ,,	1925.11.1.1482, 1493, 1527, 1540	Port Phillip, Australia; Dendy Coll. (R.N. 173, 167, 171, 158)

sp	*Sycon gelatinosum*	1925.11.1.1508	Victoria, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.1516	Near Port Phillip, Australia; Dendy Coll. (R.N. 164)
sp	,, ,,	1925.11.1.1576	Dendy Coll.
sp	,, ,,	1930.8.13.29	Great Barrier Reef Exped. (R.N. 119 II)
sp	,, ,,	1932.7.25.15	Stil Bay, South Africa; T. A. Stephenson
sp	,, ,,	1955.11.2.112	St. Vincent's Gulf, South Australia; Dendy Coll. (R.N. 174)
sp	**Sycon gelatinosum** var. **whiteleggii (H)**	1893.6.9.13	Port Jackson, Australia; T. Whitelegge
sp	*Sycandra arborea*	1886.6.7.16–18	Port Jackson, Australia
sp	,, ,,	1886.6.7.19	Port Phillip, Australia
sp	*Sycon arboreum*	1884.4.22.16–18	Bass Strait, Australia; 'Challenger' Coll.
sp	*Sycothamnus alcyoncellum*	1887.7.12.13	South coast of Australia; J. B. Wilson Coll.
dry	*Sycon gelatinosum*	1925.11.1.1394, 1397	Hamburg, S.W. Australia Exped., 1905; Dendy Coll
dry	,, ,,	1925.11.1.1492	Victoria, Australia; Dendy Coll.
dry	*Sycandra gelatinosum*	1955.11.1.101	Australia; H. J. Carter
dry	*Grantia gelatinosum*	1955.11.2.102	Fremantle, West Australia; Bowerbank Coll.
dry	*Alcyoncellum gelatinosum*	1955.11.2.103	Australia; W. Thompson
dry	*Sycothamnus alcyoncellum*	1860.12.17.2	Flinders Island, Australia; Milligan
dry	,, ,,	1887.7.12.52	Port Phillip, Australia
dry	,, ,,	1955.11.2.100	Murray River, Australia; Bowerbank Coll.
sl	*Sycon gelatinosum*	1924.2.6.40	J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1748	Watson's Bay, Port Jackson, Australia; Dendy Coll. (R.N. 163)
sl	,, ,,	1925.11.1.1749	Port Jackson, Australia; Dendy Coll. (R.N. 160)
sl	,, ,,	1925.11.1.1750	King Island; Dendy Coll. (R.N. 155)
sl	,, ,,	1925.11.1.1751–1753	Near Port Phillip Heads, Australia; Dendy Coll.
sl	,, ,,	1925.11.1.1754	Australia; Dendy Coll.
sl	,, ,,	1925.11.1.1755	Outside Port Phillip Heads, Australia; Dendy Coll. (R.N. 162)
sl	,, ,,	1934.10.4.3	Ifafa, Natal; Natal Museum Coll.
sl	*Sycon arboreum*	1925.11.1.1756	Bass Strait, Australia; 'Challenger' Coll.

SYCON GIGANTEUM

sp	**Sycon giganteum (P)**	1893.6.9.7	St. Vincent's Gulf, South Australia (from Adelaide Museum collection); Dendy Coll.

SYCON GRANTIOIDES

sp	**Sycon grantioides (H)**	1920.12.9.1	Off Dwarka; Hornell Coll. (R.N. III 4)
sl	,, ,,	1934.11.24.166	Indian Museum Coll.

SYCON HELLERI			
sl	**Sycandra helleri (P)**	1910.1.1.1570	Norman Coll.
SYCON HUMBOLDTII			
sl	*Sycandra humboldtii*	1896.11.5.14	Rovigno, Italy; R. von Lendenfeld
SYCON INCONSPICUUM			
sp	**Sycandra inconspicua (H)**	1886.6.7.22	Port Jackson, Australia; R. von Lendenfeld
SYCON INCRUSTANS			
sp	**Sycon incrustans (P)**	1908.9.24.6	Tumbes, Chile; Platé collection (Berlin Museum Exchange)
sp	,, ,,	1933.3.17.2	Swedish Antarctic Expedition, 1901–3
SYCON KERGUELENSIS			
sp	*Sycon kerguelensis*	1932.7.25.14	Stil Bay, South Africa; T. A. Stephenson
SYCON LONGSTAFFI			
sp	**Hypodictyon longstaffi (L)**	1907.8.6.87	National Antarctic Exped. (F. 9)
sp	,, ,, (C)	1907.8.6.88	National Antarctic Exped. (F. 10)
sp	,, ,, (C)	1907.8.6.91	National Antarctic Exped. (F.12)
sp	,, ,, (C)	1907.8.6.95	National Antarctic Exped. (F. 52)
SYCON MINUTUM			
sp	**Sycon minutum (P)**	1893.6.9.4	Watson's Bay, Port Jackson, Australia; J. Whitelegge (pres. by A. Dendy)
sp	,, ,,	1925.11.1.1529	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.
SYCON MUNDULUM			
sl	*Sycon mundulum*	1932.11.17.119	Okhotsk Sea; Leningrad Museum Coll. (R.N. 48 II)
SYCON MUNITUM			
sp	*Sycon munitum*	1932.7.25.16	Stil Bay, South Africa; T. A. Stephenson
sp	,, ,,	1936.3.4.479	Indian Ocean; John Murray Exped.
sp	,, ,,	1938.3.26.26	Bats Cave Rocks, South Africa; T. A. Stephenson
sl	,, ,,	1908.9.25.29	East Africa; C. F. Jenkin
SYCON QUADRANGULATUM			
sl	*Sycortis quadrangulatum*	1910.1.1.1592	Guernsey; Norman Coll.
sl	*Sycon quadrangulatum*	1924.7.2.34–34A	Cape Verde Islands; A. G. Thacker (R.N. 29)
sl	,, ,,	1954.8.12.26, 48	Wembury Bay, Plymouth; M.B.L. Coll.
SYCON RAMSAYI			
sp	**Sycandra ramsayi (L)**	1886.12.13.1–2	New South Wales; E. P. Ramsay
sp	,, ,,	1886.6.7.12–13	Port Jackson, Australia; R. von Lendenfeld
sp	,, ,,	1887.7.12.49	South coast Australia; J. B. Wilson Coll.

sp	*Sycon ramsayi*	1925.11.1.59	Port Jackson, Australia; Dendy Coll.
dry	,, ,,	1886.12.13.3	(Named by R. von Lendenfeld)
dry	*Sycandra ramsayi*	1887.7.12.49	South coast of Australia; J. B. Wilson Coll.

SYCON RAPHANUS

sp	**Sycon raphanus (C)**	1867.7.26.5	Adriatic; O. Schmidt
sp	,, ,,	1877.7.3.3	Franklin Peirce Bay, Canada; pres. by Lords of the Treasury
sp	,, ,,	1884.4.22.12	Tristan da Cunha; 'Challenger' Coll.
sp	,, ,,	1884.4.22.13	Philippine Islands; 'Challenger' Coll.
sp	,, ,,	1893.6.9.5	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1897.3.25.5	Trieste; R. von Lendenfeld
sp	,, ,,	1925.11.1.58, 1411, 1479	Port Phillip, Australia; Dendy Coll. (R.N. 110, 109, 115)
sp	,, ,,	1925.11.1.1408–1409	Victoria, Australia; Dendy Coll. (R.N. 131A, 105)
sp	,, ,,	1925.11.1.1528	Dendy Coll. (R.N. 131)
sp	,, ,,	1926.2.11.10–11	Suez Canal; H. Munro Fox
sp	,, ,,	1931.10.28.42	Lofoten Island; Trondheim Museum Coll.
sp	,, ,,	1948.3.8.94	French Guinea; 'Atlantide' Exped.
sp	*Sycandra raphanus*	1883.12.4.33–35	Trieste; F. E. Schulze
dry	,, ,,	1910.1.1.451	Trieste; Norman Coll.
dry	*Sycon raphanus*	1955.11.2.99	Adriatic; Bowerbank Coll.
sl	,, ,,	1867.3.11.75	Adriatic; O. Schmidt
sl	,, ,,	1925.11.1.1757	Geelong, Australia; Dendy Coll.
sl	,, ,,	1925.11.1.1758–1762	Port Phillip, Australia; Dendy Coll. (R.N. 100, 104, 106, 107, 139)
sl	,, ,,	1925.11.1.1763	Beaumaris, Victoria; Dendy Coll. (No. 2)
sl	,, ,,	1925.11.1.1764	Outside Port Phillip Heads, Australia; Dendy Coll. (R.N. 103)
sl	,, ,,	1925.11.1.1765	King Island; Dendy Coll. (R.N. 94)
sl	,, ,,	1925.11.1.1766	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 102)
sl	,, ,,	1925.11.1.1767	Victoria, Australia; Dendy Coll.
sl	,, ,,	1926.2.11.95	Suez Canal; H. Munro Fox (R.N. LVII)
sl	,, ,,	1931.10.28.43–46	Lofoten; Trondheim Museum Coll.
sl	,, ,,	1954.2.24.41	Red Sea; Crossland Coll.

SYCON SCHMIDTII

sp	*Sycandra schmidtii*	1897.3.25.6	Lesina, Adriatic; R. von Lendenfeld

SYCON SETOSUM

sl	**Sycon setosum (L)**	1925.11.1.1768	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 123)
sl	,, ,, (C)	1925.11.1.1769	Port Phillip, Australia; Dendy Coll. (R.N. 134)

SYCON SIMUSHIRENSIS			
sl	*Sycon simushirensis*	1938.7.4.50	Sea of Japan; Zool. Inst. Acad. Sci., Leningrad
SYCON SUBHISPIDUM			
sp	**Grantia subhispidum** (C)	1887.7.12.10	South coast of Australia; J. B. Wilson Coll.
dry	,, ,, (H)	1887.7.12.50	South coast of Australia; J. B. Wilson Coll.
SYCON SYCANDRA			
sp	**Homoderma sycandra** (H)	1886.6.7.9	Port Phillip, Australia; R. von Lendenfeld
SYCON TENELLUM			
sp	**Sycandra tenella** (H)	1886.6.7.25	Port Jackson, Australia; R. von Lendenfeld
sl	**Sycantha tenella** (H)	1910.1.1.1578	(from R. von Lendenfeld) Norman Coll.
SYCON TESSELLATUM			
dry	**Grantia tessellata** (L)	1955.11.2.97	Sark; Bowerbank Coll.
dry	*Leucandra tessellata*	1910.1.1.452	Lesina, Adriatic; E. Haeckel
dry	*Sycandra tessellata*	1910.1.1.1579	Guernsey; (named by Haeckel) Norman Coll.
dry	*Grantia tessellata*	1910.1.1.453	Guernsey; Norman Coll.
sl	,, ,,	1956.4.26.49	Locality unknown; Bowerbank Coll.
SYCON TUBA			
sp	**Sycandra tuba** (H)	1897.3.25.7	Trieste; R. von Lendenfeld
SYCON VILLOSUM			
dry	*Sycandra villosa*	1882.3.6.20–21, 31–32	Australia
dry	,, ,,	1882.3.6.33	Australia
SYCON YATSUI			
sl	*Sycon yatsui*	1938.7.4.39	Sea of Okhotsk; Zool. Inst. Acad. Sci., Leningrad
SYCANDRA UTRICULUS			
sp	*Grantia utriculus*	1932.12.10.43	East Greenland; Hoels-Grönlands Exped., 1932
sp	*Sycandra utriculus*	1934.11.7.15	Norvesund; Trondheim Museum Coll.
dry	,, ,,	1910.1.1.454	Shetland; Norman Coll.
sl	*Grantia utriculus*	1910.1.1.1582	Shetland; Norman Coll.
sl	*Sycandra utriculus*	1938.7.4.21	Sea of Okhotsk; Zool. Inst. Acad. Sci., Leningrad

GRANTESSA COMPRESSA

sp	**Heteropia compressa** (C)	1887.7.12.20	South coast of Australia; J. B. Wilson Coll.
dry	,, ,, (H)	1887.7.12.63	South coast of Australia; J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1066	South coast of Australia; Dendy Coll. (This preparation was made either from the holotype or from 1887.7.12.20; but it is not possible to say which)

GRANTESSA ERECTA

sp	**Heteropia erecta** (H)	1887.7.12.22	South coast of Australia; J. B. Wilson Coll.
dry	,, ,, (H)	1887.7.12.65	South coast of Australia; J. B. Wilson Coll.

GRANTESSA ERINACEUS

sp	**Leuconia erinaceus** (H)	1886.6.7.46	Port Jackson, Australia
sp	*Grantessa erinaceus*	1893.6.9.26	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	*Leucandra erinaceus* var.	1925.11.1.81	Port Jackson, Australia; Dendy Coll. (R.N. 130)
dry	**Leuconia erinaceus** (H)	1887.7.12.70	South coast of Australia; J. B. Wilson Coll.
sl	*Grantessa erinaceus*	1925.11.1.1770	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 113)

GRANTESSA FLAMMA

sp	**Amphoriscus flamma** (H)	1884.4.22.25	Off Bahia; 'Challenger' Coll.

GRANTESSA GLABRA

sp	**Grantessa glabra** (H)	1912.2.1.9	Red Sea; Crossland Coll.
sp	,, ,,	1949.7.5.5–6	'Manihine' Akaba Coll.

GRANTESSA GLACIALIS

sp	*Grantessa glacialis*	1934.11.7.30	Vargsund; Trondheim Museum Coll.
sp	*Sycaltis glacialis*	1874.4.4.67	Spitzbergen; A. E. Eaton
sl	*Grantessa glacialis*	1936.9.22.244, 274	Between Franz Josef Land and Leninland; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.275	Spitzbergen Sea; Zool. Inst., Acad. Sci., Leningrad

GRANTESSA HASTIFERA

sp	**Grantilla hastifera** (H)	1912.2.1.7	Red Sea; Crossland Coll.
sp	*Grantessa hastifera*	1920.12.9.2	Off Dwarka; Dendy Coll. (R.N. III 2)
sp	,, ,,	1920.12.9.57	Indian Ocean; 'Sealark' Coll.
sp	,, ,,	1925.11.1.63	Okhamandal; Dendy Coll. (R.N.2)
sl	,, ,,	1925.11.1.1772–1774	Providence; 'Sealark' Coll. (R.N. XXII 1c–a)

GRANTESSA HIRSUTA

dry	**Hypograntia hirsuta** (H)	1887.7.12.55	South coast of Australia; J. B. Wilson Coll.

sp	*Hypograntia hirsuta*	1887.7.12.14	South coast of Australia; J. B. Wilson Coll.
sp	*Grantessa hirsuta*	1893.6.9.24	King Island, Bass Straits (collected by Prof. Spencer); Dendy Coll.
sp	,, ,,	1925.11.1.70	King Island; Dendy Coll.
sp	,, ,,	1925.11.1.1389, 1393, 1500, 1502, 1512, 1521	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.
sp	,, ,,	1925.11.1.1452	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. IV 119)
sp	,, ,,	1925.11.1.1520	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 112)
sp	,, ,,	1925.11.1.1545	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 120)
sp	,, ,,	1955.11.2.91	Hobart, Tasmania; Dendy Coll. (R.N. 133)
dry	,, ,,	1925.11.1.1396	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.
dry	,, ,,	1955.11.2.90	Australia?; Dendy Coll. (R.N. 125)
sl	,, ,,	1925.11.1.1775–1776	Outside Port Phillip Heads, Australia; Dendy Coll. (R.N. 141 and 117)
sl	,, ,,	1925.11.1.1777	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 121)

GRANTESSA HISPIDA

sp	**Grantessa hispida (H)**	1893.6.9.25	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1778	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 132)
sl	,, ,,	1925.11.1.1779	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 136)
sl	,, ,,	1925.11.1.1780	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 142)

GRANTESSA INTUSARTICULATA

sp	*Grantessa intusarticulata*	1893.6.9.27	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1925.11.1.71, 1519	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 78, 79)
sp	,, ,,	1925.11.1.979	Cook Strait; Dendy Coll.
sp	,, ,,	1925.11.1.1513	Port Phillip, Australia; Dendy Coll. (R.N. 215)
sp	,, ,,	1925.11.1.1514	Watson's Bay, Port Jackson, Australia; Dendy Coll. (R.N. 73)
sp	*Grantia intusarticulata*	1925.11.1.985	New Zealand; Dendy Coll.
dry	**Hypograntia intusarticulata (L)**	1887.7.12.58	South coast of Australia; J. B. Wilson Coll.
dry	**Hypograntia medioarticulata (C)**	1887.7.12.59	South coast of Australia; J. B. Wilson Coll.

dry	*Grantessa intusarticulata*	1938.8.24.59	New Zealand; L. B. Moore
dry	,, ,,	1938.8.24.73	Island Bay, New Zealand; L. B. Moore
sl	,, ,,	1925.11.1.1781, 1783, 1785–1787	Port Phillip Heads, Australia; Dendy Coll. (R.N. 181, 91, 183, 80, 88)
sl	,, ,,	1925.11.1.1782, 1784	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 75, 81)

GRANTESSA KÜKENTHALI

sl	*Grantia kükenthali*	1936.9.22.245	Between Franz Josef Land and Leninland; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.246	Novaya Zemlya; Zool. Inst. Acad. Sci., Leningrad

GRANTESSA LANCEOLATA

sl	*Grantessa lanceolata*	1936.9.22.247, 273	Between Franz Josef Land and Leninland; Zool. Inst. Acad. Sci., Leningrad

GRANTESSA NEMURENSIS

dry	*Grantessa nemurensis*	1938.7.4.148	Sea of Okhotsk; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1932.11.17.14, 18, 65, 117	Sea of Japan; Leningrad Museum
sl	,, ,,	1936.3.10.26–27, 38–40	Petrov Island, Sea of Japan; Exped. Akad. Sci. Mus., U.S.S.R.
sl	,, ,,	1938.7.4.48, 55	Sea of Okhotsk; Zool. Inst. Acad. Sci., Leningrad

GRANTESSA NITIDA

sp	*Ebenerella nitida*	1931.10.28.13, 41	West Finmark; Trondheim Museum Coll.
sp	*Grantia nitida*	1931.6.5.1	Bear Island, Norway
sl	*Grantessa nitida*	1934.11.17.18	Skoysa; Trondheim Museum Coll.
sl	,, ,,	1936.9.22.249–272, 312–319, 375	Franz Josef Land and Leninland; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1938.7.4.59	Sea of Okhotsk; Zool. Inst. Acad. Sci., Leningrad

GRANTESSA PELAGICA

sp	**Nardoa pelagica (H)**	1879.12.27.17	Victoria Bank, off coast of Brazil; 'Alert' Coll.

GRANTESSA PLURIOSCULIFERA

dry	**Heteropia pluriosculifera (H)**	1887.7.12.64	South coast of Australia; J. B. Wilson Coll.
sp	,, ,,	1887.7.12.21	South coast of Australia; J. B. Wilson Coll.

GRANTESSA POCULUM

sp	**Amphoriscus poculum (H)**	1884.4.22.24	New South Wales; 'Challenger' Coll.
sp & dry	*Heteropia patulosculifera*	1887.7.12.18	South coast of Australia; J. B. Wilson Coll.

sp	*Grantessa poculum*	1923.10.1.7	'Terra Nova' Exped. (R.N. XIX 1a)
sl	,, ,,	1925.11.1.1793	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 182)
sl	,, ,,	1925.11.1.1794	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 72)

GRANTESSA POLYPERISTOMIA

sp	**Heteropia polyperistomia (L)**	1887.7.12.17	South coast of Australia; J. B. Wilson Coll.
sp	*Grantessa polyperistomia*	1925.11.1.1522	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.
dry	**Hypograntia** (*sic*) **polyperistomia (C)**	1887.7.12.60	South coast of Australia; J. B. Wilson Coll.

GRANTESSA SACCA

sp	**Grantessa sacca (H)**	1886.6.7.26–27	Port Jackson, Australia; R. von Lendenfeld
sp	,, ,,	1887.7.12.15	South coast of Australia; J. B. Wilson Coll.
sp	,, ,,	1893.6.9.23	Outside Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1925.11.1.69	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 151)
sp	,, ,,	1925.11.1.1544	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
dry	*Hypograntia sacca*	1887.7.12.56	Port Phillip, Australia; J. B. Wilson Coll.
sl	*Grantessa sacca*	1886.6.7.29	Port Phillip, Australia; R. von Lendenfeld
sl	,, ,,	1925.11.1.1790	Outside Port Phillip Heads, Australia; Dendy Coll. (R.N. 147)
sl	,, ,,	1925.11.1.1791	Outside Port Phillip Heads, Australia; Dendy Coll. (R.N. 253)
sl	,, ,,	1925.11.1.1792	Outside Port Phillip Heads, Australia; Dendy Coll. (R.N. 148)

GRANTESSA SIBOGAE

sp	**Grantessa sibogae (P)**	1929.8.30.2	'Siboga' Exped.

GRANTESSA SIMPLEX

sl	**Grantessa simplex (P)**	1908.9.25.34	East Africa; C. F. Jenkin
sl	,, ,, (C)	1908.9.25.39	East Africa; C. F. Jenkin

GRANTESSA SPISSA

dry	**Heteropia spissa (L)**	1887.7.12.66	South coast of Australia; J. B. Wilson Coll.
sp	,, ,,	1887.7.12.23	South coast of Australia; J. B. Wilson Coll.

GRANTESSA THOMPSONII

sl	*Grantessa thompsonii*	1932.11.17.47	Sea of Okhotsk; Leningrad Museum

GRANTESSA ZANZIBARIS

sp	**Grantessa zanzibaris (P)**	1908.9.25.42	East Africa; C. F. Jenkin
sl	,, ,,	1936.3.4.84	Indian Ocean; John Murray Exped.

HETEROPIA GLOMEROSA

dry	**Leuconia glomerosa (H)**	1955.11.2.94	Port Elizabeth, South Africa; Bowerbank Coll.
sp	*Heteropia glomerosa*	1920.12.9.3	Okhamandal; Dendy Coll.
sp	,, ,,	1925.11.1.1471, 1580	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.
sp	,, ,,	1932.7.25.28	Stil Bay, South Africa; T. A. Stephenson
sp	,, ,,	1938.3.26.47	Bats Cave Rocks, South Africa; T. A. Stephenson
dry	,, ,,	1871.5.12.1	Port Elizabeth, South Africa; Bowerbank Coll.
sl	,, ,,	1925.11.1.1263	Okhamandal; Dendy Coll. (R.N. IV 6)

HETEROPIA STRIATA

sp	**Heteropia striata** var. **minor (P)**	1929.8.30.3	'Siboga' Exped.

VOSMAEROPSIS CONNEXIVA

sl	**Leucilla connexiva (H)**	1884.4.22.69	Philippines; 'Challenger' Coll.

VOSMAEROPSIS DEPRESSA

slsl	**Vosmaeropsis depressa (H)**	1924.2.6.102	J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1072	Dendy Coll. (R.N. 228)

VOSMAEROPSIS GARDINERI

sp	**Vosmaeropsis gardineri (P)**	1930.1.21.1	Presented by Ferrer Hernandez

VOSMAEROPSIS JAPONICA

sl	*Vosmaeropsis japonica*	1932.11.17.19	Sea of Japan; Leningrad Museum

VOSMAEROPSIS MACERA

dry	**Heteropia macera (H)**	1887.7.12.62	Port Phillip, Australia; J. B. Wilson Coll.
sp	,, ,,	1887.7.12.19	South coast of Australia; J. B. Wilson Coll.
sp	*Vosmaeropsis macera*	1893.6.9.28	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1925.11.1.1420, 1456, 1505, 1535–8, 62	Port Phillip, Australia; Dendy Coll. (R.N. 225, 189, 200, 74, 92, 77, 76)
dry	,, ,,	1893.6.9.28	Port Phillip Heads, Australia; J. B. Wilson Coll.
sl	,, ,,	1924.2.6.107	J. B. Wilson Coll., January, 1889
sl	,, ,,	1925.11.1.1054, 1063, 1789	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 85, 86, 87)
sl	*Heteropia macera*	1925.11.1.1788	[B.M. 2. This is either from 1887.7.12.62 or from 1887.7.12.19]

VOSMAEROPSIS MACKINNONI

sp	**Vosmaeropsis mackinnoni (H)**	1924.9.1.2	Abrolhos Island; Dendy Coll. (R.N. IV 1)

VOSMAEROPSIS MACULATA

sl	*Vosmaeropsis maculata*	1936.3.10.32	Sea of Japan; Exped. Acad. Sci. Mus., U.S.S.R.

VOSMAEROPSIS SERICATUM

sp	**Aphroceras sericatum (L)**	1879.12.27.15	Victoria Bank, South East Brazil; 'Alert' Coll.
sp	,, ,, (C)	1880.9.1.24–28	Victoria Bank; 'Alert' Coll.
sl	,, ,,	1955.12.13.2–3	Dendy Coll. (B.M. No. 47.) [These are probably from 1879.12.27.15]
sl	*Leucandra sericata*	1924.7.2.67	Cape Verde Islands; A. G. Thacker
sl	,, ,,	1924.7.2.71	Cape Verde Islands; A. G. Thacker

VOSMAEROPSIS WILSONI

sp	**Vosmaeropsis wilsoni (H)**	1893.6.9.29	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1925.11.1.60, 74, 1495, 1539	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 178, 180, 179, 71)
dry	,, ,,	1955.11.2.96	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1795–1797	Port Phillip Heads, Australia; Dendy Coll. (R.N. 177, 184, 175)

GRANTILLA QUADRIRADIATA

sp	**Grantilla quadriradiata (H)**	1912.2.1.8	Red Sea; Crossland Coll.

GRANTIA ACULEATA

sp	*Grantia aculeata*	1928.2.15.848	'Discovery' Exped., 1926–7

GRANTIA ATLANTICA

sp	**Grantia atlantica (H)**	1879.12.27.16	Victoria Bank, coast of Brazil; 'Alert' Coll.

GRANTIA CAPILLOSA

sp	*Sycon capillosa*	1897.3.25.9	Lesina, Adriatic; R. von Lendenfeld
sp	*Grantia capillosa*	1932.12.10.47, 50	East Greenland; Hoels-Grönlands Exped.
sp	,, ,,	1954.8.12.206	Plymouth Coll.
dry	**Sycon capillosum** (?C)	1867.7.26.46, 49, 93, 95	Adriatic; O. Schmidt
dry	,, ,,	1955.11.2.125	History unknown
dry	*Grantia capillosa*	1872.5.4.1	Cies Island, Portugal
dry	*Ute capillosa*	1955.11.2.105	Straits of Malacca; Bowerbank Coll.
dry	,, ,,	1955.11.2.108	Algoa Bay; Bowerbank Coll.

sl	*Grantia capillosum*	1896.11.5.15	Pizano, Adriatic; R. von Lendenfeld
sl	,, ,,	1910.1.1.1548	Rovigno, Italy (from R. von Lendenfeld); Norman Coll.
sl	,, ,,	1912.11.5.1	English Channel; L. R. Crawshay
sl	,, ,,	1932.12.10.48–52	Hoels-Grönlands Exped.
sl	*Sycon capillosum*	1910.1.1.1544–7	Mediterranean (from O. Schmidt); Norman Coll.

GRANTIA CHARTACEA

sp	**Dermatreton chartaceum (H)**	1907.8.6.68	National Antarctic Exped.

GRANTIA CIRRATA

sp	*Grantia cirrata* var. *aurorae*	1928.2.15.53–56, 715–720	'Discovery' Exped., 1926–7
sp	*Grantia cirrata* var. *tenuipilosa*	1928.2.15.51, 709–710	'Discovery' Exped., 1926–7
dry	*Grantia cirrata* var. *aurorae*	1928.2.15.52	'Discovery' Exped., 1926–7
dry	*Grantia cirrata* var. *tenuipilosa*	1928.2.15.50, 708	'Discovery' Exped., 1926–7
sl	*Grantia cirrata*	1928.2.15.324, 622	'Discovery' Exped., 1926–7
sl	*Grantia cirrata* var. *aurorae*	1956.4.26.85–92, 97	Mawson Antarctic Coll.

GRANTIA COMOXENSIS

sp	*Grantia comoxensis*	1955.11.2.117	Departure Bay, Vancouver; Miss Pixell

GRANTIA COMPRESSA

sp	*Grantia compressa*	1887.7.12.11	South coast of Australia; J. B. Wilson Coll.
sp	,, ,,	1889.9.17.2	Guliot Caves, Sark; F. J. Bell
sp	,, ,,	1895.12.19.3	Jersey; purchased Sinel
sp	,, ,,	1903.7.30.1	Jersey; purchased Hornell
sp	,, ,,	1925.11.1.1461, 1491	Plymouth; Dendy Coll.
sp	,, ,,	1931.3.21.1	Port Erin Bay, Isle of Man; H. B. Moore
sp	,, ,,	1931.5.6.1	Port Erin, Isle of Man; H. B. Moore
sp	,, ,,	1931.6.20.94	Wembury, Plymouth; M. Burton
sp	,, ,,	1931.10.28.12	Voeroj; Trondheim Museum Coll.
sp	,, ,,	1932.7.17.7.	Isle of Man; H. B. Moore
sp	,, ,,	1933.1.2.1–19	Plymouth; J. A. Kitching
sp	,, ,,	1933.1.10.13–15	Plymouth: J. A. Kitching
sp	,, ,,	1936.1.9.2	Cullen, Banffshire; G. D. Morrison
sp	,, ,,	1936.1.10.1	Lake Eireboll, Sutherland; D. M. Read
sp	,, ,,	1936.1.10.2	Rispond, Sutherland; D. M. Read
sp	,, ,,	1936.1.11.1	Newquay, Cornwall; D. D. John
sp	,, ,,	1936.2.8.3	Rottingdean, Sussex; M. Burton
sp	,, ,,	1936.5.1.1	Greenisland, Co. Antrim; N. Fisher
sp	,, ,,	1936.6.2.3	Rush, Co. Dublin; N. Fisher

sp	*Grantia compressa*	1936.9.21.1	Lleyn Penn, North Wales; F. C. Fraser, D. D. John
sp	,, ,,	1936.11.10.15–18	Wembury Bay, Devon; J. A. Kitching
sp	,, ,,	1936.11.16.18	Movill, Co. Donegal; N. Fisher
sp	,, ,,	1936.11.16.25	Greenisland, Co. Antrim; N. Fisher
sp	,, ,,	1937.7.14.4	Greenisland, Co. Antrim; N. Fisher
sp	,, ,,	1937.8.9.10–11	Greenisland, Co. Antrim; N. Fisher
sp	,, ,,	1937.8.11.9–11	Malin Head, Co. Donegal; N. Fisher
sp	,, ,,	1938.4.18.5	Solent, off Wootton Creek; A. J. Cobham
sp	,, ,,	1938.6.23.1	Mawgon Porth, Cornwall; J. E. Hamilton
sp	,, ,,	1938.8.4.4	Rottingdean, Sussex; M. Burton
sp	,, ,,	1938.8.16.9	Green Castle, Co. Donegal; N. McMillan
sp	,, ,,	1939.1.12.4, 16	Cullercoats Bay, Northumberland; J. E. Hamilton
sp	,, ,,	1939.1.24.7	Isle of Man; G. I. Crawford
sp	,, ,,	1946.2.22.4	Plymouth; M. Burton
sp	,, ,,	1946.10.3.1–2	Tipnor Lake, Portsmouth; R. Clarke
sp	,, ,,	1946.10.3.3	Plymouth; M. W. Jepps
sp	,, ,,	1946.10.8.1, 8, 14, 20, 28, 37, 44, 48, 57, 66, 82, 87, 97, 100, 108, 111, 114, 119, 123, 127, 131, 136, 145, 151, 157, 162–3	Flotta; A. J. Cobham
sp	,, ,,	1946.11.15.30–32, 34, 36	Paignton, Devon; M. Burton
sp	,, ,,	1946.11.15.41	Phoenix Wharf, Plymouth; M. Burton
sp	,, ,,	1946.11.15.45, 49	West Wharf, Millbay, Plymouth; M. Burton
sp	,, ,,	1946.11.15.53	Floating Wharf, Millbay, Plymouth; M. Burton
sp	,, ,,	1947.6.30.12	Portsmouth; M. Burton
sp	,, ,,	1947.6.30.19, 21	Portsea Pier; M. Burton
sp	,, ,,	1947.6.30.30, 32, 38	Fountain Lake, Portsmouth; A. J. Cobham
sp	,, ,,	1947.7.1.4, 20, 30	Torbay; M. Burton
sp	,, ,,	1947.7.1.28	Saltern Head, Torbay; M. Burton
sp	,, ,,	1947.7.22.1, 3	Millbay Docks, Plymouth; E. J. Batham
sp	,, ,,	1947.7.29.2	Veryan Bay, Cornwall; W. A. Smith
sp	,, ,,	1949.5.3.19	s.s. 'Cairo City'; H. A. Cole
sp	,, ,,	1954.1.18.1	West Wharf, Devonport; M. Burton
sp	,, ,,	1954.9.27.2	Emsworth Harbour; M. Burton

sp	*Grantia compressa*	1955.1.13.1	Torbay; M. Burton
sp	,, ,,	1955.1.19.5	Cobham's 'Barham' Coll.
sp	,, ,,	1955.11.2.118	History unknown
sp	*Grantia foliacea*	1898.5.7.4	Falmouth Harbour; Norman Coll.
dry	*Grantia compressa*	1845.5.28.16	Falmouth; W. P. Cocks
dry	,, ,,	1847.9.7.119–122	Johnston Coll.
dry	,, ,,	1847.9.7.123	Berwick Bay; Johnston Coll.
dry	,, ,,	1852.5.10.14	Torquay; J. E. Gray
dry	,, ,,	1872.5.4.1	Cies Island, Portugal; S. Kent
dry	,, ,,	1886.3.25.1	Budleigh Salterton, Devon; H. J. Carter
dry	,, ,,	1910.1.1.439	Polperro, Cornwall; Norman Coll.
dry	,, ,,	1910.1.1.445	Strangford Lough, Ireland; Norman Coll.
dry	,, ,,	1931.6.20.95	Drake's Island, Plymouth; M. Burton
dry	,, ,,	1934.11.7.16	Støff; Trondheim Museum Coll.
dry	,, ,,	1955.11.2.78	Britain; Bowerbank Coll.
dry	,, ,,	1955.11.2.80	Tenby; Bowerbank Coll.
dry	,, ,,	1955.11.2.81	Scilly Isles; Bowerbank Coll.
dry	,, ,,	1955.11.2.82	Hebrides; Bowerbank Coll.
dry	,, ,,	1955.11.2.83–84	Walton-on-Naze; Bowerbank Coll.
dry	,, ,,	1955.11.2.85	History unknown
dry	,, ,,	1955.11.2.86	Guliot Caves, Sark; Bowerbank Coll.
dry	,, ,,	1955.11.2.87	(Probably) Cardiff; H. J. Carter
dry	,, ,,	1955.11.2.88	Vigo Bay, Spain; Bowerbank Coll.
dry	,, ,,	1955.11.2.89	Ipswich River; Bowerbank Coll.
dry	*Sycandra compressa*	1882.3.6.22–23	Australia
dry	,, ,,	1910.1.1.440	Cornwall; Norman Coll.
dry	,, ,,	1910.1.1.441	Berwick-on-Tweed (Dr. Johnston); Norman Coll.
dry	,, ,,	1910.1.1.442	Moray Firth, Scotland; Norman Coll.
dry	,, ,,	1910.1.1.443	Outer Skerries, Shetland; Norman Coll.
dry	,, ,,	1910.1.1.444	Shetland; Norman Coll.
dry	,, ,,	1910.1.1.446	Bergen, Norway; Norman Coll.
dry	*Sycon compressum*	1955.11.2.79	Cies Island, Portugal; S. Kent
sl	*Grantia compressa*	1910.1.1.1551, 1555	Polperro, Devon; Norman Coll.
sl	,, ,,	1910.1.1.1552	Tenby; Norman Coll.
sl	,, ,,	1910.1.1.1558, 1560	Shetland; Norman Coll.
sl	,, ,,	1910.1.1.1559	Outer Skerries, Shetland; Norman Coll.
sl	,, ,,	1910.1.1.1562	Berwick (Dr. Johnston); Norman Coll.
sl	,, ,,	1910.1.1.1564	Cornwall; Norman Coll.
sl	,, ,,	1910.1.1.1565	(Mr. Ingpens); Norman Coll.
sl	,, ,,	1932.12.20.28	River Deben, Suffolk; D. L. Serventy
sl	,, ,,	1954.3.17.31, 128, 300–301	L. R. Crawshay [in] M.B.L. Coll.
sl	,, ,,	1954.8.12.16	Turnchapel Pier, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.71, 75	Remy Rocks, Plymouth; M.B.L. Coll.

sl	*Grantia compressa*	1956.4.26.23	Tenby; Bowerbank Coll.
sl	,, ,,	1956.4.26.24	Orwell River, Suffolk; Bowerbank Coll.
sl	,, ,,	1956.4.26.25–27	Locality unknown; Bowerbank Coll.
sl	,, ,,	1956.2.26.66–79	Cobham's 'Barham' Coll.
sl	,, ,,	1956.4.26.80	Plymouth; M.B.L. Coll.
GRANTIA EXTUSARTICULATA			
sp & dry	**Hypograntia extusarticulata (L)**	1887.7.12.16	South coast of Australia; J. B. Wilson Coll.
dry	**Hypograntia extusarticulata (C)**	1887.7.12.57	South coast of Australia; J. B. Wilson Coll.
GRANTIA FOLIACEA			
sp	*Grantia foliacea*	1934.11.7.17	Vaerøg; Trondheim Museum Coll.
sp	,, ,,	1934.11.7.28	Røst; Trondheim Museum Coll.
GRANTIA GRACILIS			
sp	**Vosmaeria gracilis (H)**	1886.6.7.35	Port Jackson, Australia; R. von Lendenfeld
GRANTIA HARAI			
sl	*Grantia harai*	1938.7.4.9, 173	Sea of Japan; Zool. Inst. Acad. Sci. Leningrad
GRANTIA HODGSONI			
sp	**Dermatreton hodgsoni (H)**	1907.8.6.74	National Antarctic Exped.
GRANTIA INDICA			
sp	**Grantia indica (H)**	1920.12.9.58	Indian Ocean; 'Sealark' Coll.
GRANTIA INTERMEDIA			
sl	**Grantia intermedia (H)**	1924.7.2.43	Cape Verde Islands; A. G. Thacker
GRANTIA MIRABILIS			
sp	*Grantia mirabilis*	1932.12.10.46	East Greenland; Hoels-Grönland Exped.
dry	,, ,,	1936.9.22.280	Franz Josef Land and Leninland; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.277–279, 281–285	Franz Josef Land and Leninland; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.11.20.6	Franz Josef Land and Leninland; Zool. Inst. Acad. Sci., Leningrad
GRANTIA PHILLIPSII			
sl	*Grantia phillipsii*	1936.9.22.297–299	Spitzbergen Sea; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.298	Leninland; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1936.9.22.299–356	Franz Josef Land and Leninland; Zool. Inst. Acad. Sci., Leningrad

GRANTIA RAMULOSA

sp	**Grantia ramulosa (H)**	1923.10.1.8–9	Bay of Islands, New Zealand; 'Terra Nova' Exped. (R.N. XVI)

GRANTIA SCOTTI

sp	**Tenthrenodes scotti (H)**	1907.8.6.27, 33	National Antarctic Exped.

GRANTIA TENUIS

sl	*Grantia tenuis*	1956.4.26.93	Australian Antarctic Exped. (R.N. IV 5)
sl	,, ,,	1956.4.26.94	Australian Antarctic Exped. (R.N. IV 6)
sl	,, ,,	1956.4.26.95	Australian Antarctic Exped. (R.N. IV 7)

GRANTIA TUBEROSA

sp & dry	**Grantia tuberosa (H)**	1884.4.22.19–20	St. Vincent, Cape Verde Islands; 'Challenger' Coll.

GRANTIA VOSMAERI

sp	**Grantia vosmaeri (H)**	1925.11.1.104	Watsons Bay, Port Jackson, Australia; Dendy Coll. (R.N. 193 A)

TEICHENOPSIS LABYRINTHICA

dry	**Teichonella labyrinthica (H)**	1955.11.2.104	Fremantle, Australia; Bowerbank Coll.
sp	,, ,,	1886.12.15.11	Victoria, Australia; J. B. Wilson Coll.
sp	*Grantia labyrinthica*	1886.12.15.13–21	Port Phillip Heads, Australia; J. B. Wilson Coll.
sp & dry	,, ,,	1893.6.9.17	Port Phillip Heads, Australia (from J. B. Wilson Coll.); Dendy Coll.
sp	*Teichenopsis labyrinthica*	1925.11.1.96–97	Victoria, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.1575	Near Port Phillip Heads, Australia; Dendy Coll.
dry	*Teichonella labyrinthica*	1887.7.12.53	Port Phillip, Australia; J. B. Wilson Coll.
sl	,, ,,	1924.2.6.48	J. B. Wilson Coll.
sl	*Grantia labyrinthica*	1893.6.10.1	Near Port Phillip Heads, Australia; Dendy Coll.
sl	,, ,,	1925.11.1.1830–37	Near Port Phillip Heads, Australia; Dendy Coll.

GRANTIOPSIS CYLINDRICA

dry	**Grantiopsis cylindrica (H)**	1893.6.9.14	Port Phillip Heads, Australia (from J. B. Wilson Coll.); Dendy Coll.
sp	,, ,,	1924.9.1.4	Abrolhos Islands; Dendy Coll. (R.N. I. 1)
sp	,, ,,	1924.9.1.5	Abrolhos Islands; Dendy Coll. (R.N. VII 1a)
sp	,, ,,	1924.9.1.6	Abrolhos Islands; Dendy Coll. (R.N. VII. 1c)
sp	,, ,,	1925.11.1.73	Abrolhos Islands; Dendy Coll. (R.N. VII. 1b)
sp	,, ,,	1925.11.1.100	Abrolhos Islands; Dendy Coll. (R.N. VI. 17c)

sp	**Grantiopsis cylindrica** var. **fruticosa (H)**	1924.9.1.7	Abrolhos Islands; Dendy Coll. (R.N. III. 4)

GRANTIOPSIS INFREQUENS

dry	**Hypograntia infrequens (H)**	1887.7.12.54	South coast of Australia; J. B. Wilson Coll.

UTE ENSATA

dry	**Grantia ensata (H)**	1955.1.2.106	Guernsey; Bowerbank Coll.
dry	*Ute ensata*	1882.3.6.11	Locality unknown
dry	,, ,,	1906.12.1.33	Lervig Bay, Norway (from E. A. Minchin); Norman Coll.
dry	,, ,,	1906.12.1.34	Norway (from E. A. Minchin); Norman Coll.
dry	*Grantia ensatum*	1910.1.1.447	Guliot Caves, Sark (from Mrs. Buckland); Norman Coll.
dry	,, ,,	1910.1.1.448	Tobermory, Hebrides; Norman Coll.
dry	*Grantia ensata*	1955.11.2.107	Larne Lough; Bowerbank Coll.
sl	*Ute ensata*	1938.5.26.56	Haifa Hafen, Palestine; K. Reich
sl	*Grantia ensata*	1956.4.26.29	Tobermory, Hebrides; Norman Coll.
sl	,, ,,	1956.4.26.30	Sark; Bowerbank Coll.
sl	*Aphroceras ensata*	1957.7.17. 3, 6	Macquarie Island; A.N.A.R.E.

UTE GLABRA

sl	**Ute glabra** (?C)	1867.7.26.10	Adriatic; O. Schmidt
sp	,, ,,	1882.5.28.24	Bay of Tunis (H.M.S. 'Porcupine'); P. H. Carpenter
sp	,, ,,	1897.3.25.10	Lesina, Adriatic; R. von Lendenfeld
sp	,, ,,	1908.2.6.1	Poole Harbour; H. J. Waddington
sp	,, ,,	1933.1.2.12, 33	Plymouth; J. A. Kitching
sp	,, ,,	1936.11.10.14	Wembury Bay, Devon; J. A. Kitching
sp	,, ,,	1955.11.2.110	Greenland
dry	,, ,,	1910.1.1.1049, 1058, 1067, 1088	Norway; Norman Coll.
dry	*Sycandra glabra*	1910.1.1.449	Lesina, Adriatic (from Haeckel); Norman Coll.

UTE SPENCERI

sl	**Ute spenceri (L)**	1925.11.1.1678	Port Jackson, Australia; Dendy Coll. (R.N. 195)
sl	,, ,, (C)	1925.11.1.1679	Port Jackson, Australia; Dendy Coll. (R.N. 224)

UTE SPICULOSA

sp	**Ute spiculosa (H)**	1893.6.9.16	Port Jackson, Australia (from T. Whitelegge); Dendy Coll.

UTE SYCONOIDES

dry	**Aphroceras syconoides (H)**	1887.7.12.74	South coast of Australia; J. B. Wilson Coll.

sp	*Ute syconoides*	1893.6.9.15	Port Jackson, Australia (from T. Whitelegge); Dendy Coll.
sp	,, ,,	1925.11.1.101	Port Jackson, Australia; Dendy Coll. (R.N. 69)
sp	,, ,,	1931.1.1.79	Pearl Oyster Bank, Tuticorin; Indian Museum Coll.
sl	,, ,,	1923.10.1.10	'Terra Nova' Exped. (R.N. XXXII 3c)
sl	,, ,,	1925.11.1.1825	Port Phillip, Australia; Dendy Coll. (R.N. 213)

SYNUTE PULCHELLA

sl	**Synute pulchella (H)**	1925.11.1.1680	Near Port Phillip Heads, Australia; Dendy Coll.

SYCODORUS HYSTRIX

sp	*Sycandra hystrix*	1910.1.1.680	Naples; Norman Coll.

ACHRAMORPHA DIOMEDAE

sl	*Achramorpha diomediae*	1938.7.4.72	Swedish Bank; Zool. Inst. Acad. Sci., Leningrad
sl	,, ,,	1938.7.4.73	Sea of Okhotsk; Zool. Inst. Acad. Sci., Leningrad

ACHRAMORPHA GLACIALIS

sp	**Achramorpha glacialis (L)**	1907.8.6.101	National Antarctic Exped.
sp	,, ,, (C)	1907.8.6.103–4	National Antarctic Exped.

ACHRAMORPHA GRANDINIS

sp	**Achramorpha grandinis (H)**	1907.8.6.108	National Antarctic Exped.

ACHRAMORPHA NIVALIS

sp	**Achramorpha nivalis (L)**	1907.8.6.119	National Antarctic Exped.
sp	,, ,, (C)	1907.8.6.111, 116, 122–130	National Antarctic Exped.
sp	,, ,,	1926.10.26.49	'Terra Nova' Exped.

ACHRAMORPHA TRUNCATA

dry	*Achramorpha truncata*	1926.10.26.250	'Terra Nova' Exped.

UTEOPSIS ARGENTEA

sp	**Ute argentea (H)**	1884.4.22.21	South of Cape Howe, New South Wales; 'Challenger' Coll.
sp	*Uteopsis argentea*	1928.6.18.10,14	'Siboga' Exped.
dry	,, ,,	1892.2.6.32	N.W. Australia; B. Smith
dry	,, ,,	1892.2.6.52	Balene Bank, N.W. Australia; B. Smith

ANAMIXILLA IRREGULARIS

sl	**Anamixilla irregularis (P)**	1929.8.30.6	'Siboga' Exped.

ANAMIXILLA TORRESI			
sp	**Anamixilla torresi (H)**	1884.4.22.28	Torres Straits; 'Challenger' Coll.
sp	,, ,,	1929.8.30.1, 4	'Siboga' Exped.
sl	,, ,,	1929.8.30.5	'Siboga' Exped.
MEGAPOGON CRISPATUS			
sp	**Megapogon crispatus (H)**	1907.8.6.131	National Antarctic Exped.
MEGAPOGON CRUCIFERUS			
sp	**Leuconia crucifera (H)**	1884.4.22.46	'Challenger' Coll.
sp	*Megapogon cruciferus*	1948.3.8.2	West Africa; 'Atlantide' Exped.
MEGAPOGON POLLICARIS			
sp	**Megapogon pollicaris (H)**	1907.8.6.135	National Antarctic Exped.
MEGAPOGON RARIPILIS			
sp	**Megapogon raripilis (L)**	1907.8.6.139	National Antarctic Exped.
sp	,, ,, (C)	1907.8.6.140, 145	National Antarctic Exped.
MEGAPOGON VILLOSUS			
sp	**Megapogon villosus (L)**	1907.8.6.146	National Antarctic Exped.
sp	,, ,, (C)	1907.8.6.151-153	National Antarctic Exped.
LEUCONIA ALGOAENSIS (? = *L. gossei*, see p. 505)			
dry	**Leucogypsia algoaensis (H)**	1955.11.2.30	Algoa; Bowerbank Coll.
sl	,, ,,	1868.10.27.4	Locality unknown; Bowerbank Coll.
LEUCONIA ANANAS			
sp	*Leuconia ananas*	1934.11.7.26	Skorskjaer, Linesøg; Trondheim Museum Coll.
dry	,, ,,	1910.1.1.455	Tobermory, Hebrides; Norman Coll.
sl	,, ,,	1908.9.25.46	Zanzibar; C. F. Jenkin
sl	,, ,,	1954.8.12.43	Duke Rock, Plymouth; M.B.L. Coll.
LEUCONIA ANFRACTA			
sp	*Leuconia anfracta*	1928.2.15.844	'Discovery' Exped., 1926–7
LEUCONIA ANGUINEA			
dry	**Leucortis anguinea (H)**	1882.10.17.111c	Providence Reef, Mascarenes; 'Alert' Coll.
LEUCONIA ANTARCTICA			
sp	*Leuconia antarctica* (see also **Leucetta antarctica**)	1926.10.26.52	'Terra Nova' Exped.
LEUCONIA ASPERA			
dry	**Sycon asperum (?C)**	1867.7.26.42	Adriatic; O. Schmidt
sp	*Leucandra aspera*	1883.12.4.32	Lesina; Adriatic; F. E. Schulze
sp	,, ,,	1898.5.7.5	Naples, Marine Zoological Station; Norman Coll.

sp	*Leucandra aspera*	1910.1.1.789	Vadsø, Norway; Norman Coll.
sp	,, ,,	1912.2.1.6	Red Sea; Crossland Coll.
sp	,, ,,	1925.11.1. 1558–9	Plymouth (?Naples); Dendy Coll.
sp	,, ,,	1926.2.11.4, 6, 9, 29, 44	Suez Canal; H. Munro Fox
sp	,, ,,	1926.4.9.23	Liu-Wu-Tien, Amoy; Prof. Ping
sp	*Leuconia aspera*	1890.6.10.1	Naples
sp	,, ,,	1910.1.1.822 i	Port Sligat, South of Cape Creus, Spain; Norman Coll.
sp	,, ,,	1933.3.1.12	Naples; H. Srinivasa Rao
sp	,, ,,	1935.8.20.1, 2	East Port, off Alexandria, Egypt; Prof. Steuer
sp	,, ,,	1937.8.7.8	Bermuda; J. F. G. Wheeler
sp	,, ,,	1948.3.8.86	West Africa; 'Atlantide' Exped.
sp	,, ,,	1948.7.10.83,85	'Manihine' Coll.
sp	,, ,	1948.8.6.57	Bermuda; M. W. de Laubenfels
sp & dry	*Leucandra aspera*	1897.3.25.11	Lesina, Adriatic; R. von Lendenfeld
dry	,, ,,	1895.12.30.4	Naples
dry	*Leuconia aspera*	1948.8.6.58	Bermuda; M. W. de Laubenfels
sl	**Sycon aspera (C)**	1867.3.11.76	Adriatic; O. Schmidt
sl	,, ,,	1954.2.24.31–38	Red Sea; Crossland Coll.
sl	*Leuconia aspera*	1933.3.1.39	Naples; H. Srinivasa Rao
sl	,, ,,	1948.3.5.93	'Atlantide' Exped.

LEUCONIA AUSTRALIENSIS

dry	**Leuconia fistulosa** var. **australiensis (H)**	1887.7.12.67	South coast of Australia; J. B. Wilson Coll.
sl	*Leucandra australiensis*	1925.11.1.1824	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 150)

LEUCONIA BARBATA

dry	**Medon barbata (P)**	1928.11.12.52	Duchassaing & Michelotti Coll., Turin
sp	*Leuconia barbata*	1939.1.26.5	St. George Harbour, Bermuda; J. F. G. Wheeler
sp	,, ,,	1939.2.14.7	Cayman Island Exped.
sl	,, ,,	1936.7.8.64	Tortugas; M. W. de Laubenfels
sl	,, ,,	1938.4.26.16	Bermuda; J. F. G. Wheeler
sl	,, ,,	1939.1.26.6	Cobblers Island

LEUCONIA BATHYBIA

sp	*Leucilla bathybia*	1912.2.1.10	Red Sea; Crossland Coll.
sp	*Leuconia bathybia*	1949.7.5.7–10	'Manihine' Akaba Coll.

LEUCONIA BOLIVARI

sp	*Leuconia bolivari*	1948.3.8.4–5	West Africa; 'Atlantide' Exped.

LEUCONIA BRUMALIS

sp	**Leucandra brumalis (L)**	1907.8.6.34	National Antarctic Exped.
sp	,, ,, (C)	1907.8.6.36–38	National Antarctic Exped.

LEUCONIA CAMINUS

sp	*Leuconia caminus*	1948.7.10.50	'Manihine' Coll.

LEUCONIA CAPILLATA

sp	*Leuconia capillata*	1928.6.18.9	'Siboga' Exped.

LEUCONIA CIRRATA

sp	**Leucandra cirrata** (L)	1907.8.6.39	National Antarctic Exped.
dry	,, ,, (C)	1907.8.6.43	National Antarctic Exped.

LEUCONIA COMPACTA

sp	**Leuconia compacta** (L)	1887.7.12.34	South coast of Australia; J. B. Wilson Coll.
dry	,, ,, (C)	1887.7.12.78	South coast of Australia; J. B. Wilson Coll.

LEUCONIA CONICA

sp	**Leucandra conica** (H)	1886.6.7.70–77	Port Jackson, Australia

LEUCONIA CRAMBESSA

sp	*Leuconia crambessa*	1935.10.21.46	Oude Kraal, South Africa; T. A. Stephenson
dry	*Leucandra crambessa*	1910.1.1.457	Nice, Mediterranean; Norman Coll.
sl	,, ,,	1953.11.11.134	Porto Grande, St. Vincent; 'Scotia' Exped.

LEUCONIA CROSSLANDI (see also *L. innominata*, p. 628)

sp	**Leucilla crosslandi** (H)	1912.2.1.12	Red Sea; Crossland Coll.
sl	*Leucandra crosslandi*	1924.7.2.84, 87A, B	Cape Verde Islands; A. G. Thacker

LEUCONIA CRUSTACEA

dry	*Leuconia crustacea*	1948.8.6.59	Bermuda; M. W. de Laubenfels

LEUCONIA CYLINDRICA

sp	*Leuconia cylindrica*	1934.11.7.29	Skorskjaer; Trondheim Museum Coll.

LEUCONIA DONNANI

sp	**Leucandra donnani** (H)	1907.2.1.103	Ceylon; Herdman Coll.
sp	**Leucandra donnani** var. **tenuiradiata** (L)	1920.12.9.4	Okhamandal; Dendy Coll. (R.N. IV 9c)
sp	**Leucandra donnani** var. **tenuiradiata** (C)	1955.11.2.92	Okhamandal; Dendy Coll. (R.N. III. 5)
sp	**Leucandra donnani** var. **tenuiradiata** (C)	1925.11.1.77	Okhamandal; Dendy Coll. (R.N. IV. 17)
sp	**Leucandra donnani** var. **tenuiradiata** (C)	1925.11.1.1264	Okhamandal; Dendy Coll. (R.N. IV. 8)

LEUCONIA DWARKAENSIS

sp	**Leucandra dwarkaensis** (H)	1920.12.9.5	Okhamandal; Dendy Coll. (R.N. XXIII. 6)

LEUCONIA ECHINATA

sp	**Leuconia echinata (L)**	1887.7.12.26	South coast of Australia; J. B. Wilson Coll.
sp	*Aphroceras echinata*	1882.10.17.66	Darros Island, Amirantes; 'Alert' Coll.
sp	*Aphroceras echinata* var.	1880.9.1.29–31	Victoria Bank; 'Alert' Coll.
sp	*Leucandra echinata*	1893.6.9.20	Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1920.12.9.59	'Sealark' Sponges; Dendy Coll. (R.N. XC. 4c)
sp	,, ,,	1925.11.1.78, 1460, 1481, 1549	Port Phillip Heads, Australia; Dendy Coll. (R.N. 116, 122, 203, 112)
sp	,, ,,	1925.11.1.82	'Sealark' Sponges; Dendy Coll. (R.N. LXXXIX. 1)
sp	,, ,,	1925.11.1.85	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 81A)
sp	,, ,,	1925.11.1.87	Port Jackson, Australia; Dendy Coll. (R.N. 195A)
sp	,, ,,	1925.11.1.1484	Port Phillip, Australia; Dendy Coll. (R.N. 201)
sp	,, ,,	1925.11.1.1498	Watson's Bay, Port Jackson, Australia (J. Whitelegge); Dendy Coll. (R.N. 83)
sp	,, ,,	1955.11.2.116	Dendy Coll. (R.N. 143)
dry	*Leuconia echinata*	1887.7.12.69	South coast of Australia; J. B. Wilson Coll.
sl	*Leucandra echinata*	1924.2.6.71	J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1798–1800, 1805	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 152, 118, 112A, 194)
sl	,, ,,	1925.11.1.1801–1802	Outside Port Phillip Heads, Australia; Dendy Coll. (R.N. 138, 211)
sl	,, ,,	1925.11.1.1803	Port Phillip Heads, Australia; Dendy Coll. (R.N. 210)
sl	,, ,,	1925.11.1.1804	Beaumaris, Victoria; Dendy Coll.

LEUCONIA EGEDII

sp	**Sycandra egedii (?C)**	1910.1.1.625	Greenland (from Copenhagen Museum); Norman Coll.

LEUCONIA ELEGANS

sp	**Leucortis elegans (H)**	1886.6.7.45	East coast of Australia

LEUCONIA FERNANDENSIS

sp	**Leucandra fernandensis (C)**	1908.9.24.7	Juan Fernandez, Platé Coll. (from Berlin Museum Exchange)

LEUCONIA FISTULOSA

dry	**Grantia fistulosa (H)**	1847.9.7.78	Portaferry, Ireland; Johnston Coll.
sp	*Leuconia fistulosa*	1882.3.6.1–2	Australia; H. J. Carter
sp	,,	1889.7.26.1–6	Lulworth, Dorset; F. Beckford
sp	,,	1933.8.9.1	Eddystone, Plymouth; H. Srinivasa Rao

sp	*Leuconia fistulosa*	1947.10.3.181	English Channel; 'Manihine' Coll.
sp	,, ,,	1948.7.10.90	English Channel; 'Manihine' Coll.
sp	,, ,,	1949.10.19.59–60	English Channel; 'Manihine' Coll.
sp	,, ,,	1955.2.3.1	Flotta; A. J. Cobham
sp	,, ,,	1955.11.2.114	Plymouth; Dendy Coll.
sp	*Leuconia fistulosa* var.	1887.7.12.24	South coast of Australia; J. B. Wilson Coll.
sp	*Aphroceras fistulosa*	1872.3.3.137	Sado River, Portugal; S. Kent
sp	*Leucandra fistulosa*	1895.5.31.3	Port Erin, Isle of Man; R. Hanitsch
sp	,, ,,	1925.11.1.1–2, 1573	Plymouth; Dendy Coll.
dry	*Leuconia fistulosa*	1910.1.1.459	St. Magnus Bay, Shetland; Norman Coll.
dry	,, ,,	1910.1.1.460	Saint's Bay, Guernsey; Norman Coll.
dry	,, ,,	1955.11.2.32	Plymouth and Guernsey; Bowerbank Coll.
dry	,, ,,	1955.11.2.33	Locality unknown (from E. Forbes); Bowerbank Coll.
dry	,, ,,	1955.11.2.34	Mount's Bay, Cornwall; Bowerbank Coll.
dry	,, ,,	1955.11.2.35	Larne Lough, Ireland; Bowerbank Coll.
dry	,, ,,	1955.11.2.36	Bowerbank Coll.
dry	,, ,,	1955.11.2.37	Saint's Bay, Guernsey; Bowerbank Coll.
dry	*Leucandra fistulosa*	1889.7.26.1–6	Lulworth, Dorset
sl	*Leuconia fistulosa*	1954.8.12.13, 57	New Grounds, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.32, 36–37	Hand Deeps, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.79	Looe Island, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.94	Stoke Point Grounds, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.106–107, 109–110, 119, 196–197	M.B.L. Coll.
sl	,, ,,	1954.8.12.226	Yealm Point, Plymouth; M.B.L. Coll.
sl	*Leucandra fistulosa*	1954.3.17.21, 34, 40	Plymouth; L. R. Crawshay [in] M.B.L. Coll.
sl	,, ,,	1954.3.17.39, 59	Stoke Point; L. R. Crawshay [in] M.B.L. Coll.

LEUCONIA FRIGIDA

sp	**Leucandra frigida** (L)	1907.8.6.44	National Antarctic Exped.
sp	,, ,, (C)	1907.8.6.46, 48, 50–52	National Antarctic Exped.

LEUCONIA GELATINOSA

sp	**Leucandra gelatinosa** (L)	1907.8.6.53	National Antarctic Exped.
sp	,, ,, (C)	1907.8.6.61	National Antarctic Exped.

LEUCONIA GEMMIPARA

sl	**Leucandra gemmipara** (C)	1924.7.2.88	Cape Verde Islands; A. G. Thacker Coll.
sl	,, ,, (C)	1924.7.2.92	Cape Verde Islands; A. G. Thacker Coll.

LEUCONIA GLADIATOR

sp	**Leucandra gladiator (H)**	1893.6.9.21	Near Port Phillip Heads, Australia; J. B. Wilson Coll.

LEUCONIA GOSSEI

dry	**Leucogypsia gossei (H)**	1955.11.2.42	Torquay; Bowerbank Coll.
sp	*Leucandra gossei*	1887.7.12.5	Sark; C. Stewart
sp	,, ,,	1895.5.31.2	Port Erin, Isle of Man; R. Hanitsch
sp	,, ,,	1913.5.12.2	Seal Cave, Clare Island, Ireland
sp	,, ,,	1932.7.17.6	Isle of Man; H. B. Moore
sp	*Leuconia gossei*	1933.1.2.26–28	Plymouth; J. A. Kitching
sp	,, ,,	1933.1.10.6	Plymouth; J. A. Kitching
sp	,, ,,	1933.8.9.5	Wembury Bay, Plymouth; M.B.L. Coll.
sp	,, ,,	1954.8.12.209, 216	Wembury Bay, Plymouth; M.B.L. Coll.
dry	*Leucogypsia gossei*	1910.1.1.458	Sark; Norman Coll.
dry	,, ,,	1955.11.2.38	Locality unknown; Bowerbank Coll.
dry	,, ,,	1955.11.2.39, 41	Sark; Bowerbank Coll.
dry	,, ,,	1955.11.2.40	Torquay; Bowerbank Coll.
sl	,, ,,	1910.1.1.1623	Cornwall; Norman Coll.
sl	*Leuconia gossei*	1954.8.12.50, 56	Wembury Bay, Plymouth; M.B.L. Coll.
sl	*Leucandra gossei*	1956.4.26.51	Plymouth; R. W. H. Row

LEUCONIA HEATHI

sp	*Leuconia heathi*	1929.8.22.39	California; M. W. de Laubenfels

LEUCONIA HELENA

sp	**Leucaltis helena (H)**	1886.6.7.42–43	Port Jackson, Australia

LEUCONIA HIBERNA

sp	**Leucandra hiberna (L)**	1907.8.6.62	National Antarctic Exped.
sl	,, ,, (C)	1907.8.6.63	National Antarctic Exped.

LEUCONIA HISPIDA

sp	**Leuconia hispida (L)**	1887.7.12.25	South coast of Australia; J. B Wilson Coll.
sp	*Leucandra hispida*	1893.6.9.19	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1925.11.1.83	Port Phillip Heads, Australia; Dendy Coll. (R.N. 137)
sp	,, ,,	1925.11.1.1435	Port Jackson, Australia; Dendy Coll. (R.N. 208)
sp	,, ,,	1925.11.1.1454	Port Phillips Heads, Australia; Dendy Coll. (R.N. 135)
dry	**Leuconia hispida (C)**	1887.7.12.68	South coast of Australia; J. B. Wilson Coll.
sl	*Leucandra hispida*	1925.11.1.1806	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 131B)
sl	,, ,,	1925.11.1.1807	Port Phillip, Australia; Dendy Coll (R.N. 124)
sl	,, ,,	1925.11.1.1808	Port Phillip, Australia; Dendy Coll. (R.N. 93A)

sl	*Leucandra hispida*	1925.11.1.1809	Port Phillip, Australia; Dendy Coll. (R.N. 126)
sl	,, ,,	1925.11.1.1810	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 93)
LEUCONIA IMBERBIS			
dry	**Medon imberbis (L)**	1928.11.12.51	Duchassaing & Michelotti Coll., Turin
dry	,, ,, (C)	1928.11.12.53	Duchassaing & Michelotti Coll., Turin
LEUCONIA IMPRESSA			
sl	**Leucaltis impressa (H)**	1910.1.1.1616	(from University College Liverpool); Norman Coll.
sp	*Leuconia impressa*	1938.8.16.1	Whitestrand Bay, Co. Donegal; N. F. McMillan
sp	,, ,,	1949.5.25.17	Gatesholm; D. Purchon
LEUCONIA INFESTA			
sp	**Leucilla intermedia (L)**	1912.2.1.11	Red Sea; Crossland Coll.
sl	,, ,, (C)	1954.2.24.5–7, 27–30	Red Sea; Crossland Coll.
LEUCONIA INNOMINATA (See also *L. crosslandi*, p. 624)			
sl	**Leucilla crosslandi (L)**	1954.2.24.1	Red Sea; Crossland Coll.
sl	,, ,, (C)	1954.2.24.23–26	Red Sea; Crossland Coll.
LEUCONIA JOHNSTONII			
dry	**Leuconia johnstonii (H)**	1847.9.7.74	Britain; Johnston Coll.
sp	,, ,,	1936.11.10.10–11	Wembury Bay, Devon; J. A. Kitching
sp	,, ,,	1947.7.1.75	Torbay; M. Burton
sp	,, ,,	1947.10.3.37	'Manihine' Coll.
dry	*Grantia nivea* var.	1847.9.7.75–76	Locality unknown; Johnston Coll.
dry	*Leuconia johnstonii*	1870.8.26.32	G. Clifton
dry	,, ,,	1897.2.26.1, 3	Budleigh Salterton, Devon; H. J. Carter
dry	,, ,,	1910.1.1.461	Polperro, Cornwall; Norman Coll.
dry	,, ,,	1910.1.1.462	Devonshire (from H. J. Carter); Norman Coll.
dry	,, ,,	1910.1.1.463	Strangford Lough, Ireland; Norman Coll.
dry	,, ,,	1910.1.1.464	Loch Fyne, Tarbert; Norman Coll.
dry	,, ,,	1955.11.2.43	Locality unknown; Bowerbank Coll.
sl	,, ,,	1910.1.1.1604	Guliot Caves, Sark; Norman Coll.
sl	,, ,,	1910.1.1.1606	Guliot Caves, Sark; Norman Coll.
sl	,, ,,	1910.1.1.1608	Guernsey (det. E. Haeckel); Norman Coll.
sl	,, ,,	1954.8.12.66–67	Looe Island, Plymouth; M.B.L. Coll.
sl	,, ,,	1956.4.26.31	Plymouth; N. B. Eales
LEUCONIA KURILENSIS			
sl	*Leuconia kurilensis*	1938.7.4.134	Sea of Okhotsk; Zool. Inst. Acad. Sci., Leningrad

LEUCONIA LENDENFELDI

sp	**Leuconia lendenfeldi (P)**	1908.9.24.8	East coast of Australia; Berlin Museum Exchange

LEUCONIA LEPTORHAPHIS

dry	*Leuconia leptorhaphis*	1926.10.26.178	'Terra Nova' Exped.
sl	,, ,,	1926.10.26.34–40, 48	'Terra Nova' Exped.
sl	,, ,,	1957.7.17.5	Macquarie Island; A.N.A.R.E.

LEUCONIA LEVIS

sp	**Leuconia levis (L)**	1882.4.22.44	Prince Edward Islands; 'Challenger' Coll.
sp	,, ,, (C)	1882.4.22.45	Prince Edward Islands; 'Challenger' Coll.

LEUCONIA LOBATA

sp & dry	**Leuconia lobata (H)**	1887.7.12.33	South coast of Australia; J. B. Wilson Coll.
sp	*Grantia compressa* var. *fistulata*	1887.7.12.12	South coast of Australia; J. B. Wilson Coll.
sp	*Leuconia lobata*	1938.3.26.55	Reef Bay, Port Elizabeth, South Africa; T. A. Stephenson
dry	**Grantia compressa** var. **fistulata (H)**	1887.7.12.51	South coast of Australia; J. B. Wilson Coll.

LEUCONIA LORICATA

sp	**Leuconia loricata**	1884.4.22.47	New South Wales; 'Challenger' Coll.

LEUCONIA LUNULATA

sp	*Leuconia lunulata*	1935.10.21.45	St. James, South Africa; T. A. Stephenson

LEUCONIA MASATIERRAE

sp	*Leuconia masatierrae*	1934.1.17.36	Argentine coast; Buenos Aires Museum

LEUCONIA MAWSONI

sl	**Leucandra mawsoni (H)**	1920.12.9.95–96	Australian Antarctic Exped.

LEUCONIA MEANDRINA

sp	**Leucandra meandrina (H)**	1886.6.7.47	Port Jackson, Australia
sl	,, ,,	1925.11.1.1811	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 186)

LEUCONIA MICRORAPHIS

sp	*Leucandra microraphis*	1925.11.1.76	Near Port Phillip Heads, Australia (from T. Whitelegge); Dendy Coll.
sl	,, ,,	1893.6.10.18	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 227)
sl	,, ,,	1893.6.10.20	Outside Port Phillip Heads, Australia; Dendy Coll. (R.N. 233)
sl	,, ,,	1924.2.6.81	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 253)
sl	,, ,,	1924.2.6.82	J. B. Wilson Coll.

sl	*Leucandra microraphis*	1954.2.24.39	Red Sea; Crossland Coll.
sl	,, ,,	1954.2.24.40	Red Sea; Crossland Coll.
sl	*Leucandra primigenia*	1954.2.24.41	Red Sea; Crossland Coll.

LEUCONIA MULTIFIDA

dry	**Leuconia multifida** (L)	1887.7.12.76	South coast of Australia; J. B. Wilson Coll.
sp	,, ,, (C)	1887.7.12.32	South coast of Australia; J. B. Wilson Coll.

LEUCONIA MULTIFORMIS

sp	**Leuconia multiformis** var. **goliath** (H)	1884.4.22.32–33	Bermuda; 'Challenger' Coll.
sp	**Leuconia multiformis** var. **capillata** (H)	1884.4.22.34–36	Philippines; 'Challenger' Coll.
sp	**Leuconia multiformis** var. **amorpha** (H)	1884.4.22.37–39	Off Bermuda; 'Challenger' Coll.
sp	*Leucandra multiformis* var. *amorpha*	1925.11.1.692	Maria Island, Tasmania; Dendy Coll. (R.N. III)
sp	*Leuconia multiformis*	1939.3.6.79	Basseterre, St. Kitts, West Indies; A. K. Totton

LEUCONIA MULTITUBA

sl	*Leuconia multituba*	1938.7.4.36	Sea of Japan; Zool. Inst. Acad. Sci., Leningrad

LEUCONIA NAUSICAAE

sp	*Leuconia nausicaae*	1949.7.5.11, 12, 85	'Manihine' Akaba Coll.

LEUCONIA NIVEA

sp	*Leucandra nivea*	1925.11.1.80	Plymouth; Dendy Coll.
sp	,, ,,	1926.8.1.33	Lough Ine, South-west Ireland; L. P. W. Renouf
sp	*Leuconia nivea*	1932.1.9.33–34	Port Erin, Isle of Man; H. B. Moore
sp	,, ,,	1933.1.2.20–25	Plymouth; J. A. Kitching
sp	,, ,,	1933.3.9.9.	Lough Ine, South-west Ireland; L. P. W. Renouf
sp	,, ,,	1934.9.26.15–17	Loch Swen, Argyllshire; J. A. Kitching
sp	,, ,,	1937.8.11.7	Malin Head, Co. Donegal; N. Fisher
sp	,, ,,	1937.9.8.4	Robin Hood's Bay, Yorkshire; N. B. Eales
sp	,, ,,	1938.2.28.4	Jersey; N. B. Eales
sp	,, ,,	1946.10.3.9	Plymouth; M. W. Jepps
sp	,, ,,	1946.10.8.40, 60, 122, 146	Flotta; A. J. Cobham
sp	,, ,,	1947.7.1.12, 42, 62–63	Torbay; M. Burton
sp	,, ,,	1947.8.25.2	Loch Swen, Argyllshire; R. B. Pike
sp	,, ,,	1947.10.3.35, 36	English Channel; 'Manihine' Coll.
sp	,, ,,	1948.7.10.61	English Channel; 'Manihine' Coll.
sp	,, ,,	1955.1.12.2	Cobham Coll.
sp	*Leuconia nivea* var.	1887.7.12.27	South coast of Australia; J. B. Wilson Coll.

dry	*Grantia nivea*	1847.9.7.77	Britain; Johnston Coll.
dry	,, ,,	1910.1.1.467	Polperro, Cornwall; Norman Coll.
dry	,, ,,	1955.11.2.54	Scarborough; Bowerbank Coll.
dry	*Leucandra johnstonii*	1919.1.1.465	Guernsey; Norman Coll.
dry	,, ,,	1910.1.1.473	Strangford Lough, Ireland; Norman Coll.
dry	*Leucandra nivea*	1910.1.1.474	Bergen, Norway; Norman Coll.
dry	,, ,,	1918.1.8.1	St. Andrews, Scotland; W. C. M'Intosh
dry	*Leuconia nivea*	1840.10.23.15	No information
dry	,, ,,	1882.3.6.29	Budleigh Salterton, Devon; H. J. Carter
dry	,, ,,	1886.3.25.4	Budleigh Salterton, Devon; H. J. Carter
dry	,, ,,	1897.2.26.2	Budleigh Salterton, Devon; H. J. Carter
dry	,, ,,	1910.1.1.466	Herm; Norman Coll.
dry	,, ,,	1910.1.1.468	Tenby; Norman Coll.
dry	,, ,,	1910.1.1.470	Cullercoats, Northumberland; Norman Coll.
dry	,, ,,	1910.1.1.471	Tobermory, Hebrides; Norman Coll.
dry	,, ,,	1910.1.1.472	Westport Bay, Ireland; Norman Coll.
dry	,, ,,	1955.11.2.44	Budleigh Salterton, Devon; H. J. Carter
dry	,, ,,	1955.11.2.45	Locality unknown; Bowerbank Coll.
dry	,, ,,	1955.11.2.46	Scarborough; Bowerbank Coll.
dry	,, ,,	1955.11.2.47	Sark; Bowerbank Coll.
dry	,, ,,	1955.11.2.48	Torbay; Bowerbank Coll.
dry	,, ,,	1955.11.2.49	Connemara, Ireland; Bowerbank Coll.
dry	,, ,,	1955.11.2.50	Torquay; Bowerbank Coll.
dry	,, ,,	1955.11.2.51	Cullercoats, Northumberland; Bowerbank Coll.
dry	,, ,,	1955.11.2.52	Locality unknown; Bowerbank Coll.
dry	,, ,,	1955.11.2.53	Sark; Bowerbank Coll.
dry	,, ,,	1955.11.2.55	Locality unknown; Johnston Coll.
dry	,, ,,	1955.11.2.56	Guernsey; Bowerbank Coll.
dry	,, ,,	1955.11.2.57	Scarborough; Bowerbank Coll.
dry	*Leuconia nivea* var.	1882.3.6.13–14	Australia
dry	*Leuconia nivea* var. *australiensis*	1887.7.12.71	South coast of Australia; J. B. Wilson Coll.
sl	,, ,,	1938.6.16.59–66	Ramsay, Inverness-shire; King's College Exped.
sl	,, ,,	1954.8.12.7, 9, 11, 22, 23, 65	Plymouth; M.B.L. Coll.
sl	,, ,,	1956.4.26.32	Tenby (from Mrs. Brett); Bowerbank Coll.
sl	,, ,,	1956.4.26.81	Scarborough; Bowerbank Coll.
sl	,, ,,	1956.4.26.82	Guliot Caves, Sark (from Mr. Hughes); Bowerbank Coll.

LEUCONIA OVATA

sp & dry	**Leuconia ovata (H)**	1884.4.22.67	Christmas Harbour, Kerguelen; 'Challenger' Coll.

LEUCONIA PANDORA

dry	*Leucetta pandora*	1955.3.14.7	Australia; M. Cole

LEUCONIA PAUCISPINA

sl	*Leuconia paucispina*	1932.11.17.16	Sea of Japan; Leningrad Museum

LEUCONIA PHILLIPENSIS

sl	**Leucandra phillipensis (H)**	1925.11.1.1681	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 185)

LEUCONIA PLATEI

sp	**Leuconia platei (P)**	1908.9.24.9	Punta Arenas, Chile; Berlin Museum Exchange

LEUCONIA PUMILA

dry	**Leuconia pumila (L)**	1910.1.1.475	Guernsey; Norman Coll.
sp	,, ,,	1935.10.21.44	Oude Kraal, South Africa; T. A. Stephenson
sp	,, ,,	1948.7.10.89	'Manihine' Coll.
dry	,, ,,	1955.11.2.58	Guernsey; Bowerbank Coll.
dry	,, ,,	1955.11.2.59	Lorne Loch; Bowerbank Coll.
dry	,, ,,	1955.11.2.60	Locality unknown; Bowerbank Coll.
sl	,, ,,	1956.4.26.50	Shetland; Bowerbank Coll.

LEUCONIA PYRIFORMIS

sl	*Leuconia pyriformis*	1932.11.17.17	Sea of Japan; Leningrad Museum

LEUCONIA RAMOSA

sp	**Leuconia ramosa (H)**	1930.8.13.3	Great Barrier Reef Exped.

LEUCONIA RIOJAI

sp	**Leucandra riojai (P)**	1930.1.21.8	From Madrid Museum

LEUCONIA RUDIFERA

sp	**Leuconia rudifera (H)**	1884.4.22.42–44	'Challenger' Coll.
sl	,, ,,	1948.3.8.6, 36	West Africa; 'Atlantide' Exped.
sl	*Leucandra rudifera*	1924.7.2.56, 61, 65	Cape Verde Islands; A. G. Thacker

LEUCONIA SAGAMIANA

sl	*Leuconia sagamiana*	1936.3.10.28	Sea of Japan; Exped. Acad. Sci. Mus., U.S.S.R.

LEUCONIA SOLIDA

sl	**Grantia solida (C)**	1867.3.11.74	Adriatic; O. Schmidt
sl	*Leucaltis solida*	1910.1.1.1620	Naples, Marine Zoological Station; Norman Coll.

LEUCONIA SPLENDENS

sl	*Leuconia splendens*	1938.7.4.117	Sea of Okhotsk; Zool. Inst. Acad. Sci., Leningrad

LEUCONIA SULCATA

sp	**Leucandra sulcata (P)**	1930.1.21.6	From Madrid Museum

LEUCONIA TAYLORI			
sl	*Leuconia taylori*	1936.3.10.29–30, 35–37	Sea of Japan; Exped. Acad. Sci. Mus., U.S.S.R.
LEUCONIA TELUM			
sl	**Polejna telum (P)**	1910.1.1.1596	(From R. von Lendenfeld); Norman Coll.
LEUCONIA TYPICA			
sp	**Leuconia typica** var. **tuba (H)**	1884.4.22.40	Bermuda; 'Challenger' Coll.
sp	**Leuconia typica** var. **massa (H)**	1884.4.22.41	Bermuda; 'Challenger' Coll.
sp	*Leucandra typica*	1886.6.7.57–58	Port Jackson, Australia
sl	,, ,,	1924.7.2.79	Cape Verde Islands; A. G. Thacker
sl	,, ,,	1954.2.11.51	Cape Verde Islands; A. G. Thacker
LEUCONIA VAGINATA			
sp	**Leucandra vaginata (H)**	1886.6.7.66–67	Port Jackson, Australia; R. von Lendenfeld
LEUCONIA VALIDA			
sl	*Leuconia valida*	1932.11.17.46	Sea of Okhotsk; Leningrad Museum
LEUCONIA VERDENSIS			
sl	**Leucandra verdensis (H)**	1924.7.2.51	Cape Verde Islands; A. G. Thacker
LEUCONIA VILLOSA			
sp	**Leucandra villosa (H)**	1886.6.7.50	Port Jackson, Australia; R. von Lendenfeld
LEUCONIA WASINENSIS			
sl	**Leucilla wasinensis (H)**	1908.9.25.59	Wasin, East Africa; C. F. Jenkin
sp	*Leuconia wasinensis*	1936.3.4.537	Indian Ocean; John Murray Exped.
sl	*Leucandra wasinensis*	1925.11.1.1118	Indian Ocean; 'Sealark' Sponges; Dendy Coll. (R.N. VIII 7)
sl	,, ,,	1925.11.1.1267	Okhamandal; Dendy Coll. (R.N. XXXV 9)
LEUCOPSILA STYLIFERA			
sp	*Leucandra stilifera*	1910.1.1.627	Greenland (from Copenhagen Museum); Norman Coll.
dry	*Leucopsila stylifera*	1938.7.4.95	Sea of Okhotsk; Zool. Inst Acad. Sci., Leningrad
sl	,, ,,	1938.7.4.47	Sea of Okhotsk; Zool. Inst. Acad. Sci., Leningrad
APHROCERAS ALCICORNIS			
dry	**Aphroceras alcicornis (H)**	1955.11.2.31	Hong Kong; Mr. Harland
sp	*Leucandra alcicornis*	1880.11.25.208	Off Twofold Bay, New South Wales; 'Challenger' Coll.
sp	,, ,,	1955.11.2.119	Off S.E. Japan; Bowerbank Coll.
APHROCERAS CATAPHRACTA			
sp	*Leucandra cataphracta*	1885.6.7.52–55	Port Jackson, Australia
sp	,, ,,	1893.6.9.18	Port Jackson, Australia (from T. Whitelegge); Dendy Coll.

sp	*Leucandra cataphracta*	1925.11.1.88	Port Jackson, Australia; Dendy Coll.
sl	,, ,,	1886.6.7.56	Port Denison, Australia; R. von Lendenfeld
sl	,, ,,	1925.11.1.1826	Port Jackson, Australia; Dendy Coll. (B.M. No. 43)
sl	,, ,,	1925.11.1.1827	Port Jackson, Australia; Dendy Coll. (R.N. 68)
APHROCERAS CLIARENSIS			
sp	**Leucandra cliarensis (C)**	1913.5.12.3	Clare Island, Ireland; J. Stephens
sp	*Aphroceras cliarensis*	1936.11.10.19	Wembury Bay, Plymouth; J. A. Kitching
sp	,, ,,	1946.10.3.6	Plymouth; M. W. Jepps
sl	,, ,,	1954.8.12.12	Wembury Bay, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.64	Looe Island, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.229	Wembury Bay, Plymouth; M.B.L. Coll.
APHROCERAS CORTICATA			
sl	**Vosmaeria corticata (P)**	1910.1.1.1593	(From R. von Lendenfeld); Norman Coll.
LAMONTIA ZONA			
sp	**Lamontia zona (P)**	1938.8.24.15	Wellington, New Zealand; L. B. Moore
EILHARDIA SCHULZEI			
sp	**Eilhardia schulzei (H)**	1884.4.22.65	South of Port Jackson, Australia; 'Challenger' Coll.
sp	,, ,, (C)	1884.4.22.66	Off south coast of Australia; 'Challenger' Coll.
sp	,, ,,	1925.11.1.98–99	Tasmania; Dendy Coll.
AMPHORISCUS CHRYSALIS			
sp	*Amphoriscus chrysalis*	1949.10.19.44	English Channel; 'Manihine' Coll.
dry	,, ,,	1954.8.12.213	Mewstone, Plymouth; M.B.L. Coll.
sl	,, ,,	1954.8.12.195	Plymouth; M.B.L. Coll.
sl	,, ,,	1955.12.13.9	Plymouth; R. W. H. Row
AMPHORISCUS CYLINDRUS			
sp	*Amphoriscus cylindrus*	1886.6.7.32	Port Jackson, Australia
AMPHORISCUS ELONGATUS			
sp	**Amphoriscus elongatus (H)**	1884.4.22.27	Off Marion Island; 'Challenger' Coll.
sp	,, ,,	1948.3.8.3	West Africa; 'Atlantide' Exped.
sl	,, ,,	1955.12.13.10	Plymouth; R. W. H. Row
sl	,, ,,	1955.12.13.11	Plymouth; R. W. H. Row
AMPHORISCUS GREGORII			
sl	**Ebnerella gregorii (P)**	1896.11.5.18	Lesina, Adriatic; R. von Lendenfeld
AMPHORISCUS TESTIPARUS			
dry	*Sycaltis testipara*	1955.11.2.93	Fremantle, West Australia; E. Clifton

LEUCILLA AUSTRALIENSIS

dry	**Leuconia johnstonii** var. **australiensis (H)**	1887.7.12.72	Port Phillip, Australia; J. B. Wilson Coll.
sp	**Leuconia johnstonii** var. **australiensis (H)**	1887.7.12.28	South coast of Australia; J. B. Wilson Coll.
sp	*Leucilla australiensis*	1893.6.9.30	Near Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1925.11.1.95	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 214)
sp	,, ,,	1925.11.1.1402	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 98)
sp	,, ,,	1925.11.1.1550	Port Phillip Heads, Australia; Dendy Coll. (R.N. 204)
dry	*Leuconia johnstonii* var. *australiensis*	1882.2.6.3–5	Australia; H. J. Carter
sl	,, ,,	1925.11.1.1812	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 97)
sl	,, ,,	1925.11.1.1813	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 96)
sl	,, ,,	1925.11.1.1814	Port Phillip, Australia; Dendy Coll. (R.N. 70)
sl	,, ,,	1925.11.1.1815	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 198)
sl	,, ,,	1925.11.1.1816	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 202)
sl	,, ,,	1925.11.1.1817	Beaumaris, Victoria; Dendy Coll.
sl	,, ,,	1925.11.1.1818	Port Phillip, Australia; Dendy Coll. (R.N. 46)
sl	,, ,,	1925.11.1.1819	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 199)
sl	,, ,,	1925.11.1.1820	Port Phillip, Australia; Dendy Coll. (R.N. 257)
sl	,, ,,	1925.11.1.1828	Near Port Phillip Heads, Australia; Dendy Coll. (R.N. 206)
sl	,, ,,	1929.8.30.7–8	'Siboga' Exped.

LEUCILLA BATHYBIA

sl	*Leucilla bathybia*	1954.2.24.2–4	Red Sea; Crossland Coll.

LEUCILLA NUTTINGI

sp	*Rhabdodermella nuttingi*	1929.8.22.43	California; M. W. de Laubenfels

LEUCILLA OBLATA

sp	**Leucilla oblata (C)**	1925.11.1.93, 1468, 1494	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.

LEUCILLA PRINCEPS

sp	**Leucilla princeps (C)**	1925.11.1.90, 1483, 1504	Hamburg, S.W. Australia Exped., 1905; Dendy Coll.

LEUCILLA PROTEUS

sp	**Leucilla proteus (H)**	1920.12.9.60	'Sealark' Coll.

LEUCILLA SACCHARATA

sp	*Leucandra saccharata*	1881.10.21.345–346	Port Jackson, Australia; 'Alert' Coll.
sp	,, ,,	1886.6.7.61–63	Port Jackson, Australia
sp	,, ,,	1886.12.13.4–5	New South Wales; E. P. Ramsay
sp	*Leucilla saccharata*	1893.6.9.32	Port Jackson, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.103	Port Jackson, Australia; Dendy Coll.
sp	,, ,,	1925.11.1.106	Tasmania; Dendy Coll.
sp	,, ,,	1925.11.1.689	Maria Island, Tasmania; Dendy Coll. (R.N. VI)
sp	,, ,,	1925.11.1.690	Maria Island, Tasmania; Dendy Coll. (R.N. V)
sp	,, ,,	1925.11.1.691	Maria Island; Tasmania; Dendy Coll. (R.N. II)
sp	,, ,,	1956.4.4.1	Port Jackson, Australia; 'Alert' Coll.
sl	*Leucandra saccharata*	1886.6.7.64–65	Port Jackson Australia; R. von Lendenfeld
sl	*Leucilla saccharata*	1924.2.6.91	J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1821	Port Phillip, Australia; Dendy Coll. (R.N. 47)
sl	,, ,,	1925.11.1.1822	Port Jackson, Australia; Dendy Coll. (R.N. 207)
sl	,, ,,	1925.11.1.1823	Port Phillip, Australia; Dendy Coll. (R.N. 209)

LEUCILLA UTER

sp & dry	**Leucilla uter (L)**	1884.4.22.21	'Challenger' Coll.
sp	,, ,, (C)	1884.4.22.30–31	'Challenger' Coll.
sl	,, ,,	1924.2.6.94–95	'Challenger' Coll. (B.M. 32)

LELAPIA ANTIQUA

sp	**Lelapia antiqua (H)**	1924.9.1.8	Abrolhos Island; Dendy Coll. (R.N. VII 1e)

LELAPIA AUSTRALIS

sp	*Lelapia australis*	1887.7.12.30	Port Phillip Heads, Australia; J. B. Wilson Coll.
sp	,, ,,	1887.7.12.31	South coast of Australia; J. B. Wilson Coll.
dry	,, ,,	1887.7.12.75, 81	Port Phillip, Australia; J. B. Wilson Coll.
sl	,, ,,	1925.11.1.1829	Port Phillip Heads, Australia; Dendy Coll.

KEBIRA UTEOIDES

sp	**Kebira uteoides (H)**	1912.2.1.13	Red Sea; Crossland Coll.
sp	,, ,,	1949.7.5.1	'Manihine' Akaba Coll.
sl	,, ,,	1954.2.24.8	Red Sea; Crossland Coll.

List of Literature

ALLEN, E. J., AND TODD, R. A. 1900. The fauna of the Salcombe Estuary. *J. Mar. biol. Ass. Plymouth* (*n.s.*). **6**: 151–217.

ANDREWS, W. 1868. On rare Irish Sponges. *Ann. Mag. nat. Hist.* (4) **1**: 307–308.

ARNDT, W. 1912. Zoologische Ergebnisse der ersten Lehr-Expedition. *J. Ges. vaterl. Cultur Breslau.* **90**: 110–136, 4 text-figs.

ARNDT, W. 1927. Kalk- und Kiesel-schwämme von Curaçao. *Bijdr. Dierk.* **25**: 133–158, 3 pls., 18 text-figs.

ARNDT, W. 1928. Porifera, Schwämme, Spongien. *Tierwelt Dtsch.* **4**: 1–94, 110 text-figs.

ARNDT, W. 1935. *Grimpe Die Tierwelt der Nord. u. Ostsee*, Leipzig, **Teil 3a** (Lfg. 27): 1–140, 239 figs.

ARNDT, W. 1940. Eine neuere Ausbeute von Meeresschwämmen der West- und Südküste Portugals. *Mem. Mus. zool. Univ. Coimbra* Ser. 1. No. **116**: 75 pp., 2 text-figs.

ARNESEN, E. 1901. *Calcarea* (*in*) *Meeresfauna von Bergen*: 65–72.

ARNESEN, E. 1901. Spongier fra den norske kyst. I. Calcarea. *Bergens Mus. Aarb.* (**5**) [1900]: 3–46, 1 pl.

BACCI, G. 1947. Richerche sulle zoocenosi bentoniche del Golfo di Napoli. *Pubbl. Staz. zool. Napoli* **20**: [Sponges p. 167].

BASSINDALE, R. 1940. Studies on the Biology of the Bristol Channel. The Invertebrate Fauna of the Southern Shores of the Bristol Channel and Severn Estuary. *Proc. Bristol Nat. Soc.* **9** (2): [Sponges: 145–146].

BASSINDALE, R. 1943. Studies on the Biology of the Bristol Channel. XI. The physical environment and intertidal fauna of the southern shores of the Bristol Channel and Severn Estuary. *J. Ecol. Lond.*, **31** (1): [Sponges: 25].

BELLAMY, J. C. 1839. *The Natural History of South Devon.* [Sponges: 268–269].

BIANCO, S. LO. 1888. Notizie biologiche riguardanti specialmente il periodo di maturità sessuale degli animali del golfo di Napoli. *Mitt. zool. Stat. Neapel*, **8**: 385–440.

BIANCO, S. LO. 1899. Notizie biologiche riguardante specialmente il periodo di maturità sessuale degli animali del golfo di Napoli. *Mitt. zool. Stat. Neapel*, **13**: 448–573.

BIANCO, S. LO. 1909. Notizie biologiche riguardanti specialmenti il periodo di maturità sessuale degli animali del golfo di Napoli. *Mitt. zool. Stat. Neapel*, **19**: 513-763.

BIDDER, G. P. 1888. Preliminary note on the physiology of Sponges. *Proc. Cambridge phil. Soc.*, **6** (4): 183.

BIDDER, G. P. 1891. Review of 'A Monograph of Victorian Sponges'. *Quart. J. micr. Sci.*, **32**: 625–632.

BIDDER, G. P. 1892. Note on excretion in Sponges. *Proc. roy. Soc. Lond.*, **51** (313): 474–484.

BIDDER, G. P. 1895. The collarcells of Heterocoela. *Quart. J. micr. Sci.*, **38**: 9–43.

BIDDER, G. P. 1898. The skeleton and classification of Calcareous Sponges. *Proc. roy. Soc. Lond.*, **64** (403): 61–76, 10 text-figs.

BIDDER, G. P. 1902. Notes of Plymouth Sponges. *J. Mar. biol. Ass. U.K.*, **6**: 376–383.

BIDDER, G. P. 1913. Amoebocytes in Calcareous Sponges. *Nature, Lond.*, **92** (2304): 479.

BIDDER, G. P. 1920. The fragrance of Calcinean sponges. *Proc. linn. Soc., Lond.*, **375**: 2–3.

BIDDER, G. P. 1920. Notes on the physiology of sponges. *J. linn. Soc. Lond. (Zool.)*, **34**: 315–326.

BIDDER, G. P. 1920. The fragrance of Calcinean sponges and the spermatozoa of *Guancha* and *Sycon*. *J. linn. Soc. Lond. (Zool.)*, **34**: 299–304.

BIDDER, G. P. 1923. The relation of the form of a Sponge to its currents. *Quart. J. micr. Sci.*, **67**: 293-323, 13 figs.

BLAINVILLE, H. DE. 1834–1837. *Manuel d'Actinologie et de Zoophytologie, Paris.*

BOWERBANK, J. S. 1845. Description of a new genus of Calcareous Sponges (*Dunstervillia*). *Ann. Mag. nat. Hist.*, (1) **15**: 297–500, 1 pl.

BOWERBANK, J. S. 1858. On the Anatomy and Physiology of the Spongiadae. I. *Philos. Trans. Lond.*, **148**: 279–332, 4 pls.

BOWERBANK, J. S. 1862. On the Anatomy and Physiology of the Spongiadae. *Philos. Trans. Lond.*, **152**: 747–836, 10 pls.

BOWERBANK, J. S. 1862. On the Anatomy and Physiology of the Spongiadae. III. On the Generic Characters, the Specific Characters, and the Method of Examination. *Philos. Trans. Lond.*, **152**: 1087–1135, 2 pls.

BOWERBANK, J. S. 1864. *A Monograph of the British Spongiadae, I:* 1–290, 37 pls.

BOWERBANK, J. S. 1866. *A Monograph of the British Spongiadae, II:* 1–398.

BOWERBANK, J. S. 1872. Contributions to a general history of the Spongiadae. *Proc. zool. Soc. Lond.:* 115–129, 196–202, 626–634.

BOWERBANK, J. S. 1874. Contributions to a general history of the Spongiadae. *Proc. zool. Soc. Lond.:* 298–305.

BOWERBANK, J. S. 1874. *A Monograph of the British Spongiadae, III:* XVII+367 pp., 92 pls.

BOWERBANK, J. S. 1875. Contributions to a general history of the Spongiadae. *Proc. zool. Soc. Lond.:* 3–25, 281–296, 319–333.

BOWERBANK, J. S. 1876. Contributions to a general history of the Spongiadae. *Proc. zool. Soc. Lond.:* 768–775.

BOWERBANK, J. S. 1882. *A Monograph of the British Spongiadae, IV:* xvii+250 pp., 17 pls.

BREITFUSS, L. 1896. Kalkschwämme der Bremer-Expedition nach Ost-Spitzbergen. *Zool. Anz.*, **19** (514): 426–432.

BREITFUSS, L. 1896. *Ascandra hermesi*, ein neuer homocoeler Kalkschwamm aus des Adria. *Z. wiss. Zool.*, **63** (1): 39–42.

BREITFUSS, L. 1896. *Amphoriscus semoni*, ein neue Art heterocoeler Kalkschwamm. *Zool. Anz.*, **19**: 435–436.

BREITFUSS, L. 1897. Catalog der Calcarea der zoologischen Sammlung des königlichen Museum für Naturkunde zu Berlin. *Arch. Naturgesch.*, **63** (1): 205–226.

BREITFUSS, L. 1898. *Amphoriscus semoni*, ein neuer heterocoeler Kalkschwamme. *Denkschrift, med. nat. Ges. Jena*, **8**: 381–384.

BREITFUSS, L. 1898. Kalkschwammfauna des weissen Meeres und der Eismeerküsten des europäischen Russlands. *Mem. Acad. Sci., St. Petersb.* (8), **6** (2).

BREITFUSS, L. 1898. Kalkschwammfauna der Westküste Portugals, *Zool. Jb.*, **11**: 89–102.

BREITFUSS, L. 1898. Die Kalkschwammfauna von Spitzbergen. Nach den Sammlungen der Bremer-Expedition nach Ost-Spitzbergen. *Zool. Jb.* **11**: 103–120.

BREITFUSS, L. 1898. Die Kalkschwämme der Sammlung Plate. (Fauna Chilensis, 1). *Zool. Jb., Suppl.* **H. 4**: 455–470, pl. 27.

BREITFUSS, L. 1898 Die arktische Kalkschwammfauna. *Inaug. Diss. Berlin:* 1–40.

BREITFUSS, L. 1912. Zur Kenntnis der Spongio-Fauna des Kola-Fjords. *Trudui Soc. nat. St. Petersb. Sect. zool.* **41**: 223–226, pls. i–ii.

BREITFUSS, L. 1927. Die Kalkschwammfauna der Nord- und Ostsee. *Zool. Anz.* **70**: 26–36.

BREITFUSS, L. 1929. Zur Kalkschwämmfauna des Meerbusens von Biskaya. *Zool. Anz.* **83**: 261–265, 5 figs.

BREITFUSS, L. 1932. Die Kalkschwämmfauna des arktischen Gebietes. *Fauna Arct., Jena,* **6**: 235–252.

BREITFUSS, L. 1935. La Spugne calcares dell'Adriatico con riflesso a tutto il Mediterraneo. *R. Com. talassogr. Ital.*, **223**: 1–45, 1 map.

BREITFUSS, L. 1936. Kalkschwämme vom Skagerrak und Kattegat, unter Beruckischtigung ihrer Weltverbreitung. *Göteborgs VetenskSamh. Handl.* (5) (B) **4** (15): 1–16.

BREITFUSS, L. 1938. Zur Kenntnis der Kalkschwammfauna Jugoslawiens. *God. oceanogr. Inst Kralj Jugoslavije*, **1**: 178–180.

BREITFUSS, L. 1939. Zur Kenntnis der Kalkschwammfauna Jugoslawiens, mit einer Bemerkung über Tetraxonia und Cornacucpongida aus der Umgebung von Split. *SpitzBer. Ges. naturf. fr. Berl.*, (**4–7**): 182–185.

BROCH, H. 1927. Untersuchungen über die Marine Bodenfauna bei Lindesness im Juni 1926. *Medd. Zool. Mus. Oslo*, **10**: 5.

BRØNDSTED, H. V. 1914. Catalogue of the Porifera of Greenland. *Medd. Gronl. Kjöbenhn.*, **23** (2): 457–544.

BRØNDSTED, H. V. 1916. Report on the Porifera collected by the Danmark Expedition at North-East Greenland. *Danmarks-Expd. til Gronl. Nord.*, 1906–8, **3** (17): 475–483.

BRØNDSTED, H. V. 1921. Report on the Porifera collected by the Denmark Expedition at North-East Greenland. *Medd. Grönl. Kobenhavn*, **43** (1919): 473–484.

BRØNDSTED, H. V. 1923. Sponges from the Auckland and Campbell Islands. *Vidensk. Medd. Dansk. naturh. Foren.*, **75**: 117–167, 36 text-figs.

BRØNDSTED, H. V. 1926. Sponges from New Zealand. Part II. *Vidensk. Medd. nat. for. Kobhvn.*, **81**: 295–331, 13 figs.

BRØNDSTED, H. V. 1931. Die Kalkschämme. *Dtsch. Sudpolar-Expedn.* 1901–3, **20**: 1–47, 36 figs.

BRØNDSTED, H. V. 1933. The Godthaab Expedition 1928: Porifera. *Medd. Grönl.*, **79** (5): 1–25, 8 figs.

BRØNDSTED, H. V. 1934. Résultats scientifiques du voyage aux Indes Orientales néerlandaises de Ll.AA.RR. le Prince et la Princess Léopold de Belgique. *Mém. Mus. Hist. nat. Belg.*, Hors Serie **2** (15): 3–27, 26 figs.

BRUCE, J. R. 1938. Faunistic Notes and Records. *Rep. mar. biol. Sta. Pt. Erin*, **51**: 18–32.

BURTON, M. 1926. Report on the sponges (in) zoological results of the Suez Canal Expedition. *Trans. zool. Soc. Lond.*, **22**: 71–83, figs.

BURTON, M. 1929. Porifera. II. Antarctic Sponges. *Brit. Antarctic Expedn.* 1910 *nat. Hist. Rep. Zool.*, **6** (4): 393–458, 5 pls., 9 figs.

BURTON, M. 1930. The Porifera of the Siboga Expedition III. Calcarea. *Siboga-Exped. Leiden*, **6a**: 1-7, 8 figs.

BURTON, M. 1930. Additions to the sponge fauna at Plymouth. *J. Mar. biol. Ass. Plym.*, **16**: 489–507, 9 figs.

BURTON, M. 1930. Norwegian sponges from the Norman Collection. *Proc. zool. Soc. Lond.*: 487–545 2 pls., 8 figs.

BURTON, M. 1930. Additions to the sponge fauna of the Gulf of Manaar. *Ann. Mag. nat. Hist.*, **5**: 665–676, 3 figs.

BURTON, M. 1930. Report on a collection of sponges from South Georgia and from Campbell Island, South Pacific obtained by Dr. Kohl-Larsen. *Senckenbergiana Frankf.*, **12**: 331–335, 1 fig.

BURTON, M. 1932. *Sponges* (*in*) *Discovery Reports Cambridge*, **6**: 327–392, 20 pls., 56 figs.

BURTON, M. 1933. Report on a small collection of sponges from Still Bay, S. Africa. *Ann. Mag. nat. Hist.*, **12**: 235–244, 5 figs.

BURTON, M. 1934. Zoological results of the Norwegian Scientific Expeditions to East-Greenland. III. Report on the sponges of the Norwegian Expeditions to East-Greenland (1930, 1931 and 1932). *Skr. Svalbard Ishavet Oslo*, **61**: 3–33, 1 map, 4 figs.

BURTON, M. 1934. *Further Zool. Res. Swedish Antarctic Exped.* 1901–03. *Stockholm*, **3** (2): 1–58, 8 pls. 16 text-figs.

BURTON, M. 1934. *Sponges. Gt. Barrier Reef. Exped.* 1928–29, **4** (14): 513–621, 2 pls. 33 figs.

BURTON, M. 1935. Notes on British Sponges, with a description of a new genus and species. *Ann. Mag. nat. Hist.*, **15**: 651–653.

BURTON, M. 1935. Some sponges from the Okhotsk Sea and the Sea of Japan. *Explor. Mers. U.R.S.S.*, **22**: 61–79, 6 figs.

BURTON, M. 1936. Sponges (in) The Fishery Grounds near Alexandria. *Notes Mem. Fisheries Res. Cairo*, **17**: 1-28, 16 figs.

BURTON, M. 1947. The significance of size in sponges. *Ann. Mag. nat. Hist.* (11) **14**: 216–220.

BURTON, M. 1947. Fragmentation in sponges. *Challenger Soc. Lond.*, **2** (19): 17.

BURTON, M. 1951. The Marine Fauna. Part II. Report on the Sponges (in) MacDonald, R., and McMillan, N. F. *The nat. Hist. of Lough Foyle, North. Ireland. Proc. r. Irish Acad.*, **54** (B.5).

BURTON, M. 1952. The 'Manihine' expedition to the Gulf of Aqaba 1948–1949—Sponges. *Bull. Brit. Mus. (Nat. Hist.) Zool.*, **1**: 163–174.

BURTON, M., AND SRINIVASA RAO, H. 1932. Report on the shallow-water marine sponges in the collection of the Indian Museum. *Rec. Ind. Mus. Calcutta*, **34**: 299–356, 1 pl. 16 figs.

CARTER, H. J. 1871. On two undescribed sponges and two Esperidae from the West Indies; also on the nomenclature of the calcisponge *Clathrina*, Gray. *Ann. Mag. nat. Hist.* (4) **7**: 268–283.

CARTER, H. J. 1871. A description of two new Calcispongiae (*Trichogypsia, Leuconia*). *Ann. Mag. nat. Hist.* (4) **8**: 1–28.

CARTER, H. J. 1872. Proposed name for the Sponge-animal, viz. 'Spongozoon'. *Ann. Mag. nat. Hist.* (4) **10**: 45–51.

CARTER, H. J. 1877. Arctic and Antarctic Sponges. *Ann. Mag. nat. Hist.* (4) **20**: 38–42.

CARTER, H. J. 1878. On Teichonia, a new family of Calcareous Sponges with descriptions of two species. *Ann. Mag. nat. Hist.* (5) **2**: 35–40.

CARTER, H. J. 1883. Further observations on the so-called 'Farringdon Sponges' (Calcispongiae, Zittell), followed by a description of an existing species of a like kind (*Leucetta clathrata*, new sp.). *Ann. Mag. nat. Hist.* (5) **11**: 20–37.

CARTER, H. J. 1885–6. Descriptions of Sponges from the neighbourhood of Port Phillip Heads, S. Australia. *Ann. Mag. nat. Hist.* (5) **17**: 431–441, 502–516; (5) **18**: 34–55, 126–149.

CARTER, H. J. 1886. Description of a new species (*Aphrocerus ramosa*). *Proc. Lit. phil. Soc., L'pool.* **40**: Appendix, 92–94.

CHIAJE, S. DELLE. 1928. *Memoria sulla Storia a Notomia degli Animali sensa Vertebre del Regno del Napoli. Napoli.*

COTTE, J. 1903. Contribution à l'étude de la nutrition chez les Spongiaires. *Bull. sci. France Belg.*, **38**: 420–573.

CRAWSHAY, L. R. 1912. On the fauna of the outer western area of the English Channel. *J. Mar. Biol Ass.*, **9**: 202–393.

CRIVELLI, G. B. 1864. *Notizie naturali a chimico-agnonomiche sulla Provincia di Pavia. Pavia.*

CUTCLIFFE, A. S. 1946. Some marine sponges of the Ilfracombe district. Fauna, Flora Ilfracombe District, Exeter: 175.

DENDY, A. 1891. A Monograph of the Victorian Sponges. I. The organisation and classification of the Calcarea Homocoela, with descriptions of the Victorian species. *Trans. roy. Soc. Victoria*, **3** (1): 1–82, pls. i–ix.

DENDY, A. 1891. Studies on the comparative anatomy of Sponges. III. On the anatomy of *Grantia labyrinthica*, and the so-called family Teichonidae. *Quart. J. micr. Sci.* (*n.s.*) **32**: 1–39.

DENDY, A. 1892. The Discovery of the true Nature of the so-called family Teichonidae. *Zool. Anz.*, **15**: 245–246.

DENDY, A. 1892. Preliminary account of *Synute pulchella*, a new genus and species of Calcareous Sponges. *Proc. roy. Soc. Victoria* (*n.s.*), **4**: 1–6.

DENDY, A. 1892. Synopsis of the Australian Calcarea Heterocoela, with proposed classification of the group, and descriptions of some new genera and species. *Proc. roy. Soc. Victoria* (*n.s.*), **5**: 69–116.

DENDY, A. 1892. On a new species of *Leucosolenia* from Port Phillip Heads. *Proc. roy. Soc. Victoria* (*n.s.*), **5**: 178–180.

DENDY, A. 1893. Note on the History of the so-called family Teichonidae. *Zool. Anz.*, **16**: 43–44. (Also *Ann. Mag. nat. Hist.* (6) **11**: 50–52).

DENDY, A. 1893. Studies on the comparative anatomy of Sponges. V. Observations on the structure and classification of the Calcarea Heterocoela. *Quart. J. Micr. Sci.*, (*n.s.*) **35**: 159–257.

DENDY, A. 1893. Studies on the comparative anatomy of Sponges. VI. On the anatomy and relationships of *Lelapia australis*. *Quart. J. micr. Sci.* (*n.s.*) **36**: 127–142.

DENDY, A. 1905. Report on the Sponges collected by Professor Herdman at Ceylon in 1902. *Rep. on the Pearl Oyster Fisheries of the Gulf of Manaar*, **3**: 59–246, pls. i–xvi.

DENDY, A. 1913. Amoebocytes in Calcareous Sponges. *Nature, Lond.*, **92** (2301): 399; (2304): 479.

DENDY, A. 1913. Report on the Calcareous Sponges collected by H.M.S. *Sealark* in the Indian Ocean. *Trans. Linn. Soc. Lond., Zool.*, **16**: 1-29, 5 pls.

DENDY, A. 1914. On the occurrence of *Aphroceras* (Leucandra) *cliarensis* Stephens near Plymouth. *J. mar. Biol. Ass.*, **10**: 258–259.

DENDY, A. 1914. Observations on the Gametogenesis of *Grantia compressa*. *Quart. J. micr. Sci., Lond.* (n.s.) **60**: 313–376.

DENDY, A. 1915. Report on the Calcareous Sponges collected by Mr. James Hornell at Okhamandal in Kattiawar, 1905–6. *Rep. Govt. Baroda mar. Zool.*, **2**: 79–91, pls. i–ii.

DENDY, A. 1918. *Calcareous Sponges. Australasian Antarctic Expedition* 1911–14. *Reps. Ser. C.* **6** (1): 17 pp. 1 pl.

DENDY, A. 1924. *Porifera. I. Non-Antarctic Sponges. Brit. Antarctic* (*'Terra Nova'*) *Exped.* 1910, *Zool.*, **6** (3): 269–392, 15 pls.

DENDY, A. 1926. On the origin, growth and arrangement of sponge-spicules. A study in symbiosis. *Quart. J. micros. Sci.*, **70** (1): 1–74, pls. i–iii, 16 text-figs.

DENDY, A., AND FREDERICK, L. M. 1924. On a collection of sponges from the Abrolhos Islands, Western Australia. *J. Linn. Soc., Lond., Zool.*, **35**: 477–519, 2 pls.

DENDY, A., AND NICHOLSON, J. W. 1917. On the influence of vibrations upon the form of certain sponge-spicules. *Proc. roy. Soc.*, **B. 89**: 573–587.

DENDY, A., AND ROW, R. W. H. 1913. The classification and phylogeny of the Calcareous Sponges. *Proc. zool. Soc. Lond.*: 704–813, 1 fig.

DERJUGIN, K. 1911. Zur Kenntnis der Fauna des Kola-Fjords. *Trav. Soc. nat. St. Petersb.*, **42**: 58–62, 99–100.

DERJUGIN, K. M. 1915. La faune du golfe de Kola et les conditions de son existence. *Mém. Ac. sci. Petrograd* (*ser.* 8) **34** (1): 1–929.

DERJUGIN, K. M. 1924. Das Barentsmeer, den Kolameridian entland (33030, E.). *Arb. nord. Exped.*, **19**: 63–77.

DICKINSON, M. G. 1945. Sponges of the Gulf of California. *Allan Hancock Pac. Exped.* 1932–40, *Los Angeles*, **11** (1): 1–55, 97 pls.

DÖDERLEIN, L. 1892. Description of *Petrostroma schulzei*, n.g. et sp of Calcarea, representing a new order Lithones. *Verhandl; deutsch. zool. Ges.*, **2**: 143–145.

DÖDERLEIN, L. 1897. Ueber die Lithonina, eine neue Gruppe von Kalkschwämmen. *Zool. JB. Syst.-Abth.*, **10**: 15–32, pls. 2–6.

DUCHASSAING, P., ET MICHELOTTI, G. 1864. *Spongiaires de la Mer Caraïbe. Mats. nat. Verhandl. Haarlem.*, **21**.

DUERDEN, J. E. 1894. Notes on the Marine invertebrates of Rush, County Dublin. *Irish Nat.*, **3** (11): 230–233.

DUNCAN, P. 1880. On a parasitic Sponge of the Order Calcarea (*Mobiusispongia parasitica*). *J. roy. Micr. Soc.*, **3**: 377–393.

DRIVER, E. G. 1942. *Name that animal. A guide to the identification of the common land and fresh-water animals of the U.S.A.:* (*Sponges:* 51–55).

DUBOSCQ, O., AND TUZET, O. 1932. Sur la fécondation de *Sycon ciliatum* Lieberkühn. *C.R. Soc. biol. Paris*, **109**: 829–833, 2 figs.

DUBOSCQ, O., AND TUZET, O. 1933. Sur l'ovogénèse et la fécondation des éponges calcaires: *Grantia compressa pennigera* Haeckel et *Sycon ciliatum* Lieberkühn. *Arch. Zool. exp. gén. Paris, Notes & Rev.*, **73**: 45–56, 5 figs.

DUBOSCQ, O., AND TUZET, O. 1933. Quelques structures des amphiblastules d'Éponges calcaires. *C.R. Acad. sci. Paris*, **197**: 561–563, 2 figs.

DUBOSCQ, O., AND TUZET, O. 1934. Sur le parabasal ou corps de golgi des éponges calcaires. *Arch. Zool. exp. gén. Paris, Notes et Rev.*, **76**: 78–89, 8 figs.

DUBOSCQ. O., AND TUZET, O. 1935. Sur l'accroissement des ovocytes de *Sycon raphanus* O.S.: la signification des "Dolly-Cells." *Arch. Zool. exp. gén. Paris, Notes et Revue*, **77**: 71–78, 4 figs.

DUBOSCQ, O., AND TUZET, O. 1935. Un nouveau stade du développement des éponges calcaires. *C. R. Acad. Sci. Paris*, **200** (21): 1788–1790, 4 figs.

DUBOSCQ, O., AND TUZET, O. 1936. Sur quelques points de l'ovogénèse et du developpement des éponges calcaires. *Int. Congr. Zool.*, **12** Lisboa: 547–553, 1 fig.

DUBOSCQ, O., AND TUZET, O. 1937. Fusome et cellules en croix des Eponges calcaires. *C. R. Acad. Sci. Paris*, **204** (25): 1888–1891, 2 figs.

DUBOSCQ, O., AND TUZET, O. 1937. L'ovogénèse, le fécondation et les premiers stades du développement des éponges calcaires. *Arch. Zool. exp. gen. Paris*, **79**: 157–316, 14 pls. 41 figs.

DUBOSCQ, O., AND TUZET, O. 1938. La collerette des choanocytes chez les Eponges calcaires hétérocoeles. *C. R. Soc. biol. Paris*, **129** (26): 296–298, 3 figs.

DUBOSCQ, O., AND TUZET, O. 1939. L'Origine et l'évolution des cellules en croix des éponges calcaires. *Trav. Sta. zool. Wimereux*, **13**: 267–278, figs. and plate.

DUBOSCQ, O., AND TUZET, O. 1939. Les diverses formes des choanocytes des Eponges Calcaires Heterococles et leur signification. *Arch. Zool. exp. gén. Paris*, **80**: 353–358, 2 pls. 4 figs.

DUBOSCQ, O., AND TUZET, O. 1941. Sur les cellules en croix des *Sycon* (*Sycon ciliatum* Fabr., *Sycon coronatum* Ellis et Sol., *Sycon elegans* Bower.) et leur signification. *Arch. Zool. exp. gén. Paris, Notes et Rev.*, **81**: 151–163, 7 text-figs.

DUBOSCQ, O., AND TUZET, O. 1944. L'ovogénèse, la fécondation et les premiers stades du developpement du *Sycon elegans* Bower. *Arch. Zool. exp. gen. Paris*, **83**: 445–459, pls. *xxiv–xxv*, 3 text-figs.

EBNER, V. VON. 1887. *Amphoriscus bucčichii*, n.sp. *Zool. Jb.*, **2**: 981–982.

EBNER, E. VON. 1887. Uber den feineren Bau der Skelettheile der Kalkschwämme nebst Bemerkungen über Kalkskelete überhaupt. *Sitz. Ber. K. Akad. Wiss.* (1) **95**: 1–95, pls. i–iv.

ELLIS, J., AND SOLANDER, D. 1786. *Natural History of many curious and uncommon Zoophytes collected from various parts of the Globe. London.*

FABRICIUS, O. 1780. *Fauna Groenlandica. Hafnae et Lipsiae.*

FELL, H. B. 1950. The Kirk collection of Sponges (Porifera) in the zoology museum, Victoria University College. *Zool. Publ. Vict. Univ. Coll., N.Z.*, **4**: 1–12, 2 figs.

FERRER HERNANDEZ, F. 1912. Notas sobre algunos esponjas de Santander. *Bol. Soc. espan. Hist. nat.*, **12**: 573–589, 6 figs.

FERRER HERNANDEZ, F. 1914. Esponjas del Cantabrico. Parte Primera. I. Calcarea. II. Euceratosa. *Trab. Mus. Nac. Cienc. nat. Madrid, Zool.*, **14**: 1–36.

FERRER HERNANDEZ, F. 1916. Fauna del Mediterráneo occidental. Esponjas espanolas. *Trab. Mus. Nac. Cienc. nat. Ser. Zool.* (**27**): 1–52, 10 figs.

FERRER HERNANDEZ, F. 1918. Esponjas del litoral de Asturias. *Trab. Mus. nat. Ci. Madrid* (*Zool.*), **36**: 1–39, 6 figs.

FERRER HERNANDEZ, F. 1919. Descripción de tres esponjas nuevas del litoral espanol. *Rev. real Acad. Ci. Madrid*, **16**: 532–539, 1 pl.

FERRER HERNANDEZ, F. 1922. Más datos para el conocimiento de las esponjas de las costas espanolas. *Bol. Pesc. Madrid:* 247–272, 2 pls., 9 text-figs.

FERRER HERNANDEZ, F. 1923. Esponjas recogidassen la compana preliminar del 'Giralda'. *Bol. Pesc. Madrid*, **6** (1921): 161–177, pls., i–iv.

FERRER HERNANDEZ, F. 1923. Mas datos para el conocimiento de las eponjas de las costas espanolas. *Bol. Pesc. Madrid*, **7** (1922): 247–272, 2 pls.

FERRER HERNANDEZ, F. 1933. Sobre algunas esponjas de Marin (Galicia). *Bol. Soc. esp. Hist. nat.*, **33** (9): 347–358, 4 pls. 4 figs.

FORREST, J. E., WATERSTON, A. R., AND WATSON, E. V. 1936. The natural history of Barra, Outer Hebrides. *Proc. phys. Soc. Edinb.*, **22** (5): 262–263.

FLEMING, J. 1828. *A History of British Animals. Edinburgh.*

FRISTEDT, K. 1887. Sponges from the Atlantic and Arctic Oceans, and the Behring Sea. '*Vega*' *Expd. Vetensk. Iakttag.*, **4**: 401–471.

FYFE, W. W. 1861. Sponge-hunting in Holy Island and Berwick Bays. *Recreative Sci.*, **2**: 4–8.

GATENBY, J. B. 1920. Further notes on the oogenesis and fertilisation of *Grantia compressa. J. R. micr. Soc. Lond.*: 277–282.

GATENBY, J. B. 1920. The germ-cells, fertilization and early development of *Grantia* (*Sycon*) *compressa. J. Linn. Soc. Lond.* (*Zool.*) **34**: 261–297, pls. xix–xxiii.

GATENBY, J. B. 1927. Further notes on the gametogenesis and fertilization of sponges. *Quart. J. micr. Sci. Lond.*, **71** (2): 173–188, pls.

GIBSON, R. J. 1885. On a new species of *Sycandra* (*aspera*). *First Rep. on the Fauna of L'pool Bay:* 365–367.

GILSON, H. C., HOLLICK, F. S. J., AND PANTIN, C. F. A. 1944. Additions to the marine fauna of the Scolt Head Region. *Ann. Mag. nat. Hist.* (11) **11**: (Sponges, 234).

GISLÉN, TH. 1930. Epibioses of the Gullmar Fjord. II. *Kristineberg. Zool. Station.* 1877–1927. *Uppsala:* 131–351.

GRANT, R. E. 1825. Observations and experiments on the structure and functions of the Sponge. *Philos. J. Edinb.*, **13**: 94–107, 333–346.

GRANT, R. E. 1825. Observations and experiments on the structure and functions of the Sponge. *Philos. J. Edin.*, **14**: 113–124, 336–341.

GRANT, R. E. 1826. Remarks on the structure of some Calcareous Sponges. *Edin. New Philos. J.* **1**: 166–170.

GRANT, R. E. 1841. *Outlines of comparative anatomy, London:* 1–656.

GRANT, R. E. 1861. *Tabular view of the primary divisions of the animal kingdom, London.*

GRAY, S. F. 1821. *A natural arrangement of British plants, London.*

GRAY, J. E. 1858. Description of *Aphroceras*, a new genus of Calcareous Spongidae from Hongkong. *Proc. zool. Soc., Lond.:* 113–114.

GRAY, J. E. 1867. Notes on the arrangement of Sponges, with descriptions of some new genera. *Proc. zool. Soc., Lond.:* 492–558.

GUILER, E. R. 1950. Notes on Tasmanian marine sponges. *Rec. Queen Victoria Mus., Launceston*, **3** (2): 5–14.

HADZL, J. (1917). Rezultati bioloskih istrazivanja Tadranskoga mora. Porifèra. Calcarea I. *Clathrina blanca* (Mikloucho-Maclay); grada i razvoj s osobitim obzirom na opéa pitanja o spuzvama. *Prirod. Istraz. mat.-piv. Razved No.* **9-10**: 1–168, 1 pl., 38 figs.

HAECKEL, E. 1870. Prodromus eines Systems der Kalkschwämme. *Jenaische Z.*, **5**: 236–254.

HAECKEL, E. 1872. *Die Kalkschwämme, eine Monographie, Berlin.*

HAMMER, E. 1908. Neue Beiträge zue Kenntnis der Histologie und Entwicklung von *Sycon raphanus Archiv. für Biontol.*, **11**: 289–334.

HANITSCH, R. 1889. Second Report on the Porifera of the L.M.B.C. District. *Proc. L'pool. biol. Soc.*, **3**: 155–173, pls. v–vii.

HANITSCH, R. 1890. Third report on the Porifera of the L.M.B.C. District. *Proc. L'pool. biol. Soc.*, **4**: 192–238.

HANITSCH, R. 1894. *Amphiute*, eine neue Gattung heterocoeler Kalkschwämme. *Zool. Anz.*, **17**: 433.

HANITSCH, R. 1895. Notes on a collection of Sponges from the West Coast of Portugal. *Trans. L'pool. biol. Soc.*, **9**: 205–219.

HARA, J. 1894. On a new species of Calcareous sponge, *Lelapia nipponica*. *Zool. Mag. Tokyo*, **6**: 369–370, pl. viii.

HASSAL, A. H. 1840. Catalogue of Irish Zoophytes. *Ann. Mag. nat. Hist.*, **6**: 166–175.

HENTSCHEL, E. 1918. Zoologische Ergebenisse der schwedischen Expedition nach Spitzbergen 1908. II: 3. Die Spongien des Eisfjords. *Vet.-Ak. Handl. Stockh.*, **54** (3) 1–18.

HERAK, M. 1943. Zur Kenntnis triadischer Kalkschwämme (Sycones). *N. Jb. Min. Geol. Palaont. Stuttgart*, **88** (1): 107–135, 2 pls. 5 figs.

HIGGIN, T. 1886. Porifera of the L.M.B.C. District. First Rep. upon the Fauna of L'pool Bay. *L'pool. Mar. Biol. Comm. Reps.* (**1**): 72–94.

HINDE, G. J. 1900. On some remarkable Calcisponges from the Eocene Strata of Victoria (Australia). *Quart. J. geol. Soc.*, **56**: 50–66.

HOLT, E. W. L. 1892. Survey of Fishing Grounds, West Coast of Ireland, 1890–91. *Sci. Proc. roy. Dublin Soc.*, **7** (4): p. 225.

HÔZAWA, S. 1916. On some Japanese calcareous sponges belonging to the family Heteropiidae. *J. Coll. Sci. Tokyo*, **38** (5): 1–41.

HÔZAWA, S. 1919. Report on the calcareous sponges collected during 1906 by the United States Fisheries Steamer 'Albatross' in the Northwestern Pacific. *Proc. U.S. nat. Mus., Washington*, **54**: 525–556, pls. lxxxiv–lxxxv.

HÔZAWA, S. 1923. On a new genus of calcareous Sponge. *Annot. zool. japon. Tokyo*, **10** (18): 183–190, 1 pl.

HÔZAWA, S. 1928. Report of the biological survey of Mutsu Bay. 6. Calcarea of Mutsu Bay. *Sci. Rep. Tôhoku Univ.*, **3**: 219–221, 1 pl.

HÔZAWA, S. 1929. Studies on the calcareous sponges of Japan. *J. Fac. Sci. Univ. Tokyo Zool.*, **1**: 277–389, 12 pls., 35 figs.

HÔZAWA, S. 1933. Report on the calcareous sponges obtained by the survey of the Continental Shelf bordering on Japan. *Sci. Rep. Tohoku Univ.*, **8** (1): 1–20, 1 pl., 4 figs.

HÔZAWA, S. 1937. Report on the Calcareous Sponges collected by the zoological Museum at Hamburg. *Botany & Zool. Tokyo*, **5** (1): 12–14, 4 figs.

HÔZAWA, S. 1940. On some Calcareous sponges from Japan. *Sci. Rep. Tohôku Univ.* (4) **14** (1): 29–58, 2 pls., 9 text-figs.

HÔZAWA, S. 1940. Report on the calcareous sponges obtained by the Zoological Institute and Museum of Hamburg. *Sci. Rep. Tohoku Univ.* (4) *Biol.*, **15** (2): 131–163, 2 pls., 1 text-fig.

HÔZAWA, S., AND TANITA, S. 1941. The fauna of Akkeshi Bay. XII. Calcarea. *Journ. Fac. Sci. Hokkaido Imp. Univ. Zool.*, **7** (4): 421–429.

HUXLEY, J. S. 1921. Further studies on restitution-bodies and free tissue-culture in *Sycon*. *Quart. J. micr. Sci. Lond.*, **65**: 293–322.

HYMAN, L. H. 1925. Respiratory differences along the axis of the sponge *Grantia*. *Biol. Bull. Wood's Hole*, **48**: 379–389.

JAMES-CLARK, H. 1869. On the Spongiae Ciliatae as Infusoria Flagellata; or, observations on the structure, animality, and relationships of *Leocosolenia botryoides* Bbk. *Mem. Boston Soc. nat. Hist.*, **1**: 305–340.

JENKIN, C. F. 1908. The Calcareous Sponges (in) The Marine Fauna of Zanzibar and British East Africa, from collections made by Cyril Crossland, M.A., in the years 1901 and 1902. *Proc. zool. Soc., Lond.*: 434–456, text-figs. 81–104.

JENKIN, C. F. 1908. The Calcarea of the National Antarctic Expedition. *Nat. History Reps.*, **4**: 182–311, pls. xxvii–xxxviii.

JEPPS, M. W. 1947. Contribution to the study of the sponges. *Proc. roy. Soc. Lond.*, **134B** (876): 408–417, 5 figs.

JOHNSTON, G. 1842. *A history of British Sponges and Lithophytes. Edinburgh.*

JORGENSEN, O. M. 1917. Reproduction in *Grantia compressa*. *Rep. Dove mar. Lab. Newcastle*, **6** (1916–17): 26–32, 1 pl.

JORGENSEN, O. M. 1918. Note on the larvae of *Grantia compressa*. *Rep. Dove mar. Lab. Cullercoats*, **7**: 60–61.

KIRK, H. B. 1893. Contribution to a knowledge of the New Zealand sponges. *Trans. New Zealand Inst.*, **26**: 175–179, pl. xxii.

KIRK, H. B. 1894. Further contribution to a knowledge of the New Zealand sponges. *Trans. New Zealand Inst.*, **27**: 287–392.

KIRK, H. B. 1895. New Zealand Sponges. Third paper. *Trans. New Zealand Inst.*, **28**: 205–210.

KIRK, H. B. 1897. Notes on New Zealand sponges. Fourth paper. *Trans. New Zealand Inst.*, **30**: 313–316.

KIRK, H. B. 1909. Two sponges from Campbell Island. (in) *Sub-antarctic Islands of New Zealand*, **1909**: 539–541.

KIRKPATRICK, R. 1900. Description of sponges from Funatuti. *Ann. Mag. nat. Hist.* (7) **6**: 345–362.

KIRKPATRICK, R. 1908. On two new genera of recent Pharetronid Sponges. *Ann. Mag. nat. Hist.* (8) **2**: 503–514.

KIRKPATRICK, R. 1910. On a remarkable Pharetronid Sponge from Christmas Island. *Proc. roy. Soc., Lond.*, **83**: 124–133.

KIRKPATRICK, R. 1911A. On a new Lithonine Sponge from Christmas Island. *Ann. Mag. nat. Hist.* (8) **8**: 177–179.

KIRKPATRICK, R. 1911B. On *Merlia normani*, a sponge with a siliceous and calcareous skeleton. *Quart. J. micr. Sci.* (*n.s.*) **56**: 657–702.

KIRKPATRICK, R. 1912. Note on *Astrosclera willwyana*, Lister. *Proc. roy. Soc., Lond.*, **64B**: 579–580.

KITCHING, J. A. 1935. An introduction to the ecology of intertidal rock surfaces on the coast of Argyll. *Trans. roy. Soc. Edinb.*, **58** (2): 361.

KNIPOWITSCH, N. 1893. Etude sur la répartition verticale des animaux le long du littoral des îles Solovetsky et sur le but vers lequel doivent se diriger tout d'abord les recharches sur la faune de la Mer Blanche. *Congr. Zool. 2 me partie, Moscou*: 58–72.

KOEHLER, R. 1886. Contributions to the study of the littoral fauna of the Anglo-Norman Islands. *Ann. Mag. nat. Hist.* (5) **18**: 229–243, 290–307, 351–367.

KOEHLER, R. 1886. Sur la faune littorale des îles Anglo-Normandes. *Ann. Sci. nat.* (6) **20**: 1–62.

KÖLLIKER, A. VON. 1864. *Icones Histologicae, oder Atlas der Vergleichenden Gewebelehre. I. Der feineren Bau der Protozoen. Leipzig.*

KUMAR, A. 1924. A new variety of *Leucosolenia gardeneri* (Dendy) *Leucosolenia gardeneri* var. *vergensis*. *Proc. Lahore philos. Soc.*, **3** 1924: 21–22.

KUMAR, A. 1926. Porifera from Karachi. *Proc. Lahore philos. Soc.*, **3**: 67–68.

LACKSCHEWITSCH, P. 1886. Ueber die Kalkschwämme Menorcas. *Zool. Jb.*, **1**: 297–310.

LAMBE, L. M. 1893. Sponges from the Pacific Coast of Canada. *Trans. roy. Soc. Canada:* 25–43.

LAMBE, L. M. 1896. Sponges from the Atlantic Coast of Canada. *Trans. roy.* Soc., *Canada* (2) **2**: 181–211, pls. i-iii.

LAMBE, L. M. 1900. Description of a new species of Calcareous Sponge from Vancouver Island, B.C. *Ottawa Naturalist,* **13** (11): 261–263.

LAMBE, L. M. 1900. Catalogue of the recent marine Sponges of Canada and Alaska. *Ottawa Nat.,* **14** (9): 153–172.

LAMBE, L. M. 1900. Sponges from the coasts of North-eastern Canada and Greenland. *Trans. roy. Soc., Canada* (ser. 2) **6** (4): 19–48, pls. i-vi.

LAMEERE, A. 1895. *Manuel de la faune de Belgique. I. Animaux non Insectes. Brussels:* 4–6.

LENDENFELD, R. VON. 1885. The Homocoela of Australia and the new Family Homodermidae. *Proc. linn. Soc. N.S.W.,* **4**: 896–907.

LENDENFELD, R. VON. 1885. A monograph of the Australian Sponges. III. The Calcispongiae. *Proc. linn. Soc., N.S.W.,* **4**: 1083–1150, pls. lix–lxvii.

LENDENFELD, R. VON. 1891. Die Spongien der Adria. I. Die Kalkschwämme. *Z. wiss. Zool.,* **53** (2): 185–321, and (3): 361–463.

LESLIE, G., AND HERDMAN, W. A. 1881. The Invertebrate Fauna of the Firth of Forth. III. *Proc. phys. Soc. Edinb.,* **6**: 268–315.

LÉVI, C. 1950. Remarques sur la faune des Spongiaires de Roscoff. *Arch. Zool. exp. gén. Paris, Notes et Revue,* **97**: 10–21.

LÉVI, C. 1950. Inventaire de la faune marine de Roscoff. *Trav. Sta. biol. Roscoff Paris Suppl.,* **2**: 1–28.

LIEBERKÜHN, N. 1859. Neue Beiträge zur Anatomie der Spongien. *Müller's Arch.:* 353–383, 515-530.

LILLY, S. J., SLOANE, J. F., BASSINGDALE, R., EBLING, F. J., AND KITCHING, J. A. 1953. The ecology of the Loch Ine rapids with special reference to water currents. IV. The sedentary fauna of sublittoral bolders. *J. Anim. Ecol.,* **22**: 87–122, 25 figs. (Sponges, p. 91).

LINNAEUS, C. VON. 1758–1759. *Systema Naturae (10th Edn.). Holmiae.*

LISTER, J. J. 1900. *Astrosclera willeyana,* the type of a new Family of Sponges. *A. Willey's Zool. Res.,* **4**: 459–482, pls. xlv–xlviii.

LUNDBECK, W. 1909. The Porifera of East Greenland. *Medd. Grönland,* **24**: 423–464, 1 pl.

MACANDREW, R. 1861. List of the British Marine Invertebrate Fauna. *Rep. 30th Meeting Brit. Assoc. (Oxford):* 217–236.

M'INTOSH, W. C. 1874. On the Invertebrate Marine Fauna and Fishes of St. Andrews. *Ann. Mag. nat. Hist.* (4) **13**: 140–145.

MCMILLAN, N. F. 1938. Marine sponges from N.E. Ireland and County Dublin. *Irish nat. J. Belfast,* 7 (**2**): 44–45.

MAITLAND, R. T. 1897. *Prodrome de la faune des Pays Bas et de la Belgique Flamande, Leiden:* 55.

MICHLUCHO-MACLAY, N. DE. 1868. Beiträge zur Kenntniss der Spongien. I. Ueber *Guancha blanca,* einen neuen Kalkschwämm. *Jenaische Z.,* **4**: 221–240.

MICHLUCHO-MACLAY, N. DE. 1870. Ueber einige Schwämme des nordlichen stillen Oceans und dez Eismeeres. *Mém. Acad. Sci. St.-Petersb.,* **15** (3): 1–24, 2 pls.

MINCHIN, E. A. 1892. Note on a sieve-like membrane across the oscula of a species of *Leucosolenia. Quart. Journ. micros. Sci.,* 1–24, pls. x, xi.

MINCHIN, E. A. 1892. The oscula and anatomy of *Leucosolenia clathrus.* O.S. *Quart. Journ. micros. Sci.,* 477–495, pl. xxix.

MINCHIN, E. A. 1896. Suggestions for a natural classification of the Asconidae. *Ann. Mag. nat. Hist.* (6) **18**: 349–362.

MINCHIN, E. A. 1897. *Ascandra* or *Homandra?* A test case for the rules of Zoological Nomenclature. *Zool. Anz.,* **20** (524): 49–50.

MINCHIN, E. A. 1900. *The Porifera (in) A Treatise on Zoology, edited by E. Ray Lankester:* Part 2.

MINCHIN, E. A. 1905. On the sponge *Leucosolenia contorta* Bowerbank, *Ascandra contorta* Haeckel, and *Ascetta spinosa* Lendenfeld. *Proc. zool. Soc. Lond.*, **2**: 1–20, pl. i.

MINCHIN, E. A. 1905. The characters and synonymy of the British species of sponges of the genus *Leucosolenia. Proc. zool. Soc. Lond.*, **2**: 349–396, 8 figs.

MINCHIN, E. A. 1908. Materials for a monograph of the Ascons. II. The formation of spicules in the genus *Leucosolenia. Quart. micr. Sci.* **52** (3): 301–355, pls. xvii–xxi.

MINCHIN, E. A. 1909. The relation of the flagellum to the nucleus in the collar-cells of Calcareous Sponges. *Zool. Anz.*, **25**: 227–231.

MONTAGU, G. 1818. An essay on Sponges, with descriptions of all the species that have been discovered on the coasts of Great Britain (1812). *Mem. Werner Soc. Edinb.*, **2**: 67–122, 14 pls.

MOORE, H. B. 1937. Marine fauna of the Isle of Man. *Proc. L'pool. biol. Soc.*, **50**: 32–37.

MÜLLER, O. F. 1776. *Zoologiae Danicae prodromus. Havinae.*

MÜLLER, O. F. 1789. *Zoologia danica 2nd Ed. Havniae*, Vol. II.

PAVANS DE CECCATTY, M. 1953. Note sur les pigments de *Leucosolenia botryoides* Ellis et Solander et du *Leucosolenia* (*Clathrina*) *coriacea* Montagu. *Arch. Zool. exp. gén. Paris*, (*Notes et Rev.*) **90**: 8–17, 3 figs.

POLÉJAEFF, N. DE. 1883. Report on the Calcarea dredged by H.M.S. Challenger. *Rep. Sci. Res. Voy. 'Challenger', London, Zool.*, **8**: 1–76, pls. i–ix.

POPE, E. C. 1943. Animal and plant communities of the coastal rock-platform at Long Reef, New South Wales. *Proc. linn. Soc. N.S.W.*, **68** (5–6): [Sponges, 238, 244, 246].

POURBAIX, N. 1932. Contribution à l'étude de la nutrition des éponges calcaires. *Rec. Inst. zool. Torley-Rousseau Bruxelles*, **4**: 31–45, 1 pl.

PREIWISCH, J. 1904. Kalkschwamme aus dem Pacific. Ergebnisse einer Reise nach dem Pacific, Schauinsland, 1896–1897. *Zool. Jb.*, **19**: 9–26.

PRENANT, M. 1925. Observations sur les procytes de *Clathrina coriacea* Mont. *Trav. Sta. zool. Wimereux*, **9**: 198–204.

PRENANT, M. 1927. Notes éthologique sur la fauna marine sessile de Roscoff. *Trav. Sta. Biol. Roscoff*: 6–9.

PRIEST, B. W. 1887. On the Calcarea. *Journ. Quekett Club*, **3** (2): 99–107, pls. vii–viii.

PRUVOT, G. 1895. Coup d'oeil sur la distribution génerale des Invertébrés dan la région de Banyuls. *Arch. Zool. expér. gén. Paris* (3) **3**: 629–658.

PURCHON, R. D. 1948. Studies on the Biology of the Bristol Channel. XVII. The littoral and sublittoral fauna of the northern shores near Cardiff. *Proc. Bristol nat. Soc.*, **27** (4): (Sponges, 293, 296, 299, 300, 307, 308).

QUOY, J. R. C., ET GAIMARD, P. 1833. *Voyage de l'Astrolabe, Zoologie*, **4**, *Paris.*

RADDE, G. 1899. *Die Sammlungen des Kaukasischen Museums. I. Zoologie Tiflis.*

REMANE, A. 1934. Die Brackwasserfauna. *Verh. dtsch. zool. Ges.*, **36**: 34–74, 4 figs.

RENOUF, L. P. 1920. A contribution to our knowledge of the Fauna of the Clyde sea-area. *Glasg. Nat.*, **8**: 113–119.

RENOUF, L. 1931. Preliminary work of a new biological station (Lough Ine, Co. Cork, I.F.S.). *J. Ecol.*, **19**: 410–438, pls. xxiii-xxvi, 3 maps.

RENOUF, L. W. P. 1935. Observations on periodic, sporadic occasional and unusual appearances of certain organisms. *Acta phaenologica*, **3**: 112.

RENOUF, L. P. W. 1936. The importance of field notes to the study of Porifera. *C. R. XIIe Congr. int. Zool. Lisbon*, **1935**: 831–840.

RENOUF, L. 1937. The importance of field notes to the study of Porifera. *Int. Congr. Zool. Lisboa*, **12**: 831–840, 2 figs.

RENOUF, L. P. W. 1937. Invertebrates, Porifera and Tunicata in particular, as reef-builders on the South Coast of Co. Cork, I.F.S. *Festschr. Embrik Strand Riga*: 50–54, pls. ix–xi, 1 text-fig.

REZVOJ, P. 1928. Contribution to the fauna of Porifera in the Barents Sea. *Trans. Inst. scient. Explor. North. Moscow*, **37**: 67–95, 11 figs.

RIDLEY, S. O. 1881. Spongida collected during the Expedition of H.M.S. *Alert* in the Straits of Magellan and on the coast of Patagonia. *Proc. zool. Soc. Lond.*: 107–139, pls. x–xi.

RIDLEY, S. O. 1884. *Report on the Zoological collections made in the Indo-Pacific Ocean during the Voyage of H.M.S. 'Alert'. London (Sponges, pp. 366–482, 582–630, 7 pls.).*

RISSO, A. 1826. *Histoire naturelle des principales productions de l'Europe Meridionale et particuliere-ment de celles des environs de Nice. Tome cinquieme. Paris et Strasbourg, viii and 403 pp., 10 pls.*

ROUSSEAU, E. 1903. Note monographique sur les Spongiaires de Belgique. *Ann. Soc. malac. Belg.*, **37**: 3–26, 17 figs.

ROW, R. W. H. 1909. Reports on the marine biology of the Sudanese Red Sea. XIX. Report on the Sponges collected by Mr. Cyril Crossland in 1904–1905. *J. Linn. Soc., Lond., Zoology*, **31**: 182–214, pls. xix-xx.

ROW, R. W. H., AND HÔZAWA, S. 1931. Report on the Calcarea obtained by the Hamburg South-West Australian Expedition of 1905. *Sci. Rep. Tohôku Imp. Univ.*, **6**: 727–809. 3 pls. 17 figs.

SARÀ, M. 1951. Tre nouve Calcispongie del Golfo di Napoli. *Annu. Ist. Zool. Univ. Napoli*, **3** (8): 1–16, 1 pl., 4 figs.

SARÀ, M. 1952. Prime osservazioni sulla variabilità delle specie nelle Leucosolenie: Rapporti di spicolazione fra *Clathrina contorta* (Bowerbank) *C. falcata* (Haeckel) e C. reticulum (O. Schmidt). *Boll. Zool. Torino*, **19** (4–6): 163–170.

SARÀ, M. 1953. Variabilità di forma e di spicolazione in *Leuconia solida* (O.S.) e sua identità specifica con *L. nausicae* (Schuffn.) e *L. pumila* (Bwbk.). *Ann. Ist. Mus. Zool. Univ. Napoli*: **5** (5): 1–21, 1 pl.

SARÀ, M. 1953. Variabilità delle *Leucosolenia* del Golfo di Napoli e nouve vedute sulla sistematica nel gruppo. *Ann. Ist. Mus. Zool. Univ. Napoli*: **5** (7): 1–109, 2 pls., 14 Text-figs.

SASAKI, N. 1941. On the changes occurring in various parts of the body, especially in the spicules in accordance with the increase of body length in the case of the calcareous sponge, *Sycon okadai* Hozawa. *Sci. Rep. Tohoku Univ.* (4) *Biol.* **16** (4): 365–382, 12 text-figs.

SCHMIDT, E. O. 1862. *Die Spongien des adriatischen meeres. Leipzig, 88 pp., 7 pls.*

SCHMIDT, E. O. 1864. *Supplement der Spongien des adriatischen Meeres. Leipzig: iv+48 pp., 4 pls.*

SCHMIDT, O. 1868. *Die Spongien der Muste von Algier (Drittes Supplement). Leipzig, 44 pp., 5 pls.*

SCHMIDT, E. O. 1869. Vorläufige Mittheilungen über die Spongien der Groenlandischen Kuste. *Mitt. steierm. GewVer.*, **2** (1): 89–97.

SCHMIDT, O. 1870. *Grundzüge einer Spongien-Fauna des atlantischen Gebietes. Leipzig, 88 pp., 6 pls.*

SCHUFFNER, O. 1877. Beschreibung einiger neuer Kalkschwämme. *Jena. Z. Naturw.*, **11** (2) 4: 403–433, 3 pls.

SCHULZE, F. E. 1875. Ueber den Bau und die Entwicklung von *Sycandra raphanus* Haeckel. *Z. wiss. zool., Suppl.*, **25**: 247–280.

SPEK, J. 1938. Studiem uber die Polaritat der Larvan der Kalkschwämme. *Protoplasma Leipzig*, **30** (3): 352–372, 5 figs.

STEPHENS, J. 1912. Clare Island Survey. Part 59, Marine Porifera. Porifera. *Proc. R. Irish Acad.*, **31**: 1–42.

STEPHENS, J. 1915. Atlantic sponges collected by the Scottish National Antarctic expedition. *Trans. roy. Soc. Edinb.*, **50**: 423–467.

TANITA, S. 1939. Two new Calcarea obtained from Sasebo, Japan. *Sci. Rep. Tôhoku Univ.* (4) **14** 2–3: 319–326, 4 text–figs.

TANITA, S. 1940. Calcareous sponges of Matsushima Bay. *Sci. Rep. Tôhoku Univ.* (4) *Biol.* **15** (2): 165–177, 1 pl., 4 text-figs.

TANITA, S. 1941. Report of the biological survey of Mutsu Bay. 35. Studies on the Calcarea of Kutsu Bay. *Sci. Rep. Tôhoku Univ.* (4) *Biol.* **16** (1): 1–7, 1 pl., 2 text-figs.

TANITA, S. 1941. Calcareous sponges obtained from Onagawa Bay and its vicinity. *Sci. Rep. Tôhoku Univ.* (4) *Biol.* **16** (3): 263–282, 1 pl., 4 text-figs.

TANITA, S. 1942. Calcareous sponges collected in the Kanto District, Japan. *Sci. Rep. Tôhoku Univ.* (*4*) *Biol.* **17** (1): 17–69, 3 pls., 13 figs.

TANITA, S. 1942. Key to all the described species of the genus *Leucosolenia* and their distribution. *Sci. Rep. Tôhoku Univ.* (*4*) *Biol.* **17** (1): 71–93.

TANITA, S. 1942. Report on the calcareous sponges obtained by the zoological Institute and Museum of Hamburg. Part II. *Sci. Rep. Tôhoku Univ.* (*4*) *Biol.* **17** (2): 105–135, 2 pls. 9 figs.

TANITA, S. 1943. Studies on the Calcarea of Japan. *Sci. Rep. Tôhoku Univ.* (*4*) **17** (4): 353–490, 8 pls., 27 figs., tables.

TEISSIER, G., AND VOLKONSKY, M. 1930. Les granulations pigmentaires de *Sertularella* (Hydraire) et de *Clathrina* (Eponge). *Bull. Soc. zool. Fr.*, **54**: 599–606.

TEMPLETON, J., AND TEMPLETON, R. 1836. A catalogue of the species of rayed animals found in Ireland. *Mag. nat. Hist. & J. Zool. London*, **9**: 470–472.

THACKER, A. G. 1908. On collections of the Cape Verde Islands fauna made by Cyril Crossland, M.A. The Calcareous Sponges. *Proc. zool. Soc. Lond.*: 757–782, 1 pl., 11 text-figs.

THOMPSON, W. 1840. Additions to the Fauna of Ireland. *Ann. Mag. nat. Hist.*, **5**: 245–257.

TOPSENT, É. 1907. Eponges calcaires recueillis par le Francais dans l'Antarctique (Expédition du Dr. Charcot). *Bull. Mus. Hist. nat., Paris*: 539–544.

TOPSENT, É. 1925. Eponges de l'Etang de Thau. *Bull. Inst. oceanogr. Monaco*, **452**: 1–19.

TOPSENT, É. 1928. Spongiaires de l'Atlantique et de la Méditerranée. *Résult. Camp. sci. Monaco*, **74**: 376 pp., 11 pls.

TOPSENT, É. 1932. Remarques sur des éponges de l'estuaire de la Rance. *Bull. Lab. Mus. Hist. nat. St. Servan*, **8**: 1–7.

TOPSENT, É. 1934. Eponges observées dans les parages de Monaco. *Bull. Inst. oceanogr. Monaco*, **650**: 1–42, 3 figs.

TOPSENT, É. 1934. Etude d'eponges littorales du Golfe de Gabès. *Bull. Trav. Sta. Aquicult. Alger. 1932 fasc.*, **2**: 69–102, 3 figs.

TOPSENT, É. 1934. Aperçu de la faune des Eponges calcaires de la Mediterranée. *Bull. Inst. oceanogr. Monaco*, **659**: 1-20.

TOPSENT, É. 1936. Eponges observées dans les parages de Monaco. *Bull. Inst. oceanogr. Monaco*, **686**: 1–70, 12 figs.

TOPSENT, É. 1936. Etude sur les *Leucosolenia. Bull. Inst. océanogr. Monaco*, **711**: 1–47, 20 figs.

TOPSENT, É. 1937. Notes diverses sur des Eponges. *Bull. Inst. océanogr. Monaco*, **722**: 1–15, 2 figs.

TOPSENT, É. 1937. Sur les *Leucandra* des côtes de France. *Bull. Inst. océanogr. Monaco*, **728**: 1–15, 2 figs.

TUZET, O. 1947. L'ovogénèse et la fécondation de l'éponge calcaire *Leucosolenia* (*Clathrina*) *coriacea* Mont., et de l'éponge siliceuse *Reniera* elegans Bow. *Arch. Zool. exp. gén. Paris*, **85**: 127–148, 2 pls., 4 figs.

TUZET, O. 1948. Les premiers stades du développment de Leucosolenia botryoides Ellis et Solander et de *Clathrina* (*Leucosolenia*) *coriacea* Mont. *Ann. Sci. nat. Paris*, (11) **10**: 103–114, 3 figs.

TUZET, O. 1950. La fécondation des ésponges calcaires. *Vie et Milieu, Paris*, **1**: 163–177.

TUZET, O., LOUBATIERES, R., AND PAVANS DE CECCATTY, M. 1952. Les cellules nerveuses de l'éponge *Sycon raphanus* O.S. *C. R. Acad. Sci. Paris*, **234** (13): 1394–1396, 4 figs.

TUZET, O., AND PAVANS DE CECCATTY, M. 1952. Les cellules nerveuses de *Grantia compressa* pennigera Haeckel (Eponge calcaire Hétérocoele). *C. R. Acad. Sci. Paris*, **235** (23): 1541–1543, 4 figs.

TUZET, O., AND PAVANS DE CECCATTY, M. 1953. Les cellules nerveuses de l'eponge calcaire homocoele *Leucandra johnstoni* Cart. *C. R. Acad. sci. Paris*, **236** (1): 130–133, 6 figs.

ULRICH, E. O. 1869. Preliminary description of new Lower Silurian Sponges. *Amer. Geol.*, **3**: 233–248.

URBAN, F. 1902. *Rhabdodermella nuttingi*, nov. gen. et nov. spec. *Z. wiss. Zool.*, **71**: 268–275.

URBAN, F. 1905. Kalifornische Kalkschwämme. *Arch. Natur.*, **72** (1): 33–76.

URBAN, F. 1908. Die Kalkschwämme der deutschen Tiefsee-Expedition. *Zool. Anz.*, **33**: 247–252.

URBAN, F. 1909. Die Calcarea. *Wiss. Ergebnisse der deutschen Tiefsee-Expedition* (*Valdivia*), **19** *Jena.*

VANHOEFFEN, C. 1897. Die Fauna und Flora Grönlands. *Grönland-exped. Ges. Erdk. Berlin*, **2**: 1–320.

VERRILL, A. E. 1873. *Report upon the Invertebrate Animals of Vineyard Sound. U.S. Fish Comm.* (*i. Rep. Condition Sea Fisheries S. Coast New England*)*: 295–778, 38 pls., 4 text-figs.*

VERRILL, A. E. 1874. Exploration of Casco Bay by the U.S. Fish Commission in 1873. *Proc. Amer. Ass. Adv. Sci.*, **2**: 340–395, pls. i–vi.

VOLKONSKY, M. 1929. Les choanocytes des esponges ćalcaires. Les 'corps apical', organite cellulaire nouveau. *C. R. Soc. biol. Paris*, **102**: 664–668, 8 figs.

VOLKONSKY, M. 1929. Les choanocytes des éponges calcaires. Résultats de quelques techniques cytologiques et particulierement des imprégnations mételliques. *C. R. Soc. biol. Paris*, **102**: 759–762.

VOLKONSKY, M. 1929. Les grains des porocytes et des cellules spheruleuses de l'ascon *Clathrina coriacea* (Mont.). *Bull. Soc. zool. Fr.*, **54**: 380–385.

VOLKONSKY, M. 1930. Eponges calcaires: la cinétide des cellules de *Clathrina coriacea* Mont. *Bull. Soc. zool. Fr.*, **55**: 183–187.

VOSMAER, G. C. J. 1880. *Ueber Leucandra aspera H., nebst allgemeinen Bemerkungen ueber das Canalsystem der Spongien. Leiden.*

VOSMAER, G. C. J. 1887. *Porifera* (*in*) *Bronn: Die Klassen und Ordnungen des Thierreichs*, **2**: 369–466, 9 pls.

WALTON, C. W. 1913. The shore fauna of Cardigan Bay. *J. Mar. biol. Ass., U.K.*, **10** (1): 102–113.

WOODS, F. H. 1914. Marine biology at Whitby. *Naturalist, Lond.:* 358–359.

ZITTEL, K. A. VON. 1878. Studien über fossile Spongien. III. Monactinellidae, Tetractinellidae, und Calcispongiae. *Abh. Akad. wiss. Munchen*, **13** (2): 1–48.

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