THE ALCYONARIA

OF THE CAPE OF GOOD HOPE

PART II.

BY

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Two parcels of Alcyonaria were sent to me in the year 1900. With the exception of a dried specimen of Gorgonia albicans, all the specimens were, as before, carefully preserved and in excellent condition for histological examination.

I regret that a heavy pressure of work has prevented me from completing my anatomical description of the species, but rather than delay the statement as to the species occurring in Cape waters, I have put together in this preliminary paper the notes I have made upon the species.

In these two consignments there are twelve species of Alcyonaria and one of Stylasterina. Very striking peculiarities in the structure of two Gorgonacea have necessitated the foundation of two new genera—Malacogorgia and Trichogorgia—and, in addition, four species of old-established genera must be regarded as new to science, namely, Alcyonium purpureum, Ceratoisis ramosa, Eugorgia gilchristi, and Juncella spiralis. Of the remaining seven species, three have not hitherto been known to occur in Cape waters, and one, of which a small specimen was incorrectly described in my last paper as Primnoisis, is now referred to the species Wrightella coccinea, which is also new to Cape waters. One specimen of a Gorgonia, probably belonging to a new species, is too incomplete to describe adequately.

The following is a complete list of the Alcyonaria which have at present been found in Cape waters:—

Sub-Order **STOLONIFERA**

Family **Clavulariidae.**

Anthelia capensis, Studer (15). 33° S. 17° W. 50 Fathoms.

Sub-Order **ALCYONACEA**

Family **Xeniidae**

Heteroxenia capensis, Hickson (6). False Bay. 20 Fathoms.

Family **Alcyoniidae.**

Alcyonium pachyclados, Klz (8). Off Cape St. Blaize, etc. 15–18 Fathoms.

Alcyonium antarcticum, W. and S. (23). Off East London. 45 Fathoms.

Alcyonium purpureum, n. sp. Mossel Bay, etc. Shore.

Acrophytum claviger, Hickson (6). Algoa Bay. 26 Fathoms.

Sarcophytum trochiforme, Hickson (6). Off East London. 45 Fathoms.

Anthomastus grandiflorus, Verrill (18). Off C. Recife. 256 Fathoms.

Family **Nephthyidae**

Eunephthya thyrsoides, Verrill (20). False Bay. 20 Fathoms.

Sub-Order **GORGONACEA**

Family **Briareidae**

Spongioderma verrucosum, Möbius (12). Several localities. Shallow water.

Family **Melitodidae.**

Melitodes dichotoma, Pall. (13). Several localities. 41 Fathoms.

Wrightella coccinea, Gray (4). { Mossel Bay. Shore. / Off Algoa Bay. 25 Fathoms.

Family **Dasygorgiidae.**

Trichogorgia flexilis, N. G. et. sp. Off Cape Recife. 56 Fathoms.

Family **Isidae.**

Primnoisis capensis, Studer (15). 33° S. 17° W. 50 Fathoms.

Ceratoisis ramosa, N. sp. Off Vasco de Gama Peak. 230 Fathoms.

Family **Muriceidae.**

Villogorgia mauritiensis, Ridley (14). Off East London. 85 Fathoms.

Acanthogorgia armata, Verrill. Vasco de Gama Peak. 230 Fathoms.

Family **Plexauridae.**

Eunicella papillosa, Esper (3). { Rij Bank. 25 Fathoms. / Table Bay. 50 Fathoms.

Euplexaura capensis, Verrill (20).

New Family **Malacogorgiidae.**

Malacogorgia capensis, N. G. et sp. Algoa Bay. 25 Fathoms.

Family **Gorgoniidae.**

Gorgonia flammea, E. et S. (2). Common in Shallow water.

Gorgonia capensis, Hickson (6). Off Cape St. Blaize. 40 Fathoms.

Gorgonia albicans, Kölliker (9). Several localities. 17-20 Fathoms.

Eugorgia gilchristi, N. sp. 34° S. 25° E. 52 Fathoms.

Gorgonia Sp. (?). 34° S. 25° E. 52 Fathoms.

Gorgonia (?) crista, Möbius (12). ? ?

Family **Gorgonellidae.**

Gorgonella stricta, Lamarck. Mossel Bay. 30 Fathoms. Sent to me by Mr. Strugwell.

Juncella elongata, Pall. (13). Off Algoa Bay. 25 Fathoms.

Juncella spiralis, N. sp. Off Cape Morgan. 36 Fathoms.

Sub-Order **PENNATULACEA.**

Family **Virgulariidae.**

Virgularia reinwardti, Herklots. St. Francis Bay. 30 Fathoms.

Family **Anthoptilidae.**

Anthoptilum grandiflorum, Verrill (19). Off Lion's Head. 136 Fathoms.

Family **Cavernulariidae.**

Cavernularia elegans, Herklots. False Bay. 25 Fathoms.

Cavernularia obesa, Val. Port Alfred. 43 Fathoms.

Specimens of all these species except Anthelia capensis, Eunephythya thyrsoides, Primnoisis capensis, Gorgonia (Lophogorgia) crista, Euplexaura capensis and Gorgonella stricta have been collected by Dr. Gilchrist and sent to me for examination.

The specimen I have provisionally marked Gorgonia ? may be of the same species as Verrill's Euplexaura capensis, but the spicules of our specimen are smaller and more uniform in shape.

The present paper contains an account of the following species:—

Alcyonium purpureum. N. sp.
Anthomastus grandiflorus. Verrill.
Wrightella coccinea. Gray.
Trichogorgia flexilis. N. G. et Sp.
Ceratoisis ramosa. N. sp.
Acanthogorgia armata. Verrill.
Gorgonia albicans. Kölliker.
Gorgonia. ?
Eugorgia gilchristi. N. sp.
Malacogorgia capensis. N. G. et Sp.
Juncella spiralis. N. sp.
Anthoptilum grandiflorum. Verrill.

Geographical Distribution.—The general features of the Alcyonarian fauna of Cape waters are particularly interesting. Affinities with the Atlantic fauna are seen in the occurrence of the genera Anthomastus, Acanthogorgia, Ceratoisis, Anthoptilum, and possibly Eugorgia. Affinities with the Indian Ocean fauna in the occurrence of the genera Wrightella, Juncella, Sarcophytum and Cavernularia.

The genera Acrophytum, Spongioderma, Malacogorgia and Trichogorgia appear to be peculiar to the district, and among the peculiar and characteristic species of the district may be mentioned Alcyonium purpureum, Sarcophytum trochiforme, Gorgonia flammea, Gorgonia capensis, Eugorgia gilchristi and Juncella spiralis.

We have, therefore, assembled together in this region representatives of the Indian Ocean, of the Atlantic Ocean, and possibly in Alcyonium antarcticum a representative of the Southern Ocean, but, at the same time, we find a considerable number of species which appear to be peculiar to the district.

It may be of interest, for comparison with this statement, to quote the following sentence from Agassiz's report on the "Challenger" Echinoidea (p. 263).

"The assemblage of species at the Cape of Good Hope is most peculiar, it is the meeting of the western boundaries of the African Indian Pacific and of the Indo-African, the southern boundary of the Atlantic and the northern extremities of the Southern Ocean faunae, and it has no species characteristic of its own in the continental or abyssal range."

Family **Alcyoniidae.**

Alcyonium purpureum, n.sp.

Plate VII., fig. 1. Plate IX., fig. 18.

Locality: Jetty at Mossel Bay.

Some specimens of this Alcyonium growing upon Tunicate tests and worm tubes were taken from the piles of the jetty at Mossel Bay. Dr. Gilchrist states that he has found the same species in Saldanha Bay. With some hesitation I have decided to constitute for them a new species. They are clearly distinct from the A. pachyclados described in my last contribution (6), and they are also distinct from A. antarcticum, which they resemble superficially in some respects. They appear to differ from all species of the genus about which we have adequate information in the fact that, when alive, they are of a brilliant purple colour. Dr. Gilchrist tried all sorts of expedients, in vain, to get the specimens to retain their colour. Sometimes he seemed to have succeeded, but when the colony was apparently quite dead, the pigment would pour out into the preservative fluid in streams. I do not call to mind any description of a species of Alcyonium in which a soluble colour of this kind is mentioned, and I have never noticed anything of the kind in the living specimens I have examined. In the British specimens of Alcyonium digitatum there is frequently noticed a pale pink colour, which gradually fades when the colonies are pre-

served. It is by no means constant, however, some specimens, particularly those in very shallow water, being devoid of it. The "brilliant purple" colour of this species is particularly interesting, and is deserving of further investigation.

The colour character by itself is not one which would justify us in constituting a new species for the specimens.

The Mossel Bay Alcyonium, however, differs from other species in a variety of other characters.

It resembles A. antarcticum in the hemispherial shape of some of the colonies and in the general transparency of the coenenchym. It differs from it in the general character and distribution of the spicules and in the absence of a stalk. It comes nearest, perhaps, to Alcyonium sphaerophorum Ehrb., as described by Klunzinger (8), but differs from it in the greater size of the lobes, the entire absence of a stalk, the absence of smooth calcareous corpuscles, and in the shape and size of the spicules. Ehrenberg described the colour of his species as "pallida, polypis fuscis." This is a good description of the colour of A. purpureum after the purple colour has been washed out.

In all the specimens the zooids are partially expanded. I have little doubt that if they had been carelessly killed and preserved, their resemblance to Alcyonium sphaerophorum would have been closer than it is.

The largest colony sent to me is attached to a Tunicate test. It is roughly hemispherical in shape, 40 mm. in diameter, 20 mm. in height. It springs from a flattened incrusting base bearing polyps, there being no stalk (sterile Füss), as in A. fulvum Forsk. There are fifteen lobes, varying from 15 mm.—8 mm. in diameter. The zooids are large, being in the specimens nearly 1. mm. in diameter at the base of the anthocodiae. The other colonies are much smaller, and consist of only one or two lobes.

The six ventral mesenteries are well developed. The figure given by Kükenthal (11), in a recent paper, of Alcyonium fulvum Forsk. has some resemblance to our new species, but in the size and character of the spicules it is clearly distinct.

The general coenenchym and the body walls of the anthocodiae are singularly transparent. At the surface of the coenenchym the spicules are closely crowded together, but a little way below the surface they are isolated and scattered. At the base of the tentacles there are eight triangular shields, pointed above, of scattered spindle-shaped spicules. The tentacles themselves are dark brown in colour and entirely devoid of spicules. The spicules of the coenenchym vary considerably in shape, but are mostly double clubs or double balls with a narrow neck. Their average size is about 0·1 mm. The spindles and clubs of the anthocodial body-wall are about 0·14 mm. in length. All the spicules are provided with numerous protuberant tubercles (fig. 18.)

The sex of the specimens were not determined, but the gonads are not mature.

Alcyonium purpureum.—Colony impregnated with a soluble purple pigment. Without a stalk (sterile füss). Lobes hemispherical up to 15 mm. in diameter. Spicules of the coenenchym double clubs and double spheres about 0·1 mm. in diameter.

Anthomastus Grandiflorus, Verrill.

Plate VII., fig. 2.

Verrill (18). Amer. J. Sci. XVI., 1878, p. 376.

Locality : Off Cape Recife, 34° 27′ S. 25° 42′ E. 256 fathoms. One specimen.

The single specimen obtained clearly belongs to Verrill's species A. grandiflorus, of which many specimens have been obtained in deep water 500-1,000 fms. off the East Coast of North America and the West Indies. It has close affinities, too, with Studer's (17) species A. agaricus, which was found in 1,267 metres in 46°04′ 40″ N., 49°02′ W., but differs from it in the fact that the autozooids of A. agaricus are smaller, more numerous, and more rigid.

The measurements given are as follows :—

	A. agaricus.	A. grandiflorus. Verrill.	A. grandiflorus. mihi.
	mm.	mm.	mm.
Length of autozooid anthocodiae	9	36	22
Diameter of „ „	5	7–9	9
Length of tentacles	5	12	10
Height of Colony	20	about 40	40
Diameter of Colony	20–38	50–82	14–18

Verrill (21) had a large number of colonies to examine, and the specimen he measured he described as " a well-grown specimen, but not the largest."

In the Cape specimen there are five autozooids with their anthocodiae apparently fully expanded. In the specimens obtained by Verrill the number of autozooids varied from two in the smallest specimen to twenty or more in the larger ones. In Studer's specimen of A. agaricus there were ten autozooids.

The anthocodiae of the autozooids are nearly transparent, the body wall being provided with only a few scattered spicules; the tentacles are also transparent, but bear rather more spicules. It is very probable that they are capable of complete retraction.

The siphonozooids are minute and very numerous. It is difficult to give in figures any measurement of these siphono-

zooids that is satisfactory for comparison, as their size must depend very much on the degree of contraction of the general coenenchym. Between two points of the compasses fixed at 5 mm. apart from 7-9 siphonozooids may be counted. In A. agaricus the siphonozooids are 0·7 mm. apart.

The spicules are of two kinds. At the surface of the coenenchym they are very irregular in form and very abundant. They may be technically called clubs or double clubs or spindles, but with their form masked by the long spiny tubercles. The majority of them are about ·15 mm. in length. Below the immediate surface of the coenenchym there are many long needles irregularly spined and warted. They may be swollen in the middle or at one extremity, but more usually are fairly uniform in diameter. These needles vary very much in length, but some I have measured are over 0·7 mm. in length, with a maximum diameter of 0·04 mm. Similar needles have been described in A canariensis (0·5) and A. steenstrupii (0·5) by Wright and Studer, and in A. agaricus by Studer, but they do not appear to reach quite such a length as they do in the Cape specimen of A. grandiflorus.

The spicules of the body wall of the anthocodiae are spiny sclerites 0·05-0·07 mm. in length, and of the tentacles tuberculated rods 0·1 × ·03 mm. The colour of all the spicules is red.

The occurrence of this genus and species in Cape waters is a fact of considerable interest. It is the first recorded instance of the genus occurring elsewhere than in the Atlantic Ocean, north of the Equator (except A. steenstrupii W. and S. (23), off Japan). This is just the region from which the genus Sarcophytum, so common and abundant in the shallow waters of the Indian and Pacific Oceans, is absent.

In my last paper I recorded the existence in 32°53 S., 28°12 E., 45 fathoms, of a species which I placed in the genus Sarcophytum under the name S. trochiforme. At the time I hesitated whether S. trochiforme should be placed in the genus Sarcophytum or the genus Anthomastus. The small size of the autozooids and the relatively large size of the siphonozooids, however, appeared to me to point to its proper place being in the genus Sarcophytum. I see no reason to dissent from that view now. At the same time, there are some respects in which S. trochiforme does approach the genus Anthomastus, and it is clearly an intermediate form.

It is an interesting fact that, whereas Sarcophytum is essentially a shallow water genus (only two species occurring in water as deep as 18 fathoms), and Anthomastus is a deep-water genus, occurring in water from 200 to over 1,000 fathoms in depth; Sarcophytum trochiforme, the intermediate form, was found in 45 fathoms.

Family **Melitodidae.**

Melitodes dichotoma, Pallas (13).

Localities: 1. Vasco de Gama Peak, N.W. ¾ N., 8 miles. 41 fathoms. Rock. April 27, 1900.

2. East of Cape Agulhas (Sebastian Bluff), W. by N. ¾ W., 6 miles. 26 fathoms. Mud.

In the first dredging two specimens were obtained, one red and one yellow. It is interesting to find the two varieties of the species in the same haul of the dredge in this locality. In my last communication (6) I pointed out that the two varieties occur in the same locality in False Bay. Beyond the fact that the yellow variety in this new locality is rather more orange coloured than pale yellow, as the specimens of the yellow variety were in False Bay, no important differences were observed. In the second dredging a small piece of (probably) the same species was found growing on a shell of Terebratula rosea.

Wrightella Coccinea, Gray.

Gray (4), Catalogue Lithophyt., B. Mus., p. 32.

Ridley (14), Zool. of Alert, p. 581.

Locality: Fairly abundant on the piles of the jetty at Mossel Bay.

The specimens from Mossel Bay are very closely related to the specimens described by Gray as Wrightella coccinea from the Seychelles. Unfortunately, the genus Wrightella is not very well known, and is not very well defined from its neighbours.

The specimens in the collection agree with the description of the genus in having foliaceous clubs in the cortex; in the fact that the nodes are not perforated by canals, and that the branches arise from the nodes.

The foliaceous clubs (Blattkeule) are not very numerous, but are very variable in form. Ridley says that the genus is distinguished by the "very massive form of the Blattkeule and the swelling out of their 'Blatt' into rounded bodies with scarcely perceptible edges." This description is perhaps a little difficult to understand. It appears to me that the Blattkeule are formed by the exaggerated growth of the tubercles at one end of a tuberculated club. They may become expanded and anastomose, forming leaf-like processes of irregular shape, or, as in the case under description, the tubercles of nearly two-thirds of the thicker end of many of the clubs may be prolonged into long rod-like process with rounded ends. There is so much variety in the spicules of this species, however, that it is impossible to

describe any one form as typical. Ridley does not mention the size of the spicules. Klunzinger (8), in his description of Mopsea erythraea from the Red Sea, which Ridley places in this genus, says the spicules are from 0·16-·02 mm. in length and ·03-0·06 in breadth. The spicules I have measured in these specimens vary in size up to about 0·15 mm. in length.

An examination of a fragment of the type specimen of Wrightella coccinea in the British Museum shows that the spicules are much more crowded in the superficial coenenchym than they are in the Cape specimens and the foliaceous clubs larger (·2 mm. in length), and much more numerous. The differences in this respect are so great that I was tempted to constitute a new species for the Cape specimens, but when I examined a considerable number of specimens, and found that there is a great variability in respect of the number and crowding together of the spicules in the coenenchym and in the relative number of clubs and foliaceous clubs, it appeared to me wiser to include them in the species named by Gray.

There is a difference of 30° latitude between Mossel Bay and the Seychelles, and it is not surprising that the specimens of Wrightella from the former locality should differ in this respect from those found in the latter. There are other species of Alcyonarians in which the tropical varieties exhibit larger and more numerous spicules than the temperate varieties.

The genus is characterised by its dwarf size. Wrightella chrysanthus is $2\frac{1}{2}$ inches in height, and Wrightella (Mopsea) erythraea is said to be 40-60 mm. in height by Klunzinger (8). The average height of the Cape specimens is about 40 mm.

The colour of the majority of specimens is red, but some are orange or an intermediate colour between red and orange and some pink. Ridley says that the verrucae of W. coccinea are yellow. In this respect the Cape specimens differ from the type, all the verrucae being red. The anthocodiae are white and transparent, as described by Klunzinger for W. erythraea from the Red Sea.

I may here call attention to an erratum in my last paper on the Cape Alcyonaria. When I examined Wrightella coccinea I was strongly reminded of the specimen I described in that paper as Primnoisis capensis (Studer), and I was led to a re-examination of its structure. I am now convinced that it belongs to this species. The pink colour and the somewhat stronger habit may be associated with the fact that it was found in 20 fathoms of water, *i.e.*, much deeper than the Mossel Bay specimens, but the comparison of the spicule preparations revealed so many general similarities of form that there can be no longer doubt of their identity. The Blattkeule, which I overlooked in my first examination, do occur, although they are not numerous.

I have not had the opportunity of examining Studer's specimen from 50 fathoms in latitude 33° 59′ S. and longitude 17° 52′ E., which he named first Isidella and subsequently Primnoisis capensis, but although this nominally belongs to another family, the Isidae, I am convinced that it must be closely related to, if not identical with, Wrightella coccinea.

Family **Dasygorgiidae**, W. and S.

The family Dasygorgiidae of Wright and Studer (23) was defined as follows:—

Colony consisting of a simple or branched axis. Main axis: calcareous at its base, which latter is either flattened and disc-like, or ramifying into numerous root-like processes; the fibrous portions of the stems and branches with calcareous particles intermixed; often brilliantly iridescent. Coenenchyma; for the most part thin, sometimes without spicules, at other times with numerous transparent glassy, fusiform often spiny spicules, or with irregular scale-like spicules; sometimes the spicules are in two layers. Polyps; large, prominent, inserted on the axis either at right angles or obliquely; covered with spicules variously arranged; tentacles retractile, sometimes only imperfectly so."

In his recent important paper on the Gorgoniidae of the Siboga Expedition, Dr. Versluys (22) has revised the genera and species included in this family, and has reinstituted Verrill's original name Chrysogorgiidae for the family, and given a more restricted definition of it. The specimen I am about to describe should be clearly included in the family as described by Wright and Studer, but in the fact that the zooids are situated on all sides and not on one line only of the branches it would not be included in the more restricted family as defined by Versluys. The same difficulty arises with regard to the species Chrysogorgia constricta Hiles (7), in which the zooids are situated on at least two sides of the branches.

Two courses are open therefore. Either to constitute a new family for Hiles' Chrysogorgia constricta and this Cape specimen, or to adopt Wright and Studer's definition of the group and include them in the family Dasygorgiidae.

The latter course appears to me the more reasonable of the two. The new genus, which I propose to call Trichogorgia, is clearly related closely to many species of the genus Dasygorgia (W. and S.) or Chrysogorgia (Versluys), in the mode of origin of the branches, in the character and disposition of the spicules, in the arrangement of the calcareous deposits in the axis and in the mode of retraction of the tentacles, etc. To constitute a new

family for a form so closely related to a well known genus would be clearly inconvenient. I have re-examined the type specimen of Chrysogorgia constricta (Hiles), and I am convinced that its affinities with the genus Chrysogorgia as defined by Wright and Studer are pronounced. In neither case is there sufficient justification for the establishment of a new family. The specimen from which Miss Hiles described her new species was fragmentary, and the question whether a new genus should be constituted for it may be postponed until complete specimens are forthcoming.

Trichogorgia Flexilis N. gen et spec.

Plate VIII., fig. 13. Plate IX., figs. 16 and 17.

Locality : Off Cape Recife, 34° 7′ S., 25° 43′ E. 56 fathoms.

This species was obtained not very far from the station where Malacogorgia capensis was found but in deeper water. The colony is attached by a short main unbranched stem 8 mm. long, 2 mm. in diameter, expanding into an irregular disc 6 mm. in greatest diameter. Branching begins by a long but narrow branch 8 mm. from the base, and this is soon followed by what appears to be dichotomy, and then a third branch is given off at a considerable distance from the right hand division of this dichotomy, and finally a fourth.

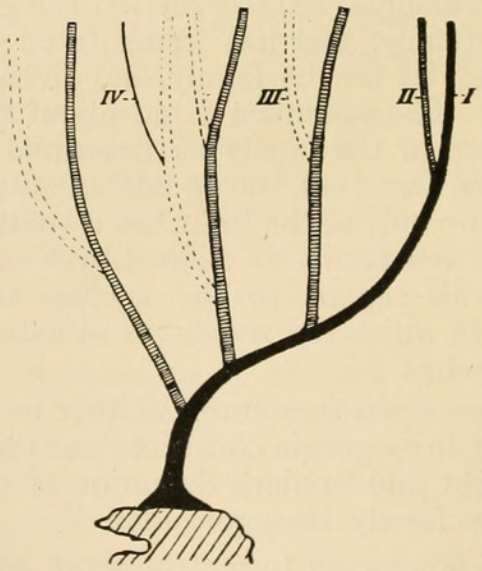

Diagram of the Branching of Trichogorgia. — I., Main axis ; II., primary branches ; III., secondary branches ; IV., tertiary branches.

If we consider that, in the position in which the specimen is drawn, the branch to the right is in all cases the main axis, then

there is a close similarity to the branching of such a species as Dasygorgia (Chrysogorgia) flexilis (W. and S.) all the primary branches being given off along a definite line on one side of the axis. This line is, however, not spirally twisted, and the colony is consequently branched in one plane only, and does not form, therefore, a bushy or shrubby colony, as is usually the case with the branched species of the family. Secondary, tertiary and in some cases quaternary branches are given off from the primary branches. The terminal branches may be 20 mm. in length, but it is characteristic of the species that the axes of the terminal and subterminal branches are very fine and hair-like 0.1-0.02 mm. in diameter. The axis is throughout fibrous and horny, but it contains a considerable quantity of calcium carbonate in the form of fine amorphous granules.

The coenenchym is missing on the unbranched stem and very thin on the larger branches, but it becomes thicker proportionately on the secondary branches, and reaches its greatest relative thickness at the end of the terminal branches. At a distance of 2.5 mm. from the extremity of a branch I found that the total diameter of the branch was .15 mm. and of the axis .025 mm.

The anthocodiae are all partially retracted into long cylindrical calicles 1 mm. in length. These calicles are set at an acute angle, and are directed towards the terminal extremity of the branch. The calices are very numerous, crowded on all sides of the terminal branches and closely set on the sub-terminal branches. Both calices and coenenchym are protected by a great number of calcareous overlapping scale-like spicules, arranged in a single layer.

The characteristic feature of the species is that nearly all these spicules are of the same general shape, i.e., a very thin, flat double disc or double paddle. The size varies from 0·1 × 0·04 (greatest breadth or 0·03 breadth across the neck) to 0·15 × ·035 (·03 across the neck). A few simple spindles of the shape shown in fig. 13c. may be found, and these and all other varieties are rare or very rare. The spicules are very nearly smooth, but in some cases a fine pattern and a minute serration of the edges may be seen (fig. 13d.).

The colony is female. Each zooid contains not more than one ripe ovum; but young zooids and adult with no ova occur on the same branch. (Plate IX., fig. 17.)

The genus may be characterised as follows:—

Colony branching in one plane. Axis becoming very thin in the terminal branches. Calices numerous and situated on all sides of the terminal and subterminal branches. Spicules very thin double discs or double paddles, numerous, overlapping, in one layer on calices and coenenchym.

Family **Isidae.**

Ceratoisis ramosa, n. sp.

Plate VII., figs. 3 and 4. Plate VIII., fig 12.

Locality: Vasco de Gama Peak, N. 71 E., 18½ miles. 230 fathoms. Stones. May 4, 1900.

This specimen is a good deal broken, but considering its extremely fragile character it is sufficiently well preserved to merit congratulation on its arrival.

The base is missing, and the terminal branches have in many places been lost, but I estimate its total height to have been about 100 mm. The main stem is relatively thick (3 mm. in diameter) and made up of calcareous internodes 3-5 mm. in length, alternating with horny nodes 1 mm. in length. The calcareous internodes give rise to the calcareous internodes of the branches, and the calcareous internodes of the branches give rise in a similar manner to the internodes of the secondary branches. The bronze colour of the nodes contrasts finely with the ivory-white calcareous internodes as described by Verrill in C. ornata. The branches arise very irregularly in all planes, and the whole colony has the appearance of a low, dwarfed, finely branched shrub. The smaller and terminal branches are very slender, and have very long internodes with relatively short nodes. The terminal branches are about 0.2 mm. in diameter, with internodes 5 mm. long and pad-like nodes 0.4 mm. thick.

Throughout the whole colony the coenenchym is extremely thin. The main stem has the appearance of being quite naked, but an extremely thin membrane bearing a few isolated zooids can be seen on closer examination. The zooids are irregularly scattered on the main stem, but are arranged on the branches at intervals of 2 to 4 mm. apart. In some places on the terminal branches three or four zooids may be close together, but they are never so crowded as they are represented to be in Ceratoisis grayii (4). The zooids with the tentacles folded over the crown are about 1 mm. in height. The surface of the zooids and the coenenchym is covered by plate-like spicules which in dried specimens overlap in places, giving the surface a primnoid appearance.

The aboral side of the bases of the tentacles are usually protected by spicules of the shape given in fig. 4b., and remind one of the opercular spicules of Primnoidae. Surrounding the neck of the zooid there are curved spindle-shaped flat spicules about 9·4 mm. in length (Fig. 4c.). On other parts of the zooids and on the general coenenchym the spicules are very irregular in size and shape, but long flat spindles up to 0.6 mm. in length predominate. Irregular plates such as those drawn in Fig. 4a. and Fig. 4d. are also found on the general coenenchym.

This species differs from all the other known species of the genus in its profuse ramification, but the justification for referring it to the genus lies in the fact that the branches arise solely from the calcareous internodes, and that the coenenchym is throughout extremely thin. In its profuse ramification it resembles the genus Acanella belonging to the same family, the general character of the spicules recalls that of many species of the Dasygorgiidae, whilst the large flat plates covering the bases of the tentacles indicate some affinities with Primnoidae.

The distribution of the species of Ceratoisis is interesting. The original type specimen of C. grayii (Wright 24) was obtained in 400 fms. off Setubal, in Portugal. Verrill (21a) records C. ornata as occurring in 250 fathoms off Nova Scotia. C. palmae was obtained by the Challenger in 1,125 fathoms off the Canary Islands. The other species are Pacific Ocean forms. C. Phillippinensis was found off the Phillippines in 82 fathoms. C. grandiflora in 210-255 fathoms, and C. nuda on the reefs off Fiji. C. paucispinosa in 345 fathoms on the Hyalonema grounds off Japan (23).

Family **Muriceidae.**

Acanthogorgia armata, Verrill.

Verrill : Am J. Sci XVI., 1878, p. 376.
„ Bull. Mus. Comp. Zool., 1883, XI., p. 31.

Locality : Vasco de Gama Peak, N. 71 E., 18½ miles. 230 fathoms, stones.

This species is fully described by Verrill (1883). It was first brought by the Gloucester fishermen from the fishing banks of Nova Scotia and Newfoundland, and it was also obtained by the U.S. Fish Commission in 1882 off Martha's Vineyard. It is essentially a deep water form, occurring in 220 fathoms off George's Bank down to 640 fathoms off Martha's Vineyard. It is closely allied to and perhaps identical with specimens obtained in deep water by the " Blake " off the West Indian Islands, and with A. hirsuta Gray obtained in deep water off Madeira. The genus Acanthogorgia is principally found in the Atlantic waters, A. longiflora from 700 fms. off the Phillippines, Acanthogorgia muricata off Funafuti (7a), and Acanthogorgia spinosa off New Britain (7), being the only species which up to the present time have been described as occurring outside this area. The species have been found off the Eastern shores of America, from Newfoundland to Patagonia, and the species A. ramosissima has been found in the Southern Ocean off Prince Edward's Island. Studer (17) records the genus from the Gulf of Gascony and the Azores, and the species A. hirsuta was originally described from Madeira.

The specimens obtained by Dr. Gilchrist are probably fragmentary. One specimen is 52 mm. and another 72 mm. in length. They correspond with the description of the type specimens in that the calices are from 5-7 mm. in height and 2 mm. in diameter, and the large bent spicules are about 0.8 mm. in length, and correspond in shape and variation with the description of the type spicules. The species that comes nearest to this geographically is A. ramosissma (23) from Prince Edward's Island, but this species has smaller spicules and a more regular arrangement of the calices on the stem.

New Family **Malacogorgiidae.**

This family is constituted for the reception of the remarkable specimen described below. Its characters are: Colony branched and upright. Axis slender, horny. Spicules and all other forms of calcareous skeleton absent.

The position of this family in our system must for the present remain uncertain. In general form the single specimen resembles Trichogorgia flexilis, which is undoubtedly a member of the family Dasygorgiidae, but as there is no calcareous deposit in the axis and the method of branching differs from that of the Dasygorgiidae in some respects, I think it is best, as a temporary measure, to place it next to the family Gorgoniidae.

Malacogorgia Capensis, N. Gen. et Spec

Plates VII., fig. 5, and VIII., figs. 10 and 11.

Locality: Algoa Bay. Lat. 35° 40 S., Long. 35° 56 E. 25 fathoms.

This remarkable specimen shows absolutely no calcareous structures. As it was possible that the preservative might have contained sufficient acid to dissolve the spicules, sections were prepared and carefully examined with the high power of the microscope, but they revealed no spaces from which the spicules could have been dissolved out. The spicules of none of the other specimens collected at the same time show signs of corrosion by acid, and it is extremely difficult to believe that any acid fluid acting for a short time could have so completely dissolved away every trace of lime. The only conclusion that can be reached, with reason, is that this is a Gorgonian devoid of spicules.

Whether we should be justified in including this genus in the family Gorgoniidae, or whether it should be made the type of a

new family are questions which the future must decide. For the present I think it is better to place it in a new family. The single specimen consists of a cylindrical stem 15 mm. long by 1.75 mm. in diameter attached to a stone by a broad base. It gives rise to four main branches which after a course of 10-20 mm. again divide into 12 secondary branches. The secondary branches are very slender, about 70 mm. in length, and alone bear the zooids. The zooids are fully expanded 0.65 mm. in length from the base of the anthocodia to the base of the tentacles and about 0.3 mm. in diameter. The tentacles are 0.4 mm. in length, and bear from 12-14 pinnae in a single row on each side.

The stomodaeum of the zooids is long and bears a very well-marked siphonoglyph.

The zooids increase in numbers partly by additions at the base of the secondary branches (Fig. 10) where there may be seen two rows, one on each side of the branch, of very young zooids, the youngest being nearest to the primary branch. In the lower two-thirds of the secondary branches the bilateral arrangement is preserved, but in the upper third other zooids are added, and then they appear to be distributed on all sides of the branch in a dense cluster. The colony was female, a few of the polyps bearing a single immature ovum 0.05 mm. in diameter. The genus may be described as follows:—

Genus Malacogorgia.—Colony slightly branched. Axis horny with no trace of lime. No spicules in any part of the colony. Polyps arranged bilaterally in the plane of branching at the basal two-thirds of the secondary branches and on all sides of the terminal one-third of the secondary branches.

M. capensis with the characters of the genus. Colour in spirit white.

Family **Gorgoniidae**.

There are many unsatisfactory features about the present day definition of this family, and a thorough revision of the genera is very necessary.

The species in Cape waters which is clearly Platygorgia albicans of Studer (16) and Eunicella palma of Verrill, and considered by these authors to be the same as Gorgonia albicans of Kölliker (9), Gorgonia palma var. alba of Esper (3) and Lophogorgia palma of E. and H. exhibits the peculiar torch-shaped spicules of the Plexaurid Eunicella, but it differs from the Plexauridae in having a very thin and not a thick fleshy coenenchym on the main axis. The remarkable flattening of the axis is similar to that of Gorgonia flammea, in which species there may also be noticed a very remarkable scantiness of coenenchym on the main branches. Until the anatomy of these

corals is more thoroughly investigated, I am inclined to include Gorgonia albicans in the family Gorgoniidae notwithstanding the remarkable difference between it and Gorgonia flammea in the character of the spicules.

Studer (16) in his original description of the genus Platygorgia stated that the spicules, although similar to the spicules of Eunicella in form, are characterised by the fact that the clubs attain the same length as the spindles. "Die spiculen sind characteristisch in dem die Keulen hier die Länge der Spindeln erreichen." This is not confirmed by my specimens. I have been able to compare carefully the spicules of my preparations of Platygorgia (Gorgonia albicans) with those of Eunicella papillosa, and I have found them remarkably alike. The torches (clubs) of both are on an average 0.1 mm. in length and the spindles 0.14 mm. The torches are fairly uniform in size when full grown, the spindles are much more variable. The most striking point, however, of the comparison is the extraordinary resemblance in detailed structure between the torches of the Eunicella and of the Gorgonia albicans. The examination of my preparations of spicules alone would lead any one to the conclusion that they were taken from the same species. Yet the specimen of Eunicella papillosa obtained on Rij Bank 25 fathoms has a cylindrical axis and prominent verrucae, whilst the specimen of Gorgonia albicans picked up on the beach at Port Alfred has a very much flattened axis, thin coenenchym and inconspicuous verrucae.

These facts seem to point to the conclusion that Eunicella papillosa and Gorgonia albicans should be included in the same genus and family. Further investigation of the anatomy of the two forms is necessary to justify the suggestion that Eunicella papillosa should be placed in the Genus Gorgonia, but I think we should be justified in transferring Eunicella papillosa to the family Gorgoniidae.

Gorgonia Albicans, Kölliker.

Gorgonia albicans, Kölliker, Icones hist.
Eunicella palma, Verrill.
Platygorgia albican, Studer, Archiv. Naturg. 53, 1, p. 60.
? *Gorgonia palma., var. alba.* Esper., Pflanzenthiere.

Localities: (1.) Port Alfred. Beach dried.
(2.) Off Cape St. Blaize, S.W. Seal Island, W. $\frac{1}{2}$ S. 17 fathoms. Sand.

The colony of the first-named specimen is upright, 300 mm. in height, branching in one plane, the branches free, not anastomosing. The stem and the inferior parts of the branches are very much flattened in the plane of branching.

The diameters of the main stem are 5 mm. and 22 mm., the axis being bare, of the lower branches are about 4 mm. and 10 mm., including the coenenchym. The terminal branches are almost cylindrical in shape. The coenenchym is thin. The axis is horny, with very little or no lime. The verrucae are small 0·5 mm. in diameter and scattered unevenly on all sides of the branches.

The surface of the coenenchym presents a series of peculiar torch-like spicules similar to those of Eunicella (Hickson 6 Plate v.c.). They are about 0.1 mm. in length. The other spicules are spindles with very pronounced and regularly arranged tubercles, varying considerably in size, but frequently reaching 0.15 mm. in length.

The second specimen, which is well preserved, is a good deal smaller, being not more than 70 mm. in height. The coenenchym of the base is very largely destroyed, and the horny axis is covered with a varied fauna of zoophytes, of which a species of Hydrozoon allied to Bimeria is a predominant feature. The most important fact about this specimen is that the stem and branches are not flattened but nearly cylindrical throughout, and the branching is not strictly in one plane. The coenenchym moreover, is in many parts of the branches swollen to form oval knobs, or knuckle-like nodes. These two features are noteworthy because, to a superficial observer, they might seem sufficient to separate the specimen from a species to which the generic name Platygorgia has been applied. I am very strongly of opinion that the flattening of the stem and branches so frequently noticed in this species and in Gorgonia (Lophogorgia) flammea (Ellis) is a character produced by local circumstances, and should be used very cautiously for diagnostic purposes. For this reason I have adopted Kölliker's view that the species should be retained in the genus Gorgonia for the present. The colour of both specimens is pale cream to white.

The second specimen is, in external features, very similar to the specimen that is described next (Gorgonia species?), but it differs from it decidedly in the character of the spicules. In Gorgonia albicans, moreover, the elongated slit-shaped openings of the calices are irregularly arranged, not parallel with the axis as they are in Gorgonia lütkeni, G. capensis and the unnamed specimen in the collection.

Gorgonia, Sp. (?).

Locality: Lat. 34° 5′ 20″ S., Long. 25° 43′ E. 52 fathoms. Rock.

Syn. Euplexaura capensis (?) Verrill, 20.

In the bottle containing Eugorgia gilchristi (p. 230) there was a fragment of what may have been a large Gorgonian consisting

of an axis 120 mm. long with six lateral branches, themselves supporting a few small branchlets. The branches are 4 mm. × 2 mm. in diameter, the axis being decidedly flattened, and they terminate distally in distinctly swollen extremities. The zooids are few in number and confined to the lateral areas of the flattened branches. The coenenchym is thick and fleshy on the terminal branches, but very thin on the principal branch or axis. The spicules are warted spindles about .1 mm. in length and fairly uniform in size. Some longer pointed spindles with fewer tubercles occur in the calices. The surface of the branches is smooth, the position of the calices being represented by slit-shaped pores parallel with the axis and in some cases with a slight mound or convexity round them. The specimen is probably related to Gorgonia lütkeni (W. and S.) and Gorgonia capensis (Hickson), but differs from both in some particulars. The terminal branches are a good deal more fleshy than in both, and in colour it is white not yellow or yellowish red. In these particulars the specimen approaches Verrill's Euplexaura capensis. The axis is devoid of calcium carbonate.

Eugorgia Gilchristi, n. sp.

Plate IX., figs. 15 and 19.

Locality: Lat. 34° 5′ 20″ S., Long. 25° 43′ E. 52 fathoms. Rock.

Considerable difficulty was found in determining the proper position of this form. In its mode of growth the character of the superficial coenenchym, the character of the verrucae, it has a close resemblance to the genus Verrucella, and at first it seemed to correspond with the Verrucella granifera, Köll, obtained by Möbius off the coast of Africa (sic!) But it differs from Verrucella and the family Gorgonellidae to which Verrucella belongs in the fact that the axis is not calcified. I have decided, therefore, with some hesitation, to place it in the genus Eugorgia (Verrill), with which it agrees in the horny character of the axis, the general character of the spicules, and the "finely granulous" nature of the surface. It seems to approach most nearly the description of Eugorgia Daniana (Verrill) from Panama and Pearl Islands, but I think it may justifiably be regarded as a distinct species.

It is a large flexible coral springing from a single horny stem 4.5 mm. in diameter and reaching a total height of 240 mm. It branches profusely, pinnately or irregularly with occasional anastomoses. The terminal branches are of variable length, and about 1 mm. in diameter. The axis is horny throughout and very slender indeed in the terminal branches. The verrucæ are dome-shaped, quite distinct, but not very prominent, and they are

evenly distributed on all sides of the branches. The coenenchym is very thin on the thicker branches, but relatively thick on the smaller ones. The surface is finely granular.

The spicules are very numerous, and consist of spindles with prominent tubercles of various sizes up to .12 mm. in length, double wheels up to ·05 mm. in length, Maltese crosses, fig. 19 c, rough stars or warted spheres .03 mm. in diameter. In the calices there are finely pointed spindles with relatively few tubercles and some which are distinctly flattened, fig. 19 e, as in Verrucella granifera.

The specimen is almost white.

Family **Gorgonellidae.**

Juncella spiralis. n. sp.

Plate VIII., figs. 6, 7, 8 and 9.

Locality : Off Cape Morgan, 32° 45′ 45″ S., 28° 26′ 15″ E. 36 fathoms. Stones, 29 specimens. January 12, 1900.

Twenty fine specimens of this remarkable, new, spirally twisted Juncella were sent to me, with the remark, "There were no specimens showing the tendril-like stock twisting round any support."

The longest specimen was 220 mm. in length when slightly stretched, but this was imperfect, the base having broken off. The longest perfect specimen was 150 mm. Two small perfect specimens which are not spirally twisted, are 50 and 55 mm. in length. The greatest breadth is 4-5 mm. in some large fragments. The smaller specimens are only 2-3 mm. in breadth. The stock is unbranched in all the specimens. The axis is pale brown in colour, and has rings of lime imbedded in the horny matrix. The verrucæ are all prominent, and arranged irregularly on two-thirds of the circumference of the stock, leaving a bare track on one side free from verrucæ for the whole length of the stock. In a large specimen the bare track is 1·75 mm. wide, and the verrucæ project about 1·5 mm. The tentacles are in all cases retracted. In colour, the bare track is orange red, and the verrucæ are a pale yellow. A specimen that I dried became yellow all over, and I have noticed that the spirit in which the specimens are preserved has a pink colour. The red colour may therefore fade away in the course of time. The bare track and verrucæ are covered with a dense armature of spicules, and it is difficult to believe that the verrucæ can be ever retracted. The spicules covering the surface of the verrucæ are irregularly tuberculated plates about ·1 mm. in length and rather less in breadth, but

mixed with these are a number of clubs (Fig. 8) and spindles with thick coarse tubercles about ·1 mm. × ·05 mm. in size. On the coenenchym the surface is armed principally with these clubs and spindles, but a few more flattened forms may be found among them. It is impossible to describe the many variations in form and character of the spicules. Many of them are like the types described, but others are quite irregular. When a fragment of the hard crust which covers the surface is detached with needles and examined with the microscope it is seen that the spicules are tightly jammed together to form an impenetrable armour. The surface of the verrucæ has a distinctly squamate appearance, the plate like spicules slightly overlapping (Fig. 9b.). There are also some long needles 0·4 mm. in length (Fig. 9a) in the deeper parts of the zooids. There can be little doubt I think that the species is rightly placed in the genus Juncella, and it appears to be most closely related to Studer's (15) Juncella flexilis from between Flat Island and Mauritius in 25 fathoms. It differs from this, however, in its smaller size (the specimen of J. flexilis was 20 cm. in length), in its spiral form, in the more irregular arrangement of the verrucæ on the stock, in the presence of a bare track on one side, and in some other peculiarities.

This bare track is seen in some other species of Juncella. In the description of Juncella juncea from the Isle of Bourbon Milne-Edwards and Haime state that the calices leave some trace of a median coenenchymatous space. Ridley (14) also states that there is a distinct median groove in the specimen of Juncella juncea obtained by the "Alert."

The squamate armature of the verrucæ shows some affinities with the characters of the Primnoidae, but, as the plate-like spicules are so small and there are no definite opercular plates, its affinities with Juncella are closer. It is noteworthy, however, that in the Primnoine genus Calypterinus the calices do not occur on one side of the stock. The track which is free from the calices in Calypterinus, however, is covered by the overlapping scales of the lateral calices so as to form a tube. These bare tracks on one side of the stock in Juncella spiralis and Calypterinus allmani have a certain resemblance to the bare tracks on one side of the smaller branches of some forms of Solenocaulon, and suggest the presence of symbiotic crustacea. There is no evidence in support of this at present, but it would be worth the trouble for any naturalist who has the opportunity of dredging in these waters to note the character of any Alpheidae or other animals that might possibly live with this Juncella. Dr. Gilchrist's note that nothing was found around which the stock twisted is of the nature of a support for the suggestion that the spiral form of the larger stocks is associated with the presence of some epizoic animal. We may for the present regard the spiral form and the bare track as characters of the species, but if they prove to be mere adaptations to an

epizoic animal their importance must be considerably discounted.

The species may be described as follows:—

Colony unbranched; in the larger forms spirally twisted. Verrucæ prominent, situated irregularly and closely on three-fourths of the circumference of the stock, leaving a bare track on one side free from verrucæ. Spicules of the surface of verrucæ and coenenchym densely packed, irregular in form or clubs or spindles with prominent blunt tubercles, all about 0·1 mm. in length. A few long needles 0·4 mm. in the more deep-seated tissues.

Colour of the coenenchym orange red, of the verrucæ yellow.

NOTE ON JUNCELLA ELONGATA (PALLAS).

Since the publication of my last paper on the Cape Alcyonaria I have had the opportunity of examining a large number of preparations of spicules of specimens of the genus Juncella from the Indian Ocean and elsewhere. In none of them can be found a single spicule of the kind which I called "triple stars." These peculiar spicules are very abundant in the preparations made from the Cape Juncella elongata, and might be regarded as a character sufficient to distinguish the Cape specimens as a distinct species. Other characters, however, that they exhibit are so strikingly similar to those of Juncella elongata that I do not propose to take this step at present. They may be regarded, however, as constituting a distinct variety, and should be called Juncella elongata (Pall.), var. capensis.

Sub-Order **PENNATULACEA.**

Family **Anthoptilidae**, Köll.

Anthoptilum grandiflorum, Verrill.

Virgularia grandiflora, Verrill (19).
Anthoptilum thomsoni, Kölliker (10).

Plate VIII., fig. 14.

Locality: Lion's Head, N. 67° E. 25 miles. Depth: 131-136 fathoms. Bottom: Black specks on the lead; no deposit obtained by the dredge.

The following notes were kindly sent by Dr. Gilchrist:—

"The colour when fresh was a uniform bright brick red. "Some difficulty was experienced in preventing the polyps from "being washed off by the motion of the preservative fluid owing "to the roll of the vessel.

"They seem to occur in great abundance in particular places, "probably forming miniature forests at the bottom of the sea. "They are not straight when fresh, but more or less bent, with "three gentle curvatures."

Fifty-four specimens were obtained on March 28, 1900, of which twelve were sent to me.

There can be no doubt of the identity of this species with that obtained by the "Challenger" in the Atlantic Ocean, S. of Buenos Ayres, depth 600 fathoms; and described by Kölliker as Anthoptilum thomsoni; but it is difficult to distinguish the species from Verrill's Virgularia grandiflora described in 1879.

The largest unbroken* specimen had the following measurements :—

	Cape Specimen.	"Challenger."
Length of Polypidom	1010 mm.	560 mm.
Length of stalk...	160 mm.	87 mm.
Breadth of stalk bulb... ...	30 mm.	18 mm.
Length of polyps	16 mm.	17·5 mm.
Length of tentacles...	6 mm.	6·8 mm.

In the second column are given the measurements of the largest specimen of the species obtained by the "Challenger."

The other specimens sent from the Cape were a little smaller than the one mentioned above, but I have not measured them accurately, as there is no sufficient reason for supposing that they belong to different species. The main point of interest is that the specimens found on the Eastern side of the Atlantic are larger than those obtained by the "Challenger" on the Western side; but whether this is to be associated with the fact that the "Challenger" specimens were found in deeper water (600 fathoms, against 135 fathoms) or that they were obtained in 20 degrees of latitude further South, or whether the difference in size is simply a matter of geographical isolation, is a question which it is premature at present to discuss. It is noteworthy, however, that notwithstanding the difference in size of the polypidoms, the autozooids and the tentacles of the autozooids of specimens from the Eastern and Western waters are approximately of the same size. Accurate measurements have not been made, and, as it is impossible to prevent a certain amount of shrinkage in the preservation, cannot be made; but the difference in the measurements of the autozooids and their tentacles given by Kölliker and those of my specimens is so slight that it is probable that when alive in their native habitats they were exactly the same.

* Some of the specimens that were cut into two or three pieces for transit were probably larger than this.

The specimens agree with the general description given by Kölliker in most respects, but there are a few minor differences which are worthy of record.

Kölliker remarks that very often the lowest parts of two or three or more polyps of a row are united so as to produce the appearance of very small pinnules, but in no place are all the polyps of one row united in such a manner. This fusion of the bases of the autozooids is much more pronounced in the Cape specimens. Most of the autozooids of a row are fused at their bases for a distance of 3-5 mm. in the middle rows, but there are usually one or two gaps irregular in position in each row where the fusion of the bases is reduced to a mere trace. In the lower rows the fusion of the bases is scarcely noticeable. (Fig. 14.)

The siphonozooids are, as in Kölliker's specimens, very numerous, but, unlike Kölliker's specimens, they exhibit an almost continuous dorsal* series uninterrupted at the bases of the rows of autozooids. I have also found no siphonozooids between the individuals of the rows of autozooids.

I have searched for the calcareous corpuscles found in the muscular layers at the base of the stalk without success. I cannot find any calcareous corpuscles in any part of the colony. This may be an oversight on my part, but it is practically impossible in seapens of this gigantic size to search all parts of the fleshy substance with equal care.

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* The dorsal side of this pennatulid was called "ventral" by Kölliker. For a full discussion of this point, the reader is referred to the important memoir by H. F. E. Jungersen on the "Pennatulida of the Danish Ingolf Expedition, 1904," a copy of which was kindly sent to me by the author, and came to hand as I was passing the proofs of this paper for the press.—S. J. H.

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DESCRIPTION OF THE PLATES.

Plate VII.

Fig. 1. Alcyonium purpureum. New species. The largest colony obtained, attached to a Tunicate test. Natural size.

Fig. 2. Anthomastus grandiflorus. Verrill. Natural size. Au. Autozooids. Si. siphonozooids.

Fig. 3. Ceratoisis ramosa. New species. The specimen was a good deal broken, but it will be noticed from the drawing that the branching is profuse and not confined to any one plane. Twice natural size. See also Pl. VIII., fig. 12.

Fig. 4. Spicules of Ceratoisis ramosa. N. sp. a. and d. Irregular plates found on the surface of the general coenenchym; b. triangular plate found on the aboral side of the base of the tentacles; c. flat spindle-shaped spicule from the neck of the anthocodia.

Fig. 5. Malacogorgia capensis. New genus and species. This species has no spicules. See also Pl. VIII., figs. 10 and 11.

Plate VIII.

Fig. 6. Juncella spiralis. New species. A large but incomplete specimen of the species. All the larger specimens are spirally twisted. Natural size.

Fig. 7. Juncella spiralis. N. sp. A small portion enlarged showing the "bare track" (b.t.) on one side of the stem and the prominent club-shaped verrucæ (ca.) on the other.

Fig. 8. Club-shaped spicule of Juncella spiralis from the surface of the general coenenchym.

Fig. 9. Spicules from the verrucæ of Juncella spiralis. a. Needle; b. plate from surface of the verruca.

Fig. 10. Malacogorgia capensis. N. sp. A portion of the colony at the origin of the primary branches to show the origin of the young zooids.

Fig. 11. Malacogorgia capensis. N. sp. A portion of a terminal branch showing the expanded zooids.

Fig. 12. Ceratoisis ramosa. N. sp. A portion of a terminal branch, much enlarged.

Fig. 13. Spicules of Trichogorgia flexilis. New genus and species. a., b., c. different forms of the flat scale-like spicules which cover the anthocodiae and general coenenchym; d. a portion of one of these spicules, very much enlarged.

Fig. 14. Anthoptilum grandiflorum. Verrill. A portion of the rachis is figured to show the connection between the bases of the autozooids (au) to form rudimentary leaves. In nearly all the rows a gap (g) is seen. Si. the scattered siphonozooids.

Plate IX.

Fig. 15. A small portion of the flabellum of Eugorgia gilchristi (N. sp.), showing at a.a. the occasional anastomoses of the branches. Natural size.

Fig. 16. Trichogorgia flexilis. New genus and species. A small portion of a colony. Natural size.

Fig. 17. Trichogorgia flexilis. New genus and species. A fragment of a branch highly magnified, showing at a. a young zooid, b, b. two large zooids each containing a single ovum, c. a bud, d. a cylindrical zooid not containing an ovum.

Fig. 18. Spicules of Alcyonium purpureum (n. sp.), a. a typical tuberculated spicule of the coenenchym, b. a club.

Fig. 19. Spicules of Eugorgia gilchristi (n. sp.), a. b. two of the many varieties of spicules of the coenenchym, c. one of the very minute Maltese crosses, d. and e. spicules of the anthocodiae.

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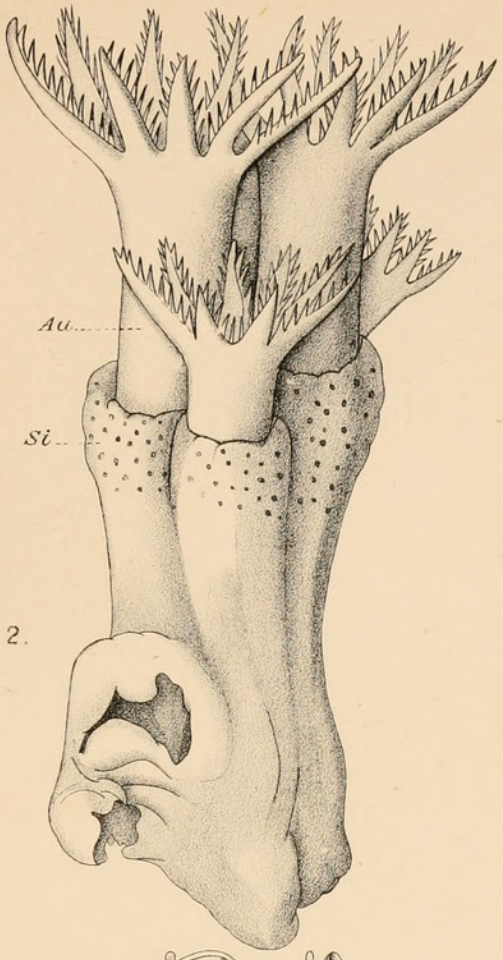

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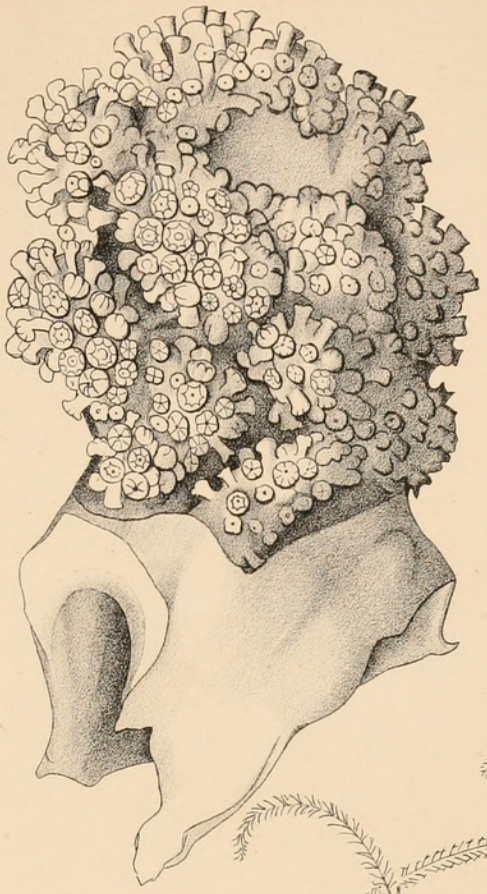

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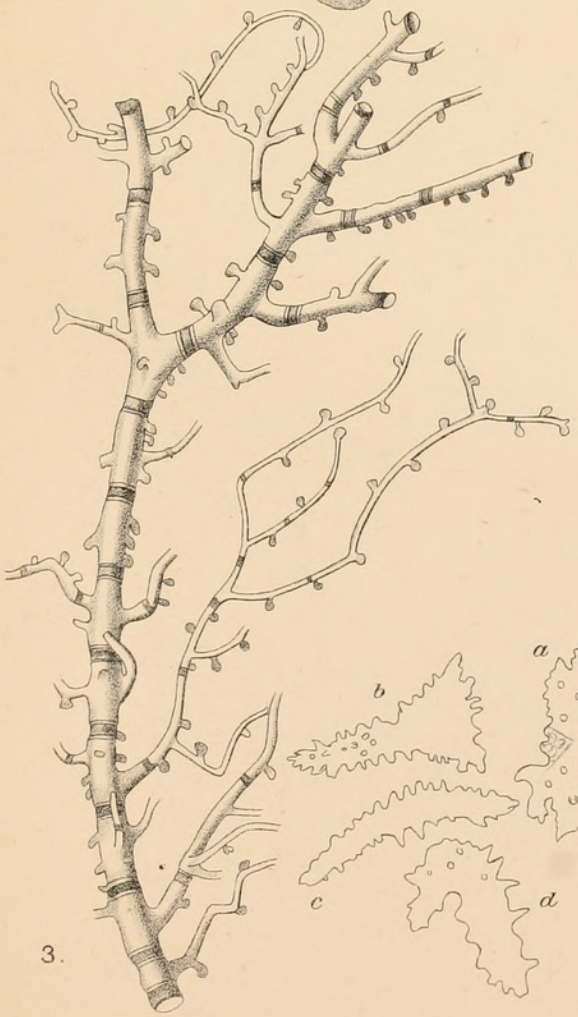

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5.

1 ALCYONIUM PURPUREUM. 3,4 CERATOISIS RAMOSA.
2 ANTHOMASTUS GRANDIFLORUS. 5 MALACOGORGIA CAPENSIS.

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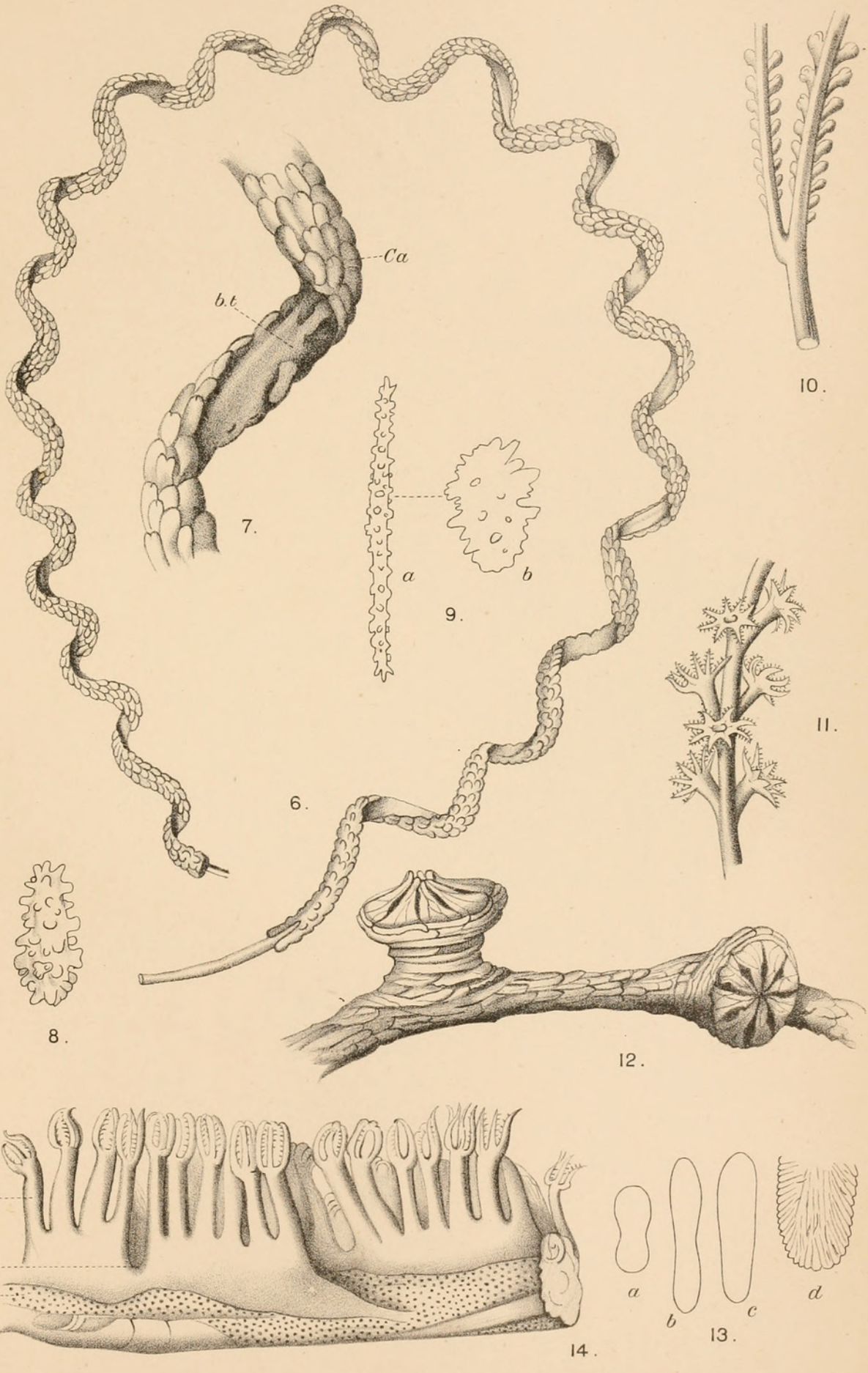
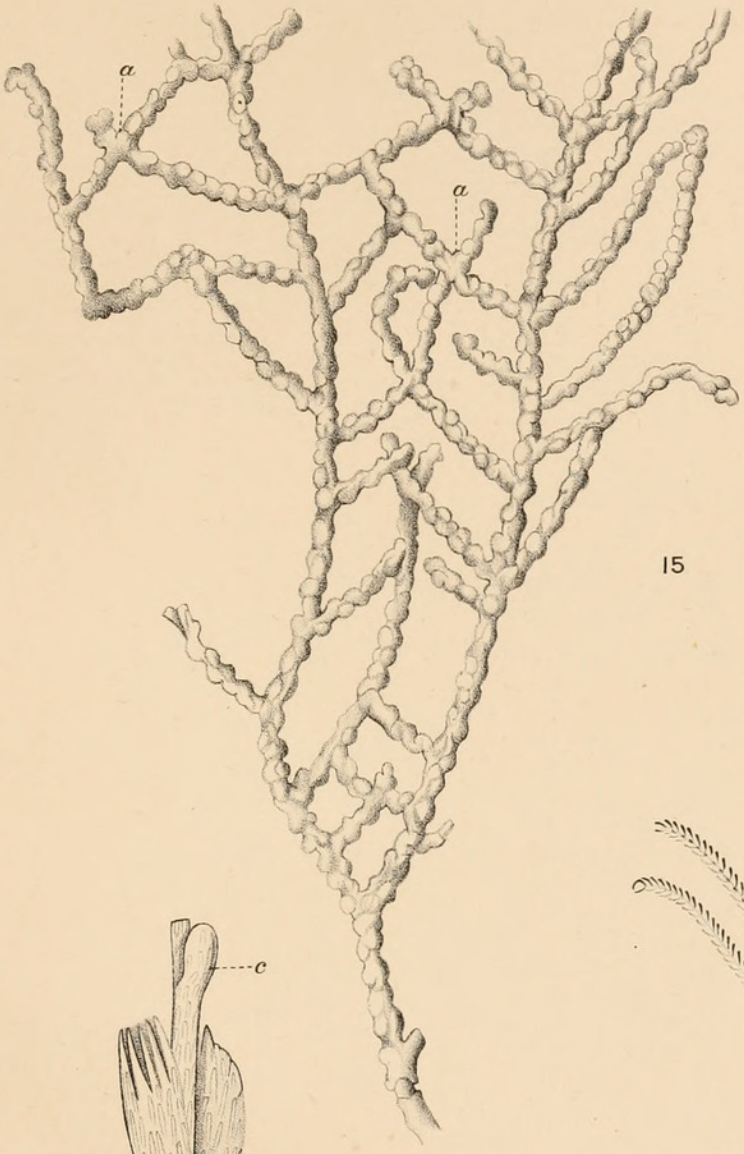


6,7,8,9 JUNCELLA SPIRALIS. 12 CERATOISIS RAMOSA.
10,11 MALACOGORGIA CAPENSIS. 13 TRICHOGORGIA FLEXILIS.
14 ANTHOPTILUM GRANDIFLORUM.

E. Wilson, Cambridge.



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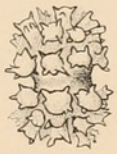

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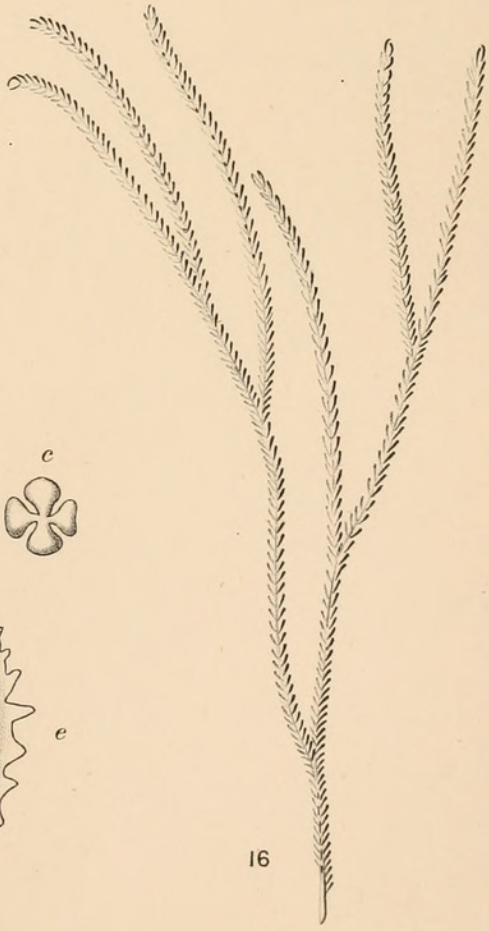

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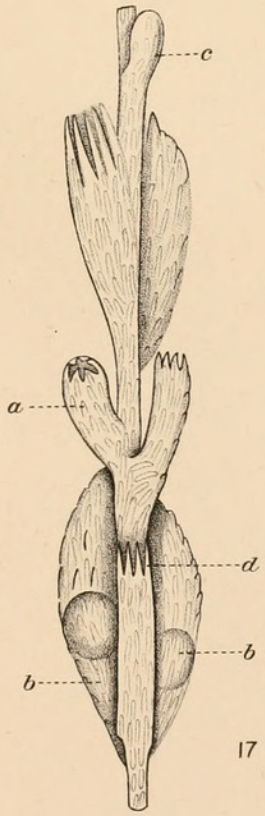

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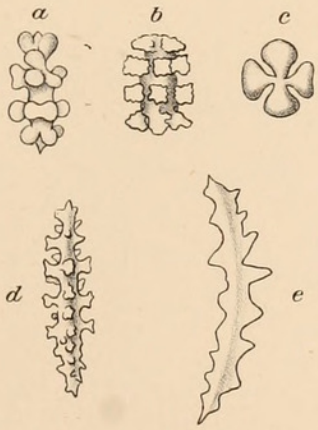

19

15,19 EUGORGIA GILCHRISTI. 16,17 TRICHOGORGIA FLEXILIS.
18 ALCYONIUM PURPUREUM.

E. Wilson, Cambridge.