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THE ALCYONARIA OF FUNAFUTI.

PART II.

By THOMAS WHITELEGGE.

Zoologist, Australian Museum.

[XII.]

THE ALCYONARIA.

Part II.

By THOMAS WHITELEGGE,
Zoologist, Australian Museum.

The collection of *Gorgonidae* made by Mr. C. Hedley, although small in number, is particularly interesting from the fact that, of the ten species obtained, eight prove to be new.

Included in the collection is a number of noteworthy forms belonging mostly to genera containing but few species.

The species described as new are as follows:—*Keroeides gracilis*, *Acanthogorgia breviflora*, *Anthomuricea simplex*, *Villogorgia flagellata*, *Bebryce Studeri*, *Muricella purpurea*, *Nicella laxa* and *Verucella flabellata*. Six out of the eight genera above mentioned, have not previously been represented in the Museum collection.

The wealth of the Pacific Ocean in *Gorgonidae*, indicated by the Challenger Report, has been further emphasized by the investigation of the Funafuti fauna.

The result of these studies has been to enlarge genera hitherto only represented by one or two species; thus, another species has each been added to the monotypic genera *Keroeides* and *Nicella*, the former inhabiting the coast of Japan, the latter that of Mauritius. *Anthomuricea* and *Bebryce* have each been increased by an additional species.

The whole of the specimens with two exceptions (*Plexaura antipathes* and *Heliopora*) were obtained by tangles on the outer reef, at a depth of from 40 to 70 fathoms.

Mr. Edgar R. Waite has again favoured me with the drawings from which the accompanying plates have been reproduced.

The following notes have been supplied by Mr. C. Hedley:—“Dead specimens of the *Heliopora* were abundant, a raised bed of it indicating upheaval is described, *ante* p. 11. Numerous colonies, each extending over many square yards were seen in two or three fathoms depth on the lagoon coast of the main islet, but on procuring pieces by the aid of a native diver, they always proved to be dead, having perhaps been smothered by shifting

sand. Dead fragments of this genus were also common on the beaches, yet it was only once encountered by any of our party alive, in which state it was dredged off the South-West Entrance. On Nukulailai, however, I noticed living *Heliopora* in abundance at low water mark at the Boat Entrance.

"The *Plexaura* was restricted, as far as my observations went, to one situation, the lagoon side of a "passage" (*vide* p. 18), where I saw it on both east and west sides of the atoll. It grew in large bushes four feet high and a yard in diameter, in two or three fathoms of water. Numerous *Avicula* attached to these suggested a flock of small birds perching on the twigs."

Order ALCYONACEA.

FAMILY HELIOPORIDÆ.

HELIOPORA COERULEA, *Pallas*.

Heliopora coerulea, (Pallas) Blainville, Manuel d'Actinol., p. 392, pl. lxi. fig. 3.

Mr. C. Hedley informs me that he only once obtained *Heliopora* alive at Funafuti, but that dead specimens were abundant, both cast up on the beach and *in situ* in the lagoon.

It was also observed in a semifossil condition in a raised reef near the centre of the islet. On the island of Nukulailai it was seen alive in profusion at the boat landing.

Order GORGONACEA.

SECTION SCLERAXONIA.

FAMILY SCLEROGORGIA.

KEROEIDES GRACILIS, sp. nov.

(Plate xvi., figs. 1-5.)

This species is represented by four fragments, of which the largest is 50 mm. in height, and 30 mm. in breadth, the main stem is 2 mm. in diameter. Near the base it bears four simple branches, which are alternate, in one plane, and at very unequal distances apart; the largest branch is 30 mm. in length and 1 mm. in diameter.

The polyps are small and roundly conical in shape, from 4 to 6 mm. in height, 1 mm. in diameter at the base, and .6 to .8 mm. at the summit, they are placed on the sides of the stem and branches alternately, those on the latter are inclined towards one side of the plane of branching, their apertures being visible from the front only.

The cœnenchyma is thin, smooth, without external grooves, and densely charged with large closely tuberculate spindles.

The axis consists of a series of long spicules firmly cemented together, its diameter near the base is .9 mm., the terminal twigs .1 mm.

The spicules of the cœnenchyma are straight or but little curved spindles, closely beset with either simple or compound tubercles. On and in the neighbourhood of the verrucae they are very irregular in shape, placed transversely and frequently adapted to each other, having one or both ends obliquely truncated, and including such forms as the following: elongate triangles, clubs, boomerangs and short bent spindles. By transmitted light they are of a bright brick red colour.

The retracted polyps are covered by a series of short, straight, or curved spiny spindles, of a pale pink or white colour; there are a number of spicules embedded in the tentacles, which have a few blunt spines and acutely-pointed ends.

The spicules are as follows:—

(1.) Large almost straight tuberculated spindles. Size—1· by ·15, 1· by ·25, 1·2 by ·35, 2· by ·3 mm.

(2.) Irregular shaped spicules of the verrucae. Size—·3 by ·15, ·3 by ·1, ·4 by ·15, ·5 by ·25, ·6 by ·25, 1· by ·35 mm.

(3.) Operculate spicules. Size—·2 by ·02, ·25 by ·03, ·25 by ·05 mm.

(4.) Tentacle spicules. Size—·1 by ·01, ·2 by ·02 mm.

(5.) Spicules from the axis. Size—·3 by ·02, ·5 by ·04 mm.

The colour is bright coral-red, the polyps are yellowish-white.

This species differs from *Keroeides koreni* in its erect non-pendulous habit and in the characters of its spicules.

SECTION HOLAXONIA.

FAMILY MURICEIDÆ.

ACANTHOGORGIA BREVIFLORA, sp. nov.

(Plate xvi., figs. 6–10.)

A small, broken and almost denuded colony, 52 mm. in height. Arising from an enlarged base, the stem at a height of 5 mm. divides, giving off two branches, of which the smaller is 20 mm. in length and bears a simple branchlet, the larger is 47 mm. in length and bears three simple branchlets at equal distances apart, the longest being 20 mm.; there are indications of four other branchlets, they are, however, broken off quite close to the main branch. The mode of branching is alternate and in one plane, the axis is

horny but rather brittle, at the base it is 1 mm. in diameter, the branches varying from .5 to .7 mm. The colour is blackish-brown, the extremities of the branchlets are yellowish-brown.

The polyps arise at right angles and are arranged on the sides of the branches alternately, they are wider at the apex and base than in the middle, measuring 1. to 1.5 mm. in height, .7 to .9 mm. in diameter, and occur at intervals of from 1. to 5. mm.

The cœnenchyma of the stem is extremely thin, and of a yellowish-white colour, the spicules are few and wide apart, the axis being visible through the tissues.

The spicules of the cœnenchyma are straight or curved, spindles longitudinally arranged, with acute points and a few distant blunt spines.

Size—.3 by .05, .5 by .04, .7 by .05 mm.

The polyp spicules are arranged transversely at the base in oblique rows on the sides, but not so distinctly seriate as in other species of the genus; at the base of the tentacles they are peripheral, and the apex is surmounted by a series of long needle-like spicules with a simple strongly bent or a bifurcated base. The surface spicules are distantly spiny or tuberculate, those deeply seated are often quite smooth. The spicules of the base and sides are curved spindles, with a few blunt spines near the ends and occasionally tuberculate in the middle. Size—.5 by .05, .65 by .04, .8 by .06 mm. The deep-seated spicules are curved or bent, rarely straight, smooth or with faint indications of spines. Size—.3 by .03, .5 by .04, .7 by .03 mm. The coronal spicules have the long free end smooth, the stout basal portion is strongly tuberculate and either simple and angularly bent or bifurcated. Size—.5 by .08, .6 by .07, 1. by .07 mm. The tentacle spicules are short curved rods or spindles with a few strong blunt spines, which are often large and prominent on the convex sides. Size—.2 by .02 mm.

Colour in formol is yellowish-white.

This species may be distinguished from other species of the genus by its small polyps and large spicules.

ANTHOMURICEA SIMPLEX, sp. nov.

(Plate xvi., figs. 11–15.)

A small broken and evidently unbranched specimen is here referred to this genus. The stem arises from an enlarged base, measures 35 mm. in height, judging by the fragments its original height must have been between 60 and 70 mm., the lower portion is a little flattened, the upper cylindrical, it exhibits two subequal curves in opposite directions, and is uniformly 2 mm. in diameter.

The polyps arise at nearly right angles, some are inclined towards the base and others towards the summit, they occur at intervals of from 2 to 3 mm.; on the lower half of the stem they alternate on opposite sides, on the upper they tend to become subspiral; they are cylindro-conical in shape, and are from 2 to 4 mm. in height and 2 mm. in diameter. The apical portion of the stem terminates in a pair of opposed polyps, with a short blunt process at the apex.

The axis is horny, but rather brittle and of dark yellow colour.

The cœnenchyma of the stem is densely packed with large tuberculated spindles, which are generally longitudinally disposed, but they are frequently oblique or even transverse near the bases of the polyps, and they are often bent and adapted to the stem.

The verrucæ are clothed externally with a thickish layer of spicules, differing little except in size from those of the stem, there are a few placed transversely or obliquely at the base, whilst those above are arranged longitudinally side by side, the points of the upper ones projecting slightly beyond the margin, beneath this exterior layer of spicules, are others much smaller, arranged transversely at the base, and obliquely or longitudinally towards the summit.

The polyps are mostly retracted within the verrucæ, in some few instances they are exerted, the conical polyp heads standing out beyond the margins of the verrucæ and exhibiting a narrow neck beneath the collar, devoid of spicules externally.

The collar is composed of a narrow ring of curved spicules, with smooth blunt ends and a few low tubercles in the middle. Above the collaret there are a series of spicules arranged *en chevron* forming an eight-rayed operculum, their upper fourth is closely tuberculate, their lower three-fourths either smooth or with low tubercles; their fixed ends are bluntly rounded, their free ends tapering to not very acute points.

The tentacles have on their dorsal surfaces numerous curved spicules, arranged *en chevron*.

The spicules of the cœnenchyma are as follows:—

(1.) Large straight or curved spindles, thick in the middle, tapering to long acute points, and closely covered with warty tubercles. Size—1 by .2, 1.5 by .23, 2 by .25, 2.5 by .4, .4 by .45 mm.

(2.) Large club-shaped, with the thick end rounded, obliquely truncated, or suddenly tapering to an acute point, and with the narrow end sharply pointed, tubercles as in No. 1. Size—1.5 by 2.5, 1.7 by .25 mm.

In addition to the above, two crosses have been observed, one equal rayed and similar to the larger spicules, the other resembling the smaller polyp spicules.

(1.) The external spicules of the verrucæ are similar to but smaller than those of the stem. Size—1· by ·15, 1·5 by ·2, 2· by ·2 mm.

(2.) Smaller deep-seated fusiform spicules, with distant tubercles or low spines, rather numerous in the verrucæ, particularly at the base. Size—·5 by ·08, ·8 by ·1, 1· by ·15 mm.

(3.) Curved collar spicules, with the ends smooth and rounded, the central region with a few distant blunt spines or low tubercles. Size—·7 by ·1, ·8 by ·12 mm.

(4.) The spicules of the operculum consist of a larger external, and of a smaller internal series, the larger are tuberculate, fusiform or subclavate with the free ends acute and the fixed ends blunt. They measure ·6 by ·08, ·7 by ·09, and ·8 by ·1 mm.; the smaller are slightly curved fusiform or subclavate, with either acute or blunt ends and a few distant tubercles. Size—·25 by ·05, 4· by ·08 mm.

(5.) The tentacle spicules are very numerous, and consist of straight, curved, or bent rods, with faint indications of spines, they are imbedded in the tissues and may be traced below the collar, probably in the apices of the inverted tentacles.

All the spicules except the last-named, which are colourless, are of a dark brick-red by transmitted light.

There are no traces of spicules of the form called "stachelplatten" by Kolliker.

The colour in formol is purplish-red.

This species differs from *A. chæmelon* and *A. argentea* by the larger size of the polyps and spicules.

VILLOGORGIA FLAGELLATA, sp. nov.

(Plate xvi., figs. 16–20.)

There are seven fragments all more or less denuded owing to their being entangled in the tow, one is attached to the dead stem of a species of *Verrucella*.

The largest specimen is 95 mm. in height and from 15 to 20 mm. in width, it is flattened in a plane opposite to that of the branching, the stem is ·7 mm. in diameter, the branches are lateral, opposite or alternate, simple or bearing long slender thread-like twigs. The axis is horny, yellowish, the branches and twigs are flexible the base of the stem rather brittle. When viewed by transmitted

light under the microscope it presents an appearance like the axis of *Plexaura flavida*.*

The polyps are alternate or often in pairs on opposite sides, especially at the summits of the slender twigs, they occur at intervals of from $\cdot 5$ to 1 mm. they are $\cdot 5$ to $\cdot 6$ mm. in diameter, and from $\cdot 7$ to $\cdot 8$ in height, in shape they are roundly conical, on the stem and branches, whilst the terminal ones are usually cylindrical.

The cœnenchyma is very thin, the branches are encircled by a single layer of quadriradiate spicules, the rays are frequently at right angles to each other, they are bent down in such a manner as to embrace the stem, the upper central ray is produced and projects through the cœnenchyma, giving the stem and branches a spiny outline.

The external spicules of the verrucæ are triradiate, the upper ray being long and spine-like, and project through the tissues, at angles varying from the horizontal to the perpendicular, the lower rays are imbedded in the cœnenchyma and are very variable in shape, in some cases they are simple tuberculated spines, in others the spines are distinct but they are connected by a perforate plate, or the spines may give place to a many rayed perforate plate, beset with minutely beaded tubercles.

The summits of the verrucæ are surmounted by a series of long acute spicules, resembling those of the walls but having the projecting ray longer and the imbedded portion more strongly but irregularly developed.

The tentacles have at their bases externally a few irregular curved spindles, with a minutely granular and tuberculated surface, on the convex side near their free ends, they are usually provided with three or four teeth-like processes; similar but smaller spicules exist in the tentacles, the denticles often projecting at their apices.

(1) The quadriradiate spicules of the cœnenchyma have acute points and a few blunt spines, they measure in their widest diameter $\cdot 15$ by $\cdot 2$ mm., they are from $\cdot 1$ to $\cdot 15$ mm. in height, the rays are from $\cdot 07$ to $\cdot 1$ mm. in length and $\cdot 03$ mm. in diameter, the apical spines are from $\cdot 03$ to $\cdot 1$ mm. in length.

(2.) The triradiate spicules of the verrucæ measure in their widest diameter from $\cdot 15$ to $\cdot 35$ mm., their height is from $\cdot 15$ to $\cdot 3$ mm., the free acute ray is from $\cdot 1$ to $\cdot 2$ mm. in length and $\cdot 05$ mm. in diameter.

(3.) The apical spicules of the verrucæ are from $\cdot 3$ to $\cdot 5$ mm. in height, and from $\cdot 2$ to $\cdot 4$ mm. wide at the base, the free spine being $\cdot 15$ to $\cdot 25$ mm. in length and $\cdot 05$ mm. in diameter.

* Kolliker—Icones Hist., ii., 1866, pl. xii., fig. 5.

(4.) The irregular curved operculate spicules are from $\cdot 15$ to $\cdot 25$ mm. in length, and from $\cdot 05$ to $\cdot 1$ mm. in diameter at the free dentate end.

(5.) The tentacle spicules are curved, acute at one end and dentate at the other, the teeth being generally confined to the convex side, they are from $\cdot 05$ to $\cdot 1$ mm. in length.

Colour in formol is yellowish-white.

Villogorgia flagellata is distinguished from other species of the genus by its slender whip-like branches, and by its single layer of quadri- or radiate spicules.

VILLOGORGIA INTRICATA, Gray.

Brandella intricata, Gray, Cat. Lithophytes Brit. Mus., 1870, p. 30, fig. 8; Ridley, Ann. & Mag. Nat. Hist., ix., ser. 5, 1882, p. 188.

One specimen, 120 mm. in height and 70 mm. wide, the axis is dark brown at the base, the branches light yellowish-brown, the polyps and cœnenchyma are creamy-white.

BEERYCE STUDERI, sp. nov.

(Plate xvii., figs. 21 – 25.)

Of this species only one small specimen is available, the base is wanting and some of the smaller branches are broken off.

The stem is 60 mm. in height and 1.5 mm. in diameter. The branches are in a plane, alternate and generally at right angles to the stem; there are four lateral branches, situated at irregular distances apart, three of which bear one or two branchlets, these in turn bearing very short twigs.

The axis is horny, the main stem dark brown, the branches yellowish-brown.

The polyps are alternate, rarely opposite, and arranged in rather loose irregular spirals round the stem and branches, at the extremities of the twigs there are usually a pair placed on opposite sides, which are slightly larger than those on the rest of the colony.

The polyps form low rounded elevations from $\cdot 3$ to $\cdot 7$ mm. in height, and from $\cdot 8$ to $\cdot 1$ mm. in diameter, and from 1 to 4 mm. apart.

The cœnenchyma is thin, grayish-white in colour, and has a finely granular appearance under a moderate magnifying power.

The cœnenchyma of the stem and walls of the polyps are densely coated with an external layer of minute spicules, which, viewed

as opaque objects under the microscope, present an irregular lenticular appearance; when seen by transmitted light they reveal a very narrow smooth central constriction, an upper round disk, minutely granulose and somewhat opaque, a lower irregular tuberculate disc, quite translucent and frequently larger than the upper.

The granular disks of these modified double clubs are directed outwards and form a fairly uniform crust over the whole colony.

Situated immediately beneath this external layer are numerous larger spicules, having a broad multilobate disk, and a very short central boss surmounted by two or more tubercles. These spicules exhibit a distinct central line of union, and the boss-like end is directed outwards.

The polyps are provided with a collar of curved spicules; on the lower dorsal surface of each tentacle are three curved spicules, a short one placed transversely with the convex side directed towards the summit, and two placed longitudinally with their convex sides inwards.

Embedded in the apices of the tentacles are a few short curved spicules, with strong dentate processes on the convex side.

(1.) The cortical spicules are rarely longer than broad. Size—.03 by .03, .04 by .35 mm.

(2.) Deep seated, broad, star-shaped, the rays and disk being studded with warty tubercles. Size—Diameter of disks from .05 to .2 mm., those measuring about .15 mm. being the most common. The height is from .03 to .1 mm.

(3.) The collar spicules are curved, sharp or blunt pointed spindles with a few distant spines. Size—.3 by .02, .35 by .03 mm.

(4.) The tentacle spicules are slightly spinose, mostly on the convex side, and frequently dentate at the apex. Size—.1 by .02, .15 by .03 mm.

Colour in formol is pale yellowish-white.

This species differs from *B. philippii* in the smaller sizes of its polyps, and from *B. mollis* in its spicular characters.

MURICELLA PURPUREA, sp. nov.

(Plate xvii., figs. 26 - 29.)

The colony is erect, branched in one plane; it is 120 mm. in height and 90 mm. in breadth.

The main stem is straight in its lower two-thirds, the upper third being a little curved; it arises from an enlarged base and gives off a series of short simple branches and about seven or eight larger branches, which bear numerous branchlets, these in turn bearing short, slightly flattened twigs. The larger and

smaller branches are given off almost at right angles, at a short distance from their origin they are bent or curved upwards; they are alternate, rarely opposite, and occur at intervals of from 3 to 10 mm. throughout the whole colony.

The polyps are confined to one surface, they are alternate or opposite, and arise at right angles from the front and sides of the stem and branches. A median line devoid of polyps exists on most of the younger shoots, but on the older parts it is more or less interrupted by isolated polyps; the terminal twigs invariably have an opposed pair of polyps at their apices.

The length of the main stem is 100 mm., its diameter at the base is 2.5 mm., and at the broken summit 1.5 mm.; the largest branch is 8.5 mm. in length, and 1.5 mm. in diameter; the shorter branches and twigs range from 5 to 14 mm. in length, and have a diameter of 1 mm.

The axis is of a dark brownish-yellow at the base, the branches are of lighter shade; at the base it is 1.7 mm. in diameter, the terminal twigs are .2 mm. at their origin.

The coenenchyma is thin, on the bases of the stem and larger branches, elsewhere it is a little thicker, the spicules consist of large closely tuberculated spindles, some are cylindrical to within a short distance of their acute points, others taper from the middle to sharp points, whilst some few are branched and have two or three short acutely pointed rays; they are curved bent or twisted and adapted to embrace the stem, a dried fragment presenting a wicker-work-like aspect due to the interlacing of the large spicules, the general arrangement being longitudinal.

The polyps are conical and arise from between the large spicules, they are .8 mm. in height, .8 to 1 mm. in diameter at the base and from .4 to .7 mm. at the apex.

The basal portion of each polyp is partly surrounded by the bent ends of the stem spicules and a series of other much shorter spicules, extending to the summit of the verruca, which are arranged longitudinally in rather indistinct groups, either erect or placed at an angle with their apices in contact. Above these is situated a narrow collar of short curved spicules, which forms a projecting rim around the summit, and arising within the collar are numerous short spiny spicules forming an operculum. There are also a few nearly smooth spicules embedded in the tentacles.

The coenenchyma spicules consist of large closely tuberculate cylindrical or fusiform spindles, occasionally branched. Size 1 by .15, 2 by .2, 3 by .27, 4.5 by .24, 5 by .28, 5.5 by .3 mm.

The polyp spicules are as follows:—

(1.) Larger straight or curved fusiform spindles with rather distant rounded tubercles. Size—.4 by .1; .6 by .15 mm.

(2.) Smaller deep seated spicules with acute points and a few scattered spines. Size—3 by .05 ; 4 by .05 mm.

(3.) Curved collar spicules with a few low rounded tubercles and rather blunt ends. Size—3 by .03 mm.

(4.) Operculate spicules with the free end acute and spiny, the lower end blunt. Size—.15 by .02 mm.

(5.) Tentacle spicules slightly curved with a few distant low spines. Size—.1 by .01.

The colour of the spicules by transmitted light varies from light to dark red. The stem when dried, appears as if coated with small silvery granules, this effect is produced by the tubercles which are—in common with the rest of the spicular surface—invested by a hyaline sheath becoming silvery white when dry. Colour in formol is dark purplish-red.

Muricella purpurea appears to be a very distinct species characterised by its gigantic spicules.

FAMILY PLEXAURIDÆ.

PLEXAURA ANTIPATHES, *Esper*.

Gorgonia antipathes, *Esper*, Die Pflanzenthiere, ii., p. 90, pl. xxiii., fig. 1, 2 ; *Kolliker*, Icones. Hist., pt. ii., 1866, p. 138, pl. xviii., figs. 21, 22 ; *Klunzinger*, Die Korallth. de Rothen Meeres, 1877, p. 51, pl. iv., fig. 1.

There is one large example referred with some little doubt to this species, it appears to be common, numerous specimens being in the Museum collection from the New Hebrides, Fiji, and other coral islands. The colony is 600 mm. in height and 300 mm. in breadth, the main stem is 25 mm. in diameter near the base, at a distance of 80 mm. it divides into two main branches, each of which bears a great number of branchlets, the whole forming a much ramified tree-like colony. Primarily the branching is usually in one plane, but owing to the twisting in and out of the branches during growth, this bilateral feature is somewhat obscured in the adult colony, if however the origin of the branches is carefully noted it at once becomes evident.

The branches are lateral and alternate, but frequently absent or suppressed on one side, the buds appearing as low elevations ; they are a little compressed in the plane of branching, after attaining to a length of from 5 to 8 mm. they take a sudden bend upwards and the further growth of the shoot is continued in a line more or less parallel to the parent branch.

The terminal twigs are cylindrical and of equal thickness throughout, or tapering gradually and ending in low conical points, whilst some few are club-shaped with obtusely rounded apices, they measure from 3 to 5 mm. in diameter.

The polyps are generally about 1.5 mm. apart, mostly flush with the surface, except on the younger parts of the colony, where they are often somewhat prominent; their apertures when perfect are covered by eight rays composed of groups of rod-like or sub-fusiform spicules, having a few low tubercles and sharply pointed apices. Size—.1 to .15 by .02 mm.

The cœnenchyma on the main stem is from 1 to 1.5 mm. in thickness, and 2 mm. on the terminal twigs; in the dried condition it is of a light stone colour.

The axis is black and spirally grooved, the stouter branches are flattened in the plane of branching.

The cortex is covered externally by a dense layer of tuberculated clubs, and a few subspherical tuberculated granules; the head of the club is directed outwards; when viewed end on from above they present a whorl of three compound tubercles; the shaft has also one or two zones of small, smooth or spiny tubercles. Size—.08 by .04, .1 by .05 mm.

The cœnenchyma spicules are chiefly straight fusiform spindles, frequently branched and cross-like. The spindles have from 4 to 8 whorls of tubercles, the two central whorls are composed of large warty tubercles, the remaining whorls gradually diminish in size as they approach the very acute ends of the spicule. Size—.15 by .05, .2 by .05, .23 by .06 mm.

There are also a few comparatively smooth fusiforms, with two or more distinct whorls of low simple tubercles. Size—.1 to .15 by .03 mm.

In the terminal twigs there exist large cylindrical or subclavate spicules, having blunt apices beset with numerous compressed spines; the rest of the surface varies greatly, being either smooth, spiny, or distantly tuberculate, the lower ends are abruptly pointed. Size—.5 by .07, .6 by .08, .7 by .1 mm.

On seeing these spicules I at first thought they did not belong to the colony, but I afterwards made about six different preparations of the spicules, by nipping off the smaller twigs and boiling in potash, taking due precautions to exclude any foreign spicules; these larger spicules were found in every instance in greater or less abundance.

FAMILY GORGONELLIDÆ.

NICELLA LAXA, sp. nov.

(Plate xvii., figs. 30–33.)

The colony is feebly branched, the branching lateral and in one plane. The short basal stem is 2 mm. in diameter, and at a height of 15 mm. divides into two branches, one of which is

broken off close to its origin, the other is 25 mm. in length and 1· mm. in diameter, diminishing to ·05 near the apex, at a height 30 mm. it gives off a lateral branch, bearing two branchlets the upper 45 mm. and the lower one 5 mm. in length. On the opposite side at a height of 32 mm. from the origin of the first branch is situated a second simple branch 42 mm. in length.

The axis is laminate, calcareous, brittle and of dark brownish-yellow at the base, with white or yellowish-white branches, the basal portion of the stem is cylindrical, the branches are subquad-rangular, without grooves, but marked by numerous elongated pits.

The cœnenchyma is thin, and when viewed with a lens presents a series of minute ridges forming a network of raised lines, which are lighter in colour and consist of double club shaped spicules.

The polyps are large, alternate, arising at nearly right angles and confined to the sides of the stem and branches, the verrucæ are conical, cylindrical or rarely wider at the base than at the summit, varying according to the relative amount of the retraction of the polyps within the verrucæ.

The verrucæ are divided at their summits, into eight lobes, each lobe is ·3 mm. in height and ·25 at the base. The verrucæ measure from 1· to 2· mm. in height, 1· to 1·5 mm. in diameter, and are from 2 to 4 mm. apart; the terminal polyps are slightly larger than those on the stem and branches.

The tentacles have a number of narrow fusiform spicules on their dorsal surface, they are straight, and either distantly tuberculate or almost smooth. There are numerous rod-shape spicules imbedded in the tentacles, they are arranged *en chevron*, their surface is either smooth or minutely but distantly dentate.

(1.) The cortical spicules are short double clubs with smooth or warty tubercles. Size—·05 by ·02, ·07 by ·03, ·1 by ·05 mm.

(2.) The cœnenchyma spicules consist of broad or narrow fusi-form spindles, with rather obtusely pointed ends and a spiny or tuberculate surface, some of which possess a transverse median constriction. Size—1 by ·03, ·2 by ·03, ·25 by ·05, ·25 by ·06 mm. Many of the spicules, both clubs and fusiforms, are a little flattened.

Colour in formol is light mouse gray. This species differs from *N. dichotoma* by its smaller more distant polyps and by its lax method of branching.

VERRUCELLA FLABELLATA, sp. nov.

(Plate xvii., figs. 34–37.)

The only specimen in the collection is in a much broken condition, and evidently only a fragment of what formed an extensive colony.

EXPLANATION OF PLATE XVI.

Keroeides gracilis, sp. nov.

- Fig. 1. Colony. Nat. size.
,, 2. Cortical spicule.
,, 3. Polyp spicule.
,, 4. Operculate spicule.
,, 5. Portion of the axis.

Acanthogorgia breviflora, sp. nov.

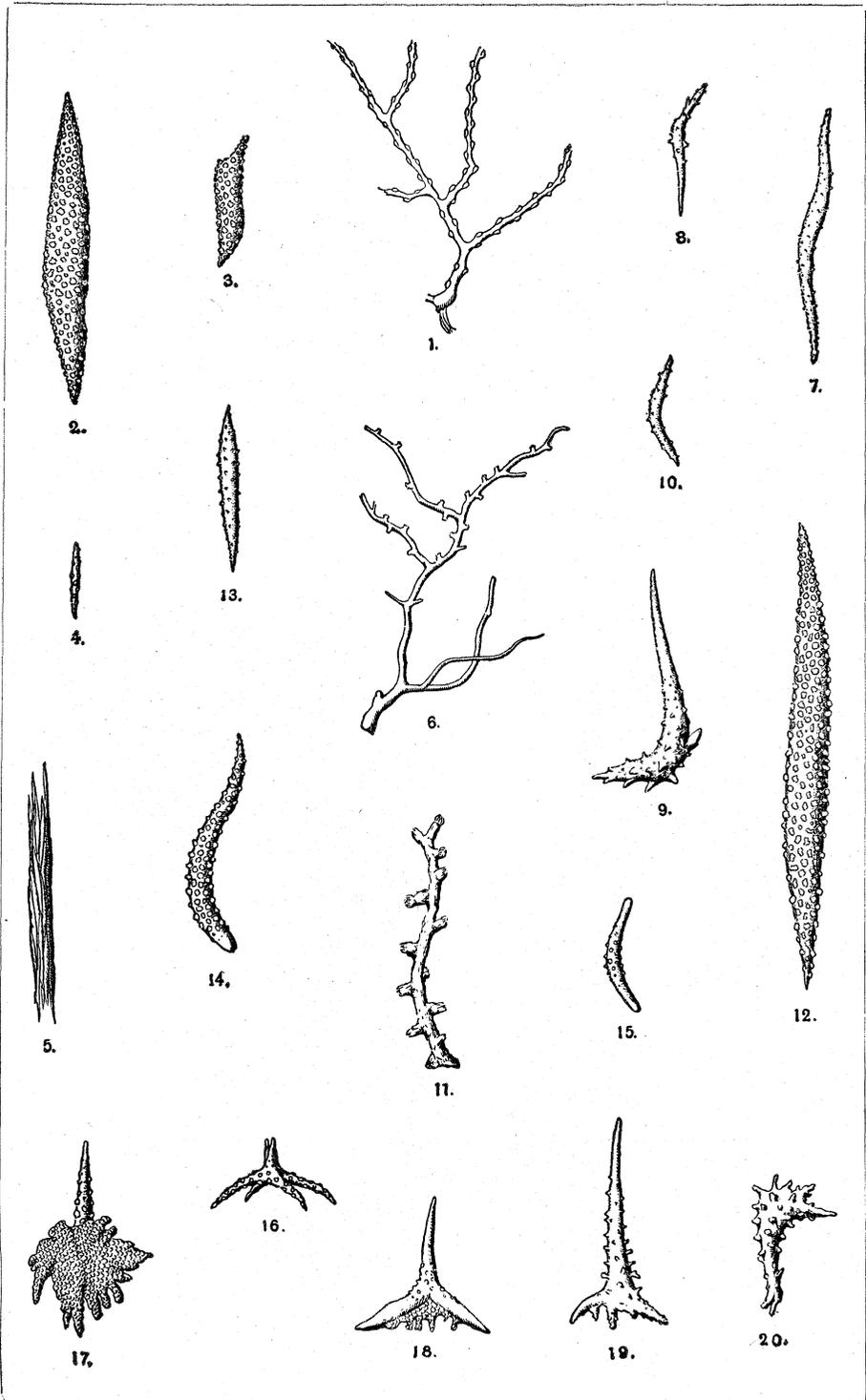
- Fig. 6. Colony. Nat. size.
,, 7. Cortical spicule.
,, 8. Polyp spicule.
,, 9. Coronal spicule.
,, 10. Collar spicule.

Anthomuricea simplex, sp. nov.

- Fig. 11. Colony. Nat. size.
,, 12. Cortical spicule.
,, 13. Deep-seated polyp spicule.
,, 14. Collar spicule.
,, 15. Operculate spicule.

Villogorgia flagellata, sp. nov.

- Fig. 16. Cortical spicule.
,, 17. Polyp spicule.
,, 18. ditto.
,, 19. Coronal spicule.
,, 20. Operculate spicule.



EXPLANATION OF PLATE XVII.

Bebryce studeri, sp. nov.

- Fig. 21. Colony. Nat. size.
- „ 22. Cortical spicule.
- „ 23. Deep-seated cœnenchyma spicule from above.
- „ 24. Ditto, in profile.
- „ 25. Collar spicule.

Muricella purpurea, sp. nov.

- Fig. 26. Cortical spicule.
- „ 27. Polyp spicule.
- „ 28. Collar spicule.
- „ 29. Operculate spicule.

Nicella laxa, sp. nov.

- Fig. 30. Colony. Nat. size.
- „ 31. Cortical spicule.
- „ 32. Deep-seated cœnenchyma spicule.
- „ 33. Ditto.

Verrucella flabellata, sp. nov.

- Fig. 34. Colony. Nat. size.
- „ 35. Cortical spicule.
- „ 36. Deep-seated flattened spicule from the cœnenchyma.
- „ 37. Ditto, viewed from the side.

