DESCRIPTIONS

OF

SOUTH AFRICAN SPONGES

BY

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Dr. J. D. F. Gilchrist, Government Biologist, of Cape Town, has recently sent to the British Museum a collection of Sponges dredged by him off the coasts of Cape Colony and Natal from depths ranging from 13 to 300 fathoms. Most of the specimens were preserved in formalin, but some were dried. All the wet specimens have been transferred to alcohol. By the kind permission of Professor E. Ray Lankester, their description has been entrusted to me. This collection contains several new and interesting forms, and this is not surprising, seeing how little has hitherto been done towards working out the Sponge Fauna of South Africa.

In the present paper the Hexactinellida and Tetractinellida Choristida are described.

Below is a list of species :—

HEXACTINELLIDA.

Family **Rossellidæ.**

1. **Rhabdocalyptus plumodigitatus**, Kirkpatrick.
2. **Crateromorpha lankesteri**, sp. n.

species [10], p. 105, of this genus the autogastralia are hexactine or hexactine and pentactine. In a species of a closely allied genus, *Staurocalyptus pleorhaphides*, Ijima [3], p. 58, both the dermal and gastral membranes are supported by spinous diactines.

Locality.—Large specimen, Lion's Head N. 73° E. distant 28 miles, depth 140 fathoms; small specimen, Lion's Head N. 63° E. distant 34 miles, depth 154 fathoms. Both specimens obtained by shrimp trawl.

Sub-family **Rossellinæ**, F. E. Schulze [8], p. 348.

Genus **Crateromorpha** (Gray), Carter.

Crateromorpha lankesteri, sp. n.

Plate I, figs. 1-11.

Sponge trumpet-shaped, with a well-developed curved stalk expanding into a wide shallow trumpet-like expansion or cup facing laterally, the central axis of the cup continuing the curve of the stalk. Colour pale yellow, and the texture of the cup-wall like that of loose felt. Dermal surface of the cup even, and covered with a fine lace-like reticulum. Gastral surface covered with a continuous mesh-work, papillated at the base of the cup, and roofing over the efferent canals and stalk canals. Edge of cup, thin, sharp-cut, without a fringe of spicules.

Stalk curved, sub-cylindrical, diminishing slightly from below upwards; compressed laterally below, and from before backwards at the upper end, where it expands funnel-like into the cup. Surface covered with a yellow fluff. Texture firm, felt-like, slightly compressible. With four or more anastomosing longitudinal canals in the centre.

Skeleton. The bulk of the skeleton is composed of a network of bundles of diacts, with medium-sized and large hexacts interspersed; the intermedia consist solely of oxyhexasters. The lace-like dermal membrane, which is supported by pentacts, covers a hypodermal network formed of bundles of diacts. Beneath a gastral layer of pentacts is a hypogastral network of diacts, the strands of which are covered with small hexacts. The vertical ray of the dermal and gastral pentacts projects into the parenchyma. The stalk is formed of longitudinal bundles of diacts supported here and there by very large solitary diacts, and of medium-sized, usually solitary, diacts arranged in horizontal plane and frequently radiating.

The fluff which covers the surface is chiefly composed of pentacts. Small hexacts line the stalk canals.

Spicules. Parenchymal diacts (Figs. 5, 6), 1360 to 3100 × 5 to 10 μ, smooth, but with roughened rounded ends, and occasionally with two or four knobs with aborted axial canals; triacts and tetracts of the same character as the diacts, occurring rarely. Large diacts of stalk (Fig. 7) 10 mm. × ·128 mm.

Parenchymal hexacts of various sizes, the largest with conical rays each 620 μ in length, and with centrum 32 μ in diameter.

Autodermal pentacts with rough truncate rays each 285 μ in length, and without a distal knob. The surface pentacts of the stalk (Fig. 9) with long smooth tapering tangentials each 220 to 520 μ in length, the vertical ray being sharp-pointed and from 50-100 μ in length.

Autogastral pentacts (Fig. 8) mostly resembling autodermal pentacts, but some in the floor of the cup having smooth tapering rays like those of the stalk pentacts.

Hypogastral hexacts (Fig. 10) and the slightly smaller hexacts of the stalk canals regular, with roughened blunt-pointed rays 40-110 μ in length, with a small centrum.

Intermedia, oxyhexasters (Fig. 11) 62 μ in diameter, the almost aborted primary rays giving rise to two (usually) or three secondary rays with roughened surface.

The species is named after Professor E. Ray Lankester.

Locality.—Three specimens were obtained by shrimp trawl from a depth of 250 to 300 fathoms, East London N.W. ½ N. distant 18 miles. Bottom—broken shells, hard ground.

Of the three specimens two are dried and the third and smallest is preserved in formalin. The largest (A) is 31 cm. in height, the diameter at the rim being 22 cm., and the depth of the cup 11 cm.; the length of the stem is 22 cm., the diameter below being 3 × 6 cm., and at the upper end 4 × 3 cm.; the system of canals in the centre of the stem occupies, near the lower end, a diameter of 0.6 cm.

The dimensions in centimetres of specimens B and C are as follows:—

	B.	C.
Height	20	12
Diameter of rim	15	7
Length of stalk	10	6

Specimen B has a double stem, a long slit-like fenestra extending nearly the whole length. Specimen A was the best preserved, but even here, the dermal membrane and to a still greater extent the autogastral layer had almost disappeared.

Trawls and dredges are not quite suitable implements for obtaining delicate Hexactinellid Sponges, much better success being obtained by the "long-line" method advocated by Ijima, [4], and [5], p. 16.

The specimens appear to have been torn up from their points of attachment; the lower ends are clear of any foreign matter.

The new species differs from others of the genus not only in its remarkable shape, but also in the absence of discohexasters. These spicules occur in all other species of *Crateromorpha*, and in all the genera of *Rossellinae* except *Bathydorus*. It does not seem necessary, however, to establish a new genus to include the new species.

Owing to the hypogastral membrane of *C. lankesteri* being continuous, the inner surface of the cup-wall does not present the cavernous aspect usually seen in species of *Crateromorpha*.

The hard-felt-like texture of the stalk partly arises from the absence of synapticulæ, which, in some species, *C. meyeri* for instance, weld the lower end of the stalk into a compact mass of stony hardness.*

Family **Tetillidæ.**

Genus **Spongocardium**, gen. nov.

Tetillidae free, ellipsoidal, with a poral vestibule at one end and an oscular cloaca at or near the other end of the long diameter of the upper surface.

Spongocardium gilchristi, sp. n.

Plate II, figs. 1, 1A, and Plate III, fig. 1.

Sponge with the upper surface somewhat flattened, and the lower surface deeply convex.

Poral vestibule usually with a spicular fringe, and oscular cloaca usually with a sharp cut edge without fringe. Surface of poral vestibule smooth and uniform; surface of oscular cloaca reticulate, with oscules (.25—.5 mm. in diameter) in the meshes of the network. Poral vestibule always much deeper than the oscular cloaca. Colour pale buff, the interior being lighter. Surface level but rough, forming a firm cortex, apparently devoid of pores. Beneath the semi-translucent surface a network of white strands visible.

Skeleton mainly formed of bundles of triænes and oxea radiating from centre to periphery, and embracing the poral and oscular depressions; skeletal cortex formed of the cladal ends of the triænes and of tangentially arranged oxea, the clear spaces visible through the surface being partly filled in by the ends of the radiating bundles. In the walls of the poral and oscular depressions, slender tufts of trichodal prodiænes spreading out in fan-like manner as they approach the surface.

Spicules. Megascleres.—Oxea (Fig. 1a). 8 to 10 mm. × .08 to .1 mm., slightly curved, sharp-pointed. Tylotes 3100 × 21 μ,

* In a letter received by me after the proofs of this paper were printed, Dr. Gilchrist writes:—"Very large specimens of this species (*Crateromorpha lankesteri*) were got, the diameter of one of the largest being about three feet. Attempts were made to preserve these, bnt when dried they crumbled on handling."

smooth, curved, with long oval head 45 μ in breadth not uncommon at the surface. Small oxea (Fig. 1b) 1900 $\times$ 30 μ.

Anatriænes (Figs. 1g, g'), rhabdome 9.4 mm. $\times$ .02 mm., with fine hair-like terminations; length of cladus 75 μ, chorda 110 μ.

Protriænes (Figs. 1c, c') with short stout cladi; rhabdome 5300 $\times$ 31 μ; length of cladus 78 μ, chorda 70 μ.

Protriænes (Fig. 1h) trichodal, rhabdome 690 $\times$ 2 μ; cladi unequal, longest cladus 45 μ.

Prodiænes (Figs. 1k, k') trichodal, abundant in poral and oscular areas with dimensions equal to those of trichodal protriænes; cladi about equal.

Orthotriænes (Fig. 1d), rhabdome 4900 $\times$ 35 μ; length of cladi 340 μ, slightly curved. Fig. 1d' represents a plagiotriæne, which only occurs rarely.

Orthodiænes (Fig. 1e), abundant, and orthomonænes (Fig. 1f) with dimensions similar to those of the orthotriænes.

Microscleres.—Sigmaspires of two kinds, viz., a serpentine variety (Fig. 1l) abundant, 35 to 45 μ in length, with long open coils, and a smaller C-and-S shaped variety (Fig. 1m) 16 to 20 μ in length.

Locality.—Cape Natal W. by N. ¾ N., 11 miles; depth 185-200 fathoms. Bottom—sand and mud; obtained by shrimp trawl.

The new species is represented by five specimens, the largest of which is 8 $\times$ 6.5 cm. in horizontal plane, by 5 cm. in height, and the smallest 3.5 $\times$ 2.6 cm. in horizontal plane by 2.8 cm. in height. Of the five specimens, four are provided with a fringe round the poral vestibule, but only one with a well-marked fringe round the oscule, a poral fringe being also present in the latter instance. The nearest allied genus is *Cinachyra* of Sollas, with its numerous poral and oscular depressions. *C. barbata* Sollas [11], p. 23, pls. iii. and xxxix., from Kerguelen is provided with a dense root-tuft and with a cortical layer of radially arranged oxea. *C. voeltzkowi* Lendenfeld [7], p. 101, pl. ix., fig. 35-53, from Zanzibar is a spherical free sponge with numerous oscular cloacæ and with the pores generally distributed over the surface; again, *Tetilla hirsuta* Dendy [2], p. 75, from the Gulf of Manaar has numerous poral and oscular pits. The chief character of the new genus is the localisation of the poral and excurrent openings each in one well-defined region. The pores occupy, in the floor of the vestibule, oval spaces bounded by the tufts of trichodal prodiænes, and open into the distal ends of sphinctrate chones, which merge below into sub-cortical spaces, whence ringed in-current canals proceed. The oscular cloaca presents small circular sphictrate excurrent openings one in each mesh of the superficial network formed by strands of soft tissue. The generic name is suggested by that of the Echinoderm genus *Echinodcardium*, in which the shape of the shell with its mouth and madreporite resembles that of the sponge. The species is named after Dr. Gilchrist.

Genus Tetilla.

Tetilla bonaventura, sp. n.

Plates II and III, fig. 2.

Sponge shaped like a mushroom with a thick stem. The dome-shaped upper surface finely hispid, with several small oscules 1.5 mm. in diameter. Colour a dirty greenish grey.

Spicules. Megascleres.—Oxea (Fig. 2a) 4200 × 48 μ, almost straight, slightly aniso-actinate, sharp-pointed. Smaller curved oxea and styles (Figs. 2b, b′), 1085 × 31 μ.

Anatriænes (Fig. 2c, c′), rare, rhabdome 8000 × 7 μ, enlarging up to 12.5 μ in width at junction with cladome; length of cladus 60 μ, chorda 90 μ.

Anadiænes (Fig. 2d), abundant, and anamonænes (rare), of the same dimensions as the anatriænes, from which they have been derived.

Protriænes (Fig. 2f, f′) 2720 × 12.5 μ with terminations of extreme tenuity; length of cladus 100 μ, chorda 60 μ.

Prodiænes (Fig. 2g) of approximately similar dimensions to protriænes figured in fig. 2f.

Trichodal protriænes (Fig. 2h), rhabdome 190 μ, one cladus 25 μ, the other two each 8 μ in length.

Microscleres. Sigmaspires (Fig. 2k), 11.5 μ.

Locality.—False Bay, 22 fathoms.

The single specimen is 4 cm. in height and 5 cm. in diameter in horizontal plane. The new species resembles *T. coronida* Sollas, and *T. pedifera* Sollas in having anamonænes, but *T. pedifera* has no microscleres; the anamonæne of *T. coronida* probably results from the reduction of a protriæne, but in the present species from a reduced anatriæne, the shape of the anamonæne being very different in the two cases.

Another characteristic feature of the new species is the occurrence of the anadiænes.

Tetilla casula, Carter.

Plate II, figs. 3, 3A.

1871, **Tethya casula**, Carter [1], p. 43.

1888, **Tetilla casula**, Sollas [11], p. 99, pl. IV., figs. 1-9.

The one example of this species occurring in the present collection presents a very different appearance from the type specimen figured by Carter [1], pl. iv. fig. 1. The former has the shape of a solid sphere segment or low circular dome with a flat under surface. It seemed, at first sight, as though the specimen were a piece sliced off from a spherical sponge. Dr. Gilchrist remembered, however, the sponge being brought to the surface in the condition in which he sent it. The flat base is 5 cm. in diameter, and the height 1.7 cm. The convex surface, over the lower half of the slope, presents tufts of spicules (oxea and protriænes) which form a fringe round the circular edge. The surface is smooth and even, excepting where fissures have formed, in one of which the excurrent canals opens. The colour is greenish grey. On section the nucleus, whence the skeletal fibres radiate, is seen to be on the vertical axis passing from base to apex, and at the junction of the middle and lower third.

The spiculation is identical with that of the type specimen.

The under surface of the new specimen is smooth and free from foreign bodies, but the same region in the type is encrusted with sand particles.

The remarkable shape of the type specimen evidently results from contraction due to drying.

Locality.—False Bay, S. Africa, 22 fathoms; the type specimen came from Port Elizabeth.

Family **Pachastrellidæ.**

Genus **Pachastrella**, Schmidt.

Pachastrella caliculata, sp. n.

Plates II and III, fig. 4.

Sponge caliculate with thick rounded rim and hard thick walls. Outer poral surface smooth, here and there nodulated; inner oscular surface finely cribriform over nearly the whole area, oscules about .75 mm. Colour pale buff.

Skeleton mainly composed of densely-packed calthrops of various sizes, with bundles of oxea arranged at right angles to the sponge surfaces; microstrongyles forming a dense surface layer and distributed through the body of the sponge.

Spicules. Megascleres.—Oxea (Fig. 4a) 4800 $\times$ 45 μ, straight or curved, with sharp or rounded points.

Calthrops of many sizes (Fig. 4b-f), the largest with thick rays, each 1085 $\times$ 240 μ, ends pointed, but often obtuse and contorted; some with a fourth ray longer than the other three.

Microscleres.—Microstrongyles (Fig. 4g) 12 $\times$ 5.5 μ, prolate-ellipsoid, with granulated surface.

Microrhabds (Fig. 4h) 25 $\times$ 3 μ, curved, closely and finely spined, not centro-tylote.

Amphiasters (Fig. 4k) 11 $\times$ 11 μ, including spines, with 4-5 truncated rays with granular surface.

Locality.—Durnford Point, Natal, N.W. $\frac{3}{4}$ W., distant 12 miles; depth 90 fathoms. Bottom—broken shells.

The solitary specimen, which is shaped somewhat like a sitz-bath without the bottom, has been cut off sharp from its attachment.

The greatest height is 10 cm; the diameter of the cut base 10 cm.; the thickness of the wall at the cut base 3 cm., and of the edge .75 cm.

The surface is encrusted with several other sponges, and infested with embedded barnacles opening at the surface.

The most characteristic feature of the new species is the caliculate shape. The spiculation closely resembles that of *Pachastrella monilifera* Schmidt, but the megascleres of the former are considerably larger than those of the latter. *P. abyssi* O.S. is here regarded as synonym of *P. monilifera*, O.S., as pointed out by Topsent [12], p. 380.

Pachastrella isorrhopa, sp. n.

Plates II and III, fig. 5.

Sponge massive; pores and oscules not apparent; colour brown; arrangement of skeleton as in preceding species.

Spicules. Megascleres.—Oxea, 3100 × 31 μ, straight or curved.

Amphityles (Fig. 5a) 480 × 10 μ, smooth, curved; head 25 × 10.5, long oval; neck 5 μ; common in one specimen (A), rare in a second specimen (B).

Strongyles (Fig. 5b) 330 × 5.5 μ, smooth, straight; not found in A, not uncommon in B.

Smooth curved oxea (? foreign) 270 × 9.5.

Calthrops, largest with each ray 590 × 62 μ.

Microscleres.—Microstrongyles, 12 × 5.5 μ, prolate-ellipsoid, with granular surface.

Microrhabds, 11-33 μ in length by 2.7 μ in breadth, curved and crooked, closely and finely spined, not centro-tylote.

Amphiasters 11 × 11 μ, with 3-5 rough truncate rays. (There is no room in the Plate for figures of all the spicules).

Locality.—Cone Point, Natal, N.W. ½ W., distant 4 miles; depth 34 fathoms. Bottom—broken shells.

The new species is represented by two specimens. Specimen A (the type), of triangular elevation, is 7 cm. in width, 2.5 cm. in thickness and 5 cm. in height; the colour is dark brown. Specimen B forms a flattened cake-like mass, 8 × 5 cm. in area, and 4 cm. in height, the colour being paler than that of specimen A. Both specimens are infested with barnacle-shells, which permeate the whole mass of specimen B.

This species differs but little from the preceding and from *P. monilifera* Schmidt, the chief distinguishing feature being the curious amphityle spicules.

Both the specimens, A and B, are associated with a soft Lithistid, which forms a flat cake-like crust on the upper surface of B. In the case of specimen A, the Lithistid occurs as a nodule deeply sunk in and incorporated with the *Pachastrella*, and communicating with the exterior by means of tubular vents passing along a deep fissure in the *Pachastrella*.

ἰσόρροπος equally balanced, the name being suggested by the amphityle spicules.

On section of specimen A, the embedded Lithistid appears more vitreous than the surrounding tissues of the *Pachastrella*.

Family **Stellettidæ.**

Stelletta (Astrella) horrens, sp. n.

Plates II and III, fig. 6.

Sponge vase-shaped with thick rounded rim and thick walls of almost stony hardness. Outer or poral surface and inner or oscular surface bristling with strong protriænes and oxea.

Small cribriform groups of oscules, about 1 mm. in diameter, distributed over the whole inner surface slightly below the level of the jungle of projecting spicules; each oscule about .2 mm. in diameter.

Colour of outer surface purplish black, of inner, rufous brown.

Skeleton mainly formed of radiating bundles of protriænes and oxea. Pycnasters forming a layer in the ectosome, and distributed through the choanosome.

Spicules. Megascleres.—Oxea (Fig. 6a) 3900 $\times$ 80 μ.

Protriænes (Fig. 6b): rhabdome 3810 $\times$ 140 μ; length of cladus 440 to 620 μ, chorda varying from 200 μ to 0 μ, the cladi sharp-pointed, claw-like, occasionally almost meeting.

Microscleres. Pycnasters (Fig. 6, c, d) 6.5 μ in diameter with short pyramidal spines; rarely the pycnasters becoming asters 12 μ in diameter, by lengthening of the spines.

Locality.—Durnford Point, Natal, N.W. $\frac{3}{4}$ W., distant 12 miles; depth 90 fathoms. Bottom—broken shells.

The vase, which has been cut off sharp from its area of attachment, expands upwards from a massive solid base; the cut surface is oval, 6 $\times$ 5 cm. in diameter and shows the skeleton fibres radiating from the centre.

The dimensions of the sponge are as follows:—Height 15 cm., diameter of mouth of vase 15 $\times$ 6 cm., thickness of rim 1 cm., depth of cavity of vase 6.5 cm.

The cladi of the remarkable claw-like protriænes are visible to the naked eye, and their presence renders it advisable to handle the specimen very cautiously.

A massive specimen of a *Trachya* is firmly attached to one side of the *Stelletta*, but has not been shown in the figure of the latter on Plate II.

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EXPLANATION OF PLATES.

Plate I.

Fig. 1. *Crateromorpha lankesteri*, sp. n. ½ nat. size.
Fig. 2. Dermal membrane, × 2.
Fig. 3. Gastral and hypo-gastral layer, × 2.
Fig. 4. Transverse section of stalk of smallest specimen, × 2.
Figs. 5, 6. Parenchymal diacts, × 140.
Fig. 7. Large solitary diact of stalk, × 140.
Fig. 8. Gastral pentact, × 140.
Fig. 9. Dermal pentact from stalk, × 140.
Fig. 10. Hypogastral hexact, × 140.
Fig. 11. Oxyhexaster, × 400.

Plate II.

Fig. 1. *Spongocardium gilchristi*, gen et sp. n. Reduced to ⅔ nat. size. *a*, poral vestibule; *b*, oscular cloaca.
Fig. 1A. Vertical section of a smaller specimen. Natural size.
Fig. 2. *Tetilla bonaventura*, sp. n. Natural size.
Fig. 3. *Tetilla casula*, Carter. Natural size.
Fig. 3A. The same, in vertical section.
Fig. 4. *Pachastrella caliculata*, sp. n. Reduced to ⅓ nat. size.
Fig. 5. *Pachastrella isorrhopa*, sp. n. ½ nat. size.
Fig. 6. *Stelletta horrens*, sp. n. ½ nat. size.

Plate III.

Fig. 1. *Spongocardium gilchristi*. *a*. Oxea, × 25.
b. Smaller oxea, × 25.
c. Protriæne, × 25; *c′*, head of *c*, × 100.
d. Orthotriænes; *d′*, plagiotriæne, × 25.
e. Two orthodiænes, × 25.
f. Orthomonæne, × 25.
g. Anatriæne, × 25; *g′*, head of same, × 100.
h. Head of trichodal protriæne, × 425.
k. Trichodal prodiæne, × 100; *k′*, head of *k*, × 425.
l. Large sigmaspires, × 425.
m. Smaller sigmaspires, × 425.

Fig. 2. *Tetilla bonaventura* *a.* Oxea, × 25.
b, b′. Smaller oxea and styles, × 25.
c. Anatriæne, × 25; *c′*, head of same, × 100.
d. Anadiæne, × 100.
e. Anamonæne, × 100.
f. Protriæne, × 25; *f′*, ditto, × 100.
g. Cladome of prodiæne, × 100.
h. Trichodal protriæne, × 425.
k. Sigmaspires, × 425.

Fig. 4. *Pachastrella caliculata.* *a.* Oxea (half length), × 25.
b. One ray of large calthrops, × 25.
c, d, e, f. Calthrops, × 100.
g. Microstrongyles, × 800.
h. Microrhabds, × 880.
k. Amphiasters, × 880.

Fig. 5. *Pachastrella isorrhopa.*
a. Amphityle, × 100.
b. Strongyle (in specimen B), × 100.

Fig. 6. *Stelletta horrens.* *a.* Oxea, × 25.
b. Protriænes, × 25.
c. Pycnasters, × 425; *d*, the same, × 880.

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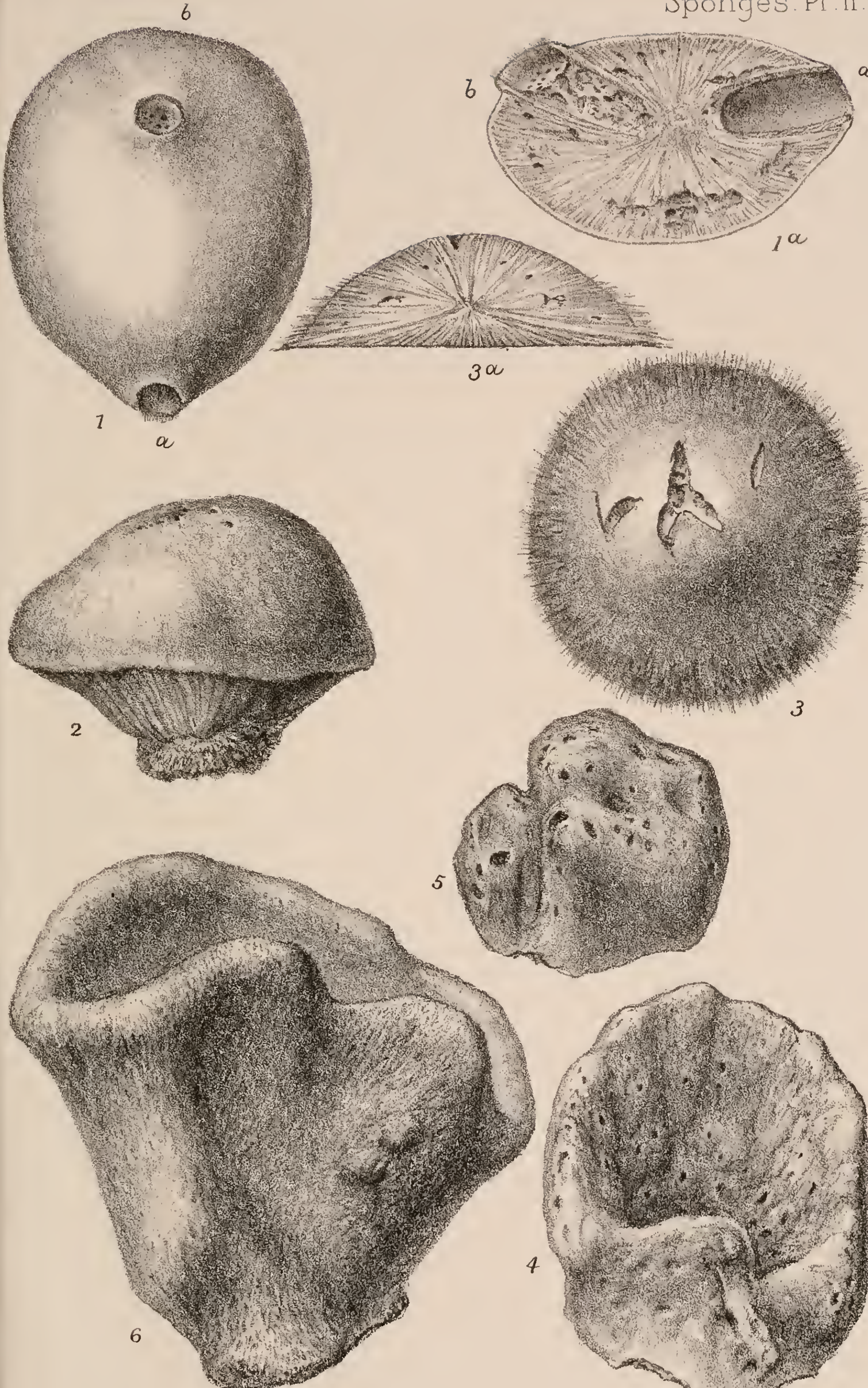
P. Highley del. et lith.

Hanhart imp.



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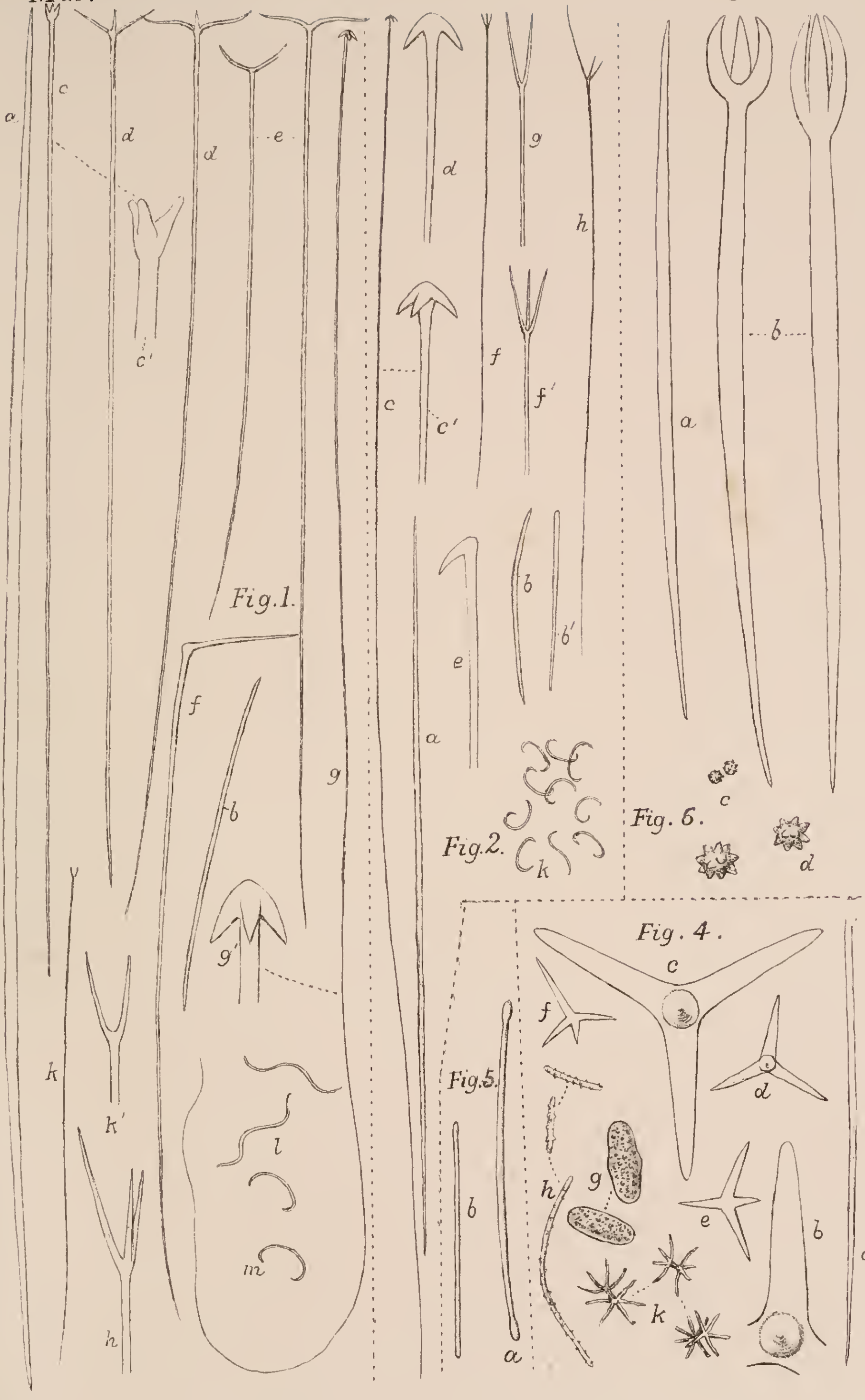
Fig. 1.
Fig. 2.
Fig. 4.
Fig. 5.
Fig. 6.

INDEX.

FISHES

(See also Catalogue of Fishes recorded from South Africa, pp. 97-179).

CRUSTACEA.

(For names of specimens see author's index, p. 65).

Crustacea.—*Continued.*

MOLLUSCA.

ALCYONARIA AND HYDROCORALLINAE.

Alcyonaria and Hydrocorallinae.—*Continued.*

SPONGES.