

- Fig. 7. *Mamillopora bidentata*, Reuss, $\times 25$. Showing the primary zoecium and the six surrounding zoecia. From Bocca di Sciesa.
- Fig. 8. *Conescharellina cocana*, Neviani, $\times 10$. Section from Spiassi, N. Italy.
- Fig. 9. *Batopora multiradiata*, Reuss, $\times 25$. Showing ovicells. From Montecchio Maggiore.
- Fig. 10. Ditto. $\times 10$. Showing the formation of a second layer from the neighbourhood of the pit. From Val di Lunte.
- Fig. 11. *Mamillopora bidentata*, Reuss, $\times 25$. Showing ovicell. From Bocca di Sciesa. (a) zoarium, $\times 3$.
- Fig. 12. *Conescharellina cocana*, Neviani, $\times 25$. This figure is built up from various parts, as the preservation as a whole is not perfect. From Spiassi.

VIII.—*Two new African Freshwater Sponges*. By JANE STEPHENS, B.A., B.Sc., National Museum of Ireland.

SEVERAL years ago Dr. Annandale (5) drew attention to the somewhat oyster-like shells of the genus *Ætheria* as affording a favourable standing-place for the growth of freshwater sponges, not only on account of their roughened and often corrugated surface, but also owing to the fact that, like true oysters, their lower valve is firmly fixed to some solid support. Dr. Annandale stated that at least one species of freshwater sponge, *Corvospongilla loricata* (Weltner), had already been described from an *Ætheria* shell, when an examination of the shells belonging to this genus in the collections of the Indian Museum led him to the discovery of two new species of sponges. He remarked that he had little doubt that other sponges would be brought to light if the *Ætheria* shells preserved in museums were carefully scrutinized. Following Dr. Annandale's suggestion, the *Ætheria* shells in the collection of this museum were examined, with the result that two well-marked new species were discovered on one shell, and a few broken gemmules, too fragmentary to identify, on another.

As is well known, the genus *Ætheria* occurs only in Africa and in the north-west part of Madagascar. On the continent of Africa it is confined to the tropics, except that it descends the River Nile to the mouth. Many species have been described from time to time, but the researches of Drs. Anthony and Germain (6, p. 372) have shown that there is only one species—a very polymorphic one, namely *Ætheria elliptica*, Lamarck. Two varieties are, however, recognized by these authors—*Æ. elliptica*, var. *typica*, Germain, a smooth

form from streams and rivers, and *Æ. elliptica*, var. *tubifera*, Sowerby, a spined form from standing water. The fine shell on which the two new species of sponges are growing is spined, and therefore belongs to the latter variety, so that we may conclude that the sponges lived in still water. The locality of the shell is given merely as Benguela.

Shells in the museum collection belonging to the genera *Mulleria* and *Bartlettia* from South America, which with *Ætheria* comprise the family *Ætheriidae*, were examined also, but without any further sponges being found.

The following seven species of sponges have up to the present been described from specimens growing on *Ætheria* shells:—*Spongilla sumatrana*, Weber, vars. α and β , Weltner; *S. atheria*, Annandale; *S. schubotzi*, Weltner; *Corresponding loricata* (Weltner), *C. micramphidiscoïdes*, Weltner; *C. scalarispiculis*, Annandale; and *Potamolepis steudelli*, Jaffé. A specimen of *Spongilla carteri*, Bowerbank (vide Kirkpatrick), has also been found on one of these shells.

Weltner (11), in a paper published in the year 1913, gives a complete list of the freshwater sponges known in Africa up to that time. Twenty-four species and varieties are mentioned. Since then Dr. Annandale (5) has described two species and Jaffé (7) one species; these, with the two species now described, bring the total number of African freshwater sponges known at the present time to twenty-nine species and varieties. Thus Africa already compares favourably as regards number of species with other parts of the world known to be rich in freshwater sponges.

Spongilla (Euspongilla) microspiculata, sp. n.

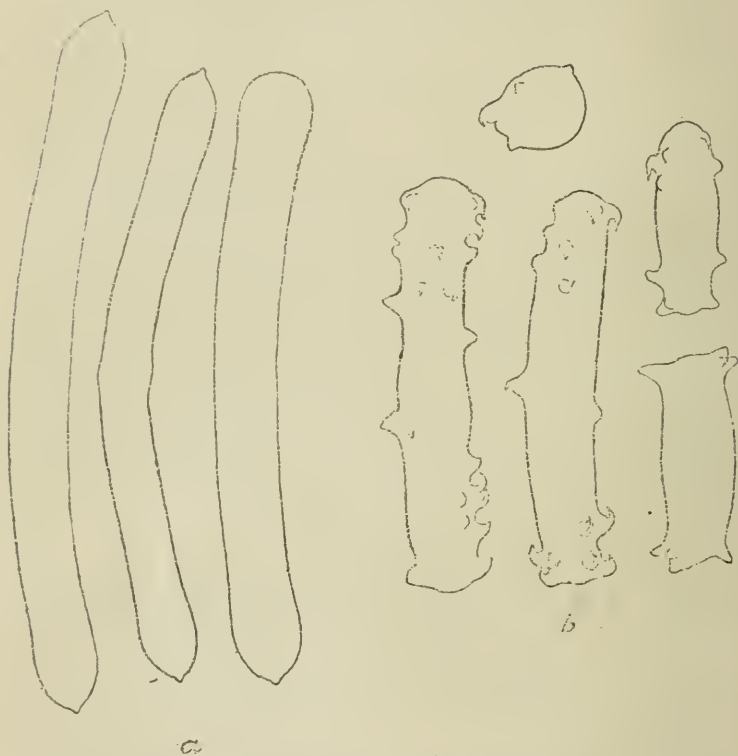
The sponge spreads in a fairly thick encrustation over about a third of the surface of the upper valve of an *Ætheria* shell, and coats some of the spines to their summits.

It is of a greyish-white colour in the dried state and is extremely hard to the touch. The surface is raised up into small ridges and rather prominent spines.

The skeleton is made up of very thick fibres, which consist of multiserially arranged spicules bound together by a considerable quantity of spongin. The main fibres run vertically upwards through the sponge, dividing from time to time, and their extremities project above the general surface of the sponge and form the spines just referred to. They are united by rather thinner fibres at right angles to them, which run only from one main fibre to the next and do not themselves form continuous fibres. The whole constitutes a dense firm network.

The gemmules are numerous. They are spherical and occur singly towards the base of the sponge. They are about 0.55 mm. in diameter. Each is surrounded by a thick coat of spongin. Outside this is a layer of gemmule-spicules, lying two or three deep and densely packed together. The majority are arranged more or less tangentially, but some are placed nearly vertically and project, giving the

Fig. 1.



Spongilla (Euspongilla) macrospiculata, sp. n.
 a, oxea, $\times 330$; b, gemmule-spicules, $\times 600$.

surface of the gemmules a shaggy appearance when seen under a low power of the microscope. The foramen is set on a very low tubule, which penetrates the layer of spicules, so that the opening is on a level with the general surface of the gemmule. A few gemmules, either singly or in groups, are

scattered over parts of the shell now free from the sponge. They are firmly attached to the shell and rest on a dense mass of gemmule-spicules.

Spicules.—The macroscleres are slightly curved, stout, smooth oxea, tapering abruptly at each end to a small sharp point into which the axial canal extends. The spicules are slightly swollen at the ends, and sometimes there is a faintly marked swelling at the centre of the shaft. There are not many abnormal forms present, but some of the spicules are irregularly bent and occasionally one end is rounded off. More rarely both ends are rounded. The macroscleres measure 0.275–0.335 mm. in length and have a thickness of 0.02–0.027 mm. They resemble in some degree the more pointed macroscleres of *Spongilla crassissima*, Annandale, var. *crassior*, Annandale, but they are more swollen at the ends and are somewhat longer and thicker.

There are no free microscleres present in the sponge.

The gemmule-spicules are short, thick strongyla provided with strong spines. Some of the spicules, especially the shorter ones, are swollen in the middle, so that they are barrel-shaped; others are nearly spherical, but still bear a few spines. The spines are grouped at either end of the strongyla, leaving the centre of the shaft smooth, but often a few scattered spines occur along the shaft. The spines are stout; typically they are strongly curved towards the centre of the shaft and end in a sharp point; but many of them are stout, straight, knob-like projections. The spicules measure from 0.035–0.1 mm. in length and have a thickness of 0.012–0.016 mm. Some of the short inflated ones are as much as 0.021 mm. in diameter.

Locality. Benguela; on a shell of *Ætheria elliptica*, var. *tubifera*.

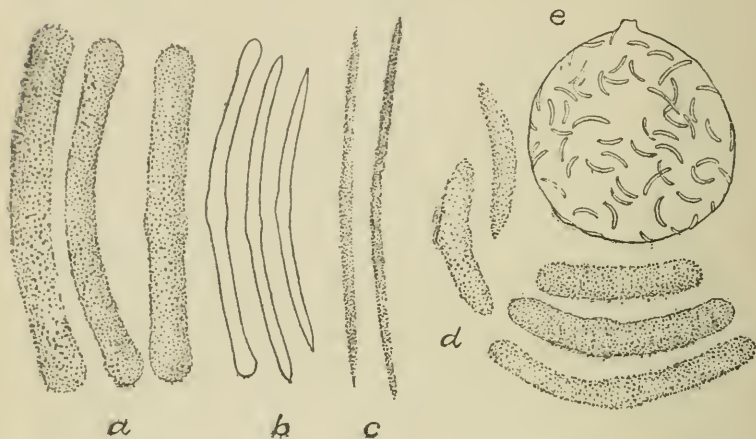
Spongilla (Stratospongilla) benguelensis, sp. n.

The sponge occurs in a number of very small patches towards the edges of the lower valve of the *Ætheria* shell on which the previously described species is growing. There are the remains of various other patches of the sponge also on the lower valve in the region of the hinge and one or two minute specimens on the upper valve. These patches of sponge are very inconspicuous, as they run chiefly in the furrows of the shell; in the dried state they are soft to the touch and their surface is even. Scattered over parts of the lower valve of the shell are quite a number of gemmules belonging to this species. Each gemmule is firmly fixed to

the shell by means of the spongin which binds together the cage of macroscleres in which it is enclosed.

The skeleton, as far as can be seen, is a rather close network of spicules. The spongin could not be made out, and it must be very scanty in quantity, as the spicules at once fall apart when a small specimen is sectioned by hand.

Fig. 2.



Spongilla (Stratospongilla) benguelensis, sp. n.

a, strongyla, $\times 330$; *b*, developing strongyla, $\times 330$; *c*, microxea, $\times 600$; *d*, gemmule-spicules, $\times 600$; *e*, gemmule freed from its cage of macroscleres, $\times 60$.

The gemmules, as already stated, are firmly fixed to the shell by means of the spongin binding the cage of macroscleres which encloses each gemmule. These macroscleres lie tangentially to the surface of the gemmule, they are strongly bound together by spongin, and adhere closely to each other, unlike the rest of the skeleton. The gemmule rests on the floor of the cage, and, at least in the dried state, there is a considerable space between the sides and roof of the cage and the gemmule. Similar cages of macroscleres have been described in other species—for example, in *Spongilla atheria*, Annandale, *Corvospongilla burmanica* (Kirkpatrick), *Corvospongilla lapidosa* (Annandale), and *Corvospongilla scabrispiculis*, Annandale. The gemmules themselves are spherical and are about 0.38–0.42 mm. in diameter.

Each is enclosed in a thick coat of spongin. The gemmule-spicules lie tangentially to the surface, and are embedded in this coat. The spicules are fairly numerous, but are not closely packed together as in the allied species *S. indica*, Annandale, *S. sumatrana*, Weber, and *S. bombayensis*, Carter. There is a short foraminal tubule which lies rather to one side of the gemmule in its natural position.

Spicules.—The macroscleres are slightly curved, uniformly microspined strongyla. The ends are a little swollen and there is often a slight swelling in the centre of the shaft. The strongyla measure 0.13–0.17 mm. in length by 0.01–0.015 mm. Among them are scattered a few slender smooth oxea with a well-marked swelling in the centre of the shaft. These are nearly the same length as the preceding spicules, and are apparently young forms of the macroscleres, as they lead on to thicker spicules which are obviously developing macroscleres and which are nearly cylindrical, but some of which still retain rather pointed ends.

The free microscleres are slightly curved, sharply pointed, microspined oxea measuring 0.06–0.09 mm. in length by 0.0025 mm. Some have a very feeble swelling at the centre of the shaft.

The gemmule-spicules are small, curved, sausage-shaped spicules uniformly covered with minute spines. Sometimes the ends are pointed instead of being rounded off as is usually the case. There is often a slight swelling in the centre of the shaft. The spicules measure 0.035–0.06 mm. in length, with a maximum diameter of 0.008 mm.

Locality. Benguela; on a shell of *Ætheria elliptica*, var. *tubifera*.

The subgenus *Stratospongilla*, Annandale (1), to which the foregoing species belongs, is chiefly tropical in its distribution (4). At the present day it is known to be represented in India by three species—*S. bombayensis*, Carter, *S. indica*, Annandale, and *S. graveleyi*, Annandale; it occurs in Sumatra—*S. sumatrana*, Weber; in tropical and South Africa—*S. rousseleti*, Kirkpatrick, *S. schubotzi*, Weltner, varieties of *S. sumatrana*, Weber, and *S. bombayensis*, Carter; in the Fiji Islands—*S. gilsoni*, Topsent; and in Eastern China—*S. sinensis*, Annandale. One species—*S. clementis*, Annandale—from the Philippines is doubtfully assigned to the subgenus, and *S. navicella*, Carter, from the River Amazon, appears to be an allied form.

Of the foregoing species the following are most nearly related to *Spongilla benguelensis*, sp. n.:—*S. bombayensis*,

S. indica, *S. graveleyi*, and *S. sumatrana*. All these possess microspined macroscleres, spined microxea, and stronglylous gemmule-spicules. Apart from other characters, all these, except *S. indica*, are clearly marked off from the new species by the possession of oxca as macroscleres. *S. indica*, like *S. benguelensis*, sp. n., possesses stronglylous macroscleres, but is separated from it by various differences in the size and character of the spicules, and particularly by the structure of the gemmules, which in *S. indica* are fixed to the substratum by their outer chitinous membrane and are not enclosed in cages of macroscleres.

A sponge belonging to another genus—namely, *Corvospongilla micramphidiscoides*, Weltner—has a very similar spiculation, but with the addition of free amphidiscs, the possession of which characterizes the genus.

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