Figs. 10–12. *Lepidospora neglecta*, sp. n.

Fig. 10. Portions of antenna. Third segment (*a*). A median segment (*b*). × 100.
Fig. 11. Terminal portion of labial palp. × 40.
Fig. 12. Terminal portion of leg. × 160.

Figs. 13–14. *Entomobrya minima*, sp. n.

Fig. 13. Eyes of the right side. × 400.
Fig. 14. Apex of leg. × 400.

PLATE III.

Figs. 1–8. *Machilis africanus*, sp. n.

Fig. 1. Posterior abdominal sternites of the female. × 24. 1*a* & *b*. Apices of gonapophyses.
Fig. 2. Urosternite 5. × 24.
Fig. 3. Eyes and ocelli. × 20.
Fig. 4. Maxilla, external and internal lobes, and palp. × 24.
Fig. 5. Apex of terminal segment of maxillary palp. × 160.
Fig. 6. Terminal segment of labial palp. × 160.
Fig. 7. Teeth of mandible. × 160.
Fig. 8. Apex of style 9. × 100.

Figs. 9–11. *Lepidospora neglecta*, sp. n.

Fig. 9. Posterior abdominal sternites of the female. × 24. 9*a*. Apex of posterior gonapophysis.
Fig. 10. Tergite x. × 24.
Fig. 11. Apex of galea (*b*) and of maxillary palp (*a*). × 160.

VI.—Stelletta purpurea, *Ridley, and its Variations.*

By MAURICE BURTON, M.Sc.

A FEW years ago I had occasion to examine a small collection of sponges belonging to the genus *Stelletta*, collected by Dr. Ondaatje at Point Galle, Ceylon, and deposited in the British Museum. From the resemblance in external form and general appearance, and from the types of spicules of which the skeleton was composed, there could be little doubt that they all belonged to one and the same species, yet the difference in size and relative proportions of the spicules was such as to make it possible to distribute them among several previously-recognised species. During the course of my observations, it became apparent that, contained in our literature, we have records of some twenty species and varieties in which the skeleton is composed of the same elements as that of the Point Galle specimens—viz., oxea, orthotriænes, anatriænes, and

tylasters. From this I started on a comparative study of these species extending over a large number of specimens, including most of the type-specimens together with many hitherto unidentified, in order to investigate how far the differences in colour, external form, and dimensions of spicules, features hitherto used as a basis for specific distinction, could be regarded as factors of taxonomic importance. My researches led me to conclude that no logical distinction could be made between the various species, and that they were but varieties of a single species, which, by priority, must be called *Stelletta purpurea*, Ridley, as shown in the synonymic list below. Since that time, I have paid particular attention to variations in sponges and find no reason for doubting my original conclusions concerning *S. purpurea* as here understood.

Drastic as this step at first appeared to me, I now see that the variations in this species are by no means so extensive as those I have witnessed in upwards of a score of other species belonging to both the genus *Stelletta* itself and to other widely separated genera. This study must be regarded, then, as on a parallel with Vosmaer's (1911 A) account of *Spirastrella purpurea* (Lamarck), and if my discussions of the various characters of *Stelletta purpurea* and their variability be meagre, it is because I feel that a detailed discussion would be redundant, since Vosmaer has so exhaustively dealt with a similar example.

SYNONYMY.

Stelletta purpurea, Ridley, 1884 C.
Stelletta purpurea, var. *retroflexa*, Ridley, 1884 C.
Stelletta purpurea, var. *parvistella*, Ridley, 1884 C.
Myriastra simplicifurca, Sollas, 1886 C, 1888 B.
Pilochrota purpurea, Sollas, 1886 C, 1888 B.
Pilochrota purpurea, var. *longancora*, Sollas, 1888 B.
Pilochrota purpurea, var. *parvistella*, Sollas, 1888 B.
Pilochrota hækeli, Sollas, 1886 C, 1888 B.
Pilochrota cingalensis, Sollas, 1888 B.
Pilochrota lendenfeldi, Sollas, 1888 B.
Stelletta reniformis, Kieschnick, 1896, 1900.
Pilochrota brevidens, Topsent, 1897 A.
Stelletta simplicifurca, Lindgren, 1897 A, 1898.
Stelletta inconspicua, Thiele, 1898 A.
Stelletta simplicifurca, Kirkpatrick, 1900 A.
Stelletta ternatensis, Thiele, 1900 A.
Stelletta brunnea, Thiele, 1900 A.
Stelletta renilla, Lendenfeld, 1903 B.
Pilochrota hækeli, Dendy, 1905 A.
Pilochrota hornelli, Dendy, 1905 A.
Stelletta bougainvillea, Lendenfeld, 1906 A.

Stelletta dolabra, Lendenfeld, 1906 A.
Stelletta nereis, Lendenfeld, 1906 A.
Stelletta tuberosa, Hentschel, 1909 A.
Stelletta purpurea, var. *grisea*, Hentschel, 1909 A.
Pilochrota parva, Row, 1911 A.
Stelletta brunnea, Hentschel, 1912 A.
Stelletta tuber, Hentschel, 1912 A.
Stelletta pilula, et varr., Lebwohl, 1914 B.
Myriastra parva, Dendy, 1916 C.
Myriastra hæckeli, Dendy, 1916 C.
(Also *vide* Lendenfeld, 1903 B, for further references.)

Diagnosis.—Sponge usually more or less spherical, but shape variable. Colour ranging from pale yellow to purple. Skeleton, typically radial, composed of large oxea, ·950–3·70 × ·012–·060 mm.; small ectosomal oxea, ·102–·390 × ·001–·010 mm.; orthotriænes, shaft 1·0–3·6 × ·015–·120 mm., cladi, ·070–·366 mm. long; anatriænes, shaft 1·0–3·5 × ·009–·060 mm., cladi, ·040–·190 mm. long; tylasters, ·006–·025 mm. in diam.

A survey of the literature dealing with the 24 so-called species and varieties included in the synonymy list above is sufficient to show that they are all exceedingly closely related. Indeed, the various authors quoted have insisted on this close relationship to such an extent that a mere perusal of their works, together with a comparison of the salient features of the species involved, leaves one convinced that we are dealing not with several species but with one widely distributed species of which the numerous so-called species and varieties are but an expression of the normal variations found in sponges. What other evidence can be brought forward to support such a conviction? This may, perhaps, be best dealt with by taking the various characters, one by one, selected by the several authors for the purpose of defining species or varieties.

In more than one instance, among the species under discussion, the colour of the sponge has been used as a means of distinction. Now, this feature is most variable, as anyone familiar with sponge-collections or with the sponge-literature will realise, and, be the significance of colour what it may, it is of doubtful value in the establishing of a species. The matter seems almost too obvious to need elaboration. To me, it appears that colour-differences in sponges may be attributed to one or more of the following:—difference in age, sexual phases, presence or absence of certain chemical substances in the surrounding water, symbiotic algæ, normal fluctuating variations or mode of preservation, the last-named applying only in those cases where records of

colour in the living state are not available, a condition obtaining in most collections. Crozier (1918) has recorded seasonal colour-changes in *Donatia*. Every spongologist must be familiar with the varied hues of our common *Halichondria panicea*. Again, sponges, like seaweeds, are specially selective to iodine, and it may be that we must look to this selective power for, at least, a partial explanation of this feature. At all events, the two examples, quoted from an almost endless number available, are sufficient to show the relatively small value of this character to the systematist. If anything further need be said on the question of colour, it is this, that among the various specimens in the British Museum Collection identified by Ridley and referred to *Stelletta purpurea* the colour varies from white to brown or a very pale purple. The same may be said of the various examples of *Stelletta simplicifurca*, identified by Sollas and Kirkpatrick, and of *Stelletta hæckeli*, identified by Sollas and Dendy. Clearly these authors did not regard colour as of primary importance in this species.

The external form of sponges, again, is anything but constant, particularly in those forms whose skeleton is built up to a greater or lesser extent of spongin. In the genus *Stelletta* variation of form is confined to fairly narrow limits. As in all sponges where the skeleton is composed of long spicules arranged radially it is primarily spherical and the modifications are but derivatives of this simple ground-form, as mammilliform, pyriform, calyciform, or even massive and irregular. I have seen this strikingly well shown in a series of specimens of *Stelletta communis* (Sollas), to mention but one example, which ranged from spherical to mammilliform, on the one hand, and to pyriform, on the other.

The pores are confined to pore-areas, and call for no comment. The oscules are subject to some variation from specimen to specimen. Of late, I have made fairly extensive observations on the exhalant apertures in different genera of sponges concerning which I hope to say more at some future date. For the present it will suffice to say that the various forms of arrangement of the exhalant apertures, described under the various so-called species here discussed, do occur among the individuals of a single species and that no obstacle is met with, as regards this feature of sponge morphology, when endeavouring to justify the above list of synonyms of *S. purpurea*. One example will serve to illustrate. In a group of specimens of *Ecionemia robusta* (Ctr.) from Port Phillip Heads, Australia, the oscules were

for the most part scattered, usually level with the surface, sometimes not apparent, while in one case, a particularly fine specimen, only a single apical osculum was present leading into a deep cloaca. The diameter of these openings varied considerably.

The variation in the character of the cortex of any Stellettid species is considerable and may be easily demonstrated, and the abandonment of the genera *Myriastra* and *Pilochrota*, on these grounds, has been taken for granted by recent authors.

The last point concerns the size and shape of the spicules. Sollas (1888 B), Hentschel (1912 A), and Topsent (1922 B) in *Stelletta communis*, *S. clavosa*, and *S. crassispicula*, respectively, have shown how much these characters may differ in different individuals of a single species. Further, in a group of specimens from one and the same locality, Pt. Galle, Ceylon, as mentioned above, I have been able to observe variations in spicular dimensions such as have led previous writers to the formation of a new variety or even species. Yet these specimens were obviously co-specific. Again, in the specimens of *S. hæckeli*, described at various times by Dendy, to take but two features, the cladi of the orthotriænes ranged from ·180–·360 mm. and of the anatriænes from ·036–·126 mm. Also the angles made by the cladi with the rhabdomes were of an almost infinite variety. In *Stelletta simplicifurca* (Sollas), too, the spicular dimensions recorded to date are sufficient to embrace those of all the related species here dealt with.

Small oxea appear to form a normal constituent of the spiculation, but they are sometimes present in such small quantities that their presence is apt to be overlooked.

In *Stelletta nereis* Lendenfeld emphasizes the fact that the chiasters are acanthtylasters. He appears to be "making a mountain out of a mole-hill." The chiasters of *Stelletta* and other allied genera will frequently be seen to bear small spines when examined with an oil-immersion lens. Just as in the anthasters of Sollas's now-abandoned genus *Anthastra* and in the microrhabds of *Ecionemia* the degree of spining may vary considerably in a single species, so in the chiasters of species of *Stelletta* the rays may or may not bear spines, and the presence or absence of these excrescences is of little value for taxonomic purposes.

Stelletta brevidens (Topsent) is obviously only an immature specimen of *S. purpurea*, Ridley, as here understood.

Distribution.—Red Sea, Indian Ocean, Indo-Pacific and Japanese Seas, Australasia.

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