PROC. BIOL. SOC. WASH.
91(4), 1978, pp. 1026–1036

ADELOGORGIA TELONES, A NEW SPECIES OF GORGONACEAN CORAL (COELENTERATA: OCTOCORALLIA) FROM THE GALAPAGOS ISLANDS

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Abstract.—A new species of the gorgonacean genus *Adelogorgia* from the Galapagos Islands is described, illustrated, and compared with the type-species. Similarity of the characteristic sclerites of *Adelogorgia* to those of related and unrelated genera is discussed and its significance considered.

A small collection of Octocorallia obtained in the Galapagos Islands by Dr. W. Duane Hope in February 1978 contains three specimens of a gorgonacean coral with gross aspect unlike any species heretofore reported either from these islands or from the Pacific coast of the Americas. Their remarkably modified coenenchymal sclerites clearly show these specimens to be congeneric with the Californian plexaurid *Adelogorgia phyllosclera* Bayer, 1958, and the second known species of the genus.

The genus *Adelogorgia* was established for an eastern Pacific gorgonacean resembling specimens of *Psammogorgia* Verrill, but having peculiarly modified coenenchymal sclerites quite unlike those of *Psammogorgia.* It was first collected near La Jolla, California, by Conrad Limbaugh in depths of 30–57 meters in 1953, 1954, and 1955, and by R. Ghilardi and J. Stewart in 1956. Although a specimen dredged in the vicinity of La Jolla in depths between 46 and 73 meters on July 3, 1906, was found among material at the Scripps Institution of Oceanography and sent to me by Mr. Limbaugh, it had been ignored until 1956, so credit for the discovery rightfully belongs to Mr. Limbaugh. Although it seems to be rather common in the vicinity of La Jolla, collections made farther to the south, in Baja California, by the same team of divers, do not include it. Neither does it occur in other collections from Baja California and the Gulf of California taken by diving and dredging, nor in collections obtained by the U.S. Fish Commission steamer *Albatross* by dredging and trawling at many localities along the coast of Central America and South America.

Family Plexauridae Gray, 1859
Genus *Adelogorgia* Bayer, 1958

Adelogorgia Bayer, 1958:46. (Type-species, *Adelogorgia phyllosclera* Bayer, 1958, by original designation and monotypy.)

Diagnosis.—Plexaurids with moderately thick coenenchyme; polyps fully retractile, communicating directly with the longitudinal canal system;

anthocodiae armed with spinose spindles converging beneath each tentacle but not forming a distinct transverse collaret. Outer layer of coenenchyme containing capstans, spindles with transverse belts of tubercles and more or less distinct median waist, leaf clubs, and asymmetrical double wheels with foliate expansions on one side; inner layer of coenenchyme containing spindles and capstans less elaborately sculptured. Axis with wide cross-chambered central core and abundantly loculated cortex.

Relationships.—Members of this genus resemble colonies of *Psammogorgia arbuscula* (Verrill, 1866) and of *Euplexaura marki* Kükenthal, 1913 (which originally was misidentified as *P. arbuscula* by Nutting in 1909) in their growth form but not in the form of their sclerites. The unilaterally foliate double wheels, often with terminal axial crests, characteristic of *Adelogorgia* are similar to the sclerites of some, but not all, species of *Swiftia* Duchassaing & Michelotti, 1864, most of which differ markedly from *Adelogorgia* in growth form. The spindles and ordinary capstans of *Adelogorgia* resemble those of *Euplexaura marki* Kükenthal, 1913, which are never unilaterally foliate and closely approach the type of sclerites characteristic of several gorgoniid genera. The relationship of *Adelogorgia* to plexaurid genera such as *Euplexaura* Verrill, 1865, and *Psammogorgia* Verrill, 1868, and to *Swiftia* (including *Platycaulos* Wright & Studer, 1889, *Callistephanus* Wright & Studer, 1889, and *Stenogorgia* Verrill, 1883), ordinarily placed in the Paramuriceidae, is by no means clear. These genera apparently belong to a closely interrelated complex and emphasize the tenuous nature and indefinite position of the boundaries between many holaxonian genera and even families.

Adelogorgia telones, sp. nov.
Figs. 1–6

Material.—Galapagos Islands: Kicker Rock, depth 23 m, on vertical rock wall; coll. W. Duane Hope, by diving, 19 February 1978. Three colonies.

Diagnosis.—*Adelogorgia* with polyps fully retractile, adjacent coenenchyme forming inconspicuous verrucae or none, anthocodiae with approximately 15–20 curved, spinose spindles converging beneath each tentacle. Average length of coenenchymal double-wheel sclerites 0.08 mm, of double spindles 0.15 mm. Color pure white or lemon yellow.

Description.—Colonies small, flabellate, branched in one plane or in intersecting planes (Fig. 1) depending upon local features of the habitat. Branching commencing a short distance above the base, mostly lateral but in some places appearing dichotomous, without anastomoses; secondary and tertiary branches arising at roughly right angles, subsequently curving upward roughly parallel with the originating branch. Branches of nearly uniform thickness, not much thinner than the main stem, 2.5–3.5 mm in diameter, commonly somewhat clavate terminally where the diameter is

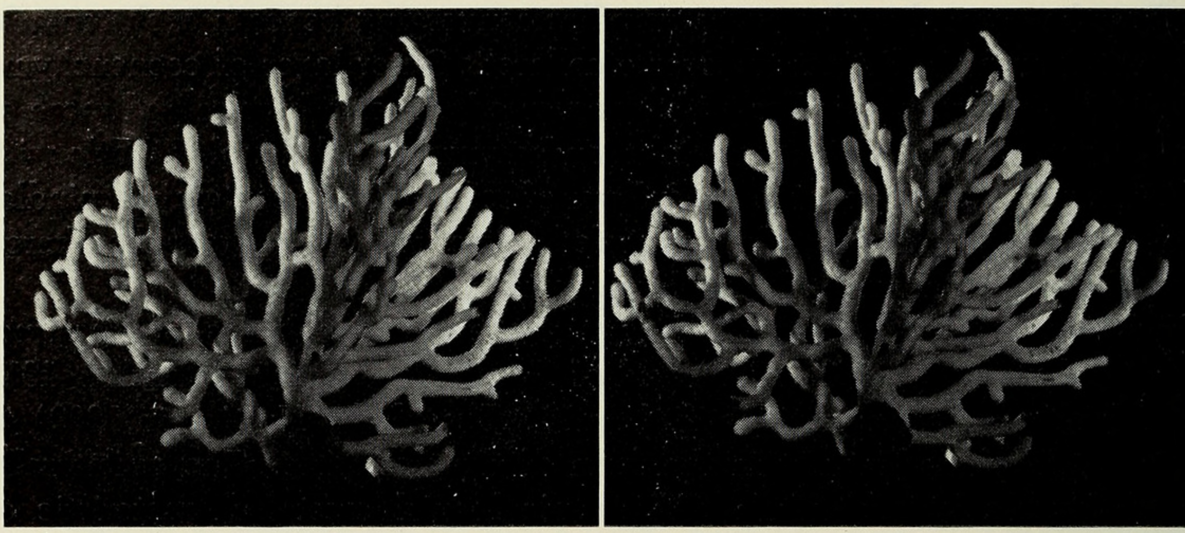


Fig. 1. *Adelogorgia telones.* Holotype colony, USNM 57453. Stereoscopic view. Width, 11 cm.

about 1 mm greater. Polyps distributed all around main stem and branches, completely retractile, usually quite flush with surrounding coenenchymal surface, in proximal parts of the colony occasionally surrounded by a low coenenchymal rim or forming low verrucae, mostly about 1.5 mm apart but as much as 2.2 mm; verrucal apertures with 8 marginal teeth composed of converging cortical sclerites. Anthocodiae with 8 subtentacular points (Fig. 2a) each consisting of about 15–20 converging, weakly curved spinose

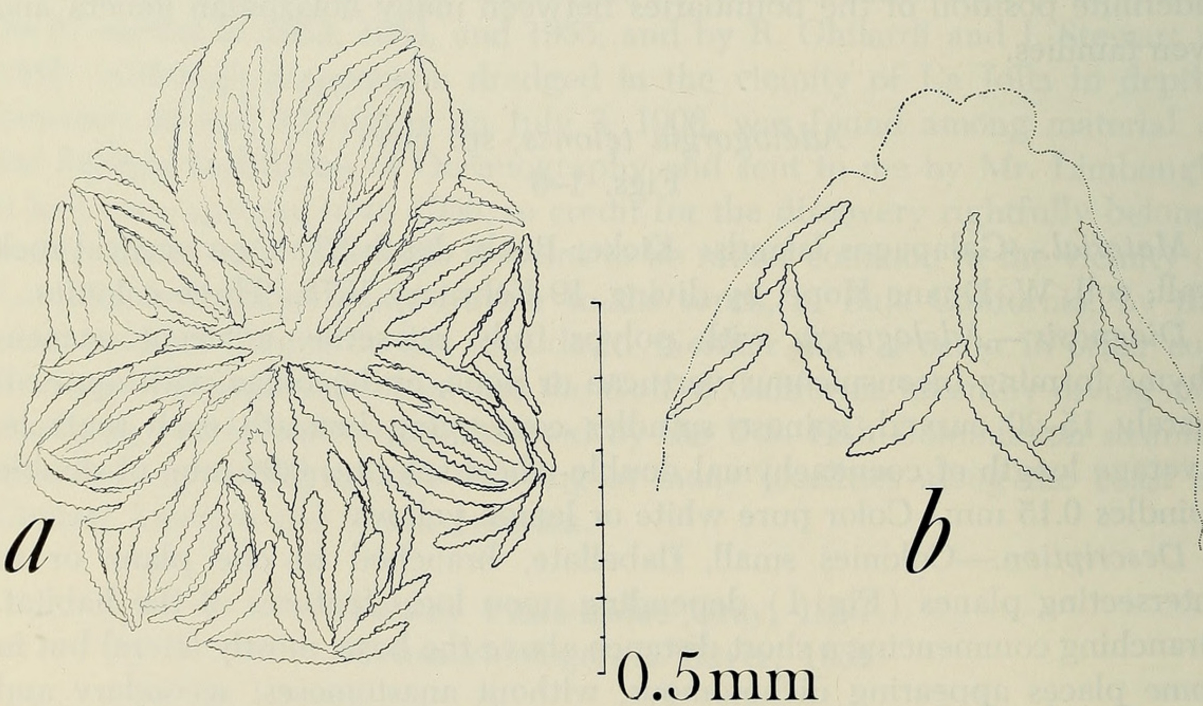


Fig. 2. Anthocodial armature. a, *Adelogorgia telones,* USNM 57453; b, *Adelogorgia phyllosclera,* USNM 50635. ×70.

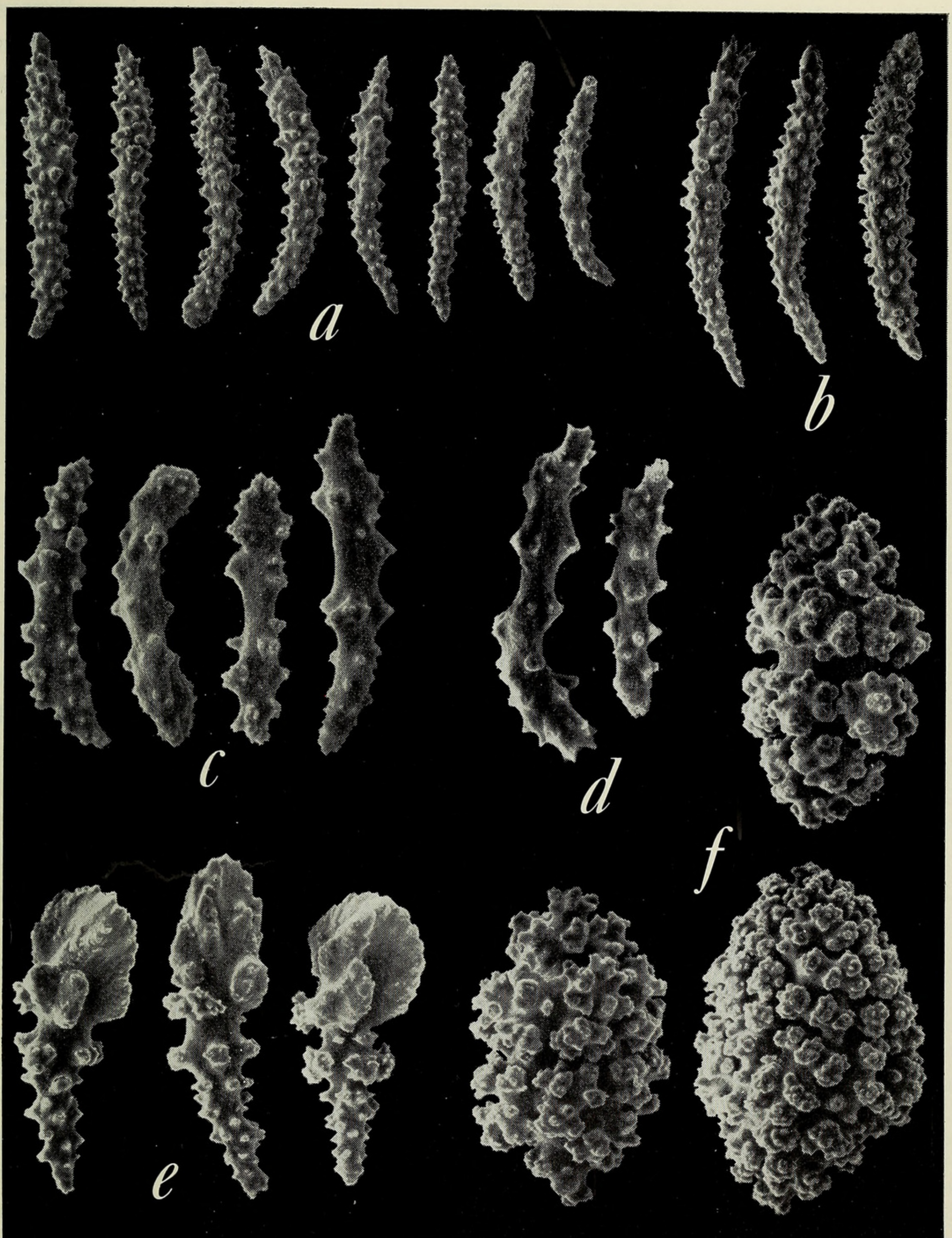
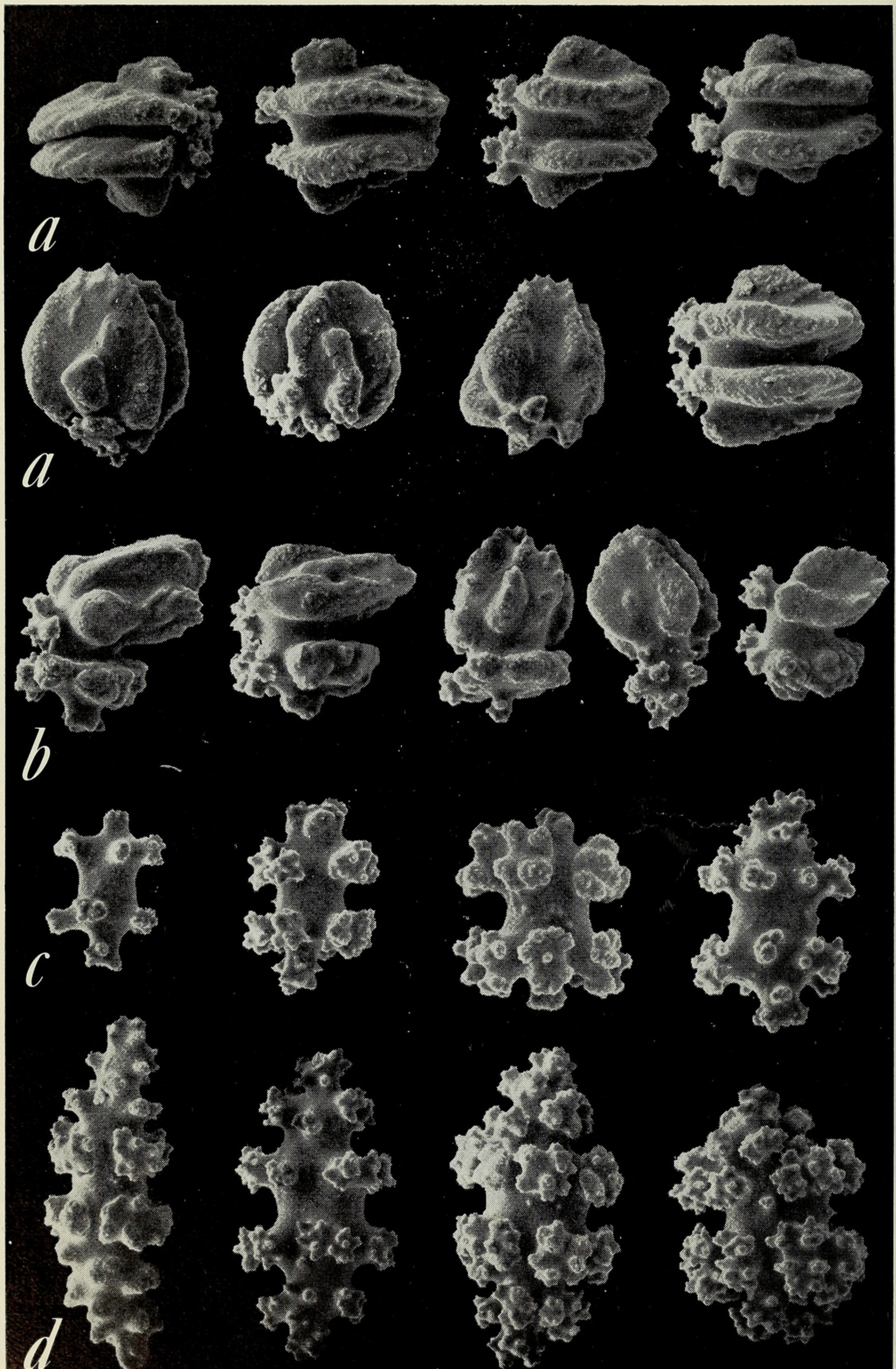


Fig. 3. Sclerites of *Adelogorgia telones*. a, Curved rods from anthocodial points, USNM 57453, ×160; b, Curved rods from anthocodial points, USNM 57455, ×160; c, Curved rods from oral disk, USNM 57453, ×400; d, Curved rods from oral disk, USNM 57455, ×400; e, Leaf-clubs from coenenchyme, USNM 57453, ×280; f, Fully developed double spindles from cortex, USNM 57453, ×300.


a
a
b
c
d

spindles about 0.16–0.28 mm long (Fig. 3a, b), the proximal ones more or less obliquely placed but not forming a well-differentiated transverse collaret. Oral disk with numerous scattered weakly spinose rods slightly curved at each end, up to about 0.13 mm in length but mostly 0.08–0.1 mm (Fig. 3c, d); in the tentacles are a few scattered, minute straight or slightly curved rods about 0.05 mm long and 0.005 mm in diameter, smooth except for a few inconspicuous short prickles near the ends. The gastric cavities of the polyps enter directly into the longitudinal stem canals surrounding the axis. Axis with a wide, chambered core and conspicuously loculated cortex; no calcification of the holdfast was observed. Coenenchyme with a superficial layer of capstans with the tubercles of the median whorls fused to form disks with serrate edges (Figs. 4a, 5a, 6a–b), and, in some cases, the terminal tubercles modified into foliate crests at right angles to the median disks. The largest of these reach a length of 0.09 mm but they average 0.08 mm. Many of these modified capstans have only one of the whorls of tubercles fused into a foliate expansion (Fig. 4b), in which case they resemble small, lopsided leaf-clubs. Beneath these foliate double wheels the coenenchyme is filled with short capstans up to 0.1 mm long but mostly 0.08–0.09 mm, symmetrical or nearly so (Fig. 4c), and tuberculate double spindles with a distinct median waist and tapered, usually acute ends (Fig. 4d), up to 0.18 mm long but averaging 0.15 mm, not unlike the double cones described by Deichmann (1936) in some species of *Thesea*. When these double spindles are fully developed, their tubercles become extremely complex and the median waist obscure or indiscernible (Fig. 3f). Some of the spindles are modified into leaf-clubs by the production of a foliate expansion at one end (Fig. 3e).

Of the three colonies obtained, two are pure white and one lemon yellow, but I can find no other difference.

Holotype.—USNM 57453. Height 9.5 cm, greatest width 11 cm. Diameter of main trunk just above holdfast, 5 mm; diameter 4 cm above holdfast, 3.7 mm; diameter of end branches 2.5 mm near origin, up to 3.5 mm just below tip. Branching apparently dichotomous but actually lateral, in three diverging planes, with some terminal twigs extending irregularly outward from the sides of the planes (Fig. 1). Unbranched terminal twigs arising from branches at intervals of 1–2.5 cm, at first growing outward at nearly 90° but in 5–10 mm curving more or less abruptly to continue parallel to the parent branch. Polyps completely retracted, 1.5–2.2 mm apart, not forming

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Fig. 4. Sclerites of *Adelogorgia telones*, USNM 57453. a, Double wheels of outer coenenchyme; b, Small torches and leaf-clubs of outer coenenchyme; c, Capstans of deeper coenenchyme; d, Double spindles of deeper coenenchyme. All figures ×300.

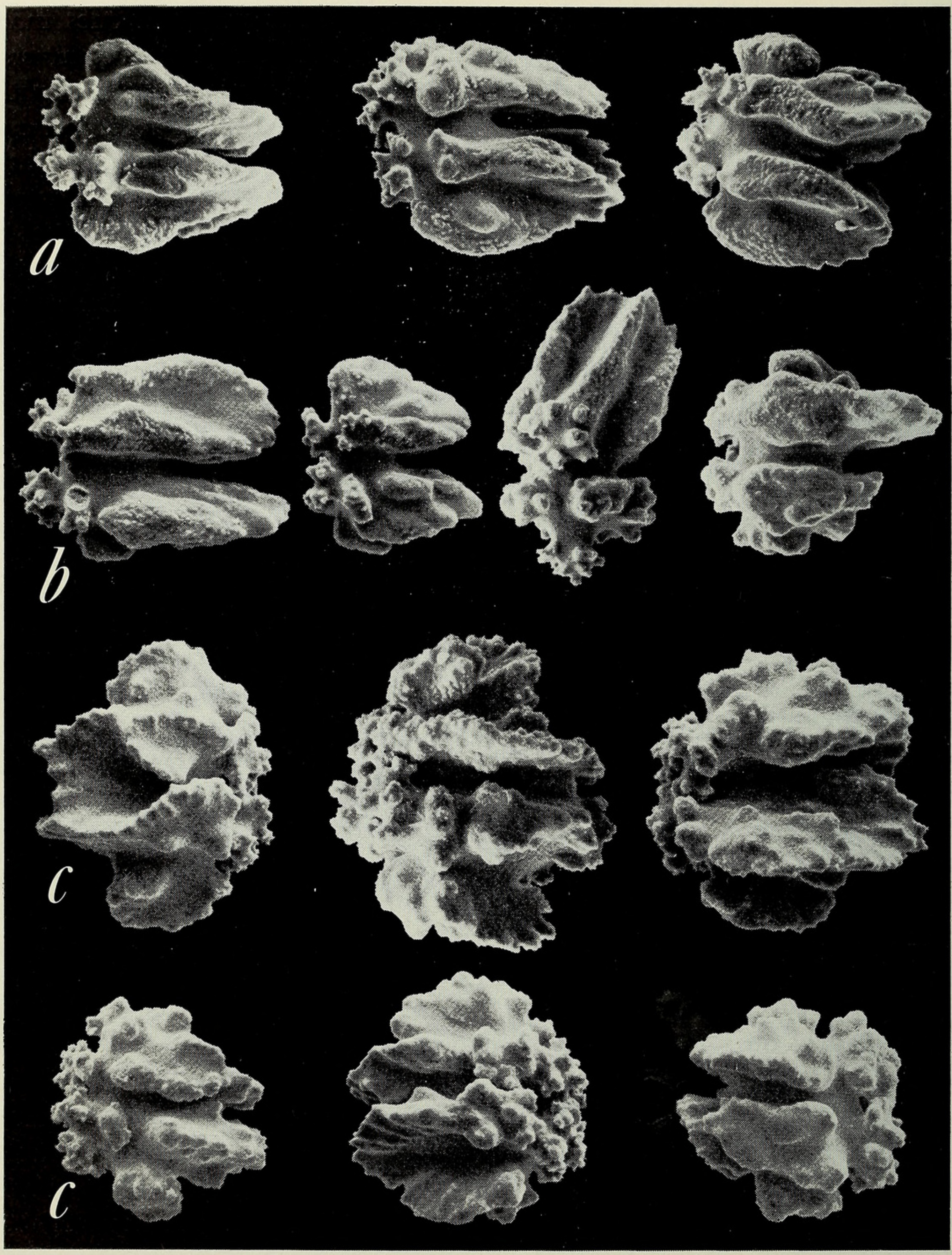

Fig. 5. Sclerites. a–b, From outer coenenchyme of *Adelogorgia telones*, USNM 57455; c, From outer coenenchyme of *Adelogorgia phyllosclera*, USNM 50186. All figures ×300.

verrucae but some of those on the trunk surrounded by a slightly raised rim of coenenchyme. Color pure white, sclerites colorless, transparent.

Paratypes.—USNM 57454. Height 10 cm, width 11 cm, branched laterally in one plane, main stem curving upward from holdfast that was attached

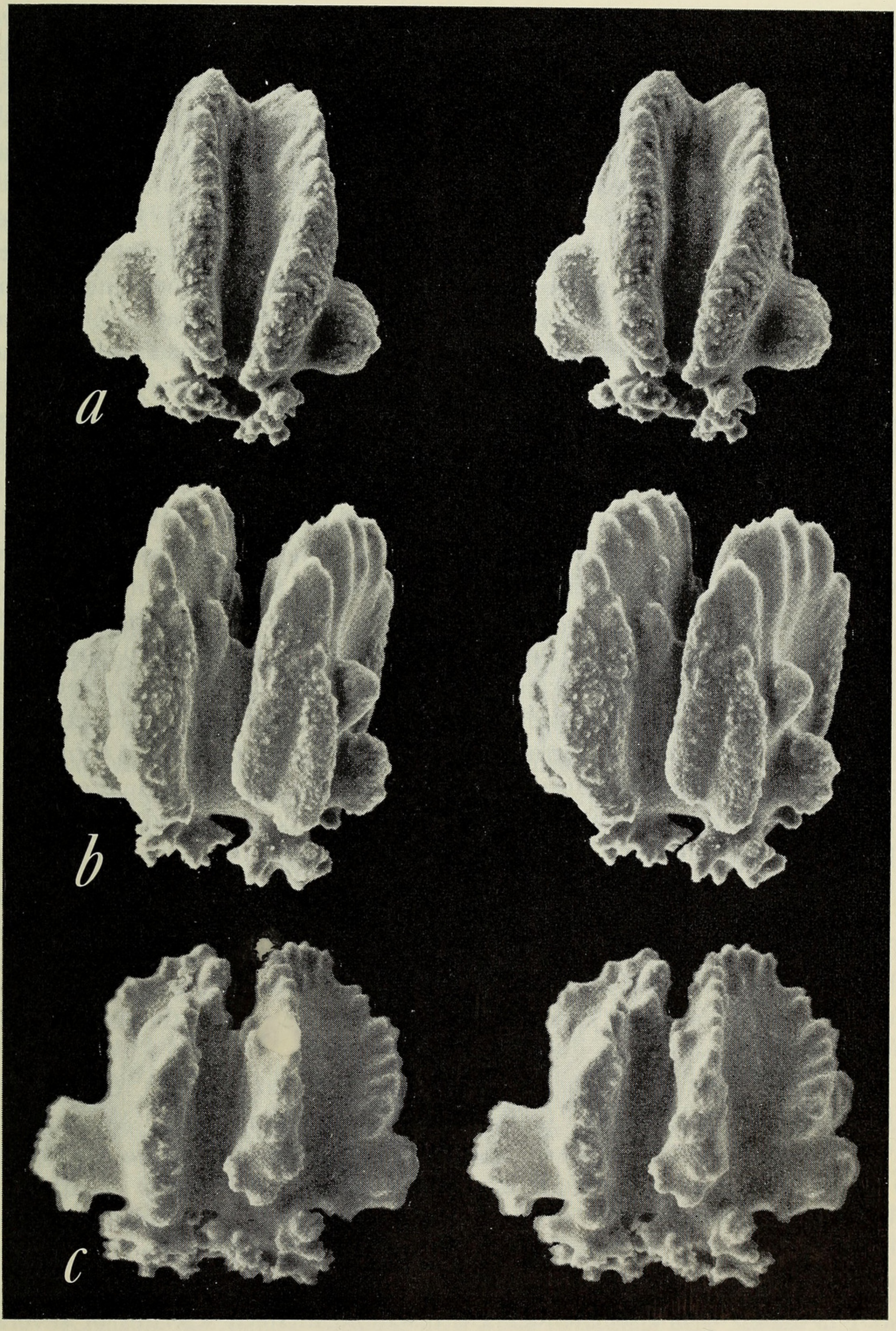

Fig. 6. Stereoscopic views of double-wheel sclerites. a, *Adelogorgia telones*, USNM 57453; b, *A. telones*, USNM 57455; c, *A. phyllosclera*, USNM 50186. All figures ×500.

to a vertical surface; diameter of trunk just above holdfast, 4 mm; branches and twigs nearly cylindrical, 3.2–3.5 mm in diameter, terminal twigs sometimes weakly clavate, about 1 mm thicker just below tip than elsewhere proximad. Polyps completely retracted, about 1.5 mm apart, those on trunk and proximal parts of branches forming indistinct verrucae with 8 marginal lobes. Color pure white, sclerites colorless, transparent.

USNM 57455. Height 7.5 cm, width 9 cm, branched laterally in one plane. Coenenchyme of base damaged, diameter of trunk in lowest part with coenenchyme intact, 4.2 mm; some terminal twigs 1.8 mm in diameter near point of origin and up to 4.2 mm near the clavate tips, but others of uniform diameter, approximately 3 mm, cylindrical or faintly flattened in the plane of branching. Polyps on trunk and adjacent large branches retracted into low verrucae but most of those on distal branches and terminal twigs retracted flush with the coenenchymal surface. Color lemon yellow, sclerites pale yellow, transparent.

Comparisons.—The one yellow and two white colonies of *Adelogorgia telones* differ from all known specimens of *A. phyllosclera*, which without exception are red. Although all three colonies are smaller than the largest *A. phyllosclera*, which is about 20 cm tall, the sample is too small to permit any reliable estimate of maximal size. Branching of the two species is similar, but that of *A. phyllosclera* is somewhat more open and crooked than that of *A. telones*. The polyps of *A. phyllosclera* usually form distinct hemispherical or blunt-conical verrucae, whereas those of *A. telones* form only inconspicuous verrucae or, usually, none at all. Both the marginal calicular teeth and the anthocodial armature are more strongly developed in *A. telones* than in the type-species. The sclerites of *A. telones* are somewhat smaller than those of *A. phyllosclera*, in which the double wheels reach 0.15 mm with an average of 0.1 mm, and the spindles reach 0.2 mm, with an average of 0.18 mm. Apart from being larger, the double wheels of *A. phyllosclera* (Fig. 5c) are somewhat different in shape and more elaborately sculptured than those of *A. telones*. These differences are best seen in the stereoscopic views in Fig. 6.

The colonies of *A. telones* are similar in general aspect to those of *Euplexaura marki* Kükenthal (=*Psammogorgia arbuscula* sensu Nutting, not Verrill) and the closely related (if not identical) *Psammogorgia spauldingi* Nutting, both of which have longer and less sinuous branches. Neither of those species has capstans modified into double wheels or spindles modified into leaf-clubs, but their sclerites bear a strong resemblance to the unmodified forms of both *A. telones* and *A. phyllosclera*.

The double wheels of *Adelogorgia* resemble in form sclerites of several other genera from diverse parts of the world. Remarkably similar are the double wheels of *Subergorgia* (Subergorgiidae) and *Melithaea* (Melithaeidae) (Bayer, 1956: figs. 143, 2a; 144, 2b). Those of *Eugorgia* usually have even thinner wheels and the terminal tubercles are also fused into disks (Bayer, 1956: fig. 153, 4a). Some of the double wheels of certain species of *Clathraria* (Melithaeidae) have terminal axial crests like those of *Adelogorgia.* Capstans in various species of *Swiftia* (including *Callistephanus, Platycaulos* and *Stenogorgia*) may have the tubercles more or less fused into disks (Thomson, 1927: plate 2, figs. 4, 6) and, in some cases (e.g., *Swiftia koreni* [Wright & Studer]), the terminal axial crests are developed much as in *Adelogorgia.*

As fusion of tubercles into disks occurs independently in several genera belonging to widely separated families, it evidently represents a morphological modification with a high degree of probability. The similarity of the double wheels of *Adelogorgia* and *Subergorgia* must therefore represent convergence rather than an indication of close phylogenetic relationship. When accompanied by other morphological similarities, however, as in *Adelogorgia* and *Swiftia,* such spicular modification may be viewed as evidence of relationship.

Acknowledgments

I am grateful to the collector, Dr. W. Duane Hope, for making a special effort to obtain octocorals in the Galapagos Islands, a locality from which as yet few records exist. I also acknowledge with pleasure the work of Mr. Walter R. Brown of the Scanning Electron Microscope Laboratory of the National Museum of Natural History, Smithsonian Institution, who made all of the scanning electron micrographs in this paper with a Coates & Welter model 106 field emission microscope. Darkroom work for preparation of the accompanying figures was done by Dr. Stephen D. Cairns. The manuscript was improved by the helpful suggestions of Dr. Thomas E. Bowman and Mr. C. W. Hart, Jr., to whom I extend thanks.

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