

## Notes on Indo-Pacific Scleractinian Corals. Part 9.<sup>1</sup> New Corals from the Galápagos Islands<sup>2</sup>

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PREPARATION OF AN ILLUSTRATED checklist of the scleractinian corals of the Galápagos Islands based on collections at the Charles Darwin Research Station (CDRS) at Academy Bay, Galápagos; the California Academy of Sciences (CAS); the National Museum of Natural History, Washington, D.C. (USNM); the Smithsonian Tropical Research Institute, Panama (STRI); the Peabody Museum of Natural History, Yale University (YPM); and material collected in 1975 in the Galápagos by Charles Birkeland, G. M. Wellington, P. W. Glynn, and the writer, revealed a total of 22 genera and 31 species of recent ahermatypic corals now known from these islands. Among these are six species believed to be new. These are the subject of the present note.

The type specimens are deposited in the National Museum of Natural History, Washington, D.C.

### FAMILY CARYOPHYLLIIDAE GRAY GENUS *Polycyathus* Duncan

#### *Polycyathus isabela* n. sp.

Figure 1, 1, 2, 3

DESCRIPTION: Quasi-colonial, forming small groups of short, cylindrical corallites by budding from low on the sides of the corallites or from stolonlike expansions of coenosteum. Costae low, rounded, subequal, minutely

granulose or spinulose. Diameter of corallites from 2 mm to 5.5 × 6.5 mm. Calice moderately deep, 1.5 mm in largest corallite. Septal, paler, and columellar arrangement typically paracyathid—three complete septal cycles plus 20 (of 24) septa of the fourth cycle. First-cycle septa slightly exsert, those of succeeding cycles regularly less so. Pali in two crowns, one before the first two cycles, the other before the third, composed of slender, twisted laths. Columella of many similar but much smaller laths differentiated from the pali and deep in the calice.

This species differs from the only other eastern Pacific *Polycyathus*, *P. hondaensis* (Durham & Bernard) from Panama, by its larger corallites with nearly twice as many septa and more pali.

HOLOTYPE: USNM 46964, 3.5 miles west of Pta. Albemarle, Isabela I., Galápagos, 14 m.

OCCURRENCE: 3.5 miles west of Pta. Albemarle, Isabela I., Galápagos, 14 m.

### FAMILY DENDROPHYLLIIDAE GRAY GENUS *Balanophyllia* S. V. Wood

#### *Balanophyllia eguchii* n. sp.

Figure 1, 4, 5, 6

*Balanophyllia affinis* Wells 1964, p. 114, pl. 2, figs. 1–3.

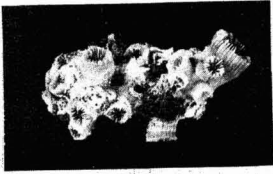
*Dendrophyllia arbuscula* var. *compressa* Eguchi & Sasaki 1973, p. 84, pl. 1, fig. 3; non *Balanophyllia compressa* Seguenza 1880, p. 303, pl. 17, figs. 26, 27.

DESCRIPTION: Solitary or quasi-colonial, forming low clusters of short corallites arising by budding from basal expansions, the polyps eventually becoming organically isolated. Secondary buds rare. Corallites cylindrical in

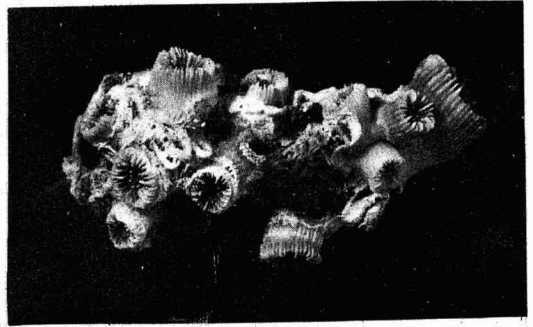
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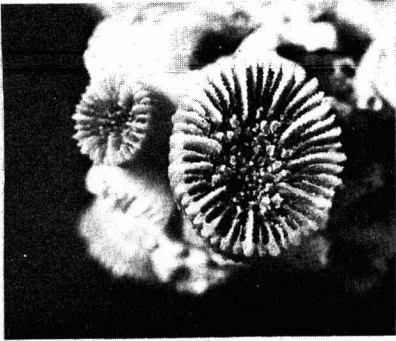
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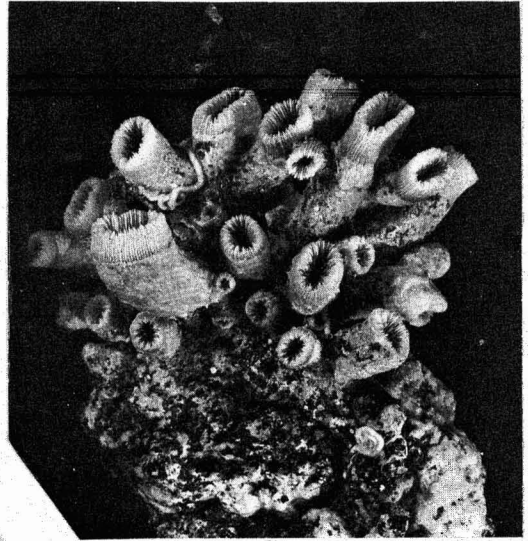
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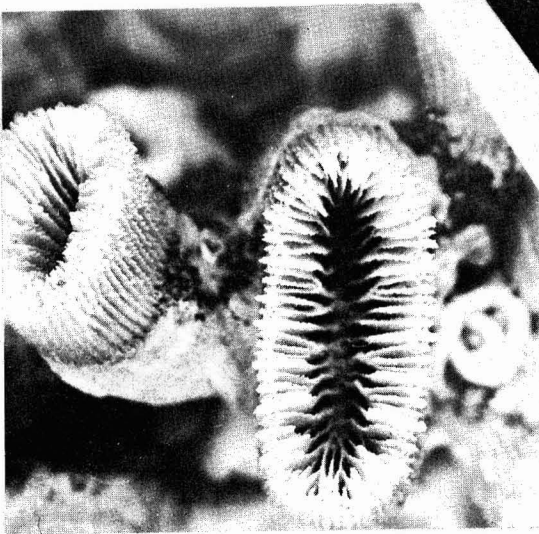
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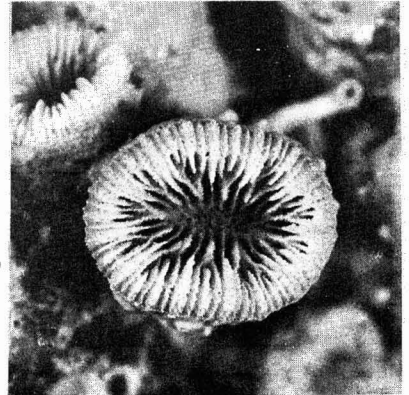
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FIGURE 1. 1, 2, 3, *Polycyathus isabela* n. sp., holotype USNM 46964,  $\times 1$ ,  $\times 2$ ,  $\times 4$ , west of Pta. Albemarle, Isabela I., Galápagos, 14 m; 4, 5, 6, *Balanophyllia eguchii* n. sp., holotype USNM 46966,  $\times 1$ ,  $\times 4$ ,  $\times 4$ , north side of Marchena I., Galápagos, 6 m.

early stages (3–4 mm), becoming strongly compressed in large corallites (5.5 × 13 mm), with equal, beaded or lightly spined costae extending 3–4 mm below calice rim, more or less covered by epitheca toward the base. Septa varying in number from 36 in small (4-mm) corallites to as many as 80 in large ones. Septa scarcely exsert, nearly equal at calice rim. Thirty-six septa reach the elongate, deep columella, and except at the ends of the elongate calices, 18 of these lack fused pairs of higher-cycle septa. At the ends of the calices, additional fused pairs make up the normal dendrophylliid plan. This “stretching” of the septa away from the regular Pourtalès plan begins to appear in small (4.5–5.5-mm) calices.

The polyps of the Galápagos specimens were vermilion to pinkish vermilion in color. Those from the Bay of Panama were yellow; those from Hawaii, pinkish orange or orange; and those from Japan, orange-brown.

This species is distinguished from other shallow-water forms of *Balanophyllia* by the quasi-colonial (“*Rhodopsammia*”) habit analogous to that of *Rhizopsammia* and by the compressed corallites with a distinctive septal arrangement.

Named for the late Motoki Eguchi (1905–1978).

HOLOTYPE: USNM 46966, north side of Marchena I., Galápagos, 6 m.

OCCURRENCE: Galápagos: north side of Marchena I., 6 m (USNM 46966); Rabida (Jervis) I., 7.5 m; Champion I., 1 m (CDRS 011); Academy Bay, Santa Cruz I., 10 m (CDRS 227); Onslow I., under rocks and ledges (CDRS 106, CAS 018928); Onslow I., 3–5 m; Sombrero Chino, Santiago I., under rock ledges (CDRS 224); Cousins Rock, 21–27 m.

Elsewhere: Wakayama-ken, Japan, 7 m (L. G. Harris); Shizuoka Prefecture, central Japan (Eguchi & Sasaki); outside Kaneohe Bay, Oahu, Hawaii, ceiling of pocket in ledge (L. G. Harris); off southern Queensland, 85 m (Wells 1964); northeast end of Pta. Chame, Gulf of Panama, to 27 m (R. Stewart); Taboguilla I., Gulf of Panamá, 9–12 m (G. Handler); Malpelo I., 9 m (C. Birkeland).

GENUS *Rhizopsammia* Verrill

*Rhizopsammia wellingtoni* n. sp.

Figure 2, 1, 2, 3

DESCRIPTION: Small colonies of closely packed corallites linked by coenosteal expansions and tending to form small clusters of corallites basally continuously united. Corallites subcylindrical, slightly expanding upward, 6–12 mm in height. Costae equal, minutely spinulose, extending basally between corallites. Calices oval, 5 × 5 to 6 × 9 mm in diameter, 3–4 mm in height. Septa (48) in four cycles, arranged in the typical Pourtalès plan, those of the first two cycles (12) extending axially to the deep, elongate, spongy columella. First-cycle septa exsert, thicker peripherally; those of the second cycle slightly exsert.

Color of the polyps: deep purple-black.

In most of the described species of *Rhizopsammia* (*R. bermudensis* Wells, *R. chamissoi* Wells, *R. manuelensis* Chevalier, *R. nuda* van der Horst, and *R. verrilli* van der Horst), the corallites are propagated by budding from basal expansions of coenosteum, commonly forming small clusters retaining organic connection, as does the type species *R. pulchra* Verrill, of which the cotype is figured here for the first time (Figure 2, 4, 5). In one species, *R. minuta* van der Horst (*R. minuta mutsuensis* Yabe & Eguchi), the corallites are low and scattered without permanent organic or coenosteal connections.

*Rhizopsammia wellingtoni* is nearest to *R. chamissoi* Wells (Marshall Islands), in which the calices have many fifth-cycle septa and the polyps are brick-red or vermilion in color. *Rhizopsammia verrilli* van der Horst has larger corallites with five cycles of septa, and the polyps of Galápagos specimens are vermilion.

Named for Gerard M. Wellington.

HOLOTYPE: USNM 46969, Tagus Cove, Isabela I., Galápagos, 25 m.

PARATYPE: USNM 46970, Tagus Cove, Isabela I., Galápagos, 25 m.

OCCURRENCE: Tagus Cove, Isabela I., Galápagos, 2 m, under rock ledge (CDRS 118, CAS 018995); Gardner I., near Floreana I.,

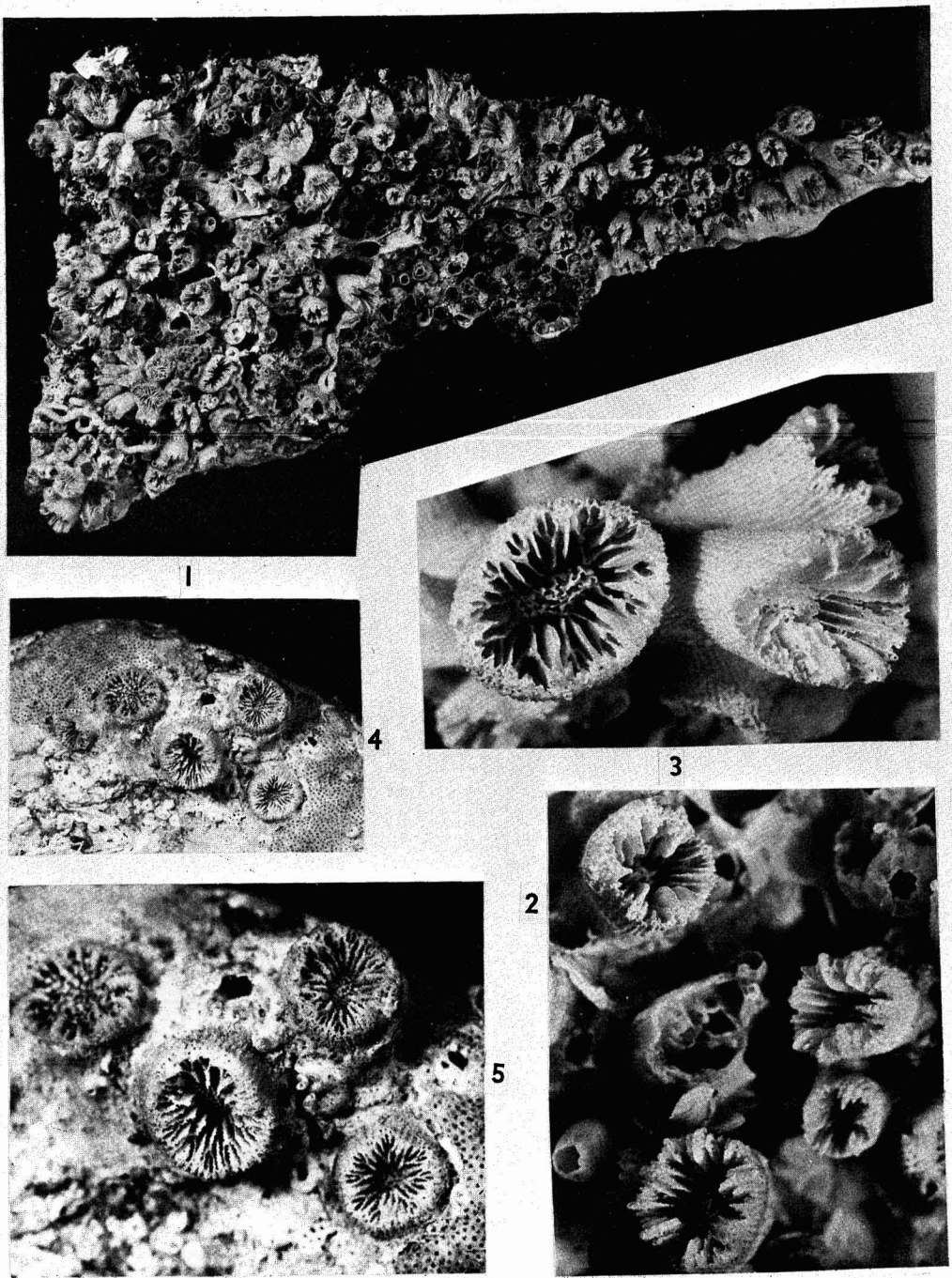


FIGURE 2. 1, 2, *Rhizopsammia wellingtoni* n. sp., holotype USNM 46969,  $\times 1$ ,  $\times 4$ , Tagus Cove, Isabela I., Galápagos, 25 m; 3, *R. wellingtoni*, paratype USNM 46970,  $\times 4$ , Tagus Cove, Isabela I., Galápagos, 25 m; 4, 5, *R. pulchra* Verrill, cotype YPM 5375,  $\times 2$ ,  $\times 4$ , Pearl I., Bay of Panamá, low tide level (upper left corallite is *Astrangia pulchella* Verrill).

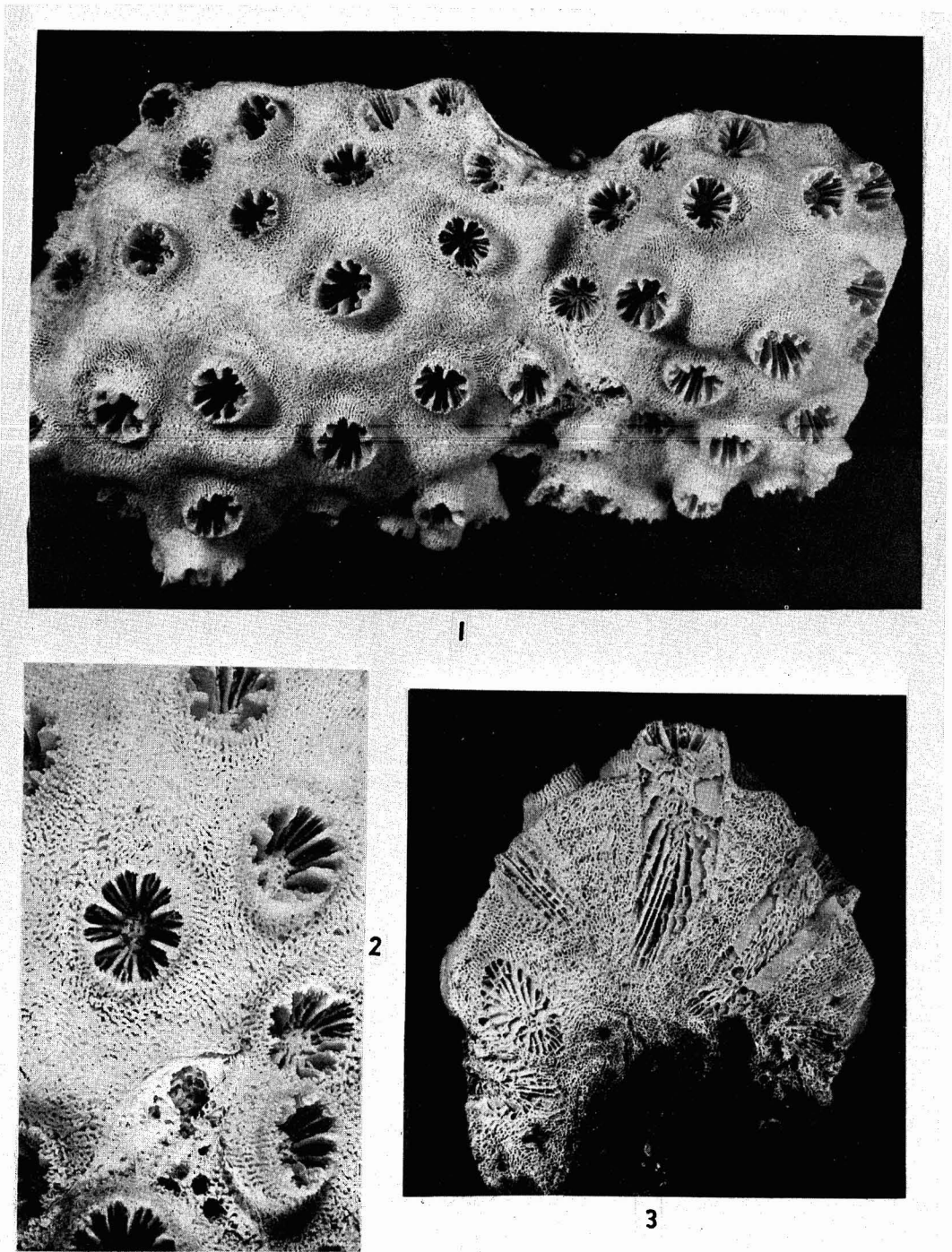


FIGURE 3. 1, 2, *Tubastraea faulkneri* n. sp., holotype USNM 47145,  $\times 1$ ,  $\times 2$ , Great Reef, Bailechesengel I., Palau, 7.6 m; 3, *T. faulkneri*, USNM 62570,  $\times 1$ , Goeneng Api, Banda, 5 m, vertical section through corallites and coenosteum.

Galápagos, 30 m (CDRS 103); dredged off Onslow I., Galápagos, 36–43 m.

#### GENUS *Tubastraea* Lesson

This genus and its type species *Tubastraea coccinea* were first described in 1829, although the date is usually cited as 1831 or 1834. Lesson's "Zoophytes" of the "Zoologie" of the Voyage . . . sur . . . *La Coquille* appeared in Volume 2, the whole volume of which finally was issued in 1838, but, as Sherborn and Woodward showed (1906:336), the author's copies of the section "Zoophytes" were sent out in 1829.

In addition to the cosmopolitan *Tubastraea coccinea*, three other species believed new occur in the Galápagos. These are described below.

#### *Tubastraea faulkneri* n. sp.

Figure 3, 1, 2, 3

*Dendrophyllia aurea* van der Horst 1926, p. 46, pl. 2, fig. 1.

*Tubastraea aurea* Boschma 1953, p. 112, pl. 9, figs. 5, 6.

— *aurea* Nemenzo 1971, p. 182, pl. 12, fig. 3.

*Tubastraea* new species Faulkner & Chesher 1979, p. 307, pl. 192.

**DESCRIPTION:** Corallum encrusting, becoming massive and strongly convex. Calices rising 3–8 mm above a porous, vermiculate coenosteum, spaced 5–15 mm apart. Surface of the coenosteum swollen between calices so that the latter appear slightly sunken. Calices 8–10 mm in diameter, 5–8 mm deep, with costae corresponding to all septa and merging with the surface of the coenosteum. Four cycles of septa, those of the first cycle prominent, slightly thickened and exsert; those of the second cycle thinner and scarcely exsert. Inner margins of septa nearly vertical, dropping steeply to the columella. Third-cycle septa barely reaching to rim of the calice, their inner margins sloping to the columella. Septa of the fourth cycle weakly developed, commonly incomplete in some systems, irregularly fusing to third-cycle septa. Columella

deep, spongy, often slightly compressed, prominent.

Color of the polyps: orange (color photographs by Faulkner and G. M. Wellington; A. G. Humes' note).

This species is related to, but distinguished from, *Tubastraea coccinea* by the widely spaced corallites sunken in thickened coenosteum and by the prominent fusion of fourth-cycle septa to those of the third. In *T. coccinea* the corallites are closely spaced and commonly only united basally. That *T. faulkneri* is only an ecovariant of *T. coccinea* seems negated by the occurrence of the two species at the same site on the steep walls of Tagus Cove.

A *Tubastraea* with similarly widely spaced corallites immersed nearly to their summits in coenosteum was described by Chevalier (1961:480, pl. 22, fig. 8, and figs. 189, 190) from the Miocene (Helvetian) of Touraine. For this form he proposed a new genus *Paleoastroides* (type: *P. michelini*), but separation from *Tubastraea* is superfluous.

Named for Douglas Faulkner, who collected and illustrated this species in color.

**HOLOTYPE:** USNM 47145, Great Reef, Bailechesengel I., Palau, 7.6 m.

**OCCURRENCE:** Tagus Cove, Isabela I., Galápagos, 3–5 m (G. M. Wellington); Goeneng Api, Banda, 5 m, USNM 62570 (A. G. Humes); Wainitu, Amboina (van der Horst); Puerto Galera, Oriental Mindoro, Philippines (Nemenzo).

#### *Tubastraea tagusensis* n. sp.

Figure 4, 1, 2, 3, 4

*Tubastraea coccinea* Scheer & Pillai 1974, p. 64, pl. 30.

— new species Faulkner & Chesher 1979, p. 307, pl. 193.

**DESCRIPTION:** Corallites cylindrical or slightly compressed, averaging 8 mm in diameter, rarely exceeding 10 mm, rising 3–15 mm above the coenosteum, forming convex, globular colonies 70–100 mm in diameter and 60–70 mm high. Corallite walls thin, with low, nearly smooth or sparsely granulose costae. Coenosteum noncostate, flaky on the surface. Increase almost wholly confined to extraten-

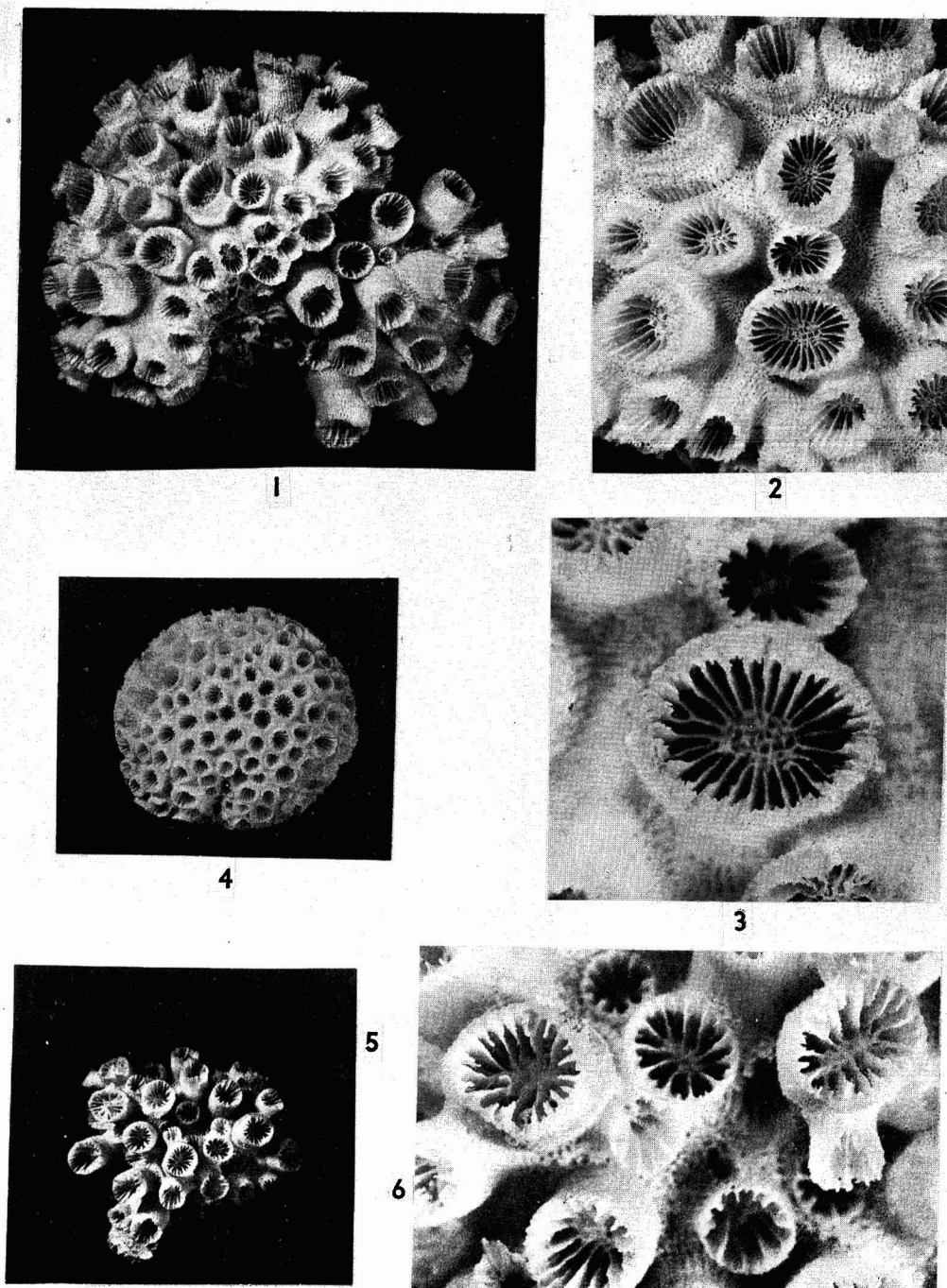


FIGURE 4. 1, 2, 3, *Tubastraea tagusensis* n. sp., holotype USNM 46977,  $\times 1$ ,  $\times 2$ ,  $\times 4$ , Tagus Cove, Isabela I., Galápagos, 4.5 m; 4, *T. tagusensis*, paratype USNM 46979,  $\times 0.5$ , Tagus Cove, Isabela I., Galápagos, 7.6 m; 5, 6, *T. floreana* n. sp. holotype USNM 46974,  $\times 1$ ,  $\times 4$ , west side of Floreana I., Galápagos, shallow water.

tacular from the intercorallite budding. Septa (24) in three cycles, except in large (10-mm) calices where there may be 30 or more, normally arranged in two groups, one consisting of the 12 septa of the first two cycles, equal and extending to the columella, nonexsert, their slightly dentate inner margins dropping steeply to the calice floor and becoming nearly horizontal before joining the columella. The second group, the 12 third-cycle septa, very short, weakly developed with dentate inner edges, internally free and rarely uniting with the first group with which they alternate, but in larger calices they may be accelerated and equal the first group, in which case some fourth-cycle septa are present. Columella varying from a weak tangle on inner ends of larger septa in small corallites to a prominent trabecular tangle half the diameter of the calice.

Color of the polyps variable: lemon-yellow with red peristomes, pale red-violet, pale red-violet with yellowish coenosarc.

*Tubastraea tagusensis* is distinguished from the cosmopolitan *T. coccinea* by the striking regularity of alternation of two groups of septa. In *T. coccinea* the corallites are generally larger, commonly forming tufts with little intervening coenosteum, and the first two cycles of septa are unequal with two or three smaller septa between each first- and second-cycle septum, whereas in *T. tagusensis* a single small septum lies between the 12 larger septa.

HOLOTYPE: USNM 46977, Tagus Cove, Isabela I., Galápagos, 4.5 m.

PARATYPE: USNM 46979, Tagus Cove, Isabela I., Galápagos, 7.6 m (D. Faulkner).

OCCURRENCE: Common at Tagus Cove, Isabela I., Galápagos, in overhangs to 24 m; Tagus Cove, 11 m (CDRS 107, 228, 229, CAS 018996); Cousins Rock, Santiago I., 3 m (CDRS 230); south side of Daphne Minor I., 43 m (USNM); Nicobar I. (Scheer & Pillai); Palau I. (Faulkner).

### *Tubastraea floreana* n. sp.

Figure 4, 5, 6

DESCRIPTION: Corallum small, subencrusting or a small tuft, with cylindrical corallites

4–6 mm in diameter, arising from a basal coenosteum. Calices 4–5 mm deep with a weakly developed columella formed by a tangle of inner septal ends. Septa in three cycles, those of the first two equal, extending nearly to the axis, nonexsert, narrow, dentate inner margins sloping steeply to the calice floor. Third-cycle septa short, rarely fusing to the larger septa, commonly rudimentary. Corallite walls very thin with minutely granulated costae.

Polyps bright pink, drying to red-black.

Distinguished from *Tubastraea coccinea* by the much smaller corallites and septal arrangement, and also by smaller corallites from *T. tagusensis* which has the same septal arrangement.

HOLOTYPE: USNM 46974, Playa Prieta, west side of Floreana I., Galápagos, shallow water.

OCCURRENCE: Playa Prieta, west side of Floreana I., Galápagos (USNM 46974); Caleta Iguana, Isabela I., Galápagos, from overhang at 5 m (USNM 46976); Gardner I., near Española (Hood) I., in cave at 2 m (G. M. Wellington) (USNM 46975); Pinzón (Duncan) I. (*Albatross* 1888, USNM).

### LITERATURE CITED

- BOSCHMA, H. 1953. On specimens of the coral genus *Tubastraea*, with notes on phenomena of fission. *Stud. Fauna Curaçao Caribb. Islands* 4: 109–119.
- CHEVALIER, J.-P. 1961. Recherches sur les madréporaires et les formations récifales miocènes de la Méditerranée occidentale. *Soc. Géol. France, Mém.* 40: 1–562.
- EGUCHI, M. 1973. On some new or little known corals from Japan and Australia. *Seto Mar. Lab. Publ.* 20: 81–87.
- FAULKNER, D., and R. CHESHER. 1979. Living corals. C. N. Potter, New York.
- VAN DER HORST, C. J. 1926. Madreporaria: Eupsammidae. No. 2. Percy Sladen Trust Expedition. *Linn. Soc. London, Trans.* 19(2): 43–53.
- LESSON, R. P. 1829. Voyage autour du monde sur ... *La Coquille*, pendant les années 1822, 1823, 1824, et 1825. *Zoologie*. Vol. 2, Part 2. Zoophytes. A. Bertrand, Paris.



- NEMENZO, F. 1971. Systematic studies on Philippine shallow-water scleractinians. VII. Additional forms. Nat. Appl. Sci. Bull. 23:141–209.
- SCHEER, G., and C. S. G. PILLAI. 1974. Report on the Scleractinia from the Nicobar Islands. Zoologica 122:1–75.
- SEGUENZA, G. 1880. Le formazioni terziarie nella provincia di Reggio (Calabria). Atti R. Accad. Linc. 6(3):1–446.
- SHERBORN, C. D., and B. B. WOODWARD. 1906. Notes on the dates of the natural history portions of some French voyages. Voyage autour du monde sur ... *La Coquille* pendant 1822–25 par L. J. Duperrey, etc.—A correction. Ann. Mag. Nat. Hist. 17(7):335–336.
- WELLS, J. W. 1964. Ahermatypic corals from Queensland. Univ. Queensl. Dept. Zool. Pap. 2(6):107–121.