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NEW FOSSIL CORALS FROM THE PACIFIC COAST

BY

JORGEN O. NOMLAND

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INTRODUCTION

In an earlier paper[1] the writer has summarized the known corals of the Pacific Coast Cretaceous and Tertiary. More recently a large and important coral fauna has been described by Dr. T. W. Vaughan[2] from the Pliocene of Carrizo Creek in the southern part of California. Since the appearance of these publications a few new species have been discovered and other forms have become available. These species are described in the present paper.

Heretofore by far the greater proportion of corals have been described from the Tejon Eocene. It is worthy of note that two of the new species here described are from the Oligocene. Several other forms are known to be present in the Oligocene faunas, but the only material obtained up to the present time is not sufficient for specific description.

[1] Nomland, J. O., Corals from the Cretaceous and Tertiary of California and Oregon, Univ. Calif. Publ. Bull. Dept. Geol., vol. 9, no. 5, 1916.

[2] Vaughan, T. W., The Reef-Coral Fauna of Carrizo Creek, Imperial County, California, and its Significance, U. S. Geol. Surv., Prof. Paper 98, 1917.

ASTRANGIA BOREAS, n. sp.

Plate 5, figures 2*a*, 2*b*, 2*c*

Type, no. 11324, Univ. Calif. Coll. Invert. Palae. From the Treadwell mine, Alaska.

Colony with base somewhat encrusting but extending upwards as irregular, short branches; reproduction by basal expansion and also by buds arising irregularly from the sides and within the calices of older corallites; corallites, frequently narrow near base, becoming wider above. Costae almost obsolete, smooth, on some portions visible nearly to the base, of the same number as the septa. Septa numerous, thin, dentate, lateral faces with few small granules, arranged in four or five cycles, of which the first two reach the columella, some of the septa of the later cycles fused to the earlier cycles without regularity. Calice deep, nearly circular. Wall rather thin. Columella well developed, spongy, rather small in proportion to the size of the calice. Greater transverse diameter of one of the largest calices of type, 15.5 mm.; lesser transverse diameter, 12.5 mm.; height of corallites varies greatly.

Occurrence.—A letter dated June 20, 1890, sent to Professor Joseph LeConte by the collector, M. A. Knapp, gives the following description of the locality at which the specimens were found, "On the quartz croppings of this (Treadwell mine) ledge, 175–180 feet above sea-level and about 500 yards from shore." Pleistocene (?), Douglas Island, southeastern part of Alaska.

ASTRANGIA GRANDIS, n. sp.

Plate 5, figures 5*a*, 5*b*

Type, no. 11325, a well preserved specimen in Calif. Acad. Sci. Coll. from locality 76, at Waldorf Asphalt mine, in hills about four or five miles south of Guadalupe, Santa Barbara County, California.

Corallum incrusting a fragment of rather soft shale saturated with asphalt; base expanding as a thin coating; corallites large, new ones apparently arising from basal expansion of the older; calicular fossa deep, elliptical. Externally ornamented by distinct, coarsely granulate somewhat angular costae extending to the base; interspaces wide, occasionally with a small granulate rib. Wall rather thin, slightly thickened internally. Septa thin, coarsely dentate; lateral faces with numerous pointed granules; in about five incomplete cycles, of which the first three reach the columella; fourth cycle fused to the earlier cycles; fifth small, free. Columella rather dense, not large in propor-

tion to size of the calices, composed of fascicles with additions from the septal ends. Dimensions: greater transverse diameter of calices, about 19 mm.; lesser transverse diameter of calices, 13 mm.; altitude of corallites, approximately 17 mm.

Occurrence.—Middle Fernando, Pliocene, Guadalupe, Santa Barbara County, California.

ASTREOPORA OCCIDENTALIS, n. sp.

Plate 5, figures 1*a*, 1*b*, 1*c*

Type, no. 11323, in Univ. Calif. Coll. Invert. Palae., from ocean beach near Newport, Oregon. Material purchased from John Lumis, Ashland, Oregon.

Corallum a water-worn pebble largely replaced by chalcedonic quartz; upper surface of corallites not present, but internal structure remarkably well preserved. Corallites small, 1.25 to 1.50 mm. in diameter, long and comparatively straight, usually circular but sometimes subcircular in outline, surrounded by a large proportion of very cellular exotheca. Wall thin with distinct but not numerous perforations, dictinctly marked off from surrounding exotheca. Septa twelve, short and thick, extending uniformly throughout the length of corallites in two cycles of which the primary is much more prominent, a third cycle of septa represented by costules; along the inner margin of the first cycle of septa nodes occurring at regular intervals project on the sides and inward, giving a dentate appearance; where these are cut in cross-section pali seem to be present on the inner ends of the primaries; interseptal loculi wide, thin tabulae well-developed, .75 to 1 mm. apart; spaces between the tabulae open. Columella absent. Dimensions of corallites: diameter from .8 mm. to 1.1 mm.; length not known.

Occurrence.—On ocean beach near Newport, Oregon. Probably from the Tertiary deposits in that vicinity.

CARYOPHYLLIA OREGONENSIS, n. sp.

Plate 5, figures 3, 4

Type specimen, no. 11326, in invertebrate palaeontology collections of California Academy of Sciences, San Francisco. From Smith's Point, Astoria, Oregon.

Corallum short, subflabellate, elliptical in cross-section, base subacute with attachment scar visible; calicular fossa deep; wall thin and fragile. Costae prominent, sharp, coarsely granular, corresponding to all the septa; those corresponding to the twelve principal septa much

larger than the others; intercostal grooves narrow. Septa forty-eight, faces granulate, irregularly bent, the upper margins projecting considerably above the corallum wall, giving a saw-tooth appearance; in four complete cycles, of which the first two reach nearly to the columella, fourth cycle short, free. Pali thin and indistinct, attached to the septa, before the margins of the first three cycles, which are of nearly the same diameter. Columella consisting of a few heavy scattered twisted trabeculae. Dimensions of type, which is a small specimen: maximum transverse diameter, 9.5 mm.; lesser transverse diameter, 6 mm.; height, approximately 8 mm.

Three other fossil corals of this genus have been described from the Pliocene and Pleistocene of the Pacific Coast—*Caryophyllia arnoldi* Vaughan, *Caryophyllia californica* Vaughan, *Caryophyllia pedroensis* Vaughan. The species here described differs from these forms greatly.

Occurrence.—In a fine soft black shale, on street grade above Smith's Point, northwestern Oregon; Astoria Series, Oligocene.

DENDROPHYLLIA CALIFORNIANA, n. sp.

Plate 5, figures 6*a*, 6*b*

Type, no. 11190, Univ. Calif. Coll. Invert. Palae. From locality 1131, one-half mile south-southwest of the town of Walnut Creek, Contra Costa County, California.

Corallum consisting of irregularly branching stems. Calices numerous but not crowded, subcircular, approximately equal in size, rising only slightly above the surface, of medium depth, occurring apparently on all sides of the stems without definite order of arrangement. Wall rather thin, spongy. Costae granulate, nearly equal in size, well developed, but due to the large number of pores in the wall ribs may not be continuous but interrupted or deflected. Septa about forty-eight, granulate, rather heavy, arranged in four cycles, of which the first three reach the columella, fourth cycle regularly fused to the third. Columella spongy, occupying a large part of the calice. Dimensions of calices, about 6.5 mm.

This species has some of the characters of *Dendrophyllia hannibali* Nomland, which also occurs in the Oligocene of the Pacific Coast. It may, however, readily be distinguished from that form by the more numerous calices, finer costae, and the large spongy columella. From *Dendrophyllia tejonensis* Nomland of the Tejon Eocene it differs in the spongy wall, greater number of calices, and larger columella.

Occurrence.—At locality 1131, near base of Agasoma gravidum zone, Oligocene.

This form occurs at the type locality of *Siderastrea clarki* Nomland and is associated with such characteristic Oligocene species as *Agasoma gravidum* (Gabb), *Antigona mathewsonii* (Gabb), *Ancellaria fishii* Gabb, *Dosinia mathewsonii* Gabb, *Dosinia whitneyi* (Gabb), *Molopophorus biplicatus* Gabb, *Mytilus mathewsoni* Gabb, *Fusinus* (*Priscofusus*) *hecoxi* Arnold.

BALANOPHYLLIA, sp.

It is of interest to note that specimens of *Balanophyllia* have been discovered recently in beds of middle Fernando, Pliocene, at Fugler Point, eight miles southeast of Santa Maria, Santa Barbara County, California. This genus has heretofore been unknown in the Tertiary deposits of the Pacific Coast later than the Oligocene. This form is associated with a large typical Fernando fauna.[2]

ASTORIA OLIGOCENE CORALS

In the Oligocene of the Astoria group of southwestern Washington several species of corals are present, but the material is only generically identifiable. These are found associated with *Dendrophyllia hannibali* Nomland or in the same series of beds as that species. The following forms, occurring with a large molluscan fauna, have been determined: *Balanophyllia,* sp., *Flabellum,* sp., *Paracyathus,* sp., *Pocillopora* (?), sp., *Sphenotrochus* (?), sp., *Trochocyathus* (two species).

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[3] See U. S. Geol. Surv. Bull. 322, p. 60.

EXPLANATION OF PLATE 5

Fig. 1*a*. *Astreopora occidentalis,* n. sp. Longitudinal view of polished surface Univ. Calif. Coll. Invert. Palae., no. 11323. × 2.

Fig. 1*b*. *Astreopora occidentalis,* n. sp. Cross-section view of polished surface of same specimen as figure 1*a*. × 7.

Fig. 1*c*. *Astreopora occidentalis,* n. sp. Cross-section of specimen shown in figure 1*a*. × 2.

Fig. 2*a*. *Astrangia boreas,* n. sp. General view of type specimen. Univ. Calif. Coll. Invert. Palae. no. 11324; Pleistocene(?). Natural size.

Fig. 2*b*. *Astrangia boreas,* n. sp. View of specimen seen in figure 2*a*, showing denticles on septal margins. × 2.

Fig. 2*c*. *Astrangia boreas,* n. sp. Enlarged calicular view of specimen seen in figure 2. × 2.

Fig. 3. *Caryophyllia oregonensis,* n. sp. Upright view of type specimen. Calif. Acad. Sci. Coll. no. 11326; Oligocene. × 2.

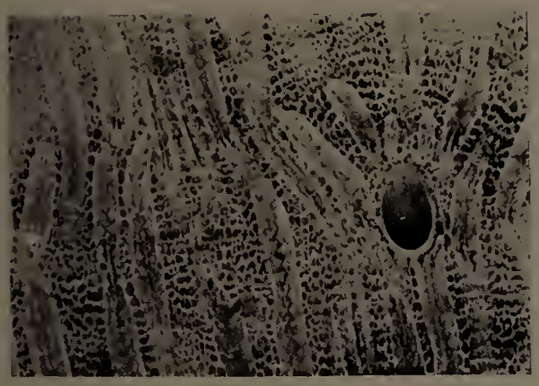
Fig. 4. *Caryophyllia oregonensis,* n. sp. Cross-section view of a small specimen. × 2.

Fig. 5*a*. *Astrangia grandis,* n. sp. Enlarged calicular view of type specimen. Calif. Acad. Sci. Coll. no. 11325; Fernando Pliocene. × 2.

Fig. 5*b*. *Astrangia grandis,* n. sp. General view of type. Natural size.

Fig. 6*a*. *Dendrophyllia californiana,* n. sp. Upright view of type. Univ. Calif. Coll. Invert. Palae. no. 11190. Oligocene. Natural size.

Fig. 6*b*. *Dendrophyllia californiana,* n. sp. Enlarged view of calices of type specimen seen in figure 6*a*. × 3.



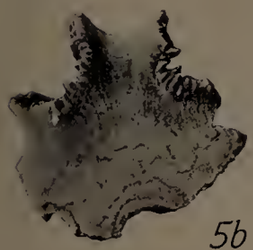
1a

2b

2a

4

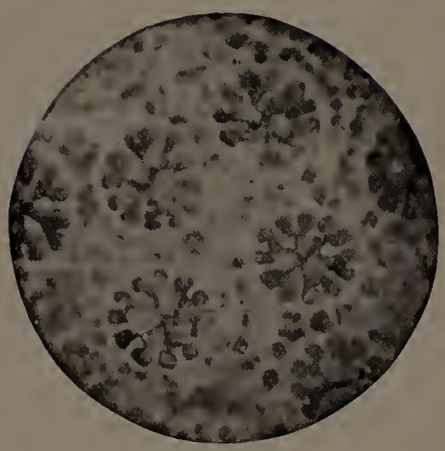
3



5b

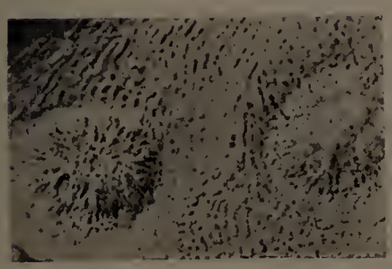
5a

6a



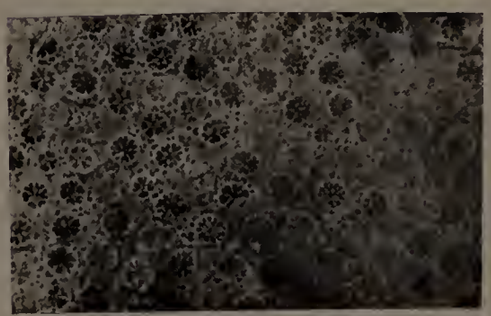
1b

2c



6b

1c



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