

REDESCRIPTION OF *CHAETETES MILLEPORACEUS* MILNE-EDWARDS & HAIME, 1851

N. GARY LANE AND ROGER A. MARTIN
Dept. of Geology, Univ. of California, Los Angeles

ABSTRACT—The tabulate coral *Chaetetes milleporaceus* Milne-Edwards & Haime, 1851, is re-described and illustrated, based on topotype specimens from Newburg, Indiana.

INTRODUCTION

THE earliest, and for many years the only, species of *Chaetetes* described from Late Paleozoic rocks of the United States was *Chaetetes milleporaceus*, established by Milne-Edwards & Haime in 1851, based on specimens collected by Edouard de Verneuil during his journey through the central United States in 1846. The original description was short, generalized, and unaccompanied by illustration. As a result, in subsequent years any chaetetiform tabulate coral from Carboniferous rocks of the United States was ascribed to this species, commonly without adequate description or illustration. Because it has proven impossible to locate the original type specimens, this redescription of the species is based on specimens from one of the two original type localities, and will provide a basis for future studies of Pennsylvanian *Chaetetes* in the United States.

History.—In 1846 de Verneuil made a geologic excursion through the eastern and central United States, during which he concentrated on study of Paleozoic rocks and made fossil collections that ultimately were housed at l'École des Mines in Paris. During his trip he travelled from New Harmony, Indiana to Tennessee (de Verneuil, 1846, p. 12), and he may have crossed the Ohio River from Indiana into Kentucky about two miles east of Newburg, Indiana, where a ferry operated across the river for many years.

At the ferry landing on the Indiana side of the river, a bluff of Pennsylvanian rock exposes a *Chaetetes*-bearing limestone that is judged to have furnished one of the two type specimens listed by Milne-Edwards & Haime in their original description of the species.

On returning to France, de Verneuil (1847) discussed Paleozoic fossils that he found to be common to the United States and Europe, and listed (1847, p. 708) as one such fossil *Chaetetes capillaris* Phillips, which he said is characteristic of the Russian Carboniferous limestones, but is rare in America, having been found by Dr. Norwood on the edge of the Ohio, at Newburg, near Evansville, Indiana, and by Professor Troost, at the foot of the Cumberland Mountains, in Tennessee. This clearly must be a reference to the specimens described three years later as *Chaetetes milleporaceus* by Milne-Edwards & Haime.

The original description of *C. milleporaceus* is as follows:

Polypier en masse gibbeuse. Polypières capillaires très-longues. Calices polygonaux, un peu inégaux, d'un quart de millimètre de diamètre. Planchers complets, très-également espacés. On en compte 40 dans la longueur d'un centimètre. Les planches ne se correspondent pas d'un individu à un autre. Murailles bien développées. Carbonifère. États-Unis: Monts Cumberland (Tennessee), Newburg près Evansville sur l'Ohio. Coll. de Verneuil (sous le nom probablement inédit de *Calamopora milleporacea* Troost).

EXPLANATION OF PLATE 80 All Figures $\times 10$

FIGS. 1-4—*Chaetetes milleporaceus* Milne-Edwards & Haime. 1,2, longitudinal sections of plesiotypes nos. 39437 and 39436; 3,4, transverse sections of plesiotypes nos. 39436 and 39438.

In subsequent years *Chaetetes milleporaceus* was listed, briefly described, or illustrated from Carboniferous or Pennsylvanian rocks from Utah (White, 1876, 1877), Missouri (Keyes, 1894), Kansas (Beede, 1900), Colorado (Girty, 1903), Illinois (Heritsch, 1933), and other states (Bassler, 1950). Only the report by Heritsch provides detailed description and illustration, but it is based on specimens from Peoria County, Illinois, and it is doubtful if these specimens are conspecific with *C. milleporaceus*. Finally, in 1945 Moore & Jeffords described new species of *Chaetetes* from Morrowan and Atokan rocks of the Midcontinent and judged *C. milleporaceus* to be unrecognizable because of the inadequate original description and uncertainty whether specimens described by later workers are conspecific. The only other Desmoinesian species of *Chaetetes* described from the United States is *C. schucherti* Morgan, 1924 from Oklahoma, which is based on peculiarities of corallite development that have not been observed in *C. milleporaceus*.

Type specimens.—Whether the original type specimens of *C. milleporaceus* are extant or not is not known. The de Verneuil collection is housed at l'École des Mines in Paris, but efforts to locate the type specimens have proved fruitless. Because the types may be recognized in the future, we are not now establishing a neotype. However, for reasons given below, if the types should be recovered we believe that the Tennessee and Indiana cotypes can be discriminated, and that the Indiana specimen should be selected lectotype.

Type localities.—That a *Chaetetes*-bearing limestone near Newburg, Indiana was well known to early geologists is not surprising, considering the proximity of the bed to the old ferry landing east of Newburg, discussed above. Collett (1876) reported this limestone in a composite columnar section taken near Newburg. The only other limestone in the southern Indiana Middle Pennsylvanian that commonly contains *Chaetetes* is the West Franklin Limestone, which is stratigraphically higher than beds near Newburg, and which outcrops west, not east, of Evansville, Indiana. Study of West Franklin specimens of *Chaetetes* by the authors reveals that they are not conspecific with specimens from Newburg.

The Newburg bed from which *Chaetetes* was collected is exposed along a bluff facing the Ohio River on the western bank of Cypress Creek, two miles east of Newburg, in the NW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 12, T. 7 S., R. 9 W., Yankeetown Quadrangle, Warrick County, Indiana. The stratigraphic position of the limestone is as follows:

"The limestone that crops out on the Ohio River near Newburg, Indiana, is below the Millersburg Coal and is between Indiana Coals V and VI. It is in the Dugger Formation of the Alleghenian Series" (C. E. Wier, Indiana Geological Survey, personal communication, Jan. 14, 1963)."

The exact locality for the cotype of *C. milleporaceus* from Tennessee is uncertain and probably can never be ascertained. In the 113 years since the original description of the species, there has never been another reference to *Chaetetes* in the Pennsylvanian of Tennessee. The genus is restricted to limestones wherever it has been reported, and the Tennessee Pennsylvanian contains almost no limestone, most of the marine faunas occurring in calcareous shales (H. R. Wanless, personal communication, 1963). An unpublished doctoral thesis on marine Pennsylvanian fossils of Tennessee (Summerson, 1942, Univ. Illinois) indicates that rugose lophophylloids are the only corals that he found in that state.

It is probable that de Verneuil obtained the Tennessee specimen from Gerard Troost, in light of de Verneuil's (1847) statement and according to Milne-Edwards & Haime the specimen was accompanied by the unpublished name *Calamopora milleporacea* Troost. Troost had collected other fossils in the Cumberlands of Tennessee that he called *Calamopora*, one of which he named *C. cumberlandica* (Troost, 1840, p. 70). Based on his description, the latter species could bear resemblance to *Chaetetes*. Limestones near Crab Orchard, Tennessee are in the Pennington Shale and are Chesteran in age (Wanless, personal communication). Consequently, we judge *C. cumberlandica* Troost to be in all probability a massive bryozoan, perhaps of stenoporid type, and that the specimen furnished de Verneuil by Troost may have been of the same type and from the same stratigraphic interval. Efforts to locate the types of *C. cumberlandica* have proven fruitless. The Troost collection was sold after his death to the Louisville, Kentucky, Public Library. Their small museum was inundated by the Ohio River flood of 1938 and all specimens and labels separated or destroyed. The senior author examined their collections during the summer of 1963 and could not find a single fossil specimen that could be ascribed certainly to the Troost collection.

From the above considerations we judge that when Milne-Edwards & Haime described *C. milleporaceus* they had before them two specimens that were of quite different age and that belonged to two different phyla of animals: one a true *Chaetetes* tabulate coral of Desmoinesian age from near Newburg, and the other a massive bryozoan of Mississippian age from Tennessee.

If the types are ever found, it should be possible to tell the Indiana and Tennessee specimens apart, because in addition to different morphologic details the Tennessee specimens might be partly or completely silicified and have oolitic limestone matrix attached, whereas the Newburg specimen should be unsilicified, be blue-gray in color, surrounded by brown, ferruginous fine-grained limestone that might also contain small fusulines, small fistuliporid bryozoans, *Mesolobus*, and fragments of other brachiopods.

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SYSTEMATIC PALEONTOLOGY

Order TABULATA Milne-Edwards & Haime, 1850

Family CHAETETIDAE Milne-Edwards & Haime, 1850

Genus CHAETETES Fischer, 1829

CHAETETES MILLEPORACEUS Milne-Edwards & Haime, 1851

Pl. 80, figs. 1–4

Chaetetes milleporaceus MILNE-EDWARDS & HAIME, 1851, p. 272.

(?) *Chaetetes milleporaceus* WHITE, 1876, p. 88; 1877, p. 98, pl. 6, fig. 2a; KEYES, 1894, p. 123, pl. 14, fig. 12; BEEDE, 1900, p. 25, pl. 2, fig. 11; Girty, 1903, p. 328; HERITSCH, 1933, p. 257, fig. 1–4.

Corallum.—Lenticular in cross section, with upper surface convex upward, lower surface uneven, undulatory, and subhorizontal to bedding; maximum horizontal dimension 20 cm, maximum vertical dimensions, 5 cm.

Transverse section.—Corallites polygonal in cross section, with 5 to 7 sides, generally six-sided. Diameter of corallites range from 0.7 mm to 0.15 mm, average 0.30 mm. Corallite walls generally smooth, a few were observed that had slightly swollen walls, but not distinctly beaded, ranging from 0.05 to 0.09 mm thick, averaging 0.065 mm thick. Pseudosepta rare except in lowest 1 mm of colony where most corallite division takes place. Some corallites are slightly elongate, resulting in maximum and minimum

diameters. Elongate corallites sporadic and not aligned in the same directions.

Longitudinal section.—Corallites long and slender, walls straight or gently arcuate, smooth-sided. Tabulae 0.01 mm or less in thickness, some are slightly concave upward, but most are straight. Most tabulae evenly spaced along a corallite, but in rare instances they are almost touching or up to 0.75 mm apart; 31 to 64 tabulae in 10 mm; averaging about 4 tabulae per mm; tabulae randomly spaced in adjacent corallites, generally not opposite each other. Near base of corallum corallites subhorizontal, turning up abruptly in lowest 1 mm of corallum and continuing to upper surface without division or interruption.

Remarks.—The average corallite width and spacing of tabulae cited above agree closely with those given in the original description of the species. The original authors state that corallites are a quarter of a mm in diameter, whereas our measurements average 0.30 mm, and that there are 40 tabulae in one cm, and our measurements average 42 tabulae in 10 mm in 6 thin sections. These measurements are in close agreement with the original description, as is the fact that tabulae of adjacent corallites are not at the same level. We conclude that the bulk of the original description of *C. milleporaceus* was taken by the authors from their Newburg specimen. The only descriptive aspect that may pertain to the Tennessee specimen is the statement that the corallum is convex. Newburg topotypes are lenticular in shape and while upper surfaces are convex, they are not similar to other *Chaetetes* coralla that are subspherical in shape.

Virtual absence of pseudosepta in specimens described here is judged to be a function of corallum shape. We have observed in other species of *Chaetetes*, especially ones from the Atokan of the southern Great Basin, that those colonies that are subspherical or cylindrical in shape have pseudosepta throughout the colony as new corallites are added to fill up the increasing volume of the corallum, whereas tabular or lenticular colonies rarely exhibit pseudosepta except in the basal portion of the colony.

Material.—Fourteen thin sections were prepared from four topotype coralla. Illustrated specimens are U.C.L.A. Invertebrate Paleontology collection nos. 39436–39438 (2 sections, one transverse and one longitudinal). Unsectioned topotypes will be deposited at the U. S. National Museum, Indiana University, and the Universities of Illinois, Kansas, Southern California, and California at Berkeley.

Measurements.—A total of 170 determinations of tabulae spacing was made on six longitudinal

thin sections. The average spacing of tabulae was 4.2/mm, with a range of 3.1 to 6.4 tabulae per mm. On section no. 39436, 40 corallites averaged 4.2/mm, with a range of 3.4 to 4.9 per mm. On section no. 39437, 20 corallites averaged 3.9 per mm, with a range of 3.4 to 4.3/mm.

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