

Notice of a remarkable new Genus of Corals, probably typical of a new Family. By F. B. MEEK.

Among some fossils sent on for investigation by Professor Whitney, the State Geologist of California, from the Silurian rocks of Nevada*, there are a few specimens of a new genus of corals presenting such an extraordinary and interesting combination of characters that it is thought desirable to call attention to it here†.

The specimens of this fossil contained in the collection are slender, slightly flexuous, arched or nearly straight, and subcylindrical, excepting near the lower end, where they taper to a point, by which they were probably attached. They may have grown in tufts or groups; but all the specimens yet seen are single, and show no evidences of growing in contact.

To the unassisted eye, the external surface of these corallites (with the exception of obscure annular swellings and constrictions of growth and faintly marked linear septal costæ) seem to be nearly or quite smooth. When examined under a strong lens, however, it is seen to be beautifully punctate—the punctures being minute, of exactly uniform size, and arranged with mathematical regularity in quincunx, and so closely crowded that the little divisions between them are scarcely equal in breadth to the punctures themselves, and form, as it were, an extremely delicate kind of network. So remarkable is the appearance of this punctured outer wall, that the first question that suggests itself, on examining it under a magnifier, is, whether or not it may be merely an exceedingly delicate Polyzoön encrusting the whole surface. A clear examination, however (especially in carefully prepared transverse sections), shows that the punctures actually pass entirely through the wall, which is very thin, and that they are not due to the growth of a Polyzoön, nor to surface-ornamentation.

On grinding away this very thin punctured wall, the septa are seen immediately within to be stout, equal, straight, and very equidistant; but on grinding a little further in, they are observed to become very regularly waved laterally, *exactly like the septa in the foraminiferous genus Fusulina*. So striking is this resemblance, that it was not until after ascertaining from cross section that the fossil has not an involuted structure, that I could get rid of the suspicion that it might be a new type of Foraminifera allied to *Fusulina*, instead of an extraordinary coral.

By grinding still further in (to a depth of about 0.06 inch, in a specimen 0.34 inch in diameter), the lateral waving of the septa already mentioned is seen to be there suddenly and so strongly marked, that they connect laterally, in such a manner as to form a

* A notice of the discovery of Silurian rocks at this distant western locality has already been published by Prof. Whitney in the Proceedings of the Californian Academy of Sciences.

† Figures and descriptions of this and the other Silurian fossils from this locality will be given in the second volume of Prof. Whitney's report on the geology of California.

kind of complex inner wall between the great central cavity and the outer septate zone. This wall, however, does not completely isolate the septate outer zone from the central cavity, but is perforated by a series of round equal canals, very regularly placed one within each of the lateral curves of the septa, so that those on the opposite sides of each septum alternate with exact regularity, as do those of each of the two rows within each interseptal space. These canals have no similarity to the minute punctures of the outer wall, being greatly larger and very differently arranged. They do not pass *directly* through the inner wall, but are directed obliquely upward and inward, so that, as seen in transverse sections of the corallites, they present the appearance of a double row of vesicles cut across.

Both longitudinal and transverse sections show the large central cavity to be without any traces of septa or columella. From these sections I was likewise at first led to believe this central portion to be also an entirely open cavity or calice, the whole length of each corallite; but on sending specimens to Prof. Verrill, he called my attention to some obscure appearances of transverse plates in one of the specimens cut longitudinally, and requested me to cut others with the view of ascertaining whether or not these are plates. A longitudinal section of another specimen, however, when carefully polished, reveals no traces of proper transverse plates; but when examined by the aid of a strong magnifier, it shows the whole interior to be occupied by a dense vesicular tissue, the walls of the vesicles being of extreme tenuity. This structure is seen in the interseptal spaces of the outer zone, as well as in the central cavity within.

In regard to the affinities of so remarkable a type, it seems scarcely safe to express an opinion without a better series of specimens for study. Some of its internal characters, as suggested by Prof. Verrill, would seem to indicate remote affinities to the *Cyathophyllidæ*; but its peculiar perforated outer wall would, on the other hand, appear to remove it from the primary division of corals including that family.

I am therefore led to believe it a new genus, and most probably typical of a new family, in which opinion Prof. Verrill concurs with me. For this genus I would propose the name *Ethmophyllum*.

Among the specimens in the collection under examination, there are apparently two species of this fossil. That considered the type of the genus is larger and more robust than the other, and more conical in form, especially near its smaller end. None of the specimens seen are quite perfect at the larger extremity. One measures 0.37 inch at its imperfect larger end, and seems to have been $2\frac{1}{2}$ to 3 inches in length. In this there are sixty septa, while its outer septate zone is 0.07 inch wide. Another fragment, however, measures 1.20 inch in diameter at the larger end, and was probably 5 to 6 inches or more in length, with 112 septa at the larger end. This large fragment shows that the septate outer zone does not increase in thickness or breadth in proportion with the size of the corallites, since it is only 0.15 inch broad in this specimen, the in-

crease in thickness of this corallite being made up by the increased size of the non-septate interior. For this larger species I would propose the name *Ethmophyllum Whitneyi*, in honour of Prof. J. D. Whitney, to whom I am indebted for the use of the specimens.

Of the other species I have seen but a single specimen, which is imperfect at both extremities, about 2.15 inches in length, and only about 0.20 inch in diameter at the larger end, and 0.15 at the smaller, with some 24 to 28 septa. In addition to its much more slender form, it differs from the other species in having its septa so strongly waved laterally as almost to divide the interseptal spaces into cells, nearly to the outer wall. For this, if it should prove to be a distinct species, I would propose the name *Ethmophyllum gracile*.

The specimens were all obtained at Silver Peak, Nevada, and were discovered by Mr. Clayton.—*Silliman's American Journal*, January, 1868.

Note on the Polymorphism of the Anthozoa and the Structure of the Tubiporæ. By A. KÖLLIKER.

The polymorphism of individuals, so remarkable among the Acalephæ, has had nothing corresponding to it among the other Cœlenterata; it is therefore a very unexpected discovery that M. Kölliker has lately made, of a true polymorphism in various genera of Anthozoa Alcyonaria. This polymorphism consists in the existence, besides the large individuals capable of taking nourishment and furnished with generative organs, of other, smaller, asexual individuals, which appear essentially to preside over the introduction of sea-water into the organism, and then over its expulsion, and which are perhaps at the same time the seat of an excrementitious secretion. Like the others, these asexual individuals possess a body-cavity divided into chambers by eight septa, and a pyriform stomach with two orifices. On the other hand they are entirely destitute of tentacles; and instead of the eight ordinary mesenteric filaments there are only two, supported upon two consecutive septa. The cavity of the body of these individuals is always in communication with that of the sexual individuals; but the mode in which this communication is effected is liable to vary with the genera.

We may distinguish two types in the mode of distribution of the asexual individuals upon the polyparies. In the first they are distributed in great abundance over the whole polypigerous region of the polypary, among the sexual individuals. This is the case in certain Alcyonids which M. Kölliker refers to the genus *Sarcophyton*, and also in *Veretillum*, *Lituaria*, *Cavernularia*, and *Sarcobelemnon*. In the second case the asexual individuals are restricted to certain perfectly definite places, which, however, are variable according to the genera. Thus in certain species of *Pteroeides* they occur on the lower surface of the pennate leaves of the region serving for attachment, in the form of a larger or smaller plate; in other species of the same genus they are also found at the apex of the polypary; in



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