AN OCCURRENCE OF *HEXAGONARIA* IN THE GRAND TOWER FORMATION OF SOUTHERN ILLINOIS AND SOUTHEASTERN MISSOURI

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ABSTRACT. — A new species of colonial coral, *Hexagonaria mesocincta*, is described. Its occurrence in the lower part of the Grand Tower Formation (Middle Devonian) in Ste. Genevieve County, Missouri, and in the basal Grand Tower Limestone in Union County, Illinois, suggests a direct correlation of these beds.

In 1910 T. E. Savage reported the occurrence of a Devonian colonial coral, *Hexagonaria*, from the uppermost bed of the Grand Tower Formation in the Backbone at Grand Tower, Illinois, as *Cyathophyllum rugosum* Rominger. Ten years later (1920) in an unpublished report of the Illinois Geological Survey, Savage listed this same species from the upper beds of the Grand Tower Formation on Green Creek (near the middle of the north side of Sec. 23, T.12S., R.2W., about two miles northwest of Jonesboro) in Union County, Illinois. These were the first reports of the occurrence of *Hexagonaria* in the Grand Tower Formation.

E. C. Stumm (1948) placed *Cyathophyllum rugosum* Rominger in synonymy with *Hexagonaria curta* Stumm. Specimens of *Hexagonaria* collected recently from the uppermost bed of the Grand Tower Formation in the Backbone are not conspecific with *H. curta*. No specimens of *Hexagonaria* were found in the upper beds of the Grand Tower Formation on Green Creek.

Hexagonaria mesocincta, new species

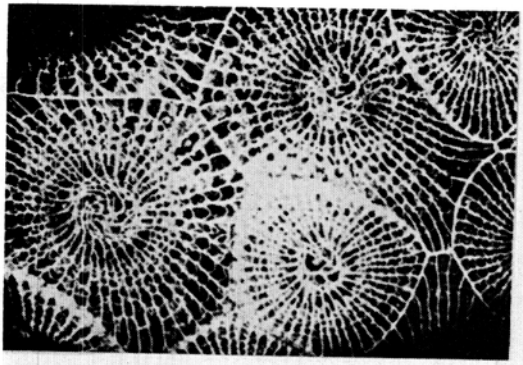
Holotype.—Southern Illinois University Museum No. 701, a large, weathered specimen collected from the Grand Tower Formation. (Fig. 3-4)

Occurrence.—Grand Tower Formation, along the north bank of Clear Creek in the NE¼ SE¼ SW¼ Sec. 27, T.11 S., R.2 W., Union County, Illinois (Southern Illinois University Museum No. 705).

Grand Tower Formation, just to the south of the west pit of the Ozora quarry in the limestone bed cut by the east edge of the pit (bed #7) in the SE¼ SE¼ Sec. 5, T.36 N., R.9 E., Ste. Genevieve County, Missouri (holotype). (Fig. 7).

Diagnosis.—The species *Hexagonaria mesocincta* can be distinguished from all other species of the genus *Hexagonaria* by means of the combination of axial whorls, thin corallite walls and number of septa.

Description of the holotype.—The coralla are cerioid, irregularly hemispherical in outline and composed of



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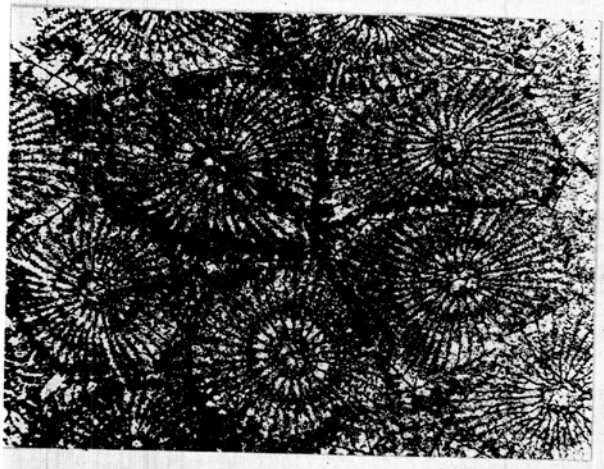

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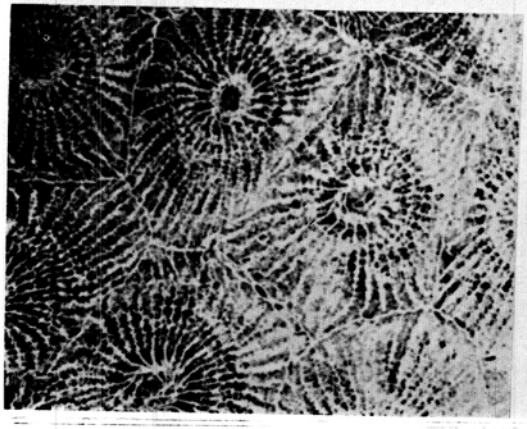

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corallites that are both pentagonal and hexagonal in outline, ranging from 10 mm. to 20 mm. in diameter. The polygonal walls are very thin and straight or curved. The calices are shallow with wide peripheral platforms, which slope toward the slightly elevated circular rims which surround the medial pits. The floors of the pits are occupied by the axial whorls produced by the ends of the major septa. These whorls may be

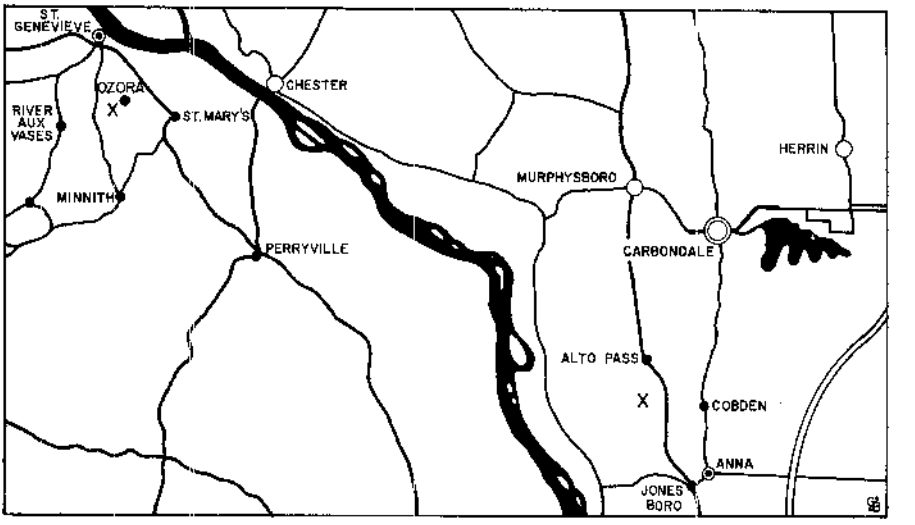

FIGURE 7.—Map showing the sites (X) where *Hexagonaria mesocincta* occurs; south of Alto Pass (along the north bank of Clear Creek in the NE¼ SE¼ SW¼ Sec. 27, T.11 S., R.2 W.), Union County, Illinois and southwest of Ozora (just south of the west pit of the Ozora quarry in the SE¼ SE¼ Sec. 5, T.36 N., R.9 E.), Ste. Genevieve County, Missouri. Map prepared by Cartographic Office, Mississippi Valley Investigation, 1966.

FIGURES 1-6.—*Hexagonaria cincta* (Stainbrook): 1. Transverse section showing the solid axial whorls and long, thin septa. Paratype (Stainbrook Collection—No. 1172), Jeffersonville Limestone, Jeffersonville, Indiana (after Stainbrook). 2. Longitudinal section showing incomplete tabulae anastomosed with axial ends of major septa: holotype (Stainbrook Collection—No. 1198) after Stainbrook). *Hexagonaria mesocincta*: new species: 3. Transverse section showing long, thin septa, yardarm carinae and axial whorls; holotype (Southern Illinois University Museum Collection—No. 701) from Grand Tower Limestone, Ozora quarry, Ste. Genevieve County, Missouri. 4. Longitudinal section showing closely-spaced carinae and incomplete tabulae anastomosed with axial ends of major septa; holotype. *Hexagonaria suncincta*: 5. Transverse section showing thin, well-spaced septa and axial whorls and septa with yardarm carinae: holotype (University of Michigan, Museum of Paleontology—No. 24233) from Bois Blanc Formation, one mile west of Mackinac City, Michigan (after Stumm). 6. Longitudinal section showing, complete, close-set, horizontal tabulae and carinae; paratype (University of Michigan, Museum of Paleontology No. 24236). Horizon and locality same as that of the the holotype (after Stumm). All figures X2.

FIGURES 1, 2, 5 and 6 reproduced by permission of Lewis B Kellum. Museum of Paleontology, University of Michigan.

elevated, forming circular axial bosses.

In transverse section the septa in the larger corallites range from 44 to 46 in number. The major septa extend into the tabularia, where they are deflected to form axial whorls, which occupy the central portion of the tabularia. The minor septa terminate at the margins of the tabularia. Both orders of septa are carinate across the dissepimentaria, with yardarm carinae occupying the central part of the septa and offset carinae occupying the irregular peripheral and axial ends of the septa. The septa are very irregular near the periphery.

In longitudinal section the tabularia average less than one-third the width of the corallite and contain a tangled series of tabellae, which are greatly anastomosed with the axial ends of the major septa. The dissepimentaria consist of small, distally convex dissepiments. Dissepimentaria are crossed by numerous distally arched carinae.

Comparisons.—This species resembles both *H. cincta* (Stainbrook) (Fig. 1-2) and *H. subcincta* Stumm. (Fig. 5-6). In *H. mesocincta* the walls are thin like in *H. subcincta*. In all other respects, *H. mesocincta* is similar to *H. cincta*.

Stuart Weller (1928) noted the occurrence of a zone of abundant corals in the lower part of the Grand Tower Formation in the Little Saline Creek area of Ste. Genevieve County, Missouri. At that time he stated: "the well known fossil coral reef at the Falls of the Ohio occurs in the lower portion of the Jeffersonville limestone of Indiana. The fossil coral reef in Ste. Genevieve County is far less extensive than that at the Falls of the Ohio, but the species are all common to the two regions, and there can be no hesitation in considering them to be contemporaneous in age". He also stated that this coral zone was not present in the Grand Tower Formation at Grand Tower, Illinois. However, none of the corals from the Grand Tower Formation in Missouri were figured or described.

Thus, since corals were the main basis for correlation used by Weller, no detailed correlations were established within the Grand Tower Formation between Missouri and Illinois.

The Devonian colonial coral *Hexagonaria mesocincta*, new species, is present in the coral zone reported by Weller (bed #7 about 40 feet above the base of the Grand Tower Formation in quarry hill, SE¼ Sec. 4, T.36 N., R.9 E., Ste. Genevieve County, Missouri). This species is similar to *Hexagonaria cincta* (Stainbrook), which occurs in the basal coral zone of the Jeffersonville Limestone in the Falls of the Ohio region. *Hexagonaria mesocincta* is also present in the abundantly coralliferous basal bed of the Grand Tower Limestone, immediately above the Dutch Creek Sandstone, on Clear Creek (along the north bank of Clear Creek in the NE¼ SE¼ SW¼ Sec. 27, T.11 S., R.2 W., about two and three quarter miles south of Alto Pass) in Union County, Illinois.

This situation seems to verify a suggestion made by J. M. Weller (1944) that the Grand Tower Formation is older in Missouri than it is in Illinois. At the same time, the presence of the same coral species

suggests a direct correlation of the middle lower part of the Grand Tower Formation in the Ozora quarry (quarry hill) of Ste. Genevieve County, Missouri, with the basal part of the Grand Tower Limestone on Clear Creek in Union County, Illinois.

Literature Cited

Savage, T. E. 1910. The Grand Tower (Onondaga) Formation of Illinois, and Its Relation to the Jeffersonville Beds of Indiana. Trans. Illinois Acad. Sci. 3:116-132.

——— ———. 1920. Geology and Economic Resources of the Jonesboro Quadrangle. Illinois Geol. Sur. Unpublished report TES-3.

Stumm, E. C. 1948. Lower Middle Devonian Species of the Tetracoral Genus *Hexagonaria* of East-central North America. Contr. Mus. Paleont., Univ. of Michigan vol. 7, No. 2. (*Hexagonaria curta*: p. 26-27, pl. 4, figs. 2-3; pl. 12, figs. 1-6. *Hexagonaria cincta*: p. 23, pl. 1, fig. 5; pl. 10, figs. 1-2. *Hexagonaria subcincta*: p. 24-25, pl. 2, fig. 2; pl. 10, figs. 3-5).

Weller, J. M. 1944. Symposium on Devonian Stratigraphy - in The Devonian of Southeastern Missouri by Carey Croneis. Illinois Geol. Sur. Bull. 68: 128.

Weller, S., and S. St Clair. 1928. Geology of Ste. Genevieve County. Missouri. Missouri Bur. Geol. and Mines, second ser., vol. 22:143-145.

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