

# A NEW NAUTILOID CEPHALOPOD, *EUTREPHOCERAS SLOANI*, FROM THE EOCENE OF SOUTH CAROLINA.

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Species of the genus *Eutrephoceras* are rare in the Tertiary deposits of the United States. Whitfield<sup>1</sup> described one, as *Nautilus cookana*, from the Shark River marl of New Jersey, probably of middle Eocene age, but none, so far as the writer knows, has been described from the Eocene of the southeastern United States. The specimen on which this paper is based is therefore of considerable interest, and, though it is perhaps not so complete as one might wish a type specimen to be, most of its essential characters can be made out and are worth recording for the benefit of future collectors.

The specimen was found in silicified marlstone at Perkins Bluff on Black River, Georgetown County, South Carolina, by Earle Sloan, of Charleston, South Carolina, then State geologist, and listed as *Enclimatoceras ulrichi* White.<sup>2</sup> It was borrowed from Mr. Sloan by Dr. C. Wythe Cooke, of the United States Geological Survey, in order to verify the identification, and when found to differ from the type of *E. ulrichi* was placed in my hands for description. At Doctor Cooke's suggestion, Mr. Sloan has deposited the specimen in the United States National Museum.

Because of the supposed presence of *Enclimatoceras ulrichi*, a Midway species, the beds at Perkins Bluff, belonging to the Black Mingo formation, were regarded by Sloan as of Midway age.<sup>3</sup> However, as the rock matrix of the type of *Eutrephoceras sloani* contains impressions of a coral identified by Dr. T. W. Vaughan as *Haimesiastraea conferta* Vaughan, a species ranging through the Midway and Wilcox groups of Alabama, the geologic age of the beds might be either Midway or Wilcox.

<sup>1</sup> Whitfield, R. P., Gasteropoda and cephalopoda of the Raritan clays and Greensand marls of New Jersey: U. S. Geol. Survey Mon. 18, pp. 285-286, pl. 48, fig. 1; pl. 49, figs. 4, 5, 1892.

<sup>2</sup> Sloan, Earle, Catalogue of the mineral localities of South Carolina: South Carolina Geol. Survey, ser. 4, Bull. 2, p. 319, 1908.

<sup>3</sup> Vaughan, T. W., in Willis, Bailey, Index to the stratigraphy of North America: U. S. Geol. Survey Prof. Paper 71, p. 732, 1912.

## Family NAUTILIDAE Owen.

## Genus EUTREPHOCERAS Hyatt.

According to Hyatt:<sup>4</sup>

This genus includes these forms like the type *E. deKayi*, which have globose ananepionic substages, increasing subsequently with great rapidity in all their diameters. The ana- and metanepionic substages are highly tachygenic and these shells have very small, and often hardly perceptible and much flattened, umbilical perforations. The siphuncles are subdorsan from the apex through the nepionic stage in some species, in others this position is not maintained, but the siphuncle is generally in the later stages near the dorsum and in the ephelic stages it is dorsad of the center.

The nepionic stage has longitudinal ridges and transverse bands, the former disappearing in adults which are smooth.

The form of the whorl in section is nephritic from an early age and changes but little throughout life.

The sutures are almost straight, having but slight ventral lobes, broad ventrolateral saddles, lobes on the umbilical zones, and deep lobes in the zone of impression. There are no annular lobes at any stage of development.

Hyatt's remarks about the genotype are all based on specimens from the Western Interior ("Dakotah"), whereas the true *E. deKayi* (Morton) is from New Jersey. It would seem, therefore, that the real genotype is the unnamed species mistakenly referred by Meek and most other writers to *E. deKayi*.

From the four other genera originally assigned to the family by Hyatt *Eutrephoceras* may be distinguished most easily as follows: From *Digoniceras* Hyatt in having a nephritic rather than subtrigonal cross section of the whorl in the adult; from *Cenoceras* Hyatt in having a nephritic rather than subquadrangular cross section of the whorl in the adult; from *Cymatoceras* Hyatt in the lack of broad ribs on the shell and in the straighter suture; from *Nautilus* Linnaeus in the broad outline of all the later stages, the general position of the siphuncle dorsad of the middle of the septum, and the straighter sutures. (See fig. 1b.) From the genera *Hercoglossa* Conrad (*Enclimatoceras* Hyatt) and *Aturia* Brown of the family Clydonautilidae, which also occur in the Eocene, *Eutrephoceras* differs sharply in suture. (See fig. 1a.)

The writer has examined a number of specimens of *Eutrephoceras* of Cretaceous age. The sutures are very much alike in all of them; the shell of all of the larger specimens, when preserved, is nearly smooth; and the position of the siphuncle is very much the same in all. The conspicuous differences between them are in the form of the cross section of the whorl and the size of the shell. These seem to offer a valid basis for separation into species, and, so far as the writer's material goes, form and size are constant within considerable

<sup>4</sup> Hyatt, Alpheus, Phylogeny of an acquired characteristic: Amer. Philos. Soc. Proc., vol. 32, p. 555, 1894.

groups of specimens of the same age and restricted geographic distribution and differ between the respective groups. It is likely that if complete and well-preserved shells were available numerous other differences would be found, but it seems desirable to distinguish the various groups that can be recognized now even though some of them are difficult to separate on the basis of such details as are commonly preserved.

*EUTREPHOCERAS SLOANI*, new species.

Shell of medium size, the largest diameter of the type specimen preserved being about 140 mm. (the complete shell must have been

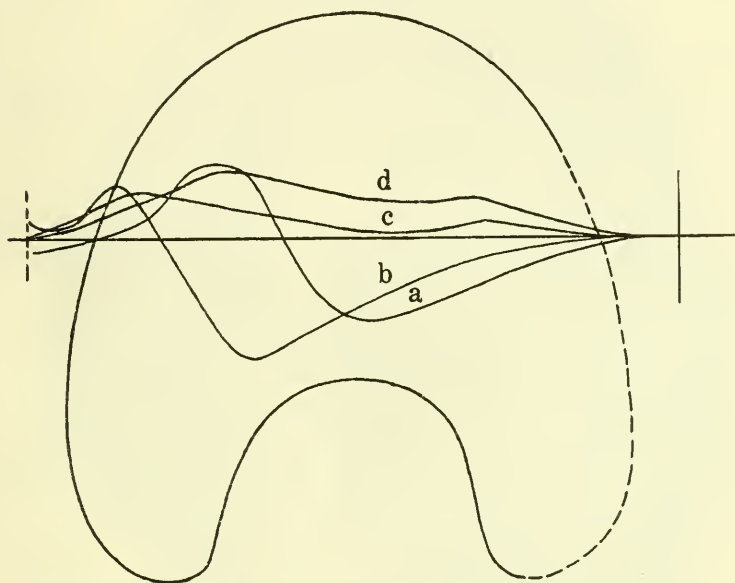


FIG. 1.—CROSS SECTION OF WHORL OF *EUTREPHOCERAS SLOANI* REESIDE AT DIAMETER OF 140 MM., NATURAL SIZE. *a*, SUTURE OF *ENCLIMATOCERAS ULRICHI* WHITE, EOCENE, AT DIAMETER OF 140 MM. ( $\times 7/10$ ). *b*, SUTURE OF *NAUTILUS POMPILIUS* LINNAEUS, RECENT, AT DIAMETER OF 140 MM. ( $\times 7/9$ ). *c*, SUTURE OF *EUTREPHOCERAS SLOANI* REESIDE, EOCENE, AT DIAMETER OF 120 MM. ( $\times 7/9$ ). *d*, SUTURE OF *EUTREPHOCERAS DEKAYI* (MORTON) OF MEEK, CRETACEOUS, AT DIAMETER OF 100 MM., NATURAL SIZE.

150 mm. in maximum diameter) ; stout, well rounded in all the stages visible. Cross section of whorl moderately compressed, nephritic, changing very little with increase in size of shell; height and breadth of the cross section about equal. Siphuncle dorsad of the center of the septum. Umbilicus closed.

Surface of shell not seen. Cast of interior smooth in both early and late stages.

Sutures are those of the genus—nearly straight with shallow ventral lobe, ventrolateral saddle, lateral lobe and saddle, and umbilical lobe.

*Holotype*.—Cat. No. 352,559 U.S.N.M.

*Eutrephoceras sloani* differs from *E. cookana* Whitfield<sup>5</sup> chiefly in size, the latter species attaining a diameter of 300 mm. The cross section of the whorl is much the same in both species but is a little broader in the Shark River species. It is possible that further collecting will show that *E. sloani* attains a large size, has a considerable range of variation in form, and is therefore inseparable from *E. cookana*. However, it seems best with the material now in hand to consider the South Carolina species as distinct from the New Jersey species. The other American species of the genus *Eutrephoceras* known to the writer are Upper Cretaceous in age and have nearly all been referred at some time to *E. dekeyi* (Morton), though unquestionably different. *E. dekeyi* (Morton), as refigured by Whitfield,<sup>6</sup> from the Navesink and Redbank formations of New Jersey is about the same size as *E. sloani* but is stouter, the proportion of height to width of the cross section of the whorl being about 3 to 4. *E. bryani* (Gabb), as refigured by Whitfield,<sup>7</sup> from the Vincentown sand of New Jersey, is more compressed than *E. sloani*, the proportions of height to width of the cross section of the whorl being about 8 to 7. An undescribed species from the Ripley formation of Alabama is stouter and apparently of consistently smaller size than *E. sloani*. Another from the Navarro formation of Texas is separated by the presence of a persistent flattened zone on the venter. A third undescribed species from the Gulf region occurs in the zone of *Mortonice-ras texanum* and is stouter proportionately and much larger. A species occurring in the upper part of the Pierre formation and equivalent horizons in the Western Interior Province, called by Meek<sup>8</sup> *Nautilus dekeyi* Morton and forming the real type of the genus *Eutrephoceras*, is about the size of *E. sloani* but is much stouter, the height to breadth of the cross section of the whorl being about 3 to 4. An undescribed species from the Eagle sandstone of Montana attains a larger size (240 mm. diameter) and is stouter, the height to breadth of the cross section of the whorl being about as 6 to 7.

#### EXPLANATION OF PLATES.

##### PLATE 1.

*Eutrephoceras sloani* Reeside, back view, five-sixths natural size.

##### PLATE 2.

*Eutrephoceras sloani* Reeside, front view, five-sixths natural view.

##### PLATE 3.

*Eutrephoceras sloani* Reeside, side view, natural size.

<sup>5</sup> Whitfield, R. P., U. S. Geol. Survey Mon. 18, pp. 285-286, 1892.

<sup>6</sup> Whitfield, R. P., U. S. Geol. Survey Mon. 18, p. 243, pl. 37, figs. 1-6; pl. 38, figs. 1-4.

<sup>7</sup> Whitfield, R. P., U. S. Geol. Survey Mon. 18, p. 244, pl. 38, figs. 5, 6.

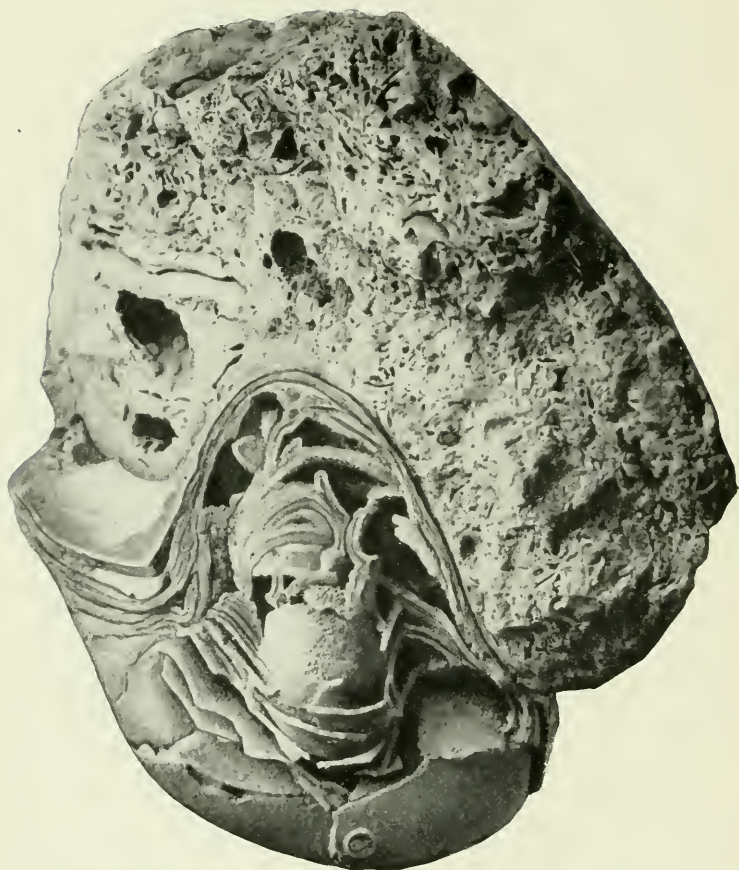
<sup>8</sup> Meek, F. B., Invertebrate Cretaceous and Tertiary fossils of the Upper Missouri country: U. S. Geol. Survey Terr., vol. 9, pp. 496-498, pl. 27, figs. 1, 2, 1876.





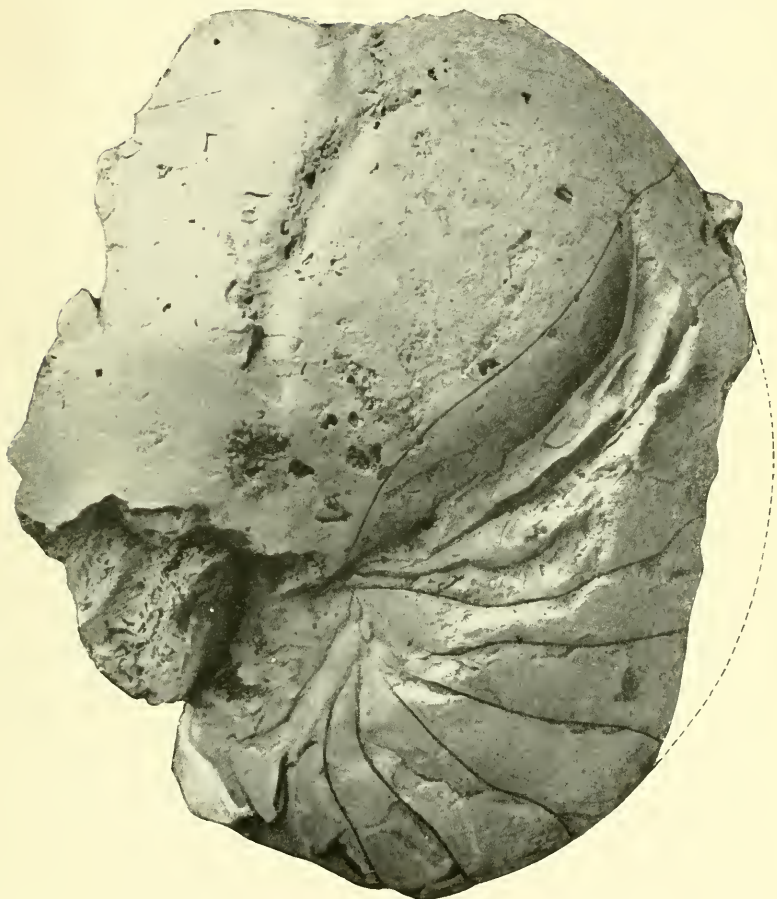
EUTREPHOCERAS SLOANI REESIDE, BACK VIEW.

FOR EXPLANATION OF PLATE SEE PAGE 4.



EUTREPHOCERAS SLOANI REESIDE, FRONT VIEW.

FOR EXPLANATION OF PLATE SEE PAGE 2.



EUTREPHOCERAS SLOANI REESIDE, SIDE VIEW.

FOR EXPLANATION OF PLATE SEE PAGE 4.

