

# The Nautilid *Eucymatoceras* (Mollusca: Cephalopoda) in the Lower Cretaceous of Northern California

by

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**Abstract.** Three specimens of the nautilid *Eucymatoceras plicatum* (Fitton, 1836), characterized by chevron-shaped ribs, were collected from Lower Cretaceous (Aptian) rocks in northern California. This is the first record of the genus in California, and the second record in the Western Hemisphere. Previous records are from the Lower Cretaceous (Barremian and Aptian) of western and southeastern Europe and Baja California, Mexico.

## INTRODUCTION

Among the numerous Cretaceous fossils collected during our many years of field work in the Cottonwood District of northern California are three specimens of the distinctive nautilid cephalopod *Eucymatoceras*. Two specimens are in the geology collections of the California Academy of Sciences (CASG); the third is from the former collections of the University of California, Los Angeles (UCLA), now at the Department of Invertebrate Paleontology, Los Angeles County Museum of Natural History (LACMIP). The purpose of this paper is to describe these specimens and compare them with previously described specimens.

## SYSTEMATIC PALEONTOLOGY

### MOLLUSCA

### CEPHALOPODA

#### Family CYMATOCERATIDAE Spath, 1927

#### Genus *Eucymatoceras* Spath, 1927

**Type species:** *Nautilus plicatus* Fitton, 1836; by original designation (SPATH, 1927).

**Diagnosis:** Conch rounded, depressed; suture slightly sinuous, siphuncle subcentral; prominent coarse ribs in a chevron pattern with the principal V's pointing adapically on the venter and adorally on the flanks.

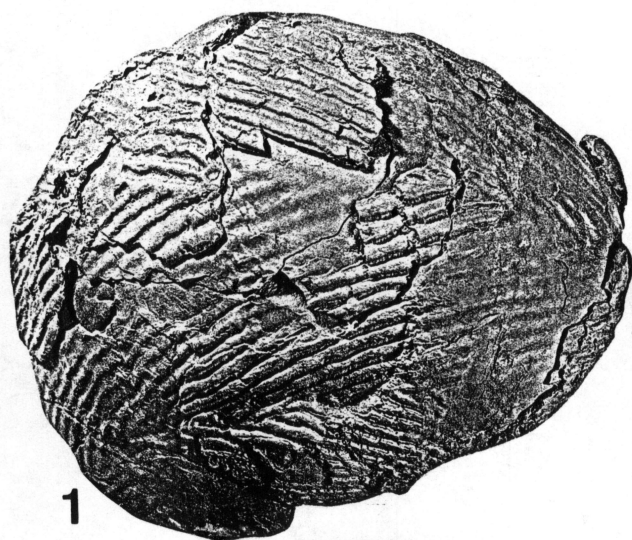
**Discussion:** Three species of *Eucymatoceras* were recognized by KUMMEL (1956:433) and by SHIMANSKY (1960:243-244): *E. plicatum* (Fitton, 1836) [= *E. requienianus* (d'Orbigny, 1840)], *E. stschurowskii* (Milashevich, 1877), and *E. steveni* (Karakasch, 1907). KUMMEL (1956:433) notes that these three species have similar shaped shells,

but he doubts that conch form in *Eucymatoceras* can be considered as species diagnostic. He mentions no other distinguishing characteristics. From published descriptions and illustrations, *E. stschurowskii* and *E. steveni* appear to differ from *E. plicatus* in the character of the ribbing. In *E. stschurowskii* the ribs are not straight and uniform but are irregularly angled in zig-zag fashion across the flank (MILASHEVICH, 1877:pl. 1, fig. 11). *Eucymatoceras steveni* differs in having an additional short chevron on the venter with the V pointing adorally, forming five chevron angles in all compared to the two chevron angles on other specimens of this genus. These distinctions are summarized by SHIMANSKY (1960:243-244).

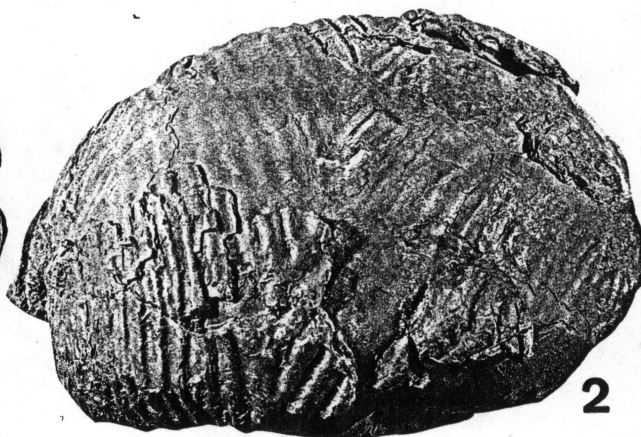
Our specimens and published illustrations of *Eucymatoceras* demonstrate considerable variation in ribbing pattern including small chevrons intercalated between the larger ones, reversed rib angulation at the apertural flank edge, irregular truncation of ribs (incomplete chevrons), chevron number, chevron angle, and position of the chevron on the flank. Chevron angles measured from published illustrations and from the California specimens vary from 45 to 80° on the venter and 30 to 95° on the flanks (Table 1). The position of the flank chevron varies from mid-flank to ventrolateral.

The variability in rib character expression, and placement do not appear to define consistent species-level groups. The three taxa (*Eucymatoceras fittoni*, *E. stschurowskii*, and *E. steveni*) are based on differences in ribbing that we interpret as variation in a single species. Published descriptions and available specimens do not uniquely resolve this taxonomic problem.

**Occurrence:** The genus is reported from Barremian and Aptian strata in England (FITTON, 1836; KUMMEL, 1956), France (D'ORBIGNY, 1840; KILIAN & REBOUL, 1915), Spain



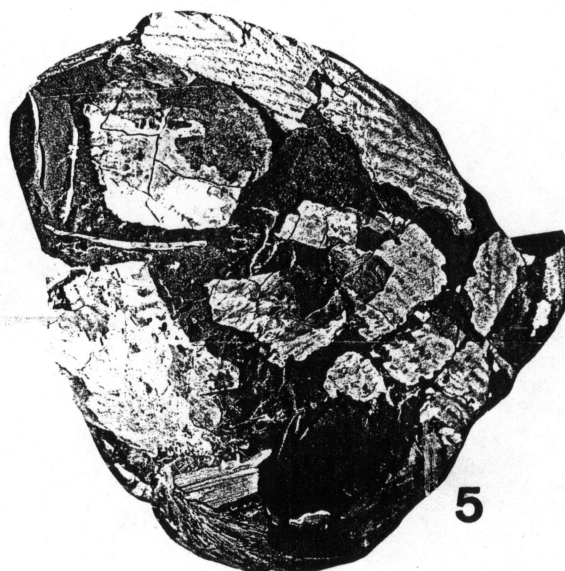
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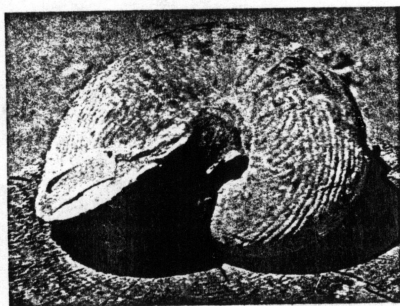
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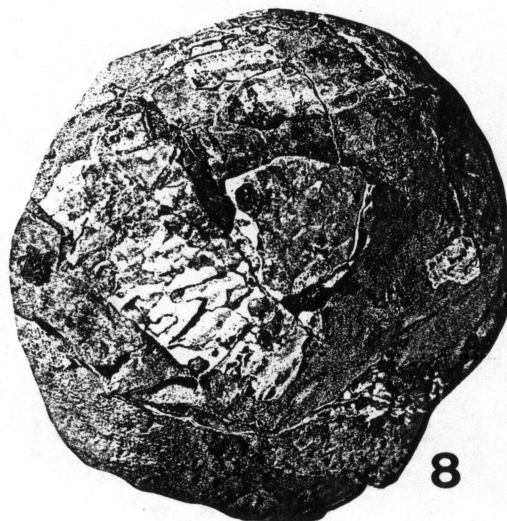
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7



8

Table 1

Chevron angles (degrees) of specimens of *Eucymatoceras*. Measurements were made directly from CASG and LACMIP specimens; the remainder are from published illustrations.

	Flank chevron (degrees)	Ventral chevron (degrees)
CASG 60847.01	30	45
CASG 60847.02	56	29, 38
LACMIP 12100	—	30
FITTON, 1836	55–60	55–60
D'ORBIGNY, 1840	88–95	59–60
MILASHEVICH, 1877	95–100	—
UHLIG, 1883	40–58	—
KARAKASCH, 1907	70–90	80–90
KUMMEL, 1956	65–76	75–80
SHIMANSKY, 1960:pl. 5	64–71	—
DIMITROVA, 1967	40	60
CALZADA & VIADER, 1980	59	47
SUNDBERG, 1984	—	28, 30

(BATALLER, 1962; CALZADA & VIADER, 1980), Czechoslovakia (UHLIG, 1883), Bulgaria (DIMITROVA, 1967), Crimea (MILASHEVICH, 1877; KARAKASCH, 1907), Caucasus (SHIMANSKY, 1960), Mexico (SUNDBERG, 1984), and California (herein).

*Eucymatoceras Plicatum* (Fitton, 1836)

(Figures 1–8)

*Nautilus plicatus* FITTON, 1836: 129, fig. 1; Uhlig, 1883:178, pl. 3.

*Nautilus requienianus* D'ORBIGNY, 1840:72–74, pl. 10.

*Nautilus stschurowskii* MILASHEVICH, 1877:121–122, pl. 1, fig. 11.

*Nautilus steveni* KARAKASCH, 1907:30, pl. 2, fig. 13, pl. 8, fig. 12.

*Eucymatoceras plicatus* (Fitton): KUMMEL, 1956:432, text-fig. 27, pl. 21; DIMITROVA, 1967:17, pl. 1, figs. 1, 1a; CALZADA & VIADER, 1980: 164, pl. 2, figs. 2a, b.

*Eucymatoceras plicatum* Fitton: SHIMANSKY, 1960:243, pl. 5, figs. 2, 3a–b.

*Eucymatoceras steveni* Karakasch: SHIMANSKY, 1960:243, pl. 6, figs. 1a–b.

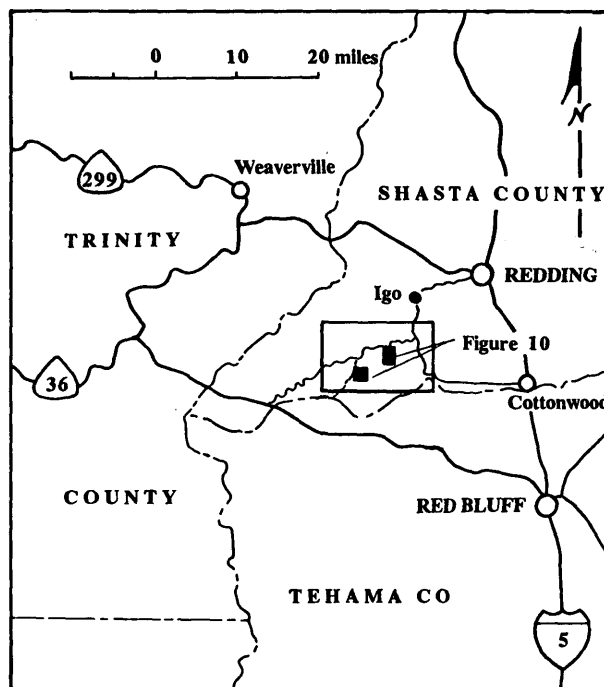


Figure 9

Map showing area of the Ono quadrangle (1:25,000) (open rectangle) and locations of the large scale maps of Figure 10.

*Eucymatoceras stschurowskii* Milashevich: SHIMANSKY, 1960: 244, pl. 8, figs. 2a–b.

*Eucymatoceras* sp.: SUNDBERG, 1984:43–46, fig. 2.

**Description and diagnosis:** As for genus.

**Description of northern California specimens:** Specimens are crushed, distorted, and partly eroded fragments from 150 mm to 230 mm in maximum dimension.

The best preserved specimen, CASG 60847.01 (Figures 1–4), is part of outer whorl, mostly body chamber, maximum dimension 230 mm; inner whorls crushed, exposed in erosional cross section; four partial suture lines are straight to slightly sinuous; siphuncle not visible; ribs about 3.5 mm wide, generally broadly arcuate, flat-topped and steep-sided in cross section; interspaces about 2 mm wide; chevron angles on venter and on flank about 45° and 30°.

Explanation of Figures 1 to 8

Figures 1–4. *Eucymatoceras plicatum* (Fitton, 1836). CASG 60847.01, maximum dimension 230 mm. Figure 1. Ventral view. Figure 2. Ventral view from adapical end. Figure 3. Lateral view. Figure 4. Ventral view from adoral end.

Figure 5. *Eucymatoceras plicatum* (Fitton, 1836). CASG 60847.02, maximum diameter 207 mm. Lateral view.

Figures 6, 7. *Eucymatoceras plicatum* (Fitton, 1836). Private collection, present status unknown, maximum diameter (estimated) 250 mm.

Figure 8. *Eucymatoceras plicatum* (Fitton, 1836). LACMIP 12100 (from UCLA 2972 = LACMIP 22972), maximum dimension 150 mm. Ventrolateral view.

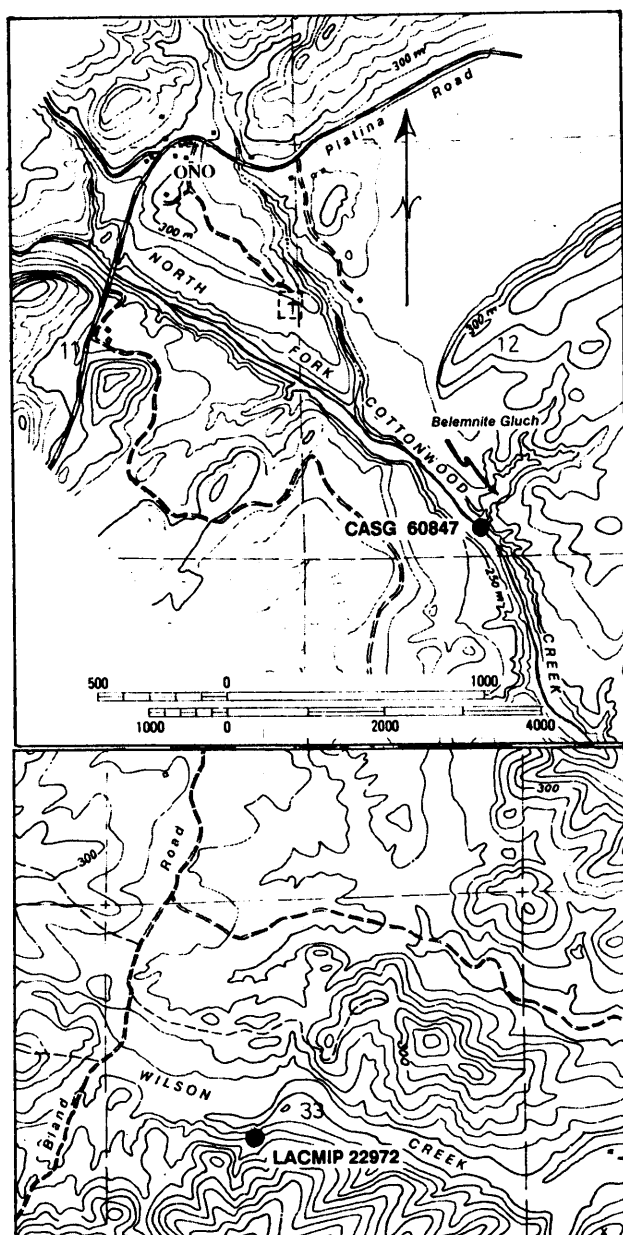


Figure 10

Maps of collecting localities, California Academy of Sciences Geology 60847 and Los Angeles County Museum Invertebrate Paleontology 22972. Base map is the Ono 1:25,000-scale metric topographic map (1981), contour interval 10 m.

respectively (measurement of chevron angles is illustrated in Figure 11). Most ribs extend singly from umbilical edge, some bifurcate on inner flank; umbilical and peripheral ribs irregularly truncate one another (incomplete chevrons), a feature well-shown in published illustrations (UHLIG, 1883:pl. 3; KUMMEL, 1956:pl. 21) (see Figure 11).

A second specimen, CASG 60847.02 (Figure 5), is a

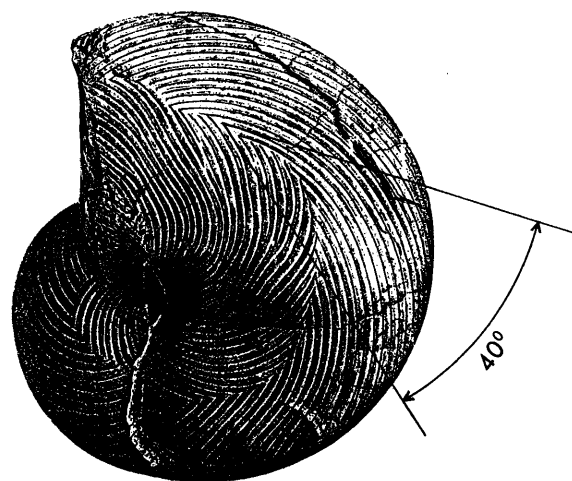


Figure 11

Illustration of measurement of chevron angles of ribs on *Eucy-matoceras*; measurement taken at apex of angle. Chevron angle changes irregularly with growth and increases as ribs curve from apex. Figure of *E. plicatus* from UHLIG (1883).

nearly complete whorl, maximum diameter 207 mm, severely crushed laterally with chevron ribs showing on three shell fragments near the apertural end of the conch. Chevron angles on ventral shell fragments are 29 and 38°; angle on flank shell fragment is 56°. Suture not exposed.

The smallest specimen, LACMIP 12100 (from UCLA locality 2972 = LACMIP 22972) (Figure 8), maximum dimension 150 mm, is crushed and eroded with partial cross section of inner whorls exposed on inner side. Chevron angle on one ventral shell fragment is 30°.

A fourth, exceptionally well-preserved specimen (Figures 6, 7), from the North Fork of Cottonwood Creek, Shasta County, was collected by a local resident and was photographed in 1951 by M. A. Murphy. The present location of this specimen is unknown.

**Remarks:** The California specimens generally have smaller chevron angles than those measured from published illustrations (Table 1).

**Localities:** The northern California specimens came from the Budden Canyon Formation, upper Chickabally Member (MURPHY *et al.*, 1964), Cottonwood District, southwest Shasta County, California (Figures 9, 10).

CASG Locality 60847: Creek-bed exposure on the north side of the North Fork of Cottonwood Creek, 5 m upstream from the mouth of Belemnite Gulch, a small north-heading tributary (Figure 10). Two specimens (Figures 1–5). C. Schuchman and M. A. Murphy, collectors.

LACMIP Locality No. 22972 [= UCLA 2972]: Exposure in south-heading tributary to Roaring River, approximately ½ mile (1 km) east of Bland Road (Figure 10; MURPHY, 1956:fig. 4). One specimen. M. A. Murphy, collector.