

# *Sanmartinoceras* aff. *walshense* (ETHERIDGE, 1892) from the Early Cretaceous of California - the first evidence of the ammonite subfamily Aconeceratinae SPATH, 1923 in North America

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## ABSTRACT:

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*Sanmartinoceras* aff. *walshense* (ETHERIDGE, 1892), a single large representative of the Aconeceratinae SPATH, 1923 from California is believed to be a macroconch. It shows close relations to *Sanmartinoceras africanum* KENNEDY & KLINGER, 1979 and *Sanmartinoceras walshense*, however the described combination of features is unique. Until the variability of this ammonite is established we assign this specimen to *Sanmartinoceras* aff. *walshense*. It is probably Late Aptian in age and represents the first evidence of the Aconeceratinae in North America.

**Key words:** Ammonoidea, Haploceratacea, Aconoceratide, *Sanmartinoceras*, Early Cretaceous, Northern California, Late Aptian?.

## INTRODUCTION

The Aconeceratinae SPATH, 1923 are a long ranging ammonite subfamily, occurring from the Late Hauterivian to the Upper Albian. Records are known from Europe, South America, Greenland, several African countries, Madagascar, Australia and Nepal. However, although the members of this subfamily are widely distributed and are typical representatives of Cretaceous ammonite faunas, they normally do not occur in a high abundance. In the present paper, we assign a well-preserved specimen from the Early Cretaceous of California (Text-fig. 1) to *Sanmartinoceras* aff. *walshense* (ETHERIDGE).

Although Cretaceous ammonites from California have been studied continuously for more than one hundred years (GABB 1864, 1869; STANTON 1896, ANDERSON 1902, 1938, 1958; MURPHY & RODA 1960, 1996; MURPHY 1975), this is the first evidence of a member of the Aconeceratinae in North America.

## SYSTEMATIC PALEONTOLOGY

Superfamily Haplocerataceae ZITTEL, 1884

Family Aconeceratidae SPATH, 1923

Subfamily Aconoceratine SPATH, 1923

Genus *Sanmartinoceras* BONARELLI, 1921

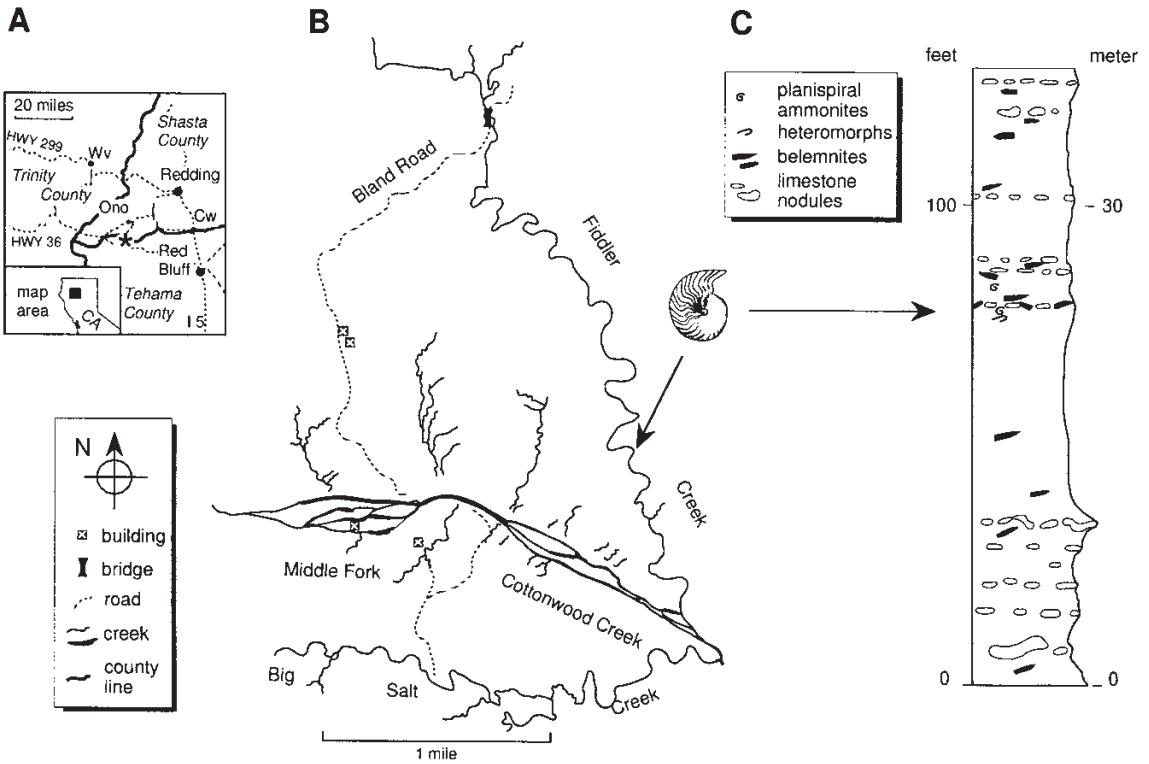


Fig. 1. Location of *Sanmartinoceras* aff. *walshense* (ETHERIDGE, 1892) in northern California (A, B) and profile at Fiddler Creek with horizon of specimen (C)

TYPE SPECIES: *Sanmartinoceras patagonicum* BONARELLI (in BONARELLI & NAGERA 1921, p. 27; Pl. 5, Figs 3-6) by original designation.

*Sanmartinoceras* aff. *walshense* (ETHERIDGE, 1892)  
(Text-fig. 2E, Text-fig. 3.1-3.5)

MATERIAL: Depository - California Academy of Sciences (San Francisco), UCR Collection catalogue number 502/56.

DESCRIPTION: Phragmocone complete, with part of shell and slightly crushed body chamber mostly preserved as internal mold; 55 mm maximum diameter (estimated maximum diameter 90 mm); last septate whorl with dense falcooid ribbing, about 23 per half whorl; ribs biconcave with 'haft' extending beyond mid flank, 'sickle' slightly shorter, ending near venter (Text-fig. 2E); first quarter of body chamber with flat, faint, but distinct folds, later indistinct, each fold of several ribs with only slightly concave 'haft' to mid flank and concave 'sickle'

that ending close to venter (Text-fig. 2E); last preserved part of the body chamber (whorl height about 43 mm) with two closely spaced constrictions (Text-fig. 3.4) and ribs biconcave with 'haft' crossing two thirds of flank. Slight spiral depression of the last septate whorl; umbilical wall nearly 90 degrees to flank in early stages becoming <90 degrees in mature stages; whorl section compressed (Text-fig. 3.2; breadth/height ratio about 0.34 at 53.9 mm diameter). Greatest breadth of whorl at mid-flank. keel mostly worn; suture complex, with most single lobes deeply incised with numerous slender endings that contact previous septa (Text-fig. 3.5).

COMPARISON: We interpret the shell as a macroconch because of its large diameter (estimated 90 mm) and late-stage constrictions is estimated. The large size distinguishes our specimen from the smaller *Sanmartinoceras patagonicum* BONARELLI, 1921, which also differs in having unornamented inner flanks, and from *S. cardielense* RICCARDI & al. 1987 with its ogival whorl section, larger umbilicus and narrowly rounded umbilical

edge, which set it apart. *S. groenlandium* ROSENKRANTZ, 1934, is also small, but is known only from the holotype, which is interpreted as microconch, but has stronger and denser ribbing. The large size suggests a closer relationship of the Californian specimen to *Sanmartinoceras africanum* KENNEDY & KLINGER, 1979, *S. fontinale* (HUDLESTON, 1890), *S. walshense* (ETHERIDGE, 1892) or *S. olene* (TENISON-WOODS, 1883). *Sanmartinoceras africanum africanum* KENNEDY & KLINGER 1979 reaches a larger size, some specimens still septate at 120 mm diameter, but the rib pattern shows a nearly straight 'haft' and a much more curved 'sickle'. We do not know if the 'sickle' of *S. aff. walshense* reaches the venter as in *S. a. africanum* or if it ends on the outer flank, because the venter is not preserved at this stage. *S. a. africanum* differs additionally in its more inflated whorl section. The subspecies *Sanmartinoceras africanum insignicostatum* RICCARDI, AGUIRRE URRETA & MEDINA, 1987 is also more compressed, has a more rounded, less steep umbilical wall, stronger ribs especially at 25 mm diameter (pattern of ribbing compare Text-fig. 2C-D with Text-fig.

2E), and the main incision of the E/L is longer than in the Californian specimen.

The holotype of *Sanmartinoceras fontinale* (see KENNEDY & KLINGER, 1979, Fig. 7A-H) has much stronger ribs than those observed on the phragmocone of the Californian specimen (whorl height of about 1.65 mm). The neotype of *Sanmartinoceras olene* (full discussion by RICCARDI & *al.* 1987, p. 136) has well developed ribbing between 25 and 35 mm whorl heights whereas it is weak in our specimen.

*Sanmartinoceras walshense* (ETHERIDGE, 1892), a large species first described from Australia, closely resembles our specimen (compare Text-fig. 3.1-3.3 with HILL & *al.* 1968, Pl. 8, Fig. 2). The holotype of *S. walshense* lacks distinct main ribs with the exception of the mid-flank where the delicate ribs strengthen "and there producing a very slightly perceptible ridge" (ETHERIDGE 1892, p. 493). The ribs show a markedly stronger curved 'sickle' in the Australian specimen compared to the Californian specimen (Text-fig. 2B and 2E). Another large *Sanmartinoceras* from Australia figured by WHITEHOUSE (1927, Pl. 16, Fig. 3; a synonym of *S. walshense* following RICCARDI & *al.* 1987, pp. 144,

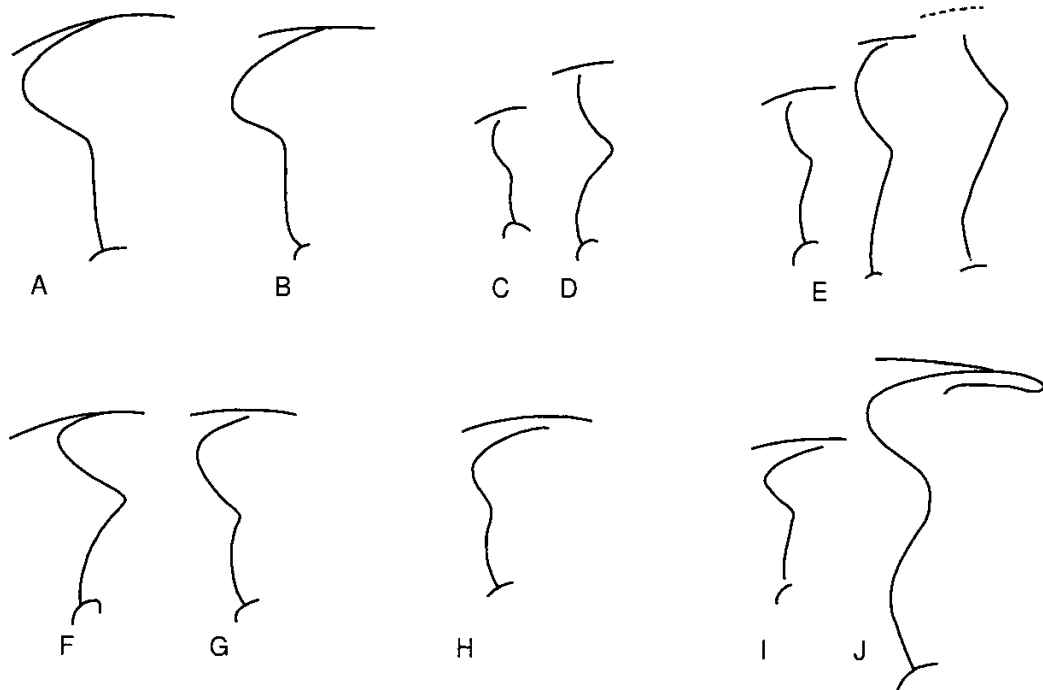


Fig. 2. Rib patterns in *Sanmartinoceras* species compared with that of the present specimen. A, *S. a. africanum*; B, *S. walshense*; C-D, *S. africanum insignicostatum*; E, *S. aff. walshense*; F-G, *S. patagonicum*; H, *S. olene*; I-J, *S. fontinale*. A, F-J after KENNEDY & KLINGER (1979); B after WHITEHOUSE 1927; C after RICCARDI & *al.* (1987), Pl. 4, Fig. 2 and D after RICCARDI & *al.* (1987), Pl. 5, Fig. 5;

E is the ontogenetic development of rib pattern in the specimen from California; B-E are mirror images, taken at the right flank of the shells

148), also lacks distinct ribs, but the delicate ornamentation seem to strengthen to ribs on a short portion of the mid-flank according to the poor figure of WHITEHOUSE. In contrast some of the material from Patagonia referred to *S. walshense* shows a broader whorl section and furthermore prominent ribs on the outer flank (whorl height 37 to 52 mm) before the shell becomes smooth again at final maturity (RICCARDI & *al.* 1987). However, our specimen shows distinct ribs on the outer flank, even on the phragmocone, where “the ornament is weak and consists only of fine, dense, falcate striae, and strigations” in *S. walshense* (RICCARDI & *al.* 1987, p. 146). The

width of the umbilicus of our specimen (ratio 0.11 at 53.9 mm diameter) are similar to measurements at comparable sizes by RICCARDI & *al.* (1987, p. 147). In contrast, the Australian holotype has a somewhat wider umbilicus (U/D ratio about 0.13), all its measurements are remeasured after the figures of WHITEHOUSE (1926, 1927) and HILL & *al.* (1968) because values given by WHITEHOUSE do not match with his figures. The umbilical edge of the California specimen is abrupt and the umbilical wall steep and high, as in the holotype of *S. walshense* (drawing by WHITEHOUSE 1927, Fig. 6 and 7), but unlike most Patagonian specimens which umbilical

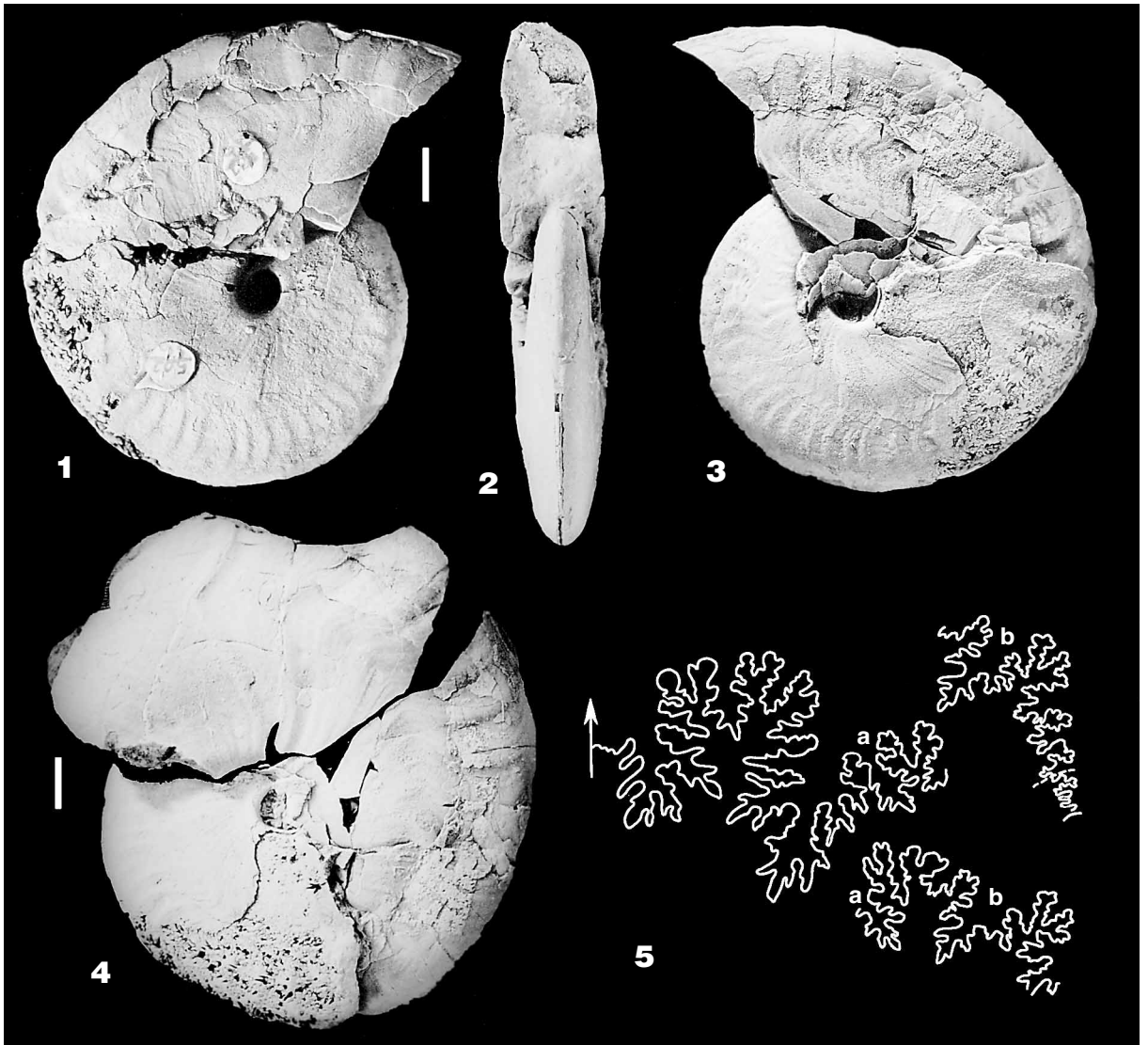


Fig. 3. *Sanmartinoceras* aff. *walshense* (ETHERIDGE, 1892) probably Aptian in age. Fiddler Creek, northern California; 1 – Left lateral view of phragmocone and first part of the body chamber; 2 – Dorsal view and first part of the body chamber; 3 – Right lateral view of the phragmocone; 4 – Right lateral view of the phragmocone with greatest part of the body chamber; 5 – Suture lines at whorl heights of about 19 mm; equal letters indicate those parts of the suture that are supposed to represent the same element; all scale bars 1 cm

walls have a lower slope (RICCARDI & *al.* 1987, Text-Fig. 22). The whorl section of our specimen is of comparable width (ratio 0.19) to that of the holotype (ratio 0.16) as well as to most of the Patagonian material (RICCARDI & *al.* 1987). The whorl height is somewhat higher however (ratio of California specimen 0.57, holotype *S. walshense* 0.51). The suture of *S. walshense* is similar to the present specimen (topotypes see WHITEHOUSE 1926, Pl. 37, Fig. 3 and 1927, Text-Fig. 1), except that the most ventral portion of WHITEHOUSE's (1927) suture of his text-figure 1 is more complicated.

## STRATIGRAPHY

*Sanmartinoceras* aff. *walshense* was collected on Fiddler Creek (Text-fig. 1). All other fossils collected on this creek up to date indicating an Aptian age. In particular the ammonite "*Puzosia*" *hoffmani* has been recorded from Fiddler Creek. This species is known from the upper part of the Aptian, *Acanthoplites gardneri* Zone *sensu* MURPHY (1965) in California only. Barremian fossils are known from the Middle Fork of Cottonwood Creek tributaries that head near Fiddler Creek, but not in the Fiddler drainage.

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