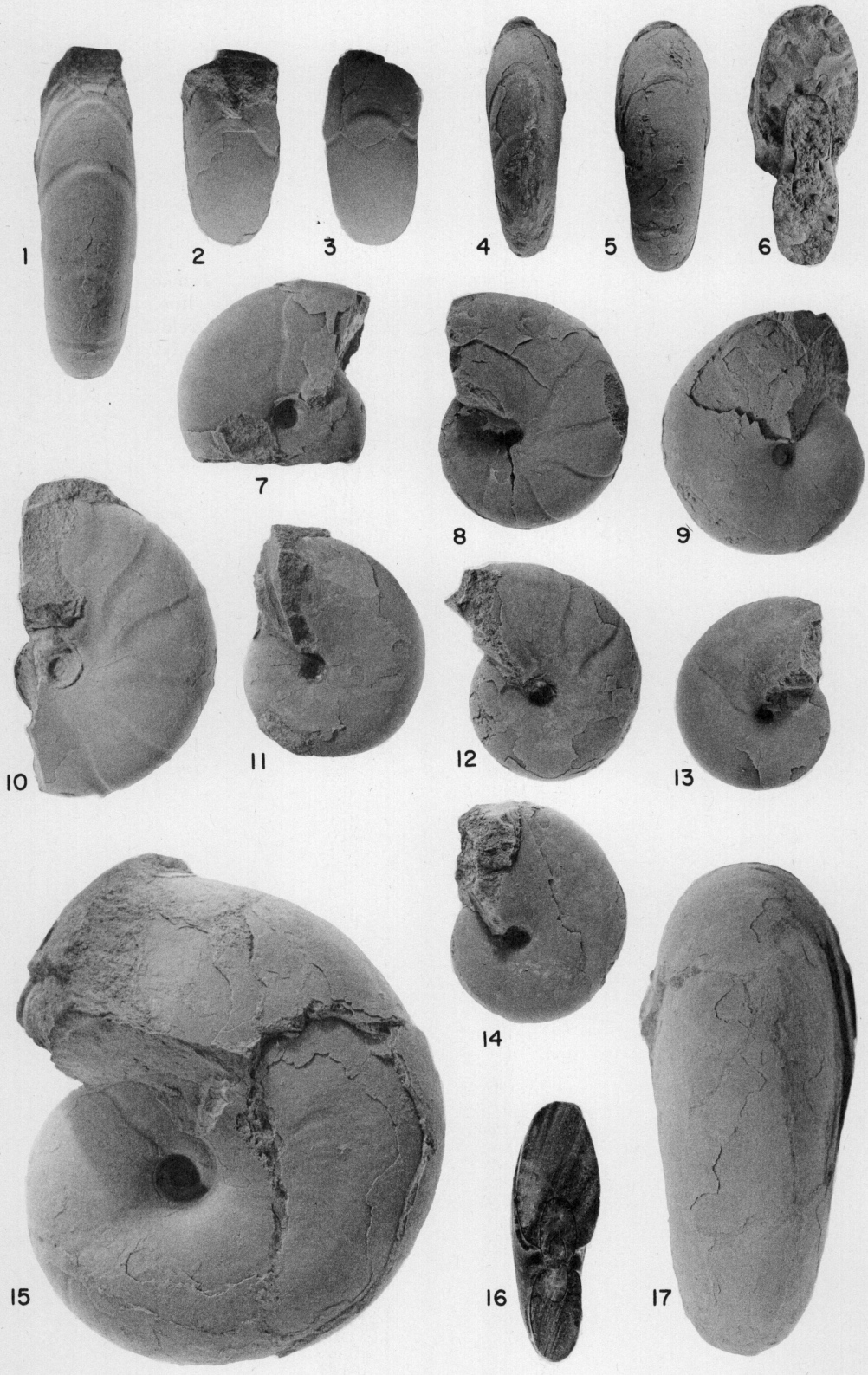
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Wright (1957, p. L370–71) *Pseudouhligella* ranges from upper Albian through Turonian while *Desmophyllites* is a Santonian-Campanian form.

The California forms from the Upper Albian and Cenomanian do not fit neatly into this classification. Most are not gradumbilicate (stair-step-like) and at least one, *Desmoceras barryae* Anderson, is very narrowly umbilicate. The suture lines of most species, however, have the same number of elements as the genotype of *Pseudouhligella*, *Desmoceras* (*Pseudouhligella*) *japonicum* Yabe. We have placed the California species in the subgenus *Pseudouhligella* Matsumoto, since the differences between them and the genotype are minor. We feel, however, that this group of species shows a very close relationship between the subgenus *Pseudouhligella* and the genus *Desmophyllites*, one that may not warrant generic or perhaps even subgeneric distinction.

In a recent paper, published 13 years after his death, F. M. Anderson (1958) described several species of *Pseudouhligella* which he assigned to the genera *Desmoceras* and *Beudanticeras*. Several dozen specimens collected by the authors and Willis P. Popenoe from the Bald Hills formation are assignable to one or the other of these species or are intermediate varieties. No attempt is made to revise the existing species as our collection does not have sufficient material to determine the variation of any of them.

DESMOCERAS (PSEUDOUHLIGELLA)
sp. cf. D. (P.)
BARRYAE Anderson
Pl. 106, figs. 1,4,5,6,7,8,10,12,13,14,16

Desmoceras (*Latidorsella*) *barryae* Anderson, 1958, p. 214, pl. 12, figs. 2,2a.

Shell small to medium size, compressed, 80–90 percent involute; ornamentation consists of biconvex growth lines with peripheral ridges sometimes developed above the constrictions; constrictions on all specimens in later growth stages but variable in number (8–12 per whorl), width, depth and diameter at which they first appear on the shell; suture desmocerid, not retracted, with numerous auxillaries in the suspensive lobe; umbilical wall low, rounded.

Figured specimens.—The figured specimens are specimen numbers 28665, 28666, 28667, 28668, 28669, 28670, 28671, and 28672 U.C.L.A. Invert. Paleo. Cat.

Remarks.—This species occurs abundantly at a number of localities throughout the Bald Hills formation. It differs from *D.* (*P.*) *japonicum* in having a more rounded flank, in lacking the subangulate umbilical edge, and the first lateral lobe is more deeply incised than the ventral lobe, the reverse is true in *D.* (*P.*) *japonicum*. *D.* (*P.*) cf. *D*

EXPLANATION OF PLATE 106

All figures ×1

FIGS. *1,4–6,8–10,12–14,16*—*Desmoceras* (*Pseudouhligella*) cf. *D.* (*P.*) *barryae* Anderson. *1,10.* ventral and lateral views of specimen 28670 U.C.L.A. Invert. Paleo. Cat. showing constrictions of the body whorl; *4,12*, ventral and lateral views of specimen 28667 U.C.L.A. Invert. Paleo. Cat.; *5,6*, ventral and cross-sectional view of specimen 28665 U.C.L.A. Invert. Paleo. Cat., representing an inflated variety of the species; *8,12,14*, lateral views of specimens 28671, 28667, and 28665 U.C.L.A. Invert. Paleo. Cat., showing variation in development of constrictions in specimens of the same size; *9*, lateral view of specimen 28666 U.C.L.A. Invert. Paleo. Cat., representing the inflated variety; *13*, lateral view of small specimen, 28672 U.C.L.A. Invert. Paleo. Cat., showing narrow constrictions; *16*, cross-sectional view of specimen 28669 U.C.L.A. Invert. Paleo. Cat.

2,3,7,11—*Desmoceras* (*Pseudouhligella*) *japonicum* Yabe. *2,11*, ventral and lateral views of specimen 28663 U.C.L.A. Invert. Paleo. Cat.; *3,7*, ventral and lateral views of specimen 28662 U.C.L.A. Invert. Paleo. Cat.

15,17—*Desmoceras* (*Pseudouhligella*) cf. *D.* (*P.*) *argonauticum* (Anderson). Lateral and ventral views of specimen 28673 U.C.L.A. Invert. Paleo. Cat.

(*P.*) *barryae* differs from *D.* (*P.*) *ezoanum* Matsumoto and *D.* (*P.*) *poronaicum* (Yabe) in having frequent constrictions and from *D.* (*P.*) *vetus* Murphy and Rodda in having a narrower umbilicus.

DESMOCERAS (PSEUDOUHLIGELLA) sp. cf. D. (P.) ARGONAUTICUM (Anderson)
Pl. 106, figs. 15,17

Beaudanticeras argonauticum Anderson, 1958, p. 213, pl. 9, figs. 1,2.
Desmoceras (*Pseudouhligella*) *dawsoni* Whiteaves Matsumoto, 1958, p. 651.

Shell medium size, moderately inflated, about 80 percent involute; ornamentation of biconvex growth lines; constrictions biconvex, infrequent, not prominent; suture not retracted, with the first lateral lobe about as long as the ventral lobe; umbilical wall high, rounded at umbilical edge.

Figured specimen.—The figured specimen, specimen number 28673 U.C.L.A. Invert. Paleo. Cat., was collected with a number of smaller specimens at locality 3778.

Remarks.—*D.* (*P.*) cf. *D.* (*P.*) *argonauticum* differs from *D.* (*P.*) *alamoense* (Anderson) in having few, poorly developed constrictions and in being more inflated than the typical variety; from *D.* (*P.*) *vetus* Murphy and Rodda in having fewer constrictions, narrower and deeper umbilicus and in being more inflated; from *D.* (*P.*) *japonicum* in having fewer constrictions and a more rounded umbilical edge; from *D.* (*P.*) *ezoanum* Matsumoto in being more inflated and having rounded umbilical edge; from *D.* (*P.*) *barryae* in a larger umbilicus and more rounded whorl shape. Compared with *D.* (*P.*) *dawsoni* Whiteaves (1884, pl. 26, fig. 1; 1900, pl. 37, fig. 3) *D.* (*P.*) *argonauticum* has a narrower and deeper umbilicus, fewer and weaker constrictions, is more inflated, and has a broader venter.

The figured specimen of *D.* (*P.*) cf. *D.* (*P.*) *argonauticum* is considerably more inflated than the holotype (Anderson, 1958, pl. 9, figs. 1,2).

DESMOCERAS (PSEUDOUHLIGELLA) ALAMOENSE (Anderson)

Beaudanticeras alamoense Anderson, 1958, p. 213, pl. 5, figs. 2,2a.
Desmoceras (*Pseudouhligella*) *dawsoni* Whiteaves, Matsumoto, 1958, p. 651.

Shell medium size, moderately inflated, about 80 percent involute; ornamentation of biconvex growth lines; constrictions biconvex, frequent on larger specimens, preceded on the venter by a strong labial ridge; suture not retracted, with L about as long as E; umbilical wall low, rounded.

Remarks.—This species is very close to *D.* (*P.*) *argonauticum*, but may be eventually differentiated on the basis of whorl shape. It may also have a slightly higher stratigraphic position. *D.* (*P.*) *alamoense* also resembles *D.* (*P.*) *dawsoni* Whiteaves (1884, pl. 26, fig. 1; 1900, pl. 37, fig. 3), but has a more rounded whorl flank, and a broader venter.

DESMOCERAS (PSEUDOUHLIGELLA) JAPONICUM Yabe
Pl. 106, figs. 2,3,7,11

Desmoceras whiteavesi var. *japonicum* Yabe, 1904, p. 35, pl. 5, figs. 3,4.
Desmoceras (*Pseudouhligella*) *japonicum* Yabe, Matsumoto, 1938, p. 23, fig. 27; 1942, p. 26, fig. 1c; 1954, p. 252–257, pl. 18, figs. 1a,b.

Shell size small with a maximum diameter of 35 mm. for the California specimens collected to date. This size is much smaller than average for this species even though the body whorls of the specimens are preserved. At this size the shell is compressed; flanks flat and parallel; the umbilical edge is angulate, the umbilical wall steep and not rounded, abutting the previous whorl at right angles (i.e. the inner margins of whorls form perpendicular steps). Constrictions are infrequent up to a diameter of about 30 mm. Two closely spaced distinct constrictions are present on one specimen and the other shows very faint poorly developed but closely spaced constrictions in the last quarter turn of the body whorl indicating that larger specimens have the frequent biconcave constriction pattern characteristic of the species. Constrictions have a strong anterior inflection across the venter and are reflected in the external shell on the venter by a very shallow groove which lies just anterior to a labial ridge. Ornamentation consists of striae on the flanks with a tendency for subcostae to arise on the venter of the body whorl. Suture agrees in detail with that figured by Matsumoto (1954, p. 255, fig. 2(48)).

Holotype.—The holotype is from Japan.

Hypotypes.—The hypotypes are numbers 28662 and 28663 U.C.L.A. Invert. Paleo. Cat.

Remarks.—Several specimens of this species, including the hypotypes, were collected at locality 3478 near the top of the Bald Hills formation. The species is found in the uppermost Albian and Cenomanian in the Japanese Islands (Matsumoto, 1942, p. 28, fig. 2) and is most abundant in the middle and upper parts of the Cenomanian (Matsumoto, oral communication).

Genus EOGUNNARITES Wright and Matsumoto, 1954

EOGUNNARITES MATSUMOTOI n. sp.

Pl. 104, figs. 1,2,3

The shell is small with a maximum measured diameter of approximately 50 mm.; number of whorls 5 or 6; whorl cross-section depressed up to 30 mm. diameter and probably thereafter but the later part of the whorl is crushed; ornamentation of primary and secondary ribs; primary ribs sharp-crested, narrow, more or less straight, extending from the umbilical edge across the flank, branch ventro-laterally into two rounded ribs of equal size, other rounded ribs intercalated on the peripheral half of the penultimate whorl but all the observed ribs on the peripheral half of the body whorl are pairs that branch from the flank ribs; six prominent prosiradiate constrictions present on the penultimate whorl; constrictions not detected on the body whorl but this part of the specimen is very fragmentary; constrictions more prosiradiate than ribs and truncate the secondary ribs they intersect; suture line very close to that of *E. unicus* (Yabe) as figured by Wright and Matsumoto (1954, p. 127, fig. 20c).

Holotype.—The holotype is number 28664 U.C.L.A. Invert. Paleo. Cat. Its dimensions are:

Diameter	Height	Width	Umbilicus
29 mm.	12 mm.	15 mm.	8½ mm.
21 mm.	9 mm.	11 mm.	6 mm.
8 mm.	3.7 mm.	4.5 mm.	2 mm.

The holotype was found at U.C.L.A. locality 3775 in the first conglomerate bed in the sequence of the Bald Hills formation on the North Fork of Cottonwood Creek.

Remarks.—*E. matsumotoi* n. sp. differs from *E. unicus* (Yabe), the genotype, in having elongate, sharp-crested ribs from which the secondary ribs arise instead of tubercles. The ribs on the body whorl are not intercalated as they are on *E. unicus*. *E. matsumotoi* n. sp. differs from an undescribed species of *Eogunnarites*, which occurs above the Bald Hills formation, in being more depressed, having the ribs branch high on the flank into two rather than arising in bundles of three or four from weak umbilical bullae as in the undescribed form.

This is the first record of this genus in America.

The species is named for T. Matsumoto, Kyushu University, Japan.

Family BRANCOCERATIDAE Spath, 1933

Genus MORTONICERAS Meek, 1876

MORTONICERAS GAINESANA (Anderson)

Pl. 103, fig. 8

Pervinquieria gainesana Anderson, 1958, p. 257, pl. 4, fig. 1,1a.

Pervinquieria sylvana Anderson, 1958, p. 258, pl. 4, fig. 2,3; pl. 7, fig. 2.

Pervinquieria tehamaensis (Reagan), Anderson, 1958, p. 257, pl. 3, fig. 1.

Pervinguieria aff. *P. inflata* Sowerby, Anderson, 1958, p. 258, pl. 7, fig. 3.

Shell large with a maximum measured diameter of 420 mm.; whorl cross section quadrate up to about 250 mm. diameter after which the whorl section becomes progressively more ovate; ribs single on the body whorl but branching from umbilical bullae in penultimate whorl, lateral tubercles slightly above the midpoint of the flank; ribs radiate to slightly prosiradiate; venterolateral tubercles prominent on later whorls, but reduced in earlier whorls to inflated ribs with numerous small clavate ridges superimposed.

Types.—The holotype is specimen number 14940 in the University of California, Berkeley, Department of Paleontology type collection.

The hypotype, specimen number 28674 U.C.L.A. Invert. Paleo. Cat., was collected at locality number 3775. Dimensions: at 420 mm. diameter, height of whorl 100 mm., width of whorl 85 mm. (interrib), 115 mm. (including ribs), umbilicus 244 mm.

Remarks.—This species differs from *M.*

hulenana (Anderson) in the slightly more prominently developed lateral tubercle and the branching ribs on the penultimate whorl. *M. gainesana* differs from *M. tehamaensis* (Reagan) in having bifurcating ribs, less prominent lateral tubercles, and a more quadrate cross-section.

All specimens of this species in our collection came from nodular limestone clasts in the lowest conglomerate unit of the Bald Hills formation exposed on the North Fork of Cottonwood Creek, Shasta County, California. Their true stratigraphic position is not known in this district.

FOSSIL LOCALITIES

All numbers refer to localities described in the invertebrate paleontology locality catalogue, University of California, Los Angeles. With the exception of locality 3287 all localities are in the Ono quadrangle, Shasta County, California, With the exceptions of localities 3287, 3816 and 3817, all localities are in the Bald Hills formation.

2901 Huling Creek. At narrows in stream about 150 yards upstream from its mouth in the lowest conglomerate of the Bald Hills formation. 2000′ S and 800′ W of the NE corner sec. 17, T30N, R6W.

3287 Millville quadrangle, Shasta Co., California. Massive sandstone in the bed of Salt Creek, about 575′ N and 700′ E of SW corner sec. 26-33N-3W. Near base of Member I.

3464 Conglomerate bed in small gully about 150′ W of the Gas Point road. 1600′ E and 1900′ S of the NW corner sec. 16-30N-6W.

3465 Conglomerate bed on ridge on E side of the North Fork of Cottonwood Creek. 700′ E and 2200′ N of SW corner sec. 16-30N-6W.

3466 In same gully as 3464, but 1000′ NW (Upstream). Limestone nodule in sandy mudstone.

3467 North side of the North Fork of Cottonwood Creek, about 1000′ WSW from the mouth of Huling Creek. Lowest conglomerate of the Bald Hills formation. 2500′ N and 1450′ W of the SE corner sec. 17-30N-6W.

3469 East bank of the North Fork of Cottonwood Creek, about 1700′ S 50° E from the mouth of Huling Creek. Sandy conglomerate. 700′ E and 1900′ N of the SW corner sec. 16-30N-6W.

3470 Beside irrigation ditch along E side of the North Fork of Cottonwood Creek. Conglomerate. 1250′ N and 715′ E of the SW corner sec. 16-30N-6W.

3471 Tributary of the North Fork of Cottonwood Creek. Limestone nodules in mudstone. 1000′ S and 1100′ E of the NW corner sec. 20-30N-6W.

3472 Tributary of the North Fork of Cottonwood Creek, about 800′ ENE from locality 3471. Massive graywacke bed. 1000′ S and 2000′ E of the NW corner sec. 20-30N-6W.

3474 Coyote Creek. Thick, massive graywacke bed. 2000′ S of the NW corner sec. 30-30N-6W.

3476 Coyote Creek, about 1700′ ESE from locality 3474. Massive graywacke. 1600′ E and 2300′ S of NW corner sec. 30-30-N-6W.

3477 Coyote Creek, about 1000′ E from locality 3476. Massive graywacke. 2400′ W. and 2800′ N of SE corner sec. 30-30N-6W.

3478 Coyote Creek, about 400′ SE of locality 3477. Massive graywacke. 2450′ N and 1950′ W of the SE corner sec. 30-30N-6W.

3762 Tributary of the North Fork of Cottonwood Creek in a very small gully on the north bank of the creek. Limy graywacke nodules in siltstone. 900′ S and 2650′ W of the NE corner sec. 30-30 N-6W.

3763 Tributary of the North Fork of Cottonwood Creek, about 350′ ESE from locality 3762. Conglomerate. 1000′ S and 2200′ W of the NE corner sec. 30-30N-6W.

3764 North Fork of Cottonwood Creek just below the mouth of Huling Creek. Massive graywacke. 2500′ S and 700′ W of the NE corner sec. 17-30N-6W.

3765 West bank of the North Fork of Cottonwood Creek. Conglomeratic graywacke. 1600′ N and 550′ E of the SW corner sec. 16-30 N-6W.

3766 Same gully as locality 3466, but about 300′ NW Concretionary graywacke. 800′ S and 800′ E of the NW corner sec. 16-30N-6W.

3767 About 100′ above the mouth of a small gully on the E side of tributary of the North Fork of Cottonwood Creek Limy, conglomeratic graywacke. 1900′ S and 2200′ E of the NW corner sec. 16-30N-6W.

3768 Tributary of the North Fork of Cottonwood Creek, about 400′ NW from locality 3767. Conglomeratic graywacke. 1550′ S and 2000′ E of the NW corner sec. 16-30N-6W.

3769 In small E-W canyon about 750′ E of the Gas Point road. Massive graywacke. 1550′ S and 2600′ E of the NW corner sec. 16-30N-6W.

3771 In small gully on the N side of the canyon of locality 3769. Limestone nodules in siltstone. 900′ S and 2600′ W of the NE corner sec. 16-30N-6W.

3775 North bank of the North Fork of Cottonwood Creek. In second conglomerate bed above the base of the Bald Hills formation and about 10 feet stratigraphically above locality 3467.

3776 North bank of the North Fork of Cottonwood Creek, and about 25–30′ strati-

graphically above locality 3775. Limestone nodules in pebbly mudstone.

3777 Lowest conglomerate of the Bald Hills formation exposed amongst placer gravels on stream terrace about 600′ NW of the junction of Huling Creek and the North Fork of Cottonwood Creek.

3778 Huling Creek. About 5′ stratigraphically above the top of the basal conglomerate of the Bald Hills formation (locality 2901). Limestone nodules in mudstone 2050′ S and 750′ W of the NE corner sec. 17-30N-6W.

3808 Roaring River. Mudstone on N bank. 3500′ E and 3000′ N of the SW corner of sec. 1-29N-7W.

3816 Coyote Creek, about 1300′ SSE from locality 3478. Thin limestone bed in mudstone of an unnamed formation above the Bald Hills formation. 750′ W and 2400′ N of the SE corner sec. 30-30N-6W.

3817 Tributary of the North Fork of Cottonwood Creek about 4800′ ESE of locality 3763, beside road to old ranch house. Limestone pebble conglomerate, and limestone nodules in mudstone. 2500′ E and 1800′ S of the NW corner sec. 29-30N-6W.

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(*Explanation of* PLATE 107 *on next page.*)

EXPLANATION OF PLATE 107

FIGS. *1–3*—*Pseudhelicoceras petersoni* (Anderson). *1,2*, oblique and lateral views showing ornamentation; *3*, suture line, ×1