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BULLETIN 396

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PALEONTOLOGY  
OF THE  
COALINGA DISTRICT  
FRESNO AND KINGS COUNTIES  
CALIFORNIA

BY

RALPH ARNOLD



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# PALEONTOLOGY OF THE COALINGA DISTRICT, FRESNO AND KINGS COUNTIES, CALIFORNIA.

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By RALPH ARNOLD.

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## INTRODUCTION.

*General statement.*—The material on which this paper is based was collected during two separate investigations in the Coalinga district and adjacent regions. The first was made in the summer of 1905, under the direction of William H. Dall, of the United States Geological Survey, in connection with a paleontologic reconnaissance of the southern Coast Ranges. During this trip, on which the writer was assisted by H. R. Johnson and Frank Stokes, jr., nearly a month was spent in the region from Coalinga southward to the vicinity of Dudley. The second examination of the district was carried on during the whole of the summer of 1907, at which time a detailed geologic map of the district was made. This map was primarily prepared to accompany a report on the oil resources of the district, but incidentally the detailed mapping threw much light on various stratigraphic and paleontologic problems, several of which are discussed in this paper.

*Acknowledgments.*—Mr. Robert Anderson collaborated in the work carried on in 1907 and in the preparation of the geologic reports relative to the district, and Mr. Earl Stonebarger assisted in some of the paleontologic field work in 1907. The writer wishes also to return thanks to Mrs. Hugo Kreyenhagen, Mr. James H. Pierce, Prof. Orlando D. Barton, Judge W. H. Kerr, Mr. K. W. Jones, and many others in the district for kindly assistance and interest in the paleontologic work. He is especially indebted to Mr. Homer Hamlin and Mr. Frank M. Anderson for notes relating to many fossiliferous localities, not only in this district but elsewhere in the southern Coast Ranges, which have expedited the collection of much of the material on which this and other papers have been based; and to Mr. S. G. Mason, of the United States Geological Survey, for assistance in the preparation of the tables of fossils and fossiliferous localities contained in this bulletin.

may be distinguished from the latter by its relatively shorter whorls, much higher angle, and consequently shorter posterior portion of whorl; the suture is usually better marked in *B. piercei* than in *B. carpenteriana*, owing to the greater convexity of the basal portion of the whorl in the former species. *B. piercei* may be distinguished from *B. carpenteriana* var. *fernandoana* Arnold, from the Fernando formation (probably Pliocene portion), by its more acute spire and the higher position of the revolving angle on each whorl. *B. piercei* bears practically the same relation to *B. carpenteriana* that *B. keepi* Arnold, from the Vaqueros (lower Miocene) of the Santa Monica Mountains, bears to the recent *B. tryoniana* Gabb.

The species is named in honor of James H. Pierce, superintendent Standard Oil Company, Coalinga, Cal., whose work among the fossiliferous localities of the Coalinga district has been of the utmost assistance to the writer.

*Type*.—Specimen from which lower portion of body whorl has been broken, catalogue No. 165578, U.S.N.M.

*Locality*.—United States Geological Survey locality 4631, *Turritella ocoyana* bed in the SE.  $\frac{1}{4}$  NE.  $\frac{1}{4}$  sec. 16, T. 19 S., R. 15 E., 10 miles north of Coalinga (James H. Pierce and Ralph Arnold).

*Horizon*.—Near top of Vaqueros formation, lower Miocene.

### Genus CONUS Linnæus.

#### CONUS HAYESI n. sp.

Plate VI, figure 3.

*Description*.—Shell averaging over 60 millimeters in length, obconic, whorls enrolled upon themselves, the spire short, tapering slightly more acutely in the younger stages of growth, shell thick. Spire elevated about one-twelfth of the length of shell above body whorl; whorls about seven, nearly flat, but showing a faint carina posteriorly next to suture; the type shows faint traces of three or four spiral lines; body whorl moderately sharply angulated and carrying a faint sutural carina, sides straight. Aperture long and narrow; the imperfect condition of the type prevents a full description of the aperture and canal.

*Dimensions*.—Longitude 60 mm.; latitude 44 mm.; altitude of spire 5 mm.

*Notes*.—*C. hayesi* closely resembles both the recent Gulf of California species *C. fergusonii* Sowerby and the tropical west American *C. purpuraceus* Broderip. It is relatively broader and slightly less sharply angulated than the former and is spirally sculptured above, while it has a less elevated spire and more sharply angulated body whorl than the latter. The species is supposed to be characteristic of the Vaqueros or lower Miocene horizon. It is named in honor of C. Willard Hayes, chief geologist, United States Geological Survey.

*Localities.*—United States Geological Survey locality 4626, "reef bed" on Wagon Wheel Mountain, Kern County, 10 miles south of Dudley; locality 4861, "reef bed" in sec. 23, T. 25 S., R. 18 E., near Barton's cabin, which is in the NW.  $\frac{1}{4}$  sec. 23, Kings County (O. D. Barton; Ralph Arnold); (?) El Toro, Orange County (Delos Arnold; Stephen Bowers).

*Horizon.*—Vaqueros sandstone, lower Miocene.

## JACALITOS (EARLY UPPER MIOCENE) SPECIES.

### ECHINODERMATA.

#### Genus ASTRODAPSIS Conrad.

#### ASTRODAPSIS JACALITOSENSIS n. sp.

Plate XV, figure 5.

*Description.*—Specimen similar in general aspects to *A. whitneyi* Rémond, but distinguished by its larger size (sometimes 80 millimeters in maximum diameter), and oblong instead of circular outline; the petals are also less prominently elevated and broader in *jacalitosis* than in the latter.

*Dimensions.*—Maximum diameter 80 mm.; minimum diameter 70 mm.; maximum latitude of petals 12 mm.

*Notes.*—As this form has a definite stratigraphic value, being so far as known confined to the Jacalitos formation, it has been deemed worthy of a specific name, although its close relationship to the previously described *A. whitneyi* is freely admitted. In the Coalinga district *A. whitneyi* (see Pl. XI, fig. 1) is found in the Santa Margarita(?) formation (upper middle Miocene), while *A. jacalitosis* occurs in the Jacalitos formation, which lies stratigraphically above the Santa Margarita(?). Merriam<sup>a</sup> states that in the Mount Diablo region *A. whitneyi* probably occurs in the upper beds of the San Pablo formation, which would correspond to the Etchegoin of the Coalinga district. This discrepancy between the horizons in which *A. whitneyi* occurs in the two regions is worthy of further study. For a fuller discussion of the stratigraphic relations of the various west American sea urchins the reader is referred to papers on this subject by J. C. Merriam,<sup>b</sup> C. E. Weaver,<sup>c</sup> and R. W. Pack.<sup>d</sup>

<sup>a</sup> Proc. California Acad. Sci., 3d ser., Geology, vol. 1, p. 167.

<sup>b</sup> The distribution of the Neocene sea urchins of middle California and its bearing on the classification of the Neocene formations: Bull. Dept. Geology Univ. California, vol. 2, May, 1898, pp. 109-118. The Tertiary sea urchins of middle California: Proc. California Acad. Sci., 3d ser., Geology, vol. 1, March 6, 1899, pp. 161-174, pls. 21-22.

<sup>c</sup> New echinoids from the Tertiary of California: Bull. Dept. Geology Univ. California, vol. 5, 1909, pp. 271-274, pls. 21-22.

<sup>d</sup> Notes on echinoids from the Tertiary of California: Bull. Dept. Geology Univ. California, vol. 5, July, 1909, pp. 275-283, pls. 23-24.

PLATE VI.

VAQUEROS (LOWER MIOCENE) FOSSILS: LOWER HORIZON.

METIS aff. ALTA Conrad.

	Page.
Figure 1. Exterior of right valve, longitude 32 mm., $\times 2$ . Catalogue No. 165567, U.S.N.M.; Vaqueros formation; locality 4627. This lower Miocene <i>Metis</i> may be different from the Recent <i>M. alta</i> , but the state of preservation of the fossils precludes a definite determination.....	17
Figure 2. Left valve of same specimen.	

CONUS HAYESI n. sp.

Figure 3. Back of slightly imperfect specimen, longitude 60 mm., natural size. Type, catalogue No. 165566, U.S.N.M.; Vaqueros formation; locality 4861.....	62
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SCUTELLA MERRIAMI F. M. Anderson.

Figure 4. Top, maximum diameter 21 mm., natural size. Catalogue No. 165584, U.S.N.M. Vaqueros formation; locality 4775. This little echinoid from which the "button bed" in the Vaqueros derives its name, is found at many localities in the Coalinga district, and is believed to be characteristic of the Vaqueros or lower Miocene.....	18
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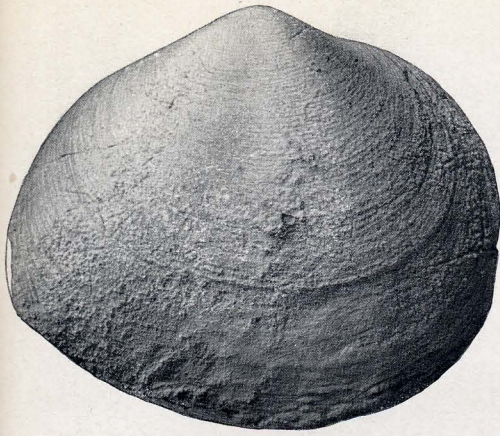
TROPHON (FORRERIA) GABBIANUM F. M. Anderson var. CANCEL-  
LARIOIDES n. var.

Figure 5. Back of imperfect specimen, longitude 56 mm., natural size. Type, catalogue No. 165605, U.S.N.M. Vaqueros formation; locality 4861. (See Pl. V, fig. 5.).....	60
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PHACOIDES (MILTHA) SANCTÆCRUCIS n. sp.

Figure 6. Exterior of nearly perfect right valve, longitude 75 mm., natural size. Type, catalogue No. 165569, U.S.N.M. Vaqueros formation; locality 4861.....	57
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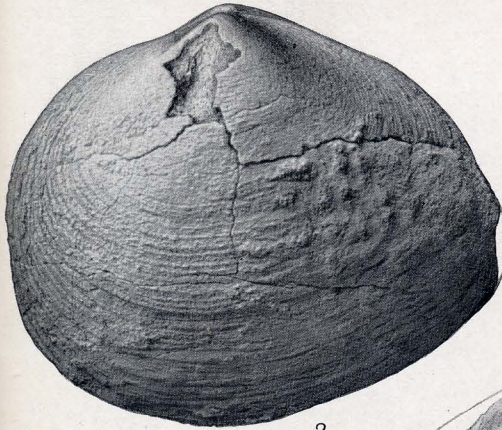




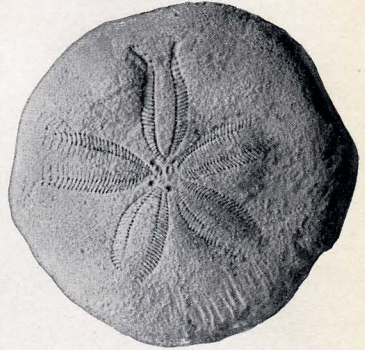
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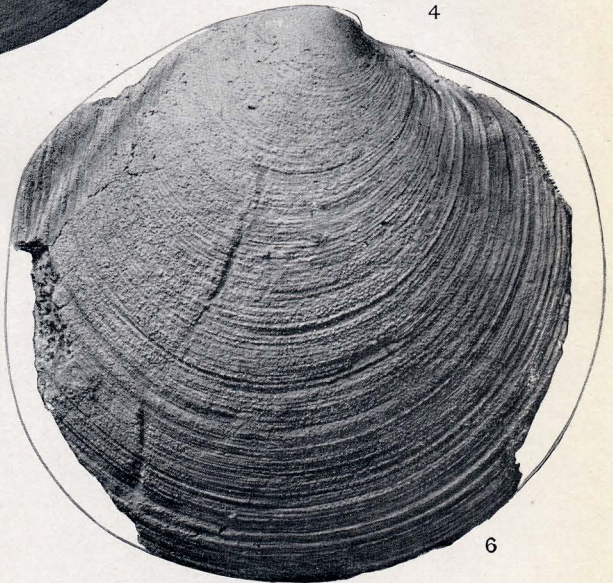
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VAQUEROS FOSSILS.