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LATE CRETACEOUS MOLLUSCA OF THE SIMI HILLS:
AN INTRODUCTION

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ABSTRACT

Diverse but poorly described molluscan faunas from the eastern and western end of the Simi Hills provide a chronologic framework for the Chatsworth Formation. These faunas indicate an age range of late mid Campanian to early Maestrichtian. Ammonite zones recognized are the late Campanian *Metaplaenticeras pacificum* zone and the early Maestrichtian *Neodesmoceras catarinae* zone. The diversity is at least four times that previously reported. With the possible exception of near littoral assemblages from the massive sandstones at the eastern end of the Simi Hills, all molluscan faunas are normal marine, deep inner sublittoral, shelf assemblages.

INTRODUCTION

Mollusks are by far the most common megafossils in the Chatsworth Formation, and yet, considering the diversity present, relatively few of them have been recorded. The most comprehensive list is that of Popenoe, 1942. His check list indicates the presence of 29 species in the Simi Hills. We find that at least four times that many are present. About half are undescribed, the gastropods being more neglected than the bivalves. Although present, scaphopods have been completely neglected, a tradition we have continued. Cephalopods are less common than the gastropods and much less common and diverse than the bivalves. The greatest concentrations of molluscan fossils are in three areas: Bell Canyon and Dayton Canyon on the eastern end of the Simi Hills and Lang Ranch at the western end of the Simi Hills. Other areas have provided few or poorly preserved fossils. Important information, however, has been added to the study of the Chatsworth Formation by these less impressive fossil localities. Most of the material upon which the following bivalve and gastropod notes are based was collected by or at the instigation of W. P. Popenoe. Bivalve and gastropod data were compiled by L. R. Saul, the cephalopod data by J. M. Alderson.

We attempt in the following notes to inventory the molluscan fauna of the Chatsworth Formation in systematic order, providing, where possible, distributional data and inferences as to geologic age and ecologic habitat. Figure 1 provides geographic and stratigraphic orientation. All of the fossil localities are plotted on the Geologic Map (in pocket). The Campanian-Maestrichtian boundary in these notes is that of Jeletzky, 1970, and is between the *Metaplaenticeras pacificum* and *Neodesmoceras catarinae* zones. In terms of Goudkoff's foraminiferal zones, all mollusks, with the possible exception of those from Bell Canyon localities, are probably from within the E zone. We have not attempted to describe the 100+ species but provide differentiating characters for a

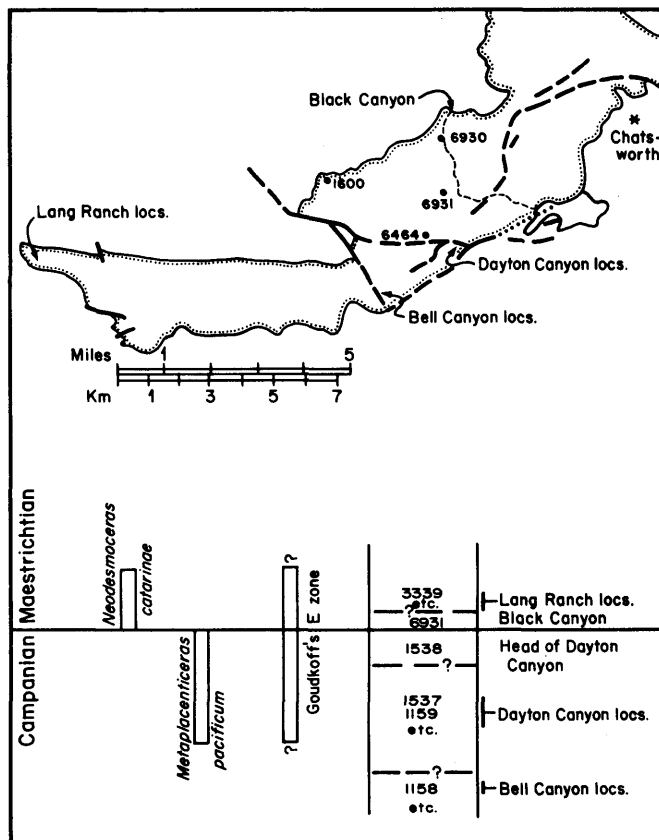


Figure 1. Outline of outcropping Chatsworth Formation from Jennings & Strand (1969) with major areas of fossil localities and some scattered localities plotted. For complete plot of localities see Squires this guidebook, Geologic Map in pocket. Fossil localities plotted on column in inferred stratigraphic order and related to Pacific Coast ammonite and benthic foraminifera zones.

few important species.

Abbreviations used are: CAS = California Academy of Sciences; CIT = California Institute of Technology; LSJU = Stanford University; UCB = University of California, Berkeley; UCLA = University of California, Los Angeles.

SUMMARY

The molluscan fauna of the Simi Hills includes representatives of at least 25 bivalve families, 22 gastropod families, and 7 ammonite families. Even though the fauna has not been critically studied, it provides a means of dating the strata of the Chats-

in Link, M. H., Squires, R. L., and Colburn, I.P., eds.,
Simi Hills Cretaceous Turbidites, Southern California,
Pacific Section, Society Economic Paleontologists and
Mineralogists, Fall Field Trip Guidebook, pg. 29-42

worth Formation both as to regional correlation and internal chronology. The oldest known fossiliferous outcrops are of late mid Campanian age, the youngest of early Maestrichtian age based on ammonite zones. Regional correlations suggest that the upper part of Goukoff's E zone includes the *Neodesmoceeras catarinae* zone of Jeletzky. The bivalves and gastropods indicate an inner sublittoral habitat, probably the deeper portion, but still within the photic zone. Some of the ammonites suggest deeper water.

BIVALVIA

Bivalve shells make up the bulk of the molluscan fossils, especially in the three areas from which abundant megafossils have been obtained. Most valves are disarticulated.

NUCULOIDA

The order Nuculoida is sparsely represented in the collections from the Chatsworth Formation by a few unidentified nuculanids from Bell and Dayton Canyon localities and the nuculid *Acila (Truncacila)* sp. *Acila (Truncacila)* sp. is found at several Dayton Canyon localities and at UCLA 6937, Black Canyon. There it occurs with *Indogrammatodon?* sp. indet., *Anomia?*, and *Baculites* cf. *B. rex* ANDERSON.

ARCOIDA

At least four arcoid families are represented in the Chatsworth Formation.

PARALLELODONTIDAE are common to abundant at Bell and Dayton Canyon localities and present at UCLA loc. 6937 in Black Canyon where thus far the fossils are too few and too poorly preserved to estimate abundance or identify with certainty. These parallelodontids have been referred to various supra-specific taxa including *Parallelodon*, *Grammatodon*, *Nanonavis*, and *Nemodon*, but they are most similar in sculpture and dentition to *Indogrammatodon*, an Indo-Pacific group said in the Treatise (Moore, 1969, p. N258) to be of Jurassic age. Other members of the group here referred to *Indogrammatodon?* have been found throughout the Cretaceous of the West Coast especially in very fine-grained sediments. Specimens from Bell Canyon are larger than usual for the group and twice the size of specimens from Dayton Canyon. Whether this results from the muddier matrix of the Bell localities or is indicative of specific difference is not now known. Specimens from Bell are referred to *Indogrammatodon?* cf. *I.? whiteavesi* (REINHART, 1937) (pl. 1, fig. 3-4, 6-7) and those from Dayton to *I.? cf. I.? vancouverensis* (MEEK, 1858) (pl. 1, fig. 5, 8-9) mainly on the basis of the radial ribbing of the right valve which is more even, and has narrow interspaces in the Bell Canyon forms and has wider interspaces with every fourth or fifth rib slightly stronger in specimens from Dayton Canyon. In both forms the sculpture and shape of the right and left valves differ, with coarser sculpture and a stronger carina on the left valve. The discrepancy of the valves and distinctive pittings of the surface (pl. 1, fig. 3) of many specimens suggest that *Indogrammatodon?* spp. may have been epifaunal forms; their presence in fine-grained sediments throughout California in association with *Acila*, *Inoceramus*, and ammonites suggests that, although not confined to soft substrates inhospitable to most bivalves, they could survive upon them.

CUCULLAEIDAE are prominent in the Bell and Day-

Plate 1.-- Bivalves from the Chatsworth Formation

[All figures natural size unless otherwise indicated.]

1. *Cucullaea (Idonearca) youngi* WARING, 1917, right valve. UCLA 59204. UCLA loc. 6020, Bell Canyon; late mid Campanian
2. *Cucullaea (Idonearca) cordiformis* PACKARD, 1922, right valve. UCLA 59205. CIT loc. 1159, Dayton Canyon; late Campanian
- 3-4. *Indogrammatodon?* cf. *I.? whiteavesi* (REINHART, 1937), left valve. UCLA 59201. UCLA loc. 6232, Bell Canyon; late mid Campanian
5. *Indogrammatodon?* cf. *I.? vancouverensis* (MEEK, 1858), left valve, x2. UCLA 59203. CIT loc. 1159, Dayton Canyon; late Campanian
6. *Indogrammatodon?* cf. *I.? whiteavesi* (REINHART, 1937), left valve, x1.5. UCLA 59199. CIT loc. 1158, Bell Canyon; late mid Campanian
7. *Indogrammatodon?* cf. *I.? whiteavesi* (REINHART, 1937) right valve, x2. UCLA 59200. CIT loc. 1158, Bell Canyon; late mid Campanian
8. *Indogrammatodon?* cf. *I.? vancouverensis* (MEEK, 1858), left valve, x1.5. UCLA 59203. CIT loc. 1159, Dayton Canyon; late Campanian
9. *Indogrammatodon?* cf. *I.? vancouverensis* (MEEK, 1858), right valve, x2, UCLA 59202. CIT loc. 1159, Dayton Canyon, late Campanian
- 10-11. *Crassatella (Crassatella) cf. C. (C.) conradi-ana* (GABB, 1864), right valve. UCLA 59206. UCLA loc. 6020A, Bell Canyon; late mid Campanian
- 12-13. *Crassatella (Crassatella) cf. C. (C.) conradi-ana* (GABB, 1864), right valve. UCLA 59307. CIT loc. 1159, Dayton Canyon; late Campanian

ton Canyon collections, if only because of their size. Specimens from Bell Canyon are *Cucullaea (Idonearca) youngi* WARING, 1917 (pl. 1, fig. 1). They are high relative to length, have rather narrow beaks, and are ornamented by fine radial ribs with broad interspaces. This is the species present in the Cedar District Formation of Sucia Island, San Juan Co., Washington, Chico Formation of Chico Creek, Butte Co., (= *C. buttensis* ANDERSON, 1958), and in the Holz Shale of the Santa Ana Mts., Orange Co. Based on these occurrences, it is of early and mid Campanian age. Specimens from Dayton Canyon localities are longer relative to height, broad-beaked, and smooth. They are *C. (I.) cordiformis* PACKARD, 1922 (pl. 1, fig. 2). Packard's poorly preserved holotype is apparently from the Pleasants Sandstone of the Santa Ana Mts., Orange Co., where the species is the same one as that of the Dayton Canyon localities. This species has also been found rarely in the Tuna Canyon Formation of the Santa Monica Mts. associated with *Metaplaenticeras* spp. and is of late Campanian age.

NOETIIDAE (TRINACRIINAE) is represented solely by *Trinacria cor* POPENOE, 1937, which is present (some places abundantly) at Dayton Canyon and Lang Ranch. That it has not turned up at Bell Canyon localities probably has no time significance as it is present in the upper Chico Formation of Chico Creek, Butte Co., and the Holz Shale of the Santa Ana Mts., Orange Co. These are probably slightly older than the Bell Canyon deposits which are the oldest known in the Chatsworth Formation. The species appears to range in age from Campanian to early Maestrichtian.

GLYCYMERIIDAE from Bell and Dayton Canyon localities and CIT loc. 1538 = UCLA loc. 6464 have flat-topped ribs with very narrow interspaces and are