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VI

CLIMATE AND ITS INFLUENCE UPON THE OLIGOCENE FAUNAS OF THE PACIFIC COAST, WITH DESCRIPTIONS OF SOME NEW SPECIES FROM THE MOLOPOPHORUS LINCOLNENSIS ZONE\*

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#### INTRODUCTION AND ACKNOWLEDGMENTS

Our knowledge of the Oligocene of the Pacific Coast is very inadequate. In order that we may study the Oligocene, its fauna must be first described. The descriptions of 36 new species from a fauna of 48 specifically identifiable forms obtained from a single locality are given below. Better testimony concerning our ignorance of the Oligocene could hardly be given when the discovery of a new locality by two such good collectors and enthusiastic paleontologists as Mr. F. M. Anderson and Mr. Bruce Martin results in finding a fauna which is 75 per cent new.

The fauna described in this paper was obtained from near Vader, Washington, on the Cowlitz River, by Mr. F. M. Anderson and Mr. Bruce Martin, the Curator and Assistant Curator, respectively, of the Department of Paleontology of the California Academy of Sciences. Mr. Martin describes

the locality and incidental stratigraphy as follows: "Locality 181, on the east bank of the Cowlitz River just back of the Greeco ranch house, about four miles east of Vader, Washington. There appear to be two formations represented at this point. The fossils occur in a sandstone formation which is associated with a conglomerate. The upper zone which is mostly *Ostrea* is in a conglomerate composed of basalt pebbles and boulders. The lower zone is nearly all small gastropods which occur in blue sandstone. These two beds dip northwest at a very small angle—about  $0^{\circ}$ - $5^{\circ}$ . A few yards to the south, a well stratified, coarse, gray, compact sandstone is exposed dipping south at an angle of  $10^{\circ}$  and striking N.  $70^{\circ}$  E. This sandstone is probably Eocene. About 20 feet south of the fossil beds a mass of coarse conglomerate is butting perpendicularly against the sand to the south. This conglomerate appears to be the same as that where the fossils occur."

The matrix in which this fauna occurs is much coarser than most of the fossil bearing rocks of the Oligocene, which are, in general, shaly in this region. Perhaps it may be that Martin has described an unconformity between Oligocene strata and the Tejon-Eocene rather than a fault.

#### FAUNA

The fauna collected by Messrs. Anderson and Martin is particularly rich in tropical species and the number of species found at one locality—48—is large. This fauna is listed below.

#### LIST OF SPECIES FROM CALIFORNIA ACADEMY OF SCIENCES LOCALITY 181

- Astarte perrini, new species.
- Arca washingtoniana, new species.
- Barbatia gabbi, new species.
- Cardium lincolniensis Weaver.
- Cardita weaveri, new species.
- Chama pacifica, new species.
- Corbula cowlitzensis, new species.

**Fusinus gesteri**, new species

Pl. 31, Fig. 4

Shell with six and a half whorls; the first three elevated, smooth, with but slight convexity; fourth and fifth whorls decorated by about 10 wavy, equally spaced spiral lines crossed by 10 sinuous axial ribs; body-whorl with axial ribs covering upper third of shell; the lower portion being covered by spiral lines only; aperture constricted medially; inner lip but slightly calloused.

*Dimensions*:—Length, 14 mm.; width of body-whorl, 6 mm.

*Type*:—No. 429, Cal. Acad. Sci. Locality 181, near Vader, Lewis County, Washington, on east bank of the Cowlitz River, just back of the Greeco ranch house, about four miles east of Vader. Colls., F. M. Anderson and Bruce Martin.

Named in honor of Mr. Clark Gester.

**Conus ruckmani**, new species

Pl. 31, Figs. 6a and 6b

Shell small with six whorls; surface of each whorl between wavy, linear suture and shoulder, concave and marked by three or four spiral threads cut by numerous, crescentric growth lines; 18 to 24 rounded nodes decorating shoulder whorls; body-whorl marked by about 20 granular spiral ribs.

*Dimensions*:—Length, 12.5 mm.; width of body-whorl, 7 mm.

*Type*:—No. 431, Cal. Acad. Sci. Locality 181, near Vader, Lewis County, Washington, on east bank of the Cowlitz River, just back of the Greeco ranch house, about four miles east of Vader. Colls., F. M. Anderson and Bruce Martin.

Named in honor of Mr. John Ruckman, whose careful work demonstrated the Oligocene age of at least the upper portion of the white shales of the Coalinga region.

**Eulima clarki**, new species

Pl. 31, Fig. 8

Shell minute with nine whorls; first three whorls naticoid; others slightly convex with linear distinct suture and two ob-

## PLATE 31

- Fig. 1. *Littorina oligocenica*, new species,  $\times 4$ . Type.  
Fig. 2. *Marginella pacifica*, new species,  $\times 4$ . Type.  
Fig. 3a. *Surcula dickersoni* (Weaver),  $\times 2$ .  
Fig. 3b. *Surcula dickersoni* (Weaver),  $\times 2$ .  
Fig. 4. *Fusinus gesteri*, new species,  $\times 2$ . Type.  
Fig. 5. *Nyctilochus*, species,  $\times 3$ .  
Fig. 6a. *Conus ruckmani*, new species,  $\times 2$ . Type.  
Fig. 6b. *Conus ruckmani*, new species,  $\times 2$ .  
Fig. 7a. *Epitonium washingtonensis* Weaver,  $\times 3$ . Type.  
Fig. 7b. *Epitonium washingtonensis* Weaver,  $\times 3$ .  
Fig. 8. *Eulima clarki*, new species,  $\times 4$ . Type.  
Fig. 9a. *Seraphs andersoni*, new species,  $\times 1$ . Type.  
Fig. 9b. *Seraphs andersoni*, new species,  $\times 1$ . Cotype.  
Fig. 10a. *Hipponyx arnoldi*, new species,  $\times 2$ . Type.  
Fig. 10b. *Hipponyx arnoldi*, new species,  $\times 2$ . Cotype.  
Fig. 10c. *Hipponyx arnoldi*, new species,  $\times 2$ .  
Fig. 10d. *Hipponyx arnoldi*, new species,  $\times 2$ .  
Fig. 11a. *Acmæa simplex*, new species,  $\times 3$ . Type.  
Fig. 11b. *Acmæa simplex*, new species,  $\times 3$ .  
Fig. 12a. *Hipponyx ornata*, new species,  $\times 2$ . Type.  
Fig. 12b. *Hipponyx ornata*, new species,  $\times 2$ .  
Fig. 13a. *Patella subquadrata*, new species,  $\times 3$ . Type.  
Fig. 13b. *Patella subquadrata*, new species,  $\times 3$ .

