PERISSODACTYLA OF THE SESPE EOCENE, CALIFORNIA

BY CHESTER STOCK

BALCH GRADUATE SCHOOL OF THE GEOLOGICAL SCIENCES, CALIFORNIA INSTITUTE OF TECHNOLOGY

Communicated April 14, 1936

Introduction.—One of the outstanding peculiarities of the Eocene faunas known from the Sespe deposits of California is the continued absence of any evidence of the Equidae. Aside from lack of representatives of this family, however, the Perissodactyla include members of the Rhinocerotoidea and Brontotheriidea. Two types have already been recorded.[1] It is the purpose of the present paper to draw attention to additional fossil material belonging to the Tapiroidea and Rhinocerotoidea.

Family Helaletidae: Dilophodon, sp.

Material.—A single upper molar, either $M\underline{2}$ or $M\underline{1}$, No. 1949, Plate 1, figure 1.

Locality.—Tapo Ranch, Locality 180 C.I.T. Vert. Pale. Sespe Upper Eocene.

Description.—This tooth furnishes as yet the only evidence of presence of the family Helaletidae. The specimen is smaller than comparable teeth in *Helaletes boöps* and *H. nanus* and comes closest in size to *Dilophodon minusculus* (No. 1634a A.M.N.H.) from the Bridger Middle Eocene of Wyoming. It represents an animal apparently not so small as *Heteraletes leotanus* Peterson from the Duchesne River horizon of Utah.

Comparing the Sespe specimen with a molar tooth of *D. minusculus*, No. 1634a A.M.N.H., the following characters may be noted. A greater disparity prevails between the levels of the tip of the paracone and the tip of the metacone. The depth of the cross-lophs, as viewed from the inner side, appears to be slightly lower. The cingulum at the outer base of the metacone is not so strongly developed as in *D. minusculus*. A cingulum is present on the anterior and on the posterior sides of the tooth. Measurements (in millimeters) of specimen No. 1949 are: anteroposterior diameter 8.6; greatest transverse diameter normal to inner side 9.2.

Family Hyracodontidae: Triplopus? woodi, n. sp.

Type Specimen.—No. 476 C.I.T. Vert. Pale. Coll., Plate 1, figures 3, 3*a*, a fragmentary ramus with $Dp\overline{3}$, $Dp\overline{4}$, $M\overline{1}$ and $M\overline{2}$. The species is named for Dr. Horace Elmer Wood, 2nd, in recognition of his valuable suggestions in the course of study of the Sespe Perissodactyla.

Referred Specimen.—Fragment of ramus with $M\overline{3}$, No. 652.

Locality.—Brea Canyon section of the Sespe, north of the Simi Valley, Ventura County, California, Locality 128 C.I.T., approximately 120 feet lower stratigraphically than Locality 150. The referred specimen, No. 652, occurred at Locality 148 C.I.T., approximately 10 feet lower stratigraphically than Locality 150.

Specific Characters.—Similar in characters of jaw and dentition to, but showing a progressive increase in size beyond, the Bridger and Lower Uinta species of *Triplopus*. Teeth more slender than in type of *Epitriplopus uintensis* (Peterson).

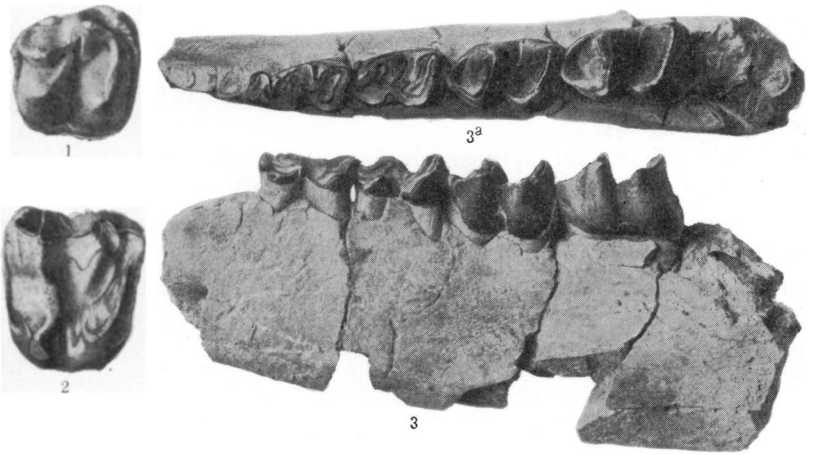

PLATE 1

Dilophodon, sp.

Figure 1, $M\underline{1}$ or $M\underline{2}$, No. 1949, occlusal view; × 2.

Triplopodine or Hyrachyid Rhinoceros

Figure 2, $D\underline{p4}$, No. 1950, occlusal view; × 1.

Triplopus? woodi, n. sp.

Figures 3, 3*a*, type specimen, No. 476, ramus with $D\bar{p}\bar{3}$–$M\bar{2}$, inclusive; lateral and occlusal views; × 1.

Calif. Inst. Tech. Coll. Sespe Eocene, California.

Description.—No. 476, as indicated by the measurements, shows an appreciable increase in size beyond the *Triplopus* represented by the lower jaw, No. 2342 A.M.N.H. from the middle Eocene Bridger of the Washakie Basin, Wyoming. Considerable similarity prevails between these two in the dentition as well as in the proportions of the jaw. A posterior mental foramen is situated below the tooth socket of $D\bar{p}\bar{2}$ in the Sespe jaw and has therefore a position slightly anterior to that in No. 2342. In both specimens this foramen is situated much closer to the ventral border than to the alveolar border.

The type of *T. cubitalis* Cope represents a young animal and in this specimen the teeth are distinctly smaller and the jaw shallower than in No. 476 from the Sespe (see comparative measurements).

In the referred specimen of *T. ? woodi*, No. 652, $M\overline{3}$ measures in anteroposterior diameter 17.4 mm. and in greatest transverse diameter approximately 10.3 mm. The depth of the jaw behind $M\overline{3}$ is 34.5 mm. This specimen is of interest because it extends upward the stratigraphic range of the triplopodine group in the Sespe deposits to within a few feet of Locality 150.

Increase in size of the Sespe individuals is likewise to be noted when comparisons are made between specimen 476 and 652 and the holotype and referred specimens of *Triplopus grangeri* Wood.[2]

In the lower jaw of the type of *Epitriplopus uintensis* the deciduous and permanent teeth are noticeably heavier than in *T. ? woodi*. Thus in the molars the width in relation to length of tooth is greater in the former than in the latter.

Relationship of the Sespe form to the triplopodine rhinoceroses is suggested but reference to one of the known genera from the American Eocene is not clearly established. The Sespe material is referred tentatively to *Triplopus*, although additional remains might show closer approach to *Epitriplopus*.

COMPARATIVE MEASUREMENTS (IN MILLIMETERS)

	Triplopus cubitalis COPE TYPE NO. 5095 A.M.N.H.	*Triplopus* SP. NO. 2342 A. M. N. H. BRIDGER MID. EOCENE	*Triplopus? woodi* N. SP. TYPE NO. 476 C.I.T. SESPE
Length of tooth row $Dp\overline{3}$–$M\overline{2}$	40.4	52.8	56.7
$Dp\overline{3}$, anteroposterior diameter	9.3	12.1	12.4
$Dp\overline{3}$, greatest transverse diameter	5	6.5	6.8
$Dp\overline{4}$, anteroposterior diameter	8.7	11.5	11.7
$Dp\overline{4}$, greatest transverse diameter	*a*6.3	7.6	8
$M\overline{1}$, anteroposterior diameter	9.1	12.8	14.1
$M\overline{1}$, greatest transverse diameter	6.7	8.2	9.3
$M\overline{2}$, anteroposterior diameter	11.3	15.6	16.6
$M\overline{2}$, greatest transverse diameter	7.2	9.3	10.2
Depth of jaw at anterior end of $Dp\overline{3}$	14.9	18.7	24.4
Depth of jaw at posterior end of $M\overline{2}$	16.9	23.8	30.2

a Approximate.

Triplopodine or Hyrachyid Rhinoceros

A well-worn $Dp\underline{4}$, No. 1950, Plate 1, figure 2, represents a rhinoceros of uncertain affinities from Locality 150.

Measurements (in millimeters) of No. 1950 are as follows: Anteroposterior diameter 18.8; greatest transverse diameter normal to inner side 22.2. The tooth approaches in size the comparable deciduous molar

in *Hyrachyus? douglassi*, No. 1929 A.M.N.H., but differs in several noteworthy characters. In the Sespe specimen the outer and inner borders are roughly parallel, whereas in No. 1929, as also in No. 12137 A.M.N.H. of *Hyrachyus eximius*, the transverse diameter of the tooth is distinctly greater in front than in back. Moreover, the parastyle in these Bridger teeth is better developed and reaches farther externally with reference to the paracone than in the Sespe specimen. The external cingulum, present at the external base of the metacone in *Hyrachyus*, is not present in the Sespe specimen.

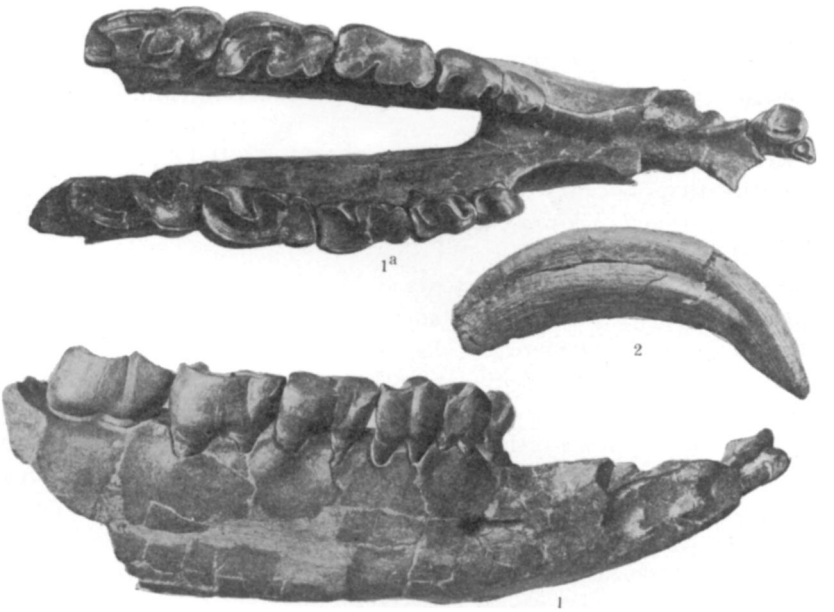

PLATE 2

Amynodontopsis bodei Stock

Figures 1, 1*a*, mandible, No. 2000, lateral and superior views; × 1/3. Figure 2, lower canine, No. 2001, lateral view; × 1/2.

Calif. Inst. Tech. Coll. Sespe Eocene, California.

Comparison of No. 1950 with the figure[3] of $Dp\frac{4}{}$ in the type of *Epitriplopus uintensis* shows that the tooth from the Sespe is of a different shape, being considerably wider for its anteroposterior diameter. Moreover, the parastyle is differently constructed in the latter and the internal cingulum on the anterior lobe is not so well developed as in *E. uintensis*.

$Dp\frac{4}{}$ in *Triplopus*, as represented by this tooth in No. 1973 A.M.N.H. resembles in shape No. 1950 from the Sespe. Aside from size, the principal difference rests in the fact that the parastyle reaches slightly far-

ther externally than in No. 1950, the outer border of the convexity being on a level with that of the paracone, whereas in the latter the outer wall of the convex parastyle lies slightly to the inner side of the outer wall of the paracone.

It is unfortunate that more material of this rhinocerotoid form is not available from Locality 150. Present evidence suggests perhaps a closer relationship to a triplopodine rather than to a hyrachyid type. In this connection it is interesting to recognize that the triplopodine rhinoceroses are known to range upward in the Sespe deposits to within at least ten feet of the stratigraphic horizon represented by Locality 150.

Family Amynodontidae: Amynodontopsis bodei Stock

Several fragmentary jaws and teeth from Locality 150 and a lower jaw, No. 2000 C.I.T. Coll., Plate 2, figures 1, 1*a* are referred to this species. The latter specimen comes from Locality 147 C.I.T., 160 feet higher stratigraphically than Locality 150 in the Sespe deposits, north of the Simi Valley, California. A lower canine tooth, No. 2001, from Locality 150, is shown in Plate 2, figure 2.

The lower jaw, No. 2000, represents an individual larger than *Amynodon erectus* (No. 11453 Y.P.M.) and *A. advenus* (No. 3102 C.M.) and resembles in this character *A. intermedius*. Of the two incisors present in the Sespe specimen, the lateral is decidedly larger than the medial one. Resemblance is shown to *Metamynodon* in this disparity in size. The occlusal surface of each incisor presents a rather curious pattern, suggestive however of the type of surface seen in comparable teeth of *Amynodon*. Extending back from the labial to the lingual border of each tooth is a ridge and on either side of this the enamel surface is indented or cupped. While only two incisors are preserved, an additional tooth is at least suggested by a faint furrowing of the alveolar wall of the symphyseal region in advance of the socket for the canine. If the tooth were present, its size, in relation to that of the incisor next to it, must have been small.

The canine possesses a short crown and long root. A well-marked furrow extends the length of one surface of the root. In addition to the worn posterior surface, a small surface of abrasion is present along the anterior edge at the base of the crown.

Only two lower premolars are present, and by far the larger portion of the wearing surface of the cheek-tooth series is furnished by the molars. The latter are individually longer in relation to their width than are the comparable teeth in *Amynodon*. The molars are less hypsodont than in *Metamynodon* and exhibit on their outer faces, as in *Amynodon*, the longitudinal groove which marks the union of protolophid and hypolophid. The furrows, however, are not so deep as in *Amynodon*.

The symphyseal region of the jaw is narrow and the dorsal surface

posteriorly is deeply sunk. A posterior mental foramen is situated below the anterior root of $P\overline{3}$.

Amynodontopsis, described[4] on the basis of a skull and dentition from the Sespe (Locality 150), is not so far advanced beyond *Amynodon* as is the Oligocene *Metamynodon*. Additional characters which point toward progressive development of the Sespe genus are presented by the lower jaw and dentition. These are the anteroposterior lengthening of the molar dentition with notable increase in extent of molar surface in relation to premolar surface, tendency toward greater flattening of external walls of cheek-teeth with fainter development of groove between protolophid and hypolophid, and in the characters of the incisors.

MEASUREMENTS (IN MILLIMETERS) OF NO. 2000 C.I.T.

Length of symphysis			108.5
Depth of ramus at anterior end of $M\overline{1}$			65.5
Width of ramus below $M\overline{2}$			24.6
Length of diastema between C and $P\overline{3}$			*a*48.5
Length from anterior end of C alveolus to posterior end of $M\overline{3}$			*a*230
Length of premolar series ($P\overline{3}$–$P\overline{4}$) through middle			39.8
Length of molar series through middle			119.5
Medial incisor, transverse diameter	9.9;	anteroposterior diameter	10.6
Lateral incisor, transverse diameter	14.9;	anteroposterior diameter	15.7
$P\overline{3}$, transverse diameter	12.8;	anteroposterior diameter	17.7
$P\overline{4}$, greatest transverse diameter	17.1;	anteroposterior diameter	23.1
$M\overline{1}$, greatest transverse diameter	20.7;	anteroposterior diameter through middle	31.5
$M\overline{2}$, greatest transverse diameter	23 ;	anteroposterior diameter through middle	40
$M\overline{3}$, greatest transverse diameter	21.4;	anteroposterior diameter through middle	44.3

a Approximate.

[1] C. Stock, *Proc. Nat. Acad. Sci.*, **19**, 762–767 (1933); **21**, 456–462 (1935).
[2] H. E. Wood, 2nd, *Bull. Amer. Pale.*, **13**, No. 50, 16–19, Table II (1927).
[3] H. E. Wood, 2nd, *Ibid.*, pl. 3, Fig. 9 (1927).
[4] C. Stock, *Proc. Nat. Acad. Sci.*, **19**, 762–767 (1933).