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III

A HYAENARCTID BEAR FROM THE LATER TERTIARY OF THE JOHN DAY BASIN OF OREGON

By JOHN C. MERRIAM and CHESTER STOCK

1 PLATE

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INTRODUCTION

In the course of field investigations on the Mascall and Rattlesnake deposits and faunas of the John Day Basin of eastern Oregon, conducted by Chester Stock and C. L. Moody during 1916.[1] fragmentary material of a hyaenarctid type was discovered at University of California collecting locality 3042. The specimen was described in 1925 by John C. Merriam, Chester Stock and C. L. Moody.

Locality 3042 was visited again during the summer of 1926. Charles W. Merriam, a member of the party in search of mammalian remains at this locality, discovered several hyaenarctid teeth and fragments. Study of this new material has shown that it represents the individual found in 1916. The additional remains furnish valuable information relating to the Tertiary bears of North America.

LOCATION OF MATERIAL

The locality (U. C. C. locality 3042) at which the hyaenarctid remains were found is that at which a number of interesting specimens have been obtained by expeditions from the University of California in 1900 and 1916. At this station there have been secured a number of specimens of *Hipparion*, belonging to forms related to the species *H. sinclairi* and *H. occidentale*.

Locality 3042 occurs near the lower boundary of the NW¼ and NE¼ of Sec. 36, T. 12S., R. 25E., Willamette Base and Meridian. The locality is situated on the south slope of a ridge with elevation of 3240 feet, shown on the topographic map known as the Picture Gorge Special, Oregon, soon to be published by the U. S. Geological Survey, and is approximately 3 miles southwest of the Mascall Ranch.

The south face of the 3,240 foot-ridge at locality 3042 presents exposures of white tuffaceous sediments overlain by coarse gravels and brownish tuffs or clays. The deposits appear at first sight to represent two distinct accumulations, heretofore presumed to be the Mascall Miocene at the bottom of the exposed section and the Rattlesnake Pliocene at the top. The tentative view has been entertained that the presumed Mascall deposits represent a higher horizon than that occurring at the type section of the Mascall, near the Mascall Ranch.

[1] Carnegie Inst. Wash. Pub. No. 347, pp. 65–66, fig. 17, 1925.

Further investigation of the geologic relations of the later Tertiary formations at this locality and in the adjacent area by John P. Buwalda has cast some doubt upon the original assumption. There appears to be a possibility that in the section under consideration the separation of the lower and the upper beds is more apparent than real and that the entire section exposed at locality 3042 may be Rattlesnake in age. The lower portion of the section may represent the Rattlesnake formation, although differing somewhat in its lithological characters from the typical Rattlesnake. In view of the fact that a study of the geology and palaeontology of the Picture Gorge sheet is now in progress it does not appear desirable to express a definite opinion as to the age of the deposits at locality 3042 until the critical studies in the field have been concluded.

HISTORY OF DISCOVERY AND IDENTIFICATION OF MATERIAL

The hyaenarctid material found by Stock and Moody at locality 3042 in 1916 consisted of a maxillary fragment with a carnassial tooth and the alveolus for $P\underline{3}$, and a root of a molar tooth, No. 22461, University of California Collection. $P\underline{4}$ lacked a portion of the protocone. The specimens discovered by Charles W. Merriam in 1926 included $M\underline{1}$ and $M\underline{2}$ and several fragments of teeth. In each case the specimens were found lying on the white tuffaceous sediments distinctly below the brownish beds with coarse gravels which are exposed in the upper portion of the section. There is reason for believing that the teeth were originally embedded in the white deposits.

The preservation of the remains found in 1926 corresponds almost exactly to that of the material collected in 1916. When the upper carnassial and associated material secured by Stock and Moody and the upper molars and fragments of teeth discovered by Charles W. Merriam were brought together, it was found that the outer anterior root, broken away and missing in $M\underline{1}$ secured in 1926, had been collected with the carnassial in 1916. The root fits to $M\underline{1}$ perfectly. Furthermore, a fragment of crown in the collection made by Charles W. Merriam was identified as a portion of the protocone missing in the carnassial collected by Stock and Moody. The fragment fits perfectly in position below the root supporting this cusp in $P\underline{4}$.

Recognition of a missing part of the specimen collected in 1926 in the collections secured in 1916 and the identification of a fragment of a tooth crown found during the past summer as a part belonging to the carnassial collected ten years ago leave no doubt that the teeth were obtained from the same spot and that they are parts of the same individual. The fact that the characteristics of the two upper molars and of the fourth upper premolar were before their comparison suggested to indicate the same type of animal, and that more careful study

shows the same relationship, gives every reason for considering these teeth as representing the same individual.

As a result of the study of the material secured in 1916 the form occurring at locality 3042 was tentatively referred to the Ursidae and was presumed to be a member of the *Indarctos-Hyaenarctos* group.

DESCRIPTION OF MATERIAL

Indarctos, near oregonensis Merriam, Stock and Moody

(Plate I)

Carnegie Inst. Wash. Pub. No. 347, pp. 65–66, fig. 17, 1925.

P4, as described by Merriam, Stock and Moody, resembles *Indarctos oregonensis* in its general characters, but differed in the somewhat smaller size of the protocone and in the different form of the parastyle. The tooth is also smaller and less massive than in the type of *I. oregonensis*. The parastyle in P4 of the type of *I. oregonensis* seems to have been more distinctly separated from the paracone and is probably more nearly conical in shape. With the discovery of the missing part of the protocone (deuterocone) in P4, the size of this cusp relative to the size of the tooth is seen to be quite comparable to that in the carnassial of *I. oregonensis*.

In other respects P4 in No. 22461 is distinctly of the type of *Indarctos oregonensis* and differs from *Arctotherium* in that the protocone (deuterocone) is situated in advance of the cleft between paracone and metacone, and its anterior border extends as far forward as the cleft between paracone and parastyle. In *Arctotherium* the protocone is situated much farther back and its anterior border reaches only slightly in advance of the cleft between paracone and metacone.

Of the two molar teeth found by Charles W. Merriam, M1 is of the *Hyaenarctos* type with high, relatively simple and laterally slightly compressed paracone and metacone and with simple protocone and hypocone. There is no division of the protocone or hypocone as in *Arctotherium* and there are no accessory tubercles in the middle of the occlusal surface. There is a faint tubercle on the cingulum in front of the paracone suggesting an incipient parastyle as in *Arctotherium*, but it is not more strongly marked than in certain other bears. The inner anterior border of the crown tends to make this end of the tooth rather angular and prominent, in which respect No. 22461 is like the California species of *Arctotherium*. M1 is 3-rooted as in *Arctotherium simum*. The largest root supports the inner side. Of the two outer roots that supporting the metacone is the larger.

M1 is narrower transversely than in any species of *Hyaenarctos* known to the writers. The dimensions are most nearly approached in *Indarctos* (*Hyaenarctos*) *punjabiensis* Lydekker. The proportions of M1 approach in some respects those of *Arctotherium haplodon* or of the corresponding tooth in *Tremarctos*.

M2 corresponds more nearly to the structure of *Indarctos oregonensis* than to any other of the forms in the *Hyaenarctos* group. It approaches in certain respects the characters of *Arctotherium*, especially in the size of the heel. On the whole, however, the characters are those of *Hyaenarctos* rather than of *Arctotherium* as indicated by the lower cusps and the absence of intermediary cusps or corrugations and the general simplicity of the occlusal surface of the tooth. M2 is 3-rooted, with the roots comparable in size to those in *I. oregonensis*. The two outer roots are separated slightly more than in the latter form.

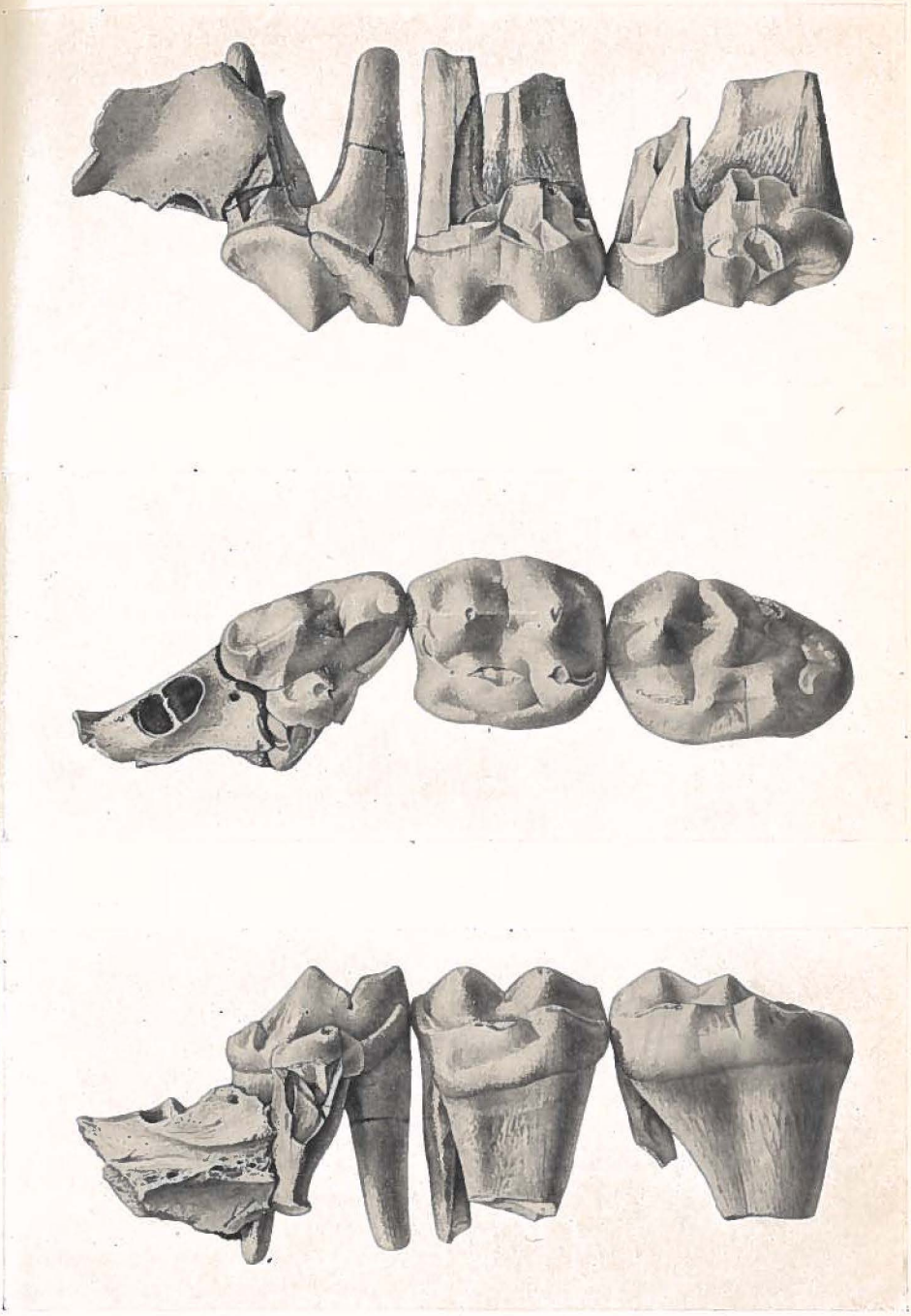
M2 is smaller than in the type of *Indarctos oregonensis*. It is also relatively narrower and the heel seems larger. M2 in No. 22461 may show a little less narrowing across the metacone than in the type of *Indarctos oregonensis*. The narrowing of the

heel region is also less marked in No. 22461 than in the type of *Indarctos oregonensis*. The development of the heel in No. 22461 approaches that of the arctotheres and of the fairly specialized bears of the *Ursus* group. The stage of development of this character is unlike that in any other member of the *Hyaenarctos* group. The only comparable form in this group of the old world is *Indarctos salmontanus* Pilgrim of the Salt Range.

No. 22461 represents an individual of the *Indarctos-Hyaenarctos* group. It is probably the most highly specialized member of the group thus far known.

Measurements of No. 22461

	mm.
P4, anteroposterior diameter measured along outer side	26.7
P4, width across protocone	19.3
P4, anteroposterior diameter of paracone at base	13
M1, greatest anteroposterior diameter	26.7
M1, greatest transverse diameter	22.9
M2, greatest anteroposterior diameter	32.4
M2, anterior end of tooth to posterior end of paracone	12.6
M2, anterior end of tooth to middle of metacone	17.4
M2, width of tooth across paracone (approximate)	23.6
M2, width of tooth across metacone	22



Indarctos, near *oregonensis*, Merriam, Stock and Moody. Superior teeth, No. 22461 U. C. C. Outer, occlusal and inner views, ×1.0. Rattlesnake Pliocene or Mascall Miocene, John Day Basin, eastern Oregon.