AN OREODONT OF MIOCENE AGE FROM SLIM BUTTES, HARDING COUNTY, SOUTH DAKOTA

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ABSTRACT:

The later Tertiary deposits of the Slim Buttes area have yielded relatively few fossils compared to the Oligocene and earlier strata. The lithostratigraphic unit that predominates the upper levels has generally been mapped as Arikaree (?) Formation and presumed to be of Miocene age, but evidence that could give a more detailed correlation is sparse. Presumably a detailed investigation of this unit could lead to a proposal of a local lithostratigraphic name, and associated paleontologic work could yield biostratigraphic and chronostratigraphic correlations.

One well-preserved mammalian fossil from this unit has recently been identified. It is a left dentary with essentially all premolars and molars, referable to *Merychyus* cf. *arenarum* Cope. This oreodont species is indicative of Hemingfordian (approximate Miocene) age.

Keywords

Oreodont, South Dakota, Miocene

INTRODUCTION

Many geologic investigations took place in the Slim Buttes area of northwestern South Dakota during the Twentieth Century. Economic evaluations, notably for coal, resulted in detailed mapping of Harding County and vicinity (Winchester et al.,1916; Denson et al., 1955; Moore and Gill,1955). Later studies focused on the wealth of vertebrate fossils that were found in the strata of Eocene and Oligocene ages (Bjork, 1967, Lillegraven, 1970). Overlying formations, generally mapped as Arikaree (?)Formation and presumably of later Tertiary age (Fig. 1), received little attention, inpart because prospecting in the upper levels had been relatively unproductive. Bjork (1967) noted only two fossils, both presumably Miocene, from the Arikaree (?) Formation in the entire region. There have been relatively few investigations in recent years, and it is to be hoped that the discovery of at least one significant specimen from these strata at Slim Buttes will revive interest in the area.

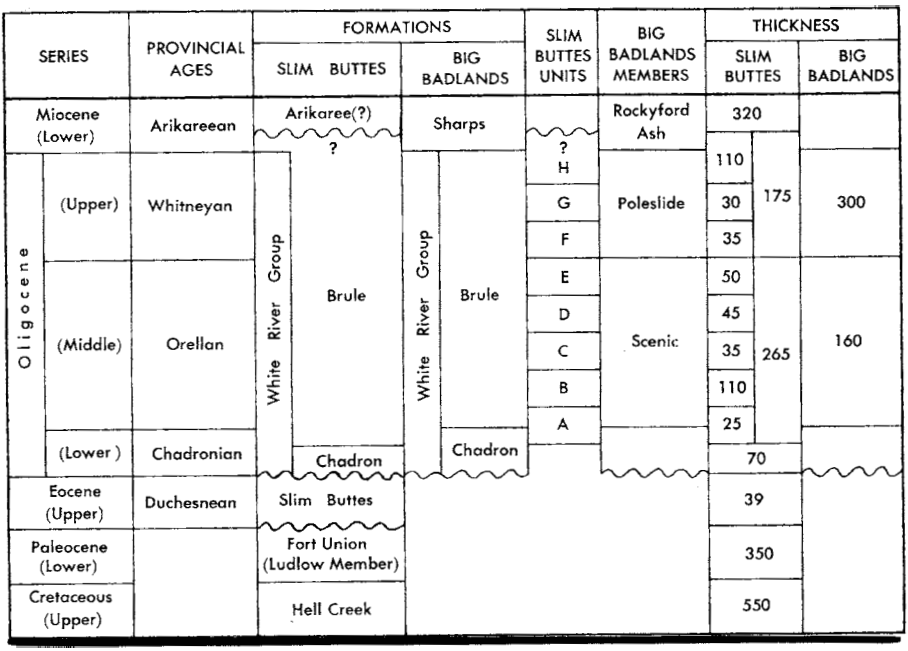

Figure 1. Stratigraphy of Slim Buttes and correlatives as established by Lillegraven (1970), with thicknesses in feet, standard usage then prevailing.

STUDY AREA AND METHODS

The readily accessible Summit Pass area was prospected during a brief expedition in 1988. This is within Township 16 North, Range 8 East, in the Irish Butte 7½ minute Quadrangle. (More specific locality data are on file with the South Dakota School of Mines and Technology and the New Jersey State Museum.) The Arikaree (?) Formation in this area consists of spectacular outcrops of white strata with substantial volcanic ash content. Fossils were collected by surface prospecting; no matrix was collected for microfaunal analysis, such as screening or washing. Fair numbers of bone fragments were found, although such identifiable items as teeth were relatively uncommon. It was hoped that prospecting would at least establish that the strata are bone-bearing, thus encouraging further investigations. Specimens found were prepared by simple physical removal of matrix and impregnation with preservatives. Identifications were made by comparison to museum collections and published literature.

RESULTS

The small collection obtained was sufficient to establish the formation as fossiliferous for permineralized bone. One mammalian specimen was sufficiently well-preserved and had enough diagnostic features to justify a more formal description. It cannot be considered sufficient to establish the age of the

formation, but it is somewhat indicative. We describe it herein, anticipating further evidence in collections to be made in the near future.

SYSTEMATIC PALEONTOLOGY

Order Artiodactyla
Family Merycoidodontidae
Subfamily Merychyinae Simpson 1945
Genus *Merychyus* Leidy 1858
Merychyus cf. *arenarum* Cope 1884

Referred specimen: SDSM 62682, major portion of left dentary with all four premolars and all three molars, excepting the posterior portion of the third molar (Figs. 2 and 3).Provenience: Arikaree (?) Formation near Summit Pass, Slim Buttes, Harding County, South Dakota. (Note previous discussion of study area.)

Description/Identification: Shultz and Falkenbach (1947) state that the dentary of *Merychyus* is characterized by "inferior border of ramus more or less straight, slight curve posterior of m3." and "dentition advanced brachyodont to subhypsodont" and by "symphysis prominent, posterior point below region of p3-p4".. These characters are not all observable in the specimen, in which the inferior border is broken away, but comparison of the dentition to previously referred specimens in various museum collections shows consistency with *Merychyus* material generally and the prominent symphysis is exactly as described.

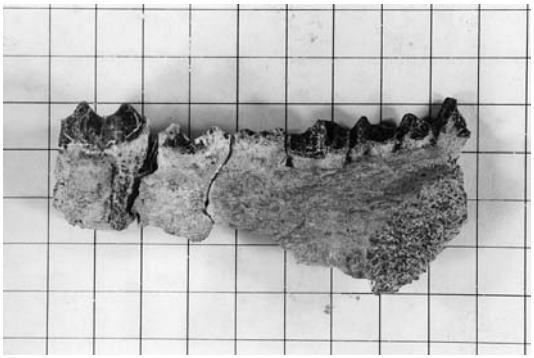

Figure 2. SDSM 62682. *Merychyus* cf. *arenarum* Cope. Left dentary, lingual aspect.

Figure 3. SDSM 62682. *Merychyus* cf. *arenarum* Cope. Left dentary, occlusal view.

We compared this specimen to type material of the type species of the genus, *Merychyus elegans* Leidy, at the United States

National Museum, with results as follows: Comparison to USNM 120 Cotype: Slim Buttes specimen very similar, but larger, the dentition differing mainly by size. The degree of hypsodonty is essentially the same. The third premolar is proportionately more elongate in the Slim Buttes specimen. The anterior crests are straight in both the second and third premolars; They curve lingually in USNM 120. There is also a small postero-lingual accessory crest in the third premolar of the Slim Buttes specimen, a feature absent from both left and right dentitions of USNM 120. The orientation of the premolars compares very closely, having an overlapping "shingled" appearance in occlusal view. The general similarity of the dentition is supplemented by overall similarity of the dentaries with the nutrient foramen beneath the third premolar in each case, and the symphysis very prominent (considered to be a diagnostic feature of the genus). The posterior margin of the symphysis is beneath the anterior edge of the fourth premolar in the Slim Buttes specimen, and slightly more posterior in USNM 120.

Comparison to USNM 121 Type: General similarity in overall shape of dentary and in degree of hypsodonty, however, the Slim Buttes specimen is slightly larger. The premolars are similarly overlapping in occlusal view. The third premolar is again proportionately shorter, with a slightly incurved anterior crest in USNM 121. There is an incipient auxiliary crest in USNM 121 which is more well-developed in the Slim Buttes specimen, but which was lacking in USNM 120, except for a tubercle. Measurements of the dentition in SDSM 62682 are: length p1-p4=37mm ;length p1-m3=85-90mm.

DISCUSSION AND CONCLUSIONS

Comparison of the Slim Buttes specimen SDSM 62682 to specimens of *Merychyus* leaves no doubt that the specimen belongs to that genus. Not only does the specimen conform to all diagnostic features of the genus, but the specimen differs very little from the type material of *Merychyus elegans* Leidy. However, it may be significantly larger than that species. The size range that we interpolate to be true of the dental measurements would fall within the range of *Merychyus arenarum* Cope. That species, originally described from Platte County, Wyoming, has been reported from various localities in the region. As we have not yet compared the specimen to the type material of that species, we refer it to *Merychyus* cf. *arenarum* Cope.

Regardless of what species may be represented, the genus is closely associated with the Hemingfordian Land Mammal Age, and suggests tentative correlation to that time. We recommend further prospecting and collecting in these later Tertiary strata in the Slim Buttes area in order to better establish age correlation and enable regional faunal comparisons. A local lithostratigraphic name may well be justified.

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