A New Pleistocene Fauna from Meade County, Kansas

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ABSTRACT: Notes on the occurrence of *Sorex cinereus* Kerr, *Mephitis mesomelas* Gray, *Taxidea taxus* Schreber, *Citellus richardsonii* (Sabine), *Citellus tridecemlineatus* (Mitchill), *Cynomys ludovicianus* Ord, *Geomys* sp., *Peromyscus* sp., and *Microtus pennsylvanicus* (Ord), from a new Pleistocene deposit in Meade county, Kansas.

INTRODUCTION

During the summer of 1939, while we were working in Meade county, Kansas, Mr. Kirk, county engineer, took us to an exposure where he had seen a number of bone fragments. From the deposit we succeeded in getting a number of vertebrates not previously reported from the Pleistocene fauna of Kansas. The locality is known as Meade County Locality No. 13. The fauna shall be known as the Jones Fauna.

A number of Pleistocene deposits have been studied during the past four years in southwestern Kansas. All of these deposits have yielded some fossil remains, either vertebrates or invertebrates. Much of the material has been fragmentary and from only a few exposures have any number of vertebrates been collected.

We have been unsuccessful to date in correlating most of the Pleistocene deposits in Meade county. The faunas so far found are sufficiently different to represent either a time interval or a different ecological niche within a given age. Until more complete faunas are found and their distribution better understood it seems best to treat each deposit separately. I shall make no attempt to correlate this fauna with any glacial or interglacial age until more evidence is at hand.

Meade County Locality No. 13 offers a good section of a phase of the Pleistocene in which occurs an abundance of invertebrates associated with a number of small vertebrates.

Section taken at Meade County Locality No. 13

		Feet
1.	Surface soil and loess	3.0
2.	Silt, sandy	5.5
3.	Sand, fine and thin bedded	.5
4.	Silt, sandy	5.0
5.	Sand, thin bedded, with high lime content, containing invertebrates and vertebrates (Jones Fauna)	1.0
6.	Clay, laminated, green to blue gray, contains fine sand	4.0
7.	Silt, fine sandy	4.5
8.	Clay (Camel limb bone)	1.5
9.	Stream sand	3.0
10.	Clay	2.0
11.	Stream sand	2.0
12.	Clay, grayish green	1.0
13.	Sand, medium thin bedded	1.0
14.	Clay, grayish green	2.0
15.	Sand, above unconformable contact (containing invertebrates)	2.0
16.	Clay, buff gray	2.0
17.	Clay, sandy, reddish brown to pink; contains pockets of rusty red sand	7.0
18.	Clay, sandy, reddish brown, with fine gravel, (dominantly lime nodules) at base	4.0
19.	Silt, sandy, dark gray, (soil zone) containing few gastropods	2.0
20.	Silt, fine sandy, red brown to pink gray with numerous irregular lime concretions	8.0

Base of section is the bottom of the stream bed in which was found in place part of an upper molar of *Equus,* No. 5490 KUMVP.

I wish to express my appreciation to the members of our field party, Mrs. Faye Hibbard, Joe Tihen, Ralph Taylor and George Rinker, who spent many hours of tedious work sorting the small fossils from the matrix; also to our laboratory assistant, Edna Mae McConnell, for carefully cleaning and sorting the specimens. I wish to thank Dr. W. H. Burt, curator of mammals, Museum of Zoölogy, University of Michigan, for the loan of recent comparative material used in this study. The drawings were made by Frances B. Watson.

JONES FAUNA

Invertebrates

Dr. Calvin Goodrich, curator of Mollusca, Museum of Zoölogy, University of Michigan, has kindly identified the invertebrates taken in association with the vertebrates from Zone 5 given in the section. Following is the list of invertebrates with remarks by Doctor Goodrich which appear in "The Nautilus," Vol. 53:77-79. 1940.

Gastrocopta armifera abbreviata (Sterki)
Gastrocopta procera (Gould)
Hawaiia minuscula (Binney)
Pupoides inornatus Vanatta
Pupoides marginatus (Say)
Pupilla muscorum (Linnaeus)
Vertigo modesta (Say)
Vertigo ovata (Say)
Vallonia costata (Müller)
Succinea grosvernori Lea
Gyraulus parvus (Say)
Helisoma lentum (Say)
Lymnaea bulimoides cockerelli Pilsbry and Ferriss
Lymnaea caperata Say
Lymnaea palustris (Müller)
Lymnaea stagnalis subsp.?
Musculium partumeium (Say)
Pisidium abditum Haldeman
Pisidium noveboracense Prime
Valvata tricarinata (Say)

"*H. lentum* has been put down as that species on the basis of identity with specimens at hand that have been so named. The shells would probably be called *H. trivolvis* if they occurred east of the Mississippi. All that remains of *L. stagnalis* are three or four whorls of as many spires. Whatever the fragments are, they belong to the *stagnalis* complex. Junius Henderson has reported subspecies *appressa* as occurring at Gunnison, Colo., and that is the locality for known living colonies which is nearest to the Meade county site. The occurrence here might seem to argue colder all-round-the-year waters in Pleistocene southwestern Kansas than in these days. *V. tricarinata* is still farther away from the present frontier of its range. The western edge of distribution is given by Mr. Frank C. Baker now as Iowa. The shells, fairly

plentiful in the Hibbard collection, would, I think, be pronounced typical although the carinae are noticably more developed than in shells from Delaware river, the type stream, with which they have been compared. The rest of the findings corresponds with the fauna of today so far as it is known."

CLASS PISCES

A number of vertebrae, spines and two pharyngeal bones with teeth were found associated with the other fossils.

CLASS AMPHIBIA

Approximately 20,000 skeletal elements of a salamander were taken, as well as limb bones and vertebrae of frogs and toads. These, with the reptile remains, are being studied by Dr. E. H. Taylor and Joe Tihen.

CLASS REPTILIA

A few vertebrae were recovered of snakes and lizards.

CLASS AVES

A number of bird remains were found. This material is very fragmentary.

CLASS MAMMALIA

But few mammal remains were recovered in comparison to those of the salamander. Those found were fragmentary and represent the small forms of the fauna.

ORDER INSECTIVORA

Sorex cinereus Kerr

(Plate I, fig. 1)

The genus *Sorex* was first recorded for Kansas from the Upper Pliocene of Meade county, Hibbard, Trans. Kan. Acad. Sci., 40:242. 1937. No species of *Sorex* is known to inhabit any part of the state at the present time. The nearest known range of *Sorex c. cinereus* to Kansas is central Colorado, while that of *Sorex c. haydeni* is northwestern Nebraska, in either case nearly 300 miles from Meade county, Kansas. The only shrew found to date in the recent fauna of Meade county is *Cryptotis parva.*

The fossil specimens have been carefuly compared with the different species of *Sorex* and agree in tooth pattern and measurements with those of *Sorex cinereus.* Following is given a description of the fossil specimens.

Specimens of *Sorex cinereus* recovered:

No. 5142. Part of a right lower jaw with M_1 and M_2.
No. 5143. Part of a left maxillary with P^4, M^1 and M^2.
No. 5144. Anterior part of skull with left P^4, M^1, M^2 and M^3 and right C, P^4, M^1, M^2 and M^3.
No. 5145. Part of right maxillary with M^1 and M^2.
No. 5146. Right lower jaw with M_1, M_2 and M_3.
No. 5147. Left lower jaw with M_1, M_2 and M_3.
No. 5148. Right lower jaw with I_3, P_4, M_1 and M_2.
No. 5149. Right lower jaw with M_1, M_2 and M_3.
No. 5150. Left lower jaw with chief incisor, P_4, M_1 and M_2.

From the known distribution of the *Sorex cinereus* group one would expect a slightly cooler and a more humid condition to exist in that region of Kansas at the time this shrew inhabited that area than exists there today.

ORDER CARNIVORA

FAMILY MUSTELIDAE

Mephitis mesomelas Gray

A right lower M_1, No. 5211 KUMVP, is referable to this species. The tooth is slightly larger than that of the specimens of *Mephitis mesomelas varians* with which it was compared.

Taxidea taxus (Schreber)

(Plate II, fig. 11)

In Zone 4 from the sandy silt approximately three feet above the other vertebrates was taken a left lower jaw; premaxillaries with incisors and the left maxillary with teeth, No. 5204 KUMVP, of a badger which seems to be identical with the species now living in Meade county.

ORDER RODENTIA

Citellus richardsonii group Howell 1938
Citellus richardsonii (Sabine)

(Plate I, figs. 5, 6)

Heretofore the larger *Citellus* from the Pleistocene of Kansas and Nebraska have been referred to *Citellus elegans*. A number of skeletal remains, including isolated teeth, limb bones, vertebrae, lower jaws and maxillaries, were found which cannot be distinguished from *Citellus elegans* (Kennicott). The specimen, No. 3958 KUMVP, reported by Hibbard, Trans. Kan. Acad. Sci. 40:233, 1937, taken from an old terrace of the Arkansas river in Finney county is indistinguishable from the Meade county specimens. Since Howell in his "Revision of the North American Ground Squirrels," N. A. F. No. 56, 1938, has placed *C. elegans* as a subspecies of *richardsonii*, our specimens will be considered as belonging to that species. It would help considerably in the interpretation of the fauna of southwestern Kansas if it were possible to know which subspecies or if both subspecies occupied that area. The presence of *Citellus r. elegans* would indicate the effect of mountain glaciation, while the presence of *Citellus r. richardsonii* could be accounted for by continental glaciation.

Measurements of specimens of *Citellus richardsonii* in millimeters:

	Length of P_4-M_3 alveolar	Depth of ramus in front of M_3
No. 5161—Right ramus with M_3	9.7	6.4
No. 5162—Left ramus with P_4, M_1	9.65	6.9
No. 5164—Left ramus with P_4, M_1	9.5	6.6
No. 5166—Left ramus with M_1, M_3	10.1	6.7

No. 5159—Right maxillary with P^4-M^3, alveolar length, 8.15.

Citellus tridecemlineatus (Mitchill)

(Plate I, figs. 2, 3)

A number of lower jaws, maxillaries and other skeletal elements were taken which are the same as the species now living in that area.

No. 5160—Left ramus with P_4, alveolar length..... 7.1 mm.
No. 5163—Right ramus with P_4-M_3, alveolar length..... 7.1 mm.
No. 5165—Right ramus with P_4, M_1, alveolar length..... 7.2 mm.
No. 5198—Left maxillary with P^4-M^3, alveolar length..... 7.0 mm.

Cynomys ludovicianus Ord.

(Plate I, fig. 4)

A part of a left ramus, No. 5203 KUMVP, bearing P_4, M_1 and M_2 of a "Prairie Dog" was recovered that compares with the species now found in western Kansas. No other remains were found belonging to this form.

Geomys sp.

A number of isolated molars and premolars, as well as a part of a maxillary with 2 teeth were recovered belonging to the above genus. The material is too fragmentary to warrant specific identification.

Peromyscus sp.

(Plate II, fig. 10)

A single specimen of the above genus was found, represented by a fragmentary right ramus bearing M_1, No. 5151 KUMVP, of a young adult. The specimen is intermediate in size between *Peromyscus maniculatus* and *Peromyscus leucopus* now found in western Kansas. Accessory cusps well developed on M_1.

Microtus pennsylvanicus (Ord)

(Plate II, figs. 7, 7a, 8, 9)

The *Pennsylvanicus* group is characterized by a posterior fifth loop to the middle upper molar, Bailey. N. A. F. No. 17, 1900.

The remains of this vole were the most abundant of any mammal found in the deposit. In comparison with those of the living forms, it seems identical with that of *Microtus p. drummondi* but also approaches closely that of *M. p. modestus* of Colorado. It is much smaller than the recent specimens of *Microtus p. pennsylvanicus* from Kennedy, Cherry county, Nebraska, with which it was compared (recent specimens in Museum of Zoölogy, University of Michigan). In the collection are a number of isolated incisors, molars, 29 lower jaws and 6 maxillaries. Measurement of the more complete specimens are given in millimeters.

	Length of M_1-M_3 alveolar
No. 5152—Part of right ramus, M_1, M_2, M_3	6.5
No. 5156—Nearly perfect left ramus M_1, M_2, M_3	6.5
No. 5158—Upper maxillaries, M^1, M^2, M^3	6.4

Discussion.—Due to the minor details upon which subspecies are based it is impossible to assign any fossil specimen to a subspecies with certainty. If skeletal characters are present in any fossil which warrant a description of a new form it should be considered, by all means, as indicating that of specific rank, for a subspecies described in fossils shows only individual variation

within a group, or, if valid differences, those differences cannot be considered on the basis with external characters and minor skeletal variations used at present in describing subspecies among living mammals.

The number of *Sorex cinereus, Citellus richardsonii* and *Microtus pennsylvanicus* remains found in the deposit indicates that these forms were once abundant and well established in a range considerably south and east of their present distribution. The fossils do not show any signs of stream transportation. The presence of *Mephitis mesomelas, Citellus tridecemlineatus* and *Cynomys ludovicianus* are found at present within the range of the above forms. The climatic conditions at the time these mammals lived in southwestern Kansas must be considered as being more humid and cooler than exists there today.

At present it is impossible to correlate the Jones fauna with any known Pleistocene fauna of Kansas because of the absence of the better known forms, such as *Equus*. We have not been successful in tracing the exposure across country to other pleistocene quarries.

PLATE I

FIG. 1. *Sorex cinereus* Kerr, left jaw, No. 5150 KUMVP. × 13.

FIG. 2. *Citellus tridecemlineatus* (Mitchill), right jaw, No. 5163 KUMVP. × 3.

FIG. 3. *Citellus tridecemlineatus* (Mitchill), right maxillary with P^4-M^3, No. 5198 KUMVP. × 3.

FIG. 4. *Cynomys ludovicianus* Ord, left jaw with P_4-M_2, No. 5203 KUMVP. × 2.

FIG. 5. *Citellus richardsonii* (Sabine), left maxillary with P^4-M^3, No. 5159 KUMVP. × 6.

FIG. 6. *Citellus richardsonii* (Sabine), left jaw, No. 5164 KUMVP. × 3.

PLATE I

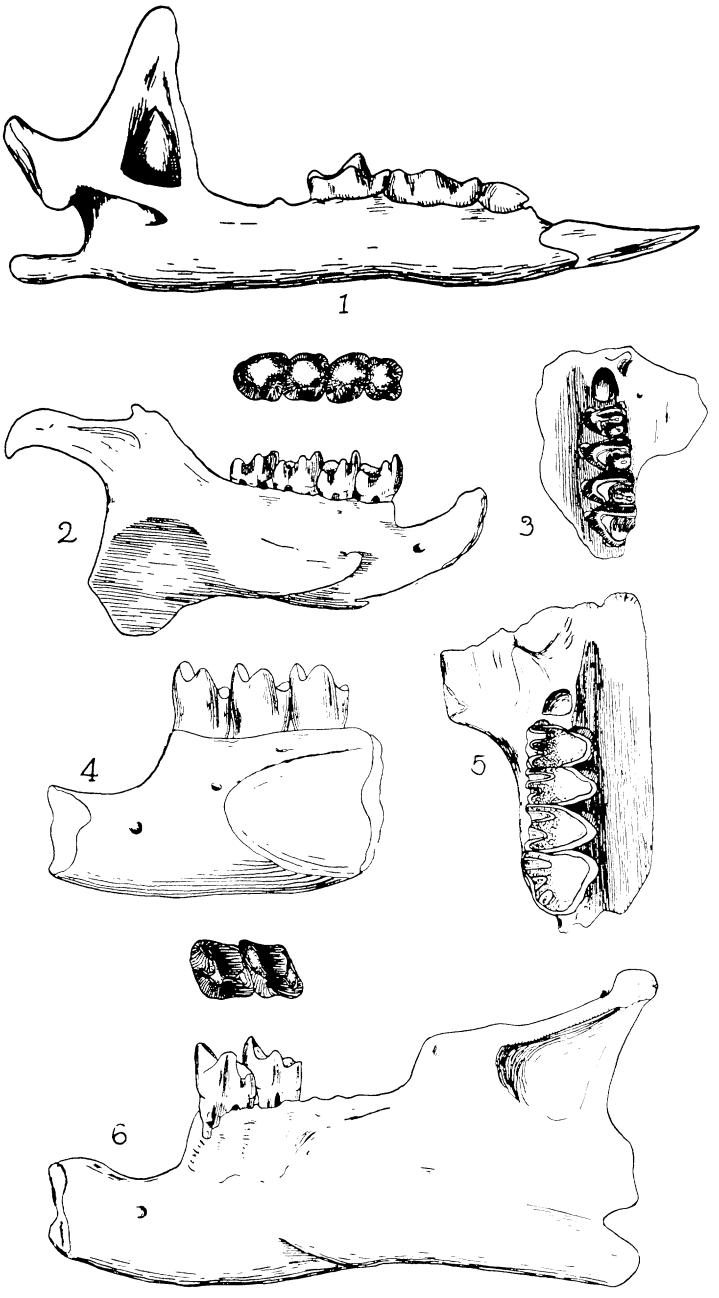

PLATE II

FIG. 7-7a. *Microtus pennsylvanicus* (Ord), crown view of upper teeth of maxillaries, No. 5158 KUMVP. × 10.

FIG. 8. *Microtus pennsylvanicus* (Ord), crown view of left M_1-M_3, No. 5156 KUMVP. × 10.

FIG. 9. *Microtus pennsylvanicus* (Ord), crown view of right M_1-M_3, No. 5152 KUMVP. × 10.

FIG. 10. *Peromyscus* sp., right jaw bearing M_1, No. 5151 KUMVP. × 8.

FIG. 11. *Taxidea taxus* (Schreber), left jaw, No. 5204 KUMVP. × 1.5.

PLATE II