PALEONTOLOGY

A LATE ILLINOIAN FAUNA FROM KANSAS
AND ITS CLIMATIC SIGNIFICANCE

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The University of Michigan
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The drainage by erosion of a large upland lake in the headwater region of Spring Creek during a torrential rainstorm laid bare new stratigraphic exposures along the north bank of Spring Creek on Big Springs ranch. One of these exposures, in SE\(\frac{1}{4}\) Sec. 14, T. 32 S., R. 29 W., contains numerous remains of mollusks. The molluscan faunule from this locality (UM-K4-53) was reported by Miller (1961). During the period from 1953 to 1960, 5 tons of fossil-bearing matrix was removed for washing to recover the contained fossils.

In the summer of 1957, while measuring a geologic section at "The Lookout" (Mt. Scott), I discovered near the base of this promontory a fossiliferous bed (UM-K2-59). The fossils were exposed in a deep cow track. It was not until the summer of 1959 that it was possible to open a quarry and remove fossil-bearing matrix from this site (UM-K2-59). The quarry is located in the SE\(\frac{1}{4}\) SE\(\frac{1}{4}\) Sec. 18, T. 32 S., R. 28 W., 1\(\frac{3}{4}\) miles downstream from locality UM-K4-53. During the summers of 1959 and 1960, 27 tons of matrix were removed from the quarry for washing. Etheridge (1961) published upon remains of a fossil glass lizard (*Ophisaurus*) recovered from the fossil concentrate. He named the fauna that was associated with the lizard the Mt. Scott local fauna.

In the summer of 1960 and 1961 a fossiliferous locality (UM-K1-60) in the SW\(\frac{1}{4}\) SW\(\frac{1}{4}\) Sec. 13, T. 32 S., R. 29 W. was worked for fossil remains. From this third locality 7 tons of matrix were removed. Locality UM-K1-60 is a short distance downstream from locality UM-K4-53 (Fig. 1).

The mammals recovered from these 3 localities are reported and are considered, on the basis of stratigraphic and taxonomic evidence, to belong to one fauna, the Mt. Scott local fauna.
Stratigraphy

The three fossil localities producing the Mt. Scott local fauna are located near the base of the Kingsdown formation on the Big Springs ranch. Hibbard and Taylor (1960) summarize the occurrence of the Kingsdown formation in Meade County. They state: "A late Yarmouth-early Illinoian erosional interval is implied by the presence of Illinoian sediments in valleys below the top of the Crooked Creek formation.** Sometime during this late Yarmouth-early Illinoian time ancestral Crooked Creek came into being, as a consequence of renewed movement along the Crooked Creek fault. The essentially unmodified surface of the Crooked Creek formation east of the fault, and the topographically low Illinoian sediments in the valleys west of it imply that the southwestward-flowing central part of the Crooked Creek dates from this time."

Miller (1961) gave a detailed description of the sediments at locality UM-K4-53. At this place the Kingsdown formation occurs in an old channel that had cut through the Crooked Creek formation and deep into the Ballard formation. The base of the Kingsdown formation is not exposed. Its depth below the bed of Spring Creek is unknown. The regional dip of the beds is slightly eastward toward the Crooked Creek fault. Most of the Kingsdown formation at this point has been removed by the development of the present valley of Spring Creek. There is a covered interval along the north bank of Spring Creek between the exposures of the Kingsdown formation at locality UM-K4-53 and locality UM-K1-60. The sediments at locality UM-K1-60 that contained the fossils consist of a lens of fine sand to sandy silt. The difference in the type of sediments between the two localities seems to be accounted for by local stream conditions at the time of deposition. Downstream from locality UM-K1-60 to Mt. Scott the Kingsdown formation has been removed mostly by erosion, buried by local collapse, or covered by slope wash, well back from the present north bank of Spring Creek. A short distance downstream from locality UM-K1-60 (Fig. 1, Mₐ), along the south bank of Spring Creek, is a good exposure of the Rexroad formation (Fig. 1, R₃) overlain by the Ballard formation.

East of the Rexroad exposure, downstream toward Mt. Scott, a basin was developed by a collapse or a series of collapses after the deposition of the Kingsdown formation. Mt. Scott appears to be part of a northeast wall of a local sink because upstream and on
the south side of Spring Creek a well-exposed bluff of the Ballard formation plunges steeply below the stream bed toward Crooked Creek. Between the dipping beds of the Ballard formation and Mt. Scott large springs occur in the bed of the present stream.

Fig. 1. Index map of Mt. Scott fossil localities and other fossil localities on the Big Springs Ranch, Meade County, Kansas. Abbreviations: C1 and C2, Cudahy fauna; CQ1, CQ2-3 and CQ4, Cragin Quarry local fauna; M1 (loc. UM-K2-59), M2 (UM-K4-33), and M3 (UM-K1-60), Mt. Scott local fauna; S1 and S2, Sanders local fauna; R1 and R2, Rexroad local fauna.

The quarry at the base of Mt. Scott (UM-K2-59) is located in the Kingsdown formation approximately 56½ feet below the caliche that caps the exposure (Hibbard and Taylor, 1960, fig. 3, and pl. 16, fig. 2). The fossils occur in a greenish-gray, sandy silt. An auger hole was put down to a depth of 93 inches in the quarry floor. The
first 31 inches consisted of a blue-gray sandy silt followed by 22 inches of coarse yellow to gray sand. This was followed by 40 inches of blue-green to reddish sandy silt. At the depth of 93 inches a caliche was encountered in a sandy silt, and it was not possible to auger to a greater depth. These lower beds are not exposed. A short way downstream is a small exposure of the Ballard formation at approximately the level to which we augered. It appears that the Kingsdown formation rests on the Ballard formation at the Mt. Scott locality.

Mt. Scott Local Fauna

The fauna comprised of invertebrates and vertebrates was taken with remains of hackberry seeds (Celtis) from very limited areas along the north bank of Spring Creek on the Big Springs ranch (Fig. 1, M1, M9, and M3).

Many samples of matrix have been taken for pollen analysis. These are being studied by Ronald O. Kapp.

Phylum Mollusca

The mollusks of this fauna are being studied by Barry B. Miller. Miller (1961) reported 30 genera and 53 species collected at locality UM-K4-53, one of the three localities from which the fauna has been recovered.

Phylum Arthropoda

The ostracods taken in association with other members of the fauna are being reported by Edwin D. Gutentag.

Faunal list of vertebrates reported from the Mt. Scott local fauna:

Class Amphibia

Order Salientia

*Bufo* sp., toad

*?Acris* sp.

*Rana pipiens* Schreber, leopard frog

Class Reptilia

Order Chelonia

*Terrapene llanensis* Oelrich, plains box turtle

Order Squamata

*Ophisaurus attenuatus* Baird, glass lizard
Class Mammalia

Order Insectivora
- *Sorex cinereus* Kerr, masked shrew
- *S. arcticus* Kerr, arctic shrew
- *S. palustris* Richardson, northern water shrew
- *Blarina b. carolinensis* (Bachman), southern shorttail shrew
- *Cryptotis parva* (Say), least shrew

Order Chiroptera
- *Lasius cinereus* (Beauvois), hoary bat

Order Rodentia
- *Cynomys* sp., prairie dog
- *Citellus* cf. *C. tridecemlineatus* (Mitchill), ground squirrel
- *C. sp.*, ground squirrel
- *Geomys* sp., pocket gopher
- *Paradipoides* or *Castor* sp., beaver
- *Reithrodontomys* sp., harvest mouse
- *Peromyscus berendsensis* Starrett, deer mouse
- *P. progressus* Hibbard, plains deer mouse
- *P. sp.*, mouse
- *Neotoma* cf. *N. floridana* (Ord), packrat
- *Oryzomys* fossilis Hibbard, fossil rice rat
- *Synaptomys australis* Simpson, Simpson’s bog lemming
- *Ondatra* zibethica Linnaeus, muskrat
- *Microtus pennsylvanicus* (Ord), meadow vole
- *Pedomys ochrogaster* (Wagner), prairie vole
- *Zapus hudsonius* (Zimmermann), meadow jumping mouse

Order Carnivora
- *Mustela vison* Schreber, mink

Order Lagomorpha
- *Sylvilagus* sp., cottontail rabbit
- *Lepus* sp., hare

Order Artiodactyla
- *Bison* cf. *B. latifrons* (Harlan), giant bison

*Age and correlation.*—The Mt. Scott local fauna underlies the Cragin Quarry local fauna of Sangamon age (Hibbard and Taylor, 1960, p. 32). Ecological inferences from the Mt. Scott fauna suggest that it lived in a climate with winters warmer than at the time the Illinoian Doby Springs, and Berends local faunas lived. The
Mt. Scott fauna lived in a climate considerably different from that in which the Cragin Quarry local fauna lived (Hibbard and Taylor, 1960, p. 37) and in a climate different from that of southwestern Kansas today.

The extant mammals of the Doby Springs and Berends local faunas (Stephens, 1960; Starrett, 1956) of markedly northern forms are considered to have lived in that region during colder winters than the Mt. Scott local fauna and therefore may have occupied the region at the time of maximum Illinoian glaciation. Hibbard and Taylor (1960, p. 47) considered the Butler Spring local fauna as late Illinoian. The microvertebrates needed to correlate this fauna with either the colder Doby Springs and Berends local faunas or with the slightly warmer (late Illinoian) Mt. Scott fauna are lacking. The placement of the Butler Spring fauna in its proper time sequence must await the recovery of certain microvertebrates unless the comparative study of the molluscan faunas can date this fauna more precisely.

A late Illinoian age is indicated for the Mt. Scott local fauna by the inferences of the climate under which it lived and by the population shifts that occurred in the region between the time the Doby Springs local fauna inhabited the area and the time the Mt. Scott local fauna lived there.

Environment.—Inferences about the conditions under which the Mt. Scott local fauna lived can be derived from the sediments containing the fossils, and the fossils, as well as from the habitats of Recent species represented also as fossils, or of their close living relatives.

The local habitat in which the fauna lived was a valley nearly as deep as that of the present Spring Creek valley through which flowed a perennial stream of cool water. This stream and valley were tributary to the ancestral Crooked Creek. The fossil locality UM-K2-59 (Fig. 1, M₁) is located approximately 2 miles from where the present Spring Creek empties into Crooked Creek. From all physical evidence this late Illinoian stream was not more than 12 miles in length. The entrenchment of this Illinoian stream upon the upland surface (Crooked Creek formation) cut through the Stump Arroyo sands and gravels, a large aquifer, which would have furnished abundant cool water for the local stream for a long time. Furthermore, at locality UM-K4-53 (Fig. 1, M₂) this stream
A Late Illinoian Fauna from Kansas

COMPARISON OF SIX LATE PLEISTOCENE VERTEBRATE FAUNAS FROM SOUTHWESTERN KANSAS AND WESTERN OKLAHOMA

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<tr>
<th></th>
<th>Dolby Springs</th>
<th>Berends</th>
<th>Butler Spring</th>
<th>Mt. Scott</th>
<th>Craig Quarry</th>
<th>Jinglebob</th>
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<td>Terrapene illanensis Oelrich</td>
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<tr>
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had entrenched into the top of the Angell member (sand and gravel) (see Hibbard, 1958). Without doubt, local springs along the valley walls contributed greatly to the constant supply of cool water in the stream. There is no evidence that boil springs (artesian) existed at that time, as are now found in the lower part of Spring Creek, or at the Cragin Quarry site during Sangamon time. The presence of gar (*Lepisosteus*), muskellunge (*Esox masquinongy* Mitchell), and yellow perch (*Perca flavescens* Mitchell) indicates a fair-sized pool of clear cool water (C. L. Smith, 1954 and 1958, and G. R. Smith, in press). I have been unable to find any evidence of a collapse along the valley floor which would at that time have provided a small lake along the course of the stream. The pool or pools of water that furnished the habitat for these fishes were probably provided by beaver dams.

The presence of *Sorex cinereus*, *S. arcticus*, *Oryzomys fossilis*, and *Synaptomys australis* indicates a marshy habitat along part of the valley floor. *Blarina b. carolinensis* indicates the presence of some trees and shrubs, with the development of a humus and litter cover. *Zapus hudsonius* indicates some trees and shrubs as well as tall grasses. The meadow vole, *Microtus pennsylvanicus*, and the giant bison, *Bison cf. B. latifrons*, indicate areas of tall grasses. *Cryptotis parva* and *Pedomys ochrogaster* would be expected to inhabit the drier grass slopes of the valley and the nearby upland surface.

Miller (1961), after a study of the mollusks from locality UM-K4-53, concluded that there was a small permanent stream of the same approximate size as the present Spring Creek; also, there would have been a temporary water situation, perhaps a slough or temporary pond located on the flood plain of the stream, with a woodland habitat near the stream.

**Climate.**—Conclusions about the climate in which the Mt. Scott local fauna lived are derived chiefly from the present distribution of living species represented in the fauna and from the habitat in which they live. Each major group of the fauna when analyzed separately gives a slightly different interpretation. No group is antagonistic to the other, and each clearly indicates that the climate at the time the Mt. Scott local fauna lived was markedly different from that for the same region today.

The Mt. Scott local fauna is considered to have lived in the
Meade County area when winter temperatures were not so low as those proposed by Hibbard and Taylor (1960) for the Butler Spring local fauna or by Stephens (1960) for the Doby Springs local fauna. I consider the winter temperatures to have been like those at the present in southern New Jersey, with cool summers as found at present in southeastern Wisconsin and northern New Jersey. The climate is considered to have been moist subhumid as defined by Thornthwaite (1948), and the region to have received from 20 to 25 inches of rainfall, which fell chiefly in the warmer part of the year.

Miller (1961), from a study of the mollusks at locality UM-K4-53, concluded that the climate at the time the mollusks lived was similar to that which now occurs in eastern South Dakota and extreme northeastern Nebraska.

Etheridge (1961) concluded, from the study of the occurrences of the fossil *Ophisaurus attenuatus*, that the present climate is somewhat drier in Meade County than anywhere within the modern range of the species and that the presence of fossil *O. attenuatus* in these areas may, however, indicate more mesic paleo-climates during the periods in which they occurred there.

Climatic significance of faunal elements.—*Sorex cinereus*, *S. arcticus*, *S. palustris*, and *Microtus pennsylvanicus* are all northern elements of the present-day fauna. None of these is living in Kansas at the present. *S. arcticus* and *S. palustris* may have been members of relic populations that had held on in the area due to a favorable microenvironment. *Blarina brevicauda* and *Zapus hudsonius* are now found to the east and north of southwestern Kansas.

It should be noted that at the time the Doby Springs local fauna lived in Harper County, Oklahoma, approximately 45 miles southeast of the Mt. Scott faunal sites, *Blarina b. brevicauda*, the northern subspecies, was associated with the above 4 mammals.

The climate in the region moderated sufficiently after the Doby Springs fauna lived, and by the time the Mt. Scott fauna occupied the area, so that the northern subspecies of *Blarina* had shifted out of the region and the southern subspecies, *Blarina b. carolinensis*, had spread northward into the area. *Cryptotis parva* (the only shrew now living in Meade County), the rice rat, and the large *Terrapene ilanensis* also moved northward into the region with *Blarina b. carolinensis*. The rice rat was first reported from this
region as a member of the Jinglebob local fauna of late Sangamon age. It is a southern element of our Recent fauna and is confined chiefly to a marshy habitat. The fossil box turtle is a close relative of *T. carolina major* whose geographical range is restricted to the Gulf Coastal Plain from eastern Texas to western Florida (Conant, 1958, map 28).

Here is evidence, for the first time supported by stratigraphic control (Cragin Quarry fauna) and population shifts within the Illinoian, that demonstrates the climatic change in a given region from the Illinoian to the Sangamon.

**DESCRIPTION OF VERTEBRATE FOSSILS**

**PHYLUM VERTEBRATA**

**CLASS OSTEICHTHYES**

Gerald R. Smith (1963) has a manuscript in press on the fish remains. It is the largest Pleistocene fish fauna recovered from that region. This fauna contains a number of new fossil records.

**CLASS AMPHIBIA**

A number of fragmentary skeletal elements were recovered from the three localities. These have been examined by Joe A. Tihen. Most of the *Rana* specimens were consistent with identification as *R. pipiens*. Two specimens were decidedly larger than *R. pipiens* and might be referable to *R. catesbeiana*. A few limb elements were those of a small hylid that are probably referable to *Acris*. Parts of a *Bufo* skeleton were taken but lack specific characters.

**CLASS REPTILIA**

The remains of pond and river turtles and those of the snakes have not been studied.

**ORDER CHELONIA**

**FAMILY EMYDIDAE**

*Terrapene llanensis* Oelrich

*Geologic range*—Illinoian and Sangamon.

*Distribution*—Mt. Scott, Cragin Quarry, and Jinglebob local faunas of southwestern Kansas and Slaton local fauna of western Texas.
Material.—Mt. Scott (locality UM-K2-59), No. 43734, part of a plastron.

Remarks.—The fragments recovered are from one individual box turtle slightly larger than the specimen from the Cragin Quarry.

ORDER SQUAMATA
FAMILY ANGUIDAE
Ophisaurus attenuatus Baird

Geologic range.—Upper Pliocene to Recent.

Distribution.—The fossil localities from which this slender glass lizard have been taken are some distance west of the western limit of this species (Etheridge, 1961, fig. 2). The present distribution is from Virginia to Florida, west to eastern Texas, north to southeastern Kansas, and then northeast to southeastern Wisconsin (Conant, 1958, map 74).

Occurrence.—Mt. Scott local fauna, localities UM-K2-59 and UM-K1-60.

Material.—Locality UM-K2-59, No. 43902, one body vertebra; Nos. 41238 and 43793, 2 body vertebrae; locality UM-K1-60, No. 44373, 1 body vertebra.

Remarks.—These specimens have been identified by Richard Etheridge. Specimen No. 44373 was recovered during the summer of 1961.

CLASS AVES
The few remains of birds are being studied by Pierce Brodkorb.

CLASS MAMMALIA
ORDER INSECTIVORA
FAMILY SORICIDAE
Sorex cinereus Kerr
(Fig. 2A-B)

Geologic range.—Kansan (Cudahy fauna) to Recent.

Distribution.—In the High Plains Region the masked shrew ranges southward into northern Nebraska (see Burt, 1952, p. 5 for map showing present distribution). Most of the fossil records are from the southern High Plains, south of its present range.
A Late Illinoian Fauna from Kansas

Habitat.—"The cinereous shrew prefers a moist or damp but not necessarily watery habitat, preferably in woods either coniferous or deciduous, or sometimes marshy or grassy bogs, such as damp mossy woods, spruce-cedar swamps, alder thickets along brooks, mossy banks, and spruce, tamarack, or leather-leaf sphagnum bogs, and rarely found in dry woods or even fields," (Jackson, 1961, p. 29).

Occurrence.—Mt. Scott local fauna, localities UM-K4-53 and UM-K2-59.

Material.—Locality UM-K4-53, No. 41215, left jaw, P$_4$-M$_2$ and No. 44590, part of right maxillary, M$_1$-M$_3$. Locality UM-K2-59, No. 43819, left maxillary, P$_1$-M$_2$; No. 43821, left jaw, M$_1$-M$_3$; No. 43822, right jaw M$_1$-M$_3$; No. 43823, parts of 5 lower jaws, 2 left, M$_1$ and M$_2$, one left, M$_2$-M$_3$, one right with M$_1$ and M$_2$, and a right with M$_2$ and M$_3$. No. 41234, a right jaw, with P$_4$-M$_3$ (Fig. 2B).

Remarks.—The specimens compare in size with those of Sorex cinereus from the Doby Springs, Berends, and Jinglebob local faunas. The anteroposterior crown length of P$_4$-M$_3$ (No. 41234) is 4.0 mm.

Sorex arcticus Kerr
(Fig. 2D)

Geologic range.—Illinoian to Recent.

Distribution.—The fossil records from Harper County, Oklahoma, and Meade County, Kansas, are far south of its present range, which is from the southwest corner of the Northwest Territory to southeastern Wisconsin, and northeast to Quebec and Nova Scotia (Burt, 1952, p. 12).

Habitat.—Jackson (1961, p. 35) says, "this shrew is found chiefly in wet spruce, and tamarack swamps, or in alder or willow marshes; it rarely occurs in more or less open leather-leaf sphagnum bogs."

Occurrence.—Mt. Scott local fauna, locality UM-K2-59.

Material.—Part of right jaw, P$_4$-M$_3$, No. 43818 (Fig. 2D).

Remarks.—The teeth agree in shape and size with those of the arctic shrew taken in the Doby Springs local fauna (Stephens, 1960, p. 1687) and with Recent specimens from North Dakota.
Sorex palustris Richardson
(Fig. 2E and G)

Geologic range.—Illinoian to Recent.

Distribution.—Present distribution is from the extreme southeastern tip of Alaska south into California and northeastern New Mexico, east across Canada to Quebec and Nova Scotia, and south into Wisconsin and New York (Burt, 1952, p. 12). The fossil specimens from Harper County, Oklahoma, and Meade County, Kansas, are well east of its present southern range in the Rocky Mountains.

Habitat.—"This species, being near aquatic or at least amphibious, inhabits marshes, bogs, and wet areas near the borders of streams, lakes, or water-holes. It frequently inhabits beaver and muskrat houses, particularly in winter. It seems to prefer a more or less wooded habitat, and is rarely found in marshes devoid of bushes or trees" (Jackson, 1961, p. 38).

Occurrence.—Mt. Scott local fauna, locality UM-K2-59.

Material.—Part of left jaw with M1-M3, No. 41235.

Remarks.—The dentition and lower jaw (Fig. 2G) are like those of the northern water shrews from the Doby Springs local fauna. Like Sorex arcticus it appears to be a rare member of the fauna. Probably both species were members of a southern plains peripheral population at the time the Mt. Scott fauna inhabited the region.

Blarina b. carolinensis (Bachman)
(Figs. 2F and H; 3B)

Geologic range.—Kansan? to Recent.

Distribution.—The fossil records of the short-tailed shrew are found from Pennsylvania south to Florida and west to northwestern Oklahoma. The present distribution of the Recent species is from southeastern Canada, south to Florida, west to the southeastern edge of Texas, and northwest to the southeast corner of Saskatchewan (Burt, 1952, p. 12). Many of the fossil records have been taken west of its present range.

Habitat.—This shrew is found in moist soils with humus which is covered with leaves or other litter. The western records are from moist stream valleys that support some trees and shrubs.
Occurrence.—Mt. Scott local fauna, localities UM-K4-53, UM-K2-59, and UM-K1-60.

Material.—Locality UM-K4-53: associated lower jaws, right maxillary and part of left maxillary No. 44591. Locality UM-K2-59: No. 41233, parts of 3 right lower jaws, 1 with 1-M1, another with M1-M2, the third without teeth, and a left maxillary with P4-M1; Nos. 43804-43812 are parts of 8 right and 11 left lower jaws varying from No. 43808 with a complete dentition, to 3 jaws without teeth; Nos. 43813-43815, fragments of 5 right and 5 left maxillaries, each bearing from 1 to 3 teeth. Locality UM-K1-60: No. 37751, right jaw, M1-M3, and No. 44600, left jaw, M1-M3.

Remarks.—In 11 jaws the anteroposterior length of M1-M3 varies from 4.75 mm to 5.0 mm, with an average of 4.85 mm. The anteroposterior length of C-M3 in 2 specimens is 6.3 mm and 6.5 mm. The anteroposterior length of P4-M2 in 2 maxillaries is 5.0 mm and 5.25 mm. The anteroposterior length of M1-M3 in 2 specimens is 3.85 mm and 4.0 mm.

The teeth are like those in Blarina b. carolinensis, and the heel of M1 (Fig. 3B) is reduced as in the southern form and not so broad as in specimens of the larger B. b. brevicauda. The third and fourth upper unicuspids are not so flat as in B. b. brevicauda.

Whether or not it is correct to use the Recent subspecific names for the fossil populations recovered from the Illinoian deposits of this region, there occurred in this region two distinct Blarina populations during the Illinoian. The Blarina that are associated with the colder phase of the Illinoian glaciation and lived in the region at the time of the Doby Springs and Berends local faunas are large like the specimen of B. fossilis Hibbard from the Rezabek local fauna, and compare in size with very large B. b. brevicauda from the north. The specimens of Blarina recovered from the Mt. Scott local fauna, of late Illinoian age, which underlies the Cragin Quarry local fauna (Sangamon), are distinct from the large species or subspecies that inhabited the region during earlier Illinoian time. In size and dental characters these smaller Blarina show a close relationship to the Recent Blarina named B. b. carolinensis. For that reason I have assigned them to carolinensis to show that this population is distinct from the earlier Illinoian population. Whether one should use Recent subspecific names for these fossil populations
or assign new names to them is not so important as the fact that there was a population shift from a large *Blarina* to a smaller *Blarina* in that region during this interval of time.

![Diagram of *Cryptotis parva* and *Blarina* jaws]


*Cryptotis parva* (Say)
(Figs. 2C and 3A)

**Geologic range.**—Illinoian to Recent.

**Distribution.**—The present range is from southern New York west to southeastern Wisconsin and southwest to extreme eastern Colorado and then southeast and east to the Gulf and Atlantic...
Coast (Burt, 1952, p. 12, and Jackson, 1961, p. 57). The previous fossil records of this species have been from Wisconsin deposits in the southern part of its present range.

Habitat.—Dry grassy areas in association with *Peromyscus maniculatus* (Wagner). In the southwestern part of its range it occurs in the moist grasslands along streams and around springs (Hibbard and Rinker, 1942).

Occurrence.—Mt. Scott local fauna, localities UM-K2-59 and UM-K1-60.

Material.—Locality UM-K2-59: part of right jaw, $M_1$ and $M_2$, No. 41236; right jaw, I and $M_1$-$M_3$, No. 43802 (Fig. 3A); left jaw, $M_1$-$M_3$, No. 43803; part of right jaw, $P_4$-$M_3$, No. 43817; part of right jaw, $P_4$ and $M_3$ and left maxillary, $M_1$ and $M_2$, No. 43820. Locality UM-K1-60: part of right jaw, $P_4$-$M_3$, No. 44601.

Remarks.—This is the first record of the least shrew from the Pleistocene in Kansas. Parts of 5 individuals were recovered. The crown length of the $P_4$-$M_3$ in the 2 dental series are 4.20 mm and 4.25 mm. The crown length of $M_1$-$M_3$ of the 4 specimens is 3.50 mm, 3.65 mm, 3.70 mm, and 3.70 mm. The heel on $M_3$ is reduced as in Recent specimens of *Cryptotis parva*. This is the only shrew now living in Meade County. It is confined chiefly to the tall grasses in the moister habitats along the valleys. It is of interest that this shrew was later replaced at least in part by *Notiosorex crawfordi* (Coues) during part of the Sangamon at the time the Cragin Quarry fauna occupied the region.

*Lasiurus cinereus* (Beauvois)

Geologic range.—Late Illinoian to Recent.

Distribution.—Boreal North America from the Atlantic to the Pacific, breeding as far south as Pratt, Kansas, but migrating southward at least to Central Chihuahua (Miller and Kellogg, 1955, p. 106).

Habitat.—This large tree-dwelling bat inhabits chiefly the broadleaf forests, but it also occurs along wooded streams, in cities with wooded parks, and in western Kansas in groves of large cottonwoods wherever an open water supply is available.

Occurrence.—Mt. Scott local fauna, locality UM-K2-59.
Material.—No. 41232, anterior part of a left jaw bearing alveoli for I-M₂.

Remarks.—The jaw is the size of that of the hoary bat. The foramina in the jaw agree in size and position with those of Lasiurus cinereus. The P₄ was single-rooted, which distinguishes the jaw from that of Eptesicus, which has a P₄ with two roots.

ORDER RODENTIA

FAMILY SCIURIDAE

Cynomys sp.

Occurrence.—Mt. Scott local fauna, locality UM-K2-59.

Material.—No. 43786, an RP₄ or M₁.

Remarks.—The tooth is from a prairie dog smaller than Cynomys ludovicianus Ord and near the size of C. vespertinus Hibbard.

Citellus cf. C. tridecemlineatus (Mitchell)

Geologic range.—Illinoian to Recent.

Distribution.—Central United States north into Canada (Burt, 1952, p. 68).

Habitat.—Dry grasslands.

Occurrence.—Mt. Scott local fauna, locality UM-K2-59.

Material.—No. 43954, 6 isolated teeth.

Citellus sp.

Occurrence.—Mt. Scott local fauna, localities UM-K2-59 and UM-K1-60.

Material.—Locality UM-K2-59, 1 upper and 1 lower molar (No. 43787), and No. 36294, an RM₂. Locality UM-K1-60, 3 lower molars, No. 44608.

Remarks.—The characters of the teeth are more like those of Citellus franklini (Sabine) than like those of C. richardsoni (Sabine).
Family Geomyidae

*Geomys* sp.

**Occurrence.**—Mt. Scott local fauna, localities UM-K4-53 and UM-K2-59.

**Material.**—Locality UM-K2-59, parts of 3 upper incisors and 5 lower premolars and molars, No. 43737. Locality UM-K4-53, 2 upper teeth, an RM³ and LM³, No. 41226.

**Remarks.**—The teeth are either those of a small species of pocket gopher or from young individuals.

Family Castoridae

*Protorodipoides* or *Castor* sp.

**Occurrence.**—Mt. Scott local fauna, locality UM-K1-60.

**Material.**—A nearly complete ulna (No. 44613) of a small beaver.

**Remarks.**—The ulna is the size of a small *Castor canadensis* Kuhl. The small beavers are not well known from the late Pleistocene of this area. Both *Protorodipoides* and *Castor* are members of the Berends fauna. The latter is known from an LM¹ (No. 44641) taken in the summer of 1959. The skeleton of *Protorodipoides* is unknown, but the lower jaw (holotype) is the size of a small *Castor*; therefore, the ulna may belong to either genus of beaver.

*Reithrodontomys* sp.

(Fig. 4G)

**Occurrence.**—Mt. Scott local fauna, localities UM-K2-59 and UM-K1-60.

**Material.**—Nos. 41247, 43847, and 43947, parts of 2 right lower jaws, 1 with M₂ and M₃, and the other with M₂; a left lower jaw with M₂; also, parts of 3 right maxillaries, 1 with M¹-M₃, all from locality UM-K2-59. No. 44619, part of a right jaw with M₂ and M₃, and a right maxillary with M¹ and M² from locality UM-K1-60.

**Remarks.**—The specimens are quite fragmentary. Most of the teeth are well worn but 2 of the lower jaws which contain M₂ are of young adult specimens. These 2 teeth have a distinct shelf that extends from the anterolophid to the hypoconid (Fig. 4G). This
character was not present in the teeth of harvest mice from the Cragin Quarry fauna. The specimens seem to represent individuals from a distinct population. This shelf occurs in *Reithrodontomys humulis* (Audubon and Bachman) and *R. burti* Benson. The cusps are like those of *R. montanus* Baird, though the teeth have styles and stylids as observed more commonly in specimens of *R. megalotis* (Baird).

*Peromyscus berendsensis* Starrett

(Fig. 4C)

**Geologic range.**—Illinoian (Berends and Mt. Scott local faunas).

**Distribution.**—Known only from Beaver County, Oklahoma, and Meade County, Kansas.

**Habitat.**—Unknown, probably an upland form.

**Occurrence.**—Mt. Scott local fauna, localities UM-K4-53 and UM-K2-59.

**Material.**—No. 41224, locality UM-K4-53, part of left jaw with M₁; and No. 41244, part of right lower jaw with M₁-M₃ (loc. UM-K2-59).

**Remarks.**—The specimens are larger than *Peromyscus cragini* Hibbard from the Cudahy fauna and smaller than *P. progressus* Hibbard from the Cragin Quarry fauna. M₁ of the above specimens agrees in size and shape with *P. berendsensis*. Specimen No. 41244 has a small mesolophid between the metaconid and entoconid of M₁ and M₂. A broad valley separates the protoconid and hypoconid of M₁, M₂ and M₃ (Fig. 4C). The anteroposterior length of M₁-M₃ is 3.55 mm. M₁ of specimen No. 41224 lacks the mesolophid. In both specimens the teeth are narrower than those of *P. progressus*.

*Peromyscus progressus* Hibbard

(Fig. 4A)

**Geologic range.**—Late Illinoian and Sangamon.

**Distribution.**—Known only from Meade County, Kansas.

**Occurrence.**—Mt. Scott local fauna, localities UM-K4-53, UM-K2-59, and UM-K1-60.

**Material.**—Locality UM-K4-53, part of a left jaw with M₁ (No. 43949). Locality UM-K2-59, parts of 5 left jaws with M₁, or M₁-M₂.
and 1 specimen with $M_2$-$M_3$, and parts of 8 right jaws $M_1$, or $M_1$ and $M_2$ (Nos. 41245, 43790, 43839-43845). Locality UM-K1-60, part of a right jaw with $M_2$-$M_3$ (No. 44620).

Remarks.—6 of the above jaws contain $M_1$, or $M_1$ and $M_2$, without mesolophid, mesostylid, ectolophid, and ectostylid. The other jaws had teeth with a very small mesolophid on $M_1$ or a very small mesostylid on $M_2$ to the extreme in specimen No. 43840 which has an $M_1$ with a mesolophid, and an ectostylid present on $M_1$ and $M_2$ (Fig. 4A).

The lophids and stylids are not as well developed on the teeth.
from the Mt. Scott fauna as they are on certain individuals of *Peromyscus progressus* from the overlying Cragin Quarry fauna.

The anteroposterior length of M₁-M₂ in 5 specimens varies from 2.70 mm to 2.75 mm, with an average of 2.74 mm.

*Peromyscus* sp.  
(Fig. 4D)

*Occurrence.*—Mt. Scott local fauna, locality UM-K2-59.

*Material.*—No. 43789, an RM₁.

*Remarks.*—The tooth is distinct from that of any *Peromyscus* previously found in the Pleistocene deposits of that region. The pattern is more advanced and complicated than that of specimen No. 29302 from the Jinglebob fauna that appeared to belong either to the *truei* or *boylei* group of *Peromyscus*. It is the size and shape of M₁ of *Peromyscus boylei* (Baird) and *P. nuttalli* (Harlan). The tooth was compared with a series of M₁s of the 2 species. I could not place it with certainty with either species. In some respects it appears more like *P. nuttalli* than *P. boylii* (Fig. 4D). A series of the fossil specimens are needed for accurate determination.

*Neotoma* cf. *N. floridana* (Ord)  
(Fig. 4F)

*Occurrence.*—Mt. Scott local fauna, locality UM-K2-59, base of Mt. Scott (The “Lookout”).

*Material.*—5 lower and 4 upper isolated teeth, Nos. 41237, 43752, and 43948.

*Remarks.*—The teeth are the size of those recovered from the Cragin Quarry fauna. The M₁ has the enamel along the side (base) of the lingual part of the anterior loop flattened (Fig. 4F), while this part of the tooth is rounded in *Neotoma micropus* Baird. Furthermore, the posterior loop of M₁ is rounded as in *N. floridana*. The anteroposterior length of RM₁ (No. 43948) is 3.65 mm.

*Oryzomys* *fossilis* Hibbard  
(Fig. 4E)

*Geologic range.*—Illinoian to late Sangamon.

*Distribution.*—Known only from Meade County, Kansas.
Habitat.—The fossil record indicates a moist to marshy habitat.

Occurrence.—Mt. Scott local fauna, localities UM-K2-59 and UM-K1-60.

Material.—No. 43788, an LM¹; No. 43951, an LM₁ and LM₂ from locality UM-K2-59, and No. 44621, an LM₃ and an RM₂ from locality UM-K1-60.

Remarks.—Only isolated teeth were recovered. They agree in size and dental characters with those of *Oryzomys fossilis* from the Jinglebob fauna. The external reentrant valleys between the cusps and crescentic enamel islands are larger and deeper than those of the Recent *O. palustris* (Harlan) (see Fig. 4E).

*Synaptomys australis* Simpson

(Fig. 5)

Geologic range.—Illinoian to late Sangamon.

Distribution.—Late Pleistocene deposits of Florida and southwestern Kansas.

Habitat.—The fossil record of this large extinct bog lemming indicates a moist to marshy habitat.

Occurrence.—Mt. Scott local fauna, localities UM-K4-53, UM-K2-59, and UM-K1-60.

Material.—Locality UM-K4-53, an LM³ (No. 41225). Locality UM-K2-59, 5 LM₃s (No. 36293); 4 RM₁s, an RM₂ and an RM₃ (No. 43750); part of a right jaw with M₁ and M₂ (No. 43825); and 3 LM₁s, an LM², 2 LM²s, an RM¹ and an RM² (No. 43952). Locality UM-K1-60, an RM₁, and LM², an RM² and 2 upper incisors (No. 44618).

Remarks.—The teeth vary slightly in size since some are from young individuals. The anteroposterior length of M₁ and M₂ (No. 43825, Fig. 5) is 5.3 mm. 2 of the LM₃s are as large as the M₁ in *Synaptomys australis* Simpson from the Jinglebob local fauna. The large specimens are bigger than *S. c. paludis* Hibbard and Rinker now found living in the bog areas of Meade County. The enamel of the reentrant angles is thicker in specimens of *S. australis* than in *S. cooperi*. The internal reentrant angles on M₁-M₅ of the Kansas specimens of *S. australis* are directed more posteriorly than in Recent specimens of *S. cooperi*. 
At the time I (Hibbard, 1955) reported *Synaptomys australis* Simpson from the Jinglebob fauna I mentioned that the lower incisor extended posteriorly past $M_3$. In a study of the Mt. Scott specimens I compared the specimens with the Jinglebob material, the Recent specimens of *S. (S.) cooperi paludis* from Meade County and other more northern subspecies of *S. cooperi*. It was noted that the more northern specimens of *S. cooperi* are smaller than the southern subspecies. *S. c. paludis* is the largest of the Recent populations. It was also observed that in northern specimens of *S. cooperi* the lower incisor never extends posterior to the posterior edge of $M_3$. Of the 137 lower jaws examined from Michigan, no lower incisor extended posteriorly farther than $\frac{3}{4}$ the length of $M_3$, and then in only 6 specimens. In 14 of the 137 specimens the incisor extended posteriorly to the midline of $M_3$, and in 78 it extended posteriorly $\frac{3}{4}$ the length of $M_3$. The rest of the incisors extended only $\frac{1}{4}$ the anteroposterior length of $M_3$. 11 specimens were examined from New Hampshire, in which the incisor ex-

![Figure 5](image_url)

*Fig. 5. Synaptomys australis, No. 48825, part of a right jaw with $M_1$ and $M_2$. Lateral and occlusal views. × 6.*
tended to 1/2 or 2/3 the length of M₃. Specimens from North Carolina, West Virginia, and Virginia were also examined. None of these specimens had the incisor extending posteriorly more than 2/3 the length of M₃. Yet the holotype of S. australis from the late Pleistocene of Florida has the incisor extending just posterior to M₃, but not as far posteriorly past M₃ as in the specimens from the Jinglebob fauna. 12 specimens were examined from Ohio; 3 of these had the incisor extending to the posterior edge of M₃. 1 specimen from Illinois had the incisor extending posterior to M₃. The 3 specimens examined from Missouri had the incisor extending posterior to M₃, as in the Recent specimens of S. c. paludis from Meade County, but not as far posteriorly as in the specimen from the Jinglebob fauna. Miller (1896, p. 33) states, “Lower incisor terminating posteriorly a little in front of the hinder edge of the back molar.” Howell (1927, p. 8) states, “The roots of the mandibular incisors terminate at a point slightly anterior to the posterior portion of the third molar.” There is a definite gradient or cline from north to south in the increase of the length of the lower incisor. Also, Synaptomys (Synaptomys) is one of the exceptions to Bergmann’s rule, where the smaller races occur in the north and the larger specimens along the southern limits of its range. There is also a slight west-east gradient in size as reported by Wetzel (1955), which is probably comparable to the west-east gradient observed in the size of Blarina (Guilday, 1957).

The cline observed in Blarina brevicauda is the opposite of that observed in Synaptomys (Synaptomys). These clines may prove most significant in the study of middle and late Pleistocene faunas. In the cooler Doby Springs and Berends local faunas remains of the large B. b. brevicauda (or a large species) were recovered. One cannot say at present why remains of Synaptomys were not recovered with these faunas. But with a slight climactic moderation the smaller B. b. carolinensis (or a smaller species) replaced the large Blarina. Associated with the smaller Blarina is the large S. australis in the late Illinoian Mt. Scott local fauna and the late Sangamon Jinglebob local fauna. Unfortunately, the posterior part of the lower jaw of S. bunkeri Hibbard from the Nye sink in Beaver County, Oklahoma, is unknown. Also, the exact age of the deposit is unknown; it can be Illinoian or Wisconsin. But when the entire jaw is found, I expect it to possess (due to the size of the species
which is smaller than *S. c. paludis* now living in Meade County) a lower incisor that does not extend posterior to $M_3$, and to repre-

sent a member of a cooler fauna than either the Mt. Scott or the Jinglebob. When *Synaptomys* is found in association with *B. b. brevicauda* in the Pleistocene faunas of that region it would be expected to be smaller than *S. australis* and with a shorter lower incisor.

**Ondatra zibethica** (Linnaeus)

(Fig. 6E and F)

**Geologic range.**—Illinoian to Recent.

**Distribution.**—Most of North America north of Mexico (Burt, 1952, p. 134).

**Habitat.**—Aquatic. The muskrat lives along the edges of lakes and streams where it burrows into the bank below the water level and the burrow ascends upward in the bank above the water level to the dry nest. It also inhabits bogs and marshes where nests are constructed of vegetation extending well above the water with an underwater entrance to the dry chamber.

**Occurrence.**—Mt. Scott local fauna, localities UM-K4-53, UM-K2-59, and UM-K1-60.

**Material.**—Locality UM-K4-53, 3 isolated teeth from at least 2 individuals, an $L_1$, an $L_3$ and an $L_3^3$ (No. 41222). Locality UM-K2-59, parts of at least 3 individuals, No. 41228, 1 $L_1$, 3 $R_3$s, 2 $L_3$s and an $R_3$. From locality UM-K1-60 parts of at least 3 individuals were taken: No. 44611, part of a humerus of a young muskrat; No. 37190, part of a right jaw, with $M_1-M_3$; No. 37191, a left maxillary, with $M_1-M_3$; No. 44610, part of a right jaw, with $M_1-M_2$; No. 37745, 6 isolated upper teeth; and No. 44609, 2 isolated $M_3$s.

**Remarks.**—The anteroposterior length of $R_1-M_3$ (No. 37190, Fig. 6E) is 12.8 mm. The anteroposterior length of $L_1-M_3^3$ (No. 37191, Fig. 6F) is 12.8 mm. The teeth agree in shape and size with those from the Doby Springs and Jinglebob local faunas.
Microtus pennsylvanicus (Ord)

(Fig. 6A-D)

Geologic range.—Illinoian to Recent.

Distribution.—Boreal region of North America, southeast to northern New Mexico, southern Nebraska, northern Missouri, northern Kentucky, and southeast to southern South Carolina.

Habitat.—Grassy areas throughout range. In the southern limits of their range these voles are confined to the moister areas with good grass cover.
Occurrence.—Mt. Scott local fauna, localities UM-K4-53, UM-K2-59, and UM-K1-60.

Material.—There are parts of at least 138 individuals based on the number of right M₁s. From locality UM-K4-53, parts of 2 right and 1 left jaw with M₁-M₂ were recovered, along with 9 more right M₁s and 5 left M₁s (Nos. 34793-34795, 41218 and 41219). At the base of Mt. Scott (UM-K2-59) parts of at least 124 individuals were taken. These include parts of 6 right and 11 left jaws with M₁-M₂. In addition, there were 118 right M₁s and 96 left M₁s (Nos. 36288, 41240-41243, 43765-43769, 43829-43837). The only complete lower dentition was recovered at locality UM-K1-60, a left jaw (No. 44612) with M₁-M₃ (Fig. 6B). Also, 3 right and 7 left M₁s (No. 44605) were included.

Remarks.—19 of the jaws have M₁-M₂. The anteroposterior length of these 2 teeth varies from 4.65 mm to 6.0 mm, with an average of 5.17 mm. Only 1 jaw contains M₁-M₃ (No. 44612). The anteroposterior length of M₁-M₃ is 7.0 mm (Fig. 6B). 3 of the M₁s had 7 closed triangles (Fig. 6A). 190 M₁s had 5 closed triangles (Fig. 6C), and the remaining 66 M₁s had 6 closed triangles (Fig. 6D). The teeth are indistinguishable from those of the Recent species. The present range of the meadow vole does not extend as far south as Kansas. Many isolated upper teeth of Microtus and Pedomys were recovered. These have not yet been cleaned and sorted.

Pedomys ochrogaster (Wagner)

(Fig. 7)

Geologic range.—Illinoian to Recent.

Distribution.—Central Alberta, southeast to north central Oklahoma, northeast to eastern Ohio, and northwest through southwestern Saskatchewan (see Burt, 1952, p. 130).

Habitat.—The prairie vole frequents tall-grass and mixed-grass land throughout the upper Missouri and Mississippi valleys, and south in the Plains region. When occurring in the range of Microtus pennsylvanicus the prairie vole occupies the drier upland habitat. In the southwestern limits of its range it lives in the moist habitats of the valleys with Reithrodontomys megalotis.
Occurrence.—Mt. Scott local fauna, localities UM-K4-53, UM-K2-59, and UM-K1-60.

Material.—Parts of at least 2 individuals, 2 right M$_3$s and an LM$_3$ (No. 41227) were recovered at locality UM-K4-53. At locality UM-K2-59, parts of at least 10 individuals were recovered. This count is based upon the number of left M$_3$s either isolated or in jaw fragments; also, 9 right M$_3$s were taken (Nos. 36289, 43826-43828). The better specimens were recovered at locality UM-K1-60; No. 37750 is part of a right jaw with M$_1$-M$_5$; No. 44603 is a right jaw with M$_1$-M$_5$; also, 4 left and 3 right isolated M$_3$s (No. 44604) were taken.

Remarks.—The fossil specimens fall within the size range of *Pedomyx ochrogaster*. M$_1$-M$_5$ of specimen No. 44604 has an anteroposterior length of 6.60 mm (Fig. 7).

The small number of *Pedomyx* recovered is probably reflected by the moist habitat in the immediate vicinity of the deposits. *Pedomyx*, requiring a drier habitat than *Microtus pennsylvanicus*, was not taken in the lake sediments that produced the Doby Springs fauna (Stephens, 1960).
Family Zapodidae

Zapus hudsonius (Zimmermann)

(Fig. 4B)

Geologic range.—Illinoian to Recent.

Distribution.—From Alaska eastward and southeast to the northeastern corner of Oklahoma and east to the Atlantic coastal area.

Habitat.—The meadow jumping mouse is found in, "Meadows, shrubby fields, brushland and thickets along the edge of woods; usually in a moist grassy situation, and preferably near a stream or lake" (Jackson, 1961, p. 263).

Occurrence.—Mt. Scott local fauna, localities UM-K2-59 and UM-K1-60.

Material.—Locality UM-K2-59, an RM₁ (No. 44599), and an LM₁ and an RM₂, No. 41249. An isolated M₃, No. 44423, was taken at locality UM-K1-60.

Remarks.—The material has been studied by David J. Klingener (1963) in a comprehensive study of late Cenozoic zapodids of western North America. I have followed his identification. But the Zapus from the Doby Springs and Mt. Scott faunas is distinct, due to its smaller size (Fig. 4B), from the larger Z. adamsi from the Jinglebob local fauna. It is impossible to assign either the Doby Springs-Mt. Scott populations or the Jinglebob population to different subspecies of Z. hudsonius as has been done with different populations of Blarina. If the specimens of Zapus recovered from Illinoian and Sangamon faunas remain as distinct in the future as the Doby Springs-Mt. Scott populations are distinct from the Jinglebob population, it would be best to consider these as distinct subspecies. Recent Zapus does not occur in this part of Kansas.

Order Carnivora

Family Mustelidae

Mustela vison Schreber

(Fig. 8A)

Geologic range.—Middle Pleistocene to Recent.

Distribution.—Southern Alaska, most of Canada, and the United
States except the arid southwest (see Miller and Kellogg, 1955, pp. 741-744; and Burt, 1952, p. 43).

_Habitat._—Banks of streams and lakes, also marshes.

_Occurrence._—Mt. Scott local fauna, locality UM-K2-59.

![Image](image_url)

**Fig. 8. Mustela and Bison.** A, _M. vison_, No. 43751, part of right jaw with _M_1, lingual view. × 2. B and C, _Bison cf. B. latifrons_. B, left astragalus, No. 43850, posterior view; C, fragment of right jaw with _M_3, No. 43733, lateral and occlusal views. Both × ½.

_MATERIAL._—Part of right lower jaw with _M_1, and alveoli of canine, _P_2-P_4_, and _M_2 (No. 43751).

_REMARKS._—The jaw (Fig. 8A) is as large as that of a large male mink from Michigan. The alveoli of _P_3 are set oblique to the long axis of the jaw, and the tooth was crowded in between the canine and _P_3. Mink occur at the present time along Crooked Creek and the Cimarron River.
ORDER LAGOMORPHA

FAMILY LEPORIDAE

* Sylvilagus * sp.

*Occurrence.*—Mt. Scott local fauna, localities UM-K2-59 and UM-K1-60.

*Material.*—Locality UM-K2-59, an RP^2 (No. 41231); and 5 P_s (No. 43735). Locality UM-K1-60, 2 lower molars (No. 44607).

*Lepus * sp.

*Occurrence.*—Mt. Scott local fauna, localities UM-K4-53 and UM-K2-59.

*Material.*—Locality UM-K4-53, an RP^2 (No. 41223); locality UM-K2-59, an RP^4 (No. 43736).

*Remarks.*—Some of the teeth are from immature rabbits. It is impossible to identify them generically.

ORDER ARTIODACTYLA

FAMILY BOVIDAE

*Bison * cf. * B. latifrons* (Harlan)

(Figs. 8B and C)

*Geologic range.*—Illinoian to early Wisconsin.

*Distribution.*—The giant bison ranged from California to Florida, South Dakota to Texas, and Kentucky to the Gulf of Mexico.

*Habitat.*—The kind of deposits from which remains are recovered in North America indicate that this long-horned bison lived either along permanent streams, which supported some shrubs and some trees, or in well-wooded stream valleys, in which there were intermittent areas of tall-grass land (meadow).

*Occurrence.*—Mt. Scott local fauna, locality UM-K2-59.

*Material.*—A fragment of a right jaw with M_3 (No. 43733).

*Remarks.*—The only remains of a large bison recovered to date from this region in Illinoian and Sangamon deposits were the horn-core of *Bison latifrons* in association with the Jinglebob fauna, and parts of a giant bison from the Doby Springs local fauna. The RM_3
(Fig. 8C) has an anteroposterior length of 49.5 mm. At locality UM-K2-59 a slight disconformity (sand and gravel zone) occurs above the Mt. Scott faunal horizon. Approximately 7 feet above the disconformity but below the Cragin Quarry horizon a left astragalus (No. 43850, Fig. 8B) was taken. It appears to belong to the same species of bison as the fragment of the lower jaw. The greatest length of the astragalus is 96.5 mm.

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