1986

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1986. *Transactions of the Nebraska Academy of Sciences*, XIV: 21-24.

INSECTIVORA (MAMMALIA) FROM THE MIOCENE (HEMINGFORDIAN) OF WESTERN NEBRASKA

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Insectivores of Middle Miocene (Hemingfordian, Marsland) from Nebraska are described. The presence of *Mesoscalops* and *Mystipterus (Mydecodon)* in the Cottonwood Creek Local Fauna extends the geographic range of these genera. Miocene erinaceid post-cranial elements are described for the first time.

† † †

INTRODUCTION

In the summer of 1975 a field crew under the direction of R. George Corner, Highway Salvage Paleontologist for the State of Nebraska, collected vertebrate fossils from Miocene (Marsland) sediments in southern Dawes County, Nebraska. The fossil salvage project was in conjunction with the construction of a new road bed for Highway 385. The field crew was made up of R. George Corner, Bruce Messenger, and me. A diversified fossil assemblage was recovered from road cuts and consisted of large (i.e., oreodont-sized) mammals as well as micromammals (i.e., rodents and insectivores). This fauna was previously named the *Cottonwood Creek Local Fauna* (Martin and Corner, 1980). Only a cricetid rodent, *Yatkolamys edwardsi* (Martin and Corner, 1980), has been described from the fauna to date.

Fossil insectivores from the Marsland Formation have not been adequately described. Only four papers dealing with insectivores of this age from Nebraska and Colorado have been published: Meade, 1941; Wilson, 1960; Rich and Rich, 1971; and Rich, 1981. The insectivores from the Cottonwood Creek Local Fauna are represented by 14 specimens, all isolated teeth or dentaries and approximately 30 post-cranial elements. Although the sample is small, it allows description of the taxa so that comparisons can be made with fossil insectivores from other geographic areas of approximately the same geologic age.

The fossils were collected by screen-washing methods. Measurements were made following the technique described by Lillegraven *et al.* (1981: 5-7) and are in millimeters (mm). The measurements were taken using an Olympus VMZ microscope with a Daedal stage. All of the specimens are catalogued in the University of Nebraska State Museum vertebrate paleontology collection (UNSM).

STRATIGRAPHY

Yatkola (1978: 34) proposed the new rank of member for the Runningwater Formation of Cook (1965), and he considered the Runningwater Member as the upper member of the Marsland Formation. The Runningwater Member is stratigraphically below the Box Butte Formation of Galusha (1975).

The Cottonwood Creek Local Fauna occurs in fine-to-medium-grained, poorly sorted, unconsolidated sand which is typical of the Runningwater Member massive sand facies of Yatkola (1978: 38-39). The Cottonwood Creek Locality is made up of sand which ranges in color from tan to grayish green. The specimens were recovered from two UNSM localities, Dw-117 and Dw-118. The former is located in the NW.¼, SW.¼, Sec. 33, T. 29 N., R. 48 W., whereas Dw-118 is in the NW.¼, NW.¼, SW.¼, Sec. 16, T. 29 N., R. 48 W., both in Dawes County, Nebraska.

SYSTEMATIC PALEONTOLOGY

Class Mammalia Linnaeus, 1758
Order Insectivora Illiger, 1811
Superfamily Erinaceoidea Fischer von Waldheim, 1817
Family Erinaceidae Fischer von Waldheim, 1817
Subfamily Erinaceinae Fischer von Waldheim, 1817
Genus *Parvericius* Koerner, 1940
Parvericius montanus Koerner, 1940

Referred Material: UNSM Dw-117: 95,491, right dentary with P_4 and alveoli for P_3, M_1-M_3; 95,493, right M_1. UNSM Dw-118: 95,486, right dentary with P_4-M_3 and alveolus for P_3; 95,487, left dentary with P_4 and alveoli for M_1-M_3; 95,488, left dentary with M_1 and alveoli for C_1, P_2-P_4, M_2-M_3; 95,489, left M_1; 95,940, right M_2.

Discussion.—Rich and Rasmussen (1973) thoroughly described the morphology of the mandible and lower dentition of *Parvericius montanus,* and the specimens from the Cottonwood Creek Local Fauna display only slight differences. The P_4 has a distinct metaconid, no bucal cingulum, and the talonid is less reduced than that of the specimens described by Rich and Rasmussen (1973: 39). In all other respects the molars and dentary of the Cottonwood Creek specimens are similar to those from Montana, Wyoming, and the much later Egelhoff Quarry in northern Nebraska as described by Rich and Rasmussen (1973).

The alveoli of P_4 which Rich and Rasmussen were unable to describe for lack of a specimen with the alveoli present and not containing a tooth are present on UNSM 95,488. The anterior alveolus is rounded and the posterior alveolus is more rectangular. The partition between the alveoli is relatively thick with twinned vertical ridges characteristic of erinaceids. These ridges are not as well developed as those of the molar alveoli.

Family Erinaceidae
Gen. et Sp. indet.

Referred Material: UNSM Dw-117: 88,416, distal end of left femur; 88,417, distal end of left tibia; 88,418, glenoid of right scapula.

Description:—The glenoid fossa is elliptical with the long axis of the fossa parallel with the subscapular surface. However, the glenoid fossa of UNSM 88,418 is not as transversely expanded as that of *Erinaceus europaeus*. The coracoid is well developed and hook-shaped, but again not to the degree of that of *E. europaeus*. The acromion process is broken on UNSM 88,418 but it does not appear to be as high as that of *E. europaeus*.

The femur (Fig. 1-A) is almost identical with that of *Erinaceus,* but it is much smaller. The tibia (Fig. 1-B), UNSM 88,417, is also very similar to that of *Erinaceus* except that the shaft is wider as it merges with the distal head of the bone and, like the femur, is smaller than that of *Erinaceus*.

Discussion:—Fossil erinaceid post-cranial elements previously have not been described. Those described here are most similar to the corresponding elements of the living *Erinaceus*. Their size corresponds with that of the dentition of *Parvericius montanus* and could well belong to that taxon, but without direct association they cannot be placed confidently in that genus or any other at present. Except for the increase in size, little change has occurred in the general erinaceid post-cranial scheme from the Miocene to present. Hemingfordian erinaceids appear to have had the same type of locomotion as living *Erinaceus*.

Superfamily Soricoidea Gill, 1872
Family Talpidae Gray, 1825
Subfamily Uropsilinae Dobson, 1883
Genus *Mystipterus* Hall, 1930
Mystipterus (Mydecodon) martini Wilson, 1960

Referred Material: UNSM Dw-118; 95,499, right M_1.

Discussion:—This is the first report of this taxon from the Hemingfordian of Nebraska. The only previously reported occurrence on the Great Plains was that of Wilson (1960). The Nebraska specimen differs from the M_1 of the type only in that the external cingulum is not as well developed. In all other respects the two are identical.

Subfamily Scalopinae Thomas, 1912
Genus *Scalopoides* Wilson, 1960
Scalopoides sp., cf. *S. isodens* Wilson, 1960

Referred Material: UNSM Dw-117: 88,426, tibiofibula.

Discussion:—Hutchison (1968: 72, Fig. 59) figured the distal end of the tibiofibula of *Scalopoides ripafodiator.* The tibbiofibula from Nebraska is similar to the specimens described by Hutchison (1968), but not close enough to warrant assignment to *S. ripafodiator.* The groove for the peroneous tendon is not as deep as that of *S. ripafodiator,* and the crural ligament is not prominently ossified. These features more closely resemble those of the tibiofibula of *S. isodens* from Martin Canyon in northeastern Colorado. As in *S. ripafodiator,* the Nebraska tibiofibula exhibits a relatively long fused portion. The specimens from Martin Canyon and that here listed from western Nebraska are of Hemingfordian (Marsland) age. The Nebraska specimen is undoubtedly assignable to the Talpidae, based on lack of fusion of the tibia and fibula in the Proscalopidae (Barnosky, 1981: 322).

Family Proscalopidae K. Reed, 1961
Genus *Mesoscalops* K. Reed, 1961
Mesoscalops scopelotemos K. Reed, 1960

Referred Material: UNSM Dw-117: 88,419, partial humerus; 88,420 terminal phalanges (7 specimens); 88,421, partial humerus; 88,422, second phalanx (2 specimens); 88,423, right radius; 88,424, right metatarsal; 88,425, metacarpal; 95,498, right M_1. UNSM Dw-118: 88,427, left humerus; 88,428, humerus fragments (3 specimens); 88,431, distal end of right femur; 88,432, right radius; 88,433, right radius; 95,494, left dentary with M_1-M_2; 95,495, left edentulous dentary; 95,496, left edentulous dentary; 94,497, right M_2.

Description:—The M_1 of *Mesoscalops scopelotemos* in the

Cottonwood Creek Local Fauna is very similar to that of *M. scopelotemos* from the Split Rock Local Fauna in Wyoming (K. Reed, 1960) in that the precingulum is absent and the paraconid-conule is small. These are characters which differ from those of *M. montanensis* as described by Barnosky (1981: 303). The Cottonwood Creek specimens also have a smaller difference in height between the paraconid and protoconid than for *M. montanensis*. As Barnosky (1981: 304) pointed out, there is little difference between the M_2 of *M. scopelotemos* and *M. montanensis*.

Reed and Turnbull (1965) briefly discussed the humerus of *Arctoryctes (=Mesoscalops scopelotemos)* from the Split Rock Local Fauna. However, they did not provide a detailed description of it. In comparing the Cottonwood Creek specimens with the description of the humerus of *M. montanensis* (Barnosky, 1981), the differences indicate separation at the species level.

The humerus of *M. scopelotemos* differs form that of *M. montanensis* in that: the shaft is slightly narrower; the pectoral process is more oblique, but not as much so as *Proscalops;* the deltoid process is not as elevated; and the fossa for the M. flexor digitorum is deeper. In all other respects the humeri of the two species are similar.

Reed and Turnbull (1965) did not have any examples of the femur, therefore it has never been described for *M. scopelotemos*. The Cottonwood Creek specimen (UNSM 88,431) consists of only the distal half of the bone. This portion of the femur in *M. scopelotemos* is generally similar to that of *M. montanensis (see* Barnosky, 1981: 320). The shaft is less flattened in *M. scopelotemos,* and the epicondyles protrude farther posteriorly. The dorsal and lateral borders of the lateral epicondyle meet at an angle less than 90°, which is not the case in *M. montanensis*. This gives the lateral epicondyle a slanted appearance. The patellar fossa is not as wide on the femur of *M. scopelotemos* as on that of *M. montanensis,* and the lateral and medial ridges of the patellar fossa are less well developed.

The tibia and radius of both species have been adequately described by Reed and Turnbull (1965) and Barnosky (1981), but specific distinction is extremely difficult. The metacarpal, metatarsal, and phalanges in the Cottonwood Creek Local Fauna exhibit no differences from those elements described by Reed and Turnbull (1965) from the Split Rock Local Fauna.

Age of the Cottonwood Creek Local Fauna

Martin and Corner (1980) concluded that the Cottonwood Creek Local Fauna is of Hemingfordian (Marsland) age. *Parvericius montanus* has a long geologic range in North America, from the Middle Arikareean to the Late Barstovian (Rich and Rasmussen, 1973). The presence of *Mystipterus (Mydecodon) martini* and a species quite close to *Scalopoides isodens* indicates a degree of correlation with the Martin Canyon Quarry A fauna from northeastern Colorado. A noticeable difference between the Quarry A fauna and the Cottonwood Creek Local Fauna is the lack of *Parvericius montanus* in the former and the presence of *Proscalops* as opposed to *Mesoscalops*. Wilson (1960) reported an erinaceid in the Quarry A fauna, one that may be assignable to *Brachyerix macrotis*. He did not mention any similarities to *Parvericius montanus*. These differences may reflect slight age or paleoecological differences, but only after the complete fauna of the Cottonwood Creek Local Fauna is studied can this be determined.

SUMMARY

Insectivores belonging to the taxa *Mystipterus (Mydecodon) martini, Scalopoides* sp. cf. *S. isodens,* and *Mesoscalops scopelotemos* are reported for the first time from Hemingfordian (Marsland) sediments in Nebraska. Post-cranial elements of Miocene erinaceids are described for the first time and prove to be similar to the same elements in the living genus *Erinaceus* except for having smaller dimensions. The fossils occur in the Marsland Formation, of Hemingfordian age.

ACKNOWLEDGMENTS

I wish to thank R. George Corner, Nebraska State Highway Salvage Paleontologist, and Dr. Michael Voorhies, both of the University of Nebraska State Museum, for allowing me to study the specimens from the Cottonwood Creek Local Fauna. I thank Dr. Robert Hoffman of the Museum of Natural History, University of Kansas for loaning specimens under his care. I also thank Dr. Larry D. Martin and Dr. Robert W. Wilson of the Museum of Natural History, University of Kansas, for many enlightening discussions on Miocene insectivores and biostratigraphy.

REFERENCES

Barnosky, A.D. 1981. A skeleton of *Mesoscalops* (Mammalia: Insectivora) from the Miocene Deep River Formation, Montana, and a review of the proscalopid moles: evolutionary, funcational, and stratigraphic relationships. *Journal of Vertebrate Paleontology,* 1:285-339.

Cook, H.J. 1965. Runningwater Formation, Middle Miocene of Nebraska. *American Museum Novitates,* 2227: 1-8.

Galusha, T. 1975. Stratigraphy of the Box Butte Formation, Nebraska. *Bulletin of the American Museum of Natural History,* 156: 1-68.

Hutchison, J.H. 1968. Fossil Talpidae (Insectivora, Mammalia) from the Later Tertiary of Oregon. *Bulletin of the Museum of Natural History, University of Oregon,* 11: 1-117.

Lillegraven, J.A., M.C. McKenna, and L. Krishtalka. 1981. Evolutionary relationships of Middle Eocene and younger species of *Centeodon* (Mammalia, Insectivora, Geolabididae) with a description of the dentition of *Ankylodon* (Adapisoricidae). *Publications of the University of Wyoming,* 45: 1-115.

Martin, L.D., and R.G. Corner. 1980. A new genus of cricetid rodent from the Hemingfordian (Miocene) of Nebraska.

Paleontological Contributions of the University of Kansas, 103: 1-5.

Meade, G.E. 1941. A new erinaceid from the Lower Miocene. *Field Museum of Natural History, Geological Series,* 8: 43-47.

Reed, C.A., and W.D. Turnbull. 1965. The mammalian genera *Arctoryctes* and *Cryptoryctes* from the Oligocene and Miocene of North America. *Fieldiana: Geology,* 15: 95-170.

Reed, K.M. 1960. Insectivores of the Middle Miocene Split Rock Local Fauna, Wyoming. *Breviora (Museum of Comparative Zoology, Harvard),* 116: 1-11.

———. 1961. The Proscalopinae, a new subfamily of talpid insectivores. *Bulletin of the Museum of Comparative Zoology (Harvard),* 125: 471-494.

Rich, T.H.V. 1981. Origin and history of the Erinaceinae and Brachyericinae (Mammalia, Insectivora) in North America. *Bulletin of the American Museum of Natural History,* 171(1): 116p.

———, and D.L. Rasmussen. 1973. New North American erinaceine hedgehogs (Mammalia: Insectivora). *Occasional Papers of the Museum of Natural History, University of Kansas,* 21: 1-54.

———, and P.V. Rich. 1971. *Brachyerix,* a Miocene headgehog from western North America, with a description of the tympanic regions of *Paraechinus* and *Podogymnura. American Museum Novitates,* 2477: 1-58.

Wilson, R.W. 1960. Early Miocene rodents and insectivores from northeastern Colorado. *Paleontological Contributions of the University of Kansas, Vertebrata,* 7: 1-92.

Yatkola, D.A. 1978. Tertiary stratigraphy of the Niobrara River Valley, Marsland Quadrangle, western Nebraska. *Paper of the Nebraska Geological Survey,* 19: 1-66.

TABLE 1—Dental and post-cranial measurements (mm) of UNSM specimens of insectivores from the Cottonwood Creek Local Fauna.

Parvericius montanus		*L*	*W*	*AW*	*PW*
95,486	P_4-M_3	5.99	—	—	—
	P_4	1.41	1.05	—	—
	M_1	2.12	—	1.42	1.47
	M_2	1.61	—	1.31	1.19
	M_3	0.71	0.66	—	—
95,487	P_4	1.41	1.05	—	—
95,491	P_4	1.33	1.00	—	—
95,492	P_4	1.30	1.00	—	—
95,486	M_1	2.18	—	1.48	1.37
95,489	M_1	2.18	—	1.44	1.30
95,493	M_1	2.16	—	1.41	1.36
95,490	M_2	1.68	—	1.27	1.17
Mystipterus (Mydecodon) martini		*L*	*AW*	*PW*	
95,499	M_1 or M_2	1.97	1.26	1.40	

Mesoscalops scopelotemos (dental measurements)

			L	*AW*	*PW*
95,494	M_1-M_2	M_1	2.78	2.11	2.37
		M_2	2.58	2.33	2.22
95,498		M_1	2.86	2.14	2.41
95,497		M_2	2.68	2.27	2.23

Mesoscalops scopelotemos (post-cranial measurements)

88,423 right radius–transverse width, proximal end	—	2.87
transverse width, distal end	—	4.11
proximodistal length	—	14.97
88,432 right radius–transverse width, proximal end	—	2.84
transverse width, distal end	—	4.06
proximodistal length	—	14.82
88,433 right radius–transverse width, proximal end	—	2.98
transverse width, distal end	—	4.21
proximodistal length	—	15.33
88,431 distal end of right femur-width	—	5.31

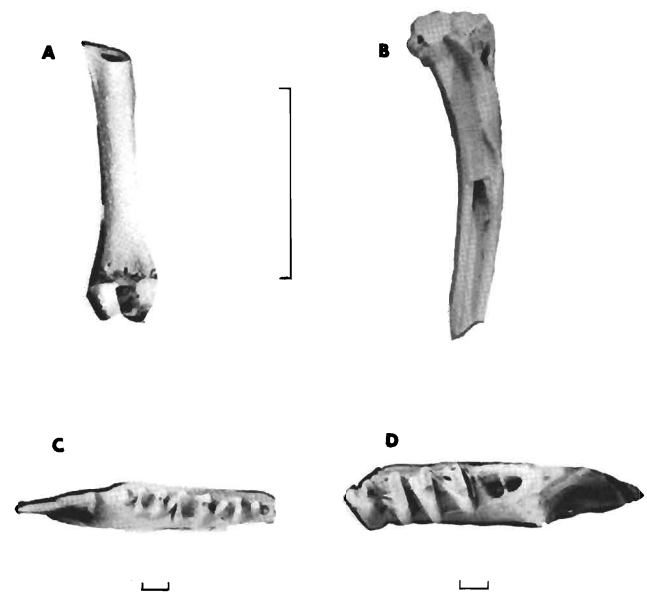

FIGURE 1. Insectivora from the Cottonwood Creek Local Fauna. A. Erinaceidae, gen. et sp. indet., UNSM 88,416, ventral view of left femur. Proximal end toward top; scale equals 1 cm. B. Erinaceidae, gen. et sp. indet., UNSM 88,417, ventral view of left tibia. Distal end toward top; scale equals 1 cm. C. *Parvericius montanus,* UNSM 95,486, right dentary with alveoli for P_3, P_4-M_3. Anterior to right; scale equals 1 mm. D. *Mesoscalops scopelotemos,* UNSM 95,494, left dentary with M_1-M_2 and alveoli for M_3. Anterior to left; scale equals 1 mm.