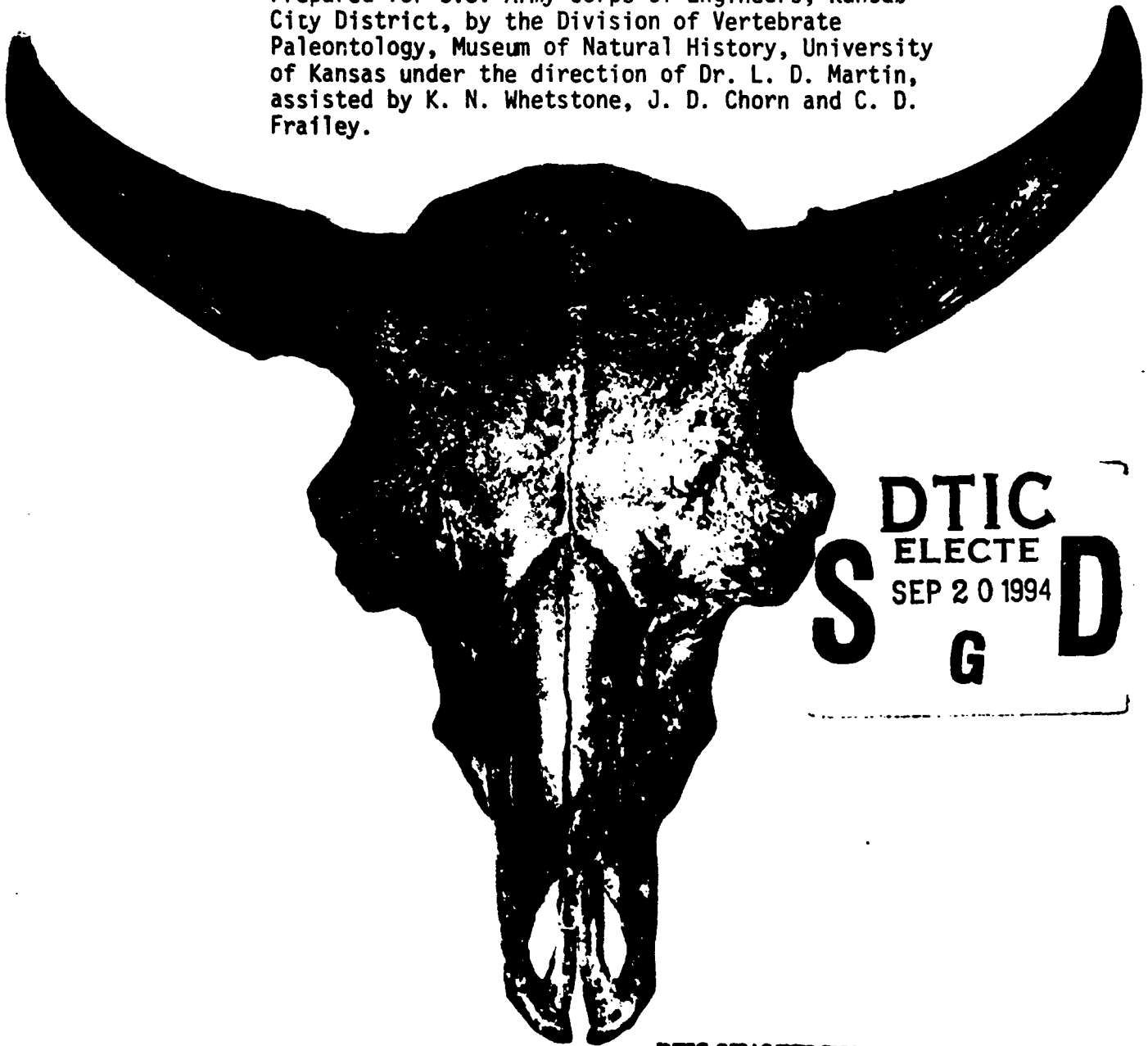


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SURVEY OF FOSSIL VERTEBRATES FROM EAST-CENTRAL KANSAS  
KANSAS RIVER BANK STABILIZATION STUDY

Prepared for U.S. Army Corps of Engineers, Kansas City District, by the Division of Vertebrate Paleontology, Museum of Natural History, University of Kansas under the direction of Dr. L. D. Martin, assisted by K. N. Whetstone, J. D. Chorn and C. D. Frailey.



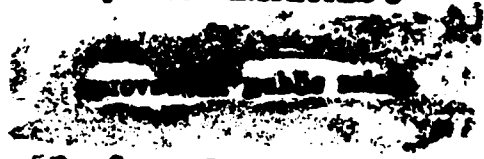
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Kansas River Bank Stabilization Study

Prepared for  
U. S. Army Corps of Engineers,  
Kansas City District

Purchase Order DACW41-78-M-1055

by

The Division of Vertebrate Paleontology,  
Museum of Natural History, under the  
direction of Dr. Larry D. Martin, assisted  
by K. N. Whetstone, J. D. Chorn and C. D.  
Frailey

University of Kansas, Lawrence, KS

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Cover illustration: Skull of Bison bison (KUPV 54005) from Kansas River at Bonner Springs, Wyandotte County, Kansas. Photograph by David Frailey, University of Kansas.

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- Figure 5. Map of counties, East-Central Kansas, covered in this report with delineation of the Kansas River and tributaries under study.

# SURVEY OF FOSSIL VERTEBRATES FROM EAST-CENTRAL KANSAS

LARRY D. MARTIN

## INTRODUCTION

This survey of vertebrate fossil resources was prepared for the Kansas City District, U. S. Army Corps of Engineers under purchase order DACW 41-78-M 1055 as authorized by Public Law 91-190. This work represents a preliminary identification, location and assessment of all known Pleistocene fossil localities in the Kansas counties of Mitchell, Lincoln, Ellsworth, Cloud, Ottawa, Saline, McPherson, Dickinson, Geary, Riley, Pottawatomie, Waubunsee, Shawnee, Jefferson, Douglas, Leavenworth, Wyandotte and Johnson. Also included are several localities older than Pleistocene, but on the Kansas River floodplain. This area has not been covered by any previous paleontological survey.

The U. S. Army Corps of Engineers is currently involved in a study of channel migration and bank erosion on the Kansas River and its major tributaries. The Kansas River flows across Kansas in a generally eastward direction until it merges with the Missouri River at Kansas City. In the study area the river cuts through geologic formations ranging in age from Pennsylvanian to Recent. In the banks are numerous localities from which fossil vertebrates have been collected. Sand bars in the river are a major source for fossil vertebrates of Pleistocene and sub-Recent age. However, the primary source of many of these fossils must be the banks themselves. Therefore, bank stabilization could obscure important collecting localities. The major repositories for fossil specimens are the University of Kansas Museum of Natural History (KUNHM) and the University of Michigan Museum of Paleontology (UMMP). Specimens are also housed in the U. S. National Museum (USNM), Washington, D.C.; Bethany College Museum (BCM), McPherson, Kansas; Kansas State University (KSU), Manhattan, Kansas; and the Yale Peabody Museum (YPM).

### History of Collecting and Statement of Cultural Significance

The paleontological resources of the Kansas River drainage have long been recognized as critical to our understanding of the natural history of the central Great Plains. They include fossils ranging in age from Pennsylvanian to Late Pleistocene and form an integral part of the cultural heritage of this region. Unfortunately, fossils in river drainages are rarely recovered. They are rapidly destroyed by erosion because of their proximity to the river. In most cases their life span after they begin to be uncovered by natural forces

must be measured in weeks rather than years. The few records that we do have are mostly chance discoveries of fisherman or rockhounds and can only represent a small fraction of what a well-organized professional survey could hope to find. Many of the fossils that have been recovered from the Kansas River drainage have been placed in the University of Kansas Museum of Natural History. In fact, one of the earliest specimens to be added to that collection was a mandible of an American mastodon, Mammut americanum. It was found by then Chancellor of the University of Kansas, F.H. Snow, who discovered it while fishing in Wakarusa Creek. Professor Snow's fossil and the excitement of discovery are described in this contemporary newspaper account (the exact citation is unknown):

Dr. Snow, determined to reach deeper water, stepped onto what looked like an old tree stump. After fishing from this vantage point for some time, he suddenly slipped off the stump. Upon trying to regain a footing on the slippery mass, he found this supposed stump did not feel exactly like wood. Naturally of an investigating nature, he examined it more fully and found it to be of a stony nature.

Flinging his fish pole to land, and disregarding the prospects of a muddy investigation, he rolled up his sleeves and tried to move the object nearer the bank, this feat proved too much for his strength, so calling his companions to help, they finally landed the catch and found to the Doctor's joy, that he had discovered a magnificent pair of under jaws of an early Mastodon that used to roam around Lawrence in the Pleistocene period.

Some quarry sites have been found in the western part of the drainage (west of Manhattan). Most of these were discovered and worked by the late Dr. Claude W. Hibbard, first for the University of Kansas and later for the University of Michigan. These quarry sites are mostly in terrace deposits of middle Pleistocene age and are thus too old to have any reasonable probability of producing associations with human remains. However, associations of fossil human bones or artifacts may be expected in the eastern part of the drainage (east of Manhattan) where Late Pleistocene fossils are most abundant.

It is not known why the area east of Manhattan has become the most productive of fossil vertebrates. Fossils may be more abundant in this area or they may have been searched for more intensively or both.

In the area around Kansas City, collectors have amassed a vast amount of Pleistocene and Recent bones mostly from sand bars in the

Kansas River. (Pleistocene plant fossils have not been recovered from the Kansas River floodplain). Only a small percentage of this material reaches permanent repositories. However, enough has been salvaged to indicate a rich Pleistocene assemblage including forms indicative of spruce forest such as the American mastodon, Mammut americanum, the woodland musk ox, Symbos cavifrons, the woodland peccary, Mylohyus, and the stag-moose, Cervalces. Associated with these fossils is a small number of human bones, some of which show similar degrees of petrification. If it can be shown by absolute dating techniques (radiocarbon, amino acid racemization, and others) that these bones are contemporaneous with the extinct fauna, then we are in a position to make important statements about the lives and habits of the first people to live in the Kansas River drainage system. Even if these associations prove to be false, the Late Pleistocene fauna of the Kansas River drainage lies in the ecotone between two great Pleistocene biomes, that of the spruce forest that dominated the eastern part of North America and that of the western montane conifer parklands that dominated the west and southwest. Most Paleo-Indian sites are from the latter biome so paleoenvironmental information about the interface between the two should help us to better understand the nature of the immigration of man into the New World and the environments with which these early immigrants had to cope.

The methods used in the compilation of this report include a literature survey and a search of the catalogue and collection of the Division of Vertebrate Paleontology, Museum of Natural History, other paleontological collections and information from private collectors were also utilized.

K. N. Whetstone, J. D. Chorn, and C. D. Frailey assisted in the compilation of this data.

Part 1

PLEISTOCENE VERTEBRATES FROM EAST-CENTRAL KANSAS

(Listed alphabetically by county)

Specimens which are particularly rare or well-preserved are marked with an asterisk (\*).

University of Kansas collecting localities are designated below by the letters KU-followed by a two or three letter code for the county and a number (e.g., entry number one, Cloud County, is locality KU-CL-2.

CLOUD COUNTY

1. KU-CL-2

Material: *Equus ?complicatus* ramus KUVP 394

2. KU-CL-3

Material: *Equus* sp. 3 teeth KUVP 7326  
*Bison* sp. 2 teeth KUVP 7327  
*Bison* sp. fragments KUVP 7328  
*Antilocaprinae* base of skull KUVP 7329  
*Cervidae* antler KUVP 7331  
*Mammalia* vertebra KUVP 7330

DICKINSON COUNTY

3. KU-DIC-1

Material: *Equus niobrarensis* mandible KUVP 2818

DOUGLAS COUNTY

4. KU-DOU-23

Material: *Bison bison* skull\* KUVP 15003

5. KU-DOU-50

Material: *Mammut americanus* ramus KUVP 5983  
*Bison americanus* literature citation

References: Savage, 1877-78; Hay, 1924

6. KJ-DOU-51  
 Material: Cervus sp. antlers KUVP 50174  
 Bison bison skulls KUVP 50175  
 lit. cit.  
 Reference: Hay, 1924
7. KU-DOU-52  
 Material: Equus laurentius skull\* KUVP 347  
 Reference: Hay, 1924
8. KU-DOU-53  
 Material: Bison occidentalis skulls KUVP unnumbered  
 Reference: Hay, 1924; Lane
9. KU-DOU-54  
 Material: Bison sp. horn cores KUVP 10297
10. KU-DOU-55  
 Material: Bison sp. horn core KUVP 397
11. KU-DOU-56  
 Material: Bison sp. scapula KUVP 12518
12. Kansas River, "North Lawrence"  
 Material: Odocoileus virginianus antlers KUVP unnumbered  
 Bison kansensis skull KUVP 388
13. "Kansas River, Douglas County"  
 Material: Smilodon fatalis femur\* KUVP 479  
 Cervalces canadensis skull\* KUVP 3892  
 Bison sp. humerus KUVP 389
14. "Kansas River near Lawrence"  
 Material: Bison sp. skulls KUVP 2827  
 KUVP 7608  
 vertebra KUVP 2823  
 ramus KUVP 5912  
 Proboscidea vertebra KUVP 3891

ELLSWORTH COUNTY

15. KU-ELS-4

Material: Mammuthus primigenius molar KUVF 3777

16. KU-ELS-5

Material: Equus calcaneum KUVF 4923

17. Kanopolis Local Fauna

Material: Acris crepitans ilia UMMP 60437  
Hyla versicolor ilia UMMP 60476  
Rana catesbeiana vertebrae UMMP 60357  
Rana pipiens fragments UMMP 60381  
Chelydra serpentina vertebrae UMMP 60380  
Sternotherus odoratus fragments UMMP 60484  
Graptemys geographica Hyoplastron UMMP 60356  
Pseudemys scripta fragments UMMP 60355  
Trionyx spinifer xiphiplastron UMMP 60485  
Ophisaurus attenuatus vertebra UMMP 60479  
Eumeces cf. fasciatus sacrum UMMP 60432  
Regina grahami vertebrae UMMP 60433  
Natrix sipedon vertebrae UMMP 60435  
Thamnophis sp. vertebrae UMMP 60477  
Natricinae indet. vertebrae UMMP 60486  
Heterodon vertebrae UMMP 60487  
Coluber sp. vertebrae UMMP 60488  
Pituophis melanoleucus vertebrae UMMP 60435  
Colubrinae indet. vertebrae UMMP 60489  
Sistrurus catenatus vertebrae UMMP 60491

The following taxa are known from fragments in the UMMP collections:

Lepisosteus osseus	Blarina sp.
Pimephales promelas	Cryptotis parva
Notropis sp.	Scalopus aquaticus
Nocomis sp.	Paramylodon harlani
Campostoma sp.	Holmesina septentrionalis
Cyprinidea	Cynomys sp.
Ictiobus niger	Geomys bursarius
Ictalurus melas	Thomomys sp.
Ictalurus punctatus	Perognathus hispidus
Noturus sp.	Castoroides sp.
Ictaluridae	Reithrodontomys humulis
Micropterus salmoides	Peromyscus sp.
Lepomis cyanellus	Neotoma sp.
Lepomis megalotis	Neofiber leonardi



Mylohyus sp.	mandible*	KUVP 50171
Cervidae	molar	KUVP 50173

LINCOLN COUNTY

25. KU-LIC-2

Material: Equus sp.	molar	KUVP 3110
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26. KU-LIC-4

Material: Microtus paroperarius	mandible	KUVP 6298
	mandible	KUVP 6299
Geomys	fragment	KUVP 6300
Rodentia	teeth	KUVP 6301
		KUVP 6302
Mammalia	fragments	KUVP 6303

Reference: Frye, Leonard, and Hibbard, 1943.

27. KU-LIC-5

Material: Sorex cinereus	ramus	KUVP 6674
Blarina fossilis	ramus	KUVP 6675
Citellus sp.	upper molar	KUVP 6730
Geomys sp.	teeth	KUVP 6732
Castoroides sp.	incisor	KUVP 6296
Reithrodontomys	ramus	KUVP 6679
Neotoma sp.	molars	KUVP 6731a,b
Microtus cf. pennsylvanicus	ramus	KUVP 6289
Microtus cf. ochrogaster	ramus	KUVP 6288
Neofiber leonardi	molar*	KUVP 6653
	molar*	KUVP 6654
Ondatra zibethicus	molar	KUVP 6290a,b
	molars	KUVP 6677
?Sylvilagus	3 teeth	KUVP 6678
Equus niobrarensis	molar	KUVP 6287
Odocoileus	antler	KUVP 6505
various catfishes, sunfishes, frogs, toads, turtles, birds		lit. cit.

Reference: Hibbard, 1943

28. KU-LIC-6

Material: Proboscidea	molar	KUVP 6177
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MCPHERSON COUNTY

29.	KU-MCP-2		
	Material: Mammut americanus	molar	KUVP 4929
30.	KU-MCP-7		
	Material: Equus scotti	maxilla*	KUVP 6878
31.	KU-MCP-8		
	Material: Mammut	molar	KUVP 7557
32.	KU-MCP-9		
	Material: Sorex cf. cinereus	mandible	KUVP 7334
	Blarina sp.	fragment	UMMP 51248
	Cynomys cf. gunnisoni	mandible	UMMP 50497
		molar	UMMP 50495
	Citellus tridecemlineatus	teeth	UMMP 50497
			KUVP 7347
	Citellus richardsoni	fragments	UMMP 50498,
			50499,
	Geomys bursarius		UMMP 50501-
			506
			KUVP 7345,
			7346
	Perognathus hispidus	teeth	KUVP 7427,
			7363, 7362
	Onychomys sp.	fragment	KU 13458
	Peromyscus sp.	fragment	KUVP 7385
	Neotoma sp.	teeth	UMMP 24509
			KUVP 7359
	Sigmodon hispidus	mandible	KUVP 7361
	Ondatra annectens	molar	UMMP 24509
	Ondatra nebracensis	fragments	UMMP 34712,
			50931
			KUVP 7350
	Synaptomys kansasensis	fragments	KUVP & UMMP
	Microtus llanensis	fragments	KUVP & UMMP
	Felis sp	molar	KUVP 7349
	Lepus sp.	teeth	UMMP 50948
			KUVP 7348
	Gigantocamelus sp.	calcaneum	KUVP 7340
	Equus sp.	tooth	UMMP 50949
	Euphagus cyanocephalus	coracoid	KUVP 7354
	Numenius borealis	coracoid	KUVP 7428
	Anas carolinensis	humeri	KUVP 9908,
			9909

Lophodytes cucullatus	fragments	KUVP 9910, 9911
Bartramia longicauda	coracoid	KUVP 9912

References: Hibbard, 1952; Galbreath, 1955; Semken, 1966.

### 33. Sandahl Local Fauna

Material: The following are known from fragments in the collections of the University of Michigan Museum of Paleontology (UMMP).

Trionyx sp.		
Ambystoma tigrinum		
Scaphiopus bombifrons		
Bufo woodhousei		
Rana pipiens		
?Pseudemys		
Eumeces sp.		
Heterodon cf. H. playrhinos		
Natricinae indet.	Indeterminate natricine snakes	
Bufo cognatus		
Bufo sp.	toad	
Pseudacris triseriata		
Sceloporinae indet.	Indeterminate sceloporine lizard	
Cnemidophorus cf. C. sexlineatus		
Coluber or Masticophis		
Natrix sipedon		
Thamnophis sp.		
Tropidoclonion lineatum		
Crotalus cf. C. viridis		

The following known specimens in the collections of KU, MNH, UMMP, Bethany College Museum (BCM), and McPherson College Museum (MCM).

Lepisosteus sp.	scales	UMMP 50456
Ictalurus sp.	spines	UMMP 50457
Stizostedion vitreum (percidae)	paraphenoid	UMMP 50483
Perca flavescens	opercle	UMMP 50455
Mylohyus nasutus	palate*	UMMP 44703
	molar	UMMP
Sorex cf. cinereus	mandible	UMMP 50387
Megalonyx leidy	skull*	BCM (type)
Megalonyx sp.	phalanges	UMMP 50930
		BCM 4088
Paramylodon cf. harlani	vertebra	MCM 50

Cynomys ludovicianus	mandible	UMMP 45355
Cynomys cf. gunnisoni	molars	UMMP 50388
	mandible	UMMP 50463
Citellus tridecemlineatus	teeth	UMMP 50394, 50470
	mandible	UMMP 50396
Citellus richardsoni	mandibles	UMMP 50396, 50471
	teeth	UMMP 50399
Geomys bursarius	fragments	UMMP 50400, 50402, 504
Perognathus sp.	mandible	UMMP 50473
Castor canadensis	molars	UMMP 50927, 50929
Castorides sp.	incisor	UMMP 51166
	astragalus	UMMP 50921
Onychomys sp.	molars	UMMP 50404, 50474
Reithrodontomys cf. montanus	mandible	UMMP 50405
Peromyscus cf. progressus	fragments	UMMP 50406, 50407, 50408
Neotoma sp.	molar	UMMP 50475
Ondatra nebrascensis	molar	UMMP 50519
	mandible	UMMP 50520
Microtus ochrogaster	fragments	UMMP 44764, 50420, 52610, 50476
Microtus pennsylvanicus	mandibles	UMMP 45356, 5043, 50477
Zapus hudsonius	mandible	UMMP 45357
Dinobastis serus (Felidae)	calcaneum	UMMP 50918
Mammuth americanus	molar	KUVP 4929
Mammuthus columbi	molar	MCM 65
Lepus sp.	tooth	UMMP 50947
Camelops sp.	teeth	UMMP 50431, 50492, 50464
Odocoileus sp.	mandible	UMMP 50920
Equus cf. niobrarensis	fragments	UMMP 50618, 50617, 50465, 50526
	mandible	MCM 42
Smilodon sp.	fragment	MCM 9

34. "10 miles west of Lindsborg"

Material: Mammuthus imperator molar BCM 896

Reference: Hibbard, 1952





- |     |   |                   |                                       |
|-----|---|-------------------|---------------------------------------|
|     |   | mandible          | KUVP 34617                            |
|     |   | metapodial        | KUVP 31012                            |
|     |   | sacrum            | KUVP 31011                            |
| 50. | KU-WYA-4                                    |                   |                                       |
|     | Material: <i>Bison crassicornis</i>         | skull*            | KUVP 9905                             |
|     | Reference: Lillegraven, 1966.               |                   |                                       |
| 51. | "Bonner Springs area in the Kaw River bed"  |                   |                                       |
|     | Material: <i>Megalonyx</i>                  | femur*            | Wyandotte<br>Co. Museum<br>unnumbered |
|     | <i>Proboscidea</i>                          | fragments         | KUVP<br>uncatalogued                  |
|     | <i>Odocoileus</i>                           | skulls            | KUVP<br>uncatalogued                  |
|     | <i>Homo sapiens</i>                         | partial<br>skull* | KUVP 54001<br>(figure 3)              |
|     |   | femur*            | KUVP 54002,<br>54003                  |
|     | <i>Symbos cavifrons</i>                     | partial<br>skull* | KUVP 54004<br>(figure 4)              |
|     | Reference: Nelson & Neas<br>(in manuscript) |                   |                                       |
|     | <i>Bison bison</i>                          | skull             | KUVP 54005<br>(Cover illustration)    |



10 cm

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Figure 1. Upper molar of adult mastodon, Mammut americanus (KUPV 5898), from Kansas River at Topeka, Shawnee County, Kansas.

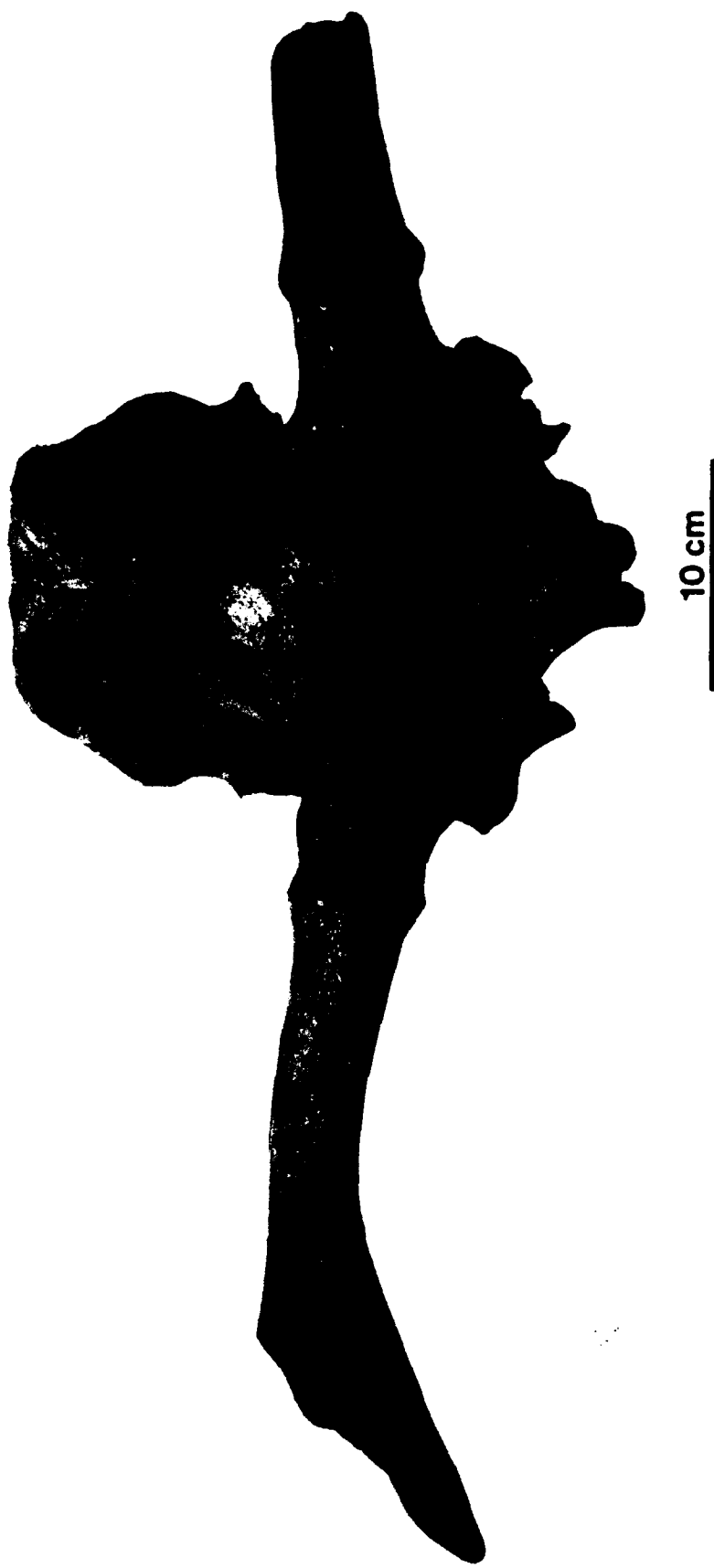


Figure 2. Partial skull of an immature male stag-moose, Cervalces scotti (KVP 5069), from Kansas River at Topeka, Shawnee County, Kansas.



10 cm

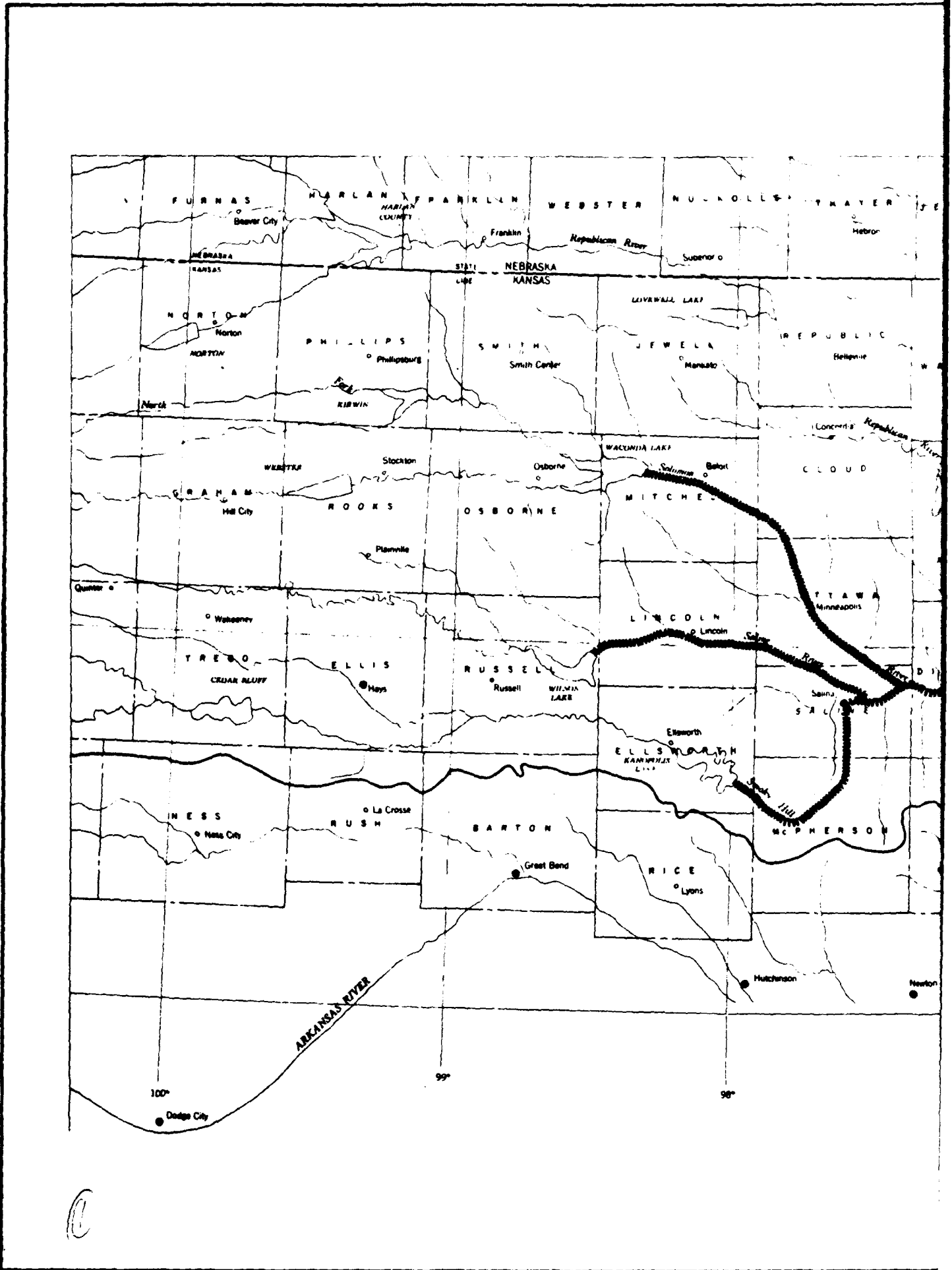
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Figure 3. Frontal bone of human, Homo sapiens (KUPV 54001), from Kansas River at Bonner Springs, Wyandotte County, Kansas.



10 cm

Figure 4. Partial skull of woodland musk ox, *Symbos cavifrons* (KUPV 54004), from Kansas River at Bonner Springs, Wyandotte County, Kansas. Reported by Nelson and Neas, in manuscript.



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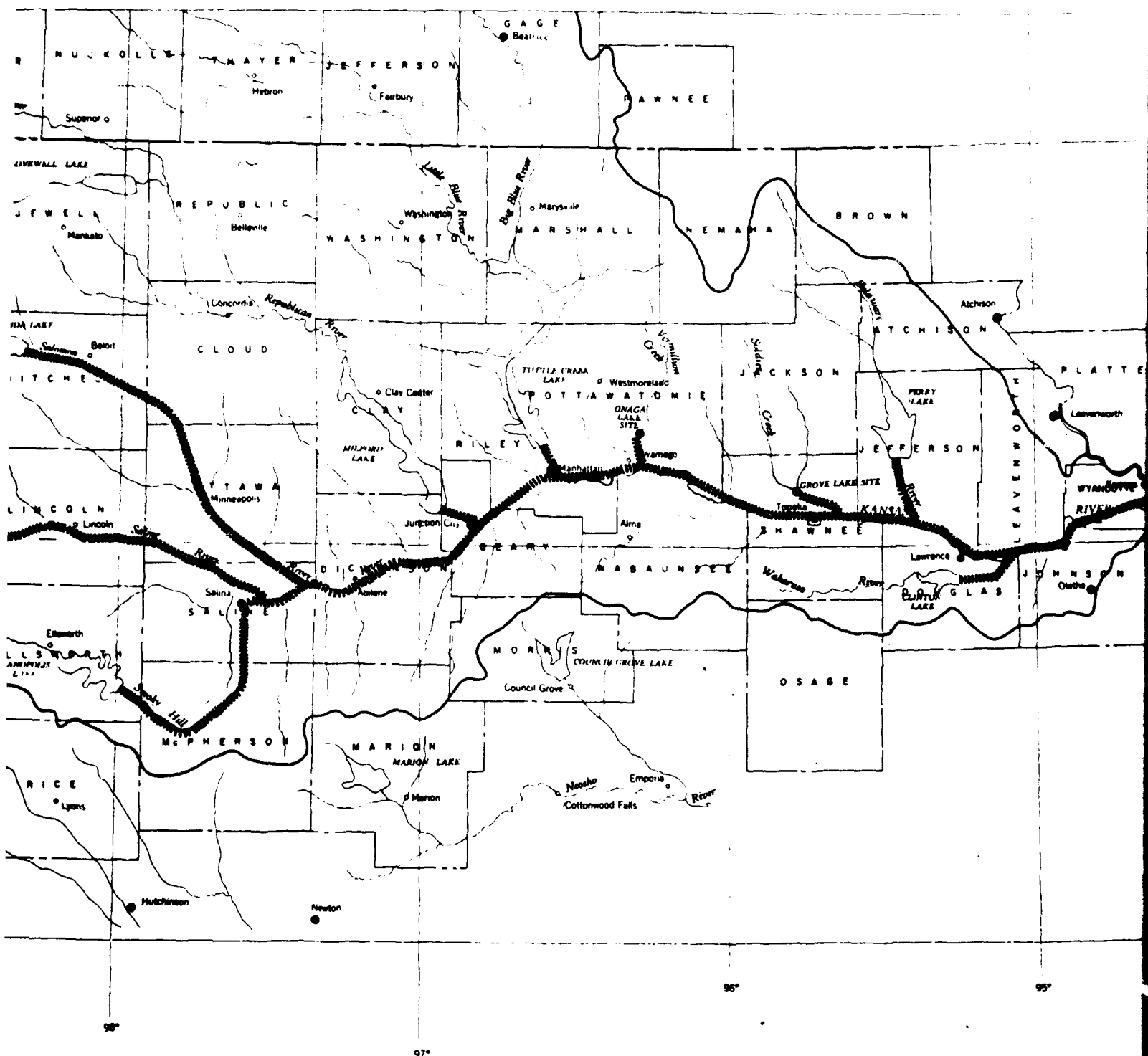
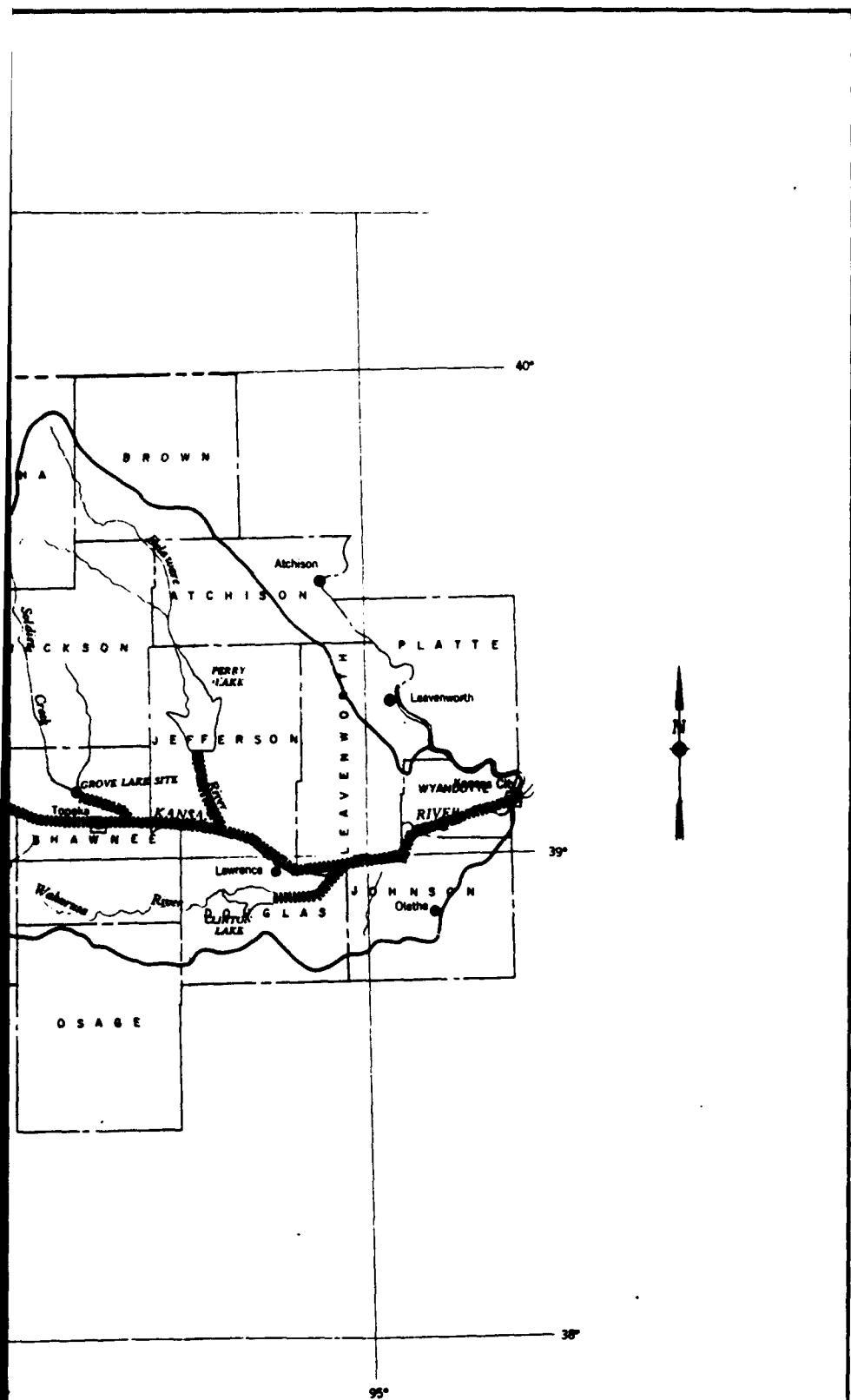


FIGURE 5.  
 Map of counties, East-Central Kansas, covered in this report with delineation of the Kansas River and tributaries under study.

BANK S



1 Kansas, covered in this  
the Kansas River and tribu-

(3)

KANSAS RIVER AND TRIBUTARIES  
**BANK STABILIZATION STUDY**  
 STUDY REACHES ~~INDICATED~~  
 CORPS OF ENGINEERS U. S. ARMY  
 KANSAS CITY DISTRICT  
 SEPTEMBER 1977

## Cultural Significance of Listed Localities

Localities listed as: 1, 3, 17, 26, 27, 30, 33, are certainly of middle Pleistocene age and cannot be expected to produce associations with human culture. However, they are important localities which contribute to our understanding of Pleistocene climate and fauna. Number 17 (the Kanopolis Local Fauna) may be the only known important assemblage of Yarmouthian age and demonstrates the existence of giant armadillo, Holmesina, in Kansas. Localities listed as 1, 2, 7, 8, 12, 13, 15, 21, 22, 24, 41, 42, 43, 45, 46, 50, and 51 have produced Late Pleistocene fauna and may produce human associations with Pleistocene fauna. Locality 51 has already produced some human bones which may be Pleistocene although further testing is required to support such an assignment. The remaining localities have produced material of either uncertain or Holocene age.

Localities of Paleozoic age have also been included (Appendix II) for the sake of completeness. They demonstrate an early interest in Paleozoic fossils in this region and include several unique and important sites.

## Recommendations

The extensive fossil productivity of the sediments exposed in the banks of the Kansas River drainage system in the past and the significant recent discoveries by interested but non-professional parties demonstrates that an expanded search and recovery effort should be undertaken if sites are in danger of destruction and that such an effort would be highly rewarded.

It is suggested that localities of proven productivity be revisited and evaluated for possible excavation. This should be done by boat and by foot with emphasis placed on that part of the system in which recent discoveries have been made (particularly locality 51 and the surrounding area). It would be useful to elicit the cooperation of non-professionals whose interest in the vertebrate fauna of this area has sparked a number of significant discoveries. At this time the relative importance of the known localities could be assessed and localities in which a collecting effort would be worthwhile, determined.

This survey would provide the Kansas City District Corps of Engineers with a detailed report of the physical inspection of each known locality in the Bonner Springs area, and those that may be discovered, along this part of the river. It will include a statement of the abundance and importance of fossils at each locality with an assessment of immediate excavation, continued scrutiny, or salvage in the event of impending construction in the vicinity.

## REFERENCES

- Frye, J. C., and C. W. Hibbard. 1941. Stratigraphy and paleontology of a new Middle and Upper Pleistocene formation of south-central Kansas. *Journal of Geology*. 49:261-278.
- \_\_\_\_\_, A. B. Leonard and C. W. Hibbard. 1943. Westward extension of the Kansas "Equus Beds". *Journal of Geology*. 51:33-47.
- Galbreath, E. C. 1955. An avifauna from the Pleistocene of central Kansas. *Wilson Bull.* 67:62-63.
- Hay, O. P. 1924. The Pleistocene of the middle region of North America and its vertebrate animals. *Carnegie Inst. (Washington)*.
- Hibbard, C. W. 1943. The Rezabek fauna, a new Pleistocene fauna from Lincoln Co., Kansas. *Kans. Univ. Sci. Bull* 29:235-246.
- \_\_\_\_\_, 1952. Vertebrate fossils from Late Cenozoic deposits of central Kansas. *Univ. Kans. Paleont. Cont. Vertebrata* 2:1-14.
- \_\_\_\_\_, 1970. Pleistocene mammalian local faunas from the Great Plains and central lowland provinces of the United States. [In] *Pleistocene and recent environments of the central Great Plains*, W. Dort Jr. and J. K. Jones, Jr. (eds.). University of Kansas Press, Lawrence. 395-433 p.
- \_\_\_\_\_, and others. 1978. Mammals from the Kanopolis local fauna, Pleistocene (Yarmouth) of Ellsworth County, Kansas. *Mich. Univ. Mus. Paleontol. Contrib.* 25:11-44.
- Holman, J. A. 1971. Herpetofauna of the Sandahl local fauna of Kansas. *Mich. Univ. Mus. Paleontol. Contrib.* 23:349-355.
- \_\_\_\_\_, 1972. Herpetofauna of the Kanopolis local fauna (Pleistocene, Yarmouth) of Kansas. *Mich. Acad.* 5:87-98.
- Lane, H. H. 1945-1948. A survey of the fossil vertebrates of Kansas; Parts I-V, *Trans. Kans. Acad. Sci.* vol. 47-51.
- Leidy, J. 1873. Contributions to the extinct vertebrate fauna of the western territories; Report of the United States Geological Survey of the Territories, F. V. Hayden, Geologist in charge, Vol. 1, 358 p.
- Lillegraven, J. A. 1966. Bison crassicornis and the ground sloth, Megalonyx jeffersoni in the Kansas Pleistocene. *Trans. Kans. Acad. Sci.* 69:294-300.

- Lindahl, J. 1892. Description of a skull of Megalonyx leidy, n. sp. Trans. Am. Phil. Soc. n. s. 17:1-10.
- McClung, C. E. 1905. The fossil bison of Kansas. Trans. Kans. Acad. Sci. 19:157-159.
- Martin, L. D. 1972. Coelacanth fishes from the Pennsylvanian and Permian of Nebraska and Kansas. Neb. Acad. Sci., 82:40-41.
- Marsh, O. C. 1877. New Vertebrate Fossils. Amer. Jour. Sci. Ser. 3, 14:252.
- Mason, S. C. 1883. A preliminary list of fossils found in Riley County: Trans. Kan. Acad. Ci., 8:12-13.
- Neff, N. A. 1975. Fishes of the Kanopolis local fauna (Pleistocene) of Ellsworth County, Kansas. Mich. Univ. Mus. Paleontol. Paper 12:39-48.
- Nelson, M. E., J. F. Neas, Unpublished manuscript.
- O'Brien, P. 1968. A mastodon tusk from Manhattan, Kansas, Trans. Kans. Acad. Sci. 71:90-91.
- Rasmussen, D. L., L. D. Martin, J. D. Chorn and D. F. Slimmer. 1971. Vertebrate assemblages from channel sandstones in the Pennsylvanian and Permian megacyclothems of Kansas and Nebraska. North-central section Geo. Soc. Am. 3:276.
- Savage, J. 1877-1878. On mastodon remains in Douglas County. Trans. Kans. Acad. Sci. 6:10-11.
- Semken, H. A. 1966. Stratigraphy and paleontology of the McPherson Equus beds. Mich. Univ. Mus. Paleontol. Contrib. 20:121-178.
- \_\_\_\_\_, and C. D. Griggs. 1965. The long-nosed peccary, Mylohyus nasutus, from McPherson County, Kansas. Mich. Acad. Sci. 50: 267-275.

APPENDIX I  
GLOSSARY OF SCIENTIFIC NAMES

- Acris crepitans* - Northern Cricket Frog  
*Ambystoma tigrinum* - Tiger Salamander  
*Anas carolinensis* - Green Winged Teal  
Antilocaprinae - Pronghorn Antelope  
*Bartramia longicauda* - Upland Plover  
Bison - American Buffalo  
*Bison antiquus* - Extinct bison often found associated with Paleo-Indian sites  
*Bison crassicornis* - Extinct bison  
*Blarina* - Short-tailed Shrew  
*Blarina fossilis* - Extinct Shrew  
*Bufo cognatus* - Great Plains Toad  
*Bufo woodhousei* - Woodhouse's Toad  
Camelops - Extinct North American Camel  
Campodus - Hybodont shark with crushing teeth  
Campostoma - Stoneroller Minnow  
*Castor canadensis* - Beaver  
*Castoroides* - Giant Beaver  
*Cervalces* - Extinct Stag-moose  
Cervidae - Deer  
*Cervus* - Elk  
*Chelydra serpentina* - Snapping Turtle  
*Citellus richardsoni* - Richardson Ground Squirrel  
*Citellus tridecemlineatus* - Thirteen-lined Ground Squirrel  
*Cladodus occidentalis* - Member of the oldest group of sharks. Known from its sharp piercing teeth.  
*Cnemidophorus sexlineatus* - Six-lined Race-runner lizard  
Coelacanth - Lobe-finned fishes related to lungfish and amphibians. They survive today in the Indian Ocean.  
Colubrinae - The most common North American snakes  
*Coluber* - Racer Snake  
*Crotalus viridis* - Western Rattlesnake  
*Cryptotis parva* - Least Shrew  
*Cynomys gunnisoni* - White-tailed Prairie Dog  
*Cynomys ludovicianus* - Black-tailed Prairie Dog  
Cyprinidae - Minnows  
*Dinobastis serus* - Saber-toothed Cat  
Equidae - Horses  
*Equus* - Horse  
*Eumeces* - Striped Skink  
*Eumeces fasciatus* - Five-lined Skink  
*Euphagus cyanocephalus* - Brewer's Blackbird  
*Felis* - Cat

Geomys - Eastern Pocket Gopher  
 Geomys bursarius - Prairie Pocket Gopher  
 Gigantocamelus - Giant camel  
 Graptemys geographica - Map Turtle  
 Hemiauchenia - Llama-like camel  
 Heterodon platyrhinos - Eastern Hognose Snake  
 Holmesina septentrionalis - Giant armadillo-like animal  
 Holostean - Primitive bony fish. Living forms are Gar and Bowfins  
 Homo sapiens - Man  
 Hyla versicolor - Gray Treefrog  
 Hybodont Sharks - A primitive group which gave rise to modern sharks  
 Ictaluridae - North American freshwater catfishes  
 Ictalurus melas - Black Bullhead  
 Ictalurus punctatus - Channel Catfish  
 Ictiobus niger - Black Buffalo Fish  
 Janassa - A shark with crushing teeth and a body shape like that of modern rays  
 Labyrinthodont - Extinct amphibians with complicated infolding of tooth enamel  
 Lepisosteus osseus - Longnose Gar  
 Lepomis cyaneus - Green Sunfish  
 Lepomis megalotis - Longear Sunfish  
 Lepospondyl - Extinct amphibians with spool-shaped vertebrate  
 Lepus - Hares and Jackrabbits  
 Lophodytes cucullatus - Hooded Merganser  
 Lungfish - Lobe-finned fishes which live today on the southern continents  
 Lutra canadensis - River Otter  
 Mammut americanus - American Mastodon, an extinct elephant  
 Mammuthus (Parelaphas) boreas - Boreal Mammoth, an extinct elephant  
 Mammuthus imperator - Imperial Mammoth  
 Mammuthus columbi - Columbian Mammoth  
 Masticophis - Coachwhip Snake  
 Megalonyx - Ground Sloth  
 Mephitis - Striped Skunk  
 Micropterus salmoides - Largemouth Bass  
 Microtus 1lanensis - Extinct Prairie Vole  
 Microtus ochrogaster - Prairie Vole  
 Microtus peroperarius - Extinct Meadow Vole  
 Microtus pennsylvanicus - Meadow Vole  
 Mylohyus nasutus - Woodland Peccary  
 Natricinae - Water Snakes  
 Natrix sipedon - Common Water Snake  
 Neofiber leonardi - Water Rat  
 Neotoma - Packrat  
 Nocomis - A Chub Minnow  
 Notropis - Shiner Minnow  
 Noturus - Madtom or Stonecat

*Numenius borealis* - Eskimo Curlew  
*Odocoileus virginianus* - White-tailed Deer  
*Ondatra annectens* - Extinct Muskrat  
*Ondatra nebracensis* - Extinct Muskrat  
*Ondatra zibethicus* - Muskrat  
*Onychomys* - Grasshopper Mouse  
*Ophisaurus attenuatus* - Slender Glass Lizard  
*Orodus*- A hybodont shark with ridge-like teeth for shell crushing  
Paleoniscid - Basal Groups of bony fishes. Distantly related to sturgeon  
*Paramylodon harlani* - Ground Sloth  
Pelycosaur - Primitive mammal-like reptile  
*Perca flavescens* - Yellow Perch  
*Perognathus hispidus* - Plains Pocket Mouse  
*Peromyscus progressus* - Extinct White-footed Mouse  
*Petalodus* - Shark-like fish with broad shell-crushing teeth  
*Pimephales promelas* - Fathead Minnow  
*Pituophis melanoleucus* - Pine (Bull) Snake  
Pleuracanth Sharks - Freshwater sharks of the Paleozoic Era  
Proboscidea - Elephants  
*Procyon lotor* - Raccoon  
*Pseudacris triseriata* - Chorus Frog  
*Pseudemys* - Sliders and Cooters (turtle)  
*Pseudemys scripta* - Pond Slider  
*Rana catesbeiana* - Bullfrog  
*Rana pipiens* - Leopard Frog  
*Regina grahami* - Graham's Water Snake  
*Reithrodontomys humulis* - Eastern Harvest Mouse  
*Reithrodontomys montanus* - Plains Harvest Mouse  
*Scalopus aquaticus* - Eastern Mole  
*Scaphiopus bombifrons* - Plains Spadefoot "Toad"  
Sceloporinae - Spiny Lizards  
*Sigmodon hispidus* - Common Cotton Rat  
*Sistrurus catenatus* - Massasauga Rattlesnake  
*Smilodon fatalis* - Saber-toothed Cat  
*Sorex cinereus* - Masked Shrew  
Sphenacodont - A generalized pelycosaur, lizard-like in form  
*Sternotherus odoratus* - Stinkpot Turtle  
*Stizostedion vitreum* - Walleye "Pike"  
*Symbos cavifrons* - Woodland Musk Ox  
*Sylvilagus floridanus* - Eastern Cottontail  
*Synaptomys kansasensis* - Extinct Bog Lemming  
*Tapirus veroensis* - Extinct Tapir  
*Thamnophis* - Garter Snake  
*Thomomys* - Western Pocket Gopher  
*Trionyx* - Softshell Turtle

Trionyx spiniferus - Spiny Softshell Turtle  
Tropidoclonion lineatum - Lined Snake  
Vulpes - Red Fox  
Xystracanthus arcuatus - A shark-like form with a forwardly  
curved dorsal spine  
Zapus hudsonius - Eastern Jumping Mouse  
Zapus sandersi - Extinct Jumping Mouse

## APPENDIX II

### PENNSYLVANIAN AND PERMIAN VERTEBRATES FROM THE KANSAS RIVER FLOODPLAIN

#### GEARY COUNTY

1. "Near Ft. Riley"  
Material: Cladodus occidentalis tooth lit. cit. only  
Reference: Leidy, 1873

#### LEAVENWORTH COUNTY

2. "Near Leavenworth, Carboniferous" (Pennsylvanian)  
Material: Xystracanthus arcuatus dorsal spine lit. cit. only  
Reference: Leidy, 1873

#### RILEY COUNTY

3. KU-RIL-4  
Material: sphenacodont pelycosaur mandible KUVF 30611
4. "Near Manhattan, Upper Carboniferous" (Pennsylvanian)  
Material: Cladodus occidentalis teeth lit. cit. only  
Reference: Leidy, 1873

#### SHAWNEE COUNTY

5. KU-SHA-1, KU-SHA-2, collectively called the "Topeka Bone Beds", Pennsylvanian  
Material: numerous uncatalogued fragments in the KU collection of Cladodus, pleuracanth sharks, hybodont sharks, Campodus, Orodus, Janassa, Petalodus, paleoniscid fishes, holostean fishes, coelacanth fishes, lungfish, lepospondyl and labyrinthodont amphibians, and pelycosaurian reptiles.  
Reference: Rasmussen, Martin, Chorn, and Slimmer, 1971

APPENDIX III  
CONTRACTOR'S VITAE

LARRY D. MARTIN

Position: Associate Professor of Systematics and Ecology and Geology and Curator of Vertebrate Paleontology, Museum of Natural History, University of Kansas.

Born: [REDACTED], [REDACTED]

Education: B.S. in Zoology, University of Nebraska, 1966  
M.S. in Geology, University of Nebraska, 1969  
Ph.D. in Biology, (Systematics and Ecology).  
University of Kansas, 1973

Professional positions and awards:

- a. Regents scholarships at the University of Nebraska 1962-1964 (Regent's All Scholastic Team, 1962), La Verne Noyles Scholarship, 1962, Green Memorial Scholarship (for field work in vertebrate paleontology) 1964.
- b. Teaching assistantships Department of Geology, University of Nebraska Fall 1966-Spring 1969 and Department of Systematics and Ecology, University of Kansas Fall 1970-Spring 1971
- c. Full-time research assistant, Department of Geology, University of Nebraska, and University of Nebraska State Museum (1969-1970).
- d. Member of the University of Nebraska Vertebrate Paleontology field parties from 1964-1971. Field party leader, Division of Vertebrate Paleontology of the Museum (1965-1969); supervisor of field parties in Nebraska for the Division of Vertebrate Paleontology of the Museum during the summers of 1970 and 1971.
- e. NDEA Fellowship at University of Kansas, September, 1971-August, 1972.
- f. Research affiliate in Vertebrate Paleontology, University of Nebraska State Museum.

Society affiliations:

American Society of Mammalogists  
Society of Vertebrate Paleontology  
Sigma Xi (National Science honorary)  
Sigma Gamma Epsilon (inactive-earth science honorary)  
Nebraska Academy of Sciences  
American Quaternary Association (AMQUA)  
Kansas Academy of Sciences  
Tertiary-Quaternary Association (TERQUA)  
International Union for Quaternary Research (INQUA)

Current List of Publications:

1966. A Bird with Teeth. Museum Notes, Univ. Nebraska State Mus., vol. 29, pp. 1-2, 1 fig. (with J. Tate).
1966. (Abstract) Tooth Replacement in Hyracodon. Proc. Nebr. Acad. Sci., 76th Meeting, p. 15.
1966. (Abstract) Fossil Birds in the State Mus. Proc. Nebr. Acad. Sci. 77th Ann. Meeting, p. 34. (with J. Tate).
1967. (Abstract) A Hesperornis from the Pierre Shale. Proc. Nebr. Acad. Sci. 77th Ann. Meeting, p. 40. (with J. Tate).
1967. X-ray Techniques for the Study of Fossil Vertebrates. The Compass of Sigma Gamma Epsilon, vol. 44(2), pp. 101-103, pls. 1-3.
1968. Horned Lark and Black-billed Magpie from the Nebraska Pleistocene. Condor, vol. 70(2), p. 183 (with J. Tate).
1968. (Abstract) Notes on Lower Oligocene Hyracondontids. Proc. Nebr. Acad. Sci. 78th Ann. Meeting, p. 23. (with L. G. Tanner).
1969. (Abstract) Cygnopterus affinis, a Probable Ancestor of Modern Swans. Proc. Nebr. Acad. Sci. 79th Ann. Meeting, p. 42. (with J. Tate).
1969. (Abstract) A Vertebrate Assemblage from the Early Permian of Nebraska. Proc. Nebr. Acad. Sci. 79th Ann. Meeting, p. 26.
1969. (Abstract) Flora and Fauna from an Upper Dakota Group Shale (Cretaceous) near Fairbury, Nebraska. Proc. Nebr. Acad. Sci. 79th Ann. Meeting, p. 27. (With R. K. Pabian and R. Lindsay).

1969. (Abstract) Evolutionary Trends in Certain Phylogenetic Lines of Quaternary Mammals. Proc. Nebr. Acad. Sci. 79th Ann. Meeting, North-Central Section, p. 7. (with C. B. Schultz and L. G. Tanner).
1969. (Abstract) New Information on *Baptornis advenus*. Proc. Nebr. Acad. Sci. 79th Ann. Meeting, pp. 49-50 (with J. Tate).
1969. Canada Goose from the Middle Pleistocene of Nebraska. Condor, vol. 71(1), p. 81. (with J. Tate).
1969. (Abstract) Evolutionary trends in certain Phylogenetic Lines of Quaternary Mammals in the Central Great Plains Region of North America. Resumes des Communications, 8th Congress INQUA Paris, France, 1 page.
1970. Machairodont Cats from the Early Pleistocene Broadwater and Lisco Local Faunas. Bull. Univ. Nebraska State Mus., vol. 9(2), pp. 33-38, figs. 1-2. (with C. B. Schultz).
1970. Quaternary Mammalian Sequence in the Central Great Plains. Pleistocene and Recent Environments of the Central Great Plains (Dort, Wakefield, Jr., and J. Knox Jones, Jr. eds.) Univ. of Kansas Press. Lawrence, Kansas, pp. 341-353, figs. 1-3. (With C. B. Schultz).
1970. A New Turkey from the Pliocene of Nebraska. Wilson Bulletin, vol. 82(2), pp. 214-218, 1 fig. (with J. Tate).
1970. A New Tribe of Saber-toothed Cats (*Barbourofelini*) from the Pliocene of North America. Bull. Univ. Nebraska State Mus. vol. 9(1), pp. 1-32, figs. 1-13. (with C. B. Schultz and M. R. Schultz).
1970. (Abstract) The Earliest Known Turkeys Proc. Nebr. Acad. Sci. 80th Ann. Meeting, p. 60.
1970. (Abstract) Two Microtine Phylogenetic Lineages. Proc. Nebr. Acad. Sci. 80th Ann. Meeting, p. 35.
1970. (Abstracts) Mammalian Distribution in the Great Plains and Adjacent Areas from 14,000 to 9,000 Years Ago. For the first meeting of the American Quaternary Association (AMQUA) at Yellowstone Park, Montana State University, Bozeman, pp. 119-120. (with C. B. Schultz and L. G. Tanner).
1971. (Abstract) Paleozoic Tetrapods from Nebraska. Proc. Nebr. Acad. Sci. 81st Ann. Meeting, pp. 49-50.

1971. (Abstract) Vertebrate Assemblages from Channel Sandstones in the Pennsylvanian-Permian Megacyclothems of Kansas and Nebraska. G. S. A. 5th Ann. Meeting North-Central Section, p. 271. (With D. L. Rasmussen, J. D. Chorn, and D. F. Slimmer).
1971. (Abstract) The Stratigraphic Position and Paleoecology of the Angus Local Fauna. G. S. A. 5th Ann. Meeting, North-Central Section, p. 271. (with C. B. Schultz).
1971. An Early Pleistocene Eagle from Nebraska. *Condor*, vol. 73(2), pp. 248-250, 1 fig.
1972. Phyletic Trends in Certain Lineages of Quaternary Mammals. *Bull. Univ. Nebraska State Mus.*, vol. 9(6), pp. 183-195, figs. 1-6. (with C. B. Schultz and L. G. Tanner).
1972. Notes on the Deciduous and Permanent Dentition of the Hyracodonts. *Trans. Nebraska Acad. Sci.*, vol. 1, pp. 1-12, pls. 1-6. (with L. G. Tanner).
1972. Two Lynx-like Cats from the Pliocene and Pleistocene. *Bull. Univ. Nebraska State Mus.*, vol. 9, no. 7, pp. 197-203, figs. 1-3. (with C. B. Schultz).
1972. A New Owl from the Eocene of Wyoming. *Auk*, vol. 89(4), pp. 887-888, 1 fig. (with C. C. Black).
1972. Review: E. Tchernov, "Succession of Rodent Faunas During the Upper Pleistocene of Israel: Morphologie, Taxonomie, and Systematik der Nagetierfauna in Israel Wahrend des Jungeren Pleistozans." *Journal of Mammalogy*, vol. 53(2), pp. 411-412.
1972. (Abstract) Coelacanth fishes from the Pennsylvanian and Permian of Nebraska and Kansas. *Proc. Nebr. Acad. Sci.*, 82nd Ann. Meetings, pp. 40-41.
1972. The Microtine Rodents of the Mullen Assemblage. *Bulletin of the University of Nebraska State Museum*, vol. 9(5), pp. 173-182, 3 figs.
1974. New Rodents from the Lower Miocene Gering Formation of Western Nebraska. *Occasional Papers of the Museum of Natural History of the University of Kansas*, no. 32, pp. 1-12, 3 figs.
1975. A New Species of Anhinga (Anhingidae) from the Upper Pliocene of Nebraska. *Auk*, vol. 92(1), pp. 137-140, 2 figs.

1975. Middle and Late Cenozoic Tapirs from Nebraska. Bulletin of the University of Nebraska State Museum, vol. 10(1), pp. 1-21 (with C. B. Schultz and R. G. Corner).
1975. A New Kimballian Peccary from Nebraska. Bulletin of the University of Nebraska State Museum, vol. 10(1), pp. 35-46 (with C. B. Schultz).
1975. Bears (Ursidae) from the Late Cenozoic of Nebraska. Bulletin of the University of Nebraska State Museum, vol. 10(1), pp. 47-54 (with C. B. Schultz).
1975. Scimitar-toothed Cats, Machairodus and Nimravides, from the Pliocene of Kansas and Nebraska. Bulletin of the University of Nebraska State Museum vol. 10(1), pp. 55-63 (with C. B. Schultz).
1975. A New Species of Spizaetus from the Pliocene of Nebraska. Wilson Bulletin, vol. 87(3), pp. 413-416.
1975. Review: Joel Cracraft, Systematics and Evolution of the Gruiformes (Class Aves). 3. Phylogeny of the Suborder Grues. Wilson Bulletin, vol. 87(3), pp. 438-439.
1975. (Abstract) Biostratigraphic Relationships of the Early Miocene Gering Fauna. Proceedings of the Nebraska Academy of Sciences 85th Annual Meeting, p. 41.
1975. Microtine Rodents from the Ogallala Pliocene of Nebraska and the Early Evolution of the Microtinae in North America. Studies on Cenozoic Paleontology and Stratigraphy in honor of Claude W. Hibbard, vol. 3, (Smith, G. R. and N. E. Friedland, eds.), Univ. of Michigan Papers on Paleontology, no. 12, pp. 101-110, 7 figs.
1976. The Eocene Zygodactyl Birds (Aves: Piciformes) of North America. Collected Papers in Avian Paleontology Honoring the 90th Birthday of Alexander Wetmore, (Olson, Storrs, eds.) Smithsonian Contributions to Paleobiology, no. 27, pp. 101-110, figs. 1-6. (with A. Fedducia).
1976. The Skeleton of Baptornis Advenus (Aves, Hesperornithiformes). Collected Papers in Avian Paleontology Honoring the 90th Birthday of Alexander Wetmore, (Olson, Storrs, eds.) Smithsonian Contributions to Paleobiology, no. 27, pp. 35-66, figs. 1-22. (with J. Tate).
1976. New Rhinocerotids from the Oligocene of Nebraska. ATHLON, Essays on Paleontology in Honour of Loris Shano Russell, (C. S. Churcher, ed.) Royal Ontario Museum Miscellaneous Publication, pp. 210-219, figs. 1-4 (with L. G. Tanner).

1977. The Relationship of the Sequence of Microtine Rodents in North America to the Neogene/Quaternary Boundary. Abstracts, 10th Congress INQUA, Birmingham, England, 1 page.
1977. Provincial Land Mammal Ages for the North American Quaternary. Abstract, 10th Congress INQUA, Birmingham, England, 1 page (with C. B. Schultz, L. G. Tanner and R. G. Corner).
1977. A Whooping Crane from the Late Pleistocene of Kansas. Kansas Ornithological Bulletin, vol. 28:22-23.
1977. A Cheetah-like Cat in the North American Pleistocene. Science, vol. 195:981-982. (cover) (with B. M. Gilbert and D. B. Adams).
1977. The Oldest (Turonian) Mosasaurs from Kansas. Journ. Paleo., vol. 51(5):973-975 (with J. D. Stewart).
1977. Teeth in Ichthyornis (Class: Aves). Science, vol. 195:1331-1332 (with J. D. Stewart).
1977. Biostratigraphy of the Neogene-Quaternary Boundary in North America. Report, IGCP Second Symposium on the Neogene/Quaternary Boundary, Inst. Geol. Bologna, Italy, pp. 251-272 (with C. B. Schultz):
1977. An Immature Baptornis advenus from the Cretaceous of Kansas. Auk, vol. 94, no. 4, pp. 787-789, 1 fig. (with O. Bonner).
1977. The Burrows of the Miocene Beaver Palaeocastor, Western Nebraska, N.S.A. Palaeogeography, Palaeoclimatology, Palaeoecology vol. 22, pp. 173-193, figs. 1-11. (with D. K. Bennett).
1978. The End of the Pleistocene in North America. TER-QUA Symposium, THE ICE AGE -- WHEN DID IT BEGIN AND HAS IT ENDED, Trans. Nebraska Acad. Sciences, Vol. 6:117-126. (with A. M. Neuner).
1978. Excavations at Natural Trap Cave, TER-QUA Symposium, THE ICE AGE -- WHEN DID IT BEGIN AND HAS IT ENDED, Trans. Nebraska Acad. Sciences, Vol. 6:107-116. (with B. M. Gilbert).
1978. Provincial Land Mammal Ages for the North American Quaternary. Trans. Nebraska Acad. Sciences, Vol. 5:59-64. (with C. B. Schultz, L. G. Tanner and G. R. Corner).
1978. A multivariate Comparison of Some Extant and Fossil Felidae, Carnivora. Carnivore, Vol. 1(1):80-88. (with G. Glass).

1978. An American Lion, Panthera atrox, from Natural Trap Cave, North-Central Wyoming. Contrib. to Geology, Univ. Wyoming, Vol. 16(2):95-101 (cover). (with B. M. Gilbert).
1978. Foot-Propelled Diving Birds of the Mesozoic. Abstracts, XVII International Ornithological Congress, p. 3.
1978. Paleontology and Paleoecology of Natural Cave. Abstracts, Fifth AMQUA Meetings, p. 203. (with B. M. Gilbert and S. A. Chomko).
1978. Martin, L. D. and K. Whetstone. An Oligocene Sirenian from The Bucatunna Formation of Alabama. Tulane Studies in Geology and Paleontology, 14:161-163.
1979. Martin, L. D. and B. M. Gilbert. Dicrostonyx (Rodentia) from the Late Pleistocene of Northern Wyoming. Jour. Mammalogy, 60:193-195.

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Research assistant to L. D. Martin

Field of Study: Fossil vertebrates

Education: B.S. (Honors) University of Alabama - Geology, 1975  
M.A. (Honors) University of Kansas - Systematics  
and Ecology, 1977.

### Awards and Honors:

Birmingham Southern College Summer Scholarship - 1970  
University of Alabama Alumni Honors Scholar - 1971-75  
W. B. Saffold Prize in Classical Languages - 1971-72  
Phi Beta Kappa (elected 1974)  
Sigma Gamma Epsilon (Geology Honorary, elected 1975)  
Summer Honors Fellowship, University of Kansas - 1977  
Fulbright Graduate Fellow (United Kingdom) - 1978-79

### Research Grants:

University of Alabama Undergraduate Research Grants: 1975  
Chapman Fund - 1979  
Sigma Xi - 1979

### Professional positions:

Academic year 1979-80: Research assistant, Museum of Natural  
History, University of Kansas  
Academic years 1975-76, 1976-77, 1977-78: Graduate Teaching  
assistant in Human Anatomy, General Biology  
Summer 1976 - Curatorial assistant to KU Vertebrate  
Paleontology field party  
Summer 1975 - Assistant archaeologist, Ft. Toulouse Historical  
Site (State of Alabama, Historical Commission)

Society affiliations:

Society of Vertebrate Paleontology  
Geological Society of America  
Alabama Geological Society  
Kansas Academy of Sciences  
Sigma Xi

Publications:

Numerous publications in regional geology, vertebrate paleontology, and invertebrate paleontology. A list is available upon request.

## CURRICULUM VITAE

Name: John D. Chorn

Office: Museum of Natural History  
University of Kansas  
Lawrence, Kansas 66045  
Phone: 913-864-3216

Present Position: Graduate Student (Ph.D) Systematics and Ecology and Curatorial Assistant, Division of Vertebrate Paleontology

Field of Study: Systematics of fossil fish, amphibians, and reptiles, and paleoecology of paleozoic vertebrate communities, osteology of Pleistocene vertebrates.

Education: B.A. in Geology, Drury College, Springfield, MO., 1970, M.A. Systematics and Ecology, Univ. Kans., Lawrence, KS, 1978. Three years graduate work in Geology at the University of Kansas; four years graduate work in Systematics and Ecology at the University of Kansas.

Military Service: 63rd Engineer Topographic Corp - two years (U.S. Army)

### Professional positions:

- a. Directed field preparation lab at Natural Trap Cave - 1976-1979.
- b. Research assistant to Dr. Larry D. Martin for Fall, 1977  
Teaching assistant, Comparative Anatomy, Spring, 1979

### Society affiliations:

Society of Vertebrate Paleontology  
Kansas Academy of Sciences  
Nebraska Academy of Sciences  
Sigma Xi (Associate member)

Committees: Search Committee (Lower Vertebrate Paleontologist)  
Budget Committee (Graduate Student Council)

Current List of Publications

John D. Chorn

1971. (Abstract) Vertebrate Assemblages from Channel Sandstones in the Pennsylvanian-Permian Megacyclothems of Kansas and Nebraska. G.S.A. 5th Ann. Meeting North-Central Section, p. 271. (with D. L. Rasmussen, L. D. Martin, and D. F. Slimmer).
1976. (Abstract) Fossil Lungfishes in Kansas. Trans. Kan. Acad. Sci. (Presented before Annual Meeting of the Kansas Academy of Sciences).
1977. (Abstract) A Late Pennsylvanian Vertebrate Assemblage from Stromatolites in the Bern Limestone, Northeastern Kansas. Trans. Kan. Acad. Sci. (with C. D. Conley) Presented before Annual Meeting of the Kansas Academy of Sciences).
1978. On the Use of the Term Nomen Vanum in Taxonomy. Jour. Paleo. (with Kenneth Whetstone).
1978. Helicoprion (Elasmobranchii, Edestidae) from the Bone Spring Formation (Lower Permian) of West Texas. Univ. Kan. Paleontological Contrib.
1978. Affinities of the Chondrichthyan Organ-Genera Listracanthus and Petrodus. Univ. Kan. Paleontological Contrib. (with E. A. Reavis)
1978. A Large Chondrichthyan Spine, Physonemus mirabilis, from the Upper Pennsylvanian of Kansas, U.S.A. Neues Jahrbuch fur Geol. und Palaeont. Monatshefte. (with David Frailey)
1978. Mammalian Species. Ailuropoda melanoleuca (Giant Panda). (with R. S. Hoffmann)
- In Press (Abstract) Stromatolites in a Schizohaline Environment-- A Vertebrate Death-Trap from the Pennsylvanian of Northeast Kansas. Geol. Soc. Amer. (with C. D. Conley)

## CURRICULUM VITAE

Name: Carl David Frailey

Address: Division of Vertebrate Paleontology, Museum of Natural History, University of Kansas, Lawrence, KS 66045

### I. Education

- A. Southern Illinois University, Carbondale, IL 62901; attended from June, 1965, to June, 1969; B.A. in Zoology with Geology minor.
- B. University of Florida, Gainesville, FL 32601; attended from September, 1969, to June 1971, and from March to June, 1974; M.S. in Zoology with a Geology minor, 1974.
- C. University of Kansas, Lawrence, KS 66045; Ph.D. program in Systematics and Ecology initiated in August, 1976.

### II. Work Experience

- A. January, 1979 to present. Teaching Asst., Dept. of Systematics and Ecology, University of Kansas. Supv: Dr. Ken Armitage.
- B. August, 1976 to December, 1978. Research Asst., Museum of Natural History, University of Kansas. Supv: Dr. Larry Martin.
- C. November, 1974 to July, 1976. Curatorial Asst., American Museum of Natural History, New York, NY 10024. Supv: Dr. Richard H. Tedford, Department of Vertebrate Paleontology.
- D. June, 1974 to August, 1974. Research Asst., Florida State Museum. Supv: Dr. Greg Shaak.
- E. September, 1971 to September, 1973. U.S. Army, Veterinary Technician.
- F. June, 1970 to July 1970. Research Asst., NIH-UF Cooperative Biological Investigations in Jamaica. Supv: Dr. T. H. Patton.
- G. September, 1969 to June, 1970. Teaching Asst., UF Dept. Zoology. Supv: Dr. Clifford Johnson.

- H. March, 1969 to June 1969. Teaching Asst., SIU Dept. Geology. Supv. Dr. John Utgaard.
- I. January, 1968 to March, 1969. Illustrator, SIU Dept. Zoology. Supv: Dr. William George.
- J. June, 1965 to January 1968. Exhibits Technician, SIU Museum. Supv: Mr. Darrell Harrison.

### III. Field Experience

1979, June-August. National Geographic Society - George C. Page Museum (Natural History Museums of L.A. County) Paleontological Expedition to Peru.

1978, June-September. University of Florida/L.A. County Museum Paleontological Expedition to Bolivia. Collected Cenozoic vertebrate fossils in cooperation with Servicio Geologico de Bolivia.

1977, August-September. National Geographic Society - George C. Page Museum (Natural History Museums of L.A. County) Paleontological Expedition to Southeastern Peru.

1977, July. Collected Oligocene and Miocene fossils in Wyoming and South Dakota with University of Kansas Museum of Natural History field party.

1976-1977, December-January. Surveyed Bolivia and Peru for research possibilities in vertebrate paleontology; collected fossils for the University of Kansas Museum of Natural History.

1976, August. Collected fossils in Florida for the University of Kansas Museum of Natural History.

1974, June. Surveyed Tertiary localities in Nebraska, Wyoming, and Colorado and collected fossils for the Florida State Museum.

1970, June-July. Located and collected small vertebrate fossils in cave deposits in Jamaica for zoogeographic studies of Dr. T. H. Patton of the Florida State Museum.

1969-1971. Various short collecting trips in Florida associated with graduate work at the University of Florida.

### IV. Special Interests and Current Research

Systematics of Cenozoic mammals of North and South America and evolution as it pertains to the fossil record. Currently engaged in descriptions of Tertiary faunas from Florida and Nebraska and bibliographic preparation for study in Peru and Bolivia.

V. Professional and Honor Society Memberships

- A. The Society of Vertebrate Paleontology
- B. The Paleontological Society
- C. Society of Systematic Zoology
- D. Timberlane Research Organization
- E. Kansas Academy of Science
- F. The Nebraska Academy of Sciences
- G. Sigma Xi, Associate Member
- H. Phi Sigma Biological Honor Society
- I. Phi Kappa Phi Honor Society

VI. Grants and Awards Received

Co-recipient of National Science Foundation Grants for work in Bolivia. 1978, DEB-7803122; 1979, DEB-7905861 (with K. Campbell, R. Wolff and B. MacFadden).

Co-recipient of National Geographic grants for field work in Peru (with Dr. Kenneth Campbell of the George C. Page Museum). 1977, 1979.

Saul Fund grant for work in South America, KU, 1976.

Claude Hibbard Memorial Fund grant for research in vertebrate paleontology, KU, 1976.

Graduate Fellowship, UF, 1970-71.

VII. Publications

1972. Additions to the Pleistocene avifauna of Arredondo, Florida. *Quart. Jour. Florida Acad. Sci.*, 35(1):53-54.

1976. Review of some carnivora (Mammalia) from the Thomas Farm Local Fauna (Hemingfordian; Gilchirst County, Florida). *Amer. Mus. Nat. Hist.*, Novit. no. 2610: 1-9 pp. (with Richard H. Tedford).

1977. Chasmaporthetes kani n. sp. from China with remarks on generic affinities within the Hyaenidae (Mammalia, Carnivora). *Amer. Mus. Nat. Hist.*, Novit. no. 2632: 1-16 pp. (with H. Galiano).

1978. Vertebrate paleontology in Bolivia and Peru: A prospectus for research. *Jour. Kansas Acad. Sci.* [Abs.]. (with Kenneth Campbell and Ronald Wolff).

1978. The SB-1A Local Fauna (Arikareean; Suwanee County, Florida).  
Occas. Papers Univ. Kansas Mus. Nat. Hist.
1978. A large chondrichthyan spine, Physonemus mirabilis, from  
the Upper Pennsylvanian of Kansas, U.S.A. Neues Jahrbuch  
fur Geologie und Palaontologie. (with John Chorn).
- In Press. The large mammals of the Buda Local Fauna (Alachua  
County, Florida). Bull. Florida St. Mus.
- In ms. Peromyscus (Podomys) floridanus. for Mammalian Species,  
American Society of Mammalogists. (with James Layne).
- In ms. A middle Oligocene fauna from Florida and its strati-  
graphic implications. (with John Waldrop).
- In ms. A Pleistocene Bufo from Peru. (with Kenneth Campbell).
- In ms. Hippocamelus, Myocastor, and Ctenomys from the Tarija  
Basin of Bolivia (Pleistocene). (with Kenneth Campbell and  
Ronald Wolff). (submitted to Occ. Papers, Mus. Nat. Hist.,  
KU).

## APPENDIX IV

### REVIEWER'S COMMENTS

Regarding the comments made by Joseph W. Snell, Executive Director and Kansas State Historic Preservation Officer: Pagination has been supplied, spelling errors corrected and the term "Carboniferous" has been replaced with the more specific term "Pennsylvanian". The citation requested for the quoted newspaper article is unknown. This reference is probably slightly less than 100 yearsold and could only be found by a search through each issue of the Lawrence, Kansas newspapers of that period. Although this quotation could be omitted or paraphrased I prefer to leave it as it is - unreferenced. I can only hope that this is satisfactory.

# Kansas State Historical Society

120 West Tenth • Topeka, Kansas 66612 • 913/296-3251

March 30, 1979

Donald L. Fritts  
Assistant Chief, Engineering Division  
Attn: MRKED-BR  
Kansas City District, Corps of Engineers  
700 Federal Building  
Kansas City, Missouri 64106

Dear Mr. Fritts:

Staff review of two reports pertaining to the Kansas river bank stabilization study has been completed. Comments on each of these reports is given below:

Although there is no one on the State Historic Preservation Officer's staff with the training to evaluate properly the "Survey of Fossil Vertebrates from East-Central Kansas" by Larry D. Martin, we offer several editorial comments: The term "Carboniferous" is no longer used to describe the geologic rock column in Kansas. (See "The Stratigraphic Succession in Kansas," Kansas Geological Survey Bulletin 189, Lawrence, 1968.) A citation should be supplied for the newspaper account on page 3. The Kansas county, "Geary," is misspelled on page 8. Pagination should be supplied.

Our comments on the "Preliminary Archeological Literature Search, Western Portion, Kansas River and Tributaries Bank Stabilization Study, Kansas," by Patricia O'Brien include both editorial remarks and criticism directed at the substance of the report:

Some pages of the report are not numbered and the tables are not indexed for reference. Several misspelled words are present, for instance the word "Saline" on page 35, when apparently Salina is meant. Neither of the maps, Figures 1 and 2, has a legend for use in its interpretation.



JOSEPH W. SNELL Executive Director  
ROBERT W. RICHMOND Assistant Executive Director  
PORTIA ALLBERT Librarian  
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The bibliography compiled for use as source material is very good and the search through archeological site files has apparently been thorough.

One apparent deviation of the report from the scope of work outlined in section 2.a. is the identification of a considerable number of sites located out of the floodplain of the study area. Knowledge of these sites is necessary for understanding the prehistory of the study area, but the scope of work was restricted to locating known sites in the floodplains of the rivers under study.

A major weakness of the report is the omission of any descriptive information about the geology, topography or environment of the river valleys under study.

The scope of work identifies channel migration and bank erosion as topics to be addressed by the study; however, this report does not describe these processes or relate these two phenomena to either the location or conservation of archeological resources in the study area.

Reference is made on page 33 to habitats used by prehistoric people, but the reader is given no information describing their nature. In a similar vein a scheme is used to order site locations according to topography. These are variously called "generalized zones" or "situational locales" and recommended survey areas are described in terms of "geomorphic settings," but no specific descriptions of these entities in terms of the Kansas river or its western tributaries is offered.

The comments below follow the outline of the report:

### Section III Introduction

The Kansas Anthropological Association does not maintain archeological site survey files. Members involved in the archeological certification program report site locations to the Kansas State Historical Society where they are incorporated into state survey files.

### Section IV Cultural Chronology

This section describes some of the artifacts associated with the prehistoric cultures identified in the survey area. Since the scope of work calls for information concerning archeological sites it would seem more appropriate to discuss the settlement pattern associated with each of these. Information about the location, size and variety of sites identified thus far would be more pertinent here than a description of pottery types or projectile point styles.

### Section VI Sites Identified

The "generalized zones" used to characterize archeological site locations have not been adequately described either in terms of the geology, topography and ecology of the four river valleys under study or in terms of the relationship of these "zones" to the archeological sites.



# United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE  
INTERAGENCY ARCHEOLOGICAL SERVICES - DENVER  
OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION  
1978 SOUTH GARRISON - ROOM 107  
DENVER, COLORADO 80227

IN REPLY REFER TO:

APR 24 1979

Mr. Donald L. Fritts  
Assistant Chief, Engineering Division  
Kansas City District, Corps of Engineers  
700 Federal Building  
Kansas City, Missouri 64106

Dear Mr. Fritts:

Our Washington office forwarded copies of the following reports which were sent to them for review and comment:

"Preliminary Archeological Literature Search, Western Portion, Kansas River and Tributaries Bank Stabilization Study, Kansas" by Patricia O. Brien,

"Survey of Fossil Vertebrates from East-Central Kansas" by Larry D. Martin, and

"A Proton Magnetometer Survey of borrow Areas Along Cut-Off Lake: L-246" by Larry Grantham and Earl W. McMurry.

Our current workload does not allow us time for review of these documents; however, lack of this action does not imply our endorsement of the reports.

Thank you for the opportunity to review these reports. We hope to provide this service in the near future.

Sincerely yours,

J. S. Hoffman  
Acting Chief, Interagency  
Archeological Services - Denver



Section VII Assessment

The discussion under the heading "Cultural Affiliation" disagrees with the accompanying table entitled "Identifiable Components on the Drainages of the Western Kansas River Basin" concerning the numbers of sites that can be assigned to a cultural/historical time period. The discussion states the cultural affiliation of 33 of 113 sites in the western Kansas river basin is unknown, leaving a total of 80 sites culturally identified, while the table lists 88 sites identified with a cultural/historical time period.

The table entitled "Location of Sites Within the Western Kansas River Basin by Identified Components" is confusing. Apparently some numbers represent percentages and some represent total numbers of sites in different "situational locales."

The statement following the table that the locations of the sites indicate a diversity of habitats used by prehistoric people is not supported by any evidence for this diversity.

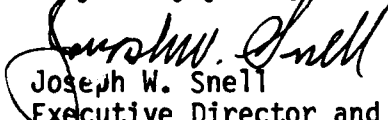
The statement that 48 sites in the study area are listed on the National Register of Historic Places is incorrect. Only four of the sites identified in this section have National Register status: the Paint creek (14MP1) and Swenson (14MP301) sites in McPherson county, the Minneapolis site (14OT5) in Ottawa county, and the Whiteford site (14SA1) in Saline county.

This section lacks a preliminary statement evaluating the eligibility of any of the sites for National Register listing such as is called for in Section 4.d. of the scope of work.

The proposed survey of "geomorphic settings" is not very well explained. It is not clear how these survey areas relate to the "generalized zones" or "situational locales" referenced earlier in the report, or how these geomorphic settings relate to the problems of channel migration or bank erosion that will be the ultimate concern of the study.

In summary, it appears that while sufficient research has been done to locate known archeological resources in the study area, this information is not considered in terms of the scope of work provided to assist in the study of the specific problems of channel migration or bank erosion.

Very truly yours,

  
Joseph W. Snell  
Executive Director and State  
Historic Preservation Officer

cc: Tom Witty  
State Archeologist