

# Transactions of the Kansas Academy of Science

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## Abstracts

- **Selachians from the Fort Hays Limestone Member of the Niobrara Chalk (Upper Cretaceous), Ellis, County, Kansas.** Kenshu Shimada, Department of Geosciences, Fort Hays State University, Hays, Kansas 67601-4099.

Vertebrates from the Fort Hays Limestone Member (uppermost Turonian?-Middle Coniacian) of the Upper Cretaceous Niobrara Chalk in Kansas are poorly known. Six selachian taxa from the member in Ellis County, Kansas, are described herein: *Ptychodus mortoni*, cf. *Scapanorhynchus* sp., *Cretolamna appendiculata*, *Cretoxyrhina mantelli*, *Paranomotodon* sp., and *Squalicorax falcatus*. These selachians probably occupied the highest positions in the food chain during the maximum invasion of the Niobrara sea. Because the gradationally overlying Smoky Hill Chalk contains a rich vertebrate fauna, including *P. mortoni*, *C. appendiculata*, *C. mantelli*, and *S. falcatus*, other fossil vertebrates may eventually be discovered in the Fort Hays Limestone.

- **Distributions of Kansas Permo-Carboniferous Vertebrate Assemblages as a function of Wet and Dry Seasons.** Christopher R. Cunningham and Ephriam D. Dickson, III. Houston Museum of Natural Science, One Hermann Circle Drive Houston, TX 77030-1799.

Vertebrate paleontologists generally consider lungfish such as *Gnathorhiza* and amphibians to be indicators of late Paleozoic freshwater environments. However, *Gnathorhiza* occurs in burrows in association with amphibians in localized blocky, rooted, and mudcracked deposits interpreted to be of ephemeral lacustrine origin within the Speiser Shale (Wolfcampian, Permian) as well as in estuarine (Hamilton quarry, Virgilian, Pennsylvanian) and marine (Bern Limestone, Virgilian, Pennsylvanian) settings leading a minority of paleontologists to consider these taxa as euryhaline forms.

Stratigraphic data indicate, however, that articulated Hamilton vertebrates occur only within the neap (fresher) part of tidal cycles within the dry parts of years. Sedimentological data from the Robinson locality likewise are consistent with alternate periods of freshwater and marine influence, perhaps wet and dry seasons. Stratigraphic distribution of vertebrate taxa from these localities therefore may indicate specific

paleoenvironmental requirements on the part of organisms within coastal areas subject to seasonal variation in salinity, rather than a tolerance for variable salinity.

- **Survey of Fishes from Rattlesnake Creek in Central Kansas.** Mark E. Eberle, Tom L. Welker, and Tim L. Welker. Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas 67601.

We collected 13 species of fishes at 10 sites in Rattlesnake Creek in Edwards, Stafford, and Rice counties, Kansas, during October 1993. In August 1995, a crew from Kansas Department of Wildlife and Parks sampled one site in Stafford County and captured 11 species. Historical collections in this stream included Arkansas darters (*Etheostoma cragini*), a threatened species in Kansas. None were taken in 1993, but they were captured in 1995. The alluvial aquifer of the lower reach of the stream is in contact with a geological formation that contributes chlorides to the surface water. Chloride values in October 1993 ranged from 10-39 mg/L in the upper portion of the creek to a maximum of 3140 mg/L in the lower reach. Concurrent with this change in water quality, a transition was noted in the fish communities from those dominated by adult red shiners (*Cyprinella lutrensis*) or juvenile common carp (*Cyprinus carpio*) in the upper reach to those dominated by adult plains killifish (*Fundulus zebrinus*) in the lower reach.

- **Ichthyosaur (Reptilia: Ichthyosauria) Vertebra from the Kiowa Shale (Lower Cretaceous: Upper Albian), Clark County, Kansas.** Kenshu Shimada, Department of Geosciences, Fort Hays State University, Hays, Kansas 67601-4099.

A partial centrum, belonging to the extinct reptilian order Ichthyosauria, from the Kiowa Shale (Lower Cretaceous: Upper Albian) of Kansas, is described formally for the first time. The specimen tentatively is referred to *Platypterygius* sp. Although paleoecology of the Kiowa vertebrate fauna remains poorly understood, the specimen described herein is important for providing a record of a relatively large ichthyosaur in the Kiowa fauna.

- **Hydrogen Bond Donor Acidity and Dipolarity in the Ethanol-Methanol System.** Orland W. Kolling, Natural Science Division, Southwestern College, Winfield, Kansas 67156.

The Kamlet-Taft dipolarity ( $\phi^*$ ) values were determined for the complete mole fraction range for the binary solvent, ethanol:methanol, at 25°C. Both dipolarity and hydrogen bond donor acidity shift linearly with mole fraction for the solvent mixtures in a manner consistent with a model for their liquid structures in which each component shares a common unit structure. Comparisons between dipolarities ( $\phi^*$ ) and longitudinal solvent relaxation times ( $T_L$ ) indicate a detectable "family dependence" for the latter in the role of the hydrogen bond donor alkanols as media for rapid electron transfer reactions.

- **Cancer Mortality in Kansas Farmers.** R. Scott Frey, Department of Sociology, Anthropology, and Social Work, Kansas State University, Manhattan, Kansas 66506.

Death certificate data were used to analyze the cancer mortality experiences of 3022 white male Kansas farmers for the period 1983-1989. Farmers were determined to be at reduced risk of death for overall cancer and lung cancer, whereas they were at increased risk of death for non-Hodgkin's lymphoma, leukemia, and cancers of the prostate and brain. Results generally are consistent with findings of previous research undertaken in the U.S. and other industrialized countries. Implications of the results are briefly discussed.

- **Science Libraries: Striving to Define Future Roles.** C. Ruth Nellis, Chemistry-Biochemistry Library, Kansas State University, Manhattan, Kansas 66506.

The complexities involved in the creation, publication, distribution, and access to scientific information has become a daunting maze for the science researcher. Just as scientists have made many changes in how they work with this explosion of information, libraries also are reevaluating their mode of operation. Libraries are looking for improved ways to assist the scientific information user within the rapidly expanding information environment.

- **Thomas Jefferson, Meriwether Lewis, The Corps of Discovery and The Investigation of Western Fauna.** P.D. Thomas, Department of History, Wichita State University, Wichita, Kansas 67260-0045.

The westward expansion of the emerging American nation nourished an interest not only in the political destiny of these unexplored and unsettled lands but also in the flora, fauna, peoples, and topography of these regions. Thomas Jefferson (1743-1826) was the catalyst for initiating the exploration of the lands beyond the Mississippi River and for ordering the initial scientific reconnaissance of this area. Jefferson's dreams of learning more about the continent's western lands were finally fulfilled by the success of Meriwether Lewis (1774-1809) and the Corps of Discovery (Lewis and Clark Expedition). Meriwether Lewis was charged by Jefferson with making the principal scientific observations, and ultimately he commented upon more than 250 species of western animals, 100 of which were new to science. Lewis' observations were the first sustained investigation of the fauna of the American West.

- **Persistence and Change in the Natural and cultural Landscapes of the Central Plains.** Donald J. Blakeslee, Department of Anthropology, Wichita State University, Wichita, Kansas 67260.

The historic period brought vast changes to the Great Plains landscape. This paper addresses three aspects of change and persistence in the native landscape. It argues that a major vegetation shift, from predominantly short grass to primarily mixed grass communities, occurred over a vast region as a result of the hunting out of bison herds. It also points to evidence that some hardwood forest communities have survived more or less intact in regions where there has been a significant change in the forest-grassland boundary as a result of the suppression of wildfires. Finally, it argues that Native

American trails exercised strong but generally unrecognized influence on the early Euro-American history of the region.

- **Kansas 19th Century Geologic Maps.** D.F. Merriam, Kansas Geological Survey, The University of Kansas, Lawrence, KS 66047.

A series of maps depicting the geology of Kansas from 1809 to 1896 are discussed in relation to the changing ideas on distribution of stratigraphic units in the State. The 1809 US map by William Maclure uses A.G. Werner's classification and extends to southeastern Kansas. The series of geologic maps goes through a sequence of Wernerian, Lyellian, The Great Reconnaissance, The Western Surveys, Kansas' Own, and U.S. Geological Survey maps, to the map of Erasmus Haworth in 1896, which may be considered the first "modern" representation and the basis for the 20th century maps. The maps represent all or parts of Kansas depending on the original intent of the map and availability of information. The earliest maps are hand-colored; later ones are color printed. Rock units recognized in the different compilations include the Lower Carboniferous (=Mississippian), Coal Measures (=Desmoinesian), Upper Carboniferous (=Missourian and Virgilian), Permian, Cretaceous, Tertiary, and Alluvial deposits. The first geological survey of Kansas of B.F. Mudge in 1864 and the second of G.C. Swallow in 1865 did not result in published maps, but Mudge later published the first map of the State in color in 1875. With establishment of a permanent geological survey in 1889, the state survey has published a series of revised and improved maps, the latest edition being that of 1991.

- **Geological Exploration of Kansas as Recorded by the *Transactions* of the Kansas Academy of Science (1868-1879).** Michael E. Nelson, Division of Science, Truman State University, Kirksville, Missouri 63501.

The Kansas Academy of Sciences is one of the oldest state science academies and as such has served as an important publication outlet for geoscientists. From 1868 to 1879 meeting presentations and *Transactions* of the Kansas Academy of Science (TKAS) papers were dominated by reports from geoscientists. Many of the critical geological papers describing the geology of Kansas first were presented at the annual meeting or published in the TKAS. During these first 12 years of the Academy, 105 geology papers or convocations were presented; 16 of these were in the area of general geology whereas 14 talks centered on paleontology. Eleven paleontology and nine general geology papers were among the 60 geology publications during the same time period. Prof. B. F. Mudge led the geologists with 26 presentations and 10 papers. This early era of the Academy ended on 21 November 1879, with the death of Mudge.

- **Geologic Studies in Western Kansas in the 19th Century.** Richard J. Zakrzewski, Department of Geosciences and Sternberg Museum, Fort Hays State University, Hays, Kansas 67601-4099.

Geologic exploration in western Kansas in the early part of the 19th century was general, being performed as part of government surveys led by military officers such as Zebulon

M. Pike, Stephen F. Long, John C. Fremont, and others. These surveys began in 1806 and occurred irregularly until the late 1850's. Subsequent to the Civil War, surveys were undertaken by parties interested in a transcontinental railroad and the State of Kansas funded two surveys, the latter adding little new data regarding the western part of the state. Discoveries of fossils in the chalk, especially vertebrates, drew the attention of paleontologists such as E.D. Cope and O.C. Marsh, who led or supported field parties in the chalk beds through much of the 1870's. Appointments of geologists to the faculty of the various colleges and to the State Board of Agriculture led to additional studies in the western part of the state. With the formation of the third State or University Geological Survey in 1889, systematic studies of the geology and natural resources of the state began. As the 19th century drew to a close, a better understanding of the geology of western Kansas began to emerge.

- **George Clinton Swallow, *The Other Kansas State Geologist*.** Leroy E. Page, Department of History, Kansas State University, Manhattan, Kansas 66506.

George Clinton Swallow (1817-1899) was educated at Bowdoin College, becoming professor of chemistry and natural sciences, University of Missouri in 1852, and later Missouri State Geologist, 1853-1861, introducing the New York nomenclature. In Kansas, he was State Geologist, 1865-1866. He underwent a change of career, acquiring an M.D. and engaging in mining operations in Montana, 1867-1870, before returning to Missouri, where he was Dean of Agriculture, 1870-1882, and taught at the medical school. On being dismissed after a dispute with the President, he went back to Montana, 1882-1890, where he was a newspaper editor and state inspector of mines. Accused of disloyalty during the Civil War, he was jailed twice in 1862. After F.B. Meek charged him in 1858 with stealing credit for being the first to recognize Permian fossils in North America, there ensued a long controversy over the Permian in Kansas. B.F. Mudge claimed that Swallow unscrupulously appropriated his work and his job as Kansas State Geologist in 1865. It was alleged by Charles R. Keyes that Swallow's work was ignored by geologists of the Kansas Survey (e.g., Erasmus Haworth).

- **Consumption of Hairy Vetch, Sweet Clover, and Foxtail Seeds by Three Granivorous Bird Species.** Daniel L. O'Leske and Robert J. Robel, Division of Biology, Kansas State University, Manhattan, Kansas 66506-4901. Kenneth E. Kemp, Department of Statistics, Kansas State University, Manhattan, Kansas 66506-0801.

Sustainable agriculture may include hairy vetch (*Vicia villosa*) and sweet clover (*Melilotus officinalis*) as cover crops. Seeds produced by these two plants are thought to be good food for wildlife, but are not abundant in crop contents of northern bobwhites (*Colinus virginianus*). To determine if the seeds were acceptable to birds, we compared their consumption by birds to that of foxtail (*Setaria glauca*), a preferred food of granivorous birds. Seed consumption was determined in feeding trials using three species of granivorous birds. Neither seeds of hairy vetch nor sweet clover were as acceptable as foxtail seeds to northern bobwhites, dark-eyed juncos (*Junco hyemalis*), or Harris' sparrows (*Zonotrichia querula*). Bobwhites consumed >12 g/day of foxtail seed compared to <3 g/day of vetch or clover seed; sparrows and juncos consumed 5-6 g/day

of foxtail seed compared to <math>1\text{ g/day}</math> of vetch or clover seed. No obvious relationship between beak size, seed size, and seed consumption was apparent.

- **The Identity of *Filoprotococcus* and *Trichosarcina* (Chlorophyta) in Kansas.** Rufus H. Thompson, Department of Botany, University of Kansas, Lawrence, Kansas 66045. Daniel E. Wujek, Department of Biology, Central Michigan University, Mt. Pleasant, Michigan 48859.

The genus *Trichosarcina* Nichols and Bold is shown to be synonymous with the genus *Filoprotococcus* Kufferath. The genus *Filoprotococcus* now contains two species: *F. enteromorphoides* and *F. polymorphum* (= *T. polymorpha*). The genus *Jaagiella* Vischer is recognized. Collections of *F. enteromorphoides* were made in the vicinity of Lawrence, Kansas.

- **County Records for Fishes in the Neosho River Basin in Kansas.** Linda Fuselier, Department of Systematics and Ecology, University of Kansas, Lawrence, KS 66045. Chris Mammoliti, Kansas Department of Wildlife and Parks, Environmental Services Section, Pratt, KS 67124.

Collections of fishes in the Neosho River Basin in Kansas included eleven county records and provided new information on the distribution of nine fish species and one hybrid darter in the state. The occurrence of *Catostomus commersoni* in Cherokee County was verified and a range extension for *Etheostoma whipplei* in the United States was documented. Fishes were collected in the summer of 1995 during a survey of the basin's tributary streams conducted by the Kansas Department of Wildlife and Parks.

- **Influence of Hydrogen Bonding Solvents on the Infrared Absorption Band of the Carbonyl Group in Acetone.** Orland W. Kolling, Natural Science Division, Southwestern College, Winfield, Kansas 67156-2499.

The IR absorption band position for the fundamental stretching mode of the carbonyl group in acetone was measured in twenty-three solvents using FTIR spectral methods. Eight of the solvents were hydrogen bond donor liquids. A quantitative reaction field model for the solvent-induced band shift is proposed which resolves the C=O frequency perturbation into a solvent polarity effect and a hydrogen bond donor acidity effect. That model reproduces the carbonyl band position within  $\pm 0.2\text{ cm}^{-1}$  in both aprotic and hydrogen bonding solvents by incorporating the appropriate Kamlet-Taft solvent parameters as the essential descriptors.

- **Cancer Morbidity in Kansas Farmers.** R. Scott Frey and Shuo Chen, Department of Sociology, Anthropology, and Social Work, Kansas State University, Manhattan, KS 66506.

Data for Kansas males (20 years of age and older) diagnosed with cancer between the years 1980 and 1990 were retrieved from the University of Kansas Cancer Data Service (UKCDS). Analysis of these data consisted of several case-control studies to determine

the cancer morbidity risks of farmers. Results suggest that Kansas farmers were at increased risk of incidence for non-Hodgkin's lymphoma; Hodgkin's disease; multiple myeloma; leukemia; and cancers of the lip, bone and connective tissues, prostate, brain, and skin. Implications of the findings are briefly discussed.