HERITAGE OF THE GREAT PLAINS

LIFE AND LORE OF THE TALLGRASS PRAIRIE

An Annotated Bibliography of the Flint Hills of Kansas
by James Hoy

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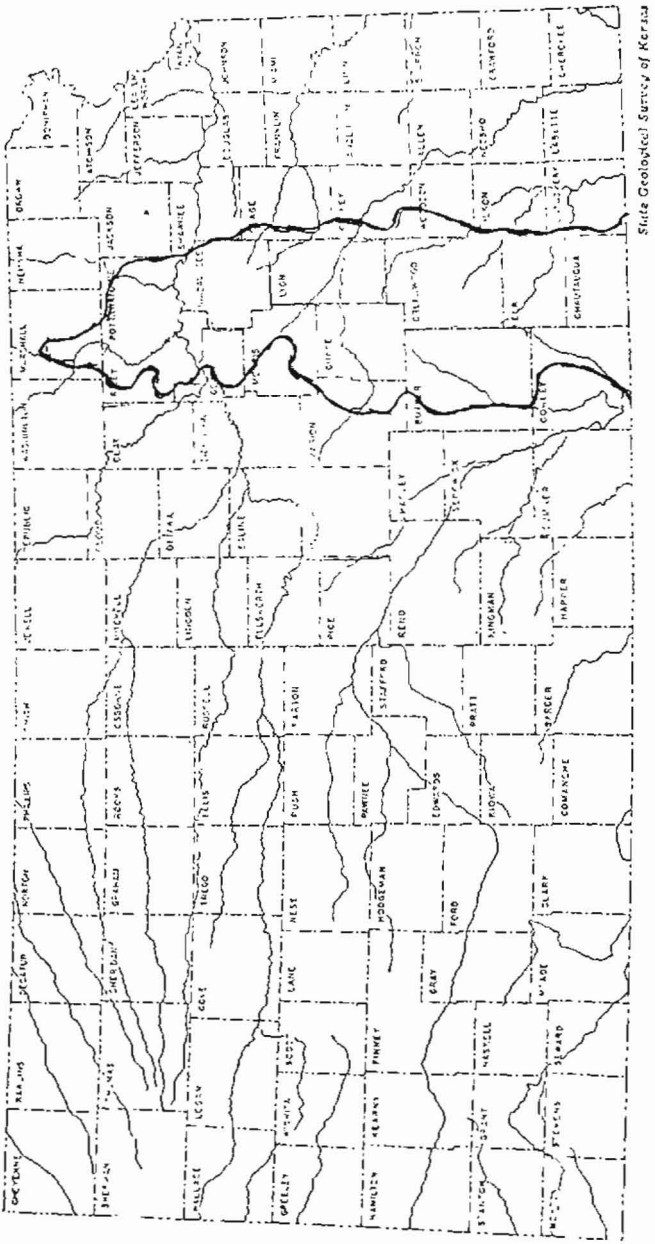
Flint Hills and Bluestem Grazing Region of Kansas



PART II, NATURAL HISTORY AND EARLY SETTLEMENT

TALLGRASS ECOLOGY

The Flint Hills of Kansas, along with the Osage Hills of Oklahoma, represent the last remaining enclave of unbroken native tallgrass prairie in the United States, a prairie that once stretched from Canada to Texas and extended east to Indiana and Kentucky. Grassland ecologists have noted that as much as eighty percent of a prairie lies below the surface. Not only are the underground root structures of the grasses extensive, but animal life teems in the thatch and in burrows. Perhaps that is why many people can drive through the Flint Hills and see nothing of significance or beauty--they are simply unable to look beyond the surface.

Flint Hills Topography. Pottawatomie County, c. 1958.
Courtesy of the Kansas State Historical Society, Topeka, KS.

Aber, James, ed. "Fall Field Trip to Ross Natural History Reservation and Lake Kahola, Flint Hills Region," Kansas Academy of Science Multidisciplinary Guidebook 3, Emporia State University, 1990.

Prepared for the third annual field trip of the Kansas Academy of Science, which occurred on the Ross Natural History Reservation during early October of 1990, this guide contains a dozen chapters by ten authors on such specific Flint Hills topics as climate, geology, soils, water, vegetation, mammals, birds, and fish. Also included is a chapter on the Kaw Indians and the Exodusters at Dunlap.

Begley, Sharon and Patricia King. "The Prairie's Last Stand," *Newsweek*, 3 June 1985, p. 76.

The authors give a brief history of the tallgrass prairie in mid-America and an overview of the attempts to establish, restore, and preserve it. A brief account of the value of burning is included.

"Bluestem Country," *Kansas!*, No. 1 (1973), pp. 14-15.

Untouched by the plow, the Flint Hills contain some of the last native tallgrass prairie in the nation. With color photography.

Bochert, John R. "The Climate of the Central North American Grassland," *Annals of the Association of American Geographers*, 40 (1950), pp. 1-39.

Although not mentioning the Flint Hills by name, this thorough study includes the tallgrass prairie of which they are a part. The author believes that fire was not a dominant factor in the establishment and maintaining of the prairie.

Bogue, D.J. and C.L. Beale. *Economic Areas of the United States*. New York: Free Press of Glencoe, 1961.

This national survey includes a brief description of and some statistics about the Flint Hills.

Collins, Joseph T., ed. *Natural Kansas*. Lawrence: University Press of Kansas, 1985.

There are many references to Flint Hills flora and fauna, springs and rivers in this statewide survey.

Costello, David. *The Prairie World*. University of Minnesota, 1969, paperback edition 1980.

The Flint Hills are specifically cited as well managed tallgrass prairies in this survey of American prairies.

Docekal, Eileen. "Tale of the Tallgrass," ***Sierra*****, May/June, 1987, pp. 76-79.**

Although neither the Flint Hills nor the Osage Hills are mentioned by name, this pro-preserve article describes the tallgrass ecology of the Kansas-Oklahoma bluestem region. The benefits of burning are given.

Fields, Wayne. "Lost Horizon," ***American Heritage*****, April 1988, pp. 54-64.**

The author describes, in this appreciation of the American prairie, visits to a number of sites, including the Konza Prairie Research Natural Area in the Flint Hills and the site of the proposed tallgrass preserve in the Osage Hills. He notes the influence of the prairie on various authors and painters and comments on the use of fire to maintain the grassland.

Freeman, Craig and Chris Lauver. "The Natural Communities of Kansas," ***The Nature Conservancy Kansas Newsletter*****, 4, No. 1 (Autumn 1990), pp. 4-6.**

This first of a continuing series features the various types of tallgrass prairie: Southeastern, Dakota Hills, Claypan, and Flint Hills, which "contain the largest remaining unbroken tract of tallgrass prairie in the world." The Nature Conservancy has two preserves in the Flint Hills: Konza Prairie south of Manhattan and Flint Hills Prairie east of Cassoday.

Hartman, Emily L. "The F.B. and Rena G. Ross Natural History Reservation," ***Emporia State Research Studies*****, 8, No. 4 (1960), 5-39.**

In 1958 Emporia State University received use of a 1040 acre tract of land from the Ross family. This article describes the tract and its use as a research site.

Hulbert, Lloyd C. "History and Use of Konza Prairie Research Natural Area," ***The Prairie Scout*****, 5 (1985), pp. 63-93.**

This article, published by the Kansas Corral of Westerners, describes for a general audience the location, facilities, purposes, and international reputation of the Konza Prairie Research Natural Area. A brief history of the Dewey Ranch is also given.

Kolata, Gina. "Managing the Inland Sea," ***Science*****, 224 (18 May 1984), 703-704.**

This brief article describes the Konza Prairie and some of the research being conducted there, including pasture burning. The author notes that the Flint Hills and Osage Hills represent the last large tracts of tallgrass prairie.

"Konza Prairie Research Natural Area Publications," Division of Biology, Kansas State University, Manhattan, Kansas.

The Konza Prairie Research Natural Area provides upon request a photocopied bibliography that contains information on articles that have resulted

from research done there. Nearly all are of a technical nature in fields such as ornithology, grassland ecology, microbiology, botany, etc.

Madson, John. *Where the Sky Begins: Land of the Tallgrass Prairie*. Boston: Houghton-Mifflin, 1982.

This readable survey of American grasslands contains several extensive references to the Flint Hills, including prairie chickens, pasture burning, and the proposed prairie national park. The author obviously feels deeply about the beauty and significance of the grasslands, but he is sometimes careless about details (snch as the misspelling of Cassoday and the apparent confusion between fence posts made of Flint Hills limestone and post-rock limestone).

May, Cheryl. "Keeping the Konza," *Kansas!*, No. 3 (1986), pp. 12-14.

Illnstrated with color photographs by Mike Blair, this article describes the research program on the thirteen- section tallgrass preserve that was once part of the old Dewey Ranch south of Manhattan.

Popper, Joe. "Life on the Konza." *Kansas City Star Magazine*, 7 June 1987, pp. 10-15, 23, 28.

This article, illustrated with color photographs, gives a thorough description of the Konza Prairie for a general andience.

Quayle, William A. *The Prairie and the Sea*. Cincinnati: Jennings and Graham, 1905.

Although they are not mentioned by name, the description of the tallgrass prairie, its flora and fauna, is that of the Flint Hills. Illustrated with black and white photographs.

Reichman, O.J. *Konza Prairie: A Tallgrass Natural History*. Lawrence: University Press of Kansas, 1987.

Reichman presents a thorough, clearly written account of the 8,616 acre tallgrass preserve in Riley County, owned by the Nature Conservancy and managed by Kansas State University. Although the tone is essentially technical, this useful book is written and illustrated (with maps, line drawings, and color photographs) for a general audience.

Risser, Paul G. "The Tallgrass Prairie," *The World & I*, June 1990, pp. 308-313.

This general-interest article describes, with specific mention of the Flint Hills and the Osage Hills, the flora, the fauna, and the current extent of tallgrass prairie in this country. The author points out that these grasslands have been grazed for some fifteen million years and that fire has been (and is) instrumental in maintaining them. Color illustrations.

Smithey, William K. ***Planet Earth: American Prairies.*** **New York: Gallery Books, 1990.**

Although the Flint Hills are not mentioned by name, the tallgrass section of this slender book does contain a photograph taken at the Konza Prairie, as well as an account of burning.

Weaver, J.E. ***North American Prairie.*** **Lincoln, Nebraska: Johnson Publishing Company, 1954.**

This study of the composition of prairie ecosystems includes a section on the Flint Hills and the Osage Hills, where the author conducted several plant surveys. He also considers the effects of burning on prairie vegetation.

Weaver, J.E. and T.J. Fitzpatrick. "The Prairie," ***Ecological Monographs,*** **4 (1934), pp. 109-295.**

This thorough study of prairie ecology in six mid-western states includes that portion of the Flint Hills north of the Kansas River.

Wilson, Jim and Alice Wilson. ***Grass Land.*** **Polk, Nebraska: Wide Skies Press, 1967.**

Although not identified, some of the photographs in this slim paean to the American prairie and plains appear to have been taken in the Flint Hills. In the essay concluding the volume, the Hills are mentioned, along with the Nebraska Sandhills, in a passage that expresses the attraction of these two major grazing areas: "While the 'hard lands' filled up mainly with farmers, areas like the Sandhills and the Flint Hills of Kansas attracted a unique breed of men and women to whom Grass became a way of life--who asked for no better heaven-on-earth than their vast, quiet empire, alive with the promise of green shoots in the spring, rich with cattle knee-deep in grass through the summer, greeting fall in a mantle of glowing russets and brown, resting silent through the winter snows with haystacks piled high in the meadows."

FLINT HILLS FAUNA

Today domestic animals--cattle, horses, sheep, hogs, goats, dogs, cats--share the Flint Hills with a vast assortment of native wildlife: badgers, mink, beaver, ground squirrels, gophers, raccoons, opossums, squirrels, rabbits, coyotes, bobcats, and perhaps even mountain lions; deer and antelope; wild turkeys, prairie chickens, meadowlarks, scissortails, kingfishers, plovers, mallard dueks, Canada geese, bobwhite quail, turkey vultures, hawks, and a host of other birds; toads, frogs, "horny toads," rattlesnakes, bullsnakes, waterdogs, tortoises, snapping turtles, and other reptiles and amphibians; bass, bullheads, crappie, channel

catfish, and such endangered species of fish as the Neosho madtom and the Topeka shiner; grasshoppers, horse flies, mosquitoes, ladybugs, cicadas, and many other insect species. In earlier days elk and bison shared the prairie with wolves, mountain lions, and bears. Even earlier, mammoths, mastodons, and giant sloths were to be found in this area. Moreover, some of the world's best fossil reptiles and insects from the Upper Paleozoic period have been found in the Flint Hills.

Today the Flint Hills are the primary habitat of the greater prairie chicken. Numerous quail and a few pheasant reside here, while each year multitudes of ducks and geese fly through seasonally. Record-sized whitetail deer have been taken in the Flint Hills, and pronghorn antelope have been reintroduced. Raccoons, opossums, squirrels, and cottontail rabbits are numerous, while an occasional jackrabbit can still be seen. Fishermen vie for largemouth bass or channel catfish in the clear, spring-fed watershed reservoirs of the Hills, or take bullheads, crappie, and bluegill from the smaller farm ponds. Catfish weighing nearly a hundred pounds have been taken from the Cottonwood and other rivers crossing the Flint Hills.

Not only game sportsmen, but photographers or bird watchers can find much to enjoy in the Flint Hills. Each winter scores of bald eagles winter at the Flint Hills Wildlife Refuge at John Redmond Reservoir in Coffey County, while ranchers in the remoter parts of the Hills will see an occasional golden or bald eagle, along with the myriad of hawks that frequent the updrafts of Flint Hills skies. In recent years bluebirds have been attracted to the area as a result of nesting boxes that have been placed on fence posts and utility poles by members of local Audubon societies.

In short the Flint Hills are teeming with fauna, both domestic and natural.

Andrews, Ted F. and Homer A. Stephens. "Colonies of Great Blue Heron (*Ardea Herodias*) In Kansas," *Transactions of the Kansas Academy of Science*, 59, No. 3 (1956), pp. 279-308.

Although rookeries of the great blue heron are found throughout the state, they are especially prevalent in the Flint Hills. This article deseribes those studied in thirteen counties within the Bluestem Grazing Region.

Baker, Maurice F. "Population Changes of the Greater Prairie Chicken in Kansas," *Seventeenth North American Wildlife Conference*, 1952, pp. 359-366.

This paper reports on a study of the effect of a hunting season on prairie chicken in Kansas. The study was conducted in counties within the Bluestem Grazing Region.

Baker, Maurice F. *Prairie Chickens of Kansas*. Lawrence: University of Kansas Museum of Natural History, 1953.

The greater prairie chicken once ranged throughout the midwest; now one of its last strongholds is the Flint Hills, which Baker, in this thorough study, terms the Bluestem Hills.

Breukelman, John and Robert F. Clarke, "A Revised List of Amphibians and Reptiles of Chase and Lyon Counties, Kansas," *Transactions of the Kansas Academy of Science*, 54, No. 4 (1951), pp. 542-545.

This updating of the item immediately following lists 53 species of 37 genera found in the central Flint Hills: 13 amphibians, 6 turtles, 10 lizards, and 24 snakes.

Breukelman, John and Allen Downs. "A List of Amphibians and Reptiles of Chase and Lyon Counties, Kansas," *Transactions of the Kansas Academy of Science*, 39 (1936), pp. 267-268.

This list of 44 species and subspecies found in the central Flint Hills includes 10 amphibians, 9 lizards, 5 turtles, and 20 snakes (including the copperhead and massassauga rattlesnake).

Church, Kevin. "A Rite of Courtship," *Kansas Wildlife and Parks*, March/April, 1989, pp. 2-9.

The author describes the courtship and mating of prairie chickens, noting that in much of the Flint Hills there is one lek (i.e., a traditional display area where roosters "boom" for hens) per square mile. A map and several attractive color photographs accompany the text.

Clarke, Robert F., John Breukelman, and Ted F. Andrews. "An Annotated Checklist of the Vertebrates of Lyon County, Kansas," *Transactions of the Kansas Academy of Science*, 61, No. 2 (1958), 165-194.

The authors document 69 species of fish, 14 of amphibians, 40 of reptiles, 248 of birds, and 37 of mammals in Lyon County. Some of the more rare creatures include porcupine, mink, and ring-tailed cat.

Cross, Frank B. "Fishes of Cedar Creek and the South Fork of the Cottonwood River, Chase County, Kansas," *Transactions of the Kansas Academy of Science*, 57, No. 3 (1954), pp. 303-314.

Some of the smaller streams of the Flint Hills have fish species of both the plains and the Ozarks. The South Fork, according to the author, is one of the best small fishing streams in Kansas, especially for spotted bass.

Dancer, Daniel D. "Great Blue Herons," *Kansas!*, No. 1 (1981), pp. 14-15.

The great blue heron, standing four feet tall with a wing span half again that large, is the largest bird to nest in Kansas. Although the bird can be found throughout the state, the Flint Hills is a preferred nesting area, particularly in tall sycamore trees.

Downs, Theodore and John Breukelman, "Birds of Lyon County and Vicinity," *Transactions of the Kansas Academy of Science*, 44 (1941), 389-399.

This list of birds from the central Flint Hills includes 276 species and subspecies, 22 of them rare. Some species are resident on one side of the Hills, migrant on the other.

Dyche, L.L. "The Puma or American Lion," *Transactions of the Kansas Academy of Science*, 19 (1905), pp. 160-163.

Zebulon Pike stood on one of the Flint Hills, perhaps along the Walnut River in northern Butler County, perhaps along the South Fork in central Chase County, and saw mountain lions. Dyche describes a lion killed near Hays in 1904, some twenty years after the last previous sighting in Kansas, which occurred in Comanche County. [Although none have been taken in contemporary times, some residents of the Flint Hills maintain that mountain lions have returned, following the resurgence of deer since the 1960s.]

"Few Prairie Chickens Left," *Kanhistique*, 2, No. 1 (May 1976), p. 10.

Reprinted from the *Emporia Gazette*, this article tells of Gerald Horak's study of prairie chickens in a nine-mile- square area near Matfield Green. Horak estimates that there are 200,000 of these birds in Kansas, more than in any other of the nine other states where they are found.

***Flint Hills National Wildlife Refuge*. US Fish and Wildlife Service Brochure, Washington DC, Department of the Interior, 1990.**

The Flint Hills National Wildlife Refuge was established at John Redmond Dam, east of the Flint Hills proper but within the Bluestem Grazing Region, in 1966. Some 291 species of birds have been observed there, including a large number of bald eagles during the winter. Prairie chicken and quail are resident, while many species of migratory waterfowl visit each year. Mammals include beaver, muskrat, bobcat, coyote, and whitetail deer.

Gier, H.T. "Vertebrates of the Flint Hills," *Transactions of the Kansas Academy of Science*, 70, No. 1 (Spring, 1967), pp. 51-59.

Acknowledging the ill-defined borders of the Flint Hills, the author names the major animal life of the area--mammals, reptiles, and birds--as well as some of the now extinct species: mountain lion, black bear, timber wolf, bison, elk, antelope, and river otter.

Green, J.K. and Frank B. Cross. "Fishes of El Dorado City Lake, Butler County, Kansas," *Transactions of the Kansas Academy of Science*, 59, No. 3 (1956), pp. 358-363.

During the drouth of 1954 most of the fish in the 265- surface-acre city lake of El Dorado, built on Satchel Creek in 1928, were removed to Lake Bluestem, the remaining ones killed, to permit restocking. This study notes that the percentage of sport fish to others was not good.

Horak, Gerald J. "The Prairie Bird, *Kansas Wildlife*, 44, No. 6 (November/December 1987), pp. 8-12.

This history of the prairie chicken and its range includes a map, color illustrations, and a photograph of the "Prairie Chieken Capital of the World" sign at Cassoday.

Kennedy, Marie. "Fossils of the Kansas Flint Hills." *Mineralogist*, 13, No. 10 (1945), pp. 371-373.

The author gives a brief account of the types of fossils she has found in the southern and central Flint Hills.

Mapes, Gene and Royal Mapes, eds. *Regional Geology and Paleontology of Upper Paleozoic Hamilton Quarry Area in Southeastern Kansas*. Lawrence: Kansas Geological Survey Guidebook Series 6, 1988.

The twenty-second annual meeting of the south-central section of the Geological Society of America met at the Hamilton quarry in Greenwood County, a site that has yielded some of the world's best fossil reptiles and insects from the Upper Paleozoic period. This guidebook contains some three dozen articles on such topics as geology, vertebrate paleontology, invertebrate paleontology, and plant paleontology.

Minckley, W.L. "A Fish Survey of the Pillsbury Crossing Area, Deep Creek, Riley County, Kansas," *Transactions of the Kansas Academy of Science*, 59, No. 3 (1956), pp. 351-357.

Deep Creek, running through the northern Flint Hills in Riley and Wabaunsee Counties, has a natural limestone crossing that was once a good fishing area. This study found only thirteen species of fish, of which only the black bullhead was big enough for angling. In addition to nets and traps for minnows, the author spent nearly ninety hours with a line and various kinds of bait, catching only thirteen bullheads averaging about four ounces each in size.

Stanley, George. *Watermark Guide to Fishing in Kansas*. Wichita: Watermark Press, 1992.

This comprehensive guide describes the types of game fish that are to be found in the Flint Hills and includes a map of the streams and drainages of

the Hills. There is also a map of the reservoirs of Kansas and a guide to rivers, showing public access points. The author gives advice on how to gain permission to angle in the farm and ranch ponds that contain the best fishing in the Flint Hills.

Thompson, Max C. and Charles Ely. *Birds of Kansas, Volume 1.* Lawrence: University of Kansas Museum of Natural History, 1989.

Many birds found in the Flint Hills are included in this work, with special mention made of the greater prairie chicken. Hunters come from throughout the United States to the Flint Hills to hunt this upland game bird, at one time nearly extinct.

Tush, Rick. "Arteries of the Hills," *Kansas Wildlife*, September/October 1984, pp. 9-11.

In addition to describing the fish (bass, sunfish, channel catfish, and bullhead), fishing, and natural beauty of the Flint Hills, the author also expresses concern about the sometimes detrimental effect of the watershed dam program on the clear-running streams of the Hills.

FLINT HILLS FLORA

To the casual sightseer the Flint Hills can appear a plain, even a barren, landscape. But to the observant eye the tallgrass prairie presents a cornucopia of life, both animal and plant. In addition to the four primary tall grasses (big bluestem, little bluestem, switch grass, Indian grass), one can also find in Flint Hills pastures grama grasses, buffalo grass, and a myriad of forbs--wild weeds and flowers that contribute both to the beauty and to the health of the prairie. Some, such as Black Sampson, were used by pioneers for medicinal purposes; some, such as wild grapes, provided food. Along the banks of the streams and rivers running through the Hills are magnificent oaks, elms, hickories, and sycamores. Seasonal flowers color the pastures like a kaleidoscope, while the subtle hues of the grass itself are ever-changing, a constant delight to the true plainsman.

Barker, William T. "The Flora of the Kansas Flint Hills," *The University of Kansas Science Bulletin*, 48, No. 14 (October 17, 1969), pp. 525-584.

This thorough study is useful not only for its exhaustive list of flora but for its capable definition and description of the Flint Hills as well. Considered are such things as names, topography, drainage, climate, original vegetation and its disturbance (through plowing, burning, and overgrazing), and present vegetation. A map and bibliography are included.

Barkley, T.M. ***Field Guide to the Common Weeds of Kansas.*** **Lawrence: University Press of Kansas, 1983.**

The Flint Hills are not mentioned by name (nor are any other physiographic regions of Kansas), but this guide can be used to identify weeds and wild flowers in Flint Hills counties. Black and white drawings.

Freeman, Craig C. and Eileen K. Schofield. ***Roadside Wildflowers of the Southern Great Plains.*** **Lawrence: University Press of Kansas, 1991.**

Many wildflowers of the Flint Hills can be identified by using this color-illustrated field guide, which covers the entire state of Kansas as well as parts of six others.

Gates, Frank C. "Grasses in Kansas," ***Report of the Kansas State Board of Agriculture*****, 55, No. 220-A, 1936.**

This monograph, primarily a comprehensive and technical field guide to the many different grasses found within the state, contains introductory material on and photographs of the Flint Hills, 270 drawings of the major grass types in Kansas, county-distribution maps, and finding lists.

Owensby, Clenton. ***Kansas Prairie Wildflowers.*** **Iowa State University Press, 1980.**

The Flint Hills are listed as one of six major types of Kansas prairies. The descriptions and color photographs are a valuable tool in identifying many of the weeds and flowers of the Flint Hills.

"Pasture and Range Plants," Bartlesville, Oklahoma: Phillips Petroleum Company, 1963.

Originally published between 1955-60 as a series of pamphlets, these color illustrations and descriptions of many different prairie grasses, flowers, and weeds specifically mention the Flint Hills in connection with big and little bluestem. The plates are now owned by Fort Hays State University, which issued a new edition in 1986.

Stevens, William Chase. ***Kansas Wild Flowers.*** **Lawrence: University of Kansas Press, 1961.**

This book, which is useful in identifying flowers and weeds of the Flint Hills, includes a description of the Hills as one of eight distinct physiographic regions in the state. Black and white photographs.

Wilson, James S. "Flowering Plants of the Ross Natural History Reservation, Lyon and Chase Counties, Kansas," *Emporia State Research Studies*, 11, No. 4 (1963), 5-91.

The author catalogs and gives a technical description of all the various types of flowering vegetation found on Emporia State University's prairie research area.

GRASS AND RANGE MANAGEMENT

The articles in this section are nearly all technical in nature, reports of research performed by grass scientists or range management specialists. As might be expected, the Flint Hills, particularly since the establishment of the Konza Prairie Research Natural Area, comprise one of the world's leading laboratories for the study of grassland ecology.

A typical Flint Hills landscape:
grass, sky, and barbed wire. Wabaunsee County, c. 1960.
Courtesy of the Kansas State Historical Society, Topeka, KS.

Aldous, A.E. "Economic Value of Native Kansas Grasses," *Report of the Kansas State Board of Agriculture*, 55, No. 220-A, 1936, pp. 13-23.

Such things as the growth patterns, feed value, and seeding properties of Flint Hills bluestem are described, along with similar information for grasses throughout the state.

Aldous, A.E. "Management of Kansas Bluestem Pastures," *Journal of the American Society of Agronomy*, 30 (1938), 244-253.

These early experiments, conducted during the dry times of the 1930s, note a gradual decrease in the carrying capacity of pastures in the bluestem region. Burning is not mentioned, but the author recommends a rotation system of deferred grazing.

Anderson, Kling L. *The Effects of Grazing Management and Site Conditions on Flint Hills Bluestem Pastures in Kansas*. Ph.D. Thesis, University of Nebraska, 1951.

One of the major conclusions of Anderson's study was that light stocking and early removal of livestock are important in maintaining the good condition of bluestem grass. Since that time, however, the practice of grazing aged steers for a few months has given way to more year- round cow herds and the grazing of yearlings for a full pasture season.

Anderson, Kling L. "Range und Pasture," in *Soil Conservation in Kansas*, Report of the Kansas State Board of Agrieulture, February 1946, pp. 92-117.

Although the Flint Hills are not mentioned by name, much of this article deals specifically with proper management techniques for the tallgrass prairies within the region. These techniques include grazing methods, use of tame pasture, supplemental feeding, distribution of water and salt, fencing, erosion, reseeding, and burning. Several pages are devoted to burning, with the author cautiously favoring the practice. Included among the several other essays in this report is a map of the natural agricultural resource areas of Kansas.

Anderson, Kling L. "Utilization of Grasslands in the Flint Hills of Kansas," *Journal of Range Management*, 6, No. 2 (March 1953), pp. 86-93.

Anderson notes, in this survey of the history, economic importance, vegetation, burning, and grazing of the Flint Hills, that the pastures are generally in good condition, not so much because of informed management but because of the "fortuitous circumstance that pasture leasing has been dominated by cattlemen of the Southwest" who have insisted on sufficient acreage for cattle and have sent them to market as they fatten, thus allowing the grass to recover in the latter part of the growing season. He concludes that as long as this system of grazing continues, the pastures will retain their health, but that range management based on better understanding of the ecology of grasslands would be preferable [an observation whose validity has been proven in light of the

major change in grazing patterns that has occurred in the Flint Hills since the 1950s].

Anderson, Kling L. and Claude L. Fly. "Vegetation-Soil Relationships in the Flint Hills Bluestem Pastures," ***Journal of Range Management*****, 8, No. 4 (1955), 163-169.**

The authors include a brief description of the Flint Hills as an introduction to this detailed report on a study of vegetation-soil relationships for purposes of conservation and land use.

Booth, W.E. "Revegetation of Abandoned Fields in Kansas and Oklahoma," ***American Journal of Botany*****, 28 (1941), pp. 415-422.**

The Kansas portion of this study took place in Elk and Chautauqua Counties. The cycle of revegetation as observed was two years in weeds, nine to thirteen years in annual grasses, and an undetermined period in bunch grass. After 30 years a fully developed prairie stage had not yet occurred. The author felt that heavy grazing and burning were harmful.

Brandeberg, George and Bill Miller. "Intensive Early Grazing: Lets You Get More Out of your Pasture by Using it Less," ***Successful Farming*****, April 1984, pp. 86, 88.**

This article discusses the economic advantages, and the supposed environmental ones, of double or triple stocking in the Flint Hills. Pastures are loaded with two to three times as many cattle as they would normally carry, then the cattle are to be removed by the middle of the season so that the grass can recover and get a good growth for winter. [The long-range effects of this practice are not known, but quite possibly problematic.]

Harris, John O. "Azotobacter of the Konza Prairie," ***Third Midwest Prairie Conference Proceedings*****, Division of Biology, Kansas State University, 1973, pp. 53-54.**

The bacterium azotobacter is a naturally occurring nitrogen fixer in the tallgrass prairie. The author reports on a preliminary study concerning nitrogen in Flint Hills soils.

Herbel, Carlton Homer. ***Response of True Prairie Vegetation on Major Flint Hills Range Sites to Grazing Treatment.*** **Kansas State College Ph. D. Dissertation, 1956.**

From 1949 to 1956 the author observed the effects of light, moderate, and heavy grazing on Flint Hills pastures. As might be expected, overgrazing caused a reduction in desirable grasses.

Herbel, Carlton H. and Kling L. Anderson. "Response of True Prairie Vegetation on Major Flint Hills Range Sites to Grazing Treatment," *Ecological Monographs*, 29, No. 2 (1959), pp. 171-186.

Native grasses, at the time this article was published, covered some 2,800,000 of the 4,000,000 acres of the Flint Hills; half a million head of cattle lived in the area year round, with an additional 300,000 transient grazers during the summer; and much of the Flint Hills range was in good to excellent condition because of proper grazing management. The authors describe thoroughly the results of overgrazing experiments conducted in the northern Flint Hills by Kansas State University.

Kenyon, Sevle. "The 'Celling' of Grass," *Kansas Farmer*, 15 May 1990, pp. 12-13.

Since about 1980 the DeVore Ranch near Cassoday has been practicing "cell grazing," based on the holistic ranch management theories of Allen Savory. By rotating through a series of paddocks during a ninety-day grazing season, more cattle can be pastured (1.3 as opposed to 3.5 acres per yearling), thus increasing profits and, according to proponents, improving grass. [This method of grazing is no doubt productive on the sandy, semi-arid soils and bunch grass of the western United States, but its long-term effectiveness in the limestone pastures of the bluestem-covered Flint Hills is problematic.]

Owensby, Clenton E., Ed F. Smith, and Kling L. Anderson. "Deferred-rotation Grazing with Steers in the Kansas Flint Hills," *Journal of Range Management*, 26, No. 6 (1973), pp. 393-395.

The authors conclude that the deferred-rotation method of stocking pastures resulted in higher forage yield and thus could accommodate a higher stocking rate. On the other hand, cattle gained more on season-long pastures than on the deferred-rotation pastures. Deferred-rotation stocking would be of benefit to range in poor condition.

Rao, Madhavarapu Rama. *Nutritive Evaluation of Forage Selected by Cattle on Flint Hills Range*. Kansas State University Ph.D. Dissertation, 1972.

The purpose of the experiments for this dissertation was to determine the nutritive quality of grass and of hay harvested during different months of the summer and fall.

Tappan, Gray. *The Monitoring of Rangeland Vegetation Cover in the Kansas Flint Hills from Landsat Data*. University of Kansas Masters Thesis, 1981.

This study, conducted in Wabaunsee County, tested the viability of estimating rangeland production from data received from the Landsat satellite system. Strong correlation was found between field measurements of green vegetation cover and spectral reflectance measurements from the satellite sensor.

The author suggests, however, that further study is needed before definite conclusions can be drawn.

Wilds, Stanley R. *An Analysis of Land Ownership and Range Management Practices in the Northern Kansas Flint Hills*. Kansas State University Masters Thesis, 1986.

This study, focusing on Wabaunsee County, examines the way in which land ownership, particularly settlement patterns and absentee ownership, has affected land usage. Also included are sections on pasture burning, stocking rates, and deferred grazing.

GRASS AND FIRE

From its earliest stages the tallgrass prairie has been formed and maintained by fire. Lightning and then Indians burned. White settlers may have learned the springtime burning of dead grass from the Native Americans, or they may have brought the practice of agricultural burning with them. In either case, much of the Flint Hills has been intentionally burned each spring from the earliest days of statehood. Without fire, the Flint Hills would soon (in geological time) be covered with trees. The following articles range from technical to popular; together they document both the theory and practice of intentional burning in the Flint Hills.

Abrams, Marc D., Alan K. Knapp, and Lloyd C. Hulbert. "A Ten-Year Record of Aboveground Biomass in a Kansas Tallgrass Prairie: Effects of Fire and Topographic Position," *American Journal of Botany*, 73 (1986), 1509-1515.

The research for this technical article was conducted on the Konza Prairie Research Natural Area between the years 1975-1984. Results suggest that burning increases forage in lowland areas but has little effect on upland and that forbs and woody plants greatly increase in unburned areas.

Aldous, A.E. *Effect of Burning on Kansas Bluestem Pastures*. Manhattan: Kansas State College of Agriculture and Applied Science Agricultural Experiment Station, Technical Bulletin 38, November 1934.

Aldous, who conducted some of the early scientific experiments on pasture burning in the Flint Hills (1927-1933), concluded that spring burning was preferable to fall burning. He suggests that burning stimulates early growth by heating the soil and notes that unburned plots had increases of Kentueky bluegrass while fall burning encouraged the succession of little bluestem, spring burning that of big bluestem.

Allen, Leland J., et al. "Range Burning and Fertilizing Related to Nutritive Value of Bluestem Grass," *Journal of Range Management*, 29 (July 1976), 306-308.

Burning in late spring improves the quality of plant carbohydrates in bluestem grass. The application of nitrogen to native pastures does not improve the nutrient content of forage but, with adequate rainfall, it does increase the amount of forage and thus the carrying capacity of the pastures.

Recently burned pasture in the Central Flint Hills c. 1960

Courtesy of the Kansas State Historical Society, Topeka, KS.

Anderson, Kling L. "Burning Bluestem Ranges," *Crops and Soils*, 13 (1961), pp. 13-14.

Fire did not create the grassland, but the climate favored grass, which in turn favored fire. Soon after intensive grazing began in the Flint Hills in the early 1880s, fire was found to enhance weight gains in cattle, and the practice of

intentional burning has continued ever since. The author does not favor burning except in particular circumstances and conditions.

Anderson, Kling L. "Burning Flint Hills Bluestem Ranges," *Proceedings of the Third Annual Tall Timbers Fire Ecology Conference*, Tallahassee, Florida, 9-10 April 1964, pp. 88-103.

Anderson gives a brief history of transient grazing and pasture burning in the Flint Hills, noting that burning in earlier years normally occurred in February and March. He believes that burning is a major reason that Flint Hills pastures are now less productive than in early days. He also points out the desirable effects of burning and offers four suggestions for achieving them: burn in late spring, after a rain, with a breeze, and let burned pastures get a start before turning out cattle.

Anderson, Kling L. "Fire Ecology--Some Kansas Prairie Forbs," *Proceedings of the Fourth Annual Tall Timbers Fire Ecology Conference*, Tallahassee, Florida, 18-19 March 1965, pp. 152-159.

Anderson describes many common tallgrass prairie forbs, their uses, and their reaction (and adaptation) to fire. One of the beneficial effects of deliberate spring burning is the reduction of competition from annuals and some perennials so that climax vegetation, including both grasses and forbs, can prosper. Burning is most effective with headfires and proper conditions of wind and moisture.

Anderson, Kling L. "Grazing Management and Fire in the Flint Hills," *Transactions of the Kansas Academy of Science*, 70 (1967), pp. 171-176.

Anderson discusses how burning came to be part of range management in the Flint Hills and gives a brief history of the scientific study of pasture burning. He concludes that grazing management and fire are essential in maintaining the productivity of bluestem pastures.

Anderson, Kling L. "Time of Burning As It Affects Soil Moisture in an Ordinary Upland Bluestem Prairie in the Flint Hills," *Journal of Range Management*, 18 (1965), pp. 311-316.

Burning reduces soil moisture; the earlier in the spring that one burns, the greater the loss both in soil moisture and in volume of grass. Anderson recommends that burning be held to a minimum, no more than is necessary for good range management.

Anderson, Kling L., Ed F. Smith, and Clenton E. Owensby. "Burning Bluestem Range," *Journal of Range Management*, 23 (1970), pp. 81-92.

This technical article reports on a seventeen-year study of the long-term effects of pasture burning on weight gain, soil moisture, forage growth, and botanical composition.

Anderson, Roger C. "An Evolutionary Model Summarizing the Roles of Fire, Climate, and Grazing Animals in the Origin and Maintenance of Grasslands: An Endpaper," in *Grasses and Grasslands: Systematics and Ecology*, ed. by James R. Estes, Ronald J. Tyrl, and Jere N. Brunken. Norman: University of Oklahoma Press, 1982.

The essence of this technical paper is indicated by its title. A summary of research in the Flint Hills is included, indicating that time of burn can affect both weight gain of cattle and forage production of grass.

Bieber, Gene Lawrence. *Soil Moisture Responses to Bluestem Burning*. Kansas State University Masters Thesis, 1960.

This study was undertaken to determine the effect of burning on subsoil moisture. Unburned check plots had higher moisture content in the spring, but the differences tapered off steadily and by late summer no substantial difference between burned or unburned existed.

Blan, Kenneth Ray. *Evaluation of Eastern Redcedar (Juniperus virginiana L.) Infestations in the Northern Kansas Flint Hills*. Kansas State University Masters Thesis, 1970.

Redcedar, a common pest in the northern Flint Hills, is spread most commonly by birds. If unchecked, redcedar stands ultimately yield to hardwood forests on what was once tallgrass prairie. Fire is the most important factor in controlling redcedar. Even burns spaced five to seven years apart appear to be adequate in controlling redcedar. The only other effective method, particularly if trees become too large, is mechanical removal.

Bragg, Thomas Braxton. *Post-Settlement Invasion of Woody Species in Kansas Tall-Grass Prairie*. Kansas State University Masters Thesis, 1971.

This study, conducted in Geary County, examined the invasion of trees and shrubs onto the tallgrass prairie. In the absence of burning or the use of herbicides, woody species increased from 24 to 33 percent. Spraying reduces the rate of invasion, but the most effective inhibitor is burning.

Bragg, Thomas Braxton and Lloyd C. Hulbert. "Woody Plant Invasion of Unburned Kansas Bluestem Prairie," *Journal of Range Management*, 29 (January 1976), pp. 19-24.

The authors, reporting on a study of the effects of intentional burning in Geary County, note that from 1937 to 1969 woody plants increased 34% on unburned pastures in contrast to an increase of one percent on pastures that were regularly burned. Spraying with herbicide can control such growth, but less effectively and at far greater expense. They conclude that burning is (and was) an essential factor in the maintenance of a natural bluestem prairie.

Collins, Scott L. and Linda L. Wallace, eds. *Fire in North American Tallgrass Prairies*. Norman: University of Oklahoma Press, 1990.

The chapters, by varied hands, in this collection were originally presented as papers at the 1987 meeting of the American Institute of Biological Sciences. Much of the research for these studies was done at the Konza Prairie Research Natural Area in the northern Flint Hills. Technical in nature, the articles are amply illustrated with charts, graphs, and photographs. The sixteen-page bibliography is as thorough a listing of the literature of burning as one could want.

Dary, David. "Burning the Kansas Flint Hills," *The Cattleman*, 59, No. 3 (August 1972), pp. 53, 112.

This perceptive article, written about the time that widespread opposition to pasture burning was giving way in the face of evidence of its benefits, includes interviews with ranchers on both sides of the issue.

Drews, Patricia. "Burning Prairie Pastures in the Flint Hills of Kansas," *The Kansas Geographer*, Spring 1975, pp. 5-19.

Recent research in intentional burning is thoroughly surveyed, with the author favoring the practice. A good bibliography is included.

Efiong, Jimmy. *Quality Evaluation of Flint Hills Range Pasture: Minerals as Quality Indicators*. Kansas State University Ph.D. Dissertation, 1977.

The experiments on which this dissertation were based were designed to evaluate the quality of burned and non-burned pastures.

Hanks, R.J. and Kling L. Anderson. "Pasture Burning and Moisture Conservation," *Journal of Soil and Water Conservation*, 12 (1957), pp. 228-229.

The authors conclude that for conserving water and a good yield of forage, burning should be eliminated on Flint Hills pastures. If one must burn, do it in late spring.

Hensel, R.L. "Effect of Burning on Vegetation in Kansas Pastures," *Journal of Agricultural Research*, 23 (1923), pp. 631-643.

Hensel seems to have carried out the earliest experiments on pasture burning, a four-year study beginning in 1918 to investigate what was at the time an extremely controversial practice that was assumed to have been handed down to white settlers from Native Americans. The results (which seem to have been somewhat surprising to him) failed to corroborate the injurious effects of burning. Instead, Hensel concluded that weeds were controlled by burning, little bluestem encouraged, big bluestem discouraged, and soil temperatures raised.

Herbel, Carlton Homer. *The Effects of Date of Burning on Native Flint Hills Range Land*. Kansas State College of Agriculture and Applied Science Masters Thesis, 1954.

Herbel concludes that burning is detrimental to major climax vegetation in bluestem range but notes that late spring burning is preferable, if burning is to be practiced.

Hoy, James F. "Burnin' Pasture," *KS Magazine*, Spring 1985, pp. 25-26, 54-55.

This article gives an overview and brief history of the practice of intentional burning, with examples from both the Flint Hills and the Smoky Hills.

Hoy, James F. "Controlled Pasture Burning in the Folklife of the Kansas Flint Hills," *Great Plains Quarterly*, 9, No. 4 (1989), pp. 231-238.

This article surveys the conflict, and the resolution, between the popular and scientific communities, who opposed burning, and the farmers and ranchers of the Flint Hills, who practiced it. According to folk tradition, Indians burned the Flint Hills by dragging blazing balls of dry grass behind their ponies. Particular attention is given to the methodology of burning, including the "firestick" or "firepipe." This device, a length of ordinary steel pipe capped and plugged with a drip hole and filled with gasoline, is used to set fires. While its origins are obscure, it seems to have been introduced around mid-century and has come into widespread use since the 1970s.

Hulbert, Lloyd C. "Fire and Litter Effects in Undisturbed Bluestem Prairie in Kansas," *Ecology*, 50 (1969), pp. 874-877.

The results of this experiment, conducted near Rock Springs 4-H Ranch, show that removal of litter increases the yield of grass and that fire should be considered a necessary part of preserving a natural prairie.

Hulbert, Lloyd C. "Management of Konza Prairie to Approximate Pre-White-Man Fire Influences," *Third Midwest Prairie Conference Proceedings*, Division of Biology, Kansas State University, 1973, pp. 14-17.

Written at the time that the Konza Prairie Research Natural Area consisted of only 916 acres, this report describes a research program that involves six different times of burning in order to replicate the burning of range by Native Americans. The program intends to show how fire affects the tallgrass prairie and to determine the methods of burning that will result in improving pasture land.

James, Samuel W. "An Unexpected Effect of Autumn Burning on Tallgrass Prairie," *The American Midland Naturalist*, 114 (1985), pp. 400-403.

James concludes in this technical article that the microclimates of spring and autumn burned plots (his research was conducted on the Konza Prairie

Research Natural Area) were similar and that different results in other experiments might be the result of differences in soil properties, grazing, or pre-fire nutrients.

Kenyon, Scvic. "Prescribed Burning Goes West," *Kansas Farmer*, 15 March 1991, p. 54.

By 1980 the practice of intentional burning, which had become restricted to the Flint Hills, began to be rediscovered. Thanks in part to the Conservation Reserve Program, burning now occurs throughout the state and beyond. Paul Ohlenbusch, range specialist with the state extension service [and self-proclaimed pyro-manager], conducts prescribed burning workshops throughout the state. An article by Kenyon on how to burn, "A Burning Need for Safety," is found on the two pages preceding. Map included.

Knapp, A.K. and T.R. Seastedt. "Detritus Accumulation Limits Productivity of Tallgrass Prairie," *BioScience*, 36 (1986), pp. 662-668.

Reporting on studies conducted at the Osage Prairie in Oklahoma and the Konza Prairie Research Natural Area, the authors conclude that if dead grass is allowed to accumulate it will have a negative effect on native pasture. Burning and grazing must occur if the tallgrass ecosystem is to remain viable.

Launchbaugh, John L. and Clenton E. Owensby. "Kansas Rangelands: Their Management Based on a Half Century of Research," Bulletin 622 of the Kansas Agricultural Experiment Station, October 1978.

Section 5 of this bulletin details the benefits of prescribed burning and describes proper methods for conducting a burn.

McGlashon, De. "Flint Hills Heat," *Kansas!*, No. 1 (1983), pp. 7-9.

This article, illustrated with color photographs, gives a brief account of the practice of pasture burning in the Flint Hills, including its controversial aspects.

McMurphy, Wilfred E. and Kling L. Anderson. "Burning Bluestem Range--Forage Yields," *Transactions of the Kansas Academy of Science*, 66 (1963), pp. 49-51.

The authors, noting that pasture burning is an old custom in the Flint Hills, conclude from 26 years of experimental burning that soil moisture and forage yields are reduced by burning, and that if ranchers are to burn, they should do it in late spring in order to minimize the ill effects.

McMurphy, Wilfred E. and Kling L. Anderson. "Burning Flint Hills Range," *Journal of Range Management*, 18 (1965), pp. 265-269.

This technical article notes that burning as late as the first of May is less detrimental to pastures than burning earlier in the season and results in better rates of gain in livestock.

Owensby, Clenton E., Gary M. Paulsen, and Jay Dee McKendrick. "Effect of Burning and Clipping on Big Bluestem Reserve Carbohydrates," ***Journal of Range Management*****, 23, No. 5 (1970), pp. 358-362.**

Big bluestem burned on May 1 had higher herbage yields and nitrogen content than unburned grass. Burning had no effect on the final storage of carbohydrates on unclipped plots, but reduced reserves on clipped plots. Late season clipping had lower reserves than early.

Owensby, Clenton E. and John Bruce Wyrill, III. "Effects of Range Burning on Kansas Flint Hills Soil," ***Journal of Range Management*****, 26, No. 3, (1973), pp. 185-188.**

This technical article reports on a study of burning on grazed and ungrazed pastures. Late spring burning does not appreciably affect physical or chemical properties of soil. Possible adverse effects on native vegetation would appear to be unlikely.

Owensby, Clenton E., Kenneth R. Blan, B.J. Eaton, and O.G. Russ. "Evaluation of Eastern Redcedar Infestations in the Northern Kansas Flint Hills," ***Journal of Range Management*****, 26, No. 4, (1973), pp. 256-260.**

Populations of redcedar have increased significantly in recent years in the Manhattan area. This study shows that heavier stocking rates are effective in reducing numbers of the trees and that fire and cutting are the best methods of eliminating the problem.

Owensby, Clenton E. and Ed F. Smith. "Burning True Prairie," ***Third Midwest Prairie Conference Proceedings*****, Division of Biology, Kansas State University, 1973, pp. 1-4.**

Fire is part of the ecology of a true prairie and is thus an appropriate range-management tool. In the Flint Hills, late spring burning is preferred because of higher forage yields, better range condition, and lower soil moisture losses.

Owensby, Clenton E. and Kling L. Anderson. "Yield Responses to Time of Burning in the Kansas Flint Hills," ***Journal of Range Management*****, 20 (1967), pp. 12-16.**

Late-spring burning causes no reduction in forage yields but early and mid-spring burning does. Weeds are significantly reduced by later burning.

Paulsen, G.A. and J.D. McKendrick. "Effect of Burning and Clipping on Big Bluestem Reserve Carbohydrates," ***Journal of Range Management*****, 23 (1970), pp. 358-362.**

This technical article reports that big bluestem, burned on May 1, had a higher herbage yield and more protein and nitrogen than unburned grass. Late season clipping reduced carbohydrate reserves more than early season clipping.

Rains, Jerry R., Clenton E. Owensby, and Kenneth E. Kemp. "Effects of Nitrogen Fertilization, Burning, and Grazing on Reserve Constituents of Big Bluestem," ***Journal of Range Management*****, 28, No. 5 (1975), pp. 358-362.**

Increasing forage production by the application of fertilizers is one method of increasing livestock carrying capacity of a given range. The authors conclude that, with proper land management techniques to control shifts in plant species composition, a rancher could increase stocking rates on native bluestem pastures by applying nitrogen.

Rao, M. Rama, Leniel H. Harbers, and Ed F. Smith. "Estimating Intake and Digestibility of Native Flint Hills Hay," ***Journal of Range Management*****, 27, No. 1 (1974), pp. 20-22.**

The authors studied hay taken from a burned meadow at three stages of maturity--June, July, and September, 1971. Their findings corroborate the experiences of Flint Hills stockmen, that protein levels and digestibility decrease dramatically with the stage of maturity.

Reed, Etta. ***Prairie Fire!*** **El Dorado, Kansas: Butler County Historical Society, 1987.**

Printed on a 1905 Chandler & Price hand-fed press, this attractive eight-page pamphlet describes the disastrous prairie fire that occurred near El Dorado on 7 September 1984.

Smith, E.F., et al. "Different Methods of Managing Bluestem Pastures," ***48th Annual Livestock Feeders' Day*****, Kansas Agricultural Experiment Station, Kansas State University, 1961.**

The results of this experiment involving burned pastures stocked at light, moderate, and heavy rates suggest that forage was reduced but cattle gains increased by burning.

Smith, E.F., et al. "The Digestibility of Forage on Burned and Non-burned Bluestem Pasture as Determined with Grazing Animals," ***Journal of Animal Science*****, 19 (May 1960), 388-391.**

This technical article reports on an experiment with 32 steers grazing on native pasture, the results of which suggest that the digestibility of crude fiber,

dry matter, and ether extract are increased with spring burning. Digestibility of protein was unaffected.

Smith, E.F. and V.A. Young. "The Effect of Burning on the Chemical Composition of Little Bluestem," ***Journal of Range Management,*** **12 (May 1959), 139-140.**

The results of this experiment showed that burned pasture was higher in crude protein, ash, and calcium; lower in ether extract; and showed no essential difference in crude fiber, phosphorus, and nitrogen-free extract.

Smith, E.F.and C.E. Owensby. "Effects of Fire on True Prairie Grasslands," ***Proceedings of the Twelfth Annual Tall Timbers Fire Ecology Conference,*** **Tallahassee, Florida, 1972, pp. 9-22.**

A short description of the Flint Hills region is followed by a brief history, noting that transient grazing and burning have been practiced in the area since earliest territorial days. The authors survey the research on the effects of burning on the various types of native grasses; on soil moisture, fertility, and temperature; on forage production; and on cattle growth. A bibliography is included.

Snell, Joseph W. "Prairie Fires," ***Kanhistique,*** **11, No. 1 (May 1985), pp. 2-4.**

In pioneer times wild prairie fires were the scourge of settlers throughout Kansas and the plains, including the Flint Hills. Included in this article is the 1875 diatribe against pasture burning by the editor of El Dorado's *Walnut Valley Times*.

Woolfolk, John S., et al. "Effects of Nitrogen Fertilization and Late-Spring Burning of Bluestem Range on Diet and Performance of Steers," ***Journal of Range Management,*** **28 (May 1975), 190-193.**

This experiment evaluated the effects of late-spring pasture burning and the application of nitrogen alone and in combination on the rate of gain of steers. Results showed that daily gain and gain per acre were higher on burned pastures than on unburned. Highest rates of daily gain were on pastures that were both burned and fertilized. Gain per acre was higher on fertilized pastures because of heavier stocking rates rather than higher individual rates of gain.

Wyrill, John Bruce III. ***Effect of Burning on Soil Chemical and Physical Properties of Loamy Upland Bluestem Range.*** **Kansas State University Masters Thesis, 1971.**

At the time this thesis was written, over 3,000,000 acres of Flint Hills grass were periodically burned. This study attempted to determine the effect of burning on the chemical and physical properties of different types of soil in the Flint Hills, taking into account the time of burning and whether or not a pasture had been grazed. The results suggest that late spring burning when continued

over a long period on grazed pastures may have some small effect on soil chemical properties, but probably not enough to harm the native vegetation.

THE PRAIRIE PARK

For over fifty years there have been attempts, usually by those who live outside the Flint Hills, to establish within the bounds of the region a Tallgrass National Park, a facility that would preserve a significant acreage of native tallgrass prairie. These efforts have invariably been opposed, usually by those who live in the Flint Hills, as unnecessary: the ranchers themselves are preserving both the prairie and the distinctive lifestyle found here. The location suggested for this park or monument has ranged from the northern Flint Hills to the Osage Hills of Oklahoma. Perhaps 1991 will be remembered as the year when the opposing forces finally reached a compromise, spurred toward that goal by the proposal of Senator Nancy Kassebaum to establish public access to the 11,000 acre Z-Bar Ranch (the old Spring Hill Ranch) near Strong City through the auspices of a private foundation that would own and operate the ranch. A more ominous threat to the land is the desire of the U.S. Army to expand Fort Riley by some 50,000 contiguous acres in Geary County and to secure 100,000 acres in Chase, Marion, and Morris counties as a site for tank and gunnery exercises. The former plan would effectively take over all the Flint Hills left in Geary County, while the latter would destroy some of the most beautiful and historic pastures in the Hills.

Baldridge, Gary. *The Flint Hills: A Question of Control*. Emporia State University Masters Thesis, 1991.

This thesis examines the history of the attempt to establish a Prairie National Park through three distinct periods: from the Dust Bowl through the end of World War Two, during the late 1950s and early 1960s, and during the 1970s and early 1980s. In each period a major contention was the matter of who could best preserve the prairie, government experts or private ranchers.

Coggins, George Cameron and Michael McCloskey. "New Directions for the National Park System," *The University of Kansas Law Review*, 25 (Summer 1977), pp. 478-543.

This pro-park article contains the most thorough summary (to publication date) of the efforts to establish a tallgrass prairie park, an idea first proposed in 1930 by V.E. Shelford of the University of Illinois. Besides providing a survey of the history of the various proposals, the article also has a section countering objections, one on site selection, and one on the economic impact.

Cook, Margie. "The Tallgrass Prairie Dilemma," ***Kansas Alumni*****, 72 (1974), pp. 2-5.**

Ultimately sympathetic to a tallgrass prairie park, this article gives an overview of the attempts to establish such a preserve and allows spokesmen from both sides of the issue to speak.

Duncan, Patricia. ***Tallgrass Prairie: The Inland Sea*****. Kansas City: The Lowell Press, 1978.**

Beautifully illustrated with color photographs by the author, an advocate of a Prairie National Park, this travelogue-journal of the tallgrass prairie moves throughout the midwest but focuses on the Flint Hills.

Ernst, Hank. "Flint Hills Tug-of-War," ***Kansas Farmer*****, 18 March 1989, pp. 6-7, 9.**

This article examines, in even-handed fashion, the controversy over the Audubon Society's proposal to convert the Z-Bar Ranch in Chase County into a Prairie National Monument.

Ernst, Hank. "Standing Our Ground," ***Kansas Farmer*****, June 1989, pp. 6-8.**

In 1989 Fort Riley announced plans to double the size of the base by adding 100,000 acres of Flint Hills ranches and farms. This article examines this unnecessary proposal and the opposition group, Preserve the Flint Hills, organized by area residents, one of whom is quoted as saying, "If they take us, they're taking the heart out of America."

Ernst, Hank. "Tug-of-War Continues," ***Kansas Farmer*****, 15 April 1990, p. 14.**

The author provides an objective update of the Z-Bar Ranch/Prairie National Monument controversy, focusing on the sparring of the National Park Service and the Kansas Grassroots Association.

Farney, Dennis. "The Tallgrass Prairie: Can It Be Saved?" ***National Geographic*****, 157, No. 1 (January 1980), pp. 37-61.**

Although the photographs come from throughout the prairie region, the focus in this article is on the Flint Hills and the attempt to establish a tallgrass national park. The viewpoints of both proponents and opponents are given. Those interviewed include ranchers, rangeland scientists, and prairie restorationists.

Garton, J. S. "Time to Save the Vanishing Prairie," ***National Parks & Conservation Magazine*****, Vol. 49, No. 9 (1975), pp. 4-9.**

This article, although not polemic in tone, is sympathetic toward the establishment of a Tallgrass National Park within the Flint Hills. It is beautifully illustrated with photographs by Ron Klataske.

Hall, E. Raymond. "The Prairie National Park," ***National Parks Magazine*****, 36, No. 173 (February 1962), pp. 4-8.**

This cover story expects authorization of a Prairie National Park to occur in 1962. The site was 57,000 acres in Pottawatomie County contiguous to Tuttle Creek Reservoir. The author, a long-time proponent, notes that prairie not hayed, grazed, or burned will turn to woodland within less than two decades.

Kindall, James. "The Idylls of the Range: Beauty and Controversy in the Flint Hills," ***Kansas City Star Magazine*****, 24 July 1983, pp. 10-13, 24-25.**

This article profiles ranchers John Spinden, Wayne Rogler, and Jim Hess in examining the efforts to preserve the prairie through a Prairie National Park. The Konza Prairie Natural Research Area is also discussed.

King, Madonna Luers. "Preserving the Tallgrass Prairie," ***Sierra*****, May/June, 1984, pp. 72-76.**

This discussion favoring the establishment of a tallgrass national park in the Flint Hills gives the history of the movement and presents the major arguments of both the pro-park Save the Tallgrass Prairie organization and the anti-park Kansas Grassroots Association.

Marson, Chuck. "Keep the Flint Hills Free," ***Kansas Farmer*****, 4 May 1974, p. 14.**

The author advocates a Prairie Parkway through the Flint Hills rather than a national park. In addition to detailing the sites along the proposed route of a parkway, this article also provides a brief history of the Flint Hills.

Miller, Glenn H. "The Proposed Prairie National Park," ***Kansas Business News*****, 14, No. 12 (December 1961), pp. 2-11.**

The author studies the possible economic importance of a national park on Kansas in terms of tourist dollars and also its possible effect on local government finances through taxes.

Pierce, Robert. "Shaping a Tallgrass Sanctuary," ***National Parks*****, March/April, 1985, pp. 28-29.**

The author, noting that the only surviving remnant of the 400,000 square mile tallgrass prairie that once existed in the central United States is in the Flint Hills and Osage Hills, advocates the establishment of a tallgrass preserve in the Osage Hills. He further notes that the prairie contains more life than any other habitat in the country.

"Proposed Prairie National Park Kansas/Oklahoma, Preliminary Environmental Assessment Alternate Study Areas," National Park Service, United States Department of the Interior, October 1975.

Primarily concerned with three counties--Wabaunsee and Chase in Kansas and Osage in Oklahoma--this lengthy document contains thorough and useful information about many aspects (natural, scenic, cultural, and socioeconomic) of the tallgrass prairie.

"Proposed Prairie National Park, Kans., Okla.," Washington: U.S. Government Printing Office, 1977, 1979.

Several reports of the proposed prairie park to be located in either the Flint Hills or the Osage Hills have been sent from the Secretary of the Interior to Congress. These studies, conducted by the National Park Service, are excellent sources of information about the environment, both natural and cultural, of the Flint Hills.

***Saving the Prairie Two Days At A Time*, Tallgrass Prairie Conference and Action Workshop, Elmdale, Kansas, 29-30 September 1973.**

This booklet contains verbatim editions of the presentations made at a conference to promote a prairie national park. The conference was sponsored by Save the Tallgrass Prairie, Inc., The Kansas State Group of the Sierra Club, and the Kansas Council of Audubon Chapters. Among the topics covered are the prairie environment, native plants and animals, the plan for a tallgrass park, and an opposing view from a Flint Hills landowner.

Sigford, Ann E. *Tall Grass and Trouble: A Story of Environmental Action.* Minneapolis: Dillon Press, 1978.

This brief survey of America's grasslands, their destruction, and the attempts to save and restore them, concludes with a chapter on the attempts to establish a Prairie National Park in the Flint Hills. The perspective is environmentalist, but even opponents must grant the accuracy of the author's observation that changing methods of grazing in the Flint Hills are resulting in changes in the nature of the Hills.

Smith, George. "Oppose the Tallgrass Prairie National Park," *Kansas Farmer*, 4 May 1974, p. 10.

This editorial strongly opposes the formation of a national park in the Flint Hills, citing as primary reasons the removal of land from the tax rolls and the preferable alternative of a Prairie Parkway.

Smith, Thayne and Clelland Cole. "Prairie Parkway," *Kansas!*, No. 1 (1969), pp. 14-15.

From the old cattle shipping town of Elgin in the south to the Pony Express station in Hanover at the north, the Prairie Parkway, designated by the Kansas legislature in 1967, uses a number of highways (chiefly K-177) in following the tallgrass prairie through the Flint Hills and Bluestem Grazing Region of Kansas.

Stout, Mel J. "A Proposed Tallgrass Prairie National Park," Save the Tallgrass Prairie, Inc., Emporia, Kansas, 1973.

This booklet, drawn from the author's master's thesis at the University of Michigan, gives details of the background and planning for a tallgrass national park to be established in the Flint Hills. It is illustrated with line drawings and includes a bibliography.

"Tallgrass Prairie," *Wilderness*, Spring 1987, pp. 33-34.

The thesis of this short article is that the last remnants of the tallgrass prairie that once stretched from the Alleghenies to the Great Plains should be preserved as prairie (not as pasture). The two sites mentioned as most preferable are in the Flint Hills and the Osage Hills.

Tomanek, G.W. and F.W. Albertson. *An Analysis of Some Grasslands in the True Prairie*. 1959.

This typescript technical report of pasture land in South Dakota, Kansas, and Oklahoma seems to have been prepared for an agency such as the National Park Service. Areas studied include the central and southern Flint Hills (Elk, Greenwood, Cowley, Butler, Chautauqua counties) and the Osage Hills in Oklahoma.

Tomanek, G.W. *An Analysis of Three Areas in the Flint Hills*. 1958.

This preliminary report (in typescript), prepared for the National Park Service, examines potential sites for a tallgrass park. It includes a survey of plant and animal species and a statement on the condition of pastures. A major criterion is that the area should be representative of the true prairie and the Flint Hills. Unfortunately, the three study areas are not clearly specified (a map would have been useful), although they are thoroughly defined.

FLINT HILLS GEOLOGY

The Flint Hills began forming nearly three hundred million years ago, during the Permian Period of the Paleozoic Era. As eons passed, inland seas

came and went, leaving behind the limestone that undergirds the Hills, the sides eventually eroding away into canyons and draws. It is, in fact, these limestone caprocks that formed the benches that give the Flint Hills their distinctive appearance. It might seem strange to an outsider to hear someone who lives on the western side of the Flint Hills upland speak of driving "down into the Hills," but the expression is not uncommon. Certain hills stand in evident relief amid their surroundings and have been named--Round Mound, Jacob's Mound, Osage Hill, Texaco Hill, and at least two Sugar Loaf hills--even though their overall altitude from sea level, 1500 to 1600 feet, is not particularly impressive.

Buffalo Mound near Maple Hill. Wabaunsee County, late 1940s.
Courtesy of the Kansas State Historical Society, Topeka, KS.

Aber, James. "The Glaciation of Kansas," *Heritage of the Great Plains*, 21, No. 4 (Fall 1988), 1-36.

Half a million years ago glaciers extended into the northeast corner of Kansas, including parts of three Flint Hills counties, Wabaunsee, Pottawatomie, and Marshall.

Adams, George I. "Physiographic Divisions of Kansas," ***Transactions of the Kansas Academy of Science*****, 18 (1903), pp. 109-123.**

The Flint Hills are defined geologically, along with the other major physical regions of the state. Map included.

Bass, N. Wood. ***The Geology of Cowley County, Kansas*****. State Geological Survey of Kansas, Bulletin 12, 1929.**

The author, in a section on topography, gives a technical description of the Flint Hills in Cowley County, which run through the eastern part of the county, and notes that earlier writers had referred to them as the Kansas Mountains.

Buchanan, Rex. ***Kansas Geology*****. Lawrence: University Press of Kansas, 1984.**

This survey contains geological information about the Flint Hills, a map showing the region, and several color photographs, including one of pasture burning. The index is accurate and complete.

Buchanan, Rex and James R. McCauley. ***Roadside Kansas: A Traveler's Guide to Its Geology and Landmarks*****. Lawrence: University Press of Kansas, 1987.**

Portions of several of the roadways followed by the authors cross the Flint Hills: the Kansas Turnpike, Interstate 70, U.S. 160, U.S. 36, and U.S. 56. The authors, who work for the Kansas Geological Survey, intermix interesting historical and cultural details with excellent geological information. This book would be especially useful to those interested in the variety of rock formations in the Flint Hills.

Elledge, Emmett L. "The Economic Geology of the Arkansas City District," State Geological Survey of Kansas, Bulletin No. 8, 1921, pp. 5-37.

The author, after describing the environment of the area, surveys the potential for developing such resources as oil and gas, cement, road materials and building stone.

Flint Hills Resource Conservation and Development Project Plan**, Flint Hills Resource Conservation and Development Council, USDA, Salina, Kansas, 1974. A57.2:F64.**

This plan examines the history, people, topography, geology, soil, water, and industry of the four central Flint Hills counties--Chase, Lyon, Marion, and Morris--in attempting to devise a program of economic development.

Fly, Claude L. "Natural Agricultural Resouree Areas of Kansas," in ***Soil Conservation in Kansas*****, Report of the Kansas State Board of Agriculture, 65, No. 271 (February 1946), pp. 126-195.**

This statewide survey includes a section on the "Kansas-Oklahoma Bluestem (Limestone-Flint Hills) Region," for which the author prefers the term "Bluestem Hills." He estimates the area to cover 3,800,000 acres and describes the topography, soils, climate, and vegetation. Map included.

Frye, John Chapman. "The Erosional History of the Flint Hills," *Transactions of the Kansas Academy of Science*, 58, No. 1 (1955), pp. 79-86.

Geologically technical in tone (but intelligible to the layman), this article gives a succinct account of the composition and formation of the Flint Hills. Apparently the oldest surface soils in Kansas are in the central Flint Hills of Butler County.

Frye, John Chapman and A. Byron Leonard. "Pleistocene Geology of Kansas," *Geological Survey of Kansas*, Bulletin no. 99 (1952), pp. 1-230.

This study contains a section on the Flint Hills, along with the Red Hills, Smoky Hills, and other distinct physiographic regions of the state.

Frye, John Chapman and A.B. Leonard. "Flint Hills Physiography," *Kansas Geology Society, Annual Field Conference*. No. 24. (1959), pp. 79-85.

The authors give a geologic history and description, with charts and photographs, of the Flint Hills.

Frye, John Chapman and Walter H. Schoewe. "The Basis for Physiographic Subdivision of Kansas," *Transactions of the Kansas Academy of Science*, 56, No. 2 (1953), pp. 246-252.

This article, which acknowledges the difficulty of precision in defining physiographic subdivisions in a plains environment, describes the Flint Hills, which have one of the most discernible boundaries in Kansas. Map included.

Geology Resource Bulletins, State Geological Survey of Kansas.

These technical surveys, illustrated with maps, charts, and photographs, contain information about the geology, mineral resources, construction materials, and ground water of various Flint Hills counties:

Chase County (by R.C. Moore, J.M. Jewett, and H.G. O'Connor), Vol. 11, 1951.
Cowley County (by Charles K. Bayne), Bulletin No. 158, 1962.
Elk County (by George J. Verville, et. al), Vol. 14, 1958.
Lyon County (by Howard G. O'Connor, Edwin D. Goebel, and Norman Plummer), Vol. 12, 1953.
Marshall County (by Kenneth L. Walters), Bulletin No. 106, 1954.
Morris County (by Melville R. Mudge, Claude W. Matthews, and John D. Wells), Bulletin No. 1060-A, 1958.
Riley and Geary Counties (John M. Jewett), Bulletin No. 39, 1941.

Wabaunsee County (by Melville R. Mudge and Robert H. Burton), Bulletin No. 1068, 1959.

Gould, C.N. "A Geologic Section Across the Flint Hills Along the Missouri Pacific Railway, Beginning Near Cedarvale and Extending to Winfield," *Kansas Geological Survey*, 1 (1896), pp. 31-34.

The title of this technical description, with cross-section chart, conveys its contents.

Haworth, Erasmus. *Geological Survey of Kansas*. Topeka: The Kansas State Printing Company, 1896.

This topographic and geologic survey includes three sections on and a map of the southern Flint Hills.

Hays, Agnes Dubbs. "The 25 Earthquakes of Kansas," *Kanhistique*, 5, No. 7 (November 1979), pp. 1, 5.

Of the twenty-five recorded earthquakes in Kansas, six have been in the Flint Hills, all near Manhattan, site of the state's strongest earth tremor, which occurred in 1867.

Moore, Raymond C. "The Environment of Camp Funston," State Geological Survey of Kansas, Bulletin No. 4, pp. 1-81.

The author describes the physiographic features of Camp Funston, part of Fort Riley in Geary County, and relates conditions there to those of the western theater of war in France during the First World War.

Muilenburg, Grace, compiler. *Second Geologic Field Conference in the Flint Hills of Lyon, Chase, Morris, and Wabaunsee Counties, Kansas*. Lawrence, Kansas: State Geological Survey of Kansas, 1958.

This handbook, prepared for participants in a field trip sponsored by Kansas State Teachers College through an NSF Science Teachers Institute, contains maps, charts, and technical information for a tour through the Flint Hills.

Muilenburg, Grace, ed. *Stories of Resource-full Kansas*. Lawrence, Kansas: State Geological Survey, University of Kansas, 1961.

There are several references to the Flint Hills in this collection of articles from a pedagogical series originally issued by the State Geological Survey.

Peterson, John E. "The Great Plains, A View from Emporia," *The Kansas School Naturalist*, 34, No. 2 (December 1987), p. 10.

In a section of the essay dealing with the hills of the Great Plains, the author includes a brief discussion of the Flint Hills, their location and their nature.

Schoewe, Walter H. "The Geography of Kansas, Part II: Physical Geography," *Transactions of the Kansas Academy of Science*, 52, No. 3 (September, 1949), pp. 261-333.

The physiographic and geologic region that the author calls The Flint Hills Upland, which includes the Flint Hills proper, was once known as the Kansas Mountains. This portion of the region, a 20-mile wide band running north-south from Marshall south through Cowley County, has summit elevations of 1500 to 1600 feet with a relief of 350 feet. Reference is made to streams and towns within the region and to the grazing of transient cattle.

Self, Huber. *Environment and Man in Kansas*. Lawrence: Regents Press of Kansas, 1978.

The author considers the Flint Hills a natural marker between the Central Lowlands and the Great Plains. He notes that the area is the best grazing ground in the state and that only one river, the Kaw, completely traverses the region. Other major waterways include the Cottonwood, Verdigris, Neosho, Marais des Cygnes, Elk, Big Caney, Big Blue, and Little Blue. Several maps are included.

Smith, Dixon. "The Physical Geography of Kansas," *Heritage of Kansas*, 4, no. 1 (February 1960), 7-15.

Dixon includes a brief description of the Flint Hills in this survey of Kansas geography. Map included.

Swallow, G.C. *Preliminary Report of the Geological Survey of Kansas*. Lawrence, KS: State Printer, 1866.

Although it does not use the term Flint Hills, this survey of topographical and geological information does include several Flint Hills counties: Butler, Chase, Greenwood, Lyon, and Morris. The author vehemently opposes the practice of pasture burning.

Tarpy, Cliff. "Home to Kansas," *National Geographic*, September, 1985, pp. 352-383.

This survey of the geography, history, and culture of Kansas contains a few mentions of the Flint Hills, which is the only geographical region of the state labeled on the accompanying map.

Wilson, Frank W. "Kansas: A Geologic Profile," *Kansas!*, No. 3 (1970), pp. 2-8.

The Flint Hills are given a paragraph in this survey of Kansas geology, along with a short article, "Bluestem and Cattle, a Winning Team" (pp. 12-13), that gives a brief history of the area.

FLINT HILLS' SOILS

The soils of the blackland bottoms along the streams and rivers of the Flint Hills are rich and grow abundant crops of tame hay, cereal grains, soybeans, corn, and sorghum. The upland soils, on the other hand, are thin, usually rocky, and often underlain by a clayey soil known to area farmers as gumbo.

Bidwell, O.W. "The Flint Hills Range Sites," *Transactions of the Kansas Academy of Science*, 69 (1966), pp. 205-213.

The author's attempt to survey the kinds, acreages, and distribution of soils in the Flint Hills is hampered by the difficulty of determining a common definition of the boundary of the Flint Hills.

Mueller, Raymond G. *Soil Genesis as Influenced by Three-dimensional Landsurface Form in Two Low-order Drainage Basins in the Flint Hills of Kansas*. University of Kansas Doctoral Dissertation, 1982.

The author chose to work in these particular sites (one glaciated, the other not) in Pottawatomie and Wabaunsee counties because they were, like much of the Flint Hills, relatively undisturbed by tillage agriculture.

"Soil Survey," United States Department of Agriculture Soil Conservation Service. Washington, D.C.: Government Printing Office.

These technical surveys contain descriptions of the Flint Hills, suggestions on range management, and information on soil types. They are thorough and well illustrated with maps, charts, and photographs.

Butler County (by Harold L. Penner, et al.), 1975.
Chase County (by James K. Neill), 1974.
Chautauqua County (by Elbert L. Bell and Harold T. Rowland), 1976.
Cowley County (by Marcellus L. Horsch), 1980.
Elk County (by Jim R. Fortner, Elbert L. Bell, and Paul R. Kutnink), 1986.
Geary County (by R.G. Dunmire and O.W. Bidwell), 1960.
Greenwood County (by Jim R. Fortner, James T. Neill, and Sylvester C. Ekhart), 1982
Lyon County (by James T. Neill), 1981.
Marion County (by Marcellus L. Horsch and Gene McFall), 1983.

Morris County (by Wesley L. Barker, 1974).
Pottawatomie County (by Marcellus L. Horsch, et al.), 1987.
Riley County and part of Geary County, (by Donald R. Jantz, et al.), 1975.

WATER IN THE FLINT HILLS

Today the Flint Hills are dotted with ponds, watershed dams, and U.S. Army Corps of Engineers reservoirs, but in earlier times residents got their water from one of the many streams that cross the Hills, from one of numerous springs, or from windmills. Witching for water when drilling a well is common practice in the Flint Hills, since the availability of ground water varies widely.

Purebred hereford cows. Cowley County, 1939.
Courtesy of the Kansas State Historical Society, Topeka, KS.

Bird, Roy D. "William Blasing's Amazing Springs," *Kanhistique*, 12, No. 6 (October 1986), pp. 12-14.

In 1882 a poor German immigrant struck two artesian wells in the Deep Creek valley southeast of Manhattan in Riley County. The mineral-rich water seemed to improve the health of all members of the family, so Blasing began to promote the curative effects of the water, which flowed at 250 gallons per hour. Through either baths or drinking, the water was said to cure a host of ailments, including malaria, diabetes, cholera, and colic. Customers came in such numbers as to warrant the construction, in 1877, of a three-story stone resort hotel, which operated until hit by a tornado in 1943.

Bridge, Sally N. "The River Shaped Our Lives," *Heritage of the Great Plains*, 22, No. 2 (Spring 1989), pp. 20-29.

The effects of the great flood of 1951 on the small town of Saffordville, which sits near the Cottonwood River in eastern Chase County, are related through interviews with residents who lived through the devastation.

Flickinger, Gary, ed. "Kansas Water Atlas," Kansas Water Resources Board, 1967.

Although not mentioning the Flint Hills by name, this statewide survey, with maps and charts, provides information about climate, precipitation, ground water, streams, and reservoirs in the region.

Genandt, James D. *The People Be Damned: The Tale of Tuttle Creek*. Emporia State University Masters Thesis, 1988.

The conflict over the proposed dam on the Blue River reached its peak in the early 1960s when local landowners lost their fight with the U.S. Army Corps of Engineers and Tuttle Creek Reservoir was constructed in the northern Flint Hills. As indicated in its title, the thesis views the conflict from the perspective of those who were forced off the land. It includes a contemporary folksong, "The Damming of the Blue."

Haworth, Erasmus. "Special Report on Well Waters in Kansas," Geological Survey of Kansas, Bulletin no. 1 (1913).

This examination of ground water resources has a specific section on the Flint Hills, which, as is his wont, Haworth primarily considers to lie in the southern half of the state--in this instance, Butler and Cowley counties.

"Ire in Tuttle Creek," *Newsweek*, 17 November 1952, p. 30.

This article notes the controversy between the Army Corps of Engineers and local landowners over the proposed flood control dam that was built a decade later.

Jacobson, Dan. "Alcove Spring," *Kanhistique*, 5, No. 7 (November 1979), p. 5.

Alcove Spring, just north of Blue Rapids in Marshall County, was a watering place for the Kansa, Otoe, Missouri, Pawnee, and Sioux Indians, as well as for travelers on the Oregon Trail.

"Large Well a Focal Point in Westmoreland," *Kansas Country Living*, November 1990, pp. 12-A, 12-D.

Kansas boasts the world's largest hand-dug well at Greensburg, but few people know that the world's second largest hand-dug well is also in Kansas, in the northern Flint Hills at Westmoreland. The well, dug in 1914 and measuring twenty-five feet in diameter, was abandoned after a few years, then restored by the Rock Creek Valley Historical Society in 1988.

Metzler, Dwight F. "Water Management in the Flint Hills," *Transactions of the Kansas Academy of Science*, 69 (1966), pp. 175-196.

The author presents a thorough survey of water resources of the Flint Hills area--ground water, surface water (including rivers and reservoirs), watersheds, flood control, supply, quality, pollution, conservation, recreation, and management. His definition of the area, however, is debatable, cutting off some of the eastern Flint Hills and extending past Abilene on the west.

Meyer, Phillip E. *Tuttle Creek Dam: A Case Study in Local Opposition*. University of North Carolina-Chapel Hill Masters Thesis, 1962.

This thesis studies the attempts of farmers, ranchers, and townsdwellers in the Blue River valley to forestall the U.S. Army Corps of Engineers in building the Tuttle Creek Dam and Reservoir.

O'Connor, Howard G. "Notes on the Ground Water Resources of Chase County, Kansas," *Transactions of the Kansas Academy of Science*, 52, No. 3 (1949), 399-405.

This technical article contains information not only about water but about different rock formations as well.

Ruetti, Oretha. "Marshall County Towns Memorialized in Monuments," *Kanhistique*, 1, No. 5 (September 1975), p. 11.

Tuttle Creek Reservoir wiped out the towns of Bigelow and Irving, something that two tornadoes, striking just an hour apart, had failed to do to Irving in 1879. The Oregon Trail crossed near the two towns.

Schoewe, Walter H. "The Geography of Kansas, Part III: Hydrogeography," *Transactions of the Kansas Academy of Science*, 56, No. 2 (June, 1953), pp. 131-190.

This survey describes Diamond Springs and Lost Spring, sites in the Flint Hills along the Santa Fe Trail, and includes a paragraph entitled "Flint Hills Springs" that lists some of the major springs in eight Flint Hills counties.

Scobee, E. Robert and Carl W. Prophet. "The Marion Reservoir: Chemical Conditions in the Cottonwood River During the 1965 Summer," *Transactions of the Kansas Academy of Science*, 70, No. 3 (Fall, 1967), pp. 371-378.

This technical study deals with one of the several Army Corps of Engineer reservoirs within the Bluestem Grazing Region. Others include Marion, Tuttle Creek, Council Grove, El Dorado, Toronto, Fall River, Melvern, and John Redmond.

Shippy, Lina M. "A Kansas Diamond," *Kanhistique*, 1, No. 7 (November 1975), p. 11.

The author gives a brief account of the spring along the Santa Fe Trail that has one of the oldest placenames in the state. Included is mention of the Indian attack in 1852 and a guerrilla attack by some of Quantrill's men in 1863.

MINERALS IN THE FLINT HILLS

From a strictly lithic point of view the Flint Hills are misnamed: the dominant rock is limestone, not flint. To be even more precise, the flint in the Flint Hills properly should be called chert. Although much of this hard flintlike quartz is enclosed within small pockets of limestone or broken into small shards that are scattered over the hillsides like gravel, in some places the deposits were extensive enough to permit quarrying by Native Americans for use as knives, arrowheads, spear points, and other tools. The Cottonwood limestone of the Flint Hills makes excellent building stone, being not only durable but light in color because of its low iron content. In 1903 the world's first helium was found near Dexter in the southern Flint Hills, while one of the country's big oil strikes took place at El Dorado in 1915. The "golden lanes" of Greenwood County are another major oil-producing region within the Flint Hills. See also the section on Memoirs and Personal Histories.

Bass, N. Wood. *Origin of the Shoestring Sands of Greenwood and Butler Counties, Kansas*. Bulletin 23, State Geological Survey of Kansas. Lawrence: University of Kansas Publications, 1936.

Although his major purpose is to describe oil-bearing sands, the author includes a description of the Flint Hills in Butler, Cowley, and Greenwood counties.

Dobler, Grace. "Oil Field Camp Wives and Mothers," *Kansas History*, 10, No. 1 (Spring 1987), pp. 29-42.

This article, based on oral history interviews and illustrated with maps and photographs, depicts with feeling the home life of women in the oil fields of Greenwood County from the mid-teens to the mid-1950s.

Dorcas, Phyllis. "Gas That Didn't Burn!" *Kanhistique*, 3, No. 4 (August 1977), pp. 1, 5.

The world's first helium was discovered at Dexter in the southern Flint Hills of Cowley County in 1903. The non-burning gas was analyzed and identified by H.P. Cady of the University of Kansas, a native of Skiddy in the Flint Hills northwest of Council Grove.

A wildcat oil well. Wabaunsee County, 1920s.
Courtesy of the Kansas State Historical Society, Topeka, KS.

Fath, A.E. "Geology of the El Dorado Oil and Gas Field, Butler County, Kansas," ***State Geological Survey of Kansas*** **Bulletin No. 7, pp. 1-187.**

This thorough technical study examines the largest oil field in the Flint Hills, site (in October 1915) of one of the nation's major oil strikes.

Green, William Allen. ***Midian--Kansas History of an Oil Boom Town.*** **Wichita: Copycat Service Co., 1964.**

Midian, along with Oil Hill, was one of the major oil-boom towns in Butler County. Today trees and grass cover a townsite where at one time some 6,000 residents lived. This privately published history contains many details of work and entertainment in the oil field. Based on the author's 1963 masters thesis at Emporia State University, this book recounts, among other things, Casey Stengel's appearance in a town-team baseball game against Oil Hill, many folktales, and accounts of IWW attempts to organize in Butler County.

Klintworth, Lawrence P. ***Oil Hill: The Town Cities Service Built.*** **El Dorado, Kansas: Butler County Historical Society, 1977.**

This profusely illustrated history documents the oil boom that gripped Butler County in the mid-teens. Its focus on people rather than on statistics, geology, or economics makes it both readable and a valuable source of information on the folklife of the oil fields of the Flint Hills.

Miner, Craig. ***Discovery! Cycles of Change in the Kansas Oil and Gas Industry, 1860-1987.*** **Wichita: KIOGA, 1987.**

Included in this industry-sponsored (Kansas Independent Oil and Gas Association) history are chapters on "El Dorado" (Butler County) and "The Golden Lanes" (Greenwood County), the two major oil-producing areas within the Flint Hills.

Miner, Craig. ***The Fire in the Rock.*** **Newton, Kansas: Mennonite Press, 1976.**

This book is Miner's earlier version of the history of the oil and gas industry in Kansas, also sponsored by KIOGA. It includes material on oil fields within the Flint Hills.

Nixon, Earl K. "The Petroleum Industry in Kansas," ***Transactions of the Kansas Academy of Science,*** **51, No. 4 (December 1948), pp. 369-424.**

The Augusta (1914) and El Dorado (1915) discoveries were the most important in Kansas, and the El Dorado field is dealt with in some detail. The shoestring sands of Greenwood County are mentioned, but otherwise nothing is related concerning petroleum in the Flint Hills.

Ruetti, Oretha. "Blue Rapids Got 'Gypped,'" *Kanhistique*, 4, No. 3 (July 1978), pp. 8-9.

There is an estimated 200 year supply of gypsum in Marshall County, a resource that was being exploited as early as 1857 by Thomas Palmer, an early settler who used the powder from burned rock to plaster his cabin near Blue Rapids.

Schruben, Francis W. *Wea Creek to El Dorado: Oil in Kansas, 1860-1920.* Columbia: University of Missouri Press, 1972.

Schruben takes the history of the oil industry in Kansas up through the El Dorado field, largest in the Flint Hills and site of one of the nation's major oil booms in the late teens.

Smith, Alva J. "The Americus Limestone," *Transactions of the Kansas Academy of Science*, 17 (1901), 189-193.

The author gives a brief, technical description of a particular type of limestone found in Lyon and Chase Counties.

Smith, Alva J. "The Geology of Lyon County, Kansas," *Transactions of the Kansas Academy of Science*, 18 (1903), pp. 99-103.

The Flint Hills are mentioned specifically in this description of rock formations in Lyon County and surrounding areas.

Smith, Alva J. "Reading Blue Limestone," *Transactions of the Kansas Academy of Science*, 19 (1905), pp. 150-153.

The author proposes naming a hard blue limestone, found across Lyon, Greenwood, and Osage counties, for the town of Reading.

Souder, Eunice. "Energy of a Dynamo," *Kanhistique*, 11, No. 4 (August 1985), pp. 6-7.

Isador Molk, a Russian Jew born in 1893, was one of the major forces in the development of the El Dorado oil field. As told in his book, *The Making of an Oilman*, he arrived in El Dorado in 1917, where he soon established a reputation as an intellect as well as an astute oilman who had drilled over one hundred producing wells. His wife, Sophia, was an accomplished poet. Molk died in 1967.

Stebbins, Fred. "A Stone Revival," *Kansas!*, No. 3 (1970), pp. 10-11.

Flint Hills limestone from the Bayer Stone Company quarries near Manhattan has been used at the Eisenhower Museum, on Kansas State University, and in Wyoming, Nebraska, Iowa, Missouri, and Oklahoma.

Teetor, Paul. "Clay and Shale Resources in the Vicinity of Arkansas City," State Geological Survey of Kansas, Bulletin No. 7, pp. 38-47.

The author examines the properties and usefulness of clay and shale in the area.

Yates, J.A. "A Description of the Changes in the Cottonwood Limestone South of Cottonwood Falls, Kan." *Transactions of the Kansas Academy of Science*, 23 (January 1911), pp. 75-90.

In this technical but readable account of one of the major forms of limestone in the Flint Hills, the author determines that if the Cottonwood and Neva limestones are the same, then the vein extends into Oklahoma.

CAVES IN THE FLINT HILLS

Although Kansas contains no large caverns to compare with those in states such as Missouri, Kentucky, or New Mexico, nevertheless there are enough cave systems within the state to entertain home-grown spelunkers. Many of these caves, including the state's four longest, have been formed in the limestone underlying the Flint Hills.

Garinger, Gaylen. "Moodyville Cave," *Kansas Caves*, 2 (1986), pp. 20-22.

Located near the ghost town of Moodyville in Pottawatomie County (touted as a mineral-spring health spa in the 1880s), the entrance of this cave sometimes serves as a nesting site for turkey vultures.

Savage, Joseph, "Sink-holes in Wabaunsee County, Kansas," *Kansas Academy of Science*, 7 (1881), pp. 26-27.

The author briefly describes small caves, some with stalactites and stalagmites, some with wolf-gnawed bones, in the central Flint Hills.

Simmons, Gary. "The Exploration of Jack's Spring," *Kansas Caves*, 1 (1985), pp. 16-22.

The author describes his four explorations of the Jack Springs cave in Chase County, the last of which was particularly harrowing. The cave, the longest in the state, is so narrow in places that the explorer must wriggle forward or backward on his stomach through a constant flow of cold spring water. [Water from this spring was used during prohibition days for the manufacture of whiskey, and the cave itself served as a hideout for the distilling equipment.]

Young, Jim. "The Cavernous Limestones of the Flint Hills," *Kansas Caves*, 3 (1987), pp. 12-34.

The four longest caves in Kansas, including the 10,000-foot cave at Jack Springs, are found in the Flint Hills. This article, illustrated with maps and photographs, describes many of the known caves in the various Flint Hills limestones, the most porous of which seems to be the Fort Riley: over thirty caves each have been found in that formation in both Butler and Cowley counties.

Young, Jim. "Drop Cave and Other Butler County Sinkholes," *Kansas Caves*, 3 (1987), pp. 1-3.

Drop Cave no longer exists, having been filled in as part of a highway expansion in the 1960s. Many such sinkholes in the Fort Riley limestone of Butler County, thought to be hazardous to livestock, have been filled in by landowners.

Young, Jim. "Rock Cave," *Kansas Caves*, 1 (1985), pp. 13-15.

This brief account, with map, describes one of the most visited caves in Kansas. It is located in Cowley County.

ARCHAEOLOGY, PRE-HISTORY, AND NATIVE AMERICANS

The original human inhabitants of the Flint Hills pre-date Coronado by thousands of years, their artifacts still to be found in the plowed bottomlands along the streams where they once camped. Several significant prehistoric sites in the Flint Hills have been studied prior to inundation by U.S. Army Corps of Engineer reservoirs. As European and American explorers entered the Flint Hills region, they encountered the Kansa (Kaw) Indians to the north, the Osage to the south. The last reservation of the Kaw in Kansas was in the Flint Hills near Council Grove. Today the remnants of that tribe live in Oklahoma, just west of Osage County, site of the Osage Reservation, which is located in the Osage Hills, the name used there for the southern extension of the Flint Hills.

Adair, Mary J., ed. "Prehistory and History of the El Dorado Lake Area, Kansas (Phase II)," University of Kansas Museum of Anthropology Project Report Series, No. 47, 1981.

In addition to extensive study of paleographic artifacts, this report also contains a thorough chapter on various historical sites associated with the town of Chelsea, now beneath El Dorado Reservoir. Included is an analysis of 1,752 nails and a description, with photographs, of the farmstead and stone house of Doc Lewellen, one of the first pioneers in Butler County in 1857.

Barr, Thomas P. "Archaeological Survey of the Cedar Point Area," *Kansas Anthropological Association Newsletter*, 14, No. 3 (November 1968), pp. 1-8.

The author examined the artifacts of thirty prehistoric habitation sites in western Chase County, concluding that occupation occurred between 1000 BC and AD 500. Photographs of some two dozen flint tools and points are included.

Bird, Roy D. "Peg Walter's Indian Artifacts," *Kanhistique*, 4, No. 2 (June 1978), pp. 1, 5.

Elmer "Peg" Walter, born in 1877 near Riley, collected many Indian artifacts, most of them from within twenty-five miles of his home. Some he bought in other states, some he picked up on his frequent coyote hunting ventures, and others he obtained directly from Indians passing through his area. After his death in 1967, his collection was put on display at the Riley County Historical Museum in Manhattan.

Blasing, Robert. *Prehistoric Geography of the Flint Hills*. Wichita State University Masters Thesis, 1986.

This thesis explains the location of late prehistoric sites of human habitation in the Flint Hills through an examination of such things as trails and other travel routes, raw materials available to indigenous populations, agricultural and hunting practices, tradition, and religion.

Brockington, Paul E., Jr., ed. "Archaeological Investigation at El Dorado Lake, Butler County, Kansas (Phase III)," University of Kansas Museum of Anthropology Project Report Series, No. 51, 1982.

Included are historical chapters on Chelsea, one of the early settlements in Butler County. The work is thorough, incorporating accounts from contemporary newspapers.

Burton, Nada. "Wah-Shun-Gah Days," *Kansas!*, No. 1 (1984), pp. 12-13.

Each year Council Grove hosts a community celebration celebrating its heritage as a frontier outpost, where a council with the Osage in 1825 helped establish the site as a trading center on the Santa Fe Trail. Named after the last blood chief of the Kaw, two of whose last reservations in Kansas were nearby, the celebration includes Kaw dignitaries and exhibitions of tribal dances and crafts.

Calabrese, F.A. "The Archaeology of the Upper Verdigris Watershed," *Kansas State Historical Society Anthropological Series*, No. 3, 1967.

In the early 1960s four archeological sites on the upper Verdigris in Chase and Greenwood Counties were excavated, yielding skeletal remains as well as pottery and bone and stone tools. Carbon dating places the earliest evidence

of habitation at these sites during the Archaic period, approximately 4,000 years ago.

Curry, H.C. and Thomas A. Witty, Jr. "Recent Excavations in a Woodland Burial Area, Greenwood County, Kansas," *Kansas Anthropological Association Newsletter*, 9, No. 9 (May 1964), pp. 3-6.

The authors conducted a dig on Curry's farm near Madison after a post-hole auger had brought up stone beads. Skeletal material from four infants and one adult was discovered, along with projectile points, beads, and bone implements, indicating the Middle Woodland pattern.

Dary, David. "Comanche," University of Kansas Museum of Natural History Public Education Series No. 5, 1976.

Comanche, the cavalry horse that survived the Custer Battle at Little Bighorn, spent his last years at Fort Riley. He died on November 7, 1891, at age twenty-nine. His body was stuffed and is now on exhibit at the Dyche Museum of Natural History on the campus of the University of Kansas.

DeVoe, Carrie. *Legends of the Kaw: The Folk-Lore of the Indians of the Kansas River Valley*, Kansas City, Missouri: Franklin Hudson Publishing Co., 1904.

Among the eight indigenous and immigrant tribes considered are the Kansa and the Osage, whose range included the Flint Hills. Such things as superstitions, funeral customs, creation stories, feasts, and removal (of the Kaw) to Council Grove are considered.

Fry, Timothy S. "Stone Houses for the Kansa Indians," *Kanhistique*, October 1987, pp. 2-4.

Before the Kansa were removed to Oklahoma from their reservation near Council Grove in 1873, the government had built some 150 stone houses for them on Big John Creek. Charles Curtis, later vice president of the United States, lived with his grandmother on this reservation before the move to Oklahoma. Today ruins from only three of these houses survive on site, although one house has been rebuilt on the grounds of the Kaw Mission Museum in Council Grove.

Fry, Timothy S. "The Unknown Indian Monument," *Heritage of the Great Plains*, 23, No. 4 (Fall 1990), pp. 19-24.

In 1925 the remains of an unknown Kaw Indian were reburied on a hill overlooking the Neosho River valley, on the site of the last Kaw Reserve in Kansas. A forty-foot-tall limestone monument marks the grave. This article provides a brief summary of the treatment of the Kaw and their removal into Oklahoma.

Good, Diane L. "Images in Osage: An Illustrated Guide to the Sylvester J. Tinker Collection," Kansas State Historical Society Anthropology Series Number 16, 1990.

For nearly two decades Sylvester Tinker, born in 1903, served as a leader of the Osage Nation, including 12 years as Principal Chief. In the late 1980s he donated his collection of Osage artifacts to the Kansas State Historical Society. This 93-page booklet serves many purposes: a descriptive catalog of items in the collection, a guide to Osage culture, and a brief history of the tribe. Index, illustrations.

Grosser, Roger Douglas. *Late Subsistence Patterns from the Central Great Plains: A Systemic Model.* University of Kansas Doctoral Dissertation, 1977.

The Snyder Site, on the Walnut River in central Butler County, was occupied as early as 3000 B.C. This study was based on four field excavations held from 1968 through 1971.

Grosser, Roger Douglas. *The Snyder Site: An Archaic-woodland Occupation in South-central Kansas.* University of Kansas Masters Thesis, 1971.

This site, occupied intermittently from c. 3000 B.C. to A.D. 1200, presented to investigators a good representation of a plains village settlement in the Archaic period. It is now covered by the waters of El Dorado Reservoir.

Grosser, Roger Douglas. "A Tentative Cultural Sequence for the Snyder Site, Kansas," *Plains Anthropologist*, 18 (1973), pp. 228-238.

This technical article offers a projected history for a site in Butler County that was occupied by Native Americans for over 3,000 years.

Johnson, Alfred E. "Late Woodland Adaptive Patterns in Eastern Kansas," *Plains Anthropologist*, 32, No. 118 (1987), pp. 390-402.

Three of the fifteen sites described in this technical article are in the Flint Hills, near Council Grove. The settlements were occupied from A.D. 500-1000.

Johnson, Alfred E. "Phase IV Archaeological Investigations at El Dorado Lake, Butler County, Kansas, Summer 1980," University of Kansas Museum of Anthropology Project Report Series, No. 52, 1983.

This report on the final season of field work, which began in 1977, tested three field sites, including Native American and historical settlements. The former existed from c. 3000 B.C. to A.D. 1000, a period marked by climatic change and the introduction of agriculture, the bow and arrow, and pottery. In the historic period, five types of occupations of white settlers were documented at New Chelsea.

Klepinger, Linda. "An Early Human Skeleton from the Snyder Site, 14BU9, Butler County, Kansas," *Plains Anthropologist*, 17 (1972), pp. 71-72.

This technical article records the second oldest Native American burial (c. 1800 B.C.) to be recovered from Kansas. The site, now underwater, is near El Dorado in Butler County.

Leaf, Gary R., ed. "Finding, Managing, and Studying Prehistoric Cultural Resources at El Dorado Lake, Kansas (Phase I)," University of Kansas Museum of Anthropology Research Series, No. 2, 1979.

This report, the first of several prepared for the U.S. Army Corps of Engineers prior to the completion of the El Dorado Reservoir, documents five prehistoric archeological sites investigated during 1977. These sites, hunting camps and villages of some of the first residents of the Flint Hills, revealed archaic, woodland, and plains village components.

Lindemuth, Tim. "Indian Burial Mound Is Studied," *Kanhistique*, 5, No. 3 (July 1979), p. 4.

A band of Woodland People cremated and buried their dead on a hill east of Junction City sometime between 400 and 900 AD. The site was excavated by anthropology students from Kansas State University in May 1979.

Malone, Judith A. and Arthur H. Rohn. "Survey and Assessment of the Cultural Resources, Marion Lake Project," Wichita State University Archaeological Laboratories, 1981.

This contract report for the U.S. Army Corps of Engineers contains information about early Native American inhabitants of what is now Marion County.

Mathews, John Joseph. *The Osages, Children of the Middle Waters*. Norman: University of Oklahoma Press, 1961.

More specifically dealing with the Osage Hills of Oklahoma than with the Flint Hills, this study is a thorough history of the Indian tribe that claimed the area that in historic times included the southern Flint Hills. The Black Dog Trail led through this area to the buffalo range.

McDonald, Leonard. "An Archeological Survey Along McDowell Creek, Geary County, Kansas," *Kansas Anthropological Association Newsletter*, 13, No. 3 (November 1967), pp. 1-10.

McDowell Creek, about ten miles east of Junction City, has an abundance of stone artifacts, some as old as 8,000 years.

Mead, J. R. "Notes on the Archaeology of Butler County," *Transactions of the Kansas Academy of Science*, 19 (1905), pp. 329-330.

Burial mounds near the junction of the Whitewater and Walnut rivers in Butler County, with the discovery of artifacts such as pipes, stone points, and pottery, led the author to believe that a prehistoric population of major proportions lived along game- and timber-rich waterways of the southern Flint Hills.

Morris, L.L. "Indians 'Borrowed' my Mother," *Kanhistique*, 5, No. 5 (September 1979), p. 4.

The author's grandparents, who lived in Lyon County, were often visited by Kaw Indians and traded with them. On one occasion a trusted Indian woman took the baby (Etta, the author's mother) to their camp a short distance away to show her off. This article contains interesting details of the relationship of white settlers and Native Americans.

O'Brien, Patricia J. "Cultural Resourees Survey of Council Grove Lake, Kansas," Report to the U.S. Army Corps of Engineers, Tulsa Distriet, 1983.

This survey, conducted from October 1979 through May 1980, revealed thirteen new sites (five prehistoric, eight historic), in addition to seventeen prehistoric sites already discovered. Flint tools found at the sites were of local origin, taken from quarries or stream beds of the surrounding Flint Hills.

"Old Indian Museum," *Kansas!*, No. 1 (1973), p. 16.

In 1851 the Methodist Church opened a mission school for the Kaw Indians at Council Grove, then had to abandon it three years later when the government withdrew its financial support (nor were the Kaw particularly eager scholars). In 1951 the building was made into a museum by the Kansas State Historical Society.

Riehmond, Robert W. "The Flint Hills--Then and Now," *Kanhistique*, 2, No. 9 (January 1977), pp. 1, 3.

This article is a good summary of Native American life in the Flint Hills. From 10,000 to 5,000 BC they were occupied by Paleo-Indians. For the next 5,000 years the inhabitants were people of the Archaic period, who were succeeded by those of the Woodland period, which lasted until roughly the time of Columbus. From that point until the settlement of the state, the Flint Hills were the hunting grounds of the Kansa and Osage. In addition to abundant game of all sorts the native peoples drew from the Hills such resources as tall grass for thatching, vegetable foods and tools, and botanic medicines.

Root, Matthew J. *The Milburn Site: Late Archaic Settlement in the Southern Flint Hills of Kansas*. University of Kansas Masters Thesis, 1981.

Radiocarbon dating places Native Americans on Durachen Creek in Butler County c. 2500 B.C. This site seems to have been a warm season hunting camp, given the evidence of stone tools and large game--deer, elk, antelope, and bison.

Schmits, Larry J. "The Williamson Site and the Late Archaic El Dorado Phase in Eastern Kansas," *Plains Anthropologist*, 32, No. 116 (1987), pp. 153-174.

This technical article describes early (c. AD 1500) Native American life and artifacts along Eagle Creek in Lyon County.

Unrau, William E. *The Kansa Indians: A History of the Wind People, 1673-1873*. Norman: University of Oklahoma Press, 1971.

The Kansa controlled an area that encompassed the northern and central Flint Hills during the Colonial period of the United States. Two of their nineteenth century reservations were near Council Grove in Morris county. Although not specifically about the Flint Hills, this competent history depicts the Kansa in detail and includes information about their Flint Hills reservations.

Vehik, Susan C. "The Effects of Trade on Resouree Procarement Behavior: A Late Prehistorie Example from the Southern Plains," *Plains Anthropologist*, 31, No. 114, part 2 (1986), pp. 141-154.

Chert from the southern Flint Hills has been found from northern Texas to northern Kansas, evidence that it was a trade item important enough to affect the behavior and settlement patterns of the native inhabitants.

Wedel, Waldo R. *An Introduction to Kansas Archeology*. Smithsonian Institution Bureau of American Ethnology Bulletin 174. Washington: U.S. Government Printing Office, 1959.

This impressive study contains many references to and descriptions of aboriginal sites in the Flint Hills, including villages and flint quarries.

Wedel, Waldo R. "The Prehistorie and Historie Habitat of the Kansa Indians," in *American Indian Ethnohistory*, ed. David Agee Horr. New York: Garland, 1974, pp. 416-492.

This study was originally published in 1951 to provide background information for land claims. One of the earliest references to this tribe is made in 1601 by Juan de Onate, governor of New Mexico, who led an expedition to the junction of the Walnut and Arkansas Rivers, near present-day Arkansas City. The Indians he met, the Escansaques, were most likely not the Kansa, however.

Wedel, Waldo R. *Prehistoric Man on the Great Plains.* Norman: University of Oklahoma Press, 1961.

Major flint quarries worked by Native Americans in the fifteenth century are found near Maple City in the southern Flint Hills, along with some smaller, earlier sites farther north.

Witty, Thomas A., Jr. "Archeological Survey of the Upper Verdigris Watershed," *Kansas Anthropological Association Newsletter*, 11, No. 3 (November 1965), pp. 2-11.

This technical survey of five counties (Chase, Coffey, Greenwood, Lyon, and Woodson), including such things as burial mounds, flint tools, camps, and small villages, indicates habitation from Archaic to Late Ceramic.

Witty, Thomas A., Jr. "Excavations in the John Redmond Reservoir," *Kansas Anthropological Association Newsletter*, 9, No. 2 (October 1963), pp. 7-10.

Undertaken in 1963, this dig in Coffey County unearthed artifacts from the Middle Woodland period, indicating habitation by a group with a Hopewellian affiliation.

Witty, Thomas A., Jr. "A Greenwood County Quarry Site," *Kansas Anthropological Association Newsletter*, 12, No. 5 (August 1967), pp. 1-2.

The author describes a Native American flint quarry in the Flint Hills. Because the flint in the Hills is available on the surface, no mining was necessary.

Witty, Thomas A., Jr. "Notes on Flint Hills Archeology," *Kansas Anthropological Association Newsletter*, 14, No. 8 (April 1969), pp. 1-5.

Flint from the Flint Hills (technically a blue-gray chert) was important to early human inhabitants of the area. A twenty-acre chipping area in Greenwood County contains such a heavy concentration of materials that one cannot avoid stepping on artifacts. Cultural history of the Flint Hills extends back over 10,000 years.

Witty, Thomas A., Jr. "The Slough Creek, Two Dog and William Young Sites, Council Grove Lake, Kansas," Kansas State Historical Society Anthropological Series, No. 10, 1982. 261 pp.

Before the Council Grove Reservoir went in, two intensive digs occurred (1962 and 1964) on the flood plains of Munkers Creek and the Neosho River. Human habitation occurred as early as 3500 BC and AD 1550.

EXPLORERS, EARLY TRAVELERS, AND TRAILS

Zebulon Pike, in 1806, is the best known of the early explorers and travelers to have crossed the Flint Hills; fittingly, he is the first to use the term ("passed very ruff flint hills"), although the name does not come into common usage until later in the century. Lewis and Clark stayed to the northeast of the Hills in 1804, while Coronado, two and a half centuries earlier, had come within the width of a modern county of entering them from the west. If one goes on the authority of folk legend rather than historical fact, however, then we learn that De Soto crossed the Flint Hills in 1537 in what is now Cowley County while seeking the Fountain of Youth (which he is said to have found at Geuda Springs), this a full four years before Coronado sought Quivira on the eastern fringes of the Smoky Hills of McPherson County.

The Santa Fe Trail crossed through the Flint Hills at Council Grove (see the section on Local and County History and Histories), while the Oregon Trail and Pony Express route went through the northern Flint Hills in Marshall County. The Black Dog Trail, used by the Osage to reach the bison-hunting grounds of the High Plains, crossed the southern Flint Hills. In addition, the ruts of various local trading trails or Indian trails can be seen throughout the Flint Hills, if one knows where to look. The section on Cowboys and Cowgirls of the Flint Hills contains two articles about nineteenth century views from the saddle.

Battey, Thomas C. *The Life and Adventures of a Quaker Among the Indians.* Introduction by Alice Marriott. Norman: University of Oklahoma Press, 1968. Orig. pub. 1875.

In 1871 Thomas Battey traveled overland from Emporia to Newton, following the Cottonwood River valley. He notes the fine quality of the water, the richness of the farmland, the lushness of the rolling prairies, and the abundance of limestone along the bluffs. As he gets out onto western part of the Flint Hills upland, however, away from the Hills proper, he comments on the thin, poor soil, incapable, he says of "enduring either wet weather or drought" because of the heavy clay. On this trip he noted his "first drove of Texas cattle, consisting of about five hundred head."

Benson, Florence. "We Spanked the Governor's Pancakes," *Kanhistique*, 3, No. 9 (January 1978), p. 4.

Many travelers along the California Trail, which ran near Chelsea in Butler County, stopped at the Benson farm, including, in 1894, the governor of Kansas, Lorenzo Lewelling. The author describes a scene at breakfast in which she, then a little girl, and her brother caused a commotion with their game of pressing a palm on each other's pancakes.

Betts, Amelia J. "Marking the Santa Fe," *Kanhistique*, 9, No. 9 (January 1984), pp. 1, 5-7.

The Flint Hills are not overly rugged or imposing where the Santa Fe Trail crosses them at Council Grove. This article begins with a comment on why many travelers fail to recognize their beauty.

Brigham, Lalla Maloy. *The Story of Council Grove on the Santa Fe Trail.* Council Grove, Kansas: Morris County Historical Society, 1921, third ed. 1975.

The colorful history of Council Grove as a stop on the Santa Fe Trail is well and thoroughly presented, along with names of leading pioneer citizens. Many references to Indians are made, including an account of the 1868 raid by the Cheyenne on the Kaw, but there is nothing special on agriculture or cattle.

Coues, Elliott, ed. *The Journal of Jacob Fowler: Narrating an Adventure through the Indian Territory, Oklahoma, Kansas, Colorado, and New Mexico to the Sources of Rio Grande Del Norte, 1821-22.* Orig. pub. 1898. Preface and additional notes by Raymond W. and Mary Lund Settle and Harry R. Stevens. Lincoln: University of Nebraska Press, 1970.

Fowler, part of a twenty-man trading and exploratory party, crossed the Osage Hills in present-day Oklahoma and the southern Flint Hills in present-day Cowley County, Kansas, in early October, 1821, where he notes the poor land covered with short oak turning to rich prairies with limestone outcroppings. He describes the central Flint Hills on his return in late June, 1822, as he crosses the Whitewater River in present-day northwestern Butler County and notes the level, rich, black soil mixed with limestone. After camping at Sycamore Springs, the party traveled northeast through what became the Thurman community in southern Chase County and camped on the headwaters of the Verdigris (land he describes as rich and rolling with higher hills than the flats in Butler county).

Dary, David. "The Mystery of Matteo Bocealini," *Kanhistique*, 3, No. 11 (March 1978), p. 7.

In the spring of 1863 Matteo Boccalini came to Council Grove, taking up residence in a shallow cave on Belfry Hill (named for the warning bell that was kept there). He would play Italian songs on his mandolin and occasionally talk to some townsfolk about his boyhood home in Capri. Later that year he joined a wagon train to Santa Fe and took up residence in a cave in the Sangre de Cristo mountains, where a few years later he was stabbed to death, whether murder or suicide is unknown.

Gregg, Josiah. *Commerce of the Prairies.* Max L. Moorhead, ed. Norman: University of Oklahoma Press, 1954.

Originally published in 1844, this seminal work about the Santa Fe Trail refers to the "delightful regions" of Council Grove as the author tells of camping

there while organizing their wagon train and acquiring lumber. He also refers to Diamond Spring. He says that antelope are sometimes found as far east as Council Grove and that buffalo are found in the tallgrass region during the spring while the grass is greening.

Herndon, Wayne, coordinator. "Trails in Kansas: A Special Study," Topeka: Kansas Park and Resources Authority, 1979.

Many historically important trails are associated Kansas, some of them crossing the Flint Hills. The Black Dog hunting trail of the Osage, for instance, crossed the southern Flint Hills; the Santa Fe Trail passed through the central Flint Hills at Council Grove; while the Smoky Hill Trail, the Oregon Trail, and the Pony Express trails passed through the northern Flint Hills.

Magoffin, Susan Shelby. *Down the Trail and into Mexico.* Stella A. Drumm, ed. Santa Fe: William Gannon, 1926.

Many Santa Fe Trail narratives include mention of Big John Springs, Diamond Spring, and Council Grove. Magoffin, however, who began her trip in 1846, is one of the few who was moved to deseribe the pleasant scenery surrounding these Flint Hills landmarks.

McDermott, John Francis. *Tixier's Travels on the Osage Prairies.* Norman: University of Oklahoma Press, 1940.

In 1840 Victor Tixier spent a summer with the Osage Indians, accompanying them on a buffalo hunt that took them along the Verdigris River into the Flint Hills near the border of Wilson and Elk Counties and thencc northwest toward Pawnee country. The detail on the Osage--camp life, customs, war, hunting, etc.--is excellent, but he does not perceive anything distinguishing about the Flint Hills except that they were without trees: "We were going to enter the woodless prairies. . . . The prairie on which we were camping was quite barren; not one tree was to be seen."

Mead, J. R. *Hunting and Trading on the Great Plains.* Norman: University of Oklahoma Press, 1987.

Published nearly a century after it was written, these entertaining memoirs of life on the Kansas frontier (Mead, a founder of Wichita, was a professional hunter, Indian trader, rancher, and entrepreneur) contain some mention of the Flint Hills, including Sycamore Springs and Towanda (where Mead had a farm and trading post).

Mooso, Josiah. ***The Life and Travels of Josiah Mooso: A Life on the Frontier among Indians and Spaniards, not Seeing the Face of a White Woman for Fifteen Years.*** **Winfield, Kansas: Telegram Print, 1888.**

The author, after high adventures throughout the western frontier, in his later life settled for a time in Winfield. Two chapters (of thirty-three) deal with the early settlement of Cowley County and the establishment of its fair in 1871.

Norall, Frank. ***Bourgmont, Explorer of the Missouri.*** **Lincoln: University of Nebraska Press, 1988.**

Bourgmont ventured into what is now Kansas in 1724. Although his precise route is not known, he most likely crossed the Flint Hills near present-day Council Grove. He did meet with representatives of several Indian tribes: Kaw, Pawnee, Oto, Missouria, Iowa, Osage, Plains Apache.

Offen, Charlotte. "Three States Claim Burial Site," ***Kanhistique*****, 3, No. 10 (February 1978), pp. 3, 5.**

The grave of Juan de Padilla, the priest who accompanied Coronado, is claimed by New Mexico, Texas, and Kansas. One of at least three Kansas sites that claim the honor is at Herington, on the western edge of the Flint Hills upland, and another is at Council Grove.

Pike, Zebulon Montgomery. ***The Journals of Zebulon Montgomery Pike.*** **Donald Jackson, ed. Norman: University of Oklahoma Press, 1966.**

Pike spent some five days crossing the Flint Hills (9- 13 September 1806) and is the first person to use that name for them. On 12 September, a day in which the expedition traveled from what near is now Bazaar in Chase County to Florence in Marion County, Pike records the following observation: "Passed very ruff flint hills. My feet blistered and very sore. I stood on a hill, and in one view below me saw buffalo, elk, deer, cabrie [i.e., pronghorn antelope], and panthers."

Shirley, Glenn, ed. ***Buckskin Joe: Being the Unique and Vivid Memoirs of Edward Jonathan Hoyt, Hunter-trapper, Scout, Soldier, Showman, Frontiersman, and Friend of the Indian, 1840-1918.*** **Lincoln: University of Nebraska Press, 1966.**

The subtitle pretty well summarizes Hoyt's interesting life, part of which was spent in the Flint Hills. In late 1870 he led a group of settlers from Emporia to Cowley County, where he took up a claim near where present-day Arkansas City now stands. He comments on the steep slopes and banks encountered while shipping goods by wagon from Cottonwood Falls and recounts experiences with Indians, claim jumpers, and hunting.

PROMOTIONAL MATERIALS, HISTORICAL AND MODERN

During the nineteenth century land agents, town promoters, newspaper editors, and other boosters trumpeted the attributes of the central plains in their attempts to lure settlers into Kansas, stressing the positive and downplaying such things as drouth, grasshoppers, and tornadoes. I have not found one of these tracts dedicated to the Flint Hills, nor even the use of that term for this area, but many of these narratives of praise do include descriptions of the Flint Hills.

In recent years various governmental agencies have initiated programs or conducted studies to assess and encourage economic growth in the Flint Hills. Both the older and the newer promotional writings can add to an understanding of the Hills.

"An Appraisal of Potentials for Outdoor Recreational Development," USDA Soil Conservation Service, 1974.

This thorough analysis, with maps, contains information about the economy, soils, climate, topography, fish and wildlife, and water resources of four central Flint Hills counties (Chase, Lyon, Marion, and Morris). It projects potentials for various types of outdoor recreation, including, among others, vacation cabins, water sports, hunting and fishing, riding, and picnicking.

***Flint Hills News*, Flint Hills Resource, Conservation, and Development Council.**

This occasional newsletter emanated from Strong City, Kansas. Approximately 15 issues were published intermittently between 1974 and 1982.

Greene, Max. *The Kanzas Region: Forest, Prairie, Desert, Mountain, Vale, and River.* New York: Fowler and Wells, 1856.

This lengthy account of the author's travels is intended to encourage settlement in the new territory of Kansas. It includes, as part of a narrative of his trip down the Santa Fe Trail, a good description of Council Grove and its environs. Greene becomes lyrical in his description of the birds, bees, squirrels, and vegetation of the area. He describes a tense encounter with Indians near Diamond Spring and includes a notation of Lost Spring, twelve miles west of which the Cottonwood River begins, as did the bison range.

***Handbook of Arkansas City*. Chicago: C.S. Burch Publishing Company, 1887.**

This promotional handbook, issued by the editor of *The American Sheep Breeder*, gives a brief history of Cowley county, describes the terrain, and includes drawings and descriptions of businesses and farms in and near Arkansas City and Burden. The Flint Hills, called here the Table Mounds, are described as "ranges of low hills" that are valued by herdsmen but deprecated by grain farmers. According to the somewhat purple prose of the author, they are a "perpetual

inspiration. . .monuments that mark the way of the soul into the higher ideal land. . .and give impulse to every noble and refined sense. . . .If they have little commercial value, they are yet priceless in esthetic worth." Fencing and the herd law are mentioned, along with the abundant native grasses. The belief that "where wild grasses flourish, tame grasses never fail to follow" has not held true in the Flint Hills. Keeping in mind its promotional rhetoric, this can be a useful booklet.

McMullen, Linda Swander and Ron Welch. *Kansas: America, Center Stage: A Contemporary Portrait*. Windsor Publications, 1990.

The purpose of this slick volume, replete with business profiles and color photographs and compiled with cooperation from the Kansas Department of Commerce, while obviously promotional, does contain a few references to the Flint Hills: the Flint Hills Overland wagon train out of El Dorado, the Flint Hills Rodeo at Strong City, Jane Koger's ranch near Matfield Green, and artist Judy Mackey's studio in Cottonwood Falls.

Moffette, Joseph F. *The Territories of Kansas and Nebraska, Being an Account of their Geography, Resources, and Settlements*. New York: J.H. Colton and Company, 1856.

Written to promote settlement in newly opened Kansas Territory, this pamphlet does not specify the Flint Hills as a distinct region, but it does describe the Neosho River valley along the Santa Fe Trail and Council Grove as having beautiful scenery with abundant timber, broad and fertile bottom lands for farming, perennially flowing springs, and a pleasant climate. This area is said to be among the most desirable in Kansas Territory for raising livestock. The limestone bluffs near Fort Riley are also described.

***The Official Atlas of Kansas, 1887*. Philadelphia: L.H. Everts & Company, 1887.**

This large-format reference book contains many line drawings of farmsteads in the Flint Hills, including the Clover Cliff Ranch near Elmdale and the Spring Hill Ranch near Strong City. Especially useful are the representations of outbuildings and equipment in use at that time.

Perry, Stephen. *The Flint Hills of Kansas*. Topeka: Kansas Department of Economic Development, 1973.

A promotional booklet, illustrated with drawings by the author, this brief overview contains items of general information about the geology, flora, fauna, and physical structures (buildings, bridges) of the Flint Hills.

Perry, Stephen. *Limestone Oak and Bluestem*. Topeka: Kansas Department of Economic Development, 1973.

This promotional booklet differs only slightly from the author's *The Flint Hills of Kansas*, including some of the same photographs and drawings.

Roth, Joseph A. and Saundra S. Simon. "Flint Hills Region Land Use Element and Housing Element," Flint Hills Regional Council, 1978.

This guide was prepared (by a HUD agency) to guide future land development and to promote more prudent and environmentally sound land use in the five-county area served: Chase, Dickinson, Lyon, Marion, and Morris.

Sloan, Walter B. *History of Kansas and Nebraska, Describing Soil, Climate, Rivers, Prairies, Mounds, Forests, Minerals, Roads, Cities, Villages, Inhabitants and Other Subjects Relating to that Region; with a Correct Map*. Galesburg, Illinois: Boishel, Kuhn, and Company, 1857.

This pamphlet purports to contain the latest information for settlers headed to Kansas Territory. The Flint Hills are not known by that name, nor are they singled out as a distinct geographical region, but there are numerous references to the area. The road between Fort Riley and Council Grove, for instance, is called "the Divide" and is said to have no timber, stones scattered over the surface of the ground, and "the poorest soil within a hundred mile radius." The potential for stock farming, as currently practiced in the Flint Hills, is, however, recognized. Clark Creek, for instance, is said to offer good farm sites with an abundance of clear water, narrow valleys with good soil, protection from wind by the high surrounding bluffs, and plenty of pasture on the "high, contiguous prairies above." Fort Riley is described as sitting on bluffs commanding a view of valleys, streams, and prairies. The author foresees a time when fence lines of Osage Orange trees will "enclose plantations" and thus protect farms from prairie fires. He speaks of the "ever changing aspect" of the high rolling prairies above the Kaw River, giving the region a "novel and picturesque appearance." Rocks breaking through "by some mysterious agency have lifted many a lofty mound out of the bosom of the prairie, perhaps only to break the monotony of the scene."

Tuttle, Charles R. *A New Centennial History of the State of Kansas*. Madison, Wisconsin and Lawrence, Kansas: Inter-State Book Company, 1876.

This strongly pro-Union history does not mention the Flint Hills, but it does discuss the types of native grasses ("blue-joint" is replacing buffalo grass) and the detrimental effect of prairie fires. It also contains thumbnail sketches of the counties in the state, which give at least some information about the Flint Hills area.

TRAVEL AND TRANSPORTATION

In recent years travel writers have discovered the Flint Hills and have come to appreciate both their quiet beauty and their connection to the cowboy myth of the American West. Also included in this section are articles about the Kansas Turnpike, the inter-urban street car of Chase County, and early-day steamboat traffic to Junction City and beyond on the Kansas River. Fred Harvey's second restaurant and first hotel were built in Florence. Today's traveler, most likely in an automobile, can visit near-ghost towns that were once lively cowtowns along the railroad lines that crossed the Flint Hills.

Arnold, David. "Prairie Country, Kansas," *National Geographic Traveler*, March/April 1989, pp. 62-67. Photographs by Berne Ketchum.

This piece of slick travel journalism begins with a description of the tallgrass prairie as experienced on an excursion with the Flint Hills Overland wagon train. The author mentions several roads (K-177 through the length of the Flint Hills, Mill Creek and Skyline Drives through the northern Flint Hills) that can be taken and some things to see and events to experience along those roads: Lowell Thierer's sawmill and museum near Alma, the Kaw Museum and other historic structures in Council Grove and that city's annual Wah-Shun-Gah Days and Indian Powwow, and the annual Flint Hills Rodeo at Strong City.

Chandler, Allison. "The Horse-car Interurban From Cottonwood Falls to Strong City," *Kansas Historical Quarterly*, 24 (1958), pp. 385-393.

The horse-drawn Cottonwood Falls-Strong City street car line was one of the first inter-city lines in Kansas. This article describes the line with both historical detail and interesting anecdotes.

Chandler, Allison. *Trolley through the Countryside*. Denver: Sage Books, 1963.

This history of trolleys in Kansas includes chapters and photographs of several streetcar lines between Flint Hills towns: Cottonwood Falls-Strong City; Junction City-Fort Riley; Manhattan-Junction City; Westmoreland-Blaine.

DeLano, Patti and Cathy Johnson. *Kansas Off the Beaten Path*. Chester, Connecticut: Globe Pequot Press, 1991.

There seems to be little feel for the geography of the state in this guide. In one section the authors locate the Flint Hills accurately, while in another they place them immediately northeast of Hutchinson, confusing them, one supposes, with the sand hills there. In any case, some worthwhile attractions of the Flint Hills are included while others are inexplicably omitted.

Cowboys and stock cars at the Rockland Stockyards. Chase County, 1962.
Author's Collection

Fitzgerald, Daniel. *Ghost Towns of Kansas: A Traveler's Guide*. Lawrence: University Press of Kansas, 1988.

Included in this survey are a number of towns within the Flint Hills area: Alcove Springs and Irving in Marshall County, Pawnee and Randolph in Riley County, Juniata and St. George in Pottawatomie County, Volland and Wabaunsee in Wabaunsee County, Bushong in Lyon County, Diamond Springs in Morris County, Midian and Oil Hill in Butler County, and Elgin in Chautauqua County.

Guise, Byron E. "Cloudburst Causes Tragic Wreck," *Kanhistique*, 2, No. 8 (December 1976), p. 4.

A 1915 flood on Fancy Creek in Riley County caused a Union Pacific train to derail with resultant loss of twelve lives.

Hager, Dan. "The Flint Hills of Kansas," ***Ford Times*****, July, 1978, pp. 55-59.**

This journalistic account of a drive through the Flint Hills turns into an essay that rings true with feeling for them.

Hann, David. ***Sampling Kansas: A Guide to the Curious*****. Lawrence: Kansas Key Press, 1990.**

This travel guide, filled with interesting trivia and historical facts, features several items related to the Flint Hills: William Allen White in Emporia, the Chase County Courthouse in Cottonwood Falls, the Monument to the Unknown Indian near Council Grove, and the Alone Statue in Junction City.

Harper, Steve. ***83,000 Square Miles No Lines, No Waiting: Kansas Day Trips*****. Wichita: Wichita Eagle and Beacon Publishing Company, 1990.**

The author, a reporter for the *Eagle-Beacon*, has compiled a useful travel guide to the state, complete with glossy color photographs. Among the Flint Hills counties specifically covered are Chase, Chautauqua, Cowley, Geary (Fort Riley), Morris (Council Grove), and Wabaunsee. The book also includes a series of Kansas trivia questions and an alphabetized list of all 105 counties showing location, county seat, population, and information about names.

Harvey, Robert W., ed. "The Sea of Grass," ***Changing Times*****, June 1968, pp. 25-26.**

The Flint Hills, illustrated with a water color by Frederic James, are featured along with other tallgrass prairie sites in an article on the fifteen places one should visit in order to discover the real America.

Humphreys, J.R. ***The Lost Towns and Roads of America*****. Garden City, New York: Doubleday, 1961.**

The author, on a diagonal automobile tour across America (from New Jersey to California), chose to drive the length of the Flint Hills, from Wamego to Moline, then west, with stops at Alma, Eskridge, Emporia, and Olpe. His history of bison, Texas cattle drives, and the bluestem grasses of the Flint Hills is a bit romantic, but not inaccurate.

Inglish, Howard, ed. ***Larry Hatteberg's Kansas People*****. Wichita: Jular Publishing, 1991.**

Photographs by Vada Snider illustrate the seventy-five profiles selected from the hundreds of video-taped interviews television journalist Larry Hatteberg has conducted during the past two decades. Included are a number of persons that reveal the diversity of life in the Flint Hills area. In addition to the expected ranching (Bobbie Kinsey Trayer and Wayne and Elizabeth Rogler of Chase County and Jake McClure of Cambridge) and farming (Belgian horse raiser Howard Johnstone of Maple Hill and antique implement collector David Gatton of Burden), there are also Eureka disc jockey Tammy Kay Scholterbeck, song

writer Phyllis Macy-Mills of Cedarvale, drug store owner Hazel Holmes of Hamilton, hardware store owner Alan Bryant of Arkansas City, grocery store owners Jack and Vernie Beaston of Marion, Browning scholar Philip Kelley of Winfield, greeting card designer Judy Barnes of Winfield, woodcarver Rusty Mauk of Augusta, and the country's oldest newspaper reporter, Rose Nix Leo of Howard.

Isern, Thomus D. "Reading the Range," *Kansas!*, No. 2 (1989), pp. 32-33.

The central Flint Hills are accurately depicted in this description of the Flint Hills Adventure Tour sponsored by the Emporia Chamber of Commerce.

"The Kansas Turnpike," *Kansas!*, II, No. 5 (November-December 1956), pp. 10-13.

The Kansas Turnpike, at 236 miles the fourth longest in the United States at the time of its completion in 1956, less than two years after construction began, is sometimes called "The Scar of the Flint Hills" by local residents. Until federal regulations mandated differently, the posted speed limit was 80 miles per hour, highest in the nation. The accompanying photographs include the cattle-loading pens at Cassoday.

Mallory, Aileen. "Service with a Smile, the Harvey Girls," *Kanhistique*, 4, No. 9 (January 1979), pp. 10-11.

Fred Harvey opened the first of his famous Santa Fe Railroad restaurants at Topeka in 1876, his second one at Florence in Marion County shortly afterward. Today part of the Florence Harvey House has been turned into a museum.

McCoy, Sondra Van Meter and Jan Hults. *1001 Kansas Place Names*. Lawrence: University Press of Kansas, 1989.

Various locations in the Flint Hills are represented in this well researched collection.

McHugh, Mary. "Flint Hills, Kansas: Where the Buffalo Still Roam," *Woman's World*, 18 October 1988, pp. 48-49.

This travel suggestion, a regular feature of the magazine, has little text, but does contain ten excellent color photographs of bison, prairie chicken, flowers, and stone architecture of the Flint Hills. A map and suggestions for where to stay, what to see, and where to eat are included.

Penner, Mil and Carol Schmidt. *Kansas Journeys*. Inman, Kansas: Sounds of Kansas, 1985.

The first chapter of this handsome book of color photographs and laudatory text is about the Flint Hills upland. It includes scenes of grass, flowers, barns, bison, and cattle shipping.

Penner, Mil and Marci Penner. *Kansas Weekend Guide*. Inman, Kansas: Sounds of Kansas, 1990.

This handy travel guide includes three sections with sites or attractions in the Flint Hills: Manhattan (Konza Prairie and Skyline Drive), Emporia (the Chase County courthouse, the stone arch bridge at Clements, Sharpes Creek Road, the Cassoday Cafe, Teterville, the Emporia livestock auction), and Winfield (Wee Kirk of the Valley in Cedar Vale, the Beaumont Hotel, El Dorado's Oil Museum, the candy factory at Dexter, the Cherokee Strip Museum at Arkansas City, and the annual Walnut Valley Bluegrass Festival at Winfield).

Phillips, Glen A., Jr. "Skyline Drive," *Kansas!*, No. 2 (1969), pp. 22-23.

The author gives a brief description, illustrated with color photographs, of the major sites along this scenic route through the northern Flint Hills.

Rydjord, John. *Kansas Place Names*. Norman: University of Oklahoma Press, 1972.

Included in this comprehensive survey of the entire state are many place names from the Flint Hills and a brief summary of the many names at one time given to the Flint Hills: Bluestem Hills, Kansas Bluestem Region, Limestone Pastures, Bluestem-Limestone Pastures, Bluestem Pasture Region of Kansas.

Shortridge, James R. *Kaw Valley Landscapes*. Lawrence: University Press of Kansas, 1977.

This travel guide by a leading cultural geographer traces a generally circular route from Kansas City west to Wamego, then south and southeast to Alma and Eskridge, then back to Kansas City. A specific section on the "layered benchland" that is the Flint Hills discusses such things as ranching, ethnicity, stone walls and other fencing, oil, pasture burning, loading pens, and sale barns.

Simecka, Betty. "Where the Buffalo Still Roam," *Kansas!*, No. 2 (1985), pp. 36-38.

Eddie Meinhardt sponsors a tour through his herd of 250 bison in the northeastern Flint Hills near Paxico on land where his grandmother once shared her lunch with a group of buffalo-hunting Potawatomie. Several recipes for cooking bison meat are included.

Stroup, C.L. "Kansas Turnpike," *Kansas!*, No. 2 (1968), pp. 4-6.

This account of the 236-mile superhighway that opened on 25 October 1956 includes a description of various sights along the route, including special mention of the Flint Hills and the "walking skeleton" cattle that are unloaded in the spring, then shipped out fat in the fall. Also mentioned are the Knute Rockne crash, Rolla Clymer, and William Allen White.

Tolliver, Bill. "Flinthills Impressions," *The Emporia Journal*, 2, No. 5 (April 1991), pp. 18-19.

The nature of this contemplative essay is indicated in its subtitle: "Thoughts of a Stranger Riding Through a Strange Land." He speaks of the colors, the wind, the rock, the wildlife, the grass--and the vain attempts of humans to control the land. He calls the Flint Hills "a country huge beyond words. . . .It is not pretty; it is magnificent."

Van Valkenburg, Randall. "Steamboating on the Kansas," *Kanhistique*, 11, No. 4 (August 1985), pp. 2-3.

For some eight years, on and off, beginning in the late 1850s, steamboats passed through the Flint Hills on their way to Fort Riley and thirty miles beyond. Altogether some thirty-four different vessels plied the shallow waters of the Kaw River, a traffic that reached its zenith in 1859.

Wallace, Douglass W. "'No. 29 Has Gone. . .'--The Volland Wreck," *Kanhistique*, 11, No. 7 (November 1985), pp. 5-6.

Volland, once a major Rock Island cattle shipping center in Wabaunsee County, was the site of a sensational train wreck on 2 January 1907 that killed thirty-four people.

Wilson, D. Ray. *Kansas Historical Tour Book*. Carpentersville, Illinois: Crossroads Communications, 1987.

Many attractions of the Flint Hills are included in this traveler's guide: the Roniger Museum and the Chase County courthouse in Cottonwood Falls, the Knute Rockne plane crash site near Bazaar, the Flint Hills Overland wagon trips near El Dorado, the Flint Hills Scenic Tours at Paxico, the Cherokee Strip Museum at Arkansas City, and the site of the world's first helium discovery at Dexter.

Winckler, Suzanne. *The Smithsonian Guide to Historic America: The Plains States*. New York: Stewart, Tabori and Chang, 1990.

One section of the Kansas portion of this excellent guidebook is entitled "The Flint Hills" (pp. 205-218). It describes such attractions as the Chase County courthouse in Cottonwood Falls, William Allen White's home in Emporia, the United States Cavalry Museum and the first Kansas Territorial Capital at Fort Riley, the Hollenberg Pony Express station, Council Grove, and the Konza Prairie. This section also includes the Eisenhower Library, even though Abilene lies outside the Flint Hills.

THE FLINT HILLS OVERLAND WAGON TRAIN

Since 1978 over a thousand adventurers have sampled pioneer life in the Flint Hills by taking part in an overnight wagon train ride, the Flint Hills Overland. Participants ride in horse-drawn wagons, walk, or ride horses in weather ranging from summer heat to autumn frost. Meals are cooked over a campfire, and sleep is under the stars. Originally the route ran east of Cassoday in Butler County, then switched to western Greenwood County near Sallyards, and has since moved into Chase County near Matfield Green.

Baker, Joan Stibal. "Flint Hills Overland Wagon Train: An Excursion to Kansas' Pioneer Past," *KS. Magazine*, May 1986, pp. 26-31.

A dozen color photographs illustrate this brief description of the overnight wagon train adventure into the Flint Hills.

Collins, Sharon. "Gone to Yesterday," *Kanhistique*, March 1979, pp. 12-13.

In 1978 the Flint Hills Overland Wagon Train began its excursions into the Flint Hills near Cassoday, changing its base of operation to the Kirk Ranch in western Greenwood County, east of Rosalia, in 1980. The author describes one of the early trips, eliciting the feel for pioneer travel.

Denton, Betty Lou. "Turning Back Time," *Kansas Farmer*, 4 May 1985, p. 44.

The origin of the Flint Hills Overland Wagon Train is described in this article, along with an account of a typical outing.

Schneider, Richard H. "Wagons West!" *Guideposts*, June 1987, pp. 24-29.

The author describes his experiences as a participant on one of the Flint Hills Overland wagon train trips in Greenwood County.

Simecka-Pappas, Betty. "Steel Wheels and Modern Day Pioneers," *Kansas!*, No. 2 (1984), pp. 28-29.

Three families from Pennsylvania and one from Delaware were among the thirty-one travelers on this excursion of the Flint Hills Overland wagon train into the Kirk Ranch in western Greenwood County. The author gives the history of the enterprise and the names of those who organized it. She also describes the food and the scenic view from Inspiration Point. Color photographs.

Stites, Tom. "The Trail of Tranquillity," *Kansas City Star Magazine*, 25 May 1986, pp. 10-13, 25.

The author describes his experiences as a participant in one of the Flint Hills Overland wagon train trips in Greenwood County.

Wilson, Annasue McCleave. "Across the Wide Prairie by Wagon--Again," *New York Times*, Travel Section, 10 June 1990.

The author recounts the details of her trip on the Flint Hills Overland Wagon Train in the summer of 1989. Her experience was positive, but she does not stint on details of roughing it.