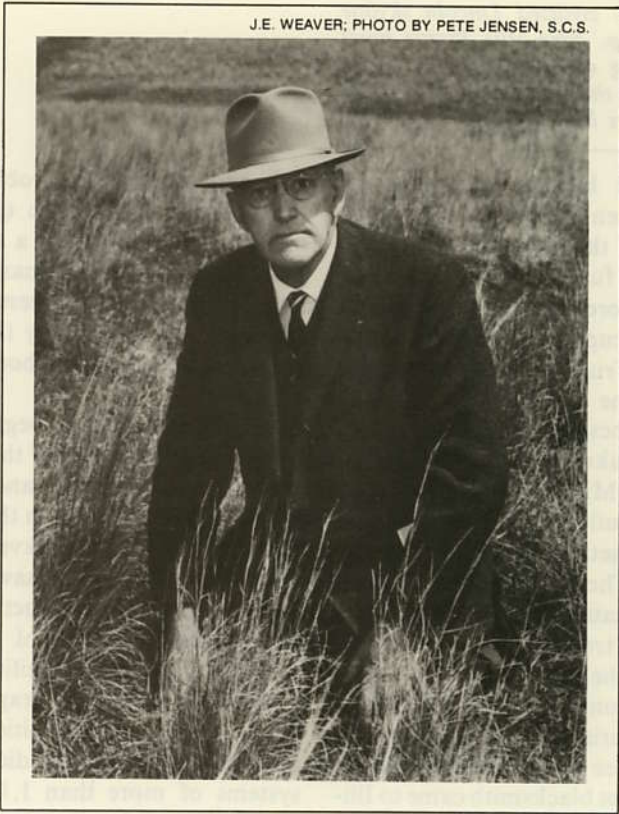




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J.E. WEAVER; PHOTO BY PETE JENSEN, S.C.S.



A Prairie Classroom

One of Nebraska's last tracts of native tall-grass prairie has been preserved for scientific study and appreciation by generations to come.

DR. JOHN L. ADAMS, UNIVERSITY OF NEBRASKA-LINCOLN

TALL GRASSES waved in numerous tracts of unplowed "original" prairie around Lincoln in 1917. But anyone passing by, perhaps in a buckboard or buggy, or even chugging along in one of the horseless carriages of that day, might have been sorely puzzled at what they saw. During the summers of 1917-18, a dignified man, in suit and tie and wearing a trim felt hat, dug more than 100 grave-like pits, usually measuring six feet deep, three feet wide and from six to 10 feet long, on the prairies around Lincoln. In the days before the back hoe and the "Ditch Witch," using nothing more than a hand spade, he cut some of his trenches much longer and deeper, sloping them steeply

downward to a depth of over 20 feet into the rich prairie soil.

The man was Dr. J.E. Weaver. At that time he was applying his tremendous energy and dogged determination to the study of prairie plant roots. In 1917, he had just begun what was to be a 50-year career at the University of Nebraska. It was a career which was to make the University of Nebraska a leader for over 20 years in the scientific field of plant ecology. Weaver authored or co-authored more than 100 technical papers and a dozen books, and became the world's top authority on prairie vegetation.

Weaver found the prairies to be a written record. "Nature is an open book for those who care to read. Each

With the very civilized Lincoln skyline for a backdrop, Nine-Mile Prairie hosts budding young ecologists visiting native grassland for the first time, as well as fleeting visitors like LeConte's sparrows.

grass-covered hillside is a page on which is written the history of the past, conditions of the present, and predictions of the future."

Early explorers saw a magnificent grassland occupying the center of the continent. "True" or tall-grass species rippled on the richest land. The best soils of Minnesota, Wisconsin, North and South Dakota, Kansas, Nebraska, Oklahoma, Missouri, Illinois, and Iowa, were built by tall-grass prairies.

But early settlers were leery of the grasslands. They were accustomed to trees and equated woodlands with fertility. And trees could give them lumber for shelter and fuel for heat. Moreover, some of the midwestern tall-grass prairies were in heavy, sticky soils that were tough to plow. But a burly Vermont blacksmith came to Illi-

nois and solved that problem. From the polished steel of an old sawmill blade he hammered out a moldboard plow designed by Thomas Jefferson. His name was John Deere; his plow "sheared"—it cut cleanly through the rich black soil so tightly bound by age-old sod.

By the time Weaver began his root studies in 1916, much of the tall-grass prairie had been broken and more was yet to be plowed under in the post-war boom of the 1920's. Weaver regretted this encroachment—he saw the grasslands as not only productive but the best available means of conserving both the soil and its fertility.

Working in eight geographically different prairie communities, Weaver removed intact and studied the root systems of more than 1,150 individ-

ual plants, making complete scale drawings representing 140 species. His studies were the first scientifically-accurate reports on depth of penetration, branching habits, size, and functions of roots of prairie flora. He later extended his work to include all the principal field crops of the midwest and to 33 of the main vegetable crops.

As his fame spread, students from more than 20 countries came to study plant ecology with Weaver. In 1930, one such student from Switzerland, T.L. Steiger, published a four-year study of the "Nine-Mile Prairie," so named because it was exactly nine miles from the Lincoln city square.

Steiger probed the prairie with typical Swiss thoroughness. He analyzed the soil, measured soil profiles, recorded the weather and plotted the



PHOTO BY CURT TWEDT



PHOTO BY DAVE MENKE

locations of 347 carefully identified species and subspecies of plants. He not only measured the proportionate populations of such plants but made repeated observations, charting the beginning and end of flowering for 242 of the identified species.

Later, other students established similar baselines for more living populations. They found 52 species of the *Orthoptera* (crickets, grasshoppers, roaches, etc.), and 103 species of *Coleoptera* (beetles). And an ecological study of all such invertebrates 24 years after Steiger's work, yielded more than 44,000 specimens, all carefully classified. Students observed and wrote about birds and mammals, too. Eighty-six species of birds and 14 species of mammals were recorded on



PHOTO BY CARL WOLFE

Showy forbs, like coneflower and prairie clover (below) are woven into the native grasses. Periodic, controlled burning in the spring discourages woody plants from encroaching on indigenous prairie plants.

"Nine-Mile Prairie."

Weaver's collected data on the Nine-Mile and other sites were to prove invaluable when the greatest drought in recorded history began in 1932. The federal government hired him to monitor drought effects on the grasslands. The government paid the University of Nebraska botany department \$1,000 a month for two years to hire from 50 to 70 botany students, with several Nebraska faculty acting as supervisors.

Weaver and his small army of tech-

nicians fanned out over the dying prairies. They studied more than 100 permanently marked plots in six states—Colorado, Nebraska, Iowa, Missouri, Kansas and Oklahoma—over a period of several years. They paid special attention to the reproduction, migration, establishment and competition of individual species of grasses and forbs—flowering herbs.

Finally the rains came. Weaver's great relief was apparent even in his technical writings: "For here was nature at work repairing the damage of

a great catastrophe, a catastrophe that has probably occurred many times in the long history of grassland, but one of which there is no written record." Weaver and his students then wrote that record.

And according to Peter Jensen, range conservationist (now retired) with the Nebraska state office of the Soil Conservation Service, "We still use information that Weaver developed—guidelines on grass succession and renewal when land is denuded by drought or other causes."



PHOTO BY CARL WOLFE

Professor Ronald C. Tobey, a University of California–Riverside historian, has recently published a book entitled *Saving the Prairies: The Life Cycle of the Founding School of American Plant Ecology, 1895-1955*. Tobey has exhaustively researched the roles of Nebraska's great botanists—Charles Bessey, Roscoe Pound, Frederick Clements and J. E. Weaver, in the development of plant ecology and the later science of range management. His well-documented volume leaves no doubt that the detailed research of Clements, Weaver and dozens of their students, was and still is a primary influence in the field.

More doctorates in plant ecology (more than 40) were completed at Nebraska under Weaver's guidance, than at any other university. Weaver's mentor and friend, Clements, worked at the Carnegie Institution in Washington, D.C. from 1917-1942, served as a consultant to the U.S. Soil Conservation Service and U.S. Forest Service for many years, and participated in development of government policies during the great drought. He maintained close ties with Weaver and the University of Nebraska. Perhaps as a result, many Nebraska doctoral graduates were hired by U.S. government agencies and helped to shape the policies and methods used today in soil conservation and range management.

Those principles and policies have been effective in helping to prevent soil erosion and in guiding range management, particularly in the western mixed prairies. Though most of the original tall-grass prairie has long since given way to intensive crops, a part of the original "Nine-Mile Prairie" still exists within view of the state capitol. A 230-acre parcel once owned by the City of Lincoln had never been plowed. The Department of Defense acquired it as part of a fenced buffer zone around a World War II bomb storage depot. The depot served the U.S. Air Force base near Lincoln during the "cold war." When the government deactivated the base,



PHOTO BY CURT TWEDT

they declared the parcel surplus and sold it to the city of Lincoln. The Lincoln Airport Authority assumed management of the tract in 1966.

In 1978, the Wachiska Chapter (Lincoln area) of the National Audubon Society became interested in the prairie. Ernest Rousek and other members, with the support of the University's School of Life Sciences, mounted a conservation project campaign involving the prairie. They wanted it transferred to an educational institution and to be preserved. This required new legislation, and in 1981 the Nebraska legislature passed LB 58 giving the Airport Authority permission to sell the land. The bill specified that the purchasing institution must preserve the land as original or "virgin" prairie.

Several University scientists were vitally interested in the preservation of the tract for teaching and research purposes. Dr. A. T. Harrison, a former plant ecologist in the School of Life Sciences, was disappointed when he arrived in Lincoln in 1977 to find that no suitable, original prairie existed for

teaching purposes in all of Lancaster County. With the cooperation of the Wachiska Chapter and the Airport Authority, he began using the tract extensively for teaching, field trips and research. He resurveyed the flora studies of 1927-29 by Steiger to see how 50 years of past management, including the great drought of the 30's, had affected the prairie.

Dr. Lowell Moser, Professor of Agronomy in the University's Institute of Agriculture and Natural Resources (IANR), specializes in range management. He sees the Nine-Mile Prairie as an invaluable teaching tool for basic ecology due to its nearness. But, he thinks it is also important to grass breeders as a close-at-hand gene pool for Nebraska's native grasses. Plant breeders sometimes need to go back to the wild type to search for desirable traits.

And Dr. Jim Stubbendieck, also an IANR range specialist, points out that in the interests of maintaining all the historic factors that resulted in the formation of the tall-grass prairies, perhaps some grazing should be applied.



Every plant has its time and place. Wild bergamot (left) blooms in ravine bottoms in late June. Wild onion, shown in one of J. E. Weavers drawings at the right, sends its roots deep for moisture and nutrients.

In both historic and prehistoric times, and in addition to periodic drought and fires, the prairies have borne the tread of the grazing giants—mammoths, musk oxen, mastodons, and later, the hordes of bison.

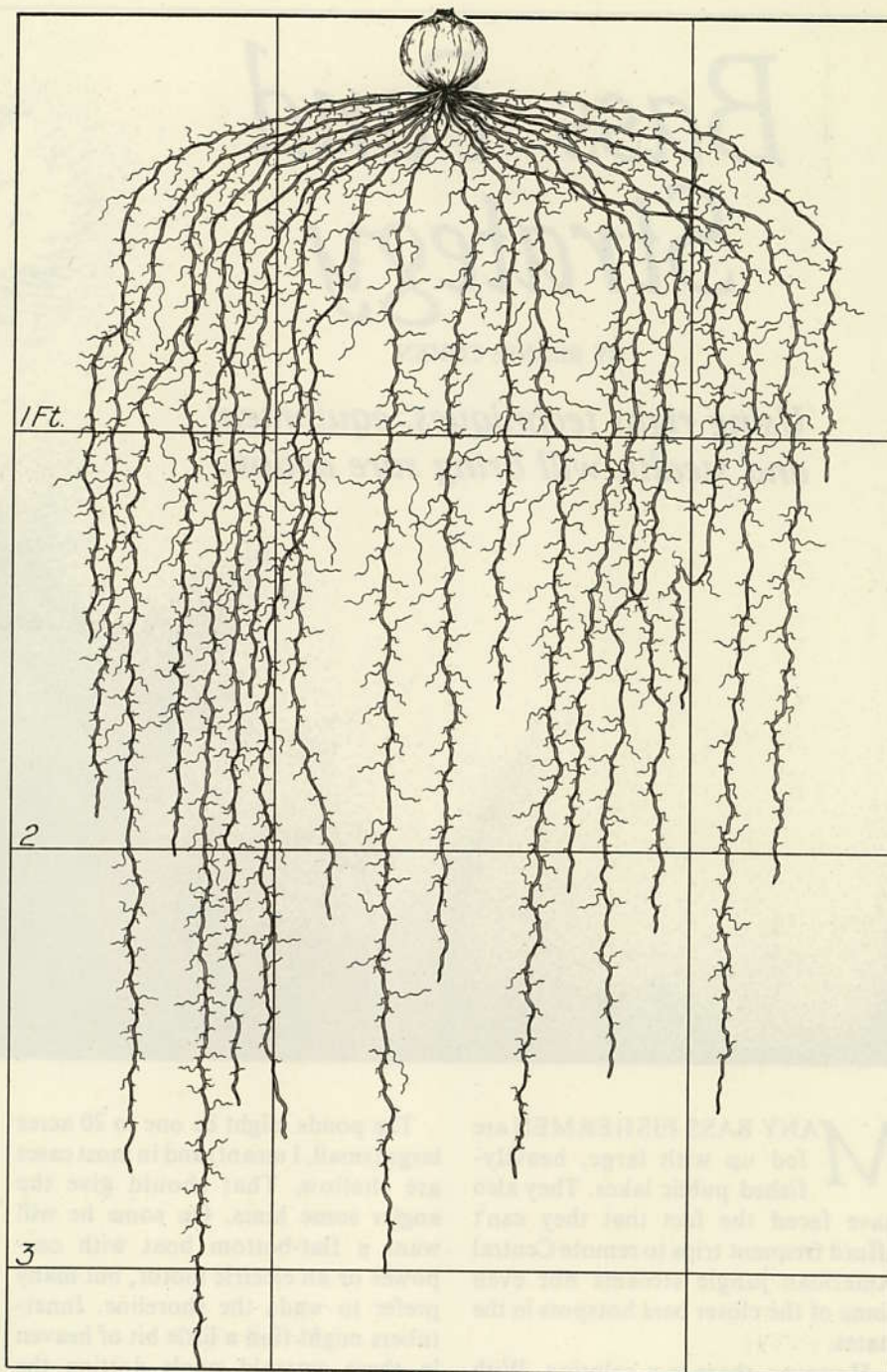
Dr. Sotero Salac, an IANR horticulturist, is breeding improved varieties of wildflowers for possible use as commercially grown cut flowers. His work with the thickspike gayfeather is particularly interesting. In the wild, the brilliant purple, multiflowered spikes of this plant measure eight to 10 inches in length. Salac has developed specimens that measure 18 inches.

Based on Steiger's work of 50 years ago, the Wachiska Audubon chapter recently published the flowering chronology of some of the most colorful of Nine-Mile's flowers. From that chart, we learn that visitors may expect to see ground plums (buffalo pea), prairie violets, blue-eyed grass and wild false-indigo in full blossom in late April or early May. Purple coneflowers bloom in most of June to mid-July. Then the Missouri goldenrod bursts forth in hot July and August. The gayfeathers and the tall and showy-wand goldenrods flaunt their colors in late August through September. The rare, reddish-blue downy gentian is usually the last wildflower to bloom on Nine-Mile Prairie in October.

As frost approaches, the prevalent big and little bluestem grasses change from green to a russet red background for the bright clusters of flowering forbs.

Almost 30 years ago, in one of those poetic passages that sprinkle his many writings, Weaver said of the prairie: "One glories in its beauty, its diversity, and in the ever-changing patterns of its floral arrangements."

In February of 1983 the preservation of this historic remnant of tall-grass prairie was insured. An anonymous donor pledged half of the purchase price of Nine-Mile Prairie (\$68,000) if it could be matched by contributions. Within a few months, donations of \$32,000 were received,



and the University Foundation supplied the additional \$36,000 to match the pledge. (Contributions to help defray the cost of maintaining the prairie are still welcome and may be made to the University Foundation, 3835 Holdrege, Lincoln, NE 68588).

Nebraskans have seized the opportunity to preserve this unique, original prairie. It will serve not only as a useful and invaluable teaching and research tool, but as a part of posterity's natural heritage. Perhaps it will serve as a monument to an unusual man who

studied the prairie as has no one else.

One of Weaver's former students explained his mentor's unique ability: "There comes occasionally to every scientific field a man who is so enthusiastic and so devoted to his work that it becomes his very life. To him, nature seems to unfold her secrets in response to his devotion; his ability to understand and communicate with nature becomes an inspiration to students and fellow workers alike."

The Nine-Mile Prairie would wear his name proudly.