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# PROCEEDINGS OF THE ELEVENTH NORTH AMERICAN PRAIRIE CONFERENCE

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**PRAIRIE PIONEERS: ECOLOGY, HISTORY, AND CULTURE**

Thomas B. Bragg and James Stubbendieck, Editors



## NORTH AMERICAN PRAIRIE CONFERENCES

The Eleventh North American Prairie Conference was the most recent of a series of biennial meetings begun in 1968. Through the Fifth Conference, these meetings were referred to as Midwest Prairie Conferences. Reflecting the broadening interest in native grassland and savanna, later meetings have been termed North American Prairie Conferences.

The previous Conference Chairs constitute the only "organization" for the Prairie Conferences. This group, or as many of the group as possible, meets at some time during each Conference to determine the host for the next North American Prairie Conference. Other than this, there is neither a central organization nor a budget. Coordination between the present and previous Conference Chairs has proven adequate to organize each meeting; local financial assistance has been used to meet required expenses.

Listed below are the chairs of the prairie conferences to date. In addition, a listing of all previous conferences is given in the suggested citation format, except for additional information which is included in brackets.

### PREVIOUS CONFERENCE CHAIRS:

1st. Peter Schramm	7th. Clair L. Kucera
2nd. James H. Zimmerman	8th. Richard Brewer
3rd. Lloyd C. Hulbert	9th. Richard H. Pemble
4th. Mohan K. Wali	10th. Arnold Davis, Geoffrey Stanford, and Madge Lindsay
5th. David C. Glenn-Lewin and Roger Q. Landers.	11th. Thomas B. Bragg and James Stubbendieck
6th. Ralph E. Ramey	

### NORTH AMERICAN PRAIRIE CONFERENCES:

FIRST: Schramm, Peter, Editor. 1970. *Proceedings of a Symposium on Prairie and Prairie Restoration*. Knox College Biological Field Station Special Publication No. 3. 14-15 September 1968, 66 pages. [For proceedings, contact Peter Schramm, Knox College, Galesburg, Illinois 61401. \$5.50 (US) payable to "Peter Schramm".]

SECOND: Zimmerman, James H., Editor. 1972. *Proceedings of the Second Midwest Prairie Conference*. 18-20 September 1970, 242 pages. [Published by the editor. For proceedings, contact James H. Zimmerman, 2114 Van Hise Ave., Madison, Wisconsin 53705. \$8.50 (US) payable to "James H. Zimmerman".]

THIRD: Hulbert, Lloyd C., Editor. 1973. *Third Midwest Prairie Conference Proceedings*. Division of Biology, Kansas State University, Manhattan, Kansas 66506. 22-23 September 1972, 91 pages. [For proceedings, make check for \$6.00 (US) payable to "Division of Biology".]

FOURTH: Wali, Mohan K., Editor. 1975. *Prairie: A Multiple View*. The University of North Dakota Press, Grand Forks, North Dakota 58202. 19-21 August 1974, 433 pages.

Pemble, Richard H., Ronald L. Stuckey, and Lynn E. Elfner. 1975. *Native Grassland Ecosystems East of the Rocky Mountains in North America: A Preliminary Bibliography*. University of North Dakota Press, Grand Forks, North Dakota 58202. 466 pages. [A supplement to the proceedings.]

[Make check for proceedings (Prairie: A Multiple View) for \$10.00 plus postage and, for supplement, \$7.00 (US) + postage, to "University of North Dakota Press".]

FIFTH: Glenn-Lewin, D.C. and Roger Q. Landers Jr., Editors. 1978. *Proceedings of the Fifth Midwest Prairie Conference*. Extension Courses & Conferences, Iowa State University, Ames, Iowa 50011. 22-24 August 1976, 230 pages. [For copies, contact D.C. Glenn-Lewin, Department of Botany; \$3.50 (US) postpaid with checks payable to "Botany Department Educational Fund".]

SIXTH: Stuckey, Ronald L. and Karen J. Reese, Editors. 1981. *The Prairie Peninsula — In the "Shadow" of Transeau: Proceedings of the Sixth North American Prairie Conference*. Ohio Biological Survey Biological Notes No. 15. 12-17 August 1978, 278 pages. For proceedings, make checks for \$12.50 (US) + postage to "Ohio Biological Survey", 484 W. 12th Ave., Columbus, Ohio 43210.

SEVENTH: Kucera, Clair L., Editor. 1983. *Proceedings of the Seventh North American Prairie Conference*. Southwest Missouri State University, Springfield, Missouri 65804. 4-6 August 1980, 321 pages. [For proceedings, contact Wallace R. Weber, Department of Biology, with checks for \$10.00 (US) postpaid payable to "Southwest Missouri State University".]

EIGHTH: Brewer, Richard, Editor. 1983. *Proceedings of the Eighth North American Prairie Conference*. Department of Biology, Western Michigan University, Kalamazoo, Michigan 49008. 1-4 August 1982, 176 pages. [For proceedings, contact Department of Biology with check for \$22.00 (US) payable to "Western Michigan University".]

NINTH: Clambey, Gary K. and Richard H. Pemble, Editors. 1986. *The Prairie - Past, Present and Future: Proceedings of the Ninth North American Prairie Conference*. Tri-College University Center for Environmental Studies. 29 July - 1 August 1984, Moorhead, Minnesota. 264 pages. [For proceedings, contact Richard H. Pemble; make check for \$20.00 (US) postpaid payable to "Tri-College University", 306 Ceres Hall, North Dakota State University, Fargo, North Dakota 58105.]

TENTH: Davis, Arnold and Geoffrey Stanford, Editors. 1988. *The Prairie - Roots of Our Culture; Foundation of our Economy: Proceedings of the Tenth North American Prairie Conference*. Native Prairie Association of Texas. 22-26 June 1986, Texas Woman's University, Denton, Texas. 334 pages. [For proceedings make check for \$35.50 (US) postpaid to "Native Prairies Association of Texas", 7575 Wheatland Road, Dallas, Texas 75249.]

ELEVENTH: Bragg, Thomas B. and James Stubbendieck, Editors. 1989. *Proceedings of the Eleventh North American Prairie Conference*. University of Nebraska, 7-11 August 1988. [For proceedings, make check for \$20.00 (US) postpaid payable to 11th North American Prairie Conference and mail to 11th North American Prairie Conference, ATTN: Tom Bragg, Department of Biology, University of Nebraska at Omaha, Omaha, Nebraska 68182-0040.]

# **PROCEEDINGS OF THE ELEVENTH NORTH AMERICAN PRAIRIE CONFERENCE**

## **Prairie Pioneers: Ecology, History and Culture**

Held 7-11 August 1988, Lincoln, Nebraska.

Edited by

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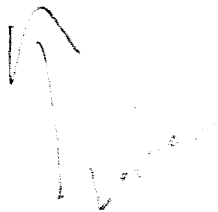
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## PREFACE

*"The scenery of the prairie is striking and never fails to cause an exclamation of surprise. The extent of the prospect is exhilarating. The outline of the landscape is beautiful; the absence of shade, and consequent appearance of profusion of light, produce a gaiety which animates the beholder."*

*Quote by Judge James Hall (ca 1839)  
John Madson's "Where the Sky  
Began — Land of the Tallgrass  
Prairie".*

The original prairies, consisting of a variety of types of communities, stretched east and west across the middle portion of North America and from southern Canada southward into Texas. In addition to the diverse plant communities, this ecosystem included immense herds of bison and elk accompanied by grizzly bear, wolves, and a host of other animals. As the natural ecosystem became increasingly modified with the arrival of European settlers, the size and number of extant prairie decreased until today, many of the original prairies exist only as patches in a matrix of agricultural land. Preserving and managing these patches, as well as some larger systems, such as the Kansas Flint Hills or the Nebraska Sandhills, has become the focus of considerable efforts across the prairie region. The North American Prairie Conferences, of which these Proceedings represent the eleventh meeting, are designed to provide a time and place for discussions on all aspects of prairie.

From 7 to 11 August 1988, 405 prairie enthusiasts, from 25 states and 3 Canadian provinces, met on the campus of the University of Nebraska - Lincoln to join in the exchange of experiences and knowledge about North American prairies. The selection of the University of Nebraska is especially appropriate since the study of grassland ecology in North America has its roots there in the work of such eminent researchers as Charles E. Bessey, Frederic E. Clements, and John E. Weaver. Bessey and Clements were, themselves, "prairie pioneers" as they laid the foundation for the study of grassland ecosystems from which arose many basic ecological concepts. Weaver followed in their footsteps, earning a reputation as one of the foremost grassland ecologists of North America. The tradition of prairie ecology continues in Nebraska today with many individuals, professional and amateur, working on a variety of aspects of basic ecology, management, and preservation of tallgrass, mixed, shortgrass, and sandhills prairie ecosystems.

The four-day, conference included 103 papers with a diverse range of subjects from categories including basic ecology, restoration, management, landscaping, and prairie culture. As with previous conferences, it included pre- and post conference field trips to a variety of grassland habitats. Keynote addresses by Gerald Tomanek, Frances Kaye, Roger Welsch, and Dick Whetsell provided additional diversity and expertise to the conference as did a Photography and a Landscape Design competition. Abstracts of all the contributed papers were published in an abstract booklet which was available to all conference registrants. A few Abstract booklets are still available at a cost of \$3.00 postpaid (make check to 11th North American Prairie Conference and mail to Tom Bragg, Department of Biology, University of Nebraska at Omaha, Omaha, NE 68182-0040).

This volume, the *Proceedings of the Eleventh North American Prairie Conference*, contains, in manuscript form, 55 papers. Each of the manuscripts has been reviewed by one or more persons outside the editorial staff. Reviewers are listed on page vi. We appreciate their careful reviews, constructive criticism, and prompt response. We also thank the authors who provided prompt, responsive revisions, even when such revisions required substantial modifications of the original manuscript. A special acknowledgment is given to Sue Peterson for her extraordinary efforts in retyping manuscripts and preparing them in the final computer disk form.

The North American Prairie Conferences provide opportunities not only for the exchange of ideas but also for establishing or renewing friendships. This is an important aspect of the conference and the loss of a frequent participant is noticed. Such a loss occurred with the death of Dr. Lloyd C. Hulbert on 23 May 1986. He was both a source of many ideas and a friend to many of us. His contributions to prairie ecology have yet to be fully realized. In recognition of his work, the planning committee unanimously agreed that these proceedings should be dedicated to him. A special section, starting on page ix, is intended both to recognize his many contributions and to serve as a reminder of what can be accomplished by those who are dedicated, enthusiastic, and proficient.

*Thomas B. Bragg  
James Stubbendieck  
6 October 1989*