

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Transactions of the Nebraska Academy of  
Sciences and Affiliated Societies

Nebraska Academy of Sciences

---

1999

## ***Transactions of the Nebraska Academy of Sciences* Table of Contents: Volume 25 (1999)**

Follow this and additional works at: <https://digitalcommons.unl.edu/tnas>



Part of the [Life Sciences Commons](#)

---

"*Transactions of the Nebraska Academy of Sciences* Table of Contents: Volume 25 (1999)" (1999).  
*Transactions of the Nebraska Academy of Sciences and Affiliated Societies*. 67.  
<https://digitalcommons.unl.edu/tnas/67>

This Article is brought to you for free and open access by the Nebraska Academy of Sciences at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Transactions of the Nebraska Academy of Sciences and Affiliated Societies by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

**STATE BOARD OF EDUCATION**  
**AND**  
**STATE BOARD OF VOCATIONAL EDUCATION**

Kim Peterson	Lincoln	District 1
Ann Mactier	Omaha	District 2
Beverly Peterson	Oakland	District 3
Rick Savage	Omaha	District 4
Stephen Sherr	Hastings	District 5
Terry Loschen, vice-president	Grand Island	District 6
Kathy Wilmot	Beaver City	District 7
Katherine Piller, president	Omaha	District 8

**DEPARTMENT OF EDUCATION**

Douglas D. Christensen, Commissioner of Education  
301 Centennial Mall South, Lincoln, Nebraska 68509-4987

***Establishment of the Transactions of the Nebraska Academy of Sciences***

In 1969, during its eightieth session, the State Legislature of Nebraska passed Legislative Bill 776, which appropriated funds to aid the Nebraska Academy of Sciences in the publication of scientific works submitted by Nebraska scientists. Volumes I and II of the *Transactions* were published under this arrangement, but Volume III was privately financed. Volume IV and succeeding volumes are being published under the auspices of the Nebraska Department of Education with funds authorized by the State Legislature, supported by the last five governors, J. James Exon, Charles Thone, Robert Kerrey, Kay A. Orr, and E. Benjamin Nelson. Volume XI was supported by the Nebraska Department of Education, but the publishing of Volume XI—Special Issue, Symposium (*Man and the Changing Environments in the Great Plains*), August 1983, was made possible by a grant from the Peter Kiewit Charitable Trust, Omaha, Nebraska. The Symposium on 16–18 April 1980 was sponsored by the Center for Great Plains Studies, College of Arts and Sciences, University of Nebraska–Lincoln and the Institute for Tertiary and Quaternary Studies (TER-QUA), a Division of the Nebraska Academy of Sciences.

Published by  
THE NEBRASKA ACADEMY OF SCIENCES

Funded by  
THE NEBRASKA DEPARTMENT OF EDUCATION

Printed by  
DAS Print Shop  
Department of Administrative Services, Lincoln

**1999**

# **TRANSACTIONS OF THE NEBRASKA ACADEMY OF SCIENCES**

**Volume 25  
1999**

ISSN 0077 6351

## **DIVISIONS OF THE NEBRASKA ACADEMY OF SCIENCES**

Nebraska Association of Teachers of Science, NATS  
Institute for Tertiary and Quaternary Studies, TER-QUA

## **AFFILIATED SOCIETIES OF THE NEBRASKA ACADEMY OF SCIENCES**

American Association of Physics Teachers, Nebraska Section, AAPT  
Friends of Loren Eiseley  
Lincoln Gem and Mineral Club, Inc.  
Nebraska Chapter, National Council for Geographic Education  
Nebraska Geological Society  
Nebraska Graduate Women in Science  
Nebraska Ornithologists' Union  
Nebraska Psychological Association  
Nebraska Psychological Society  
Nebraska-Southeast South Dakota Section, Mathematical Association of America  
Nebraska Space Grant Consortium

The Nebraska Academy of Sciences was founded 30 January 1880  
and is affiliated with the American Association for the Advancement  
of Science and the National Association of Academies of Science

All persons interested in science are welcome to become members of the Nebraska Academy of Sciences.

## NEBRASKA ACADEMY OF SCIENCES, INC.

302 Morrill Hall, 14th & U Streets, Lincoln, Nebraska 68588-0339 Phone (402) 472-2644

### OFFICERS

President: 1997–98	James McGahan, Northwest High School, Grand Island
President Elect: 1997–98	David T. Lewis, University of Nebraska–Lincoln
Treasurer: 1997–98	Henry E. Baumgarten, University of Nebraska–Lincoln
Recording Secretary: 1997–98	Karen A. Messenger, Dorchester
Executive Director: 1997–98	Walter E. Mientka, University of Nebraska–Lincoln
Councillors: 1995–98	George M. Coleman, Nebraska Wesleyan University, Lincoln
1996–99	Steven Rothenberger, University of Nebraska at Kearney
1997–2000	Robert Curtright, Lincoln Northeast High School
Junior Acad. Dir. & Corresp. Sec., Sci. Talent Search:	James Woodland, Nebraska Department of Education
Science Teaching: NATS President	Bob Feurer, North Bend Central Public Schools
NATS Treasurer	Randy Johnson, Gering Senior High School
AAAS and NAAS Representative:	Claire M. Oswald, College of Saint Mary, Omaha
Collegiate Academy: Biology	Charles F. Williams, Nebraska Wesleyan University, Lincoln
Chemistry and Physics	Thomas S. McShane, Creighton University, Omaha
Long Range Planning:	Claire M. Oswald, College of Saint Mary, Omaha
	M. Rosalind Morris, University of Nebraska–Lincoln
	John F. Hertner, University of Nebraska at Kearney
	M. Rosalind Morris, University of Nebraska–Lincoln
Program Chairman and Editor of <i>PROCEEDINGS</i> :	Robert B. Kaul, University of Nebraska–Lincoln
Editor of <i>TRANSACTIONS</i> :	David T. Lewis, University of Nebraska–Lincoln
Manager of Maiben Research Center, Otoe County:	

### POLICY COMMITTEE, 1997–1998

Bellevue University, Bellevue	Jacqueline Scholar
Central Community College, Columbus, Grand Island, Hastings	Georgianna Van Patter
Chadron State College, Chadron	Ronald R. Weedon
College of Saint Mary, Omaha	Claire M. Oswald
Concordia University, Seward	John Suhr
Creighton University, Omaha	John F. Schalles
Dana College, Blair	Larrie E. Stone
Doane College, Crete	David H. Smith
Hastings College, Hastings	Clyde C. Sachtleben
McCook Community College, McCook	Roger Wilson
Metropolitan Community College, Omaha	Patrick Nichols
Midland Lutheran College, Fremont	Greg Clements
Mid-Plains Community College, North Platte	Mark Bland
Nebraska Wesleyan University, Lincoln	Norman E. Griswold
Northeast Community College, Norfolk	Kim Timperley
Peru State College, Peru	John Hnida
Southeast Community College, Beatrice	Robert Eddy
Southeast Community College, Lincoln	Richard A. Ross
Union College, Lincoln	Robin Vance
University of Nebraska at Kearney	Carl D. Sterner
University of Nebraska–Lincoln	Kathleen Keeler
University of Nebraska at Omaha	Thomas B. Bragg
University of Nebraska Medical Center, Omaha	John K. Dyer
Wayne State College, Wayne	Mary Ettl
Western Nebraska Community College, Scottsbluff	David Nash
York College, York	Sean Cordry

**TRANSACTIONS  
of the  
NEBRASKA ACADEMY OF SCIENCES**

Volume 25

February 1999

**EDITORIAL CONTENTS**

Nebraska Academy of Sciences Officers, Policy Committee .....	ii
Editorial Board .....	iv
Membership Objectives and Friends of the Academy .....	v
Nebraska Association of Teachers of Science .....	vi
Preparation of manuscripts .....	inside back cover

**PAPERS**

Using omissive faults to obtain local convergence in partially connected networks .....	1
<b>M. H. Azadmanesh and A. W. Krings</b>	
New floristic records for Nebraska-5 .....	15
<b>Steven B. Rolfsmeier, Robert F. Steinauer, and David M. Sutherland</b>	
A key to dicotyledonous rosettes of eastern Nebraska .....	23
<b>Phillip D. Moore</b>	
The brine shrimp <i>Artemia franciscana</i> in closed microalgal-based microcosms (biospheres) .....	39
<b>Rachel Yung, Mark A. Gouthro, and James R. Rosowski</b>	
The pleasing fungus beetles (Coleoptera: Erotylidae) of Nebraska .....	53
<b>Michael A. Goodrich and Charles A. Springer</b>	
Microhabitat preferences of bullfrog tadpoles ( <i>Rana catesbeiana</i> ) of different ages .....	73
<b>Geoffrey R. Smith</b>	
The behavior of preweanling pups exposed to valproate in-utero .....	77
<b>Wayne Briner</b>	
Tertiary bats (Mammalia: Chiroptera) from northern Nebraska .....	83
<b>Nicholas J. Czaplewski, Bruce E. Bailey, and R. George Corner</b>	

## EDITORIAL BOARD

Editor .....	Robert B. Kaul
Consulting Editor .....	David M. Sutherland
Division Editors for <i>Proceedings</i>	
Anthropology .....	Peter Bleed
Biological and Medical Sciences .....	Nicolaus Hansl
Dental Research .....	John Bowley and John W. Stockstill
Earth Sciences .....	T. Mylan Stout
History and Philosophy of Science .....	Claire M. Oswald and T. Mylan Stout
Mathematics .....	Walter Mientka
Physics .....	Raymond Guenther
Psychology .....	Frank J. Dudek



## EDITOR'S CORNER

The *Transactions of the Nebraska Academy of Sciences* publishes results of original research by members of the Academy in good standing. It is indexed in *Biological Abstracts* and *Cambridge Scientific Abstracts* and is received by more than 600 libraries worldwide. Presentation of a paper at the annual meeting of the Academy is not a prerequisite or a guarantee of publication in the *Transactions*. Persons wishing to submit a paper for consideration should consult the inside back cover of this volume for information about preparation and style of manuscripts. Manuscripts are reviewed by at least two referees, including at least one from outside the author's institution. Following review by the referees and the editorial board, the author is notified whether or not the paper is accepted for publication and, if accepted, of necessary revisions.

The valued assistance of the many reviewers of manuscripts is gratefully acknowledged.

Robert B. Kaul, Editor  
rkaul1@unl.edu  
(402) 472-2715  
Nebraska Academy of Sciences  
nebacad@unlinfo.unl.edu  
302 Morrill Hall, 14th and U Streets  
Lincoln, NE 68588-0339  
(402) 472-2644

## NEBRASKA ACADEMY OF SCIENCES, INC.

The membership of the Academy consists of those individuals and institutions interested in science and those persons actively working and contributing to science in the State of Nebraska. It includes nonprofessional persons, as well as representatives from education, the professions, industry, and governmental agencies.

The Academy was organized in 1880 in Omaha with seventy-five charter members, and reorganized in 1891 in Lincoln. The Academy was incorporated in 1950 as a nonprofit educational institution, and it is neither a state agency nor is it sponsored by any particular university, college, or other Nebraska educational organization. In 1963, the Internal Revenue Service established the Academy's rating as "Section 501(c) (3)" of the Internal Revenue Code. The Policy Committee of the Academy is made up of one representative from each of the colleges and universities of the State.

**OBJECTIVES:** The objectives of the organization are to further the work of scientists and science teachers in the high schools and colleges of the state, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of science in human progress.

**RESOLUTION:** The following resolution concerning our environment was recently approved by the Academy membership: "Be it resolved that the Nebraska Academy of Sciences, as the principal organization representing the scientists of the State, is greatly concerned with the deterioration of the environment. The scientific talent of Nebraska is considerable, and it is hoped that individually-collectively it may be better utilized by both State and federal agencies in addressing problems of destruction of trees, native prairie, groundwater resources and habitats."

**"FRIENDS OF SCIENCE" AWARDS:** These awards are given to persons who are not actively engaged in scientific teaching or research, but who have shown unusual interest in promoting science and in sponsoring scientific programs in Nebraska. The following Nebraskans have received a Friend of Science Award: Mrs. Mabel L. Criss, Omaha (1970); Dr. Walter D. Behlen, Columbus (1976); Vance D. Rogers, Lincoln (1977); George and Olivia Lincoln, Lincoln (1980); Mr. and Mrs. Thomas C. Woods, Jr., Lincoln (1981); Dr. Lewis E. Harris, Lincoln (1984); Dr. Robert W. Allington, Lincoln (1989); Florence Boring Lueninghoener, Fremont (1992); Robert B. Crosby, Lincoln (1993); Virginia Dodd Smith, Chappell (1993); Dr. Donald Othmer, Brooklyn, New York (1994); John Frey, Lincoln (1995); Elizabeth Rubendall, Lincoln (1996); Professor T. Mylan and Eunice Stout, Lincoln (1996); Francis A. Haskins, Robert B. Johnston, and M. Rosalind Morris, all Lincoln (1997), Robert B. Nelson, Lincoln (1998).

**FRIENDS OF THE ACADEMY:** The Academy owns three properties and accompanying endowments: the Maiben Scientific Research Center in Otoe County, from the estate of Benjamin and Rachel Corr Maiben (1959); the C. Bertrand and Marian Othmer Schultz Environmental Prairie in Webster County, deeded to the Academy by Dr. and Mrs. Schultz; and the C. Bertrand and Marian Othmer Schultz Grandview Heights Center for Environmental Study in Lancaster County (former home of the Schultz family), deeded to the Academy by Dr. Schultz (1992).

The following individuals and organizations have contributed \$100 or more during the past year to help the Academy in promoting research and teaching of science and technology in high schools, community colleges, and universities throughout Nebraska:

### INDIVIDUALS

Robert W. Allington, Lincoln  
Marvin A. Bichel, Wakefield  
Gary W. Brown, Waterloo  
Francis and Dorothy Haskins, Lincoln  
Joseph LeDuc, Lincoln  
Morton Stelling, Lincoln

### ORGANIZATIONS

Nebraska Space Grant Consortium  
Sargent-Welch, Buffalo Grove, Illinois

## **NATS — NEBRASKA ASSOCIATION OF TEACHERS OF SCIENCE**

The purpose of the Nebraska Association of Teachers of Science is advancement, stimulation, extension, improvement, and coordination of science education in all fields of science at all levels. The Association is dedicated to the improvement of science education in Nebraska.

Membership is available to those engaged in the teaching of science and to those interested in science education. Activities include: 1) *The Annual Fall Conference*, providing science educators with updates in content and strategies designed to enhance science education in Nebraska. Workshops, speakers, and concurrent sessions are available in each content area and at all levels from elementary to post secondary. 2) *The NAS/NATS Newsletter*, a publication designed to provide a communication link among all NATS members. Each edition provides information on current research in science education, resources, opportunities for workshops and conferences, teaching tips, activities of affiliated groups, and recognition for outstanding educators in Nebraska. 3) *The Presidential Award for Excellence in Science Teaching*, coordinated and administered by NATS. 4) *The Outstanding Contributions to Science Education Award*, given annually to a Nebraskan who has made outstanding contributions to science education. 5) *The Nebraska Science Olympiad annual competition for students*, sponsored by NATS to stimulate interest and provide recognition for achievement in science.

† † †

## **TER-QUA — INSTITUTE FOR TERTIARY AND QUATERNARY STUDIES**

The Institute for Tertiary and Quaternary Studies (TER-QUA) was organized in 1968 in Lincoln at the recommendation of the National Academy of Sciences-National Research Council's U.S. International Committee of INQUA (International Union for Quaternary Research), and it became a Division of the Academy in 1974. This Division was joined by an organization of Gulf Coast geologists in 1982. TER-QUA is composed of multi-state, interdisciplinary working groups, whose research is directed to the changing environments—past, present, and future—of the Great Plains and Gulf Coast, with particular emphasis on water resources and climate. Instrumental in fulfilling the objectives of INQUA was Professor C. Bertrand Schultz, Co-director of TER-QUA and Executive Director of the Academy for many years.

TER-QUA SYMPOSIA are held periodically at Great Plains or Gulf Coast locations, including Nebraska, Colorado, Texas, Kansas, and Oklahoma.