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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), formerly a Division of the Nebraska Academy of Sciences.

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

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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.

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# TRANSACTIONS of the NEBRASKA ACADEMY OF SCIENCES

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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*, *Cambridge Scientific Abstracts*, and *Fish and Fisheries Worldwide* 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.

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## **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), Albert W. Zechmann, Lincoln (1999), David E. Lewis, Lincoln (2000), Henry E. Baumgarten, Lincoln (2001), and Claire M. Oswald, Omaha (2001).

**FRIENDS OF THE ACADEMY:** 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:

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## **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.