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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 Governor.

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This cover design represents the merging of the disciplines of the biological and social sciences with those of the earth and physical sciences.

TRANSACTIONS
of the
NEBRASKA ACADEMY OF SCIENCES

Volume XI

July 1983

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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, including the changing environments in the
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Volume XI

July 1983

CONTENTS

	Page
Nebraska Academy of Sciences, Officers, Policy Committeeii
Editorial Board, Instructions to Contributors	v
Membership Objectives and Friends of the Academy	vi
Science and society: The Gustavson Memorial Lectures J. R. Girton	1
The relationship of science to the North-South dialogue. W. N. Hubbard, Jr.	3

ANTHROPOLOGY

Inclusive fitness and the practice of polyandry among the Skidi Pawnee. T. E. McGinnis	9
American Indian artifacts from the Kansas River R. A. Rogers and L. D. Martin	13

BIOLOGICAL AND MEDICAL SCIENCES

An analysis of the vegetation and flora of field-edges and roadsides of agricultural land in eastern Nebraska J. Ducey and C. Wiederspan	19
Water conservation of the kangaroo rat, <i>Dipodomys ordii</i> W. S. Fairbanks, D. Greeger, L. Staudinger, and E. Bitterbaum	27
Geographical distribution of Acanthocephala in Nebraska fishes. B. B. Nickol and N. Samuel	31
<i>Trox hamatus</i> Robinson (Troginae) using a <i>Canthon</i> (Scarabaeinae) brood ball and new records of North American <i>Trox</i> (Coleoptera: Scarabaeidae) B. C. Ratcliffe	53

	Page
An assessment of the Nebraska City power station impingement effects relative to the fishery dynamics of the Missouri River	57
J. P. Rhone, I. Cherko, L. G. Harrow, and A. B. Schlesinger	
A bryological survey of the southern Panhandle of Nebraska	77
L. L. Spessard	

EARTH SCIENCES

Some Pennsylvanian chondrichthyan spines from Nebraska	81
J. G. Maisey	

HISTORY OF SCIENCE

Biographical sketch and contributions to medicine of Xavier Bichat	85
A. J. Krush	
The Harold W. Manter Laboratory, a national resource center for parasitology	89
M. H. Pritchard	

PHILOSOPHY OF SCIENCE

Universal determinism and relative determination	93
L. N. Meyer	
Linguistic competence	99
J. Tienson	

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The *Transactions of the Nebraska Academy of Sciences* is a medium for the publication of the results of original research by members in good standing of the Academy. Presentation of a paper at the annual meeting is not a prerequisite nor a guarantee of publication in the *Transactions*. Individuals wishing to submit a paper for consideration should consult the inside of the back cover of this volume for information regarding manuscript preparation and style.

Manuscripts are reviewed by a minimum of two referees, including at least one from an institution other than that of the author. Following review by 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 following persons, in addition to the regular editorial board, have reviewed articles for Volume XI. Their valued assistance is gratefully acknowledged.

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C. Bertrand Schultz, Managing Editor
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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 75 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 and 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.

"FRIEND 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); Dr. Vance D. Rogers, Lincoln (1977); George and Olivia Lincoln, Lincoln (1980); and Mr. and Mrs. Thomas C. Woods, Jr., Lincoln (1981).

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The following organizations and individuals have shown interest in the program of the Nebraska Academy of Sciences, and have generously provided funds (including donations for scholarships, memorials, and research involved with the interdisciplinary division, TER-QUA) during the past seven years in order to help expand the work of the Academy in promoting research and good basic teaching of science and technology in the science departments of the high schools, community colleges, colleges, and universities of the state:

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