Front Matter
YOU ARE CORDIALLY INVITED . . .

TO ATTEND

THE 106TH ANNUAL MEETING OF

THE OHIO ACADEMY OF SCIENCE

Hosted by Bowling Green State University

Bowling Green, Ohio—April 4-5-6, 1997

THEME:

Progress Toward Water Quality

In The Lake Erie Basin
Index to Session Abstracts

Saturday, April 5, 1997
Please see Author Index on page 61
to locate first authors of abstracts.

Session Title-Page Number

Poster Sessions
Various Divisions-8

Biological Sciences Division
Lake Erie Fish Biology-21
09:00AM Saturday, April 5, 1997
Olscamp Hall Room 221
Fred L. Snyder - Presiding

Lake Erie Ecosystem Status and Future-22
01:30PM Saturday, April 5, 1997
Olscamp Hall Room 221
Lauren Lambert - Presiding

Plant Systematics & History of Botany-23
09:00AM Saturday, April 5, 1997
Olscamp Hall Room 206
Allison W. Cusick - Presiding

Plant Biology-24
02:00PM Saturday, April 5, 1997
Olscamp Hall Room 206
Helen J. Michaels - Presiding

Plant Ecology-26
09:00AM Saturday, April 5, 1997
Olscamp Hall Room 224
Brent G. DeMars - Presiding

Aquatic Ecology-27
02:15PM Saturday, April 5, 1997
Olscamp Hall Room 224
Rex L. Lowe - Presiding

Microbial Biology and Phycology-28
09:00AM Saturday, April 5, 1997
Olscamp Hall Room 220
Susan Carty - Presiding

Ecology-29
01:30PM Saturday, April 5, 1997
Olscamp Hall Room 220
Arthur L. Vorhies - Presiding

Molecular Biology-31
01:30PM Saturday, April 5, 1997
Olscamp Hall Room 229
Dean Fraga - Presiding

Biochemistry & Parasitology-33
03:45PM Saturday, April 5, 1997
Olscamp Hall Room 227
Rebecca R. McKenna - Presiding

Environmental Sciences & Resource Management Division
Environmental Science-34
09:30AM Saturday, April 5, 1997
Olscamp Hall Room 226
Charles Bleckmann - Presiding

Contaminant Removal-35
03:45PM Saturday, April 5, 1997
Olscamp Hall Room 226
Yung-Tse Hung - Presiding

Information, Computing & Communications Division, Engineering & Technology Division and Social & Behavioral Sciences Division
Engineering, Social Science, Technology, and their Applications-37
01:30PM Saturday, April 5, 1997
Olscamp Hall Room 217
John K. Estell - Presiding

Earth & Space Sciences Division and Education Division
Education/Earth Science Education-36
09:00AM Saturday, April 5, 1997
Olscamp Hall Room 217
Robert F. Mauldin - Presiding

General Geology-39
09:15AM Saturday, April 5, 1997
Olscamp Hall Room 213
Ann F.H. Graetsch Harris - Presiding
Mapping Tools & Quaternary Geology-40
02:00PM Saturday, April 5, 1997
Olscamp Hall Room 213
Yu Zhou - Presiding

General Geography-41
10:00AM Saturday, April 5, 1997
Olscamp Hall Room 215
Joseph G. Spinelli - Presiding

A Collective Look Ahead at Ohio's Future Geography-41
02:00PM Saturday, April 5, 1997
Olscamp Hall Room 215
Henry Moon - Presiding

Medical Sciences & Health Technologies Division
Blood Pressure/Hypertension/Lung Ventilation-42
09:00AM Saturday, April 5, 1997
Olscamp Hall Room 225
Judy Adams - Presiding

Hormones & Metabolism-43
01:30PM Saturday, April 5, 1997
Olscamp Hall Room 225
Steve Channel - Presiding

Physiological Control Mechanisms-44
09:30AM Saturday, April 5, 1997
Olscamp Hall Room 227
Lee A. Meserve - Presiding

Genetics & Molecular Biology-46
01:30PM Saturday, April 5, 1997
Olscamp Hall Room 227
R. C. Woodruff - Presiding

Pre-College Session
Pre-College Students-Morning-47
09:00AM Saturday, April 5, 1997
Olscamp Hall Room 203
James C. Brown - Presiding

Pre-College Students-Afternoon-48
02:30PM Saturday, April 5, 1997
Olscamp Hall Room 203
Juanito S. Duran - Presiding

Interdisciplinary Session - 61
02:00-04:00 PM Saturday, April 5, 1997-49
Olscamp Hall Room 121
Ayres D' Costa, Presiding
106th Annual Meeting of
The Ohio Academy of Science
Hosted by Bowling Green State University
Bowling Green, Ohio—April 4-5-6, 1997
Theme: Progress Toward Water Quality in the Lake Erie Basin
THE OHIO JOURNAL OF SCIENCE
ISSN 0030-0950

Editorial Policy:

General:
THE OHIO JOURNAL OF SCIENCE considers original contributions from members and non-members of the Academy in all fields of science. While special consideration will be given to manuscripts concerned with Ohio subject matter, other reports with scientific merit will be reviewed for publication. Submission of a manuscript is understood to mean that the work is original and unpublished, and is not being considered for publication elsewhere. All manuscripts considered for publication will be peer-reviewed. The opinions expressed by reviewers are their own, and do not represent the views of the Ohio Academy of Science or THE OHIO JOURNAL OF SCIENCE. Manuscripts and illustrations should be prepared in triplicate in accordance with current guidelines published in THE JOURNAL at least once a year, and submitted (after 1 January 1996) to:

Dr. Thomas W. Schmidlin,
Editor
THE OHIO JOURNAL OF SCIENCE
Department of Geography
Kent State University
Kent, OH 44242-0001

Page Charges:
Publication of THE OHIO JOURNAL OF SCIENCE requires that authors assist in meeting publication expenses. These costs will be assessed at $70 per page for members of the Academy and $105 per page for non-members. In multi-authored papers, each author must be a member of the Academy at the time of publication to be eligible for the reduced member rate. Papers which exceed 12 printed pages may be charged full production costs. A bill for page charges will be sent to the communicating author by the Ohio Academy of Science at the time of publication.

Failure to Receive THE JOURNAL:
Any claim of failure to receive subscription issues of THE JOURNAL must be submitted to the Ohio Academy of Science within six months of date of issue of the missing number, to be recognized.

Listing Services:
THE OHIO JOURNAL OF SCIENCE is listed or abstracted in several sources including:
- Bibliography of Agriculture
- Biological Abstracts
- Chemical Abstracts
- Current Advances in Ecological Sciences
- Current Contents (Agriculture, Biology & Environmental Sciences)
- Deep Sea Research and Oceanography Abstracts
- Environment Abstracts
- Environmental Information Center
- Forest Products Abstracts
- Forestry Abstracts
- Geo Abstracts
- GEOBASE
- Geology Abstracts
- GeoRef
- Helminthological Abstracts
- Horticulture Abstracts
- Nuclear Science Abstracts
- Review of Plant Pathology
- Selected Water Resources Abstracts
- World Agricultural Economics and Rural Sociology Abstracts

Future Annual Meetings
1997 Bowling Green State University—April 4-5-6, 1997
Date of Issue—March 1997
Copyright ©1997 by The Ohio Academy of Science
Printed in The United States of America by CPMM, Inc.
Columbus, OH
## Contents

106th Annual Meeting  
*The Ohio Academy of Science*  
Hosted by  
Bowling Green State University  
Bowling Green, Ohio  
April 4-5-6, 1997

**THEME:**  
*Progress Toward Water Quality in the Lake Erie Basin*

<table>
<thead>
<tr>
<th>Registration</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration Form</td>
<td>63</td>
</tr>
<tr>
<td>Parking</td>
<td>2</td>
</tr>
<tr>
<td>Meals</td>
<td>2</td>
</tr>
<tr>
<td>Housing</td>
<td>2</td>
</tr>
<tr>
<td>Map</td>
<td>62</td>
</tr>
<tr>
<td>General Schedule</td>
<td>3</td>
</tr>
<tr>
<td>Saturday Internet Workshops</td>
<td>3</td>
</tr>
<tr>
<td>All-Academy Lecture</td>
<td>4</td>
</tr>
<tr>
<td>Official Notice of Business Meeting</td>
<td>4, 49</td>
</tr>
<tr>
<td>President's Address</td>
<td>4</td>
</tr>
<tr>
<td>Special Acknowledgements</td>
<td>5</td>
</tr>
<tr>
<td>Local Arrangements</td>
<td>5</td>
</tr>
<tr>
<td>Our Host</td>
<td>5</td>
</tr>
<tr>
<td>Sunday Geology and Plant Science Field Trips</td>
<td>5</td>
</tr>
<tr>
<td>Peer-Reviewed Abstracts</td>
<td>8</td>
</tr>
<tr>
<td>Posters</td>
<td>21</td>
</tr>
<tr>
<td>Podium Sessions</td>
<td>21</td>
</tr>
<tr>
<td>Interdisciplinary Session</td>
<td>49</td>
</tr>
<tr>
<td>Recommended Revisions in the Constitution &amp; By-Laws</td>
<td>50</td>
</tr>
<tr>
<td>Indices</td>
<td>7</td>
</tr>
<tr>
<td>Session Abstracts</td>
<td>7</td>
</tr>
<tr>
<td>First Authors of Abstracts</td>
<td>61</td>
</tr>
</tbody>
</table>