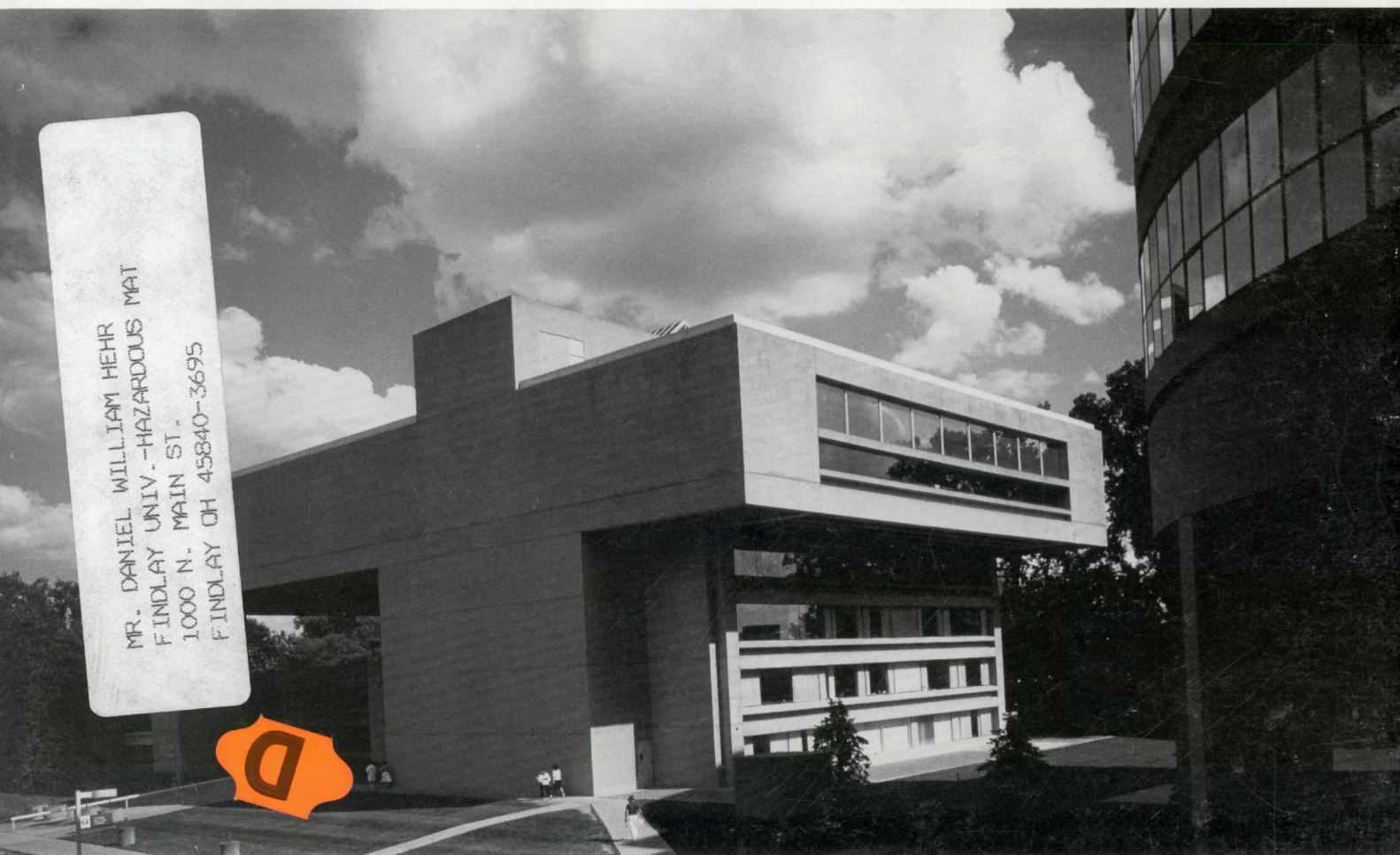


THE OHIO JOURNAL OF

SCIENCE

Volume 94 No. 2

April Program Abstracts



103RD ANNUAL MEETING

THE OHIO ACADEMY OF SCIENCE

HOSTED BY

THE MEDICAL COLLEGE OF OHIO

AT TOLEDO

APRIL 22-23-24, 1994

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 Submission of a manuscript is understood to mean that the work is original and unpublished, and is not being considered for publication elsewhere.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 to:

Dr. Lee A. Meserve, Editor
THE OHIO JOURNAL OF SCIENCE
Department of Biological Sciences
Bowling Green State University
Bowling Green, OH 43403-0212

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. 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
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 ACADEMY MEETINGS

1994 Medical College of Ohio
April 22, 23, and 24
1995 Otterbein College
April 28, 29, and 30

Typesetting—Ardella Pierce
Copyright © 1994 by The Ohio Academy of Science
Printing—Leshner Printers, Inc., Fremont, Ohio 43420 U.S.A.

The Ohio Journal of Science

Volume 94 No. 2

April Program Abstracts



The Ohio Journal of Science

Department of Biological Sciences
Bowling Green State University
Bowling Green OH 43403
419/372-2291

Editor Lee A. Meserve
Associate Editor Robert C. Romans
Assistant Editor Ardella Pierce
April Program Abstracts Issue Edited
by Lynn E. Elfner.

Editorial Board

Barbara K. Andreas
Anna Bellisari
Kelly J. Kohls
Mary Anne Swardson
John P. Sabo
Edward Weiland

The Ohio Academy of Science

1500 West Third Avenue Suite 223
Columbus OH 43212-2817
Phone or FAX (614) 488-2228

President— Richard W. Janson
Chief Executive Officer— Lynn Edward Elfner
President-Elect — Ronald L. Stuckey
Past President — John F. Schaff
Secretary — Helen R. Churella
Treasurer — Michael S. Herschler
Junior Academy Director — Lois A. Cook
Senior Academy Director — Isadore Newman
Industrial Council Director — R. Lynn Gilliland

The Ohio Journal of Science (ISSN 0030-0950) is published in March, April (Annual Meeting Program Abstracts Issue), June, September, and December by The Ohio Academy of Science, 1500 West Third Avenue Suite 223, Columbus OH 43212-2817. Individual membership and subscription: \$50. Domestic institutional subscription: \$50; Foreign institutional subscription: \$55. Single issues for Academy members: \$10; others \$12. © 1994 by The Ohio Academy of Science. ALL RIGHTS RESERVED. Printed in The United States of America.

POSTMASTER: Send address changes to: The Ohio Journal of Science, 1500 West Third Avenue Suite 223, Columbus OH 43212-2817.

CONTENTS

103RD ANNUAL MEETING
THE OHIO ACADEMY OF SCIENCE
HOSTED BY
THE MEDICAL COLLEGE OF OHIO
AT TOLEDO

APRIL 22-23-24, 1994

Registration	
Registration Form	Last Page
Parking	1
Meals	1
Housing	1
Maps	52
General Schedule	
All-Academy Lecture	4
President's Address	4
Field Trips	3, 4
Arrangements	
Special Acknowledgements	5
Local Committee	5
Academic Highlights of the Host	6
Abstracts	
Symposia	8, 29
Workshop	8
Posters	8
Podium Sessions	19
Indices	
Session Abstracts	49
First Authors of Abstracts	50
Official Notice of Business Meeting	57
Officers, Committees and Academy Representatives	51

Cover photo: Raymon H. Mulford Library, The Medical College of Ohio at Toledo