

PROCEEDINGS

*of the*

# Indiana Academy of Science

*Founded December 29, 1885*

•

Volume 90  
1980

•

DONALD R. WINSLOW, Editor  
Indiana University  
Bloomington, Indiana

•

Spring Meeting  
April 25, 26, 1980  
Geneva Center  
Rochester, Indiana

•

Fall Meeting  
November 6, 7, 8, 1980  
Saint Joseph's College  
Rensselaer, Indiana

Published at Indianapolis, Indiana  
1981

1. The permanent address of the Academy is the Indiana Academy of Science, 140 North Senate Avenue, Indianapolis, Indiana 46204.

2. **Instructions for Contributors** appear at the end of this volume.

3. **Exchanges.** Items sent in exchange for the *Proceedings* and correspondence concerning exchange arrangements should be addressed:

John Shepard Wright Memorial Library of the Indiana  
Academy of Science  
140 North Senate Avenue  
Indianapolis, Indiana 46204

4. *Proceedings* may be purchased through the Library at \$7.00 for each volume.

5. **Reprints of technical papers** often can be secured from the authors. They cannot be supplied by the Library nor by the officers of the Academy.

6. The Constitution and By-Laws reprinted from Vol. 74 are available to members upon application to the Secretary. Necrologies reprinted from the various volumes can be supplied to relatives and friends of deceased members by the Secretary.

7. Officers whose names and addresses are not known to correspondents may be addressed care of the Library.

### **Editorial Board 1981**

DONALD R. WINSLOW  
Chairman and Editor  
RITA BARR  
CHARLOTTE BOENER  
ERNEST CAMPAIGNE  
DONALD P. FRANZMEIER  
JAMES GAMMON

JAMES KELLAR  
BENJAMIN MOULTON  
JOHN PELTON  
BRUCE RENDA  
CARL SARTAIN  
BERNARD S. WOSTMAN

## TABLE OF CONTENTS

	Page
Officers and Committees for 1980 . . . . .	3
Minutes of the Spring Meeting (Executive Committee) . . . . .	16
Minutes of the Spring Meeting (General Session) . . . . .	18
Minutes of the Fall Meeting (Executive Committee) . . . . .	19
Minutes of the Fall Meeting (General Session) . . . . .	23
Annual Financial Report . . . . .	26
Annual Report, Indiana Junior Academy of Science . . . . .	30
Biological Survey Committee Report . . . . .	34
Necrology . . . . .	38
New Members for 1980 . . . . .	41

### ADDRESSES AND CONTRIBUTED PAPERS

#### Presidential Address

"Scientific Research and Economic Indicators," Robert E. Henderson . . . . .	45
---	----

#### 1980-81 "Speaker of the Year" Address

"Progress in Resolving Food Safety Problems: Systematic Evaluation of GRAS Food Ingredients," Harry G. Day . . . . .	63
--	----

#### Anthropology

FRANCIS X. GROLLIG, S. J.—Details in Mexican Archaeology* . . . . .	72
C. DEAN HIGGINBOTHAM—The Indiana Packet: Ecotone and Cultural Boundary within the Lower Wabash Valley* . . . . .	72
ROBERT E. PACE, WILLIAM RHEINHARDT, and DANIEL THIEL—Cataract Chert And Its Distribution In West-Central Indiana* . . . . .	72
ROBERT E. PACE—Stone Box Burials In West-Central Indiana* . . . . .	72
CURTIS H. TOMAK—A Note on the Distribution of Riverton Points* . . . . .	72
CURTIS H. TOMAK—Rock Shelters: An Important Archaeological Resource of Southern Indiana* . . . . .	73
CHARLES P. WARREN—Two Case Studies in Forensic Anthropology: Calumet Township, Indiana; and Griffith, Indiana* . . . . .	73
JAMES O. BELLIS—An Experiment With Time Control in Intensive Site Survey . . . . .	74
PAUL JEAN PROVOST—The Fate of the Soul in Modern Aztec Religious Thought . . . . .	80

#### Botany

WILLIAM W. BLOOM—A Proposed Third Function for Root Caps* . . . . .	86
WILLIAM DAVIES—Utilization of an Artificial Beach in Investigation of Phytosammon communities* . . . . .	86

\* Abstracts

	Page
GINA FERNANDEZ, JAY H. JONES, and DAVID L. DILCHER—A Developmental Study of Foliar Epidermal Features in <i>Castanea mollissima</i> Blume (Fagaceae)*	86
STEPHEN W. FLETCHER—Effects of Irradiance on the Morphological Characteristics of Two Plant Species of the Maritime Strand*	87
VONDA FRANTZ and KATHRYN WILSON—The Ultrastructure of Nonarticulated Branched Laticifers in <i>Asclepias tuberosa</i> L. (Butterfly Weed)*	87
JAY H. JONES and DAVID L. DILCHER—Paleobotanical Nomenclature: Principles, Problems and Proposals*	88
STEPHEN R. MANCHESTER and DAVID L. DILCHER—Fruits of the Pterocarya alliance (Juglandaceae) from the Paleogene of the Rocky Mountain Region*	88
JOHN L. ROTH, JR., DAVID L. DILCHER, and BRENT A. MCKIM—Stomatal Development in <i>Asimina triloba</i> (L.) Dunal*	89
ROBERT SCHWARZWALDER, JR. and DAVID L. DILCHER—Bisexuality in the Pistillate Inflorescence of <i>Platanus occidentalis</i> L.*	89
JAMES P. SHEPARD and WILLIAM R. CHANEY—Endomycorrhizae Increases Growth of Sycamore Seedlings*	90
MARILYN SUE VESELACK and JERRY J. NISBET—The Distribution and Uses of <i>Arundo donax</i> *	90
ROBERT D. WILLIAMS—Squirrel Resistant Walnuts for Direct Seeding? Not Yet*	90
WAYNE T. WILLIAMS and ROLAND W. USHER—Air Toxicity to Eastern White Pines in Indiana*	91
RITA BARR and FREDERICK L. CRANE—Phosphate Stimulates or Inhibits Silicomolybdate Reduction in Spinach Chloroplasts	92
DEBORAH WILLIAMS CRATON and ROBERT D. WILLIAMS—Juglone Dermatitis: Allergy or Irritant? . . . . .	98
GARY E. DOLPH, JON BOLKE, and JILL RODAER—Woody Vegetation of the Cass County Outdoor Education and Wildlife Area . . . . .	103
GAIL E. EVANS-RUHL DONALD H. SCOTT, and PAUL C. PECKNOLD—A Compilation of Plant Diseases and Disorders in Indiana—1980 . . . . .	107
HEIDI A. SCHMITT and CONNIE M. WEAVER—Chromium-Zinc Interaction in Accumulation of Minerals by Bush Beans . . . . .	125
<b>Cell Biology</b>	
JOHN H. ELDER AND D. JAMES MORRÉ—Observations on the Tertiary Structure of Ribosomes Released from Membranes of Rough Endoplasmic Reticulum* . . . . .	129
DAVID C. EVERS AND D. JAMES MORRÉ—Complex Gangliosides Bind Fibronectin* . . . . .	129
D. K. HANSEN, W. CHAEKAL, AND M. E. HODES—Electrophoretic Study of the Deoxyribonuclease Activity of Human Urine* . . . . .	129
ZAFAR IQBAL—Characterization of A Fast Transported Calcium-Binding Protein in Mammalian Nerve* . . . . .	130

---

\* Abstracts

	Page
M. E. JACOBS—The Role of Beta-alanine in Pigmentation Polymorphisms* . . .	130
JAMES S. MILLER, SAMUEL O. IKHAREBHA, VICTOR C. GAVINO, GEORGE E. MILO, AND DAVID G. CORNWELL—Antioxidants, Fatty Acids and Oxidant Stress, and the Control of Cell Proliferation in Culture* . . . . .	130
KENNETH C. MILLER AND STANLEY N. GROVE—Effects of Cytochalasins on Selected Species of <i>Aspergillus</i> and <i>Mucor</i> * . . . . .	131
DOROTHY M. MORRÉ, D. JAMES MORRÉ, AND MARTHA WALTER—Effect of Vitamin A on the Hepatic Golgi Apparatus Architecture* . . . . .	131
DOROTHY M. MORRÉ AND ANN L. ROSENTHAL—Distribution of Acid Phosphatase in Transplanted Hepatomas of the Rat* . . . . .	132
D. JAMES MORRÉ, EDWARD M. CROZE, CHERYL FRANZ, AND C. M. EPPLER—Exocytosis: Routes and Kinetics of Delivery of Secretory and Membrane Proteins* . . . . .	132
MICHAEL J. STEWART AND CHARLES W. GOFF—Comparative Cytochemical Studies of Onion Root Tip with Specific and Non-specific Substrates for Nucleoside Diphosphatase(s)* . . . . .	132
JAMES A. SWEIGARD AND STANLEY N. GROVE—Cytochalasin A (0.1-1 ug/ml) rapidly halts Hyphal Tip Growth in <i>Rhizoctonia solani</i> * . . . . .	133
MARTHA TWADDLE, RALPH A. JERSILD, AND D. JAMES MORRÉ—Kinetics of Appearance of Lipoprotein Particles in Cisternae of Subsurface Smooth Endoplasmic Reticulum of Isolated Rat Livers Perfused with Free Fatty Acid* . . . . .	133
MARTIN A. VAUGHAN AND J. P. BRASELTON—Persistent Nucleoli in Various Meristems of <i>Phaseolus aureus</i> (mung bean)* . . . . .	134
HENRY C. WOMACK AND MOHINDER S. JARIAL—The Effect of Sympathectomy on the Structure of the Rat Pineal Gland* . . . . .	134
VERNON G. ARCHER AND JAMES P. HOLLAND—Effect of Maternal Thyroid Activity Upon <i>In Vitro</i> Protein Synthesis in the Rat Blastocyst . . . . .	136
S. D. BARNARD, S. D. WARNER, W. J. CALDWELL, AND F. PARENTI—Chemically Induced Hepatocellular Inclusions Associated with Tumorigenicity in the Liver of the Rat . . . . .	143
THEODORE A. CRAIG AND FREDERICK L. CRANE—Evidence for A Trans-Plasma Membrane Electron Transport System in Plant Cells . . . . .	150
D. K. HANSEN AND M. E. HODES—Teratogenic Potential of Phenytoin in Different Strains of Mice . . . . .	156
GARY R. MATYAS, DOROTHY A. WERDERITSH, DOROTHY M. MORRÉ, AND D. JAMES MORRÉ—Comparison of Metastatic and Non-metastatic Transplantable Tumors from the Jaw Region of the Rat . . . . .	161

### Chemistry

RANDALL K. ATKINS, PAUL L. BOCK, JOHN A. MOSBO, AND BRUCE N. STORHOFF—Comparisons of the Semi-empirical Molecular Orbital Treatments MINDO/3 and MINDO with Some Simple Phosphines* . . . . .	174
JOHN E. BARTMESS, ROBERT L. HAYS, AND STEPHEN R. WILSON—Gas Phase Chemistry of 1,3-Dithiane* . . . . .	174

	Page
STANLEY L. BURDEN, DAVID WOODALL, KATHLEEN DONICA, RICK THOMPSON, JON CONDIT, STEVEN BEESON, AND DOUGLAS TAYLOR—Laboratory Inter- facing with the Apple II Plus Microcomputer: A Computer Controlled Titrator with High Resolution Color Graphics Display* . . . . .	174
MARSHALL P. CADY, JR.—Test of a Nonisothermal Apparatus Suitable for the Study of Energy and Mass Transport Coefficients* . . . . .	175
E. CAMPAIGNE AND R. YODICE—The Schmidt Reaction of 3a,4,5,6-Tetrahydro- succinimido [3,4-b] acenaphthen-10-one and Its Alkylated Derivatives* . . . . .	176
R. J. COFFEY, D. J. REULAND, AND W. A. TRINLER—The Identification of Synthetic Fibers of Forensic Interest by a Combination of Differential Thermal Analysis and Infrared Spectrophotometry* . . . . .	176
JOSEPH J. GAJEWSKI AND KEVIN E. GILBERT—Energy Surfaces of Sigma- tropic Shifts* . . . . .	176
ROBERT H. L. HOWE—The Chemistry of Cyanogen Compounds Degrad- ation* . . . . .	176
MARK D. MCINTIRE, PAUL L. BOCK, JOHN A. MOSBO, AND BRUCE N. STORHOFF— Parameterization of the Empirical Molecular Conformation Approach CAMSEQ for Phosphines* . . . . .	176
THOMAS W. MYERS AND PANG F. MA—A Study of Adenosine Deaminase in Human Serum* . . . . .	177
LOIS M. OUNAPU, JOHN A. MOSBO, PAUL L. BOCK, AND TERRY L. KRUGER— Equilibria Between Diols and the NMR Shift Reagent Eu(fod) <sub>3</sub> * . . . . .	177
SHASHI PUTTASWAMY AND PANG F. MA—A Comparative Study of the Inter- action Between the Conversion Factors from Human Tissues with the Small Forms of Adenosine Deaminase from Various Organisms* . . . . .	177
BRENDA L. SCHUFFMAN AND ERIC R. JOHNSON—The Hydrolysis of Bovine Glucagon by a Denaturant-stable Protease* . . . . .	178
EUGENE SCHWARTZ, MARK BRADLEY, AND TIMOTHY NEUFELD—Dielectric and Electronic Polarizations of Substituted Metal-Acetylacetonate Complexes* . . . . .	178
WANDA J. WILLS AND ERIC R. JOHNSON—The Isolation of a New Denaturant- stable Protease from a Commercial Protease Preparation, Pronase* . . . . .	179
BARTH H. RAGATZ—Interactions of Various Homopolypeptides with Human Platelet-Rich Plasma Suspensions . . . . .	180
JAMES T. STREATOR, PAM BERTRAM, AND CARYL L. COY—Fluoride Content of Common Foods . . . . .	186

### Ecology

ROBERT L. BALL—Changes in Yellow Bass Growth Rates and Density During the First Ten Years of Its Establishment in Monroe Reservoir* . . . . .	190
KENNETH M. BROWN—Habitat, Food, and Life History Overlap in Temporary Pond Snails: Evidence for Competition* . . . . .	190
STEPHEN R. CARPENTER AND DURLAND FISH—Detrital Dynamics Regulate Mosquito Production in Treehole Ecosystems* . . . . .	191
WILLIAM Y. B. CHANG—Limiting Nutrients and Primary Productivity* . . . . .	191
WILLIAM BLISS CRANKSHAW—Attrition of White Ash in Red Pine Plantations in Eastern New York* . . . . .	191

	Page
WILLIAM BLISS CRANKSHAW—Success of Bald Cypress Seedlings in the Drawdown Zone at Salamonie Reservoir*	191
DENNIS DEVRIES—Effect of Habitat Productivity, Permanence, and Predation on the Life History of a Temporary Pond Snail*	192
JOHN S. FEZY AND RICHARD W. GREENE—Periphyton Productivity of Three Sample Sites along Juday Creek, St. Joseph County, Indiana*	192
STEPHEN W. FLETCHER—An Updated Evaluation of Sampling Efficiencies of Overstory Sampling Methods*	192
PAUL A. GLANDER AND THOMAS S. MCCOMISH—Macrophyte Induced Fluctuations of Water Chemistry in and East-Central Indiana Borrow Pit Lake*	193
JOANNE M. PAYTON AND RICHARD W. GREENE—A Comparison of the Effect of Aluminum on a Single Species Algal Assay and Indigenous Community Algal Toxicity Bioassay*	193
KEN ROBERTS AND W. HERBERT SENFT II—Growth and Phosphorus Uptake as A Function of Temperature in the Colonial Green Alga <i>Volvox globator</i> L.*	194
ROBERT K. ROSE—The Small Mammals of Spencer County, Indiana*	194
ROBERT SCHWARZWALDER, JR.—Trends in the Climatic Adaptations of Lichens*	194
BRUCE W. SCHWENNEKER AND RONALD A. HELLENTHAL—Seasonal, Spatial and Developmental Variability of Benthic Macroinvertebrates in A Northern Indiana Stream*	195
W. HERBERT SENFT II AND ARTHUR J. WHITE—Spatial Patterning of A <i>Volvox globator</i> L. Population in A Northern Minnesota Pond*	195
PATRICK F. SULLIVAN AND STEPHEN R. CARPENTER—Relationships of Algal Trophic State Indices in Indiana Lakes and Reservoirs*	196
FORREST C. BROWN AND THOMAS S. MCCOMISH—Fishes Reported from Waters of the Hoosier National Forest	197
CLARENCE F. DINEEN—Fishes of Spicer Lake	204
WILLIAM L. FISHER AND JAMES R. GAMMON—The Implications of Rotenone Eradication on the Fish Community of Eagle Creek in Central Indiana	208
C. L. RHYKRD, E. L. HOOD, B. O. BLAIR, EKPO OSSOM, AND J. W. LIGHTNER— <i>Alopecurus pratensis</i> L. Discovered in Porter County	216

### Engineering

WARREN W. BOWDEN—Development of a Robust Routine for Calculating Vapor-Liquid Equilibrium Conditions*	219
CHRISTOPHER B. BURKE—Combined Sewer Separation: Case Study*	219
DAVID D. CHESAK—Microcomputer Driven Multi-Point Controller*	220
WAYNE F. ECHELBERGER, JR., J. MICHAEL JETER, STEVE W. KIM, AND J. C. RANDOLPH—Chemical and Physical Characterization of Wastewater Sludges in Indiana*	220
ALDO GIORGINI AND MARK SMITH—Particulate Sedimentation in Shallow Lakes*	221

---

\* Abstracts

	Page
ROBERT H. L. HOWE—The Boundary Conditions of Oxygen Transfer in Water with Respect to Temperature* . . . . .	221
ROBERT H. L. HOWE AND HAKKI DINGIL—The Determination of the Rising Velocity of a Gas Bubble Through a Liquid Column by Howe's Method* . . . . .	221
P.G. KATZ AND G. H. TOBES—Difference Models of River Reaches.* . . . .	222
A. RAMACHANDRA RAO—Analysis of Suspended Particulate Data from Chicago* . . . . .	222
GERARD F. SHELDON AND DONALD D. GRAY—Performance of the Purdue Hydromechanics Laboratory Closed Circuit Wind Tunnel* . . . . .	222
BITHIN DATTA AND MARK H. HOUCK—Grain Reserve Systems: Failure of Multiobjective Decisions Under Catastrophic Intervention, A Case for Topologic Stability in Singular Mapping . . . . .	224
MOHAMMAD KARAMOUZ AND MARK H. HOUCK—Reservoir Operating Rules . . . . .	230

### Entomology

WILLIAM E. CHANEY, DONALD L. SCHUDER, AND DAVID K. REED—Notes on the Biology and Oviposition of the Twobanded Japanese Weevil ( <i>Callirhopalus bifasciatus</i> Roelofs)* . . . . .	234
A. YUMI CLEMONS AND RAYMOND J. RUSSO—Laboratory and Field Evaluation of Oviposition Preference in <i>Toxorhynchites rutilus rutilus</i> * . . . . .	234
ROSEMARIE FUNKHOUSER AND RAYMOND J. RUSSO—Clinical Variation of Temperature Dependent Survivorship in the Mosquito <i>Aedes sollicitans</i> * . . . . .	234
JOHN W. HART—Spring-tailed Insects of the Genus <i>Proisotoma</i> , subgenus <i>Appendisotoma</i> , from Manlove Woods* . . . . .	235
SUE HENDERSON AND ROBERT R. PINGER—Oviposition and Larval Development of <i>Toxorhynchites brevivalpis</i> (Diptera: Culicidae) at Selected pH Levels* . . . . .	235
BRIDGET HOBAN AND GEORGE B. CRAIG, JR.—Effectiveness of the Ovitrap for Monitoring <i>Culex</i> Populations* . . . . .	235
JOHN KELTNER AND W. P. MCCAFFERTY—The Burrowing Mayflies (Ephemeroidea) of Indiana* . . . . .	236
STEPHEN R. MADIGOSKY, ROBERT R. PINGER, AND HORST F. SIEWERT—Effects of pH on Oviposition Preference and Larval Development of Mosquito Species <i>Aedes triseriatus</i> * . . . . .	236
RAYMOND RUSSO AND KIMBERLY RAUBENHEIMER—Effect of Prey Density on the Use of <i>Toxorhynchites rutilus</i> as A Biological Control Agent* . . . . .	237
ALAN C. YORK AND RONALD D. GARDNER—Home Garden Insecticide Use in Indiana* . . . . .	237
STEPHEN L. DURSO AND GEORGE B. CRAIG, JR.—Treehole Productivity for <i>Aedes triseriatus</i> in Northern Indiana, 1975 vs. 1979 . . . . .	238
LORRAINE LEISER—Distribution of <i>Aedes triseriatus</i> (Say) in an Urban Area: Comparison of Two Survey Methods . . . . .	248
PHILIP T. MARSHALL AND JOHN J. FAVINGER—Indiana Pine Wilt Nematode Survey . . . . .	254

---

\* Abstracts

	Page
ROBERT W. MEYER—Insects and Other Arthropods of Economic Importance in Indiana During 1980 .....	259
B. ELWOOD MONTGOMERY—Effect of Photoperiod and Temperature upon the Growth Rate of the Later Instars of <i>Erythemis simplicicollis</i> (Say) (Odonata; Libellulidae) .....	266
DAVID B. TAYLOR—New Distribution Records for Mosquitoes (Diptera: Culicidae) in St. Joseph County, Indiana .....	274

### Environmental Quality

THAD J. GODISH—Acid Precipitation Control Strategies* .....	281
THAD J. GODISH—Sensitivity of Weed Species to Ozone Exposures* .....	281
THAD J. GODISH, VIRGIL KONOPINSKI, AND DAVID PETERSON—Formaldehyde Air Pollution in Residential Housing* .....	281
ROBERT H. L. HOWE—The Chemical Properties of Biological Sludges* .....	282
ROBERT H. L. HOWE—The Meaning of pH in Environmental Control and Wastes Treatment* .....	282
PATRICK SULLIVAN—A Groundwater Quality Study of the Franklin County Sanitary Landfill, Brookville, Indiana* .....	282
ROLAND W. USHER AND EDMUND A. SCHOFIELD—The Effects of Acid Mists on Nitrogen-Fixing Blue-Green Algae* .....	282
THAD J. GODISH—Effects of Nitric Oxide, Nitrogen Dioxide and Nitric Oxide-Nitrogen Dioxide Pretreatments on the Sensitivity of Tomato cv. Rutgers to Ozone .....	283
D. W. NELSON AND E. D. ORME—Phosphorus Status of Selected Indiana Lake and Reservoir Sediments .....	287
JOSEPH R. SIEFKER AND DAVID P. MCCLEARY—Chemical Analysis of Water Samples from Three Lakes in the Greene-Sullivan State Forest and the Wabash River at Clinton, Indiana .....	293

### Geology and Geography

KONRAD J. BANASZAK—The pH of Precipitation in Indianapolis* .....	296
THOMAS J. GALLAGHER, MARGARET M. KIMMEL, AND GARY W. BARRETT—A Social Impact Assessment of the Brookville Reservoir on Union County, Indiana* .....	296
GERALD E. GREENGOLD AND TERRY R. WEST—Engineering Geology of an Operating Area Strip Mine, Southwestern Indiana* .....	297
JOSEPH G. HAILER—Groundwater Chemistry in Vigo County, Indiana* .....	297
ERIC KOGLIN AND DONALD W. ASH—The Sedimentation of Lumsden Pond, Vigo County, Indiana* .....	298
JOHN B. PATTON AND RICHARD K. LEININGER—Outlook for Shale-Oil Recovery from New Albany Strata in Indiana* .....	298
THOMAS FRANK BARTON—Rurbanization and the Countryside Urban Web in Indiana .....	299
S. N. GHOSE—A Statistical Correlation of Sulfur Content in Coal 5 and the Overlying Gray Shale .....	306

	Page
ANDREA SJOREEN AND RICHARD L. POWELL—An Analysis of Irregularity of Surveyed Sections in Indiana .....	313
DAN M. SULLIVAN, CURTIS H. AULT, AND GEORGE F. TANNER—Faulting in Perry and Spencer Counties, Indiana .....	323
<b>History of Science</b>	
R. WILLIAM ORR—Charles Lyell's Geologic Observations in Indiana, 1846* ...	329
GENE KRITSKY—Mendel and the <i>Origin of Species</i> .....	330
WALTER H. PIERCE—Arthur J. Phinney, M.D., Indiana's First Subsurface Geologist .....	335
<b>Microbiology and Molecular Biology</b>	
WILLIAM W. BALDWIN, MING TSENG, AND MARSHALL LANDAY—A Simplified Method for Storing Anaerobic Bacteria* .....	340
KENNETH F. BARTIZAL, MARGARET H. BEAVER, AND BERNARD S. WOSTMANN—The Effects of a Hexaflora on the Morphology of the Gerbil* .....	340
LARRY HERRMAN AND MARY LEE RICHESON—Isolation, Identification, and Reinfection of <i>Cephalosporium</i> spp. and Two Bacteria Associated with Wilt in <i>Helianthus annuus</i> * .....	341
ROBERT H. L. HOWE—Dissolved Oxygen Profile of an Aerobic Bio-Reactor* ..	341
MARK O. OSTER AND SYLVIA BREHM OSTER—Search for Phosphoproteins in <i>Bacillus subtilis</i> * .....	341
TONI L. POOLE AND CARL WARNES—Rate Studies on Microbial Chitin Decomposition in the Freshwater Habitat* .....	342
MARY LEE RICHESON AND LARRY HERRMAN—Isolation and Identification of Two Bacteria Associated with Wilt in <i>Helianthus annuus</i> * .....	342
DILIPKUMAR VYAS AND BRUCE STORHOFF—Methodolgy for Measuring Nitrogen Fixation by Acetylene Reduction in <i>Beijerinckia</i> and <i>Klebsiella</i> in Stream Litter Decomposition* .....	343
DILIPKUMAR VYAS, DONALD HENDRICKSON, CARL WARNES, AND BRUCE STORHOFF—Investigation of the Role of <i>Beijerinckia</i> and <i>Klebsiella</i> as Nitrogen Fixers in Stream Litter Decomposition* .....	343
DONALD HENDRICKSON—Bacterial Community Dynamics and Species Diversity of Slime Producing Bacteria at Selected Sites on the Ohio River .....	344
DONALD HENDRICKSON AND THOMAS S. MCCOMISH—Analysis of Factors Influencing Population Dynamics of Slime Forming Bacteria at Selected Sites on the Ohio River .....	351
I. L. SUN AND D. P. GUSTAFSON—Properties of Defective Interfering Particles Induced by Photodynamic Treatment on Pseudorabies Virus .....	357
<b>Physics and Astronomy</b>	
L. DWIGHT FARRINGER—A Valveless Drain-Down Solar Collector System* ...	366
J. W. KAELLNER AND D. R. OBER—Design and Construction of a Dye Laser* ..	366
RONALD E. PITTS—Some Problems Involved in Obtaining Accurate Oscillator Strengths for Use in Astrophysics* .....	366

	Page
ROGER L. SCOTT—IUE Observations of the Peculiar Object BL Lacertae* . . .	336
R. TAYLOR AND R. COSBY—Active Solar Heating Systems for Residential Application in Indiana: A Comparative Optimization Study* . . . . .	367
ROBERT L. TONKEL AND ROGER L. SCOTT—A Tube-Type Photographic Sensitometer* . . . . .	367
WILLIAM W. DAVIS—"Contra Luz Opal:" Structure and Optical Properties . . . . .	368
GERALD P. THOMAS AND MARK COGGINS—Microcomputer Assisted Coulomb Scattering Measurements in Nuclear Emulsion Pellicles . . . . .	375

### Plant Taxonomy

BUDDY CANTRELL—The Flora of the Southeastern United States: A Review* . . . . .	382
THEODORE J. CROVELLO AND CLIFTON KELLER—An Updated, Computer-based Checklist of the Vascular Plants of Indiana: The Unending Synthesis* . . . . .	382
RICHARD J. JENSEN—Phylogenetic Reconstruction in <i>Quercus</i> * . . . . .	383
VICTOR L. RIEMENSCHNEIDER—Vascular Plants of Sand Hill Nature Preserve, Pulaski County, Indiana* . . . . .	383
JOHN L. ROTH, JR. AND DAVID L. DILCHER—The Epidermal Anatomy of <i>Deeringothamnus</i> Small and Its Taxonomic Implications* . . . . .	384
HELENE STARCS— <i>Najas marina</i> L. in Indiana* . . . . .	384
JOHN A. BACONE, CLOYCE L. HEDGE, AND THEODORE J. CROVELLO—The Status of Indiana's Rarest Plants: A Revision of the List of Endangered and Threatened Vascular Plants . . . . .	385
MARY PATRICIA COONS—Plant Distribution Records for Rush, Shelby and Decatur Counties . . . . .	388
JOHN E. EBINGER AND JOHN A. BACONE—Vegetation Survey of Hillside Seeps at Turkey Run State Park . . . . .	390
WILLIAM E. MCCLAIN—Additions to the Flora of Gibson County, Indiana . . . . .	395
WILLIAM E. MCCLAIN—Additions to the Flora of Vermillion County, Indiana . . . . .	398

### Science Education

AUSTIN E. BROOKS AND WILLIAM N. DOEMEL—Wabash Summer Aquatic Biology Program—The First Year* . . . . .	403
RICHARD A. DAVIS—Botanical and Zoological Prints in the Collections of the Hugh Thomas Miller Rare Book Room, Irwin Library, Butler University* . . . . .	403
JAMES D. HADDOCK—A Simple Quantitative Method for Teaching Phylogenetic Relationships Among Animal Phyla to College Freshmen* . . . . .	403
JOHN A. RICKETTS AND PAUL B. KISSINGER—STEP: The First Year* . . . . .	404
STANLEY S. SHIMER—Summary Report of Science Educators' Survey of Science Methods Curriculum* . . . . .	405
PATRICIA ARNETT ZECK—The Necessity and Methods of Teaching Communication Skills for Science Fair Participants* . . . . .	405

	Page
<b>Soil and Atmospheric Sciences</b>	
E. A. MATNEY AND R. V. RUHE—Clay Mineral Study of Soils from the Savannah River Plant South Carolina*	406
ALLAN K. NICKELL AND STANLEY M. TOTTEN—Parent Material—Landscape—Soil Interrelationships in Jefferson County, Indiana*	406
LAWRENCE A. SCHAAL—The Varying Length of the Growing Season in Indiana*	407
ROBERT F. DALE, BETH C. REINKE, AND JOHN E. WRIGHT—Freeze-Thaw Cycles in Indiana Soils	408
J. J. KING AND D. P. FRANZMEIER—Morphology, Hydrology, and Management of Clermont Soils	416
J. W. LIGHTNER, C. L. RHYKERD, E. L. HOOD, G. E. VAN SCOYOC, AND D. B. MENGEL—Effect of NPK Fertilization on Dry Matter Yield and Crude Protein Concentration of <i>Poa pratensis</i> L. Grown on Muck Soil	423
G. C. STEINHARDT, D. P. FRANZMEIER, AND S. C. VALENTINE—Effect of Hydrogen Peroxide Pretreatment on Particle-Size Analysis	428
RUSSELL K. STIVERS—Fraction Sizes Change Available Phosphorus and Potassium Soil Test Values	435
<b>Zoology</b>	
LARRY L. GANION—A Freeze-Fracture Study of the Mouse Ovarian Follicle and Zona Pellucida*	439
JOHN D. GOODMAN—The Northern Ringneck Snake A Host of <i>Cepedietta</i> sp.*	439
G. R. HOGAN—Variation of Lead Acetate-Induced Mortality in Estradiol-Treated Male Mice*	439
MOHINDER S. JARIAL—The Fine Structure of the Rectal Pads of <i>Grylloblatta campodeiformis</i> *	440
DOYAL R. LANK, JR. AND ALICE S. BENNETT—Fatty Acid Distribution in Salamanders of the Family Plethodontidae*	441
RICHARD O. MCCrackEN, PEGGY A. JOHNSON, AND DORIS D. TAYLOR—Biochemical Effects of Tioxidazole on <i>Hymenolepis diminuta</i> in vivo*	441
RONALD L. RICHARDS—Vertebrate Remains from Carcass Crypt Cave, Lawrence County, Indiana*	442
HENRY TAMAR—The Movements of A Jumping Rotifer, <i>Polyarthra</i> sp.*	442
BARBARA A. BROWN—Extra Limbs in the Small-Mouthed Salamander, <i>Ambystoma texanum</i> .	443
THOMAS R. KOZEL, GORDON K. WEDDLE, KATHY L. WELBORN, JOHN T. DAILEY, DON C. DAILEY, AND MELVIN W. DENNER—A Fish Faunal Survey of Posey County, Indiana	446
GINGER LEE MARENCHIN AND DAVID M. SEVER—Survey of the Fishes of the St. Joseph River Drainage in St. Joseph and Elkhart Counties, Indiana	454
JOHN O. WHITAKER, JR., WYNN W. CUDMORE, AND BARBARA A. BROWN—Foods of Larval, Subadult, and Adult Smallmouth Salamanders, <i>Ambystoma texanum</i> , from Vigo County, Indiana	461

\* Abstracts

TABLE OF CONTENTS

xiii

	Page
Instructions for Contributors .....	465
Index .....	467



Proceedings  
of the  
Indiana Academy  
of Science



INDIANA ACADEMY OF SCIENCE  
Officers and Committees 1980

OFFICERS

---

- President . . . . . ROBERT E. HENDERSON, Indianapolis Center for Advanced  
(1980) Research  
1219 West Michigan Street, Indianapolis, Indiana 46202
- President-Elect . . . . . RALPH A. LLEWELLYN, Department of Physics  
(1980) Indiana State University, Terre Haute, Indiana 47809
- Secretary . . . . . JOHN H. MEISER, Department of Chemistry  
(1980-82) Ball State University, Muncie, Indiana 47306
- Treasurer . . . . . JOHN A. RICKETTS, Department of Chemistry  
(1979-81) DePauw University, Greencastle, Indiana 46135
- Director of Public  
Relations . . . . . WALTER A. CORY, JR., Coordinator for School Science  
(1979-81) Memorial Hall West 108, Indiana University,  
Bloomington, Indiana 47405
- Editor . . . . . BENJAMIN MOULTON, Department of Geography and Geology  
(1978-80) Indiana State University, Terre Haute, Indiana 47809

SECTION CHAIRMEN AND CHAIRMEN-ELECT FOR 1980:

- Anthropology  
Chairman . . . . . FRANCIS X. GROLLIG, Department of Anthropology  
Loyola University, Chicago, Illinois 60626
- Chairman-Elect . . . . . CHARLES P. WARREN, Department of Anthropology  
University of Illinois at Chicago Circle,  
Chicago, Illinois 60680
- Botany  
Chairman . . . . . GARY DOLPH, Department of Botany  
Indiana University at Kokomo, Kokomo, Indiana 46901
- Chairman-Elect . . . . . CHARLES T. HAMMOND, Department of Botany  
St. Meinrad College, St. Meinrad, Indiana 47577
- Cell Biology  
Chairman . . . . . STANLEY N. GROVE, Department of Biology  
Goshen College, Goshen, Indiana 46526
- Chairman-Elect . . . . . KARA W. EBERLY, Department of Biology  
St. Mary's College, Notre Dame, Indiana 46556

## Chemistry

Chairman ..... EDWARD MILLER, Department of Chemistry  
Manchester College, North Manchester, Indiana 46962

Chairman-Elect ..... DONALD G. CLEMENS, Department of Chemistry  
Goshen College, Goshen, Indiana 46526

## Ecology

Chairman ..... W. HERBERT SENFT, Department of Biology  
Ball State University, Muncie, Indiana 47306

Chairman-Elect ..... RICHARD W. GREENE, Department of Biology  
University of Notre Dame, Notre Dame, Indiana 46556

## Engineering

Chairman ..... DONALD D. GRAY, School of Civil Engineering  
Purdue University, West Lafayette, Indiana 47907

Chairman-Elect ..... MARK H. HOUCK, School of Civil Engineering  
Purdue University, West Lafayette, Indiana 47907

## Entomology

Chairman ..... MICHAEL SINSKO, Indiana State Board of Health  
1330 West Michigan Street, Indianapolis, Indiana 46206

Chairman-Elect ..... DAVID K. REED, Fruit and Vegetable Insect Research  
Laboratory  
USDA-ARS Box 944, Vincennes, Indiana 47591

## Environmental Quality

Chairman ..... HOWARD DUNN, Department of Chemistry  
Indiana State University at Evansville, Evansville,  
Indiana 47712

Chairman-Elect ..... DAVID PETERSON, Indiana State Board of Health  
1330 West Michigan Street, Indianapolis, Indiana 46206

## Geology and Geography

Chairman ..... KENNETH R. BREHOB, Department of Earth Sciences  
University of Notre Dame, Notre Dame, Indiana 46556

Chairman-Elect ..... HENRY H. GRAY, State Geological Survey  
611 North Walnut Grove, Bloomington, Indiana 47405

## History of Science

Chairman ..... EVERETT F. MORRIS, Dean, Academic Advisors  
Louisiana State University, Alexandria, Louisiana 71304

Chairman-Elect ..... GENE KRITSKY, Department of Biology  
Tri-State University, Angola, Indiana 46703

## Microbiology and Molecular Biology

Chairman ..... DONALD A. HENDRICKSON, Department of Biology  
Ball State University, Muncie, Indiana 47306

Chairman-Elect ..... DOROTHY ADALIS, Department of Biology  
Ball State University, Muncie, Indiana 47306

## Physics and Astronomy

Chairman . . . . . GERALD P. THOMAS, Department of Physics and Astronomy  
Ball State University, Muncie, Indiana 47306

Chairman-Elect . . . . . L. DWIGHT FARRINGER, 1407 East Orchard Drive  
North Manchester, Indiana 46962

## Plant Taxonomy

Chairman . . . . . JOHN A. BACONE, Director, Division of Nature Preserves  
Indiana Department of Natural Resources  
601 State Office Building, Indianapolis, Indiana 46204

Chairman-Elect . . . . . ROBERT J. JENSEN, Department of Biology  
St. Mary's College, Notre Dame, Indiana 46556

## Science Education

Chairman . . . . . WILLIAM G. WERT, Department of Life Sciences  
Indiana State University, Terre Haute, Indiana 47809

Chairman-Elect . . . . . CHARLES GEHRING, Department of Life Sciences  
Indiana State University, Terre Haute, Indiana 47809

## Soil and Atmospheric Sciences

Chairman . . . . . DONALD P. FRANZMEIER, Department of Agronomy  
Purdue University, West Lafayette, Indiana 47907

Chairman-Elect . . . . . ROBERT F. DALE, Department of Agronomy  
Purdue University, West Lafayette, Indiana 47907

## Zoology

Chairman . . . . . ROBERT R. PINGER, Department of Physiology and  
Health Sciences  
Ball State University, Muncie, Indiana 47306

Chairman-Elect . . . . . LARRY R. GANION, Department of Physiology and  
Health Sciences  
Ball State University, Muncie, Indiana 47306

## EXECUTIVE COMMITTEE, COUNCIL AND BUDGET COMMITTEE

**Executive Committee**

JOHN A. BACONE	*CLARENCE F. DINEEN	EARL A. HOLMES
*OTTO K. BEHRENS	WILLIAM N. DOEMEL	*WILLIAM B. HOPP
WILLIAM BERANEK, JR.	GARY DOLPH	MARION T. JACKSON
KENNETH R. BREHOB	HOWARD DUNN	*WILLIS H. JOHNSON
LOIS BURTON	WILLIAM R. EBERLY	DUVALL A. JONES
ERNEST E. CAMPAIGNE	DONALD P. FRANZMEIER	BARRY C. KNISLEY
RICHARD L. CONKLIN	*RAYMOND E. GIRTON	*ALTON A. LINDSEY
*DONALD J. COOK	DONALD D. GRAY	RALPH A. LLEWELLYN
ROBERT H. COOPER	FRANCIS X. GROLLIG	*C. A. MARKLE
WALTER A. CORY, JR.	STANLEY N. GROVE	ANDREW G. MEHALL
THEODORE CROVELLO	*ARTHUR T. GUARD	JOHN H. MEISER
FAY K. DAILY	*FRANK A. GUTHRIE	*MELVIN G. MELLON
*WILLIAM A. DAILY	ROBERT E. HENDERSON	*A. H. MEYER
*HARRY G. DAY	DONALD A. HENDRICKSON	*HOWARD H. MICHAUD

EDWARD MILLER	JOHN A. RICKETTS	*W. J. WAYNE
BENJAMIN MOULTON	PHILIP A. ST. JOHN	*J. DAN WEBSTER
*JERRY J. NISBET	*DAMIAN V. SCHMELZ	*WINONA H. WELCH
ROBERT R. PINGER	W. HERBERT SENFT	WILLIAM G. WERT
*JOHN B. PATTON	MICHAEL SINSKO	DONALD R. WINSLOW
*S. N. POSTLETHWAITE	GERALD P. THOMAS	*HOWARD R. YOUSE
*H. M. POWELL	*Past President of Academy	

### Council

President—ROBERT E. HENDERSON  
 President-Elect—RALPH A. LLEWELLYN  
 Secretary—JOHN H. MEISER  
 Treasurer—JOHN A. RICKETTS  
 Director of Public Relations—WALTER A. CORY, JR.  
 Editor—BENJAMIN MOULTON  
 Chairman, Science & Society Committee—WILLIAM BERANEK, JR.

### Budget Committee

President—ROBERT E. HENDERSON  
 President-Elect—RALPH A. LLEWELLYN  
 Immediate Past President—J. DAN WEBSTER  
 Secretary—JOHN H. MEISER  
 Treasurer—JOHN A. RICKETTS  
 Director of Public Relations—WALTER A. CORY, JR.  
 Editor—BENJAMIN MOULTON  
 Chairman, Science & Society Committee—WILLIAM BERANEK, JR.  
 Co-Director, Junior Academy of Science—KEITH HUNNINGS  
 Co-Director, Junior Academy of Science—LEOTA SKIRVIN  
 Co-Chairman, Program Committee—DUVALL A. JONES  
 Co-Chairman, Program Committee—ANDREW G. MEHALL  
 Chairman, Library Committee—LOIS BURTON  
 Chairman, Youth Activities Committee—DONALD R. WINSLOW  
 Chairman, Academy Foundation—WILLIAM A. DAILY  
 Chairman, Research Grants Committee—ERNEST E. CAMPAIGNE

### ELECTED COMMITTEES

#### Academy Foundation

WILLIAM A. DAILY, Chairman . . . . . 5884 Compton Street  
 (1979-80) . . . . . Indianapolis, Indiana 46220  
 CLYDE R. METZ . . . . . Department of Chemistry  
 (1980-81) . . . . . Indiana University-Purdue University  
 1201 East 38th Street  
 Indianapolis, Indiana 46205

#### Bonding Committee

BARRY C. KNISLEY, Chairman . . . . . 6022 Finlandia Lane  
 (1980) . . . . . Mechanicsville, Virginia 23111  
 DONALD R. WINSLOW . . . . . Department of Science and Environ-  
 (1980) . . . . . mental Education  
 Indiana University  
 Bloomington, Indiana 47405

**Research Grants Committee\***

- ERNEST E. CAMPAIGNE, Chairman . . . . . Department of Chemistry  
(1983) Indiana University  
Bloomington, Indiana 47405
- MARK RESHKIN . . . . . Department of Geology  
(1981) Indiana University Northwest  
Gary, Indiana 46408
- GARY E. DOLPH . . . . . Department of Botany  
(1983) Indiana University at Kokomo  
Kokomo, Indiana 46901
- ALICE S. BENNETT . . . . . Department of Biology  
(1984) Ball State University  
Muncie, Indiana 47306

\*President and Secretary serve as *ex-officio* members of the Research Grants Committee.

## STANDING COMMITTEES APPOINTED BY THE PRESIDENT

(The President and President-Elect are *ex-officio* members of all committees)

**Academy Representative to AAAS****Section and Delegate to NAAS**

- EARL A. HOLMES . . . . . Department of Biology  
(1980) St. Mary's College  
Notre Dame, Indiana 46556

**Auditing Committee**

- WILLIAM N. DOEMEL, Chairman . . . . . Department of Biology  
Wabash College  
Crawfordsville, Indiana 47933
- EUGENE P. SCHWARTZ . . . . . Department of Chemistry  
DePauw University  
Greencastle, Indiana 46135

**Youth Activities Committee**

- DONALD R. WINSLOW, Chairman . . . . . Department of Science and Environ-  
mental Education  
Indiana University  
Bloomington, Indiana 47405
- KEITH HUNNINGS, Assistant  
Chairman and Co-Director,  
Junior Academy of Science . . . . . Science Department  
New Haven High School  
1300 Green Road  
New Haven, Indiana 46774
- LEOTA SKIRVIN, Assistant  
Chairman and Co-Director,  
Junior Academy of Science . . . . . Brown County High School  
P. O. Box 68  
Nashville, Indiana 47448

- KARL L. KAUFMAN, Assistant  
Chairman and Director,  
Youth Science Development . . . . . Department of Mental Health  
5 Indiana Square  
Indianapolis, Indiana 46204
- WALTER A. CORY, JR., Assistant  
Chairman and Director,  
Indiana Science Talent Search . . . . . Coordinator for School Science  
Memorial Hall West 108  
Indiana University  
Bloomington, Indiana 47405
- LLOYD ANDERSON, Assistant  
Chairman and Director of  
Science Fairs . . . . . Indianapolis Newspapers  
Educational Services Coordinator  
307 North Pennsylvania Avenue  
Indianapolis, Indiana 46206
- F. KEITH AULT . . . . . Department of Chemistry  
Ball State University  
Muncie, Indiana 47306
- KENNETH BUSH . . . . . West Lafayette Senior High School  
Grant and Leslie Avenue  
West Lafayette, Indiana 47906
- JERRY M. COLGLAZIER . . . . . Office of State Superintendent of  
Public Instruction  
State House 229  
Indianapolis, Indiana 46204
- JOHN C. MOODY . . . . . Division of Education  
Indiana University Southeast  
4201 Grant Line Road  
P. O. Box 679  
New Albany, Indiana 47150
- VIRGINIA RHODES . . . . . East Noble High School  
Kendallville, Indiana 46755
- JANE TUCKER . . . . . St. John the Baptist School  
4500 Fairfield Avenue  
Fort Wayne, Indiana 46807
- RAY WEATHERHOLT . . . . . Floyd Central High School  
R. R. 2, Box 445 A  
New Albany, Indiana 47150
- Library Committee**
- LOIS BURTON, Chairman . . . . . Indiana State Library  
Indianapolis, Indiana 46204
- WILLIAM A. DAILY . . . . . 5884 Compton Street  
Indianapolis, Indiana 46220
- JOHN F. PELTON . . . . . Department of Botany  
Butler University  
Indianapolis, Indiana 46208

JAMES A. CLARK ..... Assistant State Entomologist  
5519 East 21st Street  
Indianapolis, Indiana 46218

#### **Nominations Committee**

WILLIAM B. HOPP, Chairman ..... Department of Life Sciences  
Indiana State University  
Terre Haute, Indiana 47809

BETTY D. ALLAMONG ..... Department of Biology  
Ball State University  
Muncie, Indiana 47306

DONALD J. COOK ..... Department of Chemistry  
DePauw University  
Greencastle, Indiana 46135

#### **Program Committee**

DUVALL A. JONES, Co-Chairman ..... Biology Department  
St. Joseph's College  
Rensselaer, Indiana 47978

ANDREW G. MEHALL, Co-Chairman ..... Biology Department  
St. Joseph's College  
Rensselaer, Indiana 47978

#### **Publications Committee**

WILLIAM R. EBERLY, Chairman ..... Department of Zoology  
Manchester College  
North Manchester, Indiana 46962

WILLIAM B. BUNGER ..... Department of Chemistry  
Indiana State University  
Terre Haute, Indiana 47809

LOIS BURTON ..... Indiana State Library  
Indianapolis, Indiana 46204

WALTER A. CORY, JR. .... Coordinator for School Science  
Memorial Hall West 108  
Indiana University  
Bloomington, Indiana 47405

CLYDE W. HIBBS ..... Department of Natural Resources  
Ball State University  
Muncie, Indiana 47306

MARION T. JACKSON ..... Department of Life Sciences  
Indiana State University  
Terre Haute, Indiana 47809

PAUL C. MACMILLAN ..... Department of Biology  
Hanover College  
Hanover, Indiana 47243

WILTON N. MELHORN ..... Department of Geosciences  
Purdue University  
West Lafayette, Indiana 47907

ELMER NUSSBAUM ..... Department of Physics  
Taylor University  
Upland, Indiana 46989

- BENJAMIN MOULTON ..... Department of Geography and  
Geology  
Indiana State University  
Terre Haute, Indiana 47809
- GERTRUDE L. WARD ..... Department of Biology  
Earlham College  
Richmond, Indiana 47374
- Science and Society Committee**
- WILLIAM BERANEK, JR., Chairman ..... Holcomb Research Institute  
(1981) ..... Butler University  
Indianapolis, Indiana 46208
- CLARENCE DINEEN ..... Department of Biology  
(1980) ..... St. Mary's College  
Notre Dame, Indiana 46556
- CHARLES E. WIER ..... AMAX Coal Company  
(1980) ..... 105 South Meridian Street  
Indianapolis, Indiana 46225
- HOWARD R. YOUSE ..... Department of Botany  
(1980) ..... DePauw University  
Greencastle, Indiana 46135
- STANLEY L. BURDEN ..... Department of Chemistry  
(1981) ..... Taylor University  
Upland, Indiana 46989
- WALTER CORY, JR. ..... Coordinator for School Science  
(1981) ..... Memorial Hall West 108  
Indiana University  
Bloomington, Indiana 47405
- ROBERT MENKE ..... St. Henry Road  
(1981) ..... Huntingburg, Indiana 47542
- CLYDE R. METZ ..... Department of Chemistry  
(1981) ..... Indiana University-Purdue University  
1201 East 38th Street  
Indianapolis, Indiana 46204
- CRAIG E. NELSON ..... Department of Biology  
(1981) ..... Indiana University  
Bloomington, Indiana 47405
- JERRY J. NISBET ..... Department of Biology  
(1981) ..... Ball State University  
Muncie, Indiana 47306
- JOHN B. PATTON ..... Indiana Geological Survey  
(1981) ..... 611 North Walnut Grove  
Bloomington, Indiana 47405
- DONALD J. COOK ..... Department of Chemistry  
(1982) ..... DePauw University  
Greencastle, Indiana 46135
- WILLIS H. JOHNSON ..... Department of Biology  
(1982) ..... Wabash College  
Crawfordsville, Indiana 47933

JAMES M. SHULER ..... Director  
 (1982) Office of Chemical Risk  
 Indiana State Board of Health  
 1330 West Michigan Street  
 Indianapolis, Indiana 46206

### Membership Committee

RALPH A. LEWELLYN, Chairman ..... Department of Physics  
 Indiana State University  
 Terre Haute, Indiana 47809

ROBERT H. COOPER,  
 Emeritus Membership ..... Department of Biology  
 Ball State University  
 Muncie, Indiana 47306

WALTER A. CORY, JR. .... Coordinator for School Science  
 Memorial Hall West 108  
 Indiana University  
 Bloomington, Indiana 47405

JACKSON L. MARR ..... Department of Biology  
 Indiana State University-Evansville  
 Evansville, Indiana 47712

DONALD R. WINSLOW,  
 Club Membership ..... Department of Science and Environ-  
 mental Education  
 Indiana University  
 Bloomington, Indiana 47405

### Fellows Committee

RICHARD L. CONKLIN (1980)  
 Chairman ..... Department of Physics  
 Hanover College  
 Hanover, Indiana 47243

PAUL H. GEBHARD (1980) ..... Institute for Sex Research  
 Indiana University  
 Bloomington, Indiana 47405

RUSSELL K. STIVERS (1980) ..... Department of Agronomy  
 Purdue University  
 West Lafayette, Indiana 47907

EUGENE D. WEINBERG (1980) ..... Department of Microbiology  
 Indiana University  
 Bloomington, Indiana 47405

WILTON N. MELHORN (1981) ..... Department of Geosciences  
 Purdue University  
 West Lafayette, Indiana 47907

B. ELWOOD MONTGOMERY (1981) ..... Department of Entomology  
 Purdue University  
 West Lafayette, Indiana 47907

JOHN F. PELTON (1981) ..... Department of Botany  
 Butler University  
 Indianapolis, Indiana 46208

- WILLIAM W. BLOOM (1982) . . . . . Department of Biology  
Valparaiso University  
Valparaiso, Indiana 46383
- JOHN J. FAVINGER (1982) . . . . . 640 Parkway  
Whiteland, Indiana 46184
- JAMES C. LIST (1982) . . . . . Department of Biology  
Ball State University  
Muncie, Indiana 47206
- WILLIAM G. KESSEL (1982) . . . . . Department of Chemistry  
Indiana State University  
Terre Haute, Indiana 47809

**Resolutions Committee**

- HOWARD R. YOUSE, Chairman . . . . . Department of Botany  
DePauw University  
Greencastle, Indiana 46135
- THOMAS R. MERTENS . . . . . Department of Biology  
Ball State University  
Muncie, Indiana 47306

**Invitations Committee**

- PHILIP A. ST. JOHN, Chairman . . . . . Department of Zoology  
Butler University  
Indianapolis, Indiana 46208
- GARY C. STEINHARDT . . . . . Department of Agronomy  
Purdue University  
West Lafayette, Indiana 47907

**Necrologist**

- FAY K. DAILY . . . . . 5884 Compton Street  
Indianapolis, Indiana 46220

**Parliamentarian**

- CLARENCE DINEEN . . . . . Department of Biology  
St. Mary's College  
Notre Dame, Indiana 46556

**SPECIAL COMMITTEES APPOINTED BY THE PRESIDENT****Biological Survey Committee**

- THEODORE CROVELLO, Chairman . . . . . Department of Biology  
University of Notre Dame  
Notre Dame, Indiana 46556
- JOHN A. BACONE . . . . . Director  
Division of Nature Preserves  
Indiana Department of Natural  
Resources  
601 State Office Building  
Indianapolis, Indiana 46204

- WILLIAM B. CRANKSHAW ..... Department of Biology  
Ball State University  
Muncie, Indiana 47306
- JAMES R. GAMMON ..... Department of Zoology  
DePauw University  
Greencastle, Indiana 46135
- JACK R. MUNSEE ..... Department of Life Sciences  
Indiana State University  
Terre Haute, Indiana 47809
- GEORGE R. PARKER ..... Department of Forestry and  
Conservation  
Purdue University  
West Lafayette, Indiana 47907
- VICTOR RIEMENSCHNEIDER ..... Department of Biology  
Indiana University at South Bend  
South Bend, Indiana 46615
- JOHN O. WHITAKER, JR. .... Department of Life Sciences  
Indiana State University  
Terre Haute, Indiana 47809
- HARMON P. WEEKS ..... Department of Forestry and  
Conservation  
Purdue University  
West Lafayette, Indiana 47907
- FRANK N. YOUNG, JR. .... Department of Zoology  
Indiana University  
Bloomington, Indiana 47405

**Preservation of Natural Areas Committee**

- MARION T. JACKSON, Chairman ..... Department of Life Sciences  
(1981) Indiana State University  
Terre Haute, Indiana 47809
- WILLIAM R. ORR ..... Department of Geography and Geology  
(1980) Ball State University  
Muncie, Indiana 47306
- George R. Parker ..... Department of Forestry and  
(1980) Conservation  
Purdue University  
West Lafayette, Indiana 47907
- CARL H. KREKELER ..... Department of Biology  
(1981) Valparaiso University  
Valparaiso, Indiana 46383
- VICTOR RIEMENSCHNEIDER ..... Department of Biology  
(1981) Indiana University at South Bend  
South Bend, Indiana 46615
- JOHN A. BACONE ..... Director  
(1982) Division of Nature Preserves  
Indiana Department of Natural  
Resources  
601 State Office Building  
Indianapolis, Indiana 46204

- ROBERT C. WEBER .....3649 Algonquin Pass  
(1982) Fort Wayne, Indiana 46809
- DAMIAN V. SCHMELZ ..... Department of Biology  
(1982) St. Meinrad College  
St. Meinrad, Indiana 47577
- WINONA H. WELCH .....DePauw University  
(Honorary) Greencastle, Indiana 46135
- CARROLLE MARKLE ..... Ashfield, Massachusetts 01330  
(Honorary)
- Newsletter Editor**
- WALTER A. CORY, JR. .... Coordinator for School Science  
Memorial Hall West 108  
Indiana University  
Bloomington, Indiana 47405

**“Speaker of the Year” Selection Committee**

- JOHN B. PATTON, Chairman ..... Indiana Geological Survey  
(1980) 611 North Walnut Grove  
Bloomington, Indiana 47405
- NORMAN J. NORTON ..... Department of Biology  
(1980) Ball State University  
Muncie, Indiana 47306
- ROBERT E. HALE ..... Department of Physics  
(1981) Huntington College  
Huntington, Indiana 46750
- DAMIAN V. SCHMELZ ..... Department of Biology  
(1982) St. Meinrad College  
St. Meinrad, Indiana 47577

**Academy Representative on Indiana Natural Resources Commission**

- DAMIAN V. SCHMELZ ..... Department of Biology  
St. Meinrad College  
St. Meinrad, Indiana 47577

**Emeritus Member Selection Committee**

- ROBERT H. COOPER, Chairman ..... R. R. 9, Box 242  
Muncie, Indiana 47302
- WINONA H. WELCH .....DePauw University  
Greencastle, Indiana 47135
- HARRY G. DAY ..... Department of Chemistry  
Indiana University  
Bloomington, Indiana 47405
- HOWARD H. MICHAUD ..... 301 East Stadium Drive  
Lafayette, Indiana 47906

**SPECIAL APPOINTMENTS OF THE YOUTH ACTIVITIES COMMITTEE****Indiana Science Talent Search Committee**

- WALTER A. CORY, JR., Director ..... Coordinator for School Science  
Memorial Hall West 108  
Indiana University  
Bloomington, Indiana 47405

MARK BAMBENEK	Department of Chemistry St. Mary's College Notre Dame, Indiana 46556
ROBERT L. HENRY	Department of Physics Wabash College Crawfordsville, Indiana 47933
ALFRED SCHMIDT	Department of Mathematics Rose-Hulman Institute Terre Haute, Indiana 47803
HOWARD YOUSE	Department of Botany DePauw University Greencastle, Indiana 46135
HAROLD ZIMMACK	Department of Zoology Ball State University Muncie, Indiana 47306

**Editorial Committee for *Proceedings***

BENJAMIN MOULTON, Chairman and Editor	Indiana State University
RITA BARR (1979-80)	Purdue University
CHARLOTTE BOENER (1979-80)	Indiana State University
ERNEST CAMPAIGNE (1979-80)	Indiana University
JAMES GAMMON (1979-80)	DePauw University
JOHN PELTON (1979-80)	Butler University
CARL SARTAIN (1979-80)	Indiana State University
B. K. SWARTZ, JR. (1979-80)	Ball State University

Indiana Academy of Science  
Spring Meeting  
Minutes of the Executive Committee Meeting  
April 25, 1980

The meeting was called to order by President Robert E. Henderson at 4:12 p.m. at Geneva Center, Rochester, IN.

TREASURER'S REPORT

Treasurer John A. Ricketts presented a brief report on finances for the period January 1, 1980 to April 17, 1980, a summary of which follows:

	Academy Accounts	Administered Accounts	Total
Balance, January 1, 1980 .....	\$ 4,861.86	\$13,479.32	\$18,341.18
1980 Income .....	7,551.52	6,186.00	13,737.52
1980 Expenditures .....	10,680.60	3,256.09	13,936.69
Balance, April 17, 1980 .....	1,732.78	16,409.23	18,142.01

The Treasurer's report was approved.

ELECTED COMMITTEE REPORTS

*Academy Foundation Committee*

William A. Daily, Chairman, reported Foundation accounts as of March 31, 1980. The value of the John S. Wright Invested Income Account was \$54,000 and the market values of the Foundation Account and John S. Wright Fund were \$22,423 and \$579,928, respectively. The combined assets represent an increase of approximately 4% over those of last year.

*Research Grants Committee*

Ernest E. Campaigne, Chairman, reported that 17 proposals were received; 5 were funded in full and 9 were partially funded. One proposal was still to be considered. A total of \$6116 was awarded. Deadline for receipt of proposals for the Fall 1980 round of grants is September 15, 1980.

PRESIDENTIAL APPOINTIVE COMMITTEE REPORTS

*Academy Representative to AAAS and AAS*

Earl A. Holmes, Chairman, reported on the San Francisco meeting of January 3-8, 1980 and current activities of Section X, including new rules for application of grant monies. Also announced: The Junior Academy can nominate four individuals for subscriptions to Science 80.

In other business, President Henderson stated that he had a communication from AAAS requesting a membership list for advertising Science 80. After some discussion, the following motion was presented:

*Motion:* That the request from AAAS for Academy membership lists be denied. Seconded and *carried*.

*Youth Activities Committee*

President Henderson discussed the Science Education Fund and named Karl L. Kaufman as Assistant Chairman and Director, Youth Science Development, and Lloyd Anderson as Assistant Chairman and Director of Science Fairs.

In place of Donald R. Winslow, Chairman of Youth Activities Committee, President Henderson discussed the concept that the Academy award membership in the Academy to approximately 12 high schools whose students were winners in the Talent Search.

*Motion:* That the Academy award a one-year student membership to the winners of the Talent Search and provide a certificate of membership suitable for framing. Seconded and *passed* unanimously.

*Biological Survey Committee*

Theodore Crovello, Chairman, discussed the progress on the Computer Data Base. The computer files are updated for 1969-78.

The production of vegetation maps for the State of Indiana was discussed: approximately \$30,000 is required as a budget to print 1500 maps. Three maps could be produced, including the current use map. Ways of obtaining the required money were discussed.

*Editor's Report*

Benjamin Moulton, Editor, briefly discussed the printing of the most recent *Proceedings, Volume 89*.

*Program Committee*

Duval A. Jones, Co-Chairman, commented on preparations for the meeting at Saint Joseph's College. Discussion centered on the possibility of having two days of meetings for the Fall Program. A main item of concern was how to maintain good attendance on both days. The following trial program schedule was agreed by consensus to be tried for this year:

Two-day meeting, with Executive Meeting Thursday Evening.

## Friday:

Division Sessions for both Junior Academy and Academy presentations on Friday, with expansion into Saturday morning if necessary for overflow papers.

General Business Meeting after Luncheon on Friday.

Social Hour between 5 and 6 Friday.

Dinner at approximately 6:00, followed by Annual Banquet and Committee meetings.

## Saturday:

Division Sessions early morning 8-9:45.

Two parallel symposia to be arranged 10-noon.

Luncheon

Lecture-of-the-Year by Dr. Harry Day.

The meeting was adjourned at 5:52 p.m.

Respectfully submitted,  
John H. Meiser  
Secretary

## SPRING MEETING

### Minutes of the General Session

April 25, 1980

The meeting was called to order by President Robert E. Henderson at 7:32 p.m. at Geneva Center, Rochester, Indiana.

President Henderson introduced Father Damian V. Schmelz as Speaker of the Year. Father Schmelz presented a stimulating slide-illustrated lecture entitled "Stewardship of Natural Resources in the State of Indiana."

At 8:55 p.m. President Henderson reconvened the general business meeting. Announcements were made concerning the morning field trips and workshop.

Dr. Ernest Campaigne, Chairman, Research Grants Committee, announced that Academy grant forms were available through him.

Section chairmen were to meet at end of the meeting to discuss the Fall meeting.

Meeting adjourned at 9:07 p.m.

This meeting was followed by an interesting discussion and slide show on "Mushrooms in Indiana," presented by John C. Tacoma.

Respectfully submitted,  
John H. Meiser  
Secretary

## Indiana Academy of Science 96th ANNUAL FALL MEETING

Minutes of the Executive Committee Meeting

November 6, 1980

The meeting was called to order by Treasurer John A. Ricketts at 7:58 p.m. in Raleigh Hall Conference Room at Saint Joseph's College, Rensselaer, Indiana. The minutes of the Executive Committee and of the General Session of the Spring 1980 meeting at Geneva Center were read and approved.

### TREASURER'S REPORT

Treasurer John A. Ricketts presented the Academy financial report for the period January 1, 1980 through October 31, 1980. A brief summary follows:

	Academy Accounts	Administered Accounts	Totals
Balance, January 1, 1980 .....	\$ 4,861.86	\$13,479.32	\$18,341.18
Income .....	14,324.77	35,521.38	49,846.15
Expenditures .....	17,763.26	31,354.04	49,121.30
Balance, October 31, 1980 .....	\$ 1,423.37	\$17,646.66	19,070.03

There were 841 paid members as of October 31, 1980, including 23 sustaining members, 488 senior members, 51 student members, and 52 new members. The Treasurer's report was approved.

### ELECTED COMMITTEE REPORTS

#### *Academy Foundation Committee*

William A. Daily, Chairman, reported Foundation accounts as of September 30, 1980. A summary of that report follows:

- I. *Foundation Account*

Balance on September 30, 1979	\$ 232.00
Income as of September 30, 1980	1,829.97
Disbursements to Academy	- 300.00
Cash balance as of September 30, 1980	1,761.97
<b>Total Market Value</b>	<b>\$23,948.00</b>
  
- II. *John S. Wright Fund*

Total income 10/1/79 to 9/30/80	\$27,891.93
No disbursements	
<b>Total Market Value</b>	<b>\$595,929.80</b>
  
- III. *John S. Wright Investment Income Account*

Total interest 10/1/79 to 9/30/80	\$ 6,447.48
Disbursements from account:	
Research Grants	11,187.00
Publication of IAS <i>Proceedings</i>	11,906.63
Indiana National Bank Fee	2,636.00

The Academy portfolio of the John S. Wright Fund account, Mr. Daily noted,

has decreased in market value \$27,697 or 4.4%, due to adverse market conditions. However, the Investment Income Account has increased to \$57,000, yielding about 12%.

#### *Research Grants Committee*

Ernest Campaigne, Chairman, reported that 14 papers, representing contributions from 7 institutions, had been received for the Fall '80 competition. Of these, 2 received full funding and 9 partial funding. For the year, 31 proposals were received, with 7 receiving full funding and 19 partial funding, with an average award of \$444. The total expenditure was \$11,090.

In addition, eight small grants jointly sponsored by the Academy and AAAS were awarded to Secondary School Student applicants for a total of \$690.

Discussion concentrated on the accountability of the researchers to report their progress to the Grants Committee.

*Bonding Committee.* No report.

#### *Academy Representative to NAAS*

President Robert E. Henderson reported that he would represent the Academy at the AAAS meeting in Toronto, at which meeting he would present a paper.

#### *Youth Activities Committee*

Donald R. Winslow, Chairman, discussed the program for the ISTA workshop, "How to Make Classroom Science Exciting." He reported that the workshop was well received.

Walter A. Cory, Jr., Assistant Chairman and Director of the Indiana Science Talent Search, reported that brochures have been distributed to each high school encouraging participation in the Science Talent Search. This year again Kappa Kappa Kappa will support this work with a \$2,000 grant.

Keith Hunnings, Assistant Chairman and Co-Director of the Junior Academy of Science, reported that there are now 30 science clubs that are active. The continuing growth was related to the dedication of the teachers and the Friday meetings of the Junior Academy.

Discussion ensued concerning whether the best paper or papers from the Junior Academy could be presented before the Academy.

*Motion:* That the Outstanding Junior Academy paper be presented at the proper forum in the Senior Academy.

Seconded and passed.

Lloyd Anderson, Assistant Chairman and Director of Science Fairs, reported that under the auspices of the IAS 30,000 students participate in the Science and Engineering Fairs. Indiana is unique in its organization and support of such fairs. He also reported that 60 people, including the two student winners in each of the 12 Regional Science and Engineering Fairs, will travel to Milwaukee for the International Science and Engineering Fair. The Indiana Science Education Fund will subsidize approximately \$10,000 of the \$19,900 cost.

He also noted that the rules governing the types of research are becoming more stringent.

#### *Library Committee*

William A. Daily, reporting for Lois Burton, Chairperson, indicated that the *Proceedings*, Volumes 88 and 89, had been distributed. Copies were also sent to approximately 500 libraries, institutions, and societies on the exchange list. In addition, 43 new titles were received and 120 volumes of the library's journals were

prepared for binding. Some 269 interlibrary loan requests were also filled during the year.

#### *Publications Committee*

William R. Eberly, Chairman, reported one monograph is ready for editing. *The Centennial History of the Academy* is now in preparation by William and Fay Daily. The committee continues to seek members to prepare additional titles, especially an update of the *History of Indiana Scientists*.

#### *Science and Society Committee*

Walter A. Cory, Jr., distributed a questionnaire to establish whether a need exists to reinstitute the Speakers Bureau.

#### *Biological Survey Committee*

John A. Bacone, Indiana Department of Natural Resources, reported that work was continuing on the Federal Grant for Fish and Wildlife Study and that a paper was being presented.

#### *Membership Committee*

Walter A. Cory, Jr., reported that a new supply of brochures was available and that prospective candidates would be sent letters of invitation.

Fellows for 20 years are being issued special pink name tags as a sign of honor at this meeting.

#### *Fellows Committee*

Richard L. Conklin, Chairman, gave the committee report and moved that those named be presented to the membership for election to the rank of Fellow. Seconded and passed.

#### *Emeritus Membership*

Robert H. Cooper presented the names of Dr. L. S. McClung, Department of Biology, Indiana University (1940) and Dr. W. Max Stark, Carmel, Indiana (1948) as fulfilling the requirements of Emeritus Membership. (Initial membership year shown in parentheses.)

*Motion:* That the persons presented be elected to Emeritus Membership.  
Seconded and passed.

#### *"Speaker of the Year" Selection Committee*

John B. Patton, Chairman, announced that Harry G. Day's speech is retitled "Progress in Resolving Food Safety Problems: Systematic Evaluation of GRAS Food Substances." Patton also indicated participating colleges and universities would be offered the opportunity to have Dr. Day, our "Speaker of Year," speak at their institutions.

#### *Program Committee*

Duvall A. Jones, Co-Chairman, indicated some of the detail in the preparations for the Fall meeting.

#### *Nominations Committee*

William B. Hopp, Chairman, submitted the nominations to be presented to the general membership.

*Motion:* To accept the recommendations of the Nominations Committee.  
Seconded and passed.

#### NEW BUSINESS

Donald D. Gray, Chairman of the Engineering Section, inquired to the extent that papers submitted to the *Proceedings* were reviewed. Benjamin Moulton, Editor of the *Proceedings*, spoke of the problems of refereeing the papers.

Meeting adjourned at 10:05 p.m.

Respectfully submitted,  
John H. Mesier  
Secretary

## FALL MEETING

### *Minutes of the General Session*

November 7, 1980

The Business Session of the 96th Annual Meeting of the Academy was called to order by President Robert E. Henderson at 1:10 p.m. in Science Hall Auditorium at Saint Joseph's College, Rensselaer, Indiana.

Father Charles Banet, President of Saint Joseph's College, welcomed the Academy members on behalf of the college.

President Henderson introduced the Secretary of the Academy who summarized the committee reports and informed the membership of the official actions taken by the Executive Committee the previous evening.

The Secretary announced that because all divisional election results were not available, the list of chairmen and chairmen-elect of the divisions for 1981 would not be read but would appear in the next Newsletter and be published in the minutes of the meeting. That list follows:

#### ANTHROPOLOGY

Chairman: CHARLES P. WARREN  
Chairman-Elect: CURTIS H. TOMAK

#### BOTANY

Chairman: CHARLES T. HAMMOND  
Chairman-Elect: KATHRYN WILSON

#### CELL BIOLOGY

Chairman: KARA W. EBERLY  
Chairman-Elect: DOUGLAS W. DUFF

#### CHEMISTRY

Chairman: DONALD G. CLEMENS  
Chairman-Elect: MARGARET A. CAVANAUGH

#### ECOLOGY

Chairman: RICHARD W. GREENE  
Chairman-Elect: DAVID F. SPENCER

#### ENGINEERING

Chairman: MARK H. HOUCK  
Chairman-Elect: WARREN W. BOWDEN

#### ENTOMOLOGY

Chairman: DAVID K. REED  
Chairman-Elect: ROBERT PINGER

#### ENVIRONMENTAL QUALITY

Chairman: DAVID PETERSON  
Chairman-Elect: PATRICK J. SULLIVAN

#### GEOLOGY AND GEOGRAPHY

Chairman: HENRY H. GRAY  
Chairman-Elect: AKHTAR HUSAIN SIDDIQI

## HISTORY OF SCIENCE

Chairman: EVERETT F. MORRIS  
 Chairman-Elect: GENE KRITSKY

## MICROBIOLOGY AND MOLECULAR BIOLOGY

Chairman: DOROTHY ADALIS  
 Chairman-Elect: KENNETH BRUNSON

## PHYSICS AND ASTRONOMY

Chairman: L. DWIGHT FARRINGER  
 Chairman-Elect: ROGER ROTH

## PLANT TAXONOMY

Chairman: RICHARD J. JENSEN  
 Chairman-Elect: DON HENDRICKS

## SCIENCE EDUCATION

Chairman: CHARLES L. GEHRING  
 Chairman-Elect: PATRICIA A. ZECK

## SOIL AND ATMOSPHERIC SCIENCES

Chairman: ROBERT F. DALE  
 Chairman-Elect: JOHN T. SNOW

## ZOOLOGY

Chairman: LARRY GANION  
 Chairman-Elect: DAVID SEVER

Fay K. Daily presented the Necrologist's report, which included the names of three members:

MAX WILLIAM GARDNER  
 KARL STONE MEANS  
 HELEN E. REED

William B. Hopp, Chairman of the Nominations Committee, placed the following slate in nomination:

President ..... ROBERT E. HENDERSON 1981  
 President-Elect ..... WILLIAM R. EBERLY 1981  
 Editor ..... DONALD R. WINSLOW  
 Academy Foundations ..... WILLIAM A. DAILY  
 Bonding Committee ..... WILLIAM B. BUNGER  
 Research Grants Committee ..... UWE J. HENSEN

No nominations were made from the floor. The motion was made to accept those named by the Nominations Committee as elected. Motion was seconded and passed.

Richard L. Conklin, Chairman of the Committee on Fellows, moved that

WILLIAM B. BUNGER  
 DONALD P. FRANZMEIER  
 LAWRENCE A. SCHAAL  
 JOSEPH R. SIEFKER

be elected to the rank of Fellow of the Indiana Academy of Science. Seconded and carried. Conklin then presented certificates to the newly-elected Fellows.

Howard Youse, Chairman of the Resolutions Committee, presented the following:

## RESOLUTION:

WHEREAS: The Indiana Academy of Science is deeply grateful to Saint Joseph's College for their invitation to hold its 96th annual meeting on their campus; and

WHEREAS: Administration, faculty, and students alike have cooperated in providing us their facilities for this meeting; be it

RESOLVED: That the Academy members here assembled express their sincere appreciation to Father Charles Banet, President of Saint Joseph's College, for all the courtesies that have been extended to the Academy during this meeting. We are especially grateful to Dr. Duvall A. Jones and Dr. Andrew G. Mehall and their committee for the arrangements of the entire program and the comfort and conveniences provided the membership. We also express our sincere thanks to all members who organized and participated in the special symposia on "Coal and Indiana" and "The Evolution/Creation Controversy."

## NEW BUSINESS

Duvall A. Jones, Co-Chairman, Program Committee, announced the showing times of a film provided by Eli Lilly Company entitled "Recombinant Techniques."

Donald R. Winslow, Editor for 1981, requested that abstracts for the papers presented at the meeting be submitted as soon as possible.

Some discussion followed concerning the location of future meetings. The Fall 1981 meeting is being arranged at Wabash College, with the Spring meeting at Turkey Run State Park on April 17-18.

The meeting adjourned at 1:50 p.m. and the presentation of papers continued.

The annual banquet was held in the Halleck Student Center at 6:30 p.m. with President Henderson presiding. After the banquet President Henderson addressed the attendees on "Scientific Research and Economic Indicators."

The General Session reconvened at 8:45 a.m., November 8 with presented papers followed by symposia,

"The Dangerous Position of the Science Teacher: The Evolution/Creation Controversy" and "Coal and Indiana,"

arranged by the Committee on Science and Society, William Beranek, Jr., Chairman.

Following luncheon in the Halleck Student Center, the Lecture-of-the-Year was presented by Harry Day, Professor Emeritus of Chemistry, Indiana University. An interesting and informative time was had by all who attended.

Respectfully submitted,  
John H. Mesier  
Secretary

# FINANCIAL REPORT

January 1-December 31, 1980

## I. ACADEMY ACCOUNTS

	Income	Budgeted	Expenditures	Budgeted
Dues.....	\$ 7,724.00	\$ 7,350.00	\$ —	\$ —
Reprints.....	6,532.11	3,500.00	7,636.29	3,250.00
Interest.....	1,214.47	1,000.00	—	—
Miscellaneous.....	1,810.18	0.00	15.00	100.00
Secretary.....	—	—	536.60	500.00
Treasurer.....	—	—	308.35	400.00
General Office.....	—	—	247.20	750.00
Officer Travel.....	—	—	150.00	225.00
Membership Committee.....	—	—	100.00	250.00
Transfer Administered Accounts.....	—	—	3,350.00	3,350.00
President's Fund.....	—	—	0.00	150.00
Newsletter.....	—	—	500.00	500.00
Speaker of the Year.....	—	—	700.00	700.00
Program Committee.....	—	—	2,560.08	1,500.00
Editor's Expense.....	—	—	700.00	700.00
Youth Activities.....	—	—	30.30	50.00
Biological Survey Committee.....	—	—	1,050.00	2,250.00
AAAS Representative.....	—	—	395.00	300.00
Section Chairman Expenses.....	—	—	36.00	50.00
CPA Fees.....	—	—	700.00	750.00
Lawyer's Fees.....	—	—	0.00	100.00
	\$17,280.76	\$11,850.00	\$19,014.82	\$15,875.00

## II. ADMINISTERED ACCOUNTS

	January 1 Balance	1980 Income	1980 Expenditures	December 31 Balance
Junior Academy.....	\$ 1,454.01	\$ 300.00	\$ 0.00	\$ 1,754.01
Science Talent Search.....	303.59	2,840.00	2,345.80	797.79
Science And Society.....	2,734.91	500.00	173.42	3,061.49
Research Grants.....	- 6,447.68	11,990.00	11,880.00	- 6,337.68
Lilly Library Fund III.....	2,632.76	0.00	0.00	2,632.76
Lilly Library Fund V.....	4,513.20	0.00	13.00	4,500.20
J.S. Wright Library Fund.....	134.28	0.00	0.00	134.28
Natural Areas.....	0.00	0.00	0.00	0.00
Library Binding.....	2,247.30	1,500.00	2,264.70	1,482.60
Proceedings: Publications.....	2,400.89	12,677.63	11,845.63	3,232.89
Proceedings: Mailing.....	707.04	100.00	284.29	522.75
Publications and Sale of Monographs.....	2,299.02	571.00	0.00	2,870.02
Publications: Clerical.....	500.00	0.00	500.00	0.00
Dept. of Interior Grant.....	0.00	10,226.75	9,822.11	404.64
14-16-0003-79-133				
	\$13,479.32	\$40,705.38	\$39,128.95	\$15,055.75

## III. SUMMARY

	Academy Accounts	Administered Accounts	Total
Balance 1/1/80.....	\$ 4,861.86	\$13,479.32	\$18,341.18
Income.....	17,280.76	40,705.38	57,986.14
Expenditures.....	19,014.82	39,128.95	58,143.77
Balance 12/31/80.....	3,127.80	15,055.75	18,183.55

## IV. BANK BALANCE 12/31/80

First Citizens Bank and Trust Co. (Checking Account).....	\$ 3,006.40
Savings Accounts:	
C.D.6 Mos., First Citizens.....	10,235.79
First Western Savings (matures 6/16/81).....	4,941.36
	<u>\$18,183.55</u>

## V. SUMMARY OF TRUST FUNDS

A. Foundation Account (00430-00-0)		
Income Balance (1/1/80).....	\$ 567.81	
Dividends and Interest.....		1,855.52
Disbursements for 1980:		
Research Grants.....	\$ 300.00	
Transfer.....	1,000.00	- 1,300.00
	<u>\$ 1,300.00</u>	<u>\$ 1,123.33</u>
Principal Cash 12/31/80.....		53.40
Investments Carrying Value.....		27,178.47
B. John S. Wright Fund (00430-01-9)		
Income Balance (1/1/80).....	\$ 1,530.95	
Dividends and Interest.....		28,398.92
Disbursements for 1980:		
Fees.....	\$ 2,636.00	
Transfer to (00430-02-08).....	22,513.86	
Account transfer.....	203.18	- 25,353.04
	<u>\$25,353.04</u>	<u>\$ 4,576.83</u>
Principal Cash Balance (12/31/80).....		\$ 754.03
Investments Carrying Value.....		\$320,017.47
C. Indiana Academy of Science Invested Income Account (00430-02-08)		
Income Cash Balance (1/1/80).....	\$ 810.33	
Interest.....		7,153.90
Disbursements:		
Account Transfer.....	\$ 6,463.00	- 6,463.00
		<u>\$ 1,501.23</u>
Principal Cash (1/1/80).....		0.00
Investments Value (1/1/80).....		49,000.00
Receipts for 1980:		
Investments Sold.....	\$49,000.00	
Miscellaneous.....	\$22,513.86	
	<u>\$71,513.86</u>	
Disbursements:		
Investments Purchased.....	\$53,988.60	
Academy Expenses:		
Research.....	11,090.00	
Printing <i>Proceedings</i> .....	11,096.63	
	<u>\$76,985.23</u>	
Account Transfer.....	\$ 6,463.00	
Principal Cash Balance (12/31/80).....		\$ 991.63
Investments Carrying Value.....		53,988.60

## VI. NOTES

## Membership for 1980:

- 1,002 active members (25 sustaining, 522 senior, 287 regular, 60 student, 101 emeritus)
- 69 new members
- 78 members dropped for non-payment of 1980 dues.

**Dues Structure for 1980:**

- \$ 2.00 for student memberships
- 5.00 for regular memberships and club memberships
- 10.00 for senior memberships
- 25.00 for sustaining memberships
- 2.00 additional for family memberships
- 1.00 additional for initiation or reinstatement fee.

Special memberships include: Life membership (\$300.00), Corporate memberships (150-\$500.00), Institutional memberships (\$50-\$150.00)

**Reprints:**

Reprint charges for Volumes 88 and 89 were \$7,636.29; reprint charges collected from authors amounted to \$6,532.11.

**Research Grants:**

\$11,880.00 was awarded to the following persons to support their research activities: William Bandy (Indiana U.), John Fezy (U. of Notre Dame), James Vogelmann (Indiana U.), Thomas Jones (Purdue U.), David Osgood (Butler U.), Kathleen Horwath (U. of Notre Dame), Donald French (Indiana U.), Carol Summers (Indiana U.), Mary Richeson (Purdue U.), Larry Hauser (U. of Notre Dame), Robert Rogers (Purdue U.), Joseph Tatarewicz (Indiana U.), Ernest Shull (Manchester College), Mark Loyd (Ball State U.), Betty Allamong (Ball State U.), Thad Godish (Ball State U.), Donald Hudson (Indiana U.), Steven Manchester (Indiana U.), Joanne Payton (U. of Notre Dame), Walter Pierce (Ball State U.), David Spencer (IUPUI), Patrick Sullivan (U. of Notre Dame), Clifford Teme (Purdue U.), Jerry Nisbet (Ball State U.), Frederick Woodson (Indiana State U.), Rick Meyer (East Noble High School), Dana Kincaid (Heritage Christian School), Eleanor Pollak (John Adams High School), Tom Sedgewick (East Noble High School), Tom Buether (Marquette High School) Mark Paulik (Marquette High School), Richard Bush (Marquette High School), and Paul Worthington (Marquette High School).

**Publications:**

Sales during 1980 amounted to \$571.00. The cost of publishing Volume 88 and 89 amounted to \$11,845.63 (Academy's share).

**VII. BUDGET FOR 1981**

The following budget was approved by the Budget Committee on November 29, 1980.

**Academy Accounts****Anticipated Income:**

Dues.....	\$ 7,500.00
Reprint Charges to Authors.....	4,000.00
Interest.....	1,200.00
Miscellaneous.....	0.00
	<u>\$12,700.00</u>

**Budgeted Expenditures:**

Publishing Charges for Reprints.....	\$ 3,500.00
Secretary.....	500.00
Treasurer.....	400.00
General Office.....	350.00
Officer's Travel.....	225.00
Membership.....	250.00
President's Fund.....	150.00
Newsletter.....	650.00
Speaker of the Year.....	700.00
Program Committee.....	1,700.00
Editor's Expenses.....	900.00
Youth Activities.....	250.00
Biological Survey Committee.....	2,250.00
AAAS.....	0.00
Public Relations.....	100.00
Section Chairman Expenses.....	50.00
CPA Fee.....	750.00
Lawyer's Fee.....	100.00
Miscellaneous.....	100.00
Transfer from Administered Accounts.....	(- 1,200.00)
	<u>\$11,725.00</u>

FINANCIAL REPORT

29

Administered Accounts:

Junior Academy.....	\$ 0.00
Science Talent Search.....	0.00
Science and Society.....	(- 1,000.00)
Library Binding.....	1,500.00
Proceedings: Postage.....	300.00
Proceedings: Publication.....	(- 2,000.00)
	<u>\$(- 1,200.00)</u>

Endowment Funds

Anticipated Income:

IAS Foundation.....	\$ 1,000.00
J.S. Wright Invested Income.....	30,000.00
Invested Income Carry-Over.....	57,000.00
	<u>\$88,000.00</u>

Expenditures:

Bank Fee.....	\$ 2,750.00
Reserach Grants (including \$300.00 from IAS Foundation).....	15,000.00
Publication of <i>Proceedings</i> (Academy's share).....	6,250.00
Publications: Special.....	5,000.00
	<u>\$29,000.00</u>

Restricted Accounts

Anticipated Income

Science Talent Search from Tri Kappa.....	\$ 2,500.00
Department Interior Grant 14-16-0003-79-133.....	3,500.00
	<u>\$ 6,000.00</u>

Expenditures:

Science Talent Search.....	\$ 2,500.00
Department Interior Grant 14-16-0003-79-133.....	3,500.00
	<u>\$ 6,000.00</u>

Respectfully submitted,  
John A. Ricketts, Treasurer

# INDIANA JUNIOR ACADEMY OF SCIENCE

## OFFICERS

President ..... Jamie Sibbitt, Paoli, Jr.-Sr. High School  
President Elect ..... Ernie Tseng, Highland High School  
Secretary ..... Jody Sibbitt, Paoli, Jr.-Sr. High School

## JUNIOR ACADEMY COUNCIL

Larry Bennet (Co-Chair, Polemic)	Burriss Jr. High School, Mitchell
Michael Kobe (Chair, Paper Planes)	Gavit High School, Hammond
Cheryl Mason (Co-Chair, Polemic)	Highland High School, Highland
Thomas Anderson (Chair, Junior Scientist)	Paoli Jr.-Sr. High School, Paoli
Carrol Ritter (Chair, Junior Scientist)	Paoli Jr.-Sr. High School, Paoli
Jane Tucker (Chair, Senior Papers)	Saint John the Baptist, Ft. Wayne
Leota Skirvin (Chair, Junior Papers; IJAS Co-Director)	Brown County High School, Nashville
Keith Hunnings (Chair, Science Fiction; IJAS Co-Director)	New Haven High School, New Haven
Donald Winslow (Youth Council-Director)	Indiana University, Bloomington

## PROGRAM

### FORTY-EIGHTH ANNUAL MEETING

November 7, 1980

Saint Joseph's College, Rensselaer, Indiana

8:30-11:00 AM	Registration, Halleck Student Center
9:00- 9:30 AM	Welcome by Father Charles Banet, President of Saint Joseph's College. Introduction of candidates and announcements. Ballroom, Halleck Student Center.
9:35-11:00 AM	Papers Presented, Halleck Student Center, Second Floor.
9:35-10:30 AM	Paper Planes. Ballroom, Halleck Student Center.
9:35- AM	Junior Scientist Interviews. Halleck Student Center. North Lounge.
10:15-10:55 AM	Group "A" Polemic. Ballroom, Halleck Student Center.
11:00-11:40 AM	Group "B" Polemic. Ballroom, Halleck Student Center.
12:00- 1:00 AM	Lunch. Cafeteria, Halleck Student Center.
<i>Afternoon</i>	
1:30 PM	Awards presented. Ballroom, Halleck Student Center.
2:45 PM	Adjournment.

### CANDIDATES FOR STATE OFFICE 1981-82

President Elect:	Bourdon, Michael Bryan-Marquette High School Sibbitt, Jody Lynn-Paoli Jr.-Sr. High School
Secretary:	Karr, Rick G.-Highland Sr. High School Pardus, Philip Anthony-Pierce Jr. High School

SENIOR DIVISION PAPERS  
 HALLECK STUDENT CENTER (2nd Floor)  
 LIFE SCIENCE

- 9:35- 9:45 Kelli Copeland-East Noble High School  
 "The Effects of Oligodynamics on *Staphylococcus aureus* and  
*Escherichia coli*."
- 9:50-10:00 Ernie Tseng-Highland High School  
 "Acid Phosphatase."
- 10:05-10:15 Tom Sedgwick-East Noble High School  
 "Crown Gall: A Study of Botanical Cancer and Its Control."
- 10:20-10:30 Jamie Sibbitt-Paoli Jr.-Sr. High School  
 "Cigarette Smoke Residue Quantity Comparisons: The  
 Effects on Bacterial Survival."
- 10:35-10:45 Luralynn Ustanik-Highland High School  
 "Studies on the Co-aggregation of *Streptococcus sanguis* and  
*Actinomyces naeslundii*."
- 10:50-11:00 Mark A. Paulik-Marquette High School  
 "Laetrile Cancer Research: A Complete Metabolic Program  
 Consisting of an Anti-Tumor Regimen of Laetrile, Vitamin A,  
 and Retenzyne, on Mammalian Lung Cancer."
- 11:05-11:15 Michelle Trinkle-Paoli Jr.-Sr. High School  
 "The Absorption, Distribution, and Utilization of Water and  
 Minerals by Various Herbaceous Plants Using Radioisotopes  
 as Tracers."

SENIOR DIVISION PAPERS  
 HALLECK STUDENT CENTER (2nd Floor)  
 PHYSICAL SCIENCE

- 9:35- 9:45 Michael A. Warot-Gavit Jr.-Sr. High School  
 "The Use of Pulse Width Modulation for Stereo Data Trans-  
 mission."
- 9:50-10:00 Thomas Beutner-Marquette High School  
 "Wind Tunnel Design and Remote Piloted Testing of Multi-  
 Bladed Rotor System, Experimental Airfoils, and Wing-  
 lets as High Performance Devices on Rotary and Stationary  
 Wing Aircraft."
- 11:50-12:05 Douglas Ayers-Brown County High School  
 "Laser and Reflection."
- 10:20-10:30 Dan Gehring-New Haven High School  
 "Translation of German to English via Computer."

INTERVIEWS FOR OUTSTANDING JUNIOR SCIENTIST  
 SENIOR DIVISION

North Lounge H.S.C. (1st Floor)

- 9:35- 9:50 Ernie Tseng-Highland High School  
 9:55-10:10 Jamie Sibbitt-Paoli Jr.-Sr. High School  
 10:15-10:30 Thomas Beutner-Marquette High School

## JUNIOR DIVISION PAPERS

## HALLECK STUDENT CENTER (2nd Floor)

- 9:35- 9:45 Ali Raheem-Marquette (Junior High) School  
"Lung Cancer."
- 9:50-10:00 Rick G. Karr-Highland Senior High School  
"Acid Rain, Its Effects on a Small Pond Ecosystem."
- 10:05-10:15 Chris Lauer-St. John The Baptist  
"Logic Fun in Math."
- 10:20-10:30 Brad Shrader-Pierce Junior High School  
"Pacemakers."
- 10:35-10:45 Lauri Spindler-The Canterbury School  
"Chemical Differences in the Water of the Fort Wayne Metropolitan Areas as a Function of pH Conductivity, Chloride, Hardness and Alkalinity."
- 10:50-11:00 James Barsic-Marquette Jr. High School  
"The Design, Comparison, and Construction of Two Basic Types of Cloud Chambers-Phase I."
- 11:05-11:15 Amy Knight-St. John The Baptist  
"The Formation of Taste."
- 11:20-11:30 John Terrill-The Canterbury School  
"An Inductive Analysis of the Possibility of Acid Rain in the Fort Wayne Metropolitan Area."
- 11:35-11:45 Philip Pardus-Pierce Jr. High School  
"Interferon: Wonder Drug of Modern Medicine."

## INTERVIEWS FOR OUTSTANDING JUNIOR SCIENTIST

## JUNIOR DIVISION

## North Lounge H.S.C. (1st Floor)

- 10:35-10:45 Rick Karr-Highland Senior High School
- 10:50-11:00 Ali Raheem-Marquette Junior High School

## SCIENCE FICTION STORIES

## SENIOR DIVISION

- Richard A. Dahm-Bishop Luers High School  
"You Can't Keep a Good Man Down"
- Tammy Minor-Brown County High School  
"Double Jeopardy"
- Adam Adams-Gavit Jr.-Sr. High School  
"Challenge of the Headless Baseball Team"
- Barry Driver-Gavit Jr.-Sr. High School  
"The Battle of Armageddon"
- Kim Earman-Highland High School  
"Earth to Earth . . . Dust to Dust"
- Kelly Hanson-Highland High School  
"The Final Generation"
- Beth England-Marquette High School  
"Existing In Time"
- J. Genschoreck-Marquette High School  
". . . An In This Corner. . ."

## JUNIOR DIVISION

- Lisa Hill-St. John the Baptist Catholic School  
"Just One Boy"
- Ryan Hill-St. John the Baptist Catholic School  
"Gamma World"
- Joff Giltz-Pierce Junior High School  
"The Flammable Object"
- Paul Tomak-Pierce Junior High School  
"The Desert Devil"
- James Barsic-Marquette High School  
"The Scattering"
- Amer Marsh-Marquette High School  
"A Mouse's Dream Come True"
- Joseph Pawlowski-Highland High School  
"Fatal Mission"

## ACKNOWLEDGEMENT

The officers, members of the Junior Academy Council and all others concerned with the program, wish to thank Dr. Duvall A. Jones and Dr. Andrew G. Mehall of the Saint Joseph's College Biology Department for arranging the fine tours and meeting facilities for our convention. We also want to make special mention of the time and effort they gave so generously, thereby making our meeting such a success.

## Biological Survey Committee Report

### NEW LITERATURE AND WORKS IN PROGRESS ABOUT THE BIOTA OF INDIANA

1980 Annual Report Of The Biological Survey Committee (BSC)  
Of The Indiana Academy Of Science

#### BSC Members For 1980:

THEODORE J. CROVELLO, Chairman, Department of Biology, University of  
Notre Dame, Notre Dame, Indiana 46556, Phone: (219) 283-7496. SUVON:  
Your access code plus 736 + 7496  
JOHN A. BACONE, Indiana Department of Natural Resources  
WILLIAM CRANKSHAW, Ball State University  
JAMES R. GAMMON, DePauw University  
JACK R. MUNSEE, Indiana State University, Terre Haute  
GEORGE R. PARKER, Purdue University, Lafayette  
VICTOR RIEMENSCHNEIDER, Indiana University at South Bend  
JOHN WHITAKER, JR., Indiana State University, Terre Haute  
HARMON P. WEEKS, Purdue University, Lafayette  
FRANK N. YOUNG, JR., Indiana University, Bloomington

The goal of the Literature Subcommittee of the Academy's Biological Survey Committee is to accumulate and maintain published and unpublished references on the biota of the State. While in the past the BSC Literature Project has presented its findings in conventional printed form, in addition we now simultaneously add these contributions to the Indiana Academy's computerized literature and works in progress register. It provides update, integrated bibliographies on particular topics in response to specific requests. Contact Professor Crovello for further details or to submit literature or project information to the data bank. The data bank contains more information about each reference than is presented in this printed summary. Items omitted here include: Higher taxa (common names) to which organisms belong; Classes or orders of organisms; Families; Genera or species; Subjects describing each work; and name, address and telephone number of person to contact for further information on each entry.

The following literature references and works in progress were obtained by circulating requests and questionnaires to chairpersons of 69 Life Science departments throughout the State, and to participants at the Academy's Fall Meeting. The Committee welcomes suggestions on ways to increase the number of contributions to this annual survey, and to increase awareness of its customized computer search capabilities.

Each literature reference or work in progress given below may contain the following, separated by semicolons: author(s); date; title; citation; and Indiana counties in which the work was performed. If any of these are absent, the contributor did not provide it. Counties are abbreviated by using their first five letters. The exception is Saint Joseph, which is abbreviated StJoe.

An "ALL" in the county field indicates that the work applies to all 92 Indiana counties. A "MANY" indicates the work applies to many counties. In both cases up to five of the most important counties also may be included.

Each citation begins with a letter which has one of the following meanings:

- P : Formal Publication (PIAS refers to Proceedings, Indiana Academy of Science)
- I : In Press in a formal publication
- T : Thesis
- O : Other (semi) published work, e.g. park checklists, maps.
- E : Environmental Impact Statements
- W : Work in Progress

- BENNETT, G. W. and E. S. RUNSTROM; 1980; Efficacy of fenthion, sodium bicarbonate, microencapsulated diazinon, and carbaryl against German cockroaches in urban housing; I: Journal of Economic Entomology; Mario.
- BERNHARD, K. M. and G. W. BENNETT; 1980; Ultra-low volume applications of synergized Pyrethrins for stored products pest control; I: J. Econ. Entomol.
- BROWN, K. M. and A. KONOPKA; 1980; Interactions of phytoplankton and zooplankton in Crooked Lake; W: Dept of Interior grant; Noble Whitl.
- BROWN, K. M.; 1980; Life history variation and competition in pond snails; W: NSF Grant; Allen Noble Whitl.
- DAVIES, W.; 1980; Seasonal variation and productivity of phytoplankton (interstitial algae) of an artificial sandy beach; W: Purdue University; Whitl Noble.
- DEYRUP, M.; 1980; Annotated list of Indiana Scolytidae; I: Great Lakes Entomologist; Tippe Porte Clark Warre.
- DINEEN, C. F.; 1979; Plankton and benthos of Spicer Lake; I: PIAS 89: 173-179; StJoe.
- DINEEN, C.F.; 1980; Fishes of Spices Lake; I: PIAS 90; StJoe.
- FERRIS, V. R., C. G. GOSECO, and J. M. FERRIS; 1980; Revisions of *Oxydirus* and *Tarjanus* n. gen. in Oxydiridae, Belondiroidea (Nematoda; Dorylaimida); and *Oxydiroides* in Prodorylaimidae, Dorylaimoidea; P: Purdue University Research Bull. 965:29 pp.; Riple.
- GOODMAN, J. D.; 1980; CEPEDIETTA KAY, 1942 in the northern Ringneck Snake in Indiana; I: PIAS 90; Montg.
- HADDOCK, J. D.; 1980; Biological control of mealybugs by *Cryptolaemus* sp. and other coccinellid predators; W: Purdue University-Fort Wayne; Allen.
- HART, J. W. and R. D. WALTZ; 1980; The Collembola of Indiana; ALL.
- HENDRICKS, D. R.; 1976; Checklist of woody plants native to the Whitewater Valley drainage Basin of Indiana and Ohio; O: Hayes Regional Arboretum, 22 pgs.; White Valle Wayne Fayet Frank Dearb. (10 counties)
- HENDRICKS, E. G.; 1977; Phenology of wildflowers at Hayes Regional Arboretum; O: Hayes Regional Arboretum, 48 pgs.; Wayne.
- HENDRICKS, D.R.; 1979; Tree S.A.V.E.R. (computer analysis of native tree species for homeowner planting); O: Hayes Regional Arboretum, 2 pgs; White Valle Wayne Fayet Frank Dearb. (10 counties)
- HENDRICKS, D. R. and HENDRICKS, E. G.; 1980; Flora of the Whitewater Valley Drainage Basin of Indiana & Ohio; W: Hayes Regional Arboretum; White Valle Wayne Fayet Frank Dearb.
- IVERSON, J. B.; 1980; Demography of the Painted Turtle, *Chrysemys picta*; W: Kosci.
- KOZEL, T. R.; G. W. WEDDLE, K. WELBORN; 1980; A fish faunal survey of Posey County, Indiana; I: PIAS; Posey.

- KRUGER, R. M. and R. R. PINGER; Larval Study of mosquitoes of Delaware county; W: Ball State; Delaw.
- LAWSON, H. R. and L. CHANDLER; 1980; Neuroptera of Indiana: Checklist and key to the adults; I: In Press; ALL; Tippe Porte Lawre Warre.
- LULLA, K.; 1980; Detection of biomass changes in forest covers of Indiana using Landsat MSS data; P: Program Abstracts, 1980 ESA Meeting; Vigo.
- MACDONALD, J. F.; 1980; Biology, recognition, medical importance and control of Indiana social wasps; P: Cooperative Extension Survey Bulletin E-91:23 pp; ALL.
- MACDONALD, J. F., R. D. AKRE; 1980; The German yellowjacket (*Vespula germanica*) problem in the United States (Hymenoptera; Vespidae); I: Entom. Soc. Amer., Bulletin 26 (4); Tippe.
- MARENCHIN, G., and D. M. SEVER; 1981 Survey of the fishes of the St. Joseph River drainage in St. Joseph and Elkhart Counties, Indiana; I: PIAS 90; StJoe Elkha.
- MAXWELL, R. H.; 1980; Indiana plant distribution records, Clark County; P: PIAS 89:355; Clark.
- MAXWELL, R. H.; 1980; Indiana plant distribution records; I: PIAS; Clark Floyd Harri Jeffe.
- MAXWELL, R. H.; 1981; Checklist of vascular plants of the Indiana Army Ammunition Plant, Clark County; W: Contribution of the Indiana University Southeast Herbarium; Clark.
- MCCAFFERTY, W. P.; 1979; Swarm-feeding by the damselfly *Hetaerina americana* (Odonata; Calopterygidae) on mayfly hatches; P: Aquatic Insects 1: 149-151; Marti.
- MCCAFFERTY, W. P. and M. C. MINNO; 1979; The aquatic and semiaquatic Lepidoptera of Indiana and adjacent areas; P: Great Lakes Entomologist 12: 179-187; Lake. Dekal Tippe Posey Porte.
- MEYER, R. W.; 1980; Insects and other arthropods of economic importance in Indiana during 1979; P: PIAS 89: 210-214; Harri Porte Warre Jacks.
- MILLER, D. E.; 1980; Biology of a population of *Ambystoma tremblayi*; W: Ball State University—Dr. James C. List, Dept. of Biology; Delaw.
- MOULD, E. D.; 1981; Nutritional status of Indiana squirrels; W: St. Mary's College, Eric Mould; StJoe Elkha LaPor.
- PARMAN, V. and M. C. WILSON; 1980; Interaction between the meadow spittlebug (*Philaenus spumarius* (Homoptera: Cercopidae) and alfalfa (*Medicago sativa*); Warre.
- RICHESON M. L., L. HERRMAN; 1980; Etiology of wilt in *Helianthus annuus*; W: Indiana University—Purdue University at Fort Wayne Biology Department; Allen.
- RIEMENSCHNEIDER, V.; 1980; Vascular plants of Sand Hill Nature Preserve, Pulaski County, Indiana; I: PIAS; Pulas.
- RIEMENSCHNEIDER, V.; 1980; Vascular plants of Barker Woods Nature Preserve, Laporte County, Indiana; W: Indiana University at South Bend; Lapor.
- RUNSTROM, E. S., G. W. BENNETT, S. EHRICH, V. L. ANDERSON; 1980; Use of statistics in the comparative analysis of urban pesticide efficacy evaluations; I: J. Econ. Entomol.; Mario.

- SHELTON, M. D. and C. R. EDWARDS; 1980; Effects of weeds on the diversity and abundance of insects in soybeans; I: Environmental Entomology; Lawre.
- SOSA, O. JR.; 1980; Biotypes J and L of the Hessian fly discovered in an Indiana wheat field; I: Journal of Economic Entomology; Rando.
- SPARLING, D. W.; 1980; Behavioral significance of plumage variability in wintering House Sparrows; W: Ball State University; Black. Delaw.
- SQUIERS, E.; 1980; The effects of the season of fallowing on the development of first and second year old fields; W: E.R. Squiers, Taylor University; Grant.
- TORKE, B.; 1980; Distribution of meiobenthic fauna in southern Lake Michigan; W: Biology Department, Ball State University;
- WALKER, G. L. and R. E. WILLIAMS; 1980; A unique fly problem in an industrial bio-filter system; I: Journal of the Water Pollution Control; Tippe.
- WALTZ, R. D.; 1980; The Caddisflies (Trichoptera) of Indiana; T: Purdue University, Dr. W. P. McCafferty, Purdue University; ALL.
- WHITMAN, R.; 1980; Evaluation of Salt Creek (Indiana) for supporting and spawning Coho Salmon; W: Indiana University Northwest, Biology Department; Porte.
- WILLIAMS, R. E. and J. G. BERRY; 1980; CGA 72662 as a topical spray and feed additive for controlling houseflies breeding in chicken manure; I: Poultry Science; Carro. Tippe.
- WILLIAMS, R. E. and J. G. BERRY; 1980; Control of northern fowl mite with permethrin and fenvalerate, two synthetic pyrethroid compounds; I: Poultry Science; Tippe.
- WILLIAMS, R. E., T. L. MCCAIN, and A. TAKLAHAIMANOT; 1980; Survey of pesticide usage by livestock producers in Indiana; O: Research Bulletin; ALL.
- WILLIAMS, R. E., E. J. WESTBY, K. S. HENDRIX, and R. P. LAMENAGER; 1980; Use of insecticide-impregnated ear tags for control of face flies and horn flies on pastured cattle; I: Journal of Animal Science; Duboi Grant.
- WILLIAMS, R. E. and E. J. WESTLY; 1980; The use of synthetic pyrethroids impregnated in cattle ear tags for control of face flies and hornflifes; I: Journal of Economic Entomology; Warre.
- WILLIAMS, G. E. and R. E. WILLIAMS; 1980; Survey of cattle grub populations in native Indiana cattle (Diptera: Oestridae); Publication; Lagra Porte. Washi Vande.
- WILLIAMS, W. T.; 1980; Environmental stress to forests & agroecosystems; I: Phytopathology; ALL.

## Necrology

### Fay Kenoyer Daily, Butler University

MAX WILLIAM GARDNER

Lansing, Michigan  
May 11, 1890

Berkeley, California  
October 31, 1979

Dr. Max W. Gardner died of a heart attack in Berkeley, California, October 31, 1979. He was a botanist and Emeritus Professor of Plant Pathology at the University of California at Berkeley.

He was interested in nature and Indian artifacts from early life, and studied wildlife around Lansing, Michigan, where he was born May 11, 1890. He kept an extensive diary relating his field studies; it was recently typed and preserved by his grandson, William Gardner Schottstaedt. The diary covers 1904 to 1911. He was particularly interested in birds and learned to identify them by song, flight patterns and behavior in addition to morphology.

His early education was obtained in North Lansing schools. A B.S. degree in 1912 and D.Sc. in 1950 were obtained at Michigan State University, and a M.S. degree in 1915 and Ph.D. in 1918 were bestowed by the University of Wisconsin. It was his service on the Pennsylvania Chestnut Blight Commission in Philadelphia that led F. D. Heald, with whom he worked, to encourage him to do graduate work with L. R. Jones at the University of Wisconsin.

Dr. Gardner's first academic position was held at the University of Michigan, Ann Arbor, from 1917 to 1918. He was then Assistant Pathologist for the Bureau of Plant Industry, U. S. Department of Agriculture 1918 to 1919. In 1919, Dr. Gardner moved to Indiana. He was Botanist in the Experiment Station of Purdue University from 1919 to 1929 and was Chief of Botany from 1929 to 1932. While there, he initiated a graduate studies program. In 1932, Dr. Gardner moved to California. He became Professor of Plant Pathology and Plant Pathologist at the Experiment Station on the University of California, Berkeley and Davis. The major course given by him there was on diseases of truck crops. He became Emeritus Professor in 1957. After retirement, he continued building the reprint collection in the U. C. Plant Pathology Library, and collecting powdery mildews, many not previously described in the United States of America.

About 180 publications were authored or co-authored by Dr. Gardner covering various plant diseases and lightning injury to plants. He was associated in research with J. B. Kendrick, F. D. Heald, R. D. Studhalter, L. R. Jones, W. W. Gilbert, G. K. K. Link, H. S. Jackson, H. D. Brown, L. Greene, C. E. Baker, F. P. Cullinan, P. H. Brewer, H. R. Kraybill, L. C. Cochran, C. L. Burkholder, R. W. Sampson, H. E. White, E. B. Mains, J. J. Davis, C. M. Tompkins, O. C. Whipple, C. M. Tucker, B. L. Richards, P. A. Ark, H. R. Thomas, J. T. Middleton, C. E. Yarwood, A. E. Michelbacher, Ray F. Smith, P. G. Smith, E. B. Babcock, R. E. Smith, E. E. Wilson, R. D. Raabe, H. Kern, P. D. Caldis, T. Duafala, C. J. Krass, and W. N. Takahashi. Some of these were also Indiana Academy of Science members.

Dr. Gardner joined the Indiana Academy of Science the year he came to Purdue in 1919, and he was honored as Fellow in 1923. He gave a series of papers before the Academy at fall meetings from 1919 to 1924. He also co-authored a paper with J. B. Kendrick on a simple way to determine the thermal death point. He served on the Indiana Academy of Science Publications Committee from 1924 to 1929 and the Anniversary Publicity Committee from 1931 to 1932.

Dr. Gardner was active in other groups, too. He was on a committee in the Division of Biology and Agriculture of the National Research Council. He was also a life member of the American Phytopathological Society (v. pres. 1930, pres. 1931, journal editor 1959 to 1964). He was a member of: Botanical Society of America, American Society of Naturalists, American Association for the Advancement of Science, the Michigan Academy of Science, Gamma Alpha, and Sigma Xi.

He and his wife, Margaret Briggs Gardner, have two children in the scientific profession: Mary Frances Schottstaedt, M. D., Associate Professor of Psychiatry, University of Texas Medical Branch at Galveston; and Murray Briggs Gardner, M. D. Professor of Pathology, University of Southern California School of Medicine. There are eight grandchildren.

Dr. Gardner is listed in *Indiana Scientists* and *American Men of Science*. A very fine article about Dr. Gardner was written by C. E. Yarwood (*Phytopathology* 70(2): 79. 1980.), one of Dr. Gardner's first graduate students and close associate for 50 years. Dr. Gardner was a kind, considerate man and in Dr. Yarwood's words: "graciously shared his knowledge and inspired in his friends and family a love and respect for nature."

## KARL S(TONE) MEANS

Morristown, Indiana  
January 2, 1892

Indianapolis, Indiana  
July 18, 1980

Dr. Karl S. Means was born in the small community of Morristown, Indiana, January 2, 1892.

His college education began at Butler University where he received an A.B. degree in 1914. He then went to Indiana University for a M.A. degree in 1915 and received a Ph.D. degree in organic chemistry at Chicago University in 1924.

Dr. Means first taught chemistry at Kokomo High School in 1916. Then he was at Butler University from 1917 to 1920; Chicago University 1920 to 1922; Michigan College of Mines from 1922 to 1926; Milligan College in Tennessee from 1926 to 1928; and, back to Butler University from 1928 to 1957. He became full professor in chemistry in 1939. Dr. Means became Emeritus Professor at retirement.

The chief research interests of Dr. Means were concerned with the electro deposition of antimony (Master's thesis) and the saponification of ethyl formate (Ph.D. thesis). At Butler, he was on the Men's Council, Student Affairs Committee, special adviser for the Liberal Arts College, Pharmacy Adviser, adviser for the Butler University Independent Association (student society) and adviser for Alpha Chi Omega. He gave significant service in his church also, as chairman of the Board of Elders, Chairman of the Education Committee, member of the Board of Directors, as well as the Marion County Association of Christian Schools.

Dr. Means joined the Indiana Academy of Science in 1928 and became a Fellow in 1940. He was an Emeritus Member at death. He gave a paper at the fall meeting of the Academy in 1940 on the relation of valence and nomenclature to formulas for negative ions of ternary inorganic compounds. He was Division Chairman of the Chemistry Division that year. From 1942 to 1951, he was on the Auditing Committee and served as Chairman from 1947 to 1951 when he was also on the Executive Committee. He served on the Program Committee in 1944.

Dr. Means belonged to several other societies: the American Chemical Society, Alpha Chi Sigma, and Indiana Chemical Society, and was honored by election to Phi Kappa Phi and Sigma Xi.

Dr. Means died July 18, 1980, at Indianapolis, Indiana, at 88 years of age. He had served long and well as teacher and counselor at Butler University and in the many duties of his religious and civic activities. He was a quiet, kind and dependable man.

INDIANA ACADEMY OF SCIENCE  
NEW MEMBERS — 1980

- ADAMS, DR. PRESTON, Dept. of Botany & Bacteriology, DePauw University, Greencastle, IN 46135
- ALDRICH, MR. JAMES R., 612 State Office Bldg., Indianapolis, IN 46204
- ALEXANDER, MR. LEE H., 208 E. 6th St., Muncie, IN 47302
- ARNOLD, DR. GERALD B., Dept. of Physics, Univ. of Notre Dame, Notre Dame, IN 46556
- BARTMESS, DR. JOHN E., Dept. of Chemistry, Indiana University, Bloomington, IN 47405
- BEELE, MISS CYNTHIA L., 4356 Buchanan St., Gary, IN 46408
- BLACK, MS. CHARLENE, 2001 Roosevelt St., Gary, IN 46404
- BOWDEN, DR. WARREN W., 5500 Wabash Ave., Rose-Hulman Inst. of Technology, Terre Haute, IN 47803
- BRAUN, MR. EDWARD R., Tri-Lakes Fisheries Station, R.R. 4, Columbia City, IN 46725
- BRAY, DR. MALCOLM D., R.R. 1, Box 710, Noblesville, IN 46060
- BRIGHT, MR. GREG R., Ind. State Board of Health, 1330 W. Michigan, Indianapolis, IN 46206
- BRUNSON, DR. KENNETH W., 3400 Broadway, Ind. Univ. School of Medicine, Gary, IN 46408
- BURROWS, MR. STEPHEN D., 401 Sherwood Forest, Galveston, IN 46932
- BUSH, DR. KENNETH H., 1130 N. Salisbury St., W. Lafayette, IN 47906
- BUTLER, DR. FRANK, Dean, IU East, Richmond, IN 47374
- CANTRELL, MR. BUDDY, Dept. of Biology, Univ. of Notre Dame, Notre Dame, IN 46556
- CARPENTER, DR. STEPHEN R., Dept. of Biology, Univ. of Notre Dame, Notre Dame, IN 46556
- CHESAK, DR. DAVID D., 420 S. Weston St., Rensselaer, IN 47978
- CLEMENS, DR. DONALD G., Dept. of Chemistry, Goshen College, Goshen, IN 46526
- COUTS, MR. PAUL J., 715 N. Earl Ave., Lafayette, IN 47904
- DATTA, MR. BITHIN, 745 Grad. Housing East, W. Lafayette, IN 47906
- DILLING, DR. RICHARD A., Grace College, Winona Lake, IN 46590
- DUNN, MRS. VIVIE E., Ind. State Board of Health, 215 Monroe, Newburgh, IN 47630
- ELLIS, MR. MARK G., P.O. Box 74, Albany, IN 47320
- FARSTER, MS. JILL ANN, 324 W. 41st Ave., Gary, IN 46408
- FERSON, MR. SCOTT DAVID, Dept. of Ecology & Evolution, SUNY at Stony Brook, Stony Brook, NY 11794
- FOGLE, DR. THOMAS, Dept. of Biology, St. Mary's College, Notre Dame, IN 46556
- FRANKOWSKI, MS. SHERYL, 4870 Jefferson St., Gary, IN 46408
- FRANZ, DR. FRANK A., Bryan Hall 109, Indiana University, Bloomington, IN 47405
- GARNER, MR. JOHN, Cloverdale High School, Cloverdale, IN 46120
- GILLESPIE, MISS SHARON L., 6818 Maryland Ave., Hammond, IN 46323
- GREEN, DR. JOHN G., Box 35, Huntington College, Huntington, IN 46750
- GREENGOLD, MR. GERALD, Dept. of Geosciences, Purdue University, W. Lafayette, IN 47906

- GREENLEE, MS. JUDITH, Dept. of Biology, Univ. of Notre Dame, Notre Dame, IN 46556
- GRIMSTAD, DR. PAUL R., Dept. of Biology, Univ. of Notre Dame, Notre Dame, IN 46556
- GULINO, MS. TERRI, 750 West Hampton Dr., Indianapolis, IN 46208
- HAILER, MR. JOSEPH G., 611 N. Walnut Grove, Bloomington, IN 47405
- HALL, MR. BRADLEY K., 509 Travers Circle, Apt. D, Mishawaka, IN 46544
- HAMRICK, MRS. LINDA, Canterbury School, 5601 Covington, Rd., Ft. Wayne, IN 46819
- HASENMUELLER, MR. WALTER A., Ind. Geological Survey, 611 N. Walnut Grove, Bloomington, IN 47405
- HAUGHS, MR. R. DOUGLAS, 6900 Bloomfield Dr. E., Indianapolis, IN 46259
- HAWKINS, DR. M. JEANNE, 636 Linwood #218, Buffalo, NY 14209
- HAWTHORNE, DR. ROBERT M., JR., Purdue University-North Central Campus, Westville, IN 46391
- HEDGE, MR. CLOYCE L., 612 State Office Bldg., Indianapolis, IN 46204
- HERRMAN, DR. LARRY, Dept. of Biology, IU-PU at Ft. Wayne, Ft. Wayne, IN 46805
- HIVELY, DR. RAY M., Dept. of Physics, Earlham College, Richmond, IN 47374
- HOFFMAN, MRS. SARAH, R.R. 3, Box 41, Rochester, IN 46975
- HOLDIMAN, MS. JEANNINE, 750 W. Hampton Dr., Indianapolis, IN 46208
- HOLLAND, DR. JAMES PHILIP, 4125 South Gran Haven Dr., Bloomington, IN 47401
- HOSEK, MR. HENRY, JR., Purdue University-Calumet Campus, Hammond, IN 46323
- HOWES, DR. RUTH, Dept. of Physics & Astronomy, Ball State University, Muncie, IN 47306
- HUDSON, MR. W. DONALD, JR., 115 S. Bryan St., Bloomington, IN 47401
- HUFFMAN, DR. JOHN C., Molecular Structure Center, Indiana University, Bloomington, IN 47405
- JOHNSTON, DAVID K., Dept. of Geology, Ball State University, Muncie, IN 47306
- JONES, DR. BARRY NELSON, Roche Inst. of Molecular Biology, Nutley, NJ 07110
- KAELLNER, MR. JEFF W., Elliott Hall, Ball State University, Muncie, IN 47306
- KENDRA, MR. ALBERT, Dept. of Biology, Ball State University, Muncie, IN 47306
- KIRKPATRICK, DR. RALPH, Dept. of Biology, Ball State University, Muncie, IN 47306
- KOWALSKI, MR. MICHAEL P., Dept. of Biology, Indiana University, Bloomington, IN 47405
- KYKER, DR. G. C., JR., Dept. of Physics, Rose-Hulman Inst. of Technology, Terre Haute, IN 47803
- LINDMARK, DR. ALAN F., 3503 Coventry Circle, Valparaiso, IN 46383
- LITTON, DR. JAMES R., JR., Dept. of Biology, St. Mary's College, Notre Dame, IN 46556
- LONGENECKER, MR. NEVIN, 1510 Renfrew Dr., South Bend, IN 46614
- LOVELL, DR. C. W., School of Civil Engineering, Purdue University, W. Lafayette, IN 47906
- LOYD, MR. K. MARK, Dept. of Natural Resources, Ball State University, Muncie, IN 47306

- LYON, DR. ED, Dept. of Geography/Geology, Ball State University, Muncie, IN 47306
- MCCLAIN, MR. WILLIAM F., Illinois Dept. of Conservation, 605 Stratton Building, Springfield, IL 62706
- MCDONALD, MR. ERIC, 514½ West High St., Elkhart, IN 46514
- MCKINNEY, DR. PAUL C., Wabash College, Crawfordsville, IN 47933
- MCNITT, MR. TIMOTHY J., 2803 Parnell Ave., Ft. Wayne, IN 46805
- MCTAGUE, MR. MICHAEL, 818 W. Riverside Ave., Apt. E4, Muncie, IN 47303
- MAGENHEIMER, MS. CINDY, 750 West Hampton, Indianapolis, IN 46208
- MALLETT, DR. GORDON E., Eli Lilly & Co., 307 E. McCarty St., Indianapolis, IN 46285
- MARTIN, MR. PATRICK P., R.R. 16, Box 393, Brazil, IN 47834
- MATNEY, MS. ELIZABETH ANN, 406 Western Dr., Bloomington, IN 47401
- MAYES, DR. RICHARD ALAN, Dept. of Botany & Bacteriology, DePauw University, Greencastle, IN 46135
- MIDKIFF, MS. KAREN R., 2103 W. Washington, #4, Muncie, IN 47303
- MILLER, MRS. KIMBERLY, 1600½ West Jackson St., Muncie, IN 47303
- MITCHELL, DR. GEORGE R., Purdue University-Calumet Campus, Hammond, IN 46323
- MOSHER, MR. DAN, 5707 River Rd., Muncie, IN 47304
- MOULD, DR. ERIC, Dept. of Biology, St. Mary's College, Notre Dame, IN 46556
- NICKELL, MR. ALLAN K., U. S. Soil Conservation Service, 1417 Bear St., Madison, IN 47250
- O'LOUGHLIN, DR. CAROL L., 1201 East 38th St., Indianapolis, IN 46205
- ORR, MR. JOHN W., Ind. State Board of Health, 1330 W. Michigan St., Indianapolis, IN 46206
- ORTMAN, DR. ELDON, 3615 Capilano, W. Lafayette, IN 47907
- PROVOST, DR. PAUL-JEAN, Dept. of Anthropology, IU-PU at Ft. Wayne, Ft. Wayne, IN 46805
- RADCLIFFE, MR. MICHAEL J., Redbud Hill, Apt. 603, Bloomington, IN 47401
- RAUBENHEIMER, MISS KIM J., 3535 West 14th St., Indianapolis, IN 46222
- REED, DR. DAVID K., USDA-SEA-AR, P.O. Box 944, Vincennes, IN 47591
- ROSEN, DR. S. P., Dept. of Physics, Purdue University, W. Lafayette, IN 47906
- RUMBAUGH, MAX E., JR., 1125 Brookside Ave., P.O. Box 80-B, Indianapolis, IN 46206
- SCHROEDER, DR. DOLORES M., 3518 Tudor Lane, Bloomington, IN 47401
- SCHWARZWALDER, MR. ROBERT, JR., Dept. of Biology, Indiana University, Bloomington, IN 47405
- SHAFFER, MR. NELSON R., 611 N. Walnut Grove, Indiana Geological Survey, Bloomington, IN 47405
- SHIPMAN, MR. STUART T., R.R. 4, Columbia City, IN 46725
- SIMINSKI, MISS CYNTHIA, 6643 Maryland Ave., Hammond, IN 46323
- SINCLAIR, MR. H. RAYMOND, JR., 410 Montrose Court, Indianapolis, IN 46234
- SOSA, DR. LYNN R., Dept. of Chemistry, Ball State University, Muncie, IN 47306
- SPEECE, DR. SUSAN P., Decker Hall, Anderson College, Anderson, IN 46011

- STABLER, DR. TIMOTHY A., Dept. of Biology, IU Northwest, Gary, IN 46408  
STEWART, MR. MICHAEL JAMES, 2010 South 6th, Terre Haute, IN 47802  
STEWART, WILLIAM AND KATHY, 1709 East Madison, South Bend, IN 46617  
SWEENEY, MR. VERNON D., 702 West 7th, Bloomington, IN 47401  
TAYLOR, DR. JAMES I., Box G, Univ. of Notre Dame, Notre Dame, IN 46556  
THOMAS, DR. GERALD P., Dept. of Physics, Ball State University, Muncie, IN 47306  
TROXEL, MS. KAREN S., 1122 South 21st St., Lafayette, IN 47905  
VANDENBERGE, DR. JAMES C., 10030 Fifth St., Highland, IN 46322  
VAUGHAN, MR. MARTIN A., Dept. of Life Sciences, Indiana State University, Terre Haute, IN 47809  
VAUGHN, MR. DANNY M., 812 North 7th St., Apt. B, Terre Haute, IN 47809  
VOGELMANN, MR. JAMES, Dept. of Biology, Indiana University, Bloomington, IN 47405  
VYAS, MR. DILIP V., 215 North College Ave., Muncie, IN 47306  
WAGNER, MS. WENDY, ADPI House, Hanover College, Hanover, IN 47243  
WALLACE, MR. HOWARD A., P.O. Box 653, South Bend, IN 46624  
WEAVER, DR. CONNIE, Dept. of Foods & Nutrition, Purdue University, W. Lafayette, IN 47906  
WENSTRUP, MR. JEFFREY, 256C Myers Hall, Indiana University, Bloomington, IN 47405  
WESONGA, MR. SAM, 520 North Grant, #9, Bloomington, IN 47401  
WRIGHT, MR. JOE, Div. of Curriculum, Rm. 229, State House, Indianapolis, IN 46204  
YOVITS, DR. MARSHALL C., 9016 Dewberry Court, Indianapolis, IN 46260  
ZIMMER, MR. LESTER L., R.R. 1, Box 155, Nashville, IN 47448  
c/o LINDA HAMRICK Canterbury School Science Club, 5601 Covington Rd., Ft. Wayne, IN 46819  
c/o LARRY D. BENNETT, Mitchell Jr. High School Science Club, Hancock Ave., Mitchell, IN 47446