

PROCEEDINGS

of the

Indiana Academy of Science

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1969



MARION T. JACKSON, Editor

Indiana State University

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Spring Meeting

April 25-26

HANOVER COLLEGE, Hanover, Indiana 47243

Fall Meeting

October 23-24

HANOVER COLLEGE, Hanover, Indiana 47243

Published at Indianapolis, Indiana

1970

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Chemisches Zentralblatt

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Metallurgical Abstracts

Pesticides Documentation Bulletin

Psychological Abstracts

Review of Applied Entomology

The Torrey Bulletin

Zoological Record

TABLE OF CONTENTS

Part 1

THE WORK OF THE ACADEMY

	Page
Officers and Committees for 1969	3
Minutes of the Spring Meeting	6
Minutes of the Fall Meeting (Executive Committee)	9
Minutes of the Fall Meeting (General Session)	12
Annual Financial Statement	14
Annual Report, Junior Academy of Science	16
Biological Survey Committee Report	23
Necrology	27
New Members for 1969	39

Part 2

ADDRESSES AND CONTRIBUTED PAPERS

Presidential Address	45
"The World of the Honeybee", HOWARD R. YOUSE	
"To Ruine a World", JOHN B. PATTON	49

Anthropology

E. DOLAN—Use of Historical and Archaeological Evidence to Reconstruct the Cherokee Past*	57
R. E. PACE—Exploratory Examination of the Oxendine Site*	57
E. V. McMICHAEL and S. J. COFFING—Test Excavations at the Daughtery-Monroe Site (12-Su-13)*	57
R. J. FERGUSON—The Continued Excavation of the Van Nuys Site: A Probable Late Woodland Occupation*	58
G. K. NEUMANN—A Re-examination of the Question of the Middle Western Origin of the Delaware Indians	60
K. B. HUNTER and G. K. NEUMANN—Origins and Racial Affiliations of the Illinois Hopewell Indians	62
W. H. ADAMS—Some Possible Causes for Late-Pleistocene Faunal Extinctions	65
G. K. NEUMANN and T. A. MURAD—Preliminary Report on the Crania from the Island Field Site, Kent County, Delaware	69
K. D. VICKERY—Preliminary Report on the Excavation of the "Great Mound" at Mounds State Park in Madison County, Indiana	75

*Abstract or Note only

Botany	Page
L. and ADELE BEESLEY—Trilliums of Franklin County, Indiana*	83
K. E. NICHOLS and W. W. BLOOM—Report of a Carotenoidmutant of <i>Cyanidium caldarium</i> *	83
W. W. BLOOM and K. E. NICHOLS—Responses of Megagametophytes of <i>Marsilea</i> to Growth Substances with Respect to Rhizoid Formation*	83
B. O. BLAIR—Phenology Studies of Ten Species at Eleven Locations in Indiana*	83
L. FORD—Chromosome Associations in Corn Monoploids*	84
J. YEMMA—A Microspectrophotometric Analysis of DNA in the Heterothallic Species of Slime Mould, <i>D. iridis</i> , which Sometimes Exhibits Apogamy*	84
FAY K. DAILY—Some Charophytes from the Pleistocene*	84
P. WEATHERWAX—Some "Atypical" Stem Structures in the Gramineae	85

Cell Biology

J. R. WELSER and W. W. CARLTON—Response of the Duck Thyroid to the Administration of Thiouracil*	91
J. F. VAN VLEET, B. V. HALL and J. SIMON—Regeneration of Skeletal Muscle in Vitamin E-Deficient Rabbits*	91
I. WATANABE and G. BINGLE—Deficient Myelination in the Brain of "Quaking" Mouse: An Electron Microscopic Study*	92
J. F. SCHMEDTJE—The Identification of Gamma-A Globulin in Human Enteric Epithelial Cells*	92
N. E. WEBER and P. V. BLAIR—Effects of Adenosine Diphosphate on the Morphology of Heart Mitochondria*	93
A. N. SIAKOTOS—The Isolation of Nuclei and Endothelial Cells from Brain*	93
S. YUMOTO and S. ISHIKAWA—Ultrastructural and Enzymological Observations of Isolated Kidney Microvilli*	93
J. B. WHITTEN—Ultrastructural Features of the Calcifying Epithelial Odontogenic Tumor*	94
D. J. MORRÉ, J. C. ROLAND and C. A. LEMBI—Comparisons of Isolated Plasma Membranes from Plant Stems and Rat Liver . .	96
R. D. CHEETHAM and D. J. MORRÉ—Di- and Tri-nucleotidase Activities of Rat Liver Cytomembranes	107
T. F. CHUANG, Y. C. AWASTHI and F. L. CRANE—A Model Mosaic Membrane: Cytochrome Oxidase	110

*Abstract or Note only

Chemistry	Page
L. G. ONG and E. SCHWARTZ—Determination of the Hydrolysis Constant of the Stannous Ion by an Electromotive Force Method*	121
J. NOWAK, R. WILLIAMS and J. GEORGE—The Infrared Spectra of Coordination Compounds*	121
R. L. VANETTEN and D. S. PAGE—pH Dependent Isotope Effects on the Flavin Enzyme L-Amino Acid Oxidase*	121
J. T. SNOW and G. R. BAKKER—A Kinetic Study of the Decarboxylation of Duroic Acid in Sulfuric Acid Solutions*	122
D. J. COOK—Molecular Complexes of Bromine and Various Substituted Carbostyrils and their Hydrolysis Products*	122
SR. BARBARA BUCKBEE, R. E. SURDZIAL and C. R. METZ—Temperature Dependence of Eo for the Daniell Cell	123
W. E. HOFFMAN, M. JACOBS, G. KENNEPOHL, D. W. PARROTT, P. REED, T. R. STOUT and J. SUNDY—The Study of Complexes of Di-n-butylloxamidine with Transition Metals	129
 Ecology 	
T. S. MCCOMISH and R. O. ANDERSON—The Annual Growth Cycle of the Bluegill*	135
P. G. DAVIDSON and T. S. MCCOMISH—The Effect of Photoperiod on Growth of Bluegill*	135
J. R. GAMMON—The Response of Fish to Heated Effluents*	136
T. E. MANGUM, III and T. S. MCCOMISH—Preliminary Experiments on Growth of Bluegill with Varied Feeding Frequency and Constant Ration*	136
RUTH A. WILSEY and T. S. MCCOMISH—The Relationship Between Growth and Social Hierarchy in the Green Sunfish*	136
D. R. GOINS—A Taxonomic Survey of the Ostracods of Delaware County, Indiana*	137
R. D. HART and W. B. CRANKSHAW—The Influence of Environmental Factors on the Concentration of Hydrocyanic Acid in <i>Manihot esculenta</i> *	137
M. T. JACKSON and R. O. PETTY—A Comparison of Dominance Expressions for Tree Species in Foley Woods, Edgar County, Illinois*	137
D. SCHMELZ—Testing the Quarter Method against Full Tallies in Old-growth Forests*	138
W. J. GULISH—Bluegill Predation by Three Fish Species	139
H. E. MCREYNOLDS—Practicality of Endrin as a Fish Toxicant	148
H. P. WEEKS, JR.—Courtship and Territorial Behavior of Some Indiana Woodcocks	162
G. S. JONES—Foods of the White-footed Mouse, <i>Peromyscus leucopus noveboracensis</i> , from Pike County, Indiana	172

*Abstract or Note only

	Page
J. P. MUEHRCKE and C. M. KIRKPATRICK—Observations on Ecology and Behavior of Indiana Ruffed Grouse	177
R. D. KIRKPATRICK—Fox Bounty in Indiana During the Years 1961 through 1968	187
M. E. HEATH—Naturalized Big Trefoil (<i>Lotus pedunculatus</i> Cav.) Ecotypes Discovered in Crawford County, Indiana	193
A. A. LINDSEY and D. V. SCHMELZ—The Forest Types of Indiana and a New Method of Classifying Midwestern Hardwood Forests	198
L. A. KRUMHOLZ, R. L. BINGHAM and E. R. MEYER—A Survey of the Commercially Valuable Mussels of the Wabash and White Rivers of Indiana	205

Entomology

MILDRED G. WARE and H. L. ZIMMACK—The Use of Heartbeat as a Potential Screening Technique for Insect Pathogens*	227
F. N. YOUNG—Further Studies on the Interbreeding of an Insular Form of <i>Tropisternus collaris</i> (Castelnau) with Mainland Forms*	227
L. CHANDLER—The Second Record of <i>Coelioxys obtusiventris</i> Crawford (Hymenoptera, Megachilidae)	228
L. CHANDLER—Indiana vs. Indian Territory: Misinterpreted Locality Citations	229
GERTRUDE L. WARD—The occurrence of <i>Chalybion zimmermanni</i> Dahlbom (Sphecidae) in Indiana	231
PATRICIA M. ARNETT—A Taxonomic Key to the Collembola in Four Seral Stages Leading to the Beech-Maple Climax	234
R. E. SIVERLY—Factors Influencing the Species Composition of Mosquito Populations in Indiana	238
J. W. HART—A Check List of Indiana Collembola	249

Geology and Geography

C. T. STATTON—Faunal Assemblage Study of the Maryland Miocene*	253
A. H. SIDDIQI—Urbanization in Asia*	253
R. F. BONEHAM—Acritarchs (<i>Leiosphaeridia</i>) in the New Albany Shale of Southern Indiana	254
C. E. WIER—Factors Affecting Coal Roof Rock in Sullivan County, Indiana	263
N. I. JOHANSEN and W. N. MELHORN—Proposed Origins for the Hadley Lake Depression, Tippecanoe County, Indiana	270

*Abstract or Note only

	Page
R. L. POWELL—Base Level, Lithologic and Climatic Controls of Karst Groundwater Zones in South-Central Indiana	281
L. A. SCHAAL—Cooling Degree Days in Indiana	292
E. M. AGEE—The Climatology of Indiana Tornadoes	299
R. M. DINKEL and A. J. CANTIN—The Changing Location Patterns of the Neighborhood Grocers in Terre Haute, Indiana: A Geographic Analysis	309
T. F. BARTON—Population and Settlement Decline in Southwestern Indiana	318
N. V. WEBER—A Comparison of the Central Place Hierarchy Pattern of Central Indiana to the Walter Christaller Model	325
D. M. COFFMAN—Parameter Measurement in Fluvial Morphology ..	333

Microbiology and Molecular Biology

R. RAMALEY and R. KINDIG—Stream Pollution from Coal Mine Waste Piles: Effect of Sulfur and Iron Oxidizing Bacteria* ..	345
D. A. COTTER—Fine Structure Changes during Germination of <i>Dictyostelium discoideum</i> Spores*	345
S. S. LEE—Thermal Induction of Bacteriophage P1*	346
A. R. SCHULZ and D. D. FISHER—Computer-based Derivation of Rate Equations for Enzyme-catalyzed Reactions*	346
S. OCHS, M. I. SABRI and N. RANISH—Axoplasmic Transport of Materials in Nerve Fibers*	346
T. A. COLE and W. F. MIDDENDORF—Development of a Clear, Photopolymerizable Acrylamide Gel and Its Use in Immobilization and Staining of Nucleic Acids	348
K. SCHWENK and ALICE S. BENNETT—The Effect of Avidin on the Biosynthesis of Fatty Acids in <i>Aspergillus niger</i> and <i>Aspergillus flavus</i>	351

Physics

W. D. MUELLER—Measurement of Ionization in Nuclear Emulsion by Lacunarity Technique*	357
M. A. BURKLE and L. M. REYNOLDS—Operation and Flux Determination of a Neutron Generator*	357
L. K. STEINRAUF, O. SEELY, J. A. HAMILTON and J. M. H. PINKERTON—Molecular Structure of Thyroxine by X-Ray Crystallography*	357
J. F. HOULIHAN and L. N. MULAY—Electron Paramagnetic Resonance Studies on the Magneli Phases of the Titanium-Oxygen System*	358
D. L. STEINERT—An Evaluation of Relativistic Thermodynamics* ..	358

*Abstract or Note only

	Page
R. A. LLEWELLYN—Physical Oceanography in Indiana: A Study of Horse Shoe Lake*	359
J. H. HETTMER—Polarized $^3\text{He}^+$ Ion Source for the Indiana University Cyclotron*	359
U. J. HANSEN and J. L. HAZELTON—Non-local Contributions to the Cyclotron Absorption Spectrum for a Single Valley Semiconductor Model*	360
C. C. SARTAIN—Semiconductors Produced by Doping Oxideglasses with Ir, Pd, Rh or Ru	361

Plant Taxonomy

N. E. LAMBERT and D. L. DILCHER—Eocene Euphorbiaceous Fruits*	375
M. V. SHEFFY and D. L. DILCHER—Morphology and Taxonomy of Fossil Fungal Spores*	375
C. B. HEISER, JR.—The Cultivated Solanaceae of Ecuador*	376
WINONA H. WELCH—Hookeriaceae Species and Distribution in Africa, Europe, Asia, Australia and Oceania	377
JEANETTE C. OLIVER—Biosystematic Studies of the Beech and Marsh Ferns	388
D. N. MOORE, T. R. MERTENS and JOYCE E. HIGHWOOD—Cytotaxonomic Notes on Genus <i>Polygonum</i> , Section <i>Polygonum</i>	396

Soil Science

R. K. STIVERS—Distribution of Corn (<i>Zea mays</i> L.) Roots in Two Soils in Relation to Depth of Sampling and Type of Sampler	401
J. V. MANNERING and D. WIERSMA—The Effect of Rainfall Energy on Water Infiltration into Soils	407
M. F. BAUMGARDNER, S. KRISTOF, C. J. JOHANNSEN and A. ZACHARY—Effects of Organic Matter on the Multispectral Properties of Soils	413
L. B. HUGHES and H. W. REUSZER—A Two-year Study of Bacterial Populations in Indiana Farm Pond Waters	423
N. L. MEYERS, J. L. AHLRICHS and J. L. WHITE—Adsorption of Insecticides on Pond Sediments and Watershed Soils	432

Zoology

E. WHITTLE—Some Modifications in Rat Ovaries and Uteri Following Aminoglutethimide Treatment*	439
J. B. COPE and R. MILLS—Big Brown Bat (<i>Eptesicus fuscus</i>) Movement in Tunnel Cave, Clifty Falls State Park, Indiana*	439

*Abstract or Note only

	Page
J. O. WHITAKER, JR.—Parasites of Feral Housemice, <i>Mus musculus</i> , in Vigo County, Indiana	441
R. E. BRECHNER and R. D. KIRKPATRICK—Molt in Two Populations of the House Mouse, <i>Mus musculus</i>	449
R. E. ZIMMERMAN and W. J. EVERSOLE—Some Effects of Amino- glutethimide on Water and Electrolyte Metabolism in the Female Rat	455
F. J. ZELLER and W. R. RATHKAMP—The Effect of Steroids on the Follicle Stimulating Hormone (FSH) Content of Chicken Anterior Pituitary Glands	462
J. B. COPE, D. R. HENDRICKS and W. B. TELFAIR—Radiotelemetry with the Big Brown Bat (<i>Eptesicus fuscus</i>)	466
J. B. COPE and D. R. HENDRICKS—Status of <i>Myotis lucifugus</i> in Indiana	470
R. L. RICHARDS—Vertebrate Remains from an Indiana Cave	472
R. E. SCHAFFER and R. W. BULLARD—Comparisons of Rewarming from Natural Torpidity and Induced Hypothermia in Chip- munks (<i>Tamias striatus</i>) with Reference to Heart Rate and Temperature Relationships	476
<i>Instructions for Contributors</i>	484
<i>Index</i>	486

* Abstract or Note only

PART 1

THE WORK
OF THE
ACADEMY

1969

HOWARD R. YOUSE, *President*

OFFICERS AND COMMITTEES FOR 1969

OFFICERS

President.....Howard R. Youse, DePauw University
President-elect.....Frank A. Guthrie, Rose Polytechnic Institute
Secretary.....James R. Gammon, DePauw University
Treasurer.....Damian Schmelz, St. Meinrad College
Editor.....William R. Eberly, Manchester College
Director of Public Relations.....Paul E. Klinge, Indiana University

DIVISIONAL CHAIRMEN

Anthropology.....Robert E. Pace, Indiana State University
Botany.....Robert L. Kent, Indiana Central College
Cell Biology.....Edward J. Hinsman, Purdue University
Chemistry.....James E. George, DePauw University
Ecology.....Thomas S. McComish, Ball State University
Entomology.....Jack R. Munsee, Indiana State University
Geology and Geography.....Wilton N. Melhorn, Purdue University
History of Science.....B. Elwood Montgomery, Purdue University
Microbiology and Molecular Biology.....D. S. Wegener,
Indiana University Medical Center
Physics.....Richard L. Conklin, Hanover College
Plant Taxonomy.....Jack E. Humbles, Indiana University
Soil Science.....James E. Newman, Purdue University
Zoology.....James C. List, Ball State University

EXECUTIVE COMMITTEE

(Past Presidents,* Current Officers, Divisional Chairmen,
Committee Chairmen)

*Baldinger, L. H.	Heniser, V.	*Morgan, W. P.
Behrens, O. K.	Hinsman, E. J.	Moulton, B.
Brooker, R. M.	Humbles, J. E.	Munsee, J. R.
*Christy, O. B.	*Johnson, W. H.	Newman, J. E.
*Cleland, R. F.	Kaufman, K. L.	Nisbet, J.
Coats, N.	Kent, R. L.	Pace, R. E.
Conklin, R. L.	Kessel, W. G.	Petty, R. O.
Daily, F. K.	Klinge, P. E.	*Powell, H. M.
*Daily, W. A.	*Lilly, Eli	Schmelz, D.
*Day, H. G.	*Lindsey, A. A.	Stockton, Sister M. R.
Eberly, W. R.	List, J. C.	*Wayne, W. J.
*Edington, W. E.	McComish, T.	*Weatherwax, P.
*Edwards, P. D.	*Markle, C. A.	Webster, J. D.
Gammon, J. R.	Melhorn, W. M.	Wegener, D. S.
George, J. E.	*Mellon, M. G.	*Welch, W. H.
*Girton, R. E.	*Meyer, A. H.	*Welcher, F. J.
*Guard, A. T.	*Michaud, H. H.	Winslow, D.
Guthrie, F. A.	Montgomery, B. E.	Youse, H. R.
*Haenisch, E. L.		

BUDGET COMMITTEE

President, H. R. Youse; President-elect, F. A. Guthrie; Secretary, J. R. Gammon; Treasurer, D. Schmelz; Editor, W. R. Eberly; Director of Public Relations, P. E. Klinge; Retiring President, W. J. Wayne; Director of Junior Academy, D. R. Winslow; Library Committee, Nellie Coats; Program Committee, R. L. Conklin; Relation of Academy to State, W. A. Daily.

COMMITTEES ELECTED BY THE ACADEMY

Academy Foundation: W. P. Morgan, 1969, Chairman; W. A. Daily, 1970.

Bonding: R. M. Brooker, 1969, Chairman; H. H. Michaud, 1969.

Research Grants: O. K. Behrens, 1969, Chairman; J. E. Newman, 1973; J. B. Patton, 1972; W. K. Stephenson, 1971; W. H. Welch, 1970.

COMMITTEES APPOINTED BY THE PRESIDENT

(President an ex officio member of all committees)

Academy Representative on the Council of A.A.A.S.: W. H. Johnson.

Auditing Committee: W. G. Kessel, Chairman; L. Guernsey; F. A. Guthrie.

Youth Activities Committee: V. Heniser, Chairman; Sr. Mary Alexandra; R. Brooker; J. Colglazier; J. Davis; E. Haenisch; K. Kaufman; W. Kessel; G. Kirkman; R. Lefler; R. Settle; D. Winslow.

Indiana Science Talent Search: V. Heniser, Director; L. H. Baldinger; R. L. Henry; A. Kahn; A. R. Schmidt; H. L. Zimmack.

Indiana Science Fairs State Coordinator: K. L. Kaufman.

Library Committee: Nellie Coats, Chairman; Lois Burton; J. W. Klotz; Eli Lilly.

Program Committee: R. L. Conklin, Chairman; S. C. Adams; J. D. Webster.

Publications Committee: W. R. Eberly, Chairman; J. A. Clark; D. A. Frey; W. N. Melhorn; J. F. Pelton; W. J. Wayne.

Relation of Academy to State: W. A. Daily, Chairman; J. A. Clark; C. F. Dineen; W. R. Eberly.

Membership Committee: Sr. M. Rose Stockton, Chairman; G. R. Bakker; W. L. Burger; G. H. Bick; K. H. Carlson; R. H. Coleman; R. L. Conklin; J. P. Danehy; F. K. Edmundson; Olive Forbes; R. E. Hale; W. E. Hoffman; W. B. Hopp; J. F. Hayden; W. R. Hurt; E. R. Johnston; R. L. Kent; H. P. Leighly; Marie Mayo; J. W. McFarland; D. E. Miller; G. R. Miller; E. Nussbaum; P. A. Orpurt; J. B. Patton; J. F. Pelton; R. O. Petty; S. N. Postlethwait; A. F. Schneider; Rev. J. Siegrist; L. A. Willig; F. J. Zeller; W. A. Zygmunt.

Fellows Committee: B. Moulton, Chairman; M. F. Baumgardner; R. L. Conklin; S. Crowell; F. K. Daily; H. E. Driver; D. Fraser; C. B. Heiser; D. E. Miller; B. E. Montgomery; K. M. Seymour; W. H. Welch.

Resolutions Committee: J. E. Newman, Chairman; A. T. Guard; J. M. Smith.

Invitations Committee: J. Nisbet, Chairman; W. B. Hopp, J. C. List; W. K. Stephenson, J. D. Webster.

Necrologist: F. K. Daily.

Parliamentarian: P. Weatherwax.

SPECIAL COMMITTEES APPOINTED BY THE PRESIDENT

Biological Survey Committee: J. D. Webster, Chairman; L. Chandler; C. B. Heiser; G. C. Marks; R. Mumford, W. H. Welch; F. Young.

Emeritus Members Committee: R. E. Cleland, Chairman; R. Cooper; E. L. Haensch; H. H. Michaud; W. H. Welch.

Preservation of Scientific Areas Committee: R. O. Petty, Chairman; R. C. Gutschick; C. H. Krekeler; C. Markle; B. Moulton; D. Schmelz; R. C. Weber; W. H. Welch.

Science and Society Committee: W. Johnson, Chairman; O. K. Behrens; M. Burton; J. E. Christian; R. Cleland; H. Day; W. R. Eberly; P. Klinge; H. Kohnke; A. A. Lindsey; R. Miles; R. Rogers; R. Menke; H. Wells.

SPRING MEETING

HANOVER COLLEGE, Hanover, Indiana

MINUTES OF THE EXECUTIVE COMMITTEE MEETING

April 25, 1969

The meeting was called to order in the Senate Room of the J. Graham Brown Campus Center at 4:00 PM., by President Howard R. Youse.

The minutes of the General Session, Ball State University, October 19, 1968, were approved as read.

Treasurer: Rev. Damian Schmelz submitted the financial report for the period January 1, 1969, through April 22, 1969. A summary is as follows:

Academy Accounts

Balance as of January 1, 1969	\$ 8,719.46
Receipts through April 22, 1969	4,147.40
Expenditures through April 22, 1969	2,855.02
Balance as of April 22, 1969	10,011.84

Administered Accounts

Balance as of January 1, 1969	\$14,817.13
Receipts through April 22, 1969	12,125.00
Expenditures through April 22, 1969	10,441.66
Balance as of April 22, 1969	16,500.47

Academy Foundation Committee: Mr. W. A. Daily reported that the Academy Foundation is in very satisfactory condition.

Bonding Committee: Dr. R. M. Brooker, Chairman, presented the idea that perhaps the amount of the bond should be increased. President Youse suggested that the matter be considered at the October Executive Committee Meeting, and a recommendation be made at that time.

Research Grants Committee: Chairman O. K. Behrens reported that eight grants-in-aid-of-research had been made since the last Academy Meeting, a total of \$2,956.40, and that there are funds available for additional grants.

Academy Representative on the Council of A.A.A.S.: Dr. W. H. Johnson, our representative, attended the 1968 meeting.

Auditing Committee: Dr. F. A. Guthrie reported that the committee found the financial records in fine condition.

Youth Activities Committee: Dr. Howard R. Youse stated that the Indiana Science Talent Search and Science Fairs have had very good results.

Library Committee: Mrs. Lois Burton reported that there are 330 copies of "Natural Features of Indiana" available.

Program Committee: Chairman R. L. Conklin announced that the Fall Meeting will be held at Hanover College, October 24-25, and that the preliminary notice will be mailed in June. Dr. J. D. Webster has served as chairman of the Spring Meeting.

Publications Committee: President Youse read a letter from Editor W. R. Eberly, stating his desire to resign upon the completion of the 1968 volume of the Proceedings and monograph now in press. Dr. Youse asked for suggestions regarding a successor to Dr. Eberly.

Relation of Academy to State Committee: Chairman W. A. Daily announced that the Academy will receive \$4,000 per annum for the next two years.

Membership Committee: Chairman Sister Mary Rose Stockton has had 2,000 membership blanks prepared and distributed to her committee members. Fifteen applications for membership have been received since the October 1968 meeting.

Invitations Committee: Chairman J. Nisbet extended the invitation of St. Mary's College for the 1972 Fall Meeting. The invitation was accepted with thanks.

Parliamentarian: Paul Weatherwax read the following: Indiana Academy of Science Constitutional Amendment, authorized by Executive Committee at Annual Meeting, 1968, and submitted to Executive Committee at Spring Meeting, 1969. Art. II, Sec. 8 to be added:

Sec. 8. Sustaining Members. Any person or corporation making a substantial annual contribution to The Academy in an amount to be determined by the Executive Committee may be elected to sustaining membership.

This proposal is to be acted upon at the 1969 October Meeting after a copy has been distributed to each member by mail, 30 days before the Fall Meeting. Dr. Weatherwax made the motion that this Constitutional Amendment be distributed to the membership and acted upon at the 1969 October Meeting. The motion was seconded by Dr. Behrens. Motion carried.

Emeritus Members Committee: Chairman R. E. Cleland presented a list of five requests for Emeritus Membership: Dr. Thomas DeVries, Dr. Naomi Hougham, Dr. David T. Jones, Mr. Elmer Sulzer, and Mr. William A. Willer. These members of the Academy were voted Emeritus Membership.

Preservation of Scientific Areas Committee: The report is one of continuation of activities.

Science and Society Committee: Chairman Willis H. Johnson gave a favorable report on the requests for the Speaker's Bureau and for Science in Government, and recommended the continuation of this committee because of its benefit to the legislators as well as to the State. Dr. Johnson

announced that the Academy had received a grant of \$20,000 for each of the next two years for the activities of this committee.

Dr. R. L. Bernhardt asked for information regarding the formation of a new section in Science Education at the October Meeting. Parliamentary Weatherwax read instructions regarding procedure from Art. 4 of the Constitution.

Dr. J. S. Ingraham presented a request from The Indiana Branch of the American Society of Bacteriology regarding the change of its name as an Academy Section from Bacteriology to Microbiology and Molecular Biology. The Section so voted at the 1968 October Meeting. Dr. Paul Weatherwax moved that the request be granted. Dr. Willis Johnson seconded the motion. The vote was favorable.

Adjournment at 5:35 PM.

Approved October 23, 1969.

HOWARD R. YOUSE, President
WINONA H. WELCH, Secretary *pro tem*.

FALL MEETING

MINUTES OF THE EXECUTIVE COMMITTEE MEETING

HANOVER COLLEGE, Hanover Indiana

October 23, 1969

The meeting was called to order at 7:30 p.m. by Dr. Howard R. Youse, President of the Academy, in the Student Senate Room of the Campus Center.

The minutes of the Executive Committee and General Session of the Spring Meeting of the Academy held at Hanover College on April 25, 1969, were read and approved.

Treasurer: Rev. Damian Schmelz reported the Academy funds as follows:

January 1, 1969 balance	\$23,536.59
Income to October 17, 1969	26,126.28
Expended to October 17, 1969	17,738.06
Balance, October 17, 1969	31,924.81

Trustees of the Academy Foundation: William A. Daily reported Academy Foundation Funds as follows:

October 1, 1968 balance	\$ 1,050.20
Receipts through September 30, 1969	725.32
Disbursements through Sept. 30, 1969	1,302.46
Balance, September 30, 1969	473.06
In the John S. Wright Fund:	
Balance, October 1, 1968	\$ 1,466.33
Receipts to September 30, 1969	11,351.42
Disbursements to Sept. 30, 1969	12,605.72
Balance as of September 30, 1969	212.03

Bonding Committee: Dr. R. M. Brooker, Chairman, stated that there seemed to be no need to increase the amount of the bond at this time.

Research Grants Committee: Dr. O. K. Behrens reported the approval of nine grants thus far this year totalling \$3,456.30.

Publications Committee: Dr. W. R. Eberly reported that the Proceedings are in the final steps of publication. The number of published papers has been increasing each year and that a system of review and selection may soon become necessary. Dr. Eberly announced the publication of Monograph No. 1, "Distribution of the Mammals of Indiana," by Russell Mumford. Dr. Howard Youse suggested that this publication be mailed to Academy members without cost. Dr. Weatherwax moved the adoption of the suggestion and the motion was seconded and approved.

Youth Activities Committee: Mr. Gil Turpin reported that Dr. Wendell McBurney has assumed the duties of Dr. Virgil Heniser who

has retired after many fruitful years with the Youth Activities Committee. He also discussed briefly the activities planned for the Annual Meeting of the Indiana Junior Academy of Science which will be held November 1, 1969, at Purdue University. The Indiana Science Talent Search was reported to have had a busy and successful year.

Library Committee: Miss Nellie M. Coats reported several major acquisitions purchased from a Lilly Endowment Fund. The process of listing new library titles for the National Union List of Serials was continued and was listed in a Serials Data Bank being compiled by computer at Purdue University. Increased use of the Library's materials was noted for 1969.

Relation of the Academy to the State: William A. Daily stated that \$4000.00 will again be provided by the State.

Membership Committee: Sister M. Rose suggested that the applications of new members be forwarded to her after processing by the Treasurer and Secretary so that the appropriate member of the Committee can be notified.

Fellows Committee: Dr. B. Moulton recommended the following members for Fellows of the Academy:

Robert I. Fletcher

John A. Leighty

A motion was approved to accept these members as Fellows of the Academy.

Invitations Committee: Dr. Jerry J. Nisbet reported the schedule of fall meetings include 1970—Indiana State University; 1971—Earlham College; 1972—St. Mary's College; 1973—open.

Emeritus Membership Committee: Dr. Ralph E. Cleland recommended four members for Emeritus status:

May S. Iske

Harry R. Mathias

Elmer Sulzer

Darl F. Wood

A motion was approved to accept these members as emeritus members of the Academy.

Scientific and Natural Areas Committee: Dr. Robert Petty reported that 251 areas are on the list of natural areas. Information concerning their location was sent to several companies, institutions, other organizations and individuals. An evaluation of specific threatened areas were offered to the Audubon Society, the Izaak Walton League and the Indiana Conservation Council, Inc., this year.

Committee on Science and Society: Dr. W. H. Johnson reported that representatives of the Committee have held two meetings with the Gover-

nor and his Administrative Assistant, were received cordially and were promised that different agencies of government would call on the Committee for assistance. Dr. John Leighty is now serving as Executive Director for the work of the committee under the NSF grant. Favorable publicity was received in news media through Dr. Leighty's introduction in his new capacity at the second meeting in the Governor's office. Dr. Leighty opened an office in Columbus, Indiana, in September at 641 Washington Street, Room 5. The Public Service Commission requested assistance in connection with problems of pipeline safety and were provided with a list of consultants. Dr. Leighty has already attended a meeting planning a midwest conference on science and technology in relation to state and local government and another meeting with the State Drug Education Committee which had asked for information on the work of the committee for inclusion in their newsletter.

The disposition of several inactive Academy Sections was discussed and a motion recommending the placing of Sections Mathematics and Psychology on inactive status was approved.

The formation of a new section of Science Education was also discussed. Mr. Virgil Imel reported a new group, "Hoosier Association of Science Teachers, Inc." which is meeting on October 25, 1969, and is for elementary, junior high school and high school science teachers. Some discussion ensued about the need for a duplicate, competing Section in Science Education in the Academy of Science. Dr. Eberly suggested the formation of an *ad hoc* committee which would consider ways in which the Academy might become associated with science teaching at these levels. Following a suggestion by Dr. Youse, Dr. Brooker moved the provisional establishment of a Section in Science Education for a trial one-year period. This was seconded and approved.

Dr. Howard R. Youse recommended that serious consideration be given to establishing a permanent position of Executive Director who would carry out much of the continuing work of the Academy.

The meeting was adjourned at 9:20 PM.

Approved October 24, 1969.

JAMES R. GAMMON, Secretary

MINUTES OF THE GENERAL SESSION

October 24, 1969

The General Session of the Eighty-fifth Fall Meeting of the Indiana Academy of Science was held in Parker Auditorium on Friday, October 24, 1969, at 11:00 AM. Dr. Howard R. Youse, President, called the meeting to order.

Dr. Harold J. Haverkamp, Academic Dean and Acting President of Hanover College, bid the Academy members welcome.

Dr. Richard S. Westfall, Department of the History and Philosophy of Science, Indiana University, delivered a scholarly and interesting address entitled "Problems of Biological Thought in the 17th Century."

The minutes of the Executive Committee of Thursday, October 23, 1969, were read and approved as read.

President Howard R. Youse presented the following Constitutional Amendment to the Academy Membership for action. The Amendment had been approved at the 1969 Spring Meeting by the Executive Committee and circulated to the members more than 30 days prior to the Fall Meeting.

Article II, Section 8 to be added:

Section 8. Sustaining Members. Any person or corporation making a substantial annual contribution to The Academy in an amount to be determined by the Executive Committee may be elected to sustaining membership.

This amendment was approved.

President Howard R. Youse then introduced Dr. John Leighty, the new Executive Director of the Committee on Science and Society, who discussed some of the activities planned for the near future.

Fay Kenoyer Daily read a biographical sketch of each member who had died since the 1968 Fall Meeting. These are printed under Necrology.

The Annual Dinner Meeting was held in the Dining Hall, J. Graham Brown Campus Center, Dr. Frank A. Guthrie, President-Elect presiding. Dr. Arthur T. Guard, Resolutions Committee, submitted the following resolution: "That the Academy members here assembled express their appreciation to Hanover College for all the courtesies which have been extended to the membership of the Academy during this meeting. We are indebted especially to Dr. Richard L. Conklin, Chairman of the Program Committee, for his efforts in arranging facilities for this annual meeting. Further, the Academy is appreciative of the warm welcome extended by Dr. Harold J. Haverkamp, Academic Dean and Acting President, Hanover College." The resolution was approved.

The Secretary presented 65 applications for membership to the Academy. A motion was approved accepting these applicants as members.

Dr. Alton A. Lindsey, Nominating Committee, presented the following slate of officers and elected committees: President, Frank A. Guthrie, Rose Polytechnic Institute; President-Elect, Samuel N. Postlethwaite, Purdue University; Secretary, J. Dan Webster, Hanover College; Editor, Marion T. Jackson, Indiana State University; (Treasurer, Damian Schmelz, St. Meinrad College, and Director of Public Relations, Paul E. Klinge, Indiana University continue in office for two more years); Bonding Committee, Robert M. Brooker, Indiana Central College and Howard H. Michaud, Purdue University (both 1970); Research Grants Committee, Nelson Easton, Eli Lilly & Co. (1974); Academy Foundation Trustee, W. P. Morgan, Indiana Central College (1971). A motion was made to accept the officers and committee members and was approved unanimously.

The meeting was concluded by an informative and thought-provoking talk delivered by Dr. Howard R. Youse entitled "The World of the Honey Bee."

The meeting was adjourned at 9:00 PM.

Approved May, 1970.

JAMES R. GAMMON, Secretary

FINANCIAL REPORT OF THE INDIANA ACADEMY OF SCIENCE

January 1-December 31, 1969

I. ACADEMY ACCOUNTS

	Income	Expenditure	Budgeted
Dues -----	\$ 3,906.00		
Reprints -----	1,847.10	\$ 1,828.73	\$ 150.00
Publication -----		476.17	
Editor -----	\$ 400.00		400.00
Mailing -----	76.17		100.00
Secretary -----		360.55	300.00
Clerical -----	354.28		
Postage, etc. -----	6.27		
Treasurer -----		222.23	225.00
Clerical -----	61.25		
Postage, etc. -----	160.98		
Office -----		120.56	175.00
Travel, Dues -----		170.10	180.00
President's Fund -----			100.00
Membership Committee -----		18.00	75.00
Junior Academy -----		22.18	150.00
Program Committee -----		472.43	650.00
Chairman -----	66.08		
Printing -----	212.09		
Mailing -----	194.26		
Transfer to Administered			
Accounts: -----		2,100.00	
Science and Soc. -----	600.00		600.00
Library Binding -----	1,000.00		1,000.00
Publication -----	500.00		500.00
Transfer from Administered			
Accounts: -----	22.03		
Interest on Savings -----	1,070.70		
Miscellaneous -----	43.05	43.05	
	\$ 6,888.88	\$ 5,834.00	\$ 4,605.00

II. ADMINISTERED ACCOUNTS

	Jan. 1 Balance	1969 Income	1969 Expen- diture	Dec. 31 Bal.
Scienc Talent -----	\$ 1,995.80		\$ 1,860.45	\$ 135.35
Science Fair -----	7,515.99	\$10,730.00	5,545.99	12,700.00
Science and Society -----	466.42	600.00*	554.53	511.89
Research -----	307.67	6,659.35	6,533.50	433.52
J. S. Wright Library -----	134.28			134.28
Lilly III Library -----	4,374.94	34.88**	1,487.00	2,922.82
Publication -----				1,029.50
Proceedings -----		217.00*		
Natural Features -----		312.50*		
Academy Budget -----		500.00*		
Library Binding -----		1,000.00*		1,000.00
NSF Funded Project:				
Science to People -----		11,663.33	4,492.61	7,170.72
Transfer to Academy				
Account from Miscellaneous -----	22.03		22.03	
	<hr/>	<hr/>	<hr/>	<hr/>
	\$14,817.13	\$31,717.06	\$20,496.11	\$26,038.08

*Transfer from Academy Accounts

**Payment cancelled on check

III. SUMMARY

	Academy	Administered	Total
1969 Income -----	\$ 6,888.88	\$31,717.06	\$38,605.94
1969 Expenditure -----	5,834.00	20,496.11	26,330.11
Net Gain 1969 -----	1,054.88	11,220.95	12,275.83
1968 Balance -----	8,719.46	14,817.13	23,536.59
December 31 Balance -----	9,774.34	26,038.08	35,812.42

BANK BALANCES

Terre Haute First National Bank, Terre Haute, Ind. -----	\$15,087.86
Equitable Savings & Loan, Los Angeles, California -----	5,392.10
First Western Savings & Loan, Las Vegas, Nevada -----	15,332.46
Total Assets in All Accounts -----	\$35,812.42

REV. DAMIAN SCHMELZ, Treasurer

December 31, 1969

January 30, 1970

We the undersigned have audited the Treasurer's records for the Indiana Academy of Science for the year 1969 and have found them to be accurate and in order.

W. G. KESSEL

J. L. GUERNSEY

INDIANA JUNIOR ACADEMY OF SCIENCE

OFFICERS

President: Dennis Waltke, Division of University Schools, Bloomington, Indiana

Vice-President: Timothy O'Leary, Brebeuf Preparatory School, Indianapolis, Indiana

Secretary: Rachel Koontz, New Haven Senior High School, New Haven, Indiana

JUNIOR ACADEMY COUNCIL

Prof. Howard Michaud, Honorary Chairman, Purdue University

Mr. F. Ray Saxman, Cascade High School, Clayton

Mr. Charles Souers, Division of University Schools, Bloomington

Miss Helen Reed, Manual High School, Indianapolis

Mr. David Blase, Arlington High School, Indianapolis

Dr. Mary J. Pettersen, Morton High School, Hammond

STATE DIRECTOR

Prof. Donald R. Winslow, Division of University Schools, Bloomington, Indiana 47401

PROGRAM

Thirty-Seventh Annual Meeting

Saturday, November 1, 1969

8:00 AM-10:00 AM

Registration of members, sponsors, and guests—East Foyer registration counter, Memorial Center.

9:30 AM

Tours of several academic facilities. Check registration area.

9:30 AM

INTERVIEWS for "Best Boy" and "Best Girl" Awards. Memorial Center—Room 111.

11:30 AM-1:00 PM

Lunch—Purdue Union Cafeterias.

1:00 PM

Academy General Session. Room 302 of the Memorial Center. Dennis Waltke, presiding.

1:30 PM

Presentation of papers. Rooms 302 and 306, Memorial Center.

3:00 PM

Closing Session. Room 302, Memorial Center. Announcements; presentation of awards.

PROGRAM OF PAPERS

1. The Origin of the Universe.
JOHN J. FARRELL, Brebeuf Science Club, Brebeuf Preparatory School, Indianapolis.
2. Morphogenesis of the Chick Embryo Lung under the Influence of Nicotine.
MARY JANE OLIVER, Kennedy Research Center, Roncalli High School, Indianapolis.
3. Physiological Factors Involved in Acid-Base Balance Disturbances.
BARBARA KONKLE, Madison Consolidated High School Science Club, Madison.
4. Infrared Study of the Environment of Exchangeable Ammonium Ions on Clay Surfaces.
KEN MORSE, Chemistry Club, Oliver P. Morton Senior High School, Hammond.
5. The Use of Matrices and Determinants in the Balancing of Redox Equations.
JANET MARSHALL, Phi Chi Science Club, New Haven High School, New Haven.
6. The Characterization of RE Virus.
MARK COATES, Madison Consolidated High School, Madison.
7. Comparative Analysis of Commercial Dentrifices Containing Fluoride Compounds.
W. CRAIG LANNIN, Oliver P. Morton High School, Hammond.
8. Reduction of Cancerous Tumors through *Helianthemum annuum* Extractions.
JOAN FIELD, Kennedy Research Center, Roncalli High School, Indianapolis.
9. Drugs Cause Damage.
STEVE MARIETTA, Pius X Science Club, Schulte High School, Terre Haute.
10. Experiments in Artificial Intelligence Using a Digital Computer.
KEVIN MCGILL, Brebeuf Science Club, Brebeuf Preparatory School, Indianapolis.

ACKNOWLEDGMENT

The officers, members of the Junior Academy Council, and all others concerned with the program wish to thank Prof. Ralph Lefler of the Purdue Physics Department, and Mr. Mark Ocker of the Purdue Division of Conferences and Continuation Services for arranging the fine tours and meeting facilities for our convention. We are indeed indebted to these members of the Purdue campus for so generously giving of their services. We also are indebted to the Purdue President's Office for making this meeting financially possible.

MINUTES OF THE THIRTY-SEVENTH ANNUAL
MEETING OF THE
INDIANA JUNIOR ACADEMY OF SCIENCE

For the first time, in order to meet in a central location, the Junior Academy met separately from the Senior Academy. The thirty-seventh annual meeting of the Indiana Junior Academy of Science was held Saturday, November 1, 1969, on the Purdue Campus at Lafayette, Indiana. There were 274 students and sponsors present, representing 51 chapters.

President Dennis Waltke called the meeting to order at 1:00 PM. in Room 302 in the Purdue Student Union Center. Previous to this session members and their sponsors enjoyed tours and lectures in various parts of the campus.

Following a brief welcome, Dennis introduced the 1969 officers as following:

Dennis Waltke President
Timothy O'Leary Vice-President
Rachel Koontz Secretary

Next Mr. Charles Souers of the Junior Academy Council explained and presented the awards for 1970. Officers for 1970 are as following:

Rachel Koontz President
Mark Coates Vice-President
John Farrell Secretary

The 1969-70 "Best Scientist" awards were presented by Mr. Souers and they went to Rachel Koontz, "Best Girl Scientist" and to Steve Marietta, "Best Boy Scientist." Each received a certificate and a year's membership in the American Association for the Advancement of Science.

Dennis then broke the group into two parts for presentation of papers. Vice-President Timothy O'Leary presided over the second group in Room 306. Each person was then allowed seven minutes in which to present his paper. Nine papers were given.

Following the presentation of papers the entire group met in Room 306, and Dr. Mary Jane Pettersen presented certificates to all those who presented papers. Dennis then introduced Mr. Winslow, the State Director, who introduced the new Council members for 1970 and extended the Academy's thanks for the outstanding co-operation provided by Purdue University. Particular acknowledgment was extended to Prof. Ralph Lefler who made arrangements for the excellent tours.

Following a short closing message President Dennis Waltke adjourned the meeting at 3:15 PM.

Next year's meeting is to be held with the Senior Academy at Indiana State University, Terre Haute.

Respectfully submitted,
RACHEL KOONTZ, Secretary
DENNIS WALTKE, President

INDIANA JUNIOR ACADEMY OF SCIENCE

1969-70

<i>Town</i>	<i>Club and School</i>	<i>Sponsor</i>
Acton	Sigma Mu Chapter of FSA, Franklin Central H. S.	Margaret Richwine
Bedford	Bedford Science Problems Research Group, Bedford H. S.	Paul Hardwick
Bloomington	National Scientific Honor Society, Bloomington H. S.	Orville Long
Bloomington	E. Wayne Gross Academy, University H. S.	Billie Stucky
Bloomington	MSE Academy, University Junior High	Charles Souers
Clarksville	Clarksville H. S. Science Club, Clarksville Junior-Senior H. S.	Gerald K. Sprinkle
Clarksville	Phy-Chem, Our Lady of Providence H. S.	Sr. Jean Marian
Columbus	Science Club, Columbus Senior H. S.	L. N. Carmichael
Crawfordsville	Up-N-Atom, Crawfordsville H. S.	David Wells
Evansville	Reitz Memorial Chapter of FSA, Reitz Memorial H. S.	Charles Hames
Fort Wayne	Albertus Magnus Science Club, Central Catholic H. S.	Sr. Winifred
Fort Wayne	Phy-Chem Club, Elmhurst H. S.	Ruth Wimmer
French Lick	Springs Valley Science Club, Springs Valley H. S.	D. L. Clark
Gary	Andrean Biology Club, Andrean H. S.	Sr. Marie Antoine SS.C.M. Sr. Marie Carmel SS.C.M.
Gary	Mu Alpha Theta, Andrean H. S.	Sr. M. Nadine SS.C.M.
Gary	Biology Club, Lew Wallace H. S.	Lola Lemon

<i>Town</i>	<i>Club and School</i>	<i>Sponsor</i>
Griffith	Griffith Junior High Science Club Griffith Junior H. S.	Fred Meeker
Griffith	Griffith Junior High Science Club, Griffith Senior H. S.	Geraldine R. Sherfey
Hammond	Chemistry Club, Oliver P. Morton H. S.	Mary J. Pettersen
Hartford City	Hartford City H. S. Science Club, Hartford City H. S.	—————
Highland	Science Club, Highland H. S.	Jon Hendrix
Hobart	Hobart Senior High Science Club, Hobart Senior H. S.	Stanley J. Senderak
Huntington	Aristotelian, Huntington Catholic H. S.	Sr. M. Petrona
Huntington	Science, Huntington H. S.	Robert Diffenbaugh
Indianapolis	Arlington Science Club, Arlington H. S.	Robert McClary
Indianapolis	Nature Club, Arsenal Technical H. S.	Michael Simmons
Indianapolis	Brebeuf Science Club, Brebeuf Pre- paratory School	Donald G. Maines Harold J. Sommer
Indianapolis	Science Club, Howe H. S.	Jerry Motley
Indianapolis	Mendelian Science Club, Ladywood H. S.	Sr. Helen Jean
Indianapolis	North Central H. S. Science Club, North Central H. S.	Robert Prettyman
Indianapolis	Roncalli H. S.	Sr. Mary Alexandra C.S.J.
Indianapolis	Science Club of Westlane, West- lane Junior H. S.	John Van Sickle
Indianapolis	Science Club, George Washington H. S.	William Baldwin
Jamestown	Science Club of Granville Wells, Granville Wells School	Cecil O. Bennington
LaPorte	Bi-Phi-Chem Club, LaPorte H. S.	Frances M. Gourley Byron Bernard
Lebanon	Junior Explorers of Science, Leba- non Junior H. S.	Tom Ewing

<i>Town</i>	<i>Club and School</i>	<i>Sponsor</i>
Logansport	Lewis Cass H. S. Science Club, Lewis Cass H. S.	Raymond T. Kozer
Madison	Madison Science Club, Madison Consolidated High	David Dunkerton
Muncie	Muncie Central Science Club, Muncie Central H. S.	William Beuoy
New Albany	Science Club, New Albany Senior H. S.	Roger Moody
New Haven	New Haven Science Club, New Haven H. S.	Keith Hunnings E. H. Sanders
Portland	Science Club, Portland-Wayne Township Junior H. S.	Mary Zehner
Portland	Portland Senior H. S. Science and Mathematics Club, Portland Sr. H. S.	Ralph Settle Robert Freemyer
South Bend	Junior Izaak Walton League, John Adams H. S.	Ernest Litweiler
South Bend	JETS Junior Engineering Technical Society, Central H. S.	—————
South Bend	Second Year Biology Class, Clay H. S.	John V. Davis
South Bend	IONS Club, J. W. Riley H. S.	John Marker
South Bend	LaSalle High School	—————
Terre Haute	Pius X Science Teens, Schulte H. S.	Sr. Marie Barbara S.P.
Tipton	Tipton H. S. Science Club, Tipton H. S.	Richard Garst Frederick Calhoun
Trafalgar	Indian Creek School	—————
Vincennes	Sigma Tau Science Club, St. Rose Academy	Sr. Anna Margaret Sr. Aloyse

BIOLOGICAL SURVEY COMMITTEE

J. DAN WEBSTER, Chairman, Hanover College

Publications of 1968-1969

Dealing with the Flora and Fauna of Indiana

- Virales: WHITAKER, J. O., JR., W. A. MILLER and W. L. BOYKO. 1969. Rabies in Indiana Bats. Proc. Indiana Acad. Sci. 78: 447-456.
- Tracheophyta: BEESLEY, ADELLE, and L. BEESLEY. 1970. Trilliums of Franklin County, Proc. Indiana Acad. Sci. 79 :83.
HEATH, M. E. 1970. Naturalized big trefoil (*Lotus pedunculatus* Cav.) ecotypes discovered in Crawford County. Proc. Indiana Acad. Sci. 79 :193-197.
JACKSON, M. T. 1969. Hemmer Woods: an outstanding old-growth lowland forest remnant in Gibson County, Indiana. Proc. Indiana Acad. Sci. 78: 245-254.
JACKSON, M.T., and P. R. ALLEN. 1969. Detailed studies of old-growth forests in Versailles State Park, Indiana. Proc. Indiana Acad. Sci. 78:210-230.
LINDSEY, A. A. and D. V. SCHMELZ. 1970. The forest types of Indiana and a new method of classifying midwestern hardwood forests. Proc. Indiana Acad. Sci. 79 :198-204.
MOORE, D., T. MERTENS and JOYCE HIGHWOOD. 1970. Cytotaxonomic notes on the genus *Polygonum*, Section *Polygonum*. Proc. Indiana Acad. Sci. 79 :396-400.
OLIVER, JEANETTE C. 1970. Biosystematic studies of the Beech and Marsh ferns. Proc. Indiana Acad. Sci. 79 :388-395.
- Protozoa: TAMAR, H. 1968. Observations on *Halteria bifurcata* sp. n. and *Halteria grandinella*. Acta Protozoologica. 6 :175-184.
- Worms and Arthropods: WHITAKER, J. O., JR. 1970. Parasites of feral housemice, *Mus musculus*, in Vigo County. Proc. Indiana Acad. Sci. 79 :441-448.
- Crustacea: GOINS, D. R. 1970. A taxonomic survey of the Ostracods of Delaware County, Indiana. Proc. Indiana Acad. Sci. 79 :137.
- Insecta: ARNETT, PATRICIA M. 1970. A taxonomic key to the Collembola in four seral stages leading to the Beech-Maple climax. Proc. Indiana Acad. Sci. 79 :234-237.
ARNETT, R. H., E. C. MIGNOT and E. H. SMITH. 1969. North American Coleoptera fauna: notes on Pyrophorinae, Elateridae (Coleoptera), Coleoptera Bull., 23:9-15.
CHANDLER, L. 1970. Indiana vs. Indian Territory: Misinterpreted locality citations. Proc. Indiana Acad. Sci. 79 :229-230.
CHANDLER, L. 1970. The second record of *Coelioxys obtusiventris* Crawford (Hymenoptera, Megachilidae). Proc. Indiana Acad. Sci. 79 :228.
HART, J. W. 1970. A checklist of Indiana Collembola. Proc. Indiana Acad. Sci. 79 :249-252.
SIVERLY, R. E. 1970. Factors influencing the species composition of mosquito populations in Indiana. Proc. Indiana Acad. Sci. 79 :238-248.
WARD, GERTRUDE L. 1970. The occurrence of *Chalybion zimmermanni* Dalbon (Sphecidae) in Indiana. Proc. Indiana Acad. Sci. 79 :231-233.

- Acarina: WHITAKER, J. O., JR., and N. WILSON. 1968. Mites of the small mammals of Vigo County, Indiana. *Amer. Midland Natur.* 80:537-542.
- Pisces: ZIMMERMAN, C. J. In press. Ecology of the brook silverside (*Labidesthes sicculus*) in Lake Lemon, Stephens Creek, and Monroe Reservoir, Indiana. *Trans. Amer. Fish. Soc.*
- Aves: BAKER, MRS. H. A. Breeding bird census—grazed, brushy fields and tree-bordered creek. *Audubon Field Notes* 22:701.
 GUTH, R. W. Winter bird population study—shrubby field. *Audubon Field Notes* 23:550-551.
 GUY, R. E. Winter bird population study—shrubby field. *Audubon Field Notes* 23:541-542.
 GUY, R. E. Winter bird population study—corn stubble. *Audubon Field Notes* 23:549-550.
 GUY, R. E. Winter bird population study—pasture. *Audubon Field Notes* 23:550.
 Indiana Audubon Society Members. 1969. Many titles in *Indiana Audubon Quarterly* 46:1-152.
 SMITH, SHELIA L. Breeding bird census—suburban edge. *Audubon Field Notes* 22:721.
 WEBSTER, J. D. Winter bird population study—soybean stubble. *Audubon Field Notes* 23:550.
- Mammalia: COPE, J. B. and D. HENDRICKS. 1970. Status of *Myotis lucifugus* in Indiana. *Proc. Indiana Acad. Sci.* 79:470-471.
 MUMFORD, R. E. 1969. Distribution of the mammals of Indiana. *Indiana Acad. Sci. Monograph No. 1.* Indiana Acad. Sci., Indianapolis. 114 p.
 MUMFORD, R. E. 1969. Long-tailed weasel preys on big brown bats. *J. Mammal.* 50:360.
 WHITAKER, J. O., JR., and G. R. SLY. 1970. First record of *Reithrodontomys megalotis* in Indiana. *J. Mammal.* 51:381.
- Aquatic animals: GAMMON, J. R. 1968. Aquatic life survey of the Wabash River, with special reference to the effects of thermal effluents on populations of macroinvertebrates and fish. Second year progress report to Public Service Indiana. 48 p.
 GAMMON, J. R. 1968. The effect of inorganic sediment on stream biota. Second year progress report to FWPCA. 84 p.
- All organisms: LINDSEY, A. A., D. V. SCHMELZ and S. A. NICHOLS. 1969. Natural areas in Indiana and their preservation. *Indiana Natural Areas Survey, Lafayette, Indiana.* 594 p.

Theses Completed and Placed on File Dealing with the Flora and Fauna of Indiana

- Arachnida: PARKER, T. A. 1969. Spiders of the Wabash-Tippecanoe river system. Ph.D. Purdue.
- Insecta: BELL, SUSAN C. 1969. The Effects of Thermal Pollution on the Macroinvertebrate Population of the Wabash River. M.A. DePauw.
 FINNI, G. R. 1969. Developmental patterns in winter stonefly species (Insecta: Plecoptera: Allocapnia: Taeniopterys). M. Sc. Purdue.
 LAWRENCE, V. M. 1968. The composition and dynamics of Odonata populations in farm pond ecosystems. Ph.D. Purdue.

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