

PROCEEDINGS

of the

Indiana Academy
of Science

Founded December 29, 1885

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Volume 69

1959

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RICHARD A. LAUBENGAYER, Editor
Wabash College
Crawfordsville, Indiana

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Spring Meeting
May 15-16
McCormick's Creek
State Park

Fall Meeting
October 29-31, 1959
BUTLER UNIVERSITY

Published at Indianapolis, Indiana
1960

1. The permanent address of the Academy is the Indiana State Library.
2. **Instructions for Authors** appear at end of this volume, P. 340.
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.
c/o Indiana State Library
Indianapolis 4, Indiana.
4. **Proceedings** may be purchased through the State Library at \$3.00 per volume.
5. **Reprints of technical papers** can often be secured from the authors. They cannot be supplied by the State Library nor by the officers of the Academy.
6. The Constitution and By-Laws reprinted from v. 62 and the Membership List reprinted from v. 67, are available to members upon application to the Secretary. Necrologies reprinted from the various volumes can be supplied relatives and friends of deceased members by the Secretary.
7. Officers whose names and addresses are not known to correspondents may be addressed care the State Library. The address of the editor of the present volume is Biology Department, Wabash College, Crawfordsville, Ind.

Papers published in the Proceedings of the Indiana Academy of Science are abstracted or indexed in appropriate services listed here:

Annotated Bibliography of Economic Geology
Bibliography of Agriculture
Bibliography of North American Geology
Biological Abstracts
Chemical Abstracts
Chemisches Zentralblatt
Current Geographical Publications
Geological Abstracts
Mathematics Reviews
Metallurgical Abstracts
Psychological Abstracts
Review of Applied Entomology
The Torrey Bulletin
Zoological Record

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OFFICERS AND COMMITTEES OF THE INDIANA
ACADEMY OF SCIENCE FOR 1959

Spring Meeting: May 15, 16, McCormick's Creek State Park, Spencer, Ind.
Fall Meeting: October 29, 30, 31, Butler University, Indianapolis, Ind.

OFFICERS FOR 1959

President.....R. E. CLELAND, Indiana University
Vice-President.....A. T. GUARD, Purdue University
Secretary.....H. E. CRULL, Butler University
Treasurer.....D. J. COOK, DePauw University
Editor.....R. A. LAUBENGAYER, Wabash College
Press Secretary.....F. N. YOUNG, JR., Indiana University

CHAIRMEN OF THE DIVISIONS

Anthropology.....G. K. NEWMAN, Indiana University
Bacteriology.....W. A. ZYGMUNT, Mead-Johnson Research Labs.
Botany.....C. B. HEISER, JR., Indiana University
Chemistry.....F. WELCHER, Indiana University, Adult Education Center
Entomology.....J. DAVIS, Purdue University
Geology and Geography.....R. W. LOUNSBURY, Purdue University
History of Science.....S. S. VISHER, Indiana University
Mathematics.....G. N. WOLLEN, Purdue University
Physics.....M. DIXON, Butler University
Plant Taxonomy.....S. MCCOY, Technical High School, Indianapolis
Psychology.....C. JOSEY, Butler University
Soil Science.....C. W. GUERNSEY, Purdue University
Zoology.....F. FULLER, DePauw University

EXECUTIVE COMMITTEE

(Consisting of Past Presidents, Current Officers, Divisional
Chairmen, and Chairmen of Standing Committees)

Bessey, W. H.	Edington, W. E.	Laubengayer, R. A.
Christy, O. B.	Edwards, P. D.	Lilly, Eli
Cleland, R. E.	Fletcher, R.	Lounsbury, R. W.
Coats, N. M.	Fuller, F.	Mackell, J. F.
Cook, D. J.	Girton, R. E.	Markle, C. A.
Crull, H. E.	Guard, A. T.	Markle, M. S.
Cummings, E. R.	Guernsey, C. W.	McCoy, S.
Daily, W. A.	Heiser, C. B., Jr.	Meyer, A. H.
Davis, J. J.	Johnson, W. H.	Michaud, H. H.
Deay, H. O.	Josey, C.	Morgan, W. P.
Degering, D. F.	Just, T. K.	Newman, G. K.
Dixon, M.	Klinge, Paul	Payne, F.

Polley, J. C.	Wallace, F. N.	Young, F. N., Jr.
Porter, C. L.	Weatherwax, P.	Yuncker, T. G.
Powell, H. M.	Welch, W. H.	Zygmunt, W. A.
Schultz, R. W.	Welcher, F.	
Visher, S. S.	Wollen, G. N.	

BUDGET COMMITTEE

Consisting of President, Secretary, Treasurer, Editor, Chairman of Junior Academy, Library, Program, and Relation of Academy to State: R. E. Cleland, H. E. Crull, D. J. Cook, R. A. Laubengayer, H. H. Michaud, N. M. Coats, W. H. Bessey, F. N. Wallace.

COMMITTEES ELECTED BY THE ACADEMY

Trustees of the Academy Foundation (term 4 years): Chairman, Ward J. Rice (term expires 1960), J. E. Seybert (term expires 1961).

Bonding of Trustees (elected annually): Chairman, Scott McCoy, Technical High School, Indianapolis; F. J. Welcher, Indiana University, Adult Education Center, Indianapolis.

Research Grants (term 5 years): Chairman, T. G. Yuncker, DePauw University (term expires 1959); Paul Weatherwax (1961); A. A. Lindsey (1963); J. F. Hart (1962); R. E. Cleland and H. E. Crull (ex officio).

COMMITTEES APPOINTED BY THE PRESIDENT

Auditing: Chairman, W. P. Morgan, Ind. Central College; F. J. Welcher.

Biological Survey: Chairman, C. A. Markle, Earlham College; F. K. Daily; D. G. Grey; C. J. Goodnight; H. H. Michaud; W. H. Welch; F. N. Young, Jr.; J. Webster.

Fellows Committee: H. O. Deay, Chairman; H. H. Remmers, Psychology, Purdue University; H. Driver, Anthropology; A. T. Guard, Botany; L. S. McClung, Bacteriology; K. Seymour, Chemistry; H. O. Deay, Entomology; T. F. Barton, Geology and Geography; M. S. Markle, History of Science; P. D. Edwards, Mathematics; A. C. Mitchell, Physics; F. K. Daily, Plant Taxonomy; N. Pearson, Zoology.

Index: Chairman, R. A. Laubengayer, Wabash College; Nelle Coats; F. N. Wallace.

Indiana Talent Search: Chairman, R. S. Schulz, Purdue University; L. N. Baldinger; P. D. Edwards; C. A. Markle; M. Correll; Sears Crowell.

Invitations: Chairman, A. H. Meyer, Valparaiso; M. Hall; J. F. Mackell.

Junior Academy: Chairman, H. H. Michaud, Purdue University; N. E. Adams; R. Cooper; P. E. Klinge; Lola Lemon; R. E. Martin; R. E. Niswander; R. W. Schulz; J. Cope.

Library: Chairman, N. M. Coats, State Library; Eli Lilly, G. Black.

Membership: Chairman, R. Fletcher, DePauw University; John A. Buehler, Anderson College; Louis E. Delanney, Wabash College; H. M. Dixon, Butler University; M. R. Garner, Earlham College; E. Kintner, Manchester; R. E. Martin, Hanover College; D. F. Johnson, Indiana State Teachers College; Charles Brumfiel, Ball State Teachers College; K. N. Campbell, Mead-Johnson Research Labs.; D. Den Uyl, Purdue University; L. Farquharson, Franklin College; G. Hennion, University of Notre Dame; R. G. Larson, Valparaiso University; G. R. Miller, Goshen College; F. J. Zeller, Indiana University.

Necrologist: W. E. Edington, DePauw University.

Program: Chairman, W. E. Bessey, Butler University; K. Seymour, E. Rowe, V. Kavanaugh, S. McCoy, C. B. Heiser, Jr.

Publication of Proceedings: Chairman, R. A. Laubengayer, Wabash College; A. A. Lindsey, F. Hart.

Publicity: Chairman, F. N. Young, Jr., Indiana University, W. H. Bessey, C. Theophanis.

Relation of Academy to State: Co-Chairmen, F. N. Wallace, Dept. of Conservation, and W. A. Daily, Eli Lilly; J. A. Clark; Eli Lilly; H. J. Reed; R. A. Laubengayer.

Representative on Council of the AAAS: C. B. Heiser, Jr., Indiana University.

Resolutions: Chairman, W. Johnson, Wabash College; F. Hart, E. T. McBee.

Science Education: Chairman, Paul Klinge, Indiana University; K. Dale, R. Lefler, W. Smith, R. S. Schulz.

Indiana School and College Committee on Mathematics: Chairman, J. C. Polley, Wabash College; G. N. Wollen, G. Vannatta.

SPRING MEETING
EXECUTIVE COMMITTEE MEETING

McCORMICK'S CREEK STATE PARK

May 15, 1959

4:30 P. M. CDT

The meeting was called to order by Pres. R. E. Cleland at 4:35 p. m. CDT.

The following reports were presented:

Treasurer—Donald J. Cook (read by H. R. Youse):

Balance on Hand January 1, 1958.....	\$9,469.93
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Receipts

Dues and Initiation Fees.....	\$3,434.50
Publications sold	103.05
Authors' reprints, Vol. 64.....	20.62
Authors' reprints, Vol. 65.....	88.12
Authors' reprints, Vol. 66.....	502.74
Authors' reprints, Vol. 67.....	320.77
Designated gift	50.00
Talent search	1,492.50

6,012.30

Disbursements

Editor, Vol. 67.....	\$ 225.00
Expenses of Secretary.....	160.05
Expenses of Treasurer.....	177.04
Stationery	215.60
Talent Search	1,358.03
Program Committee	300.75
Research Grants	522.67
Mailing <i>Proceedings</i> , Vol. 67.....	54.55
Returned checks	13.20
Error in deposit.....	2.00
Expenses of six officers.....	125.00
Academy Conference	29.35
Reprints, Vol. 67.....	665.03
J. S. Wright Memorial Library.....	1,461.63
Junior Academy of Science.....	14.24
Binding, Memorial Library.....	699.50
Publishing <i>Proceedings</i> , Vol. 67.....	209.15
AAAS	8.50

6,241.29

Balance on hand December 31, 1958*..	\$9,240.94
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* Includes \$4,299.41 in the John Shepard Wright Memorial Library fund and \$1,878.54 in the Talent Search fund.

Editor—Richard A. Laubengayer: Mr. Laubengayer reported that the galley proofs had been corrected and returned to the printer's for the final printing. The appropriation for biennium was approved.

Library—Nelle Coats: A collection of photos of presidents was discussed, and Mr. Daily remarked that ample storage space was available for photos and historical material. Kraus Periodicals has supplied scarce items for the files for which \$1,658.99 was expended from the Lilly Endowment, Inc. fund. Other purchases totaled \$95.76. These, together with the volumes to which they belong, have been prepared for binding by the State Library's Serials Librarian, Mrs. Lois Burton, and will shortly be delivered to the National Library Bindery, Indianapolis.

During a legislative year the State Library has many visitors including young people from many schools, and these as usual seemed especially interested in the Academy Library materials in the display case at the entrance to the building together with a map indicating cities on the exchange list in 80 foreign areas. It was reported last November that 983 domestic and foreign titles were currently received. The availability of copies of *Indiana Scientist* and other publications is as follows:

Indiana Scientists, 550 copies, free to 3-year members, price \$2.50 (\$1.50 to biographees or relatives).

Index volumes 1-50, 1891-1940, 500 copies, free to 5-year members, price \$3.00.

Index volumes 51-60, 1941-1950 in *Proceedings* v. 61, 1951, total 295 (177 hard covers, 118 paper covers), price \$3.00, \$1.00 to members.

Press Secretary—F. N. Young, Jr.: Mr. Young presented a folder of press releases and requested that popular abstracts of papers be turned in in advance of the fall meeting.

Program Chairman—Wm. Bessey (read by Mrs. Fred Kavanaugh): The program of the present meeting was prepared by Prof. Charles B. Heiser, Jr., with no help from the rest of the committee. Some work has now been done on the fall meeting at Butler University, October 30, 31. We can have the business meeting and the general meeting in the Chemistry lecture room from 9:00 to 11:00 a. m. as previously. This room has a maximum seating capacity of a little over 250. If necessary, overflow crowds could be handled with public address systems in other rooms. If we prefer, we could hold the business and general meetings in the cafeteria which holds 360 with all the tables in place. In this case, the cafeteria *must* be emptied by 10:30 a. m. as students will be coming for lunch at 11:00 a. m. If we get a local person for the speaker for the general meeting, the chemistry lecture room will no doubt be amply large. If we bring in someone with a big reputation from out of the state (for example, former Hoosier Urey) we would probably find the large room necessary, but then would be cramped for time. So far, the following local people have been suggested to the committee as likely speakers for the morning session: Dr. J. N. McGuire, microbiologist, Eli Lilly & Co.; Dr. John S. Karling, botanist, Purdue University; Dr. Frederick N. Andres, Animal Science Department, Purdue University; Dr. Tracy N. Sonneborn, geneticist, Indiana University; Dr. George Kimball, geography, Indiana University; Dr. Frank Edmondson, astronomy, Indiana University. At least one member of the committee has objected to each one of these. Out of state people suggested are: Roger P. Wodehouse, Pearl River, New York,

to talk on "Allergies"; Wendell Stanley, Harold Urey, LeRoy Burney, Albert Noyes, Rollo May.

It was suggested that the main speaker follow the luncheon in the cafeteria. It was moved, seconded and passed that an effort be made to secure a speaker from the Institute of Tropical Medicine which will be meeting in Indianapolis at the same time.

Other Reports—A request has been made to the National Science Foundation for \$16,750 to make available visits by scientists to high schools. The request has been approved.

New Business—Dr. Yuncker reported that \$200-\$300 a year was available for research grants from the AAAS. It was moved and seconded that the endowment fund interest less bank charges from the previous year be made available each year to the research grants committee. Any unused part would revert to the fund. This motion was amended to read that a maximum of \$300 of the endowment interest be made available. The motion and amendment were passed.

Dr. Fletcher of the membership committee read a proposed folder on membership. The cost would be \$27 per 1,000. It was moved, seconded and passed that the Academy secure 1,000 of these folders.

It was reported that the Academy was represented at the Academy Conference in December, 1958.

It was announced that Dr. Welcher had submitted his resignation as chairman of the chemistry division and that Dr. Lawrence Strong will be asked to serve in this position. It was moved that he be appointed to this position, and in the event that he could not accept, the president was authorized to appoint a successor to Dr. Welcher.

Dr. Edington suggested that the Committee on the Relation of the Academy to the State investigate the possibility of state printing.

The meeting was adjourned at 6:00 p. m. CDT.

Respectfully submitted,

HARRY E. CRULL, Secretary

SPRING MEETING
GENERAL SESSION

MCCORMICK'S CREEK STATE PARK

May 15, 1959

7:45 P. M. CDT

Words of welcome to members were given by Pres. R. E. Cleland. The officers of the Academy were introduced, and the Secretary's reports were read and approved. The Membership Committee reported that there were 15 new members. The following resolution was read by W. Johnson:

The Resolutions Committee on behalf of all the members of the Indiana Academy of Science present wish to thank Dr. Charles Heiser of the Program Committee for his work in arranging for this meeting, Mr. Ray Myers, Manager of Canyon Inn, for providing us with comfortable facilities and a fine dinner, Dr. Charles Hagen for sharing with us some of his recent experiences in Trinidad, and finally the officers of the Academy for their efficient conduct of the meeting.

The Indiana Soil Science Society presented an award of recognition to Prof. Bushnell.

Mr. Charles W. Hagen, Jr., Indiana University, spoke on "Customs and Contrasts in Trinidad."

After Mr. Hagen's speech Saturday morning field trips were announced and the meeting was adjourned.

Respectfully submitted,

HARRY E. CRULL, Secretary

FALL MEETING
EXECUTIVE COMMITTEE

OBSERVATORY, BUTLER UNIVERSITY

October 29, 1959

The meeting was called to order by President R. E. Cleland at 7:30 p. m. The minutes of the Spring meeting were read by the secretary and approved as read.

Treasurer—Donald J. Cook: Financial report.

FINANCIAL REPORT OF THE INDIANA ACADEMY OF SCIENCE

Jan. 1, 1959 thru Dec. 31, 1959

Receipts

Balance on Hand—January 1, 1959.....	\$ 9,240.94
Dues and Initiation Fees.....	3,722.50
Sale of Reprints: Vol. 66, 67, 68.....	229.83
Sale of Publications.....	71.00
Gifts	70.00
National Science Foundation Grant.....	16,750.00
A. A. A. S. Grants for Research.....	762.00
Academy Endowment Grant.....	300.00
Indiana Science Talent Search.....	1,465.00
John Shepard Wright Library.....	500.00
Returned Check	5.00

Disbursements

Editor—Volume 68 of Academy Proceedings.....	\$ 225.00
Mailing Proceedings	36.76
Miscellaneous Expenses	17.06
Bond for Treasurer.....	62.50
Stationery	165.51
Expenses of Secretary.....	146.20
Expenses of Treasurer.....	183.70
Adding Machine for Treasurer.....	85.00
Expenses of President's Office.....	6.20
Expenses of Officers.....	125.00
Academy Conference	21.00
Research Grants	450.00
Indiana Talent Search.....	2,205.32
Junior Academy of Science.....	79.35
John Shepard Wright Memorial Library.....	3,076.68
Cost of Reprints: Volume 68.....	944.15
Additional Costs of Printing Volume 68 of Proceedings.....	872.24
Indiana Science Fairs.....	49.90
Visiting Scientists Program—National Science Foundation	
Grant G-8724	1,724.68
Program Committee	316.42
Binding—Academy Funds as Budgeted.....	998.95

TOTAL RECEIPTS:	\$33,116.27
TOTAL DISBURSEMENTS:	11,791.62
Balance on Hand—December 31, 1959.....	\$21,324.65

Balance on Hand, December 31, 1959:

Indiana Science Talent Search.....	\$ 1,138.22
John Shepard Wright Library.....	1,727.73
National Science Foundation Grant G-8724.....	15,025.32
Indiana Academy Funds.....	3,433.38
(\$300 of Academy Funds designated for Research Grants)	

Editor—Richard A. Laubengayer: Copies of Volume 68 of the Proceedings of the Indiana Academy of Science were in the mail by the latter part of September. The lateness of mailing was due to unavoidable difficulties encountered by the editor during the early summer months. The Bookwalter Company delivered 1,197 bound and 580 paper copies, for a total of 1,777 copies, to the State Library. This was slightly under the number ordered but sufficient to satisfy demands. Thirty-seven of the contributors ordered reprints. The editor and committee wish to thank the members of the Academy, Miss Coats and Mrs. Burton of the library staff, and the Bookwalter Printing Company for their cooperation in the publishing of this volume.

Trustees of the Academy. Report by Harry E. Crull:**Income Cash Statement**

October 1, 1958—Beginning Balance.....	\$ 964.90
October 1, 1958—September 30, 1959—Total Receipts.....	399.78
October 1, 1958—September 30, 1959—Bank Fees.....	19.99
September 30, 1959—Ending Balance.....	1,344.69
Total Carrying Value Stocks and Bonds.....	14,354.02

Principal Cash Statement

October 1, 1958—Beginning Balance.....	6.34
September 30, 1959—Ending Balance.....	6.34

Press Secretary—F. N. Young: Notices of the 75th Annual Meeting of the Academy were sent to all Indianapolis newspapers and to the United Press International and Associated Press wire services. In addition releases on more than twenty individual papers were prepared and sent out over the state. Releases on the visiting scientist program and on some individual papers were released before the meetings and were published in several papers. A complete report with press clippings will be submitted at the spring meeting.

Research Grants Committee—T. G. Yuncker: The following grants have been made during the period since our last annual meeting in 1958: (1) Dr. W. H. Welch, DePauw University, \$100.00 to aid in her work on the taxonomy of the moss family Hookeriaceae. (2) Dr. L. S. McClung, Indiana University, \$100.00 for studies on the taxonomy of the genus *Clostridium*. (3) Mr. Scott McCoy, Arsenal Technical High School, \$22.67 covering field collecting expenses. (4) Dr. Carrolle Markle, Earlham College, \$100.00 for field and herbarium expenses connected with her work on the flora of Wayne County. (5) Dr. William Hopp, Indiana State Teachers College, \$100.00 for experimental investigations on the growth rate of snakes. (6) Dr. Robert L. Henry, Wabash College, \$150.00 for expenses connected with a problem involving the techniques of x-ray

defraction. (7) Dr. Lois I. Farquharson, Franklin College, \$100.00 for expenses connected with genetical studies on the corn plant. (8) Dr. Emily J. Blasingham, Indiana University, \$100.00 for an investigation on the archeology of Saline Springs, Gallatin County, Illinois. The increased number of grants for the current year was made possible because of an allotment of \$300.00 for this purpose from the Academy funds at its last spring meeting. This money, together with that received from the AAAS, has now been expended and no further grants are possible at the present time. It was moved and seconded that at any time during each calendar year up to \$600.00 may be appropriated for research grants, subsequently to be paid by the AAAS and by \$300.00 of Academy funds. The motion was carried.

Nominating Committee—Carrolle A. Markle: Scott McCoy and Frank Welcher were nominated to succeed themselves for the Bonding of Trustees Committee. Nominated as members of the Research Grants Committee were T. G. Yuncker for a term of five years and Keith M. Seymour to fill the unexpired term of Melvin G. Mellon, who resigned.

Fellows Committee—Howard O. Deay: The following persons were recommended to be elected Fellows of the Indiana Academy of Science: F. J. Belifante, Physics, Purdue University; Malcom Correll, Physics, DePauw University; Dean Fraser, Bacteriology, Indiana University; S. D. Gerking, Zoology, Indiana University; John F. Hart, Geography, Indiana University; Vaclav Hlavaty, Mathematics, Indiana University; C. E. Kaslow, Chemistry, Indiana University; W. A. Konetzka, Bacteriology, Indiana University; L. L. Meritt, Jr., Chemistry, Indiana University; and E. D. Weinberg, Bacteriology, Indiana University.

Biological Survey Committee—Carrolle Markle:

Publications of 1958-1959 Dealing with the Flora and Fauna of Indiana

- Algae:**
1. Daily, Fay Kenoyer. 1959. Some Observations on the Occurrence and Distribution of the Characeae of Indiana. Proceedings of the Indiana Academy of Science 68:95-107.
 2. Daily, William. 1959. In search of Some Blue-Green Wanderers. Presidential Address. Proceedings of the Indiana Academy of Science 68:43-57.
 3. Eberly, William. 1959. The Metalimnetic Oxygen Maximum in Myers Lake. Invest. Indiana Lakes and Streams Vol. V. No. 1:1-46
- Bryophyta:**
- Miller, H. A. and J. W. Thompson. 1959. The 1958 Foray of the American Bryological Society. (Held in Putnam and Parke Counties, Indiana.) The Bryologist 62:67-73.
- Vascular Plants:**
- Humbles, Jack. 1959. Preliminary Studies of *Desmodium* Populations in Southern Indiana. Proceedings of the Indiana Academy of Science 68:319.
- Aves:**
1. Baker, Mrs. H. A. 1958. Breeding Bird Census—Two Hay Fields and Grazed Creek Pasture. Audubon Field Notes 12(6):450-451.
 2. Various Authors. 1959. 12 Christmas Bird Counts Numbers 326-337. Audubon Field Notes 13(2):182-185.

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- Fungi: Brown, Mary J. Some Fungi on the Oakland City Campus.
- Bryophyta: 1. Nebel, Bernard. Studies in Mosses of Wayne County, Indiana.
2. Welch, Winona H. Studies in Indiana Bryophytes XII.
- Vascular Plants: 1. Davidson, Thomas. The Flowering Plants of Grant County, Indiana.
2. Humbles, Jack. The *Desmodium paniculatum* Complex in Southern Indiana. Thesis, Indiana University.
3. Humbles, Jack. *Symplocarpus*.
4. Markle, Corrolle A. Flora of Wayne County, Indiana, continued.
- Annelida: 1. Goodnight, Clarence J. Continued Work on the Oplionids and Oligochaetes.
2. Joyner, James W. Earthworms of the Upper Whitewater Valley (East Central Indiana.)
- Crustacea: Eberly, William R. Crustacea of Indiana, Particularly Wabash County, but Plankton Crustacea from Other Locations.
- Insecta: 1. Siverly. Distributional and Ecological Studies of Mosquitoes of Delaware County, Indiana.
2. Wallace, Herbert S. Revision of the Genus *Hesperotettix*.
3. Ward, Gertrude L. Insects of the Upper Whitewater Valley (East Central Indiana).
4. Young, Frank N. Water Beetles as Indicators of Pollution. Taxonomic Studies of Genus *Peltodytes*.
- Amphibia: 1. Gordon, Robert E. Competition Among Larval Ambystomid Salamanders.
2. Gordon, Robert E. Population Dynamics of *Ambystoma*.
3. List, James C. Establishment of a Reference Collection of Indiana Amphibians and Reptiles.
- Reptilia: Williams, Eliot C., Jr. Studies on the Population of the Box Turtle, *Terrapene carolina* (L.) and Small Mammals in the Allee Memorial Woods along Sugar Creek, Indiana.
- Aves: 1. Cope, James B. Birds of Indiana.
2. Gough, Betty Jane. Breeding Bird Census—Mixed Deciduous Forest on Hanover College Campus, Indiana.
3. Hodson, Margaret. Birds of Grant County, Indiana.
4. Kirkpatrick, Ralph D. The Coturnix Quail in Indiana. Final Report P-R, Project Z-R, Indiana Department of Conservation.
5. Webster, J. Dan, and Betty Jane Gough. Breeding Bird Census—Beech-Maple Forest at Mary Gray Bird Sanctuary, Connersville, Indiana.
- Mammalia: 1. Cope, James B. Bats of Indiana.
2. Kirkpatrick, Ralph D. The San Juan Rabbit, *Oryctolagus cuniculus*, in Indiana. Final Report, P-R, Project Z-R, Indiana Department of Conservation.
- Miscellaneous Plant and Animal Groups: 1. Dineen, Clarence R. Bottom Organisms and Bottom Types of Saint Joseph River Drainage System of Indiana.
2. Laubengayer, Richard A. Inventory of Plant and Animal Groups in the Allee Memorial Woods Along Sugar Creek, Indiana.

Library Committee—Nelle M. Coats: As will be reflected in the treasurer's report, records have been searched and orders placed for items lacking from serial files. Volumes have been prepared for binding, both expenditures provided for by the Lilly Endowment, Incorporated gift. Additional binding provided for in the Academy's general budget has also been prepared. Also to be reported by the treasurer is Mrs. J. S. Wright's gift of \$500.00 to the Library in honor of her husband's birthday, October 17. Mr. Wright had been chairman of a committee which in 1907 entered into a contract with the Indiana State Library, placing the Academy Library in its care and thus making its materials more widely useful. For this 75th anniversary a revision of the publication Periodicals currently received by the Library has been compiled and is being distributed to members at this session, courtesy of the State Library. Fifty-five new titles have been added during the year. An exhibit of some of these and other titles will be on view here tomorrow. Material from the library is constantly on display in the entrance hall of the State Library. Resources of the library were included in a discussion of the availability of science materials at a western Indiana librarians' conference last April. The Proceedings, vol. 68, 1958, published September 20, 1959, have been distributed, labor and wrappings, as usual, supplied by the State Library. The Torrey Bulletin has been added to the list of publications abstracting or indexing the Proceedings, making fourteen in all now.

Membership Committee—Robert I. Fletcher: Forty-four new membership applications for the Senior Academy and two for the Junior Academy were presented to the Academy for action during the last year. New application forms were printed carrying information as to the activities of the Academy and an application form to be completed and returned to the proper officers. It is recommended that all of the old forms be destroyed and only the new forms be used. The old forms carry the old dues charge and many have not been changed by hand, thus leading to problems for the Treasurer.

Program Committee—William H. Bessey: The report of the Program Committee is in essence the printed program which by now is available to everyone. Charles Heiser was responsible for the very successful spring meeting. Mr. Goethe sent the chairman a check for ten lunches and ten dinners for the fall meeting. After consultation with the President, the Secretary and a number of others, nineteen of the meals were offered to various members of the Academy with the request that if they were not going to be used, the Chairman should be informed immediately so that they could be offered to someone else. No refusals have been received to date. As of 8:00 a. m. this morning, reservations for lunch are down quite a bit from last year, but reservations for dinner are up. It is not clear as yet how many lunch tickets will be available on Friday.

Junior Academy—Howard H. Michaud: The twenty-sixth annual meeting of the Indiana Junior Academy of Science was held Saturday, November 8, 1958 at Marian College, Indianapolis. Four hundred and seventeen students, teachers, and guests registered for the 1958 annual meeting. This represented the largest attendance of any previous meeting

of the Junior Academy. The morning program included fifteen exhibits in science by high school students and career conferences in science and mathematics. Sixteen papers were read by Junior Academy members during the afternoon session including nine in the biological sciences and seven in the physical sciences. There are currently fifty-five Junior Academy of Science clubs on our roll. About sixty per cent of these are known to be quite active. Three new clubs were added since last year. They include the Science Club, Columbus High School, Columbus; the Science Club, Westlane Junior High School, Indianapolis; and the Heterogeneous Genius Club, Immaculate Conception Academy, Oldenburg. The twenty-seventh annual meeting of the Junior Academy will convene Saturday, October 31, 1959. Seventeen papers will be read by members of the Junior Academy including ten in the biological and seven in the physical sciences. The American Society of Bacteriologists will offer a cash award of \$25.00 again this year to the student presenting the best paper on bacteriology or microbiology. The Kroger Grocery Company will again present a top award of \$50.00 and a plaque and two runner-up awards of \$25.00 each and plaques to the schools showing evidence of the best school science programs. Last year's top award winner was Shortridge High School, Indianapolis. The two runner-up winners were Howe High School, Indianapolis, and the University High School, Bloomington. This year's winners have been selected, and the awards will be presented to the schools on Saturday by Mr. Harry McDaniel, Indianapolis Kroger Division. Since reporting to the Executive Committee last year, the Indiana Academy of Science has received a grant from the National Science Foundation for a Visiting Scientists' Program for Indiana High Schools. Approximately eighty scientists from Indiana colleges and universities have agreed to participate in the program. Their names have been listed in a brochure that explains the program and that has been mailed to all Indiana high schools and teachers of science and mathematics. The Junior Academy is continuing its cooperation with the Regional Science Fairs, the state and national Science Talent Searches, and with Science Clubs of America.

Indiana Science Talent Search—R. W. Lefler: One hundred forty-two Indiana high school seniors completed entry requirements for the 12th Indiana Science Talent Search. Of this group 28 were designated finalists. The finalists and their sponsoring teachers were invited to the Junior Scientists' Assembly in Indianapolis, March 20-21, 1959. Fifteen of the finalists were declared winners in the search and recognized at the annual Honors Luncheon on Saturday, March 21. Of the papers submitted by the finalists, 39 per cent were related to the biological sciences, 16 per cent to mathematics, 4 per cent to earth science, 10 per cent to chemistry, and 31 per cent to physics. One hundred thirteen of the participating students responded to a questionnaire sent them in June. Of these, 109 indicated they had enrolled in a college, 83 in Indiana schools and 26 in out-of-state schools. In addition, 65 participants reported they had been awarded scholarships with stipends totaling more than \$60,000.00. Thirty-three of the participants anticipate careers in engineering, 30 in physics or chemistry, 16 in biological sciences or medicine, 9 in mathematics, and 25 in other fields. In a special presentation at the Honors Luncheon the following

teachers received certificates in recognition of their sponsorship of 10 students who were designated finalists through the 12 years of the Indiana Science Talent Search: Woodrow Pemberton, Evansville Bosse High School; Walter Reed, Connersville Senior High School; L. A. Lundgren, Hammond High School; and E. Wayne Gross (posthumously), University School, Bloomington. The Junior Scientists' Assembly for the 13th Indiana Science Talent Search will be held on March 18-19, 1960. There was a deficit of \$97.07 for the Indiana Regional Science Fairs. The balance for the Indiana Science Talent Search account is \$1,263.87. Following this report a discussion of the finances of the Talent Search resulted in a motion that a recommendation be forwarded to the Budget Committee suggesting that they appropriate \$200.00 to the Indiana Science Talent Search Fund.

Science Education Committee—Paul Klinge: The agenda items and items of discussion at the committee meeting, November 7, 1958, were as follows:

1. Duties of the Committee: Science Fairs, Science Talent Search, and Junior Academy are not within its jurisdiction.
2. Assistance can be rendered Science Fairs in following ways:
 - a. help in raising money
 - b. booklet for students interested in project work
 - c. slides to illustrate project work
 - d. money for project supplies
3. Work with State Department of Public Instruction in re-evaluating State certification requirements.
4. Committee could coordinate youth activities of Academy.
 - a. Seek and administer funds.
 - b. Prevent duplication of efforts of programs.
5. Money should be sought for following (possibly from NSF grant to Academy):
 - a. administrative expenses
 - b. awards
 - c. participant expenses
 - d. travel of high school students to universities for consultation
 - e. tours of science clubs to university and industrial laboratories
 - f. preparation of slides to help in project promotion
 - g. project equipment support
 - h. booklet of aids for projects
 - i. committee meeting expenses
6. Recommend each section consider sponsorship of joint symposia with invited high school teachers on:
 - a. graduate education of high school teachers
 - b. how to teach science methods courses

It was suggested and taken by consent that the Science Education Committee undertake a study of the whole youth program of the Academy.

Bonding of Trustees—Scott McCoy: The Trustees of The Indiana Academy are duly bonded. This bond was renewed this October 1959 and covers a period of three years from November 18, 1959 to November 18, 1962 at a cost of \$62.50 for the three years. The Hartford A. & I. with Gregory & Appel, Inc., Indianapolis, Indiana.

Indiana School and College Committee on Mathematics—G. N. Wollan: The I. S. & C. C. M. met on six occasions last year and has held one meeting so far this fall. Sub-committees have conducted surveys to get information about the mathematical training of mathematics teachers in junior and senior high schools of the state and of elementary school teachers, and to get information about mathematics taught in the schools at the various grade levels. These surveys have tended to support the conclusion that significant improvement ought to be possible. As specific activities designed to contribute to improvement, the I. S. & C. C. M. has:

1. urged Indiana colleges and universities to submit proposals to NSF for summer institutes and academic year in-service institutes for Indiana mathematics teachers and,

2. persuaded some of its members to organize evening meetings during the school year to which school mathematics teachers from the region around a college are invited to participate in discussions of mathematical topics. Such meetings were held last year at Butler University, DePauw University, Earlham College, Evansville College, Hanover College, Purdue University, Rose Polytechnical Institute, Fort Wayne, and Notre Dame University. The I. S. & C. C. M. is also a committee of the Indiana Council of Teachers of Mathematics and of the Indiana Section of the Mathematical Association of America. This year in an effort to provide a more effective base for the regional evening meetings, it is planned that local Councils of Teachers of Mathematics be organized at each of the places at which these meetings are held, to take over responsibility for the meetings. Dr. I. Owen Foster of the State Department of Public Instruction attended several I. S. & C. C. M. meetings, and a sound basis for co-operation with that department has been established. In order to expand these activities, the Academy submitted to NSF a proposal for a grant to provide needed funds. In any event we recommend that the committee be continued on the basis that its activities are of some value in promoting a worthy cause. It was recommended and taken by consent that the committee be continued for another year.

Relation of the Academy to State—W. A. Daily and F. Wallace: The Indiana State Legislature has appropriated the sum of \$4,000 per annum to publish the Academy Proceedings for the fiscal years 1959-1960 and 1960-1961.

The secretary read a letter from H. Batchelder of the Committee on Teacher Education and Professional Standards of the Indiana State Teachers Association explaining why a state-wide meeting as suggested in our resolution a year ago had not been held. The secretary also read the invitation of the American Society of Tropical Medicine and Hygiene to members of the Academy to attend meetings at the Claypool Hotel October 28 through 31, 1959.

After a discussion of the library funds it was moved and duly passed that authority be vested in the officers to approve necessary transfer of funds to the library account. It was moved and duly passed that Mr. R. W. Stark be made a life member of the Academy in view of his contribution of \$100.00 to the Academy. It was moved and duly passed that the Budget Committee be asked to appropriate \$85.00 for an adding machine for the Treasurer's office.

The secretary reminded all division chairmen to provide the names of their successors to the secretary.

A short discussion was held concerning professional certification of science teachers.

The meeting adjourned at 9:53 p. m.

Respectfully submitted,
HARRY E. CRULL, Secretary

FALL MEETING GENERAL SESSION

FRIDAY, OCTOBER 30, 1959

9:00 A. M.

The regular annual meeting of the Indiana Academy of Science was held in Room 162, Jordan Hall, Butler University, at 9:00 a. m. Friday, October 30, 1959. Vice-President George Diener of Butler University welcomed the Academy to the campus. The minutes of the Executive Committee meeting of Thursday, October 29, were read by the secretary and approved as read. The Necrologist, Dr. Will E. Edington, read the list of the following thirteen members who have died since the last annual meeting:

- | | |
|--------------------------|----------------------------|
| 1. Jacob A. Badertscher | 8. William Emil Riecken |
| 2. Pearl Harvey Brewer | 9. Arthur Rosenthal |
| 3. Adam Hastings Fiske | 10. William Henry Shideler |
| 4. Elmo Wayne Gross | 11. Ralph W. Showalter |
| 5. Robert Earl Martin | 12. Ralph Bushnell Stone |
| 6. Karl Wilhelm Meissner | 13. Agnes Ermina Wells |
| 7. Thomas Benjamin Noble | |

Dr. Yuncker moved and it was seconded and passed that the Academy instruct the secretary to send a letter of best wishes and heartiest greetings to Mr. and Mrs. F. N. Wallace from the Academy. The meeting was adjourned and section meetings followed.

Respectfully submitted,
HARRY E. CRULL, Secretary

FALL MEETING
DINNER MEETING
FRIDAY, OCTOBER 30, 1959

The meeting was held in the main cafeteria of the Atherton Center. Dr. A. T. Guard, Vice-President of the Academy, presided. He introduced the guests at the speaker's table, including Dr. Theodore M. Sperry, President of the Kansas Academy and member of this Academy. The Nominating Committee reported and it was duly moved and passed that the recommendations of the Nominating Committee be accepted and the secretary instructed to cast a unanimous ballot for the officers. They are as follows:

President—A. T. Guard, Purdue University
Vice President—Lawrence H. Baldinger, Notre Dame
Secretary—William W. Bloom, Valparaiso University
Treasurer—Donald J. Cook, DePauw University
Editor—Richard A. Laubengayer, Wabash College
Press Secretary—Eugene Weinberg, Indiana University
Trustee of the Academy—Ward Rice, Eli Lilly

Names of Chairmen elected by the various sections were read. They are as follows:

Anthropology—M. S. Wadia
Bacteriology—Walter A. Zygmunt
Botany—S. N. Postlethwait
Chemistry—H. Burkett
Entomology—R. E. Niswander
Geology and Geography—J. C. Hook
History of Science—Mrs. Fay K. Daily
Mathematics—Kermit Carlson
Physics—C. S. Morris
Plant Taxonomy—William A. Daily
Psychology—R. Bollinger
Soil Science—Stanley Barber
Zoology—Carl Krekeler

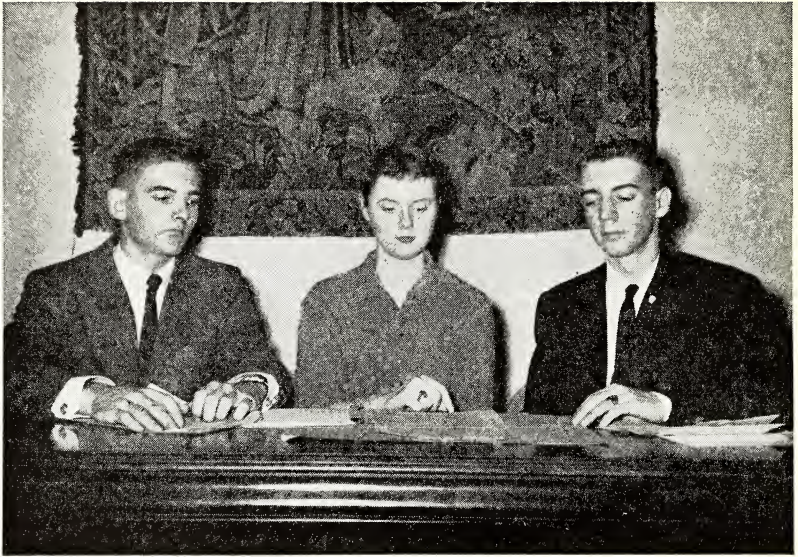
Dr. A. H. Meyer of Valparaiso University announced that the fall meeting of 1960 would be held at Manchester College, North Manchester, Indiana.

Dr. R. E. Cleland, retiring President, delivered the presidential address—"A Case History of Evolution." The meeting was adjourned.

Respectfully submitted,
HARRY E. CRULL, Secretary

NEW MEMBERS

Aughenbaugh, Nolan B., R. R. 10, Lafayette, Ind.	G
Campau, Dr. Edward J., 114 Willow Road, Greenfield, Ind.	E
Crum, Richard Owen, Tangier, Ind.	E
Decatur, David R., 159 N. Whitcomb, Indianapolis, Ind.	Z
Dobson, Dr. R. C., Dept. of Entomology, Purdue Univ., Lafayette, Ind.	E
Dowds, Richard E., 5015 N. Kenmore Rd., Indianapolis, Ind.	M
Engelhardt, Donald W., 406 N. Fess, Bloomington, Ind.	Bo
Faulkner, Charles H., Hawks Lake, Culver, Ind.	A
Fedynskyj, Mrs. Natalie, St. Mary's College, Notre Dame, Ind.	A
Fetters, Thomas W., 406 N. Fess, Bloomington, Ind.	Bo
Fogg, George, 114 W. College, Crawfordsville, Ind.	Bo
Frieders, Rev. Fabian, St. Meinrad College, St. Meinrad, Ind.	Z
Grothaus, Roger Harry, 120-14 Marshall Dr., West Lafayette, Ind.	E
Hardwick, Capt. Willard Eli, Dept. of Bacteriology, Indiana Univ., Bloomington, Ind.	Ba
Hartsock, James G., Agricultural Engineering Dept., Purdue Univ., Lafayette, Ind.	E
Hazeltine, William E., Dept. of Entomology, Purdue Univ., Lafayette, Ind.	E
Hindel, Rev. Richard, St. Meinrad College, St. Meinrad, Ind.	Z
Hummel, Arleen K., 4001 S. Otterbein Ave., Indianapolis 27, Ind.	Z, Ps
Johnston, Ernest R., Purdue Univ. Center, Indianapolis, Ind.	M
Kirkpatrick, Ralph D., Taylor Univ., Upland, Ind.	Z
Leoschke, William L., Chemistry Dept., Valparaiso Univ., Valparaiso, Ind.	C
Lubin, Dr. Bernard, Dept. of Psychiatry, Indiana Univ. Med. Center, Indianapolis, Ind.	Ps
McManus, Michael L., 116-9 Nimitz Dr., West Lafayette, Ind.	E
Matthews, Jr., David L., Dept. of Entomology, Purdue Univ., Lafayette, Ind.	E
Morrison, Frederick D., 847 Maple Dr., Greenfield, Ind.	E
Munsee, Jack R., Ind. State Teachers College, Terre Haute, Ind.	Z
Novak, Joseph D., Biology Dept., Purdue Univ., Lafayette, Ind.	Bo
Parrott, William L., Entomology Dept., Purdue Univ., Lafayette, Ind.	E
Patrick, Rose E., Indiana Central College, Indianapolis 27, Ind.	Z
Raibourn, Downey, 4114 Homerlee Ave., East Chicago, Ind.	A
Schmelz, Rev. Damian, St. Meinrad College, St. Meinrad, Ind.	Bo
Simpers, Robert E., R. F. D. 3, c/o Glen Fruin, Crawfordsville, Ind.	Bo
Smith, Earl C., 35 S. 24th St., Terre Haute, Ind.	C
Sprague, Newton G., 3510 Winthrop Ave., Indianapolis 5, Ind.	Ph, C
Thomas, Jr., Clarence, 5730 E. Washington St., #4, Indianapolis 19, Ind.	Bo
Tovazzi, Gino, Villa Concordia, Mira, Venezia, Italy	C
Westing, Arthur H., Dept. of Forestry and Conservation, Purdue Univ., Lafayette, Ind.	Bo
Winslow, Donald R., 2627 Dekist St., Bloomington, Ind.	Z
Yendol, William George, 128-11 Marshall Dr., West Lafayette, Ind.	E



Officers of the Junior Academy : l. to rt., Vice-President, Sheldon McCullum, Our Lady of Providence High School, Clarksville; Secretary, Nancy Davis, Shawe Memorial High School, Madison; President, William Schall, Central Junior-Senior High School, South Bend.

INDIANA JUNIOR ACADEMY OF SCIENCE

OFFICERS FOR 1959

President: WILLIAM SCHALL, Central Junior-Senior High School, South Bend.

Vice-President: SHELDON MCCULLUM, Our Lady of Providence High School, Clarksville.

Secretary: NANCY DAVIS, Shawe Memorial High School, Madison.

Members of the Council: Mrs. Mary Gough, New Castle (1955-1959); Ernest Litweiler, South Bend (1956-1960); Mrs. Elizabeth Crider, Indianapolis (1957-1961); Robert Weber, Fort Wayne (1958-1962); Sister Suzanne, Vincennes (1959-1963); V. C. Cripe, South Bend (1960-1964).

PROGRAM OF THE TWENTY-SEVENTH ANNUAL MEETING

OCTOBER 31, 1959

Jordan Hall, Butler University, Indianapolis, Indiana.

8:30-9:30 a. m. Registration and Placement of Exhibits, Room 326.

10:00-11:00 a. m. Conferences in Science and Mathematics by faculty representatives of Butler University.

11:00-12 noon. Visits to Instructional Facilities and Laboratories of Butler University.

12:00 noon. Luncheon at the cafeteria.

1:00-2:00 p. m. Business meeting. Election of Officers and Presentation of the Kroger Awards, Cafeteria.

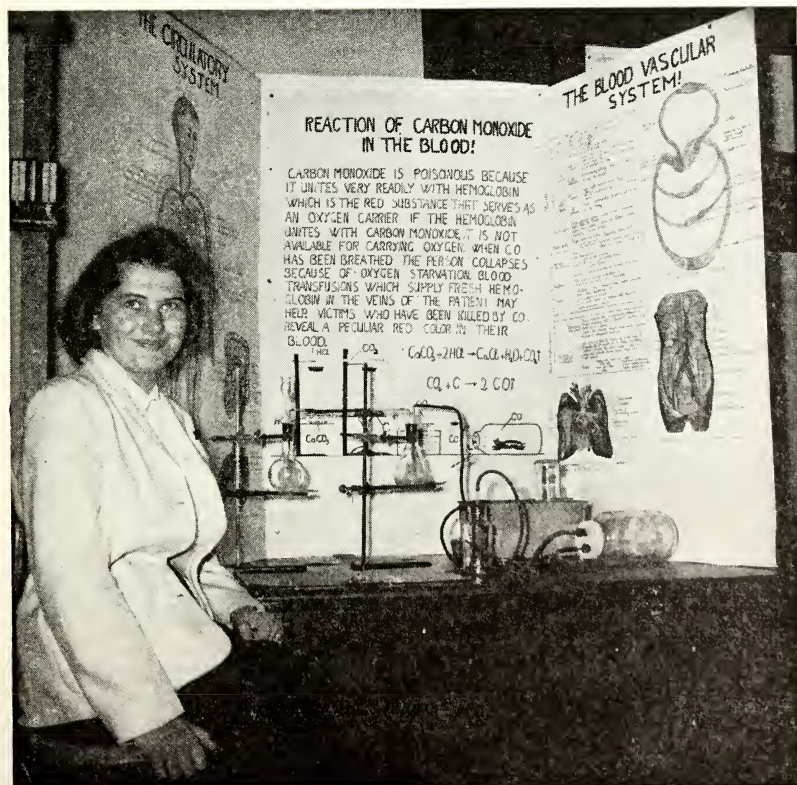
2:00-4:00 p. m. The Assembly Program.

I. Biological Science Section, Jordan Hall, Room 131.

II. Physical Science Section, Chapel, Christian Theological Seminary.

Papers: Biological Science Section, Sheldon McCullum presiding.

1. Is Escherichia Coli Found in the Final Effluent of the South Bend Sewage Treatment Plant? Shirley Marko, Walton Club, Adams High School, South Bend.
2. Bacterial Study of Milk, Nelda Arvin and James Aikman, Aquinas Science Club, Washington Catholic High School, Washington.
3. Effect of Vibrations on Serratia Marcescens Streaked on Nutrient Agar, Janice Shoemaker, Walton Club, Adams High School, South Bend.



A Student Exhibit on "Reaction of Carbon Monoxide on the Blood" from Ladywood School, Indianapolis.

4. Struggle for Existence Among Soil Mico-organisms, Marilyn Wichman, Aquinas Science Club, Washington Catholic High School, Washington.
5. Are Antibiotics Conquering Bacteria? Patricia A. Coleman, Science Club, Washington High School, Indianapolis.
6. Camouflage—A Necessity for Survival, Diane Osting, Science Club, Washington High School, Indianapolis.
7. Identity of Protoplast-infecting and Cell-infecting Particles Derived from T2 Bacteriophage, Norman Pace, Edinburg High School, Edinburg (illustrated).
8. The Effects of Temperature on the Respiration Rate of Goldfish, Mary Kathryn Crider, Westlane Junior High School, Indianapolis.
9. My Ant Colony, Pat Martin, Biology Club, Lew Wallace High School, Gary.
10. Effect of Bacteria on Plant Structures, Ivan Joe Brown, Junior Explorers of Science, Lebanon High School, Lebanon.

Papers: Physical Science Section, William Schall, presiding.

1. The Van de Graff Generator, Phy-Chem Club, Our Lady of Providence High School, Clarksville.
2. Refraction of Light Through Prisms, Phy-Chem Club, Our Lady of Providence High School, Clarksville.
3. Astronomical Observations and Calculations of an Asteroid, Terence Hooten, Aquinas Science Club, Washington Catholic High School, Washington.
4. Remanent Spin Magnetometer, William D. Schall, JETS, Central High School, South Bend.
5. Chemical Bonding in Allotropy, John Linsky, Albertus Magnus Science Club, Central Catholic High School, Fort Wayne.
6. The Preparation of Acetamides from Primary and Secondary Amines, Samuel B. Etienne, Danville High School, Danville.
7. Construction and Possible Use of an Electrostatic Proton Accelerator as a Research Tool, Michael R. Meadows, Science Club, Senior High School, Richmond.

MINUTES

The twenty-seventh annual meeting of the Indiana Junior Academy of Science was held Saturday, October 31, 1959, in Jordan Hall of Butler University, Indianapolis, Indiana.

Eighteen exhibits of science projects by high school students were displayed in Room 326, Jordan Hall. The exhibits included the following: A Study of Mezzium Americanum; Camouflage, A Necessity for Survival; Chemical Bonding in Allotropy; Effect of Bacteria on Stem Tissue; Entomology; Is Escherichia Coli Found in the Final Effluent of the South Bend Sewage Plant?; Light Beam Modulation; Plastic-Phenol Formaldehyde; Priz-Mir-Scope; Reaction of Carbon Monoxide on the Blood; Rocks;

Struggle for Existence Among Soil Micro-organisms; Textiles and Dyeing; The Effects of Temperature on the Respiration Rate of Goldfish; The Effects of Vibration on *Serratia Marcescens*; Van de Graff Generator; Wireless Broadcaster and Amplifier; and Your Wonder Drugs at Work (Are Antibiotics Conquering Bacteria?).

Conferences in science and mathematics were held at 10:00 a. m. by members of the faculty at Butler University. The science areas represented included botany, chemistry, mathematics, pharmacy, physics, psychology, and zoology. The cooperation of the Butler University faculty in this program was greatly appreciated by club sponsors and members of the Junior Academy.

Members of the staff who presented the separate science conferences also conducted tours through the instructional facilities and science laboratories of the University.

The annual business meeting was held in the cafeteria immediately following the noon luncheon. President William Schall, Central Junior-Senior High School, South Bend, introduced Vice-President Sheldon McCullum, Our Lady of Providence High School, Clarksville, and Secretary Nancy Davis, Shawe Memorial High School, Madison.

President Schall then called upon Dr. Alexander E. Jones, Dean, College of Arts and Sciences, Butler University, to welcome the Junior Academy on the occasion of their annual meeting. Dean Jones encouraged the students to continue their interest in science and all phases of education leading toward a productive career.

Mr. William Tatter, Indianapolis Kroger Division, was introduced next to present the second annual Kroger awards. Mr. Tatter expressed briefly Kroger's interest in encouraging good high school science programs. A top award of fifty dollars and a plaque were presented to Washington High School, Indianapolis. Two runner-up awards of twenty-five dollars and a plaque were presented to both Garfield High School, Terre Haute, and to Washington Catholic High School, Washington.

The next item of the business meeting was the election of officers. The list of nominees was submitted by the Council from names received from club sponsors and nominations were accepted also from the floor. The following officers were elected for 1960: president, Harry Scribner, New Albany High School, New Albany; vice-president, Robert Raymond, Central Junior-Senior High School, South Bend; secretary, Ann Burton, University High School, Bloomington.

Mr. Ernest Litweiler, reporting for the Council, announced that Sister Suzanne, sponsor of the Sigma Tau Science Club, Saint Rose Academy, Vincennes, was named to fill the unexpired term of Sister Mary Blanche of Washington Catholic High School, Washington, since the latter had moved to Washington, D. C. Mr. V. C. Cripe, sponsor of the JETS Science Club, Central Junior-Senior High School, South Bend, was named the new Council member replacing Mrs. Mary Gough, New Castle, whose term expired this year.

Awards for the "best boy" and "best girl" in science were received by William D. Schall, Central Junior-Senior High School, South Bend, and Patricia Coleman, Washington High School, Indianapolis, respectively. A certificate of merit was presented to each, together with a year's mem-

bership in the American Association for the Advancement of Science. Terence Hooten, Washington Catholic High School, Washington, and Nancy Davis, Shawe Memorial High School, Madison, received honorable mention.

Professor H. H. Michaud, State Sponsor, Purdue University, expressed appreciation on behalf of the Junior Academy of Science for the splendid cooperation of Butler University for providing the facilities for the meeting. Dr. William H. Bessey, Department of Physics, Butler University, was introduced and commended for his special efforts as local program chairman in making the program a success. Professor Michaud announced that the 1960 annual fall meeting will be held at Manchester College.

Thanks was expressed to Miss Jerry Motley, Science Club Sponsor, Howe High School, Indianapolis, for her work as editor of the Junior Academy Journal. Both the spring and fall issues were given to members at the registration table.

Miss Marilyn Wichman, Aquinas Science Club, Washington Catholic High School, Washington, received an award of twenty-five dollars for the best exhibit on bacteriology. The title of the exhibit was "Struggle for Existence Among Soil Micro-organisms." Patricia Coleman, Washington High School, Indianapolis, received honorable mention for her exhibit on "Your Wonder Drugs at Work." An award of twenty-five dollars was presented to Mr. Norman Pace, Edinburg High School, Edinburg, for his paper on "Identity of Protoplast-infecting and Cell-infecting Particles Derived from T2 Bacteriophage." Miss Shirley Marko, Adams High School, South Bend, received honorable mention for her paper "Is *Escherichia Coli* Found in the Final Effluent of the South Bend Sewage System?" These awards are presented each year by the American Society of Bacteriologists.

A brief account of the papers presented to the biological science section follows:

Shirley Marko, Walton Club, Adams High School, South Bend, discussed the question, "Is *Escherichia Coli* Found in the Final Effluent of the South Bend Sewage System?" The purpose of the experiment was to determine whether the final effluent of the South Bend Sewage Plant was safe for public use. Water samples which were collected from the water entering the plant and leaving it were tested. The tests proved that the treatment plant was 86% effective, which measures up to the United States Health Service requirement.

"A Bacterial Study of Milk" was reported by Nelda Arvin and James Aikman, Aquinas Science Club, Washington Catholic High School, Washington. Different methods of handling raw and pasteurized milk were employed to find what conditions were optimum for keeping the Coliform bacterial count low after it reaches the consumer. The conclusions were that only sanitary handling and refrigeration provided optimum conditions for keeping Coliform count low in milk after it reaches the consumer.

Janice Shoemaker, Walton Club, Adams High School, South Bend, related the results of her experiment on the "Effect of Vibrations on *Serratia Marcescens* Streaked on Nutrient Agar." *Serratia marcescens*, a bacillus form of bacteria, were streaked on nutrient agar in three sterile

petri dishes and kept at room temperatures. Two of the dishes were vibrated for different periods of time and her conclusions were that the bacteria grew best under conditions with no vibrations.

"Struggle for Existence Among Soil Micro-organisms" was the title of the next paper given by Marilyn Wichman, Aquinas Science Club, Washington Catholic High School, Washington. Antibiotic producing colonies of bacteria were found in collections of four different types of soil. These were cultivated in petri dishes and the experiment proved that the bacteria produced substances that inhibited growth of other micro-organisms. It was concluded that this provided more room for the chemical producing bacteria to grow.

A paper by Patricia A. Coleman, Science Club, Washington High School, Indianapolis, on "Are Antibiotics Conquering Bacteria?" explained that her experiment was an attempt to determine whether certain antibiotics were really effective against specific bacteria. Various antibiotics were introduced into pure cultures of harmful bacteria. While the antibiotics used were found to be effective, it was concluded that they should be administered only by a physician because of possible harmful side-effects such as hives, intestinal disturbances and allergies.

"Camouflage—A Necessity for Survival" was the topic presented by Diane Osting, Science Club, Washington High School, Indianapolis. Sunfish and catfish were found to be able to change color in adaptation to various colored backgrounds. This, she concluded, was an effective means of protecting the fish against its enemies and was important in its survival.

Ivan Joe Brown, Junior Explorers of Science, Lebanon High School, Lebanon, discussed "The Effect of Bacteria on Plant Structures." Bacteria growing on certain plant structures were found to be contagious and dangerous to other plants.

"Identity of Protoplast-infecting and Cell-infecting Particles Derived from T2 Bacteriophage" was the title of a paper presented by Norman Pace, Edinburg High School, Edinburg. The purpose of the experiment was to identify the agent derived from T2 bacteriophage responsible for bacterial cell infection.

The next paper on "The Effect of Temperature on the Respiration Rate of Goldfish" was read by Mary Katherine Crider, Westlane Junior High School, Indianapolis. A graph was used to show that the respiration rate of the goldfish increased with higher temperature and decreased as the water temperature was lowered. It was also indicated that a range of 60° to 70° F. is the best temperature to maintain for the goldfish.

"My Ant Colony" was the final topic of the biology section discussed by Pat Martin, Biology Club, Lew Wallace High School, Gary. This represented a description of the activities, division of labor, and life history of an ant colony.

Anita Morris, Washington High School, Indianapolis, served as acting secretary of the biological science section.

The following is a brief account of the papers read at the physical science section:

"The Van de Graff Generator" was the title of the paper given by Steve Ames, Phy-Chem Club, Our Lady of Providence High School, Clarksville. The Van de Graff generator was built in 1931 in order to accelerate

particles to strike a target. The report explained how the generator works and that it is used to change the atomic structure of the atom.

Steve Vince, Phy-Chem Club, Our Lady of Providence High School, Clarksville, discussed the "Refraction of Light Through Prisms." With the aid of diagrams, it was pointed out that white light could first be broken into colored light and then back to white light again by the use of prisms.

The next paper on "Astronomical Observations and Calculations of an Asteroid" was read by Terence Hooten, Aquinas Science Club, Washington Catholic High School, Washington. He explained that the origin of these minor planets was unknown, although many theories exist. It is the special work of research to discover and determine the position of the asteroids by employing similar triangles and the medians of these triangles.

"Remanent Spin Magnetometer" was the topic presented by William Schall, JETS, Central Junior-Senior High School, South Bend. The theory, operation and design of the magnetometer were explained. Its use was to study paleo-magnetism—i.e., to locate the magnetic pole at the time when the earth's sediments were formed.

John Linsky, Albertus Magnus Science Club, Central Catholic High School, Fort Wayne, read a paper on "Chemical Bonding in Allotropy." Allotropy was explained as the phenomenon of the existence of an element, or sometimes a compound, in two or more different forms. Thus the diamond and graphite are two allotropic forms of carbon. Models were displayed to show the different types of bonding and it was explained that high temperatures and pressures would change graphite to an artificial diamond. The diamond can be reduced to graphite by subjecting it to high temperatures and low pressure, thus making the transition cycle interchangeable. The two main allotropic forms of phosphorus, red and white, were also discussed.

Michael R. Meadows, Science Club, Senior High School, Richmond, explained "The Construction and Possible Use of an Electrostatic Proton Accelerator as a Research Tool." The electrostatic accelerator functions on the principle that like electrical charges repel each other. A large positive potential is maintained by a Van de Graff generator and a source of protons is provided by a local beam of electrons at 500 w. passing through a volume of hydrogen gas. The protons are then repelled and accelerated down the six foot accelerator tube. The air in the tube has been pumped out to provide a free path for the protons. At the opposite end of the tube is the target chamber. The targets, mostly thin foils, are placed in the chamber. The kinetic energy of the protons, due to the acceleration, is equal to the potential difference between the two ends of the acceleration tube.

The final paper entitled, "The Preparation of Acetamides from Primary and Secondary Amines," was presented by Samuel B. Etienne, Danville High School, Danville. The purpose of the experiment was an attempt to prove that the same acetamide derivatives could be produced from Schiff's bases, in a one step process, by reacting them with trimethylamine borane in glacial acetic acid, as could be produced from the Schiff's bases, in a two-step process, by treating them with dimethylamine borane in glacial acetic acid to yield secondary amines and then treating the second-

ary amines with either acetic anhydride or acetyl chloride to produce the acetamide derivatives. No specific conclusions were reached since further experimentation is needed to check the results.

The minutes of the physical science section were recorded by Nancy Davis, Secretary, Junior Academy, Shawe Memorial High School, Madison.

The twenty-seventh annual meeting of the Junior Academy of Science was attended by four hundred and thirty-seven registered members, sponsors and guests. This is the highest attendance ever recorded at an annual meeting and attests to the growing interest and improved quality of the Junior Academy program.

INDIANA JUNIOR ACADEMY OF SCIENCE CLUBS

FALL 1959

<i>Town</i>	<i>School and Club</i>	<i>Sponsor</i>
Bloomington	H. S., National Scientific Honor Society (1931)	Merril L. Crisler
Bloomington	University H. S., Junior Academy (1938)	Donald R. Winslow
Chesterton	H. S., Science (1954)	Robert McCord
Clarksville	Our Lady of Providence H. S., Phy-Chem (1956)	Sister Joseph Louise
Clayton	H. S., Junior Academy (1951)	Howard C. Lewis
Columbus	H. S., Science (1958)	Lawrence Poorman Neal Carmichael
Crawfordsville	H. S., Up-N-Atom (1950)	David Wells
Edinburg	H. S., The Alchemists (1954)	S. C. Harrell
Elkhart	H. S., Junior Academy (1940)	Robert Mahan
Evansville	Reitz Memorial H. S., Science (1958)	Sister Jean Margaret
Fort Wayne	Central H. S. (1940)	Iva Spangler
Fort Wayne	Central Catholic H. S., Albertus Magnus Science Club (1952)	Sister Anne Pauline
Fort Wayne	Elmhurst H. S., Phy-Chem (1935)	Ruth Wimmer
Fort Wayne	North Side H. S., Nature (1936)	Vesta Thompson
Fort Wayne	South Side H. S., Junior Academy of Science (1956)	Robert Weber
Gary	Edison H. S., Beaker Breakers (1949)	Mrs. Martha B. Connor
Gary	Lew Wallace H. S., Biology (1935)	Lola Lemon
Gary	Lew Wallace H. S., Klub Kem (1941)	Mrs. Helen McKenzie
Gary	Tolleston H. S., Biology (1952)	John Reidel
Gary	Wirt H. S., Biology (1945)	Mrs. Frances Huddleston
Gas City	Mississinewa Joint H. S., Science (1936)	Roy McKee
Griffith	H. S., Science (1953)	George M. Bunce

Hamlet	H. S., Science (1954)	Lawrence Cushman
Hobart	H. S., Science (1952)	Lola Stewart
Indianapolis	Howe H. S., Science (1949)	Jerry Motley
Indianapolis	Ladywood School, Guerin Science Club (1957)	Sister Pauline Marie Sister Louise
Indianapolis	St. Agnes Academy, Science (1959)	Sister Amelia
Indianapolis	Shortridge H. S., Naturalist's Club (1947)	Robert A. Weaver
Indianapolis	Shortridge H. S., Science (1931)	Mrs. Henrietta A. Parker
Indianapolis	Technical H. S., Nature (1932)	Charles E. Russell
Indianapolis	Washington H. S., Science (1931)	Mrs. Elizabeth Crider
Indianapolis	Westlane Jr. H. S., Science (1959)	John W. Van Sickle
Jeffersonville	Clark and Floyd County Seminar (1959)	Harold E. Cook
LaPorte	H. S., Bi-Phi-Chem (1958)	Frances Gourley Byron Bernard
Lebanon	H. S., Jr. Explorers of Science (1953)	Helen E. Reed
Loogootee	St. John H. S., Science (1959)	Sister Mary Ellen
Madison	Shawe Memorial H. S., Science (1957)	Theodore A. Winkel
Mishawaka	H. S., Science (1936)	Darl F. Wood
New Albany	H. S., Science (1935)	Erwin Steinkamp
New Castle	H. S., Science (1947)	Betty Jo Montag
New Haven	H. S., Phi-Chi (1954)	Keith Hunnings
Oldenburg	Immaculate Conception Academy, Heterogeneous Genius Club (1958)	Sister Mary Constance
Richmond	H. S., Science (1950)	Von Alexander
Rossville	H. S., Science (1954)	Martin Silverthorn
Sanborn	H. S., Up and Atom (1954)	Paul D. Carter
South Bend	Central H. S., Jr. Academy (1939)	V. C. Cripe
South Bend	John Adams H. S., Adams Walton (1953)	Ernest Litweiler
Wanamaker	Franklin Twp. H. S., Sigma Mu (1958)	Jerry M. Colglazier
Vincennes	St. Rose Academy, Sigma Tau (1958)	Sister Suzanne
Washington	Catholic H. S., Aquinas Science Club (1958)	Sister Jean Francis