

PROCEEDINGS

of the

Indiana Academy
of Science

Founded December 29, 1885

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Volume 70
1960

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RICHARD A. LAUBENGAYER, Editor
Wabash College
Crawfordsville, Indiana

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Spring Meeting
May 20-21
Clifty Falls
State Park

Fall Meeting
October 6-8, 1960
Manchester College

Published at Indianapolis, Indiana
1961

1. The permanent address of the Academy is the Indiana State Library.
2. **Instructions for Authors** appear at end of this volume, P.—
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 \$5.00 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 1960

Spring Meeting: May 20-21, Clifty Falls State Park, Madison, Indiana.
Fall Meeting: October 6, 7, 8, Manchester College, North Manchester,
Indiana

OFFICERS FOR 1960

President.....A. T. GUARD, Purdue University
Vice President.....LAWRENCE H. BALDINGER, Notre Dame University
Secretary.....WILLIAM W. BLOOM, Valparaiso University
Treasurer.....DONALD J. COOK, DePauw University
Editor.....R. A. LAUBENGAYER, Wabash College
Press SecretaryEUGENE WEINBERG, Indiana University

CHAIRMEN ELECTED BY THE DIVISIONS

Anthropology.....M. S. WADIA, Indiana University
Bacteriology.....W. A. ZYGMUNT, Mead Johnson and Company
Botany.....S. N. POSTLETHWAIT, Purdue University
Chemistry.....H. B. BURKETT, DePauw University
Entomology.....R. E. NISWANDER, Manchester College
Geology and Geography.....J. C. HOOK, Indiana State Teachers College
History of Science.....FAY K. DAILY, Butler University
Mathematics.....KERMIT H. CARLSON, Valparaiso University
Physics.....C. S. MORRIS, Manchester College
Plant Taxonomy.....W. A. DAILY, Eli Lilly & Company
Psychology.....D. C. COLBURN, Manchester College
Soil Science.....STANLEY A. BARBER, Purdue University
Zoology.....CARL H. KREKELER, Valparaiso University

EXECUTIVE COMMITTEE

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

L. H. Baldinger	P. D. Edwards	W. P. Morgan
S. A. Barber	A. T. Guard	C. S. Morris
W. W. Bloom	M. T. Hall	R. E. Niswander
H. B. Burkett	J. C. Hook	J. C. Polley
K. H. Carlson	W. H. Johnson	C. L. Porter
O. B. Christy	T. K. Just	S. N. Postlethwait
R. E. Cleland	P. Klinge	H. M. Powell
N. M. Coats	K. H. Krekeler	W. J. Rice
D. C. Colburn	R. A. Laubengayer	S. S. Visher
D. J. Cook	R. W. Lefler	M. S. Wadia
F. K. Daily	S. McCoy	F. N. Wallace
W. A. Daily	C. A. Markle	P. Weatherwax
J. J. Davis	M. S. Markle	E. D. Weinberg
E. F. Degering	M. G. Mellon	Winona H. Welch
L. E. DeLanney	A. H. Meyer	T. G. Yuncker
W. E. Edington	H. H. Michaud	W. A. Zygmunt

BUDGET COMMITTEE

Consisting of President, Secretary, Treasurer, Editor, Chairman of the Junior Academy, Library, Program, and Relation of Academy to State: A. T. Guard, W. W. Bloom, D. J. Cook, R. A. Laubengayer, H. H. Michaud, Nelle M. Coats, Wm. Eberly, Wm. Daily, 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 H. S., Indianapolis; F. J. Welcher, Indiana University, Adult Education Center, Indianapolis.

Research Grants (term 5 years): Chairman, T. G. Yuncker, DePauw University (term expires 1964); Keith M. Seymour (term expires 1965); Paul Weatherwax (term expires 1961); A. A. Lindsey (term expires 1963); J. F. Hart (term expires 1962); A. T. Guard and William W. Bloom (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; Fay K. Daily; D. G. Grey; C. J. Goodnight; H. H. Michaud; W. H. Welch; F. N. Young, Jr.; J. Webster.

Fellows Committee: Chairman, P. D. Edwards, Mathematics, Ball State Teachers College; H. H. Remmers, Psychology; H. Driver, Anthropology; Winona H. Welch, Botany; L. S. McClung, Bacteriology; K. Seymour, Chemistry; H. O. Deay, Entomology; T. F. Barton, Geology and Geography; M. S. Markle, History of Science; A. C. Mitchell, Physics; A. R. Bertrand, Soil Science; N. Pearson, Zoology.

Index: Chairman, R. A. Laubengayer, Wabash College; Nelle Coats; Mrs. L. Burton.

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

Invitations: Chairman, Marion T. Hall, Butler University; A. H. Meyer.

Junior Academy: Chairman, H. H. Michaud, Purdue University; R. Cooper; P. E. Klinge; Lola Lemon; R. E. Niswander; R. W. Schulz; J. Cope; D. Webster; R. Weber.

Library: Chairman, Nelle Coats, State Library; Eli Lilly, G. A. Black.

Membership: Chairman, Louis E. DeLanney, Wabash College; John A. Buehler, Anderson College; H. M. Dixon, Butler University; M. R. Garner, Earlham College; E. Niswander, Manchester College; J. Webster, Hanover College; J. F. Hennen, State Teachers College; Jerry J. Nisbet, Ball State Teachers College; Lois Farquharson, Franklin College; G. F. 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. R. Eberly, Manchester College; H. Weimer; C. Morris; J. Baumgart; E. Niswander; P. Orpurt; W. Bessey; G. Wickwire;

Publication of Proceedings: Chairman, R. A. Laubengayer, Wabash College; A. A. Lindsey; James Clark.

Publicity: Chairman, Eugene Weinberg, Indiana University; Nelle Coats; H. Weimer; R. Nelson.

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

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

Resolutions: Chairman, Winona H. Welch, DePauw University; S. D. Gerking; E. L. Haenisch.

Science Education: Chairman, Paul Klinge, Indiana University; K. Dale; R. Lefler; W. Smith; R. S. Shulz; H. N. Hardy (University School, Bloomington); L. Poorman (Columbus High School).

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

SPRING MEETING EXECUTIVE COMMITTEE

CLIFTY FALLS STATE PARK
May 20, 1960
4:30 P. M.

The meeting was called to order by the president, Dr. A. T. Guard.

Editor Richard Laubengayer was unable to be present but submitted a written report. He reported that there had been some slowness in getting the galley proofs so that they would not go out to contributors until the second week in June. The need of contributors getting their material to the editor was noted and members were urged to observe the published deadline for submitting papers for publication.

Nelle Coats, librarian, reported that the library still had many copies of the Index for Volumes 1-50 and that new members may need copies. Extra copies of volumes 51-61 of the proceedings were also available. About 500 copies of Indiana Scientists are available at \$2.50. Volume 67 is exhausted and copies of this volume would be welcomed by the librarian. She reported that Mrs. Wright had given \$500.00 to the library and suggested the purchase of an herbal.

The program chairman, William Eberly, reported on plans for the fall meeting at Manchester College. Following a discussion of the need for projection equipment it was moved and carried that the program chairman request the divisional chairmen to try to provide projection equipment.

The treasurer, Donald J. Cook, submitted the following tentative financial report as of April 30, 1960:

Receipts:		
Bank Balance as of Jan. 1, 1960.....	\$21,324.65	
Total Receipts thru April 30, 1960.....	1,381.30	\$22,705.95
Disbursements:		
Total Disbursements thru April, 1960.....		\$ 8,316.47
Balance on Hand May 1, 1960.....		\$14,389.48
Account Balances on Hand, May 1, 1960		
John Shephard Wright Library Account.....	\$ 1,727.73	
Indiana Science Talent Search Account.....	181.43	
N. S. F. Visiting Scientists Account.....	9,263.59	
Indiana Academy of Science Funds.....	3,216.73	
		\$14,389.48

A motion carried that the treasurer transfer \$898.95 from the Academy funds to the Lilly Endowment Fund Gift.

The treasurer called attention to the increasing work load placed upon his office by the increasing activity in the visiting scientist and mathematician programs. Doctors Guard, Cook, Michaud, and someone from the mathematics program are to meet and work out a solution to reduce the load on the treasurer's office.

Mr. Paul Klinge reported for the Press Secretary, Eugene Weinberg, in his absence and emphasized the need for adequate abstracts to papers

so that news stories can be written. He suggested that the News Bureaus of the local institutions be utilized to help in preparing newsworthy abstracts.

The Science Education Committee chairman, Mr. Paul Klinge, presented extensive recommendations to the Executive Board concerning the youth programs of the Academy.

Following are the recommendations to the Executive Board:

At a meeting of the Education Committee Saturday, February 20, 1960, at the Indiana University Medical Center, the members of this committee were unanimous in the following recommendations to the Executive Board for the reorganization of the youth activities of the Academy.

The youth programs of the Academy at present constitute the State Science Fairs, the Indiana Science Talent Search, the Junior Academy of Science, and the Visiting Scientist Lectureship Program.

We recommend the following:

All the youth programs of the Indiana Academy of Science should be put under the supervision of an Administrative Committee. In addition, members of the Education Committee may be considered as candidates for the Administrative Committee. The function of the Administrative Committee would be to set up rules and regulations for these programs, exercise appointive power in the direction of the programs, and have authority to formulate policy for the conduct of each one of the current youth programs.

In addition, a Finance Committee should be set up under the chairmanship of a member of the Academy, and other members of this Committee will include outstanding industrial, commercial, and business leaders of this state as well as ex officio members from the Administrative Committee. The chief purpose of this Committee will be to raise funds which will be necessary to carry on the programs in a more financially comfortable arrangement. The current budget of some \$10,000 for these programs should be increased to a possible \$15,000 for the programs to run more smoothly. Some of this money will be necessary for the administration of these programs as this has been assumed in the past to a large degree by state colleges and universities.

It is further recommended that these programs be confined to two times during the academic year. At present, it is hoped that the fall program will be largely under the control of the Junior Academy of Science. The general arrangement of this program will be to encourage students to read papers of their science work. It seems necessary now to make some selection of the papers which will be read at this meeting. It is hoped that the fall meeting will be one of motivating students to further work in science as well as to give an opportunity for students to read papers of their work before an audience.

The spring event should be the concluding meeting of the other programs in the current youth program of the Academy. This may tentatively be called a Science Congress. This will include a display of the projects of students who have placed in the Indiana Science Talent Search as well as those students who have been chosen from Regional Science Fairs throughout the state. This will be a culminating event for gifted high school science students in their work in the preceding academic year.

The tentative reorganization plan of the Science Fairs of the state is as follows: Colleges and universities in the state will be permitted to organize their own local Science Fairs with students having the option of which of these Science Fairs they wish to enter. The best projects from each of these university and college Science Fairs will be chosen on an area basis, perhaps four such areas in the state. These projects will then be displayed at the Science Congress in the spring. Winners from the Science Congress Science Fair exhibits will be candidates for attending the National Science Fair. Winners from local Science Fairs, sponsored by universities and colleges, will also have the option of attending the National Science Fairs under financial arrangements which local institutions may devise.

The narrative account of the meeting of the Education Committee in February has been submitted to Professor Guard, and it includes details of the discussion of which the above recommendations were the result. It should be indicated that Professor Lefler feels that he should relinquish the leadership of the Science Talent Search and the Science Fairs, and the proposed Administrative Committee, mentioned above, should appoint new directors of these activities. However, it was the feeling of the Committee that Professor Lefler should still remain on the Administrative Committee.

It is the feeling of the Education Committee that this reorganization will permit high school science teachers to be less confused about all of the activities now in operation for science student activities. Publicity and definite financial arrangements would be more easy to obtain with this proposed reorganization, the Committee felt.

We recommend to the Executive Board of the Indiana Academy of Science the adoption of the above recommendation.

MRS. CATHERINE DALE, Griffith, Chemistry Teacher

PROFESSOR RALPH LEFLER, Purdue University

MR. LAWRENCE POORMAN, Columbus High School, Physics Teacher

PROFESSOR RICHARD SCHULZ, Purdue University

MR. WILLIAM SMITH, Howe High School, Biology

PROFESSOR PAUL KLINGE, Indiana University, Chairman

Other persons present:

PROFESSOR A. T. GUARD, Purdue University

President, Indiana Academy of Science

PROFESSOR HOWARD MICHAUD, Purdue University,

Director, Junior Academy of Science

MR. EBNEST LITWEILER, John Adams High School, South Bend,

Member of Junior Academy of Science Board

April 14, 1960

A motion carried to accept the recommendations of the committee and instructing the president to appoint the two committees included in the recommendations.

WILLIAM W. BLOOM, *Secretary*

Approved 10-7-60

SPRING MEETING
DINNER MEETING

CLIFTY FALLS STATE PARK

May 20, 1960

Dr. A. T. Guard called the meeting to order and extended words of welcome to the members. The officers of the Academy present were introduced by the President.

Eighteen new members were accepted into the Academy and three new Junior Academy clubs were received.

Dr. William Eberly, program chairman, reported that sixty participants had registered and were staying over in the Inn and announced the field trips for Saturday morning.

Dr. Markle, as speaker for the evening, gave a most interesting account of his recent visit to Hawaii and used his excellent color slides to illustrate his talk on the people and the flora of the islands.

Following the adjournment of the meeting, Mr. Gerken, manager of Clifty Inn, served refreshments for the members of the Academy.

WILLIAM W. BLOOM, Secretary

Approved 10-7-60

FALL MEETING EXECUTIVE COMMITTEE

MANCHESTER COLLEGE, North Manchester, Ind.

The meeting was called to order by President A. T. Guard at 7:35 P. M.

The minutes of the spring meeting of the Executive Committee of the Academy and the minutes of the dinner meeting held at Clifty Inn at Clifty Falls State Park were read by the secretary and approved as read.

Reports of officers and chairmen of committees:

Treasurer—Donald J. Cook: Financial report of the Indiana Academy of Science, Jan. 1, 1960 thru Dec. 31, 1960.

FINANCIAL REPORT OF THE INDIANA ACADEMY OF SCIENCE AS OF DECEMBER 31, 1960

Receipts

Balance on Hand—January 1, 1960.....	\$21,324.65	
Dues and Initiation Fees.....	3,151.00	
Sales and Reprints: Vol. 68.....	636.28	
Sale of Publications.....	18.50	
Refunds.....	19.69	
Indiana Science Talent Search.....	1,275.00	
Endowment Funds for Research Grants.....	300.00	
National Science Foundation Grant No. G-12417.....	17,150.00	
National Science Foundation Grant No. G-12412.....	13,710.00	
TOTAL RECEIPTS.....	\$57,585.12	\$57,585.12

Disbursements

Editor—Vol. 69 of Academy Proceedings.....	\$ 225.00
National Science Fair.....	100.00
Indiana Science Talent Search: IAS Funds.....	200.00
Indiana Science Talent Search.....	1,774.13
Academy Conference.....	12.34
Expenses of Treasurer.....	150.00
Expenses of Secretary.....	90.65
Expenses of Program Committee.....	321.75
Stationery.....	147.50
John S. Wright Library Fund.....	200.00
Binding of Periodicals from Academy Funds.....	997.65
Cost of Publishing Vol. 69 of Proceedings (In Excess of State Payment).....	1,636.23
Cost of Reprints for Vol. 69.....	994.43
Expenses of Indiana Jr. Academy of Science.....	55.93
Expenses of Academy Officers.....	125.00
Grants-In-Aid for Research: Fay Daily.....	100.00
Charles Hall.....	100.00
Misc.: Postage, Office Supplies, etc.....	108.81
National Science Foundation Grant G-8724.....	9,195.90
National Science Foundation Grant G-12412.....	13,710.00
National Science Foundation Grant G-12417.....	2,686.35
Transfer of Funds to Treasurer-Elect Kermit Carlson from NSF G-12417 monies.....	5,000.00

Refund to National Science Foundation of Unexpended Balance of Grant No. G-8724.....	5,829.42	
TOTAL DISBURSEMENTS.....	\$43,741.09	\$43,741.09
BALANCE ON HAND AS OF DECEMBER 31, 1960.....		\$13,844.03
BALANCE ON HAND in the Following Accounts as of 12-31-60 :		
John S. Wright Library Fund.....	\$ 2,426.68	
Indiana Science Talent Search.....	639.09	
Visiting Scientists NSF Grant G-12417.....	9,463.65	
Academy Funds (Of which \$400. is designated for Research) ..	1,314.61	
		\$13,844.03

Editor—Richard A. Laubengayer: There were 1,292 hardbound and 610 softbound copies of Volume 69 of the *Proceedings* which had been printed, giving a total of 1,902 copies. These have been distributed by the State Library. Forty-one of the contributors ordered reprints.

Press Secretary—Eugene D. Weinberg: Notices of the 76th Annual Meeting of the Academy had been issued to each of the State's daily newspapers and to the wire services. In addition releases have been issued concerning the general meeting, the meetings of the Divisions, the banquet, and the Junior Academy. Subsequent releases will be issued concerning the election of officers of the Academy and of the Junior Academy and the winners of the awards in the Junior Academy. A request was made that contributors of papers to the sessions submit newsworthy popular abstracts of their papers to the Division Chairmen well in advance of the meetings so that adequate news coverage of the scientific papers presented can be secured in advance of the meetings.

Nominations Committee—Willis H. Johnson, chairman of the committee: Nominated as Trustees of the Academy Foundation: Chairmen, Ward J. Rice and William A. Daily to complete the term of J. E. Sybert. Scott McCoy and Frank Welcher were nominated to succeed themselves as members of the Bonding of Trustees Committee.

Fellows Committee—P. D. Edwards: The following members were recommended for fellows in the Indiana Academy of Sciences: Lawrence Manning Baker, Psychology, Purdue University; James Edward Canright, Botany, Indiana University; Paul Henry Gebhard, Anthropology, Indiana University; Edward W. Shrigley, Microbiology, Indiana University Medical Center; Joe Lloyd White, Agronomy, Purdue University; James Thorp, Geology, Earlham College.

Biological Survey Committee—Submitted by the chairman, Carroll A. Markle, and presented by Winona H. Welch:

Report of the Biological Survey Committee of the Indiana Academy of Science

Publications of 1959-1960 Dealing with the Flora and Fauna of Indiana

- Algae :
1. Palmer, C. Mervin and Earle Brown, 1960. Pectodictyon and other Unusual Algae from Indiana. *Proceedings of the Indiana Academy of Science for 1959*, 69 : 119-122.
 2. Thomas, Clarence, 1960. Some Algae of the St. Meinrad Area. *Proceedings of the Indiana Academy of Science for 1959*, 69 : 121-133.

- Bryophyta : Welch, Winona H., 1960. Studies in Indiana Bryophytes XII Proceedings of the Indiana Academy of Science for 1959, **69** : 123-127.
- Vascular Plants : 1. Markle, Carrolle A., 1960. Contributions to the Flora of Wayne County, IV. Proceedings of the Indiana Academy of Science for 1959, **69** : 266-268.
2. McCoy, Scott, 1960. New County Records for Indiana (Abstract). Proceedings of the Indiana Academy of Science for 1959, **69** : 262.
- Annelida : Joyner, James W., 1959. Earthworms of the Upper White-water Valley (East Central Indiana). Proceedings of the Indiana Academy of Science for 1959, **69** : 313-319.
- Crustacea : Eberly, William R., 1960. Competition and Evolution in Cave Crayfish of Southern Indiana. Systematic Zoology, **9** (1) : 29-32. March 1960.
- Insecta : 1. Matthew, D. L. and R. C. Dobson, 1960. *Musca autumnalis* (DeGeer), a New Livestock Pest in Indiana. Proceedings of the Indiana Academy of Science for 1959, **69** : 165-166.
2. Osmun, John V., 1960. Insects and Other Arthropod of Economic Importance in Indiana in 1959. Proceedings of the Indiana Academy of Science for 1959, **69** : 167-177.
3. Schuder, Donald L., 1960. *Tortrix pallorana* Rob., A Pest of Pine Trees in Indiana. Proceedings of the Indiana Academy of Science for 1959, **69** : 175-177.
4. Young, Frank N., 1960. The Water Beetles of a Temporary Pond in Southern Indiana. Proceedings of the Indiana Academy of Science for 1959, **69** : 154-164.
- Pisces : Dineen, Clarence F., 1960. Semi-Annual Report for Stream Investigations Bottom Types and Bottom Organisms of the Saint Joseph Drainage In Indiana. Indiana Department of Conservation Fisheries Research Report., Vol. 3, No. 2, pp. 2-26.

Work in Progress or Completed in 1959-1960 But Not Yet Published

- Algae : 1. Daily, F. K. Some Fossil Charophyta from North America (Chiefly Pleistocene).
2. Daily, W. A. Forms of *Ceratium hirundinella* (O. F. M.) Schrank in Lakes of Indiana.
3. Hall, Charles R. Algae of Putnam County, Indiana.
- Vascular Plants : 1. Bloom, William W. Guide to the Common Ferns of Indiana (Illustrated).
2. Clewell, Andre. Variation in *Lespedeza hirta* and Relatives.
3. Hall, Gustav. *Bidens* in eastern North America.
4. Heiser, C. B. Jr. *Gleditsia triacanthos*, *G. aquatica* and their Hybrid in Indiana.
5. Lindsey, Alton A., Robert O. Petty, David K. Sterling and Willard Van Asdall. Vegetation and Environment along the Wabash and Tippecanoe Rivers. Ecological Monographs.
6. Purcell, Gina. Variation in *Aster lateriflorus* in southern Indiana.
- Insecta : 1. Krekeler, Carl H., Anophthalmids of Indiana (Cavernicolous Carabidae).
2. Siverly, R. E., Distribution and Ecology of Mosquitoes of Indiana ; Insect Rearing.
3. Ward, Gertude L., Insects of Eastern Indiana.
- Amphibia : 1. Randall, E. J., Studies on Reproductive Potentials of Ambystomid Salamanders.

2. Gordon, R. E. and K. S. Tweedell, Radiation Effects on Hybrid Salamanders (Ambystomidae).
- Aves : Cope, James B. Birds of Indiana
- Mammalia : Cope, James B. Bats of Indiana.
- Miscellaneous Plant and Animal Groups : 1. Laubengayer, Richard A., Inventory of Plant and Animal Groups in Allee Memorial Woods, Parke County, Indiana.
2. Williams, Eliot C., Jr., Quantitative and Population Studies of Certain Insect, Reptile, Mammal and other Faunal Groups in the Allee Memorial Woods, Parke County, Indiana.

Library Committee—Nelle Coats: A report was submitted for the John Shepard Wright Memorial Library. As superior display material there was purchased, as part of Mrs. Wright's \$500.00 gift, a fine copy of W. P. C. Barton's "A Flora of North America, Illustrated by Coloured Figures Drawn from Nature," a three volume work published in Philadelphia 1821-23. With its 106 color plates, it is a first edition of the finest early American herbal. Another medical botany suitable for exhibit was presented by Mr. Eli Lilly, "The Badianus Manuscript, an Aztec Herbal 1552." Published by Johns Hopkins Press in 1940, the volume is now out of print and scarce.

Volume 69, the *Proceedings* for 1959, was published September 8, 1960 and as usual the Indiana State Library supplied envelopes and labor for distributing copies to members.

Mrs. Lois Burton has prepared and sent to the bindery 224 volumes from the Academy Library, estimated cost to be \$997.65, approximating the sum allotted by the Budget Committee.

The Taxonomic Index is added to indexing or abstracting services covering the *Proceedings* bringing the total to 15.

A new edition of the great "Union List of Serials in the U. S. and Canadian Libraries" is in preparation and the necessary checking for inclusion of the Wright Library holdings is being done. This year 21 new titles have been added to those currently received.

An exhibit of some of the materials was prepared for the 1959 meeting and, as this was a 75th anniversary for the Academy, photographs and articles illustrating its history were also shown. Another exhibit was prepared for the Indiana Science Talent Search Assembly in the spring.

Invitations Committee—Marion T. Hall: The Indiana State Teachers College, Terre Haute, Indiana, has invited the Academy to hold its fall meeting in 1961 on their campus. The meeting dates are to be October 19, 20, and 21. The recommendations of the committee were accepted.

Program Committee—William Eberly: The chairman expressed his appreciation of the work of the members of the Academy associated with him in preparing the program and getting things in readiness for a meeting this early in the academic year. He noted that room 104 in the new Hall of Science had been set aside for Academy headquarters.

Research Grants—T. G. Yuncker: Attention was called to the fact that some Academy monies are available to members for research yet this year. Applications should be made to the chairman.

Relation of Academy to State—W. A. Daily and F. N. Wallace: Mr. Daily reported that a budget request for legislative appropriation has

been submitted to the State Budget Committee for the sum of \$4,000 per annum for the fiscal years 1961-1962 and 1962-1963. The report was accepted.

Junior Academy—Howard H. Michaud: There was a registration of 437 students, teacher club sponsors, and guests for the 1959 meeting of the Junior Academy. Eighteen exhibits and seventeen papers were presented. William D. Schall of Central Junior-Senior High School, South Bend, received the "best boy" award and Patricia Coleman, Washington High School, Indianapolis, received the "best girl" award. Garfield High School of Terre Haute and Washington Catholic High School, Washington, received the Kroger Awards for showing evidence of the best high school science programs based on a self-evaluation questionnaire sent to Indiana high schools. Marilyn Wickman of Washington Catholic High School, Washington, and Norman Pace of Edinburg High School received the Society of American Bacteriologists awards in bacteriology. The twenty-eighth annual meeting of the Junior Academy will convene October 8th at Manchester College.

Visiting Scientists—Dr. Michaud also reported on the Visiting Scientists Program for Indiana High Schools made possible by a grant from the National Science Foundation. The total amount of the grant was \$16,750. This program provided for 250 visits by Indiana College Scientists and Mathematicians to Indiana High Schools as well as \$2,500 for the purchase of expendable materials by high school students for individual research projects. A total of 88 scientists representing 19 of the state's 31 colleges were listed as participants, brochures were sent out to all private and public high schools, and about 200 requests were received. One hundred seventy-seven visits were completed. Two major objectives of the program were (a) to develop better understanding and cooperation between college scientists and the secondary schools, and (b) to encourage more college scientists to assume an active interest in the improvement of the high school science program. Both of these objectives, it is certain from reports received, were exceptionally well met. A similar grant in the amount of \$17,150 has been approved by the N. S. F. for 1960-61 academic school year. An application to continue the program for the 1961-62 school year has been made. Dr. Donald J. Cook, as treasurer of the Indiana Academy of Science, is fiscal agent for the N. S. F. funds.

Indiana School and College Committee on Mathematics—J. C. Polley: A report on the activities of the committee during the 1959-60 academic year was given. The committee has been working to develop a program of activities designed to involve mathematics teachers at all levels in an effort to improve the mathematics program. The committee has promoted local meetings designed to bring college and school mathematics teachers together to discuss their programs. Meetings have been sponsored by colleges or local councils of mathematics teachers. Last year eight such meetings were held and this year 12 are planned. About 200 school administrators and mathematics teachers attended a conference at Indiana University to discuss the experience of Indiana schools with experimental programs. Four or five similar conferences are planned for this year as well as a conference at Purdue University to discuss training of school mathematics teachers.

Indiana Science Talent Search—Ralph Lefler: A report was given on the thirteenth Indiana Science Talent Search and on Indiana Science Fairs. He noted that 197 Indiana High School seniors completed entry requirements for the talent search and 31 were designated as finalists. These finalists and their sponsoring teachers were invited to the Junior Scientists' Assembly in Indianapolis on March 18 and 19, 1960. Seventeen were declared winners in the Search. Vernon Cripe of South Bend Central was cited for having sponsored ten finalists through the thirteen years of the Indiana Science Talent Search.

Indiana Science Fairs—Ten Regional Science Fairs were held in Indiana in the spring of 1960 and each designated two finalists to the National Science Fair held in Indianapolis on May 11-14. The organization of Science Fairs in Indiana is such that every junior or senior high school student has the opportunity to participate in a regional fair if he so wishes. The generous support from many quarters for the Science Fairs is deeply appreciated.

The new Administrative Committee of Junior Activities approved by the executive committee in the spring meeting has been appointed and Chairman Paul Klinge announced that they will hold their first meeting today.

After some discussion of the rising costs of printing the *Proceedings* and the increased cost of dues to members, it was decided to raise the price of the *Proceedings* to non-members to \$5.00 beginning with Vol. 70. The meeting adjourned at 10:45 P. M.

Respectfully submitted,

WILLIAM W. BLOOM, Secretary

Approved October 7, 1960.

FALL MEETING
GENERAL SESSION

FRIDAY, OCTOBER 7, 1960
9:30 A. M.

The regular annual meeting of the Indiana Academy of Science was held in the Chapel in the Administration Building of Manchester College, North Manchester, Indiana, on October 7, 1960 at 9:30 A. M. The meeting was called to order by President A. T. Guard. Dr. A. Blain Helman, president of Manchester College, welcomed the Academy to the campus and emphasized the role of the members as teachers and scientists in working toward a solution of the great problems that confront the world and our country. The minutes of the Executive Committee meeting of Thursday, October 6, were read by the secretary and approved as read. Dr. Will E. Edington presented the report of the necrologist in which he gave a brief biographical sketch of the following seven members who had died since the last annual meeting:

Norval E. Adams	Theodor K. Just
Eldo H. M. Clauser	George S. Meikle
Martha Doan	John White
Charles M. Ek	

Dr. Marion E. Hodes, Assistant Professor of Medicine and Biochemistry at Indiana University Medical Center, presented an address on "The Status of Cancer Research in the United States, with Special Reference to the Work at Indiana University Medical Center." Following the presentation of the address the meeting was adjourned and section meetings followed.

Respectfully submitted,

WILLIAM W. BLOOM, Secretary

FALL MEETING
DINNER MEETING

October 7, 1960

The annual dinner meeting of the Indiana Academy of Science was held in the Oakwood Dining Room of Manchester College. Dr. Lawrence H. Baldinger, Vice-President of the Academy, presided. He introduced the guests at the speaker's table and called upon Dr. A. T. Guard to make special recognition of members with fifty years or more of membership in the Academy. Dr. M. S. Markle, who has been a member for fifty years, was present and warmly acclaimed by the members.

Dr. Willis Johnson, as chairman of the Nominating Committee, submitted the following names as candidates for the offices of the Academy and they were elected.

President.....L. H. BALDINGER, Notre Dame University
Vice-President.....HARRY G. DAY, Indiana University

NEW MEMBERS

Ashcraft, James S., 3606 E. Michigan St., Indianapolis, Ind.	Z
Baker, Wm. Wilson, Box 424, Earlham College, Richmond, Ind.	Z
Baumgardner, Marion F., 404 Wood St., West Lafayette, Ind.	SS
Bennett, D. Page, Sigma Nu, DePauw University, Greencastle, Ind.	Bo
Bloom, Anna G., 1002 Oak St., Valparaiso, Ind.	Bo
Brambel, Prof. Charles E., University of Notre Dame, Notre Dame, Ind.	C
Brock, Dr. Thomas D., Indiana University, Bloomington, Ind.	Ba
Brooks, Austin, Jr., Wabash College, Crawfordsville, Ind.	Bo
Brown, Cyril B., 127-9 Marshall Drive, West Lafayette, Ind.	SS
Brown, Earle, 301 Caleb Street, Salem, Ind.	Bo
Churchwell, Edward B., Box 91, Earlham College, Richmond, Ind.	Z, Ph, M
Clark, F. Bryan, 1521 15th St., Bedford, Ind.	Bo, SS
Clements, Jeanette N., R. R. 1, Lizton, Ind.	Bo
Cole, Carol L., 519 S. W. 2nd St., Richmond, Ind.	E, G
Confer, John Earlham College, Richmond, Ind.	Z
Cook, Dr. A. Gilbert, Valparaiso University, Valparaiso, Ind.	C
Craig, Prof. George B., University of Notre Dame, Notre Dame, Ind.	E
Davis, J. Maxwell, 818 S. Rotherwood Avenue, Evansville, Ind.	
de Langlade, Ronald A., Purdue University, West Lafayette, Ind.	Bo
Dowds, Dr. Richard E., Butler University, Indianapolis, Ind.	M
Droste, John B., 1701 Longwood West, Bloomington, Ind.	G
Engle, LaMont G., 728 P Street, Bedford, Ind.	Bo, SS
Fedynskij, Mrs. Nathalie, St. Mary's College, Notre Dame, Ind.	A
Flanagan, Mary A., Box 71, Ambion, Ind.	C
Foley, Arlene F., 520 Central Avenue, Anderson, Ind.	Z
Gohlke, Arthur F., 109-12 State St., West Lafayette, Ind.	SS
Gorden, Robert W., Box 6, Rolling Prairie, Ind.	Z
Henderson, Dr. Norlan C., 2145 College Avenue, Huntington, Ind.	Bo
Herrala, Elizabeth A., 736 E. 3rd St., Bloomington, Ind.	A
Huffman, John L., R. R. 1, Eaton, Ind.	Bo, Z
Johnson, Edward R., 710 Lake Shore Drive, Box 40, Chicago, Ill.	Z
Johnson, Richard F., R. R. 1, Gaston, Ind.	Bo, Z
Jones, R., Purdue University, West Lafayette, Ind.	Ps
Kellar, Dr. James H., 1311 N. Fee Lane, Bloomington, Ind.	A
Kemp, Dr. Cecil R., Indiana State Teachers College, Terre Haute, Ind.	Z
Koontz, Keith C., Box 384, Earlham College, Richmond, Ind.	Z
LeMaster, Douglas F., R. R. 1, Markle, Ind.	C
Lubin, Dr. Bernard, Ind. Univ. Medical Center, Indianapolis, Ind.	Ps
Manske, Paul, Washington University Medical School, St. Louis, Mo.	Z
Marks, Gayton C., Box 228, Schererville, Ind.	Bo
Marsh, Terrence G., Box 830, Earlham College, Richmond, Ind.	E
Mewhinney, James A., 602 W. Wabash Avenue, Crawfordsville, Ind.	Bo
Mielke, Paul T., Wabash College, Crawfordsville, Ind.	M
Modesitt, Robert E., R. R. 3, Paoli, Ind.	SS
Neal, Robert R., Jr., 702 S. Marshfield Avenue, Chicago, Ill.	Z
Novak, Dr. Joseph D., Purdue University, West Lafayette, Ind.	Bo
Omoto, Miss Constance E., Indiana University, Bloomington, Ind.	A
Ostdick, Rev. Thomas, St. Meinrad Archabbey, St. Meinrad, Ind.	C, M

Overack, Dr. Daniel E., 10666 N. College, Indianapolis, Ind.	Z
Park, Prof. Richard M., 526 Melrose Drive, Whiteland, Ind.	M
Rickenberg, Prof. Howard V., Indiana University, Bloomington, Ind.	Ba
Shanks, Prof. Merrill E., 1107 Hillcrest, West Lafayette, Ind.	M
Smith, Wm. M., 4900 Julian Avenue, Indianapolis, Ind.	Bo, Z
Snow, Brian, 804 E. Walnut, Kokomo, Ind.	Ph
Stivers, Dr. Russell K., Purdue University, West Lafayette, Ind.	SS
Taylor, Irvin E., 2156 Admiral Drive, Indianapolis 18, Ind.	C
Taylor, Morris D., 201-2 Nimitz Drive, West Lafayette, Ind.	Ph, C
Thompson, Ian B., University of Leeds, Leeds, England.	G
Tovazzi, Prof. Gino, Villa Concordia, Mira, Venezia, Italy.	C
Ventresca, Prof. Dante L., R. R. 2, Brownsburg, Ind.	Bo, Z
Walcher, Dwain, Indiana University Medical Center, Indianapolis Ind.	Ba
Wiersma, Prof. Dan, West Lafayette, Ind.	SS
Wilcox, Gerald E., 1957 Indian Trail Drive, Lafayette, Ind.	SS
Willig, Leslie A., Tri-State College, Angola, Ind.	Ps
Woodham, Gregory C., Indiana Univ. Medical Center, Indianapolis, Ind.	Z



Officers of the Junior Academy : l. to rt., President, Harvey 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.

INDIANA JUNIOR ACADEMY OF SCIENCE

OFFICERS FOR 1960

President: HARVEY 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.

Members of the Council: 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-EIGHTH ANNUAL MEETING

OCTOBER 8, 1960

Hall of Science, Manchester College, North Manchester, Indiana

8:30-10:00 A. M. Registration and Placement of Exhibits, Room 108.

10:00-11:00 Conferences in Science and Mathematics by faculty representatives of Manchester College.

11:00-12:00 Noon. Visits to Instructional Facilities and Laboratories of Manchester College.

12:00 Luncheon at the College Cafeteria.

1:15 p. m. General Assembly, Chapel of the Administration Building.
Greetings, President A. Blair Helman, Manchester College.
Business Meeting. Election of Officers and Presentation of Awards.

1:45-4:30 Program of Papers, Harvey Scribner presiding.

The following papers were read by members of the Junior Academy:

1. Nipkow-Blanc Semi-Electronic Television System, Theodore V. Blanc, Shawe Science Club, Shawe Memorial High School, Madison.

2. Effect of RF on Tumor Growth in Rats, Harvey Scribner, Science Club, New Albany High School, New Albany.
3. Basic Stannous Phosphates, David C. Herrick, National Scientific Honor Society, Bloomington High School, Bloomington.
4. Number Systems and Computers, Frances Walker, Aquinas Science Club, Washington Catholic High School.
5. A Duplication of a Land Experiment Relating to a New Theory of Color Vision, Sue Hendricks, Junior Academy, University High School, Bloomington.
6. Some Observations of Chick Embryos, Susan Hathaway, Senior High School, Columbus.
7. The Effects of X-Radiation on Seeds, Stephen Steele, Science Club, Senior High School, Columbus.
8. Synergistic Relationship of Antibiotics and Metals, Patricia A. Coleman, Science Club, Washington High School, Indianapolis.



Exhibit on the Effect of Radio Frequencies on Tumor Growth in Rats; New Albany High School.

9. The Role of the Prophage in the Life of Escherichia coli, Craig Johnson, Science Club, Washington High School, Indianapolis.
10. The Photoreactivation of Amino-Acid-Requiring Mutants in Escherichia coli, Paul Everman, Natural Science Club, Arsenal Technical High School, Indianapolis.
11. Humidity Gradient in a Corn Field, Earl Retherford, Sigma Mu Club, Franklin Central High School, Acton.
12. A Comparative Study on the Effect of Pills on Boys and Girls, Diane Osting, Science Club, Washington High School, Indianapolis.
13. Induced Metamorphosis of Mexican Axolotl, M. Kathryn Crider, Science Club, Westlane High School, Indianapolis.
14. The Influence of Light on the Uptake of C14 by Geraniums, Patricia Kira, Science Club, Washington High School, Indianapolis.
15. Free Energy Determinations in 1-chloro-1-propene, Roger Peters, JETS, Central Junior-Senior High School, South Bend.
16. A Study of Root Initiation, Robert Raymond, JETS, Central Junior-Senior High School, South Bend.
17. Can the Growth Curve of the Common Land Snail Be a Logarithmic Spiral?, Margaret Weir, Adams Walton High School, South Bend.
18. An Analysis of the Vegetation in an Abandoned Gravel Pit, Rick Ferrell, JETS, Central Junior-Senior High School, South Bend.
19. Tropical Fish, Donna Berns, Biology Club, Lew Wallace High School, Gary.
20. Embedding Biological Specimens in Transparent Plastic, Howard Wallace, Adams Waltons, Adams High School, South Bend.
21. Can Hereditary Immunity to Insecticides Be Developed in Drosophila, Edmund Lapham, Adams Waltons, Adams High School, South Bend.

Minutes

The twenty-eighth annual meeting of the Indiana Junior Academy of Science was held Saturday, October 8, 1960 in the Hall of Science of Manchester College, North Manchester, Indiana.

Fifteen exhibits of science projects by high school students were displayed in Room 108, Hall of Science. Exhibits included the following: The Effect of RF Waves on Tumor Growth; The Uptake of Carbon-14 by Geranium Plants as Influenced by Various Light Waves; Determination of Free Energy in 1-chloro-1-propene; Amateur Telescope; Can the Growth Curve of the Common Land Snail Be a Logarithmic Curve?; Embedding Biological Specimens in Transparent Plastic; The Humidity Gradient on Corn; Psychological Effect of Capsules on the Physiological Reactions of Adolescents; Tropical Fish; The Photoreactivation of Amino-Acid-Requiring Mutants in Escherichia Coli; Induced Metamorphosis in the Mexican Axolotl; The Prophage and Its Role in the Life of Escherichia

coli; Paper Cliff Dwellers; The Bee and the Earthworm; and Synergistic Effect of Metals on Certain Antibiotics.

Conferences in science and mathematics were held at 10:00 a. m. by members of the faculty of Manchester College. The science areas represented included biology, chemistry, mathematics, medicine and related fields, physics, and psychology. Following the science conferences each of the participating science staff members also conducted tours through the instructional facilities and science laboratories of the college. The cooperation of the Manchester College faculty in this program was greatly appreciated by club sponsors and members of the Junior Academy.

The annual business meeting was held in the Chapel of the Administration Building beginning at 1:45 p. m. President Harvey Scribner, New Albany High School, New Albany, opened the meeting by introducing Vice President Robert Raymond, Central Junior-Senior High School, South Bend, and Secretary Ann Burton, University High School, Bloomington.

President Scribner then called upon Dr. A. Blair Helman, President of Manchester College, to welcome the Junior Academy on the occasion of its annual meeting. President Helman extended the greetings of the college to the members of the Junior Academy and encouraged them to work diligently in pursuit of scientific as well as other important fields of knowledge.

The next item of business was the election of officers. The Council submitted a list of nominees on a mimeographed ballot from names received from club sponsors. A brief statement about each candidate's achievements in science was included with the listing. After each candidate was introduced, an opportunity was given for nominations from the floor. Since there were no further nominations, the members were asked to cast their ballots. A tabulation of the ballots resulted in the election of the following officers for 1961: President, Stephen Ridgeway, Central Junior-Senior High School, South Bend; Vice President, Mark Schaefer, Central Catholic High School, Fort Wayne; and Secretary, Margaret Weir, John Adams High School, South Bend.

Mr. Ernest Litweiler, reporting for the Council, announced that Mr. Donald R. Winslow, sponsor of the Junior Academy Science Club, University High School, Bloomington, was named the new council member to replace Mr. Litweiler, South Bend, whose term expired this year.

Awards for the "best boy" and "best girl" in science were received by Richard Ferrell, Central Junior-Senior High School, South Bend, and Diane Osting, Washington High School, Indianapolis, respectively. A certificate of merit was presented to each, together with a year's membership in the American Association for the Advancement of Science. Arthur Judd, University High School, Bloomington, and Anne Marie Miller, Central Catholic High School, Fort Wayne, received honorable mention.

An award of \$25 was presented to Paul Everman, Arsenal Technical High School, Indianapolis, for the best paper on bacteriology. The presentation was made by Dr. Morris Wagner, Department of Bacteriology, University of Notre Dame, on behalf of the American Society of Bacteriology. Dr. Wagner and Dr. Robert J. Hanson, Department of

Biology, Valparaiso University, served as judges for selecting the best paper presented on bacteriology or microbiology.

Professor H. H. Michaud, State Sponsor, Purdue University, expressed appreciation on behalf of the Junior Academy of Science for the splendid cooperation of Manchester College in providing facilities for the meeting. Special recognition was given Dr. William Eberly, Department of Biology, Manchester College, for his efforts as local program chairman in making the program a success. Professor Michaud introduced the members of the Council and expressed appreciation for their work in preparing the list of nominations for Academy officers and selection of the "best boy" and "best girl" award winners. It was announced also that the next fall meeting of the Junior Academy would be held at Indiana State Teachers College, Terre Haute, on Saturday, October 21, 1961.

The 28th annual meeting of the Junior Academy of Science was attended by 250 registered members, sponsors, and guests, which was considerably less than during the two previous years. The early date of the annual meeting and distance of travel for many clubs no doubt were responsible for the smaller attendance. However, the quality of papers and exhibits continues to improve and clearly indicates the influence of the many science programs in which the Junior Academy of Science participates, such as science fairs, the state and national science talent searches, and the visiting scientists' program.

Twenty of the papers listed on the program were read at the meeting. A brief statement of each paper follows:

"Nipkow-Blanc Semi-Electronic Television System" was the title of the first paper presented on the afternoon program by Theodore V. Blanc, Shawe Memorial High School, Madison. The speaker gave a short history of television followed by an explanation, with diagrams, of his Nipkow-Blanc Semi-Electronic Television System.

"The Effect of RF Tumor Growth in Rats" was reported by Harvey Scribner, New Albany High School. The methods used and effects of radio frequencies in the treatment of tumor growth in rats were explained.

David Herrick, Bloomington High School, related the experimental work done on "Basic Stannous Phosphates," a product of the stannous fluoride found in Crest toothpaste. The investigations were done as a part of the High School Science Institute at Indiana University under the direction of Dr. William Nebergall.

"Number Systems Used by Computers" was reported by Frances Walker, Washington Catholic High School, Washington. The binary system was explained as one of the systems used by computers.

By duplicating an experiment performed by Edwin Land, Sue Hendricks, University High School, Bloomington, explained how she was able to produce color by projecting black and white slides on a screen. The title of her paper was "Duplication of a Land Experiment Relating to a New Theory of Color Vision."

Stephen Steele, Columbus High School, reported on, "The Effects of X-Radiation on Seeds." The purpose of the experiment was to determine the effects of different strengths of X-radiation on the growth of plants.

"The Synergistic Relationship of Antibiotics and Metals" was the title of the next paper presented by Patricia A. Coleman, Washington

High School, Indianapolis. It was concluded from the tests used that three of the antibiotics were more effective when used with metals. Terramycin, however, did not produce the same results when used with metals.

Craig Johnson, Washington High School, Indianapolis, discussed "The Role of the Prophage in the Life of *Escherichia coli*. He concluded from his experiments that a prophage can cause a genetic change in bacteria.

The next paper by Paul Everman, Arsenal Technical High School, Indianapolis, discussed, "The Photoreactivation of Amino-Acid-Requiring Mutants in *Escherichia coli*." The paper was judged the best presentation on bacteriology at the annual meeting.

"Humidity Gradient in a Corn Field" was the topic reported by Earl Retherford, Franklin Central High School, Acton. Variations in humidity in different months of the growing season and during different parts of a 24 hour period were recorded. Differences due to topography were also noted. Graphs were prepared to show the humidity gradients in the months of June and September.

An interesting experiment on "A Comparative Study on the Effect of Pills on Boys and Girls" was discussed by Diane Osting, Washington High School, Indianapolis. It was found that some students exhibited physiological reactions to capsules that contained nothing but powdered sugar. It was concluded therefore, that the taking of a capsule, which was a sugar pill, had a definite psychological effect upon their physical reactions.

Kathryn Crider reported on "Induced Metamorphosis of Mexican Axolotl." She discovered that thyroid activators could be used successfully to induce metamorphosis in the Mexican Axolotl. Otherwise, this species of amphibian in its native habitat near Mexico City remains all its life a gill breathing water dweller and breeds in the larval condition.

"The Influence of Light on the Uptake of C14 by Geraniums" was presented by Patricia Kira, Washington High School, Indianapolis. She reported that geranium plants were covered with various colors of cellophane paper to determine the influence of light differences on the uptake of C14. It was found that red light compared favorably to direct sunlight but that blue light practically inhibited the uptake of carbon-14.

Roger Peters, Central Junior-Senior High School, South Bend, analyzed some of his theories concerning "Free Energy Determinations in 1-Chloro-1-Propene," using the latter as the title of his paper.

"Can the Growth Curve of the Common Land Snail Be a Logarithmic Spiral" was presented by Margaret Weir, Adams High School, South Bend. She said her objective was to prove that the common land snail, similar in appearance to the nautilus, is also a logarithmic spiral and not merely a geometric progression. Some progress was made toward proving this objective but further study was needed for conclusive proof.

Rick Ferrell, Central Junior-Senior High School, South Bend, presented an illustrated study of "An Analysis of the Vegetation in an Abandoned Gravel Pit." From his examination of the vegetation and other environmental factors in the gravel pit he concluded that the organic content of the soil correlates with the abundance of plants but that soil moisture was the primary factor in producing vegetation.

While tropical fish culture is an interesting hobby, there are many valuable scientific lessons to be gained from rearing these colorful fishes as related by Donna D. Berns, Lew Wallace High School, Gary. In her paper entitled "Tropical Fish" she reported that special environmental conditions were necessary such as a controlled temperature, constant aeration, suitable plants, freedom from impurities in the water, and constant guard against fish diseases and parasites.

The next paper, entitled "Embedding Biological Specimens in Transparent Plastic," was read by Howard Wallace, Adams High School, South Bend. He described the type of plastic and the procedure used in embedding biological specimens in transparent plastic.

A final paper was submitted on "A Study of Root Initiation" by Robert Raymond, Central Junior-Senior High School, South Bend. The purpose of the study was to determine the nature of the substance responsible for inhibition of root development on cut stems of pea seedlings after three days germination.

INDIANA JUNIOR ACADEMY OF SCIENCE CLUBS

FALL 1960

<i>Town</i>	<i>School and Club</i>	<i>Sponsor</i>
Acton	Franklin Central, Sigma Mu (1957)	Jerry Colglazier
Bloomington	H. S., National Scientific Honor Society (1931)	Merril L. Crisler
Bloomington	University H. S., Jr. Academy (1938)	Don R. Winslow
Chesterton	H. S., Science (1954)	Robert McCord
Clarksville	Our Lady of Providence H. S., Phy-Chem (1956)	John Chilks
Clayton	H. S., Jr. Academy (1951)	Howard C. Leslie
Connersville	Alquina H. S., Science Club (1960)	Walter Gronning
Columbus	Senior H. S., Science Club (1958)	L. N. Carmichael
Crawfordsville	H. S., Up-N-Atom (1950)	David Wells
Edinburg	H. S., The Alchemists (1954)	S. C. Harrell
Elkhart	H. S., Jr. Academy (1940)	Robert Mahan
Evansville	Reitz Memorial H. S., Phi Chi Mu (1958)	Sr. Francetta Sr. Peter
Fort Wayne	Central H. S., Biology (1940)	Iva Spangler
Fort Wayne	Central Catholic H. S., Albertus Magnus Science Club (1952)	Sr. M. Magdelen, S. P. Sr. Jean Margaet, S. P.
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., Jr. Academy of Science (1956)	Robert Weber Don Weaver
Gary	Edison, H. S. Beaker Breakers (1949)	Mrs. Martha 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	Tolleston H. S., Future Scientists of America (1949)	Arthur Kline
Gary	Wirt H. S., Biology (1945)	Mrs. Frances Hudleston
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	Ladywood School, Guerin Club (1957)	Sr. Pauline Marie Sr. Louise
Indianapolis	St. Agnes Academy, Science (1959)	Sr. Amelia
Indianapolis	Shortridge H. S., Naturalists Club (1947)	Robert A. Weaver
Indianapolis	Shortridge H. S., Science (1931)	Mrs. H. A. Parker
Indianapolis	Technical H. S., Nature (1932)	Chas. E. Russell
Indianapolis	Howe H. S., Science (1949)	Jerry Motley
Indianapolis	Washington H. S. Science (1931)	Mrs. E. H. Crider
Indianapolis	Westlane Jr. H. S., Science (1959)	John Van Sickle
Jeffersonville	Clark and Floyd County Seminar (1959)	Harold E. Cook 1019 Springdale Dr. Jeffersonville
LaPorte	H. S., Bi-Phi-Chem (1958)	Francis M. Gourley Byron Bernard
Lebanon	H. S., Jr. Explorers of Science (1953)	Helen Reed
Loogootee	St. John H. S., Science (1959)	Sr. Mary Ellen
Madison	Fr. Michael Shawe Memorial High School, Shawe Science Club (1957)	T. 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 Geniuses (1958)	Sr. M. Constance
Richmond	H. S., Science (1950)	Von Alexander
Rossville	H. S., Science (1954)	Martin Silverthorn
Sandborn	H. S., Up and Atom (1954)	Paul Carter
South Bend	Central H. S., JETS (1939)	V. C. Cripe
South Bend	John Adams H. S., Adams Walton (1953)	Ernest Litweiler
Vincennes	St. Rose Academy, Sigma Tau	Sister Suzanne
Washington	Washington Catholic H. S., Aquinas Science Club (1958)	Sr. Marian Francis