

PROCEEDINGS

*of the*

# Indiana Academy *of* Science

*Founded December 29, 1885*

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Volume 65  
1955

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RICHARD A. LAUBENGAYER, Editor  
Wabash College  
Crawfordsville, Indiana

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Spring Meeting  
May 13-14  
BROWN COUNTY STATE PARK

Fall Meeting  
October 13-15, 1955  
UNIVERSITY OF NOTRE DAME

Published at Indianapolis, Indiana  
1956

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2. **Instructions for Authors** appear at end of this volume, p. 249.
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6. The Constitution and by-laws reprinted from v. 62 and the Membership list reprinted from v. 61, 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.

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## OFFICERS AND COMMITTEES FOR 1955

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### OFFICERS

President .....	A. H. MEYER, Valparaiso University
Vice President .....	WILLIS JOHNSON, Wabash College
Secretary .....	W. A. DAILY, Eli Lilly and Company
Treasurer ..	F. J. WELCHER, Adult Education Center, Indiana University
Editor .....	BENJAMIN MOULTON, Butler University
Press Secretary ..	J. A. CLARK, Department of Conservation, Indianapolis

### DIVISIONAL CHAIRMEN

Anthropology .....	JOHN JONES, Indiana University
Bacteriology .....	H. A. DETTWILER, Eli Lilly and Company
Botany .....	A. L. DELISLE, Notre Dame University
Chemistry .....	JOHN A. BUEHLER, Anderson College
Entomology ..	DONALD HAMILTON, 1237 Washington Avenue, Vincennes
Geology and Geography .....	WILLIAM J. WAYNE, Indiana University
History of Science .....	B. E. MONTGOMERY, Purdue University
Mathematics .....	HARRY E. CRULL, Butler University
Physics .....	FRANCIS E. THROW, Wabash College
Plant Taxonomy .....	A. A. LINDSEY, Purdue University
Psychology .....	BARRON B. SCARBOROUGH, DePauw University
Zoology .....	JACKSON WEBSTER, Hanover College

### EXECUTIVE COMMITTEE

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

J. A. Buehler, O. B. Christy, J. A. Clark, N. M. Coats, Sears Crowell, H. E. Crull, E. R. Cumings, F. K. Daily, W. A. Daily, J. J. Davis, Ed. Degering, A. L. Delisle, H. A. Dettwiler, W. E. Edington, P. D. Edwards, H. E. Enders, D. Hamilton, W. Johnson, John Jones, T. K. Just, R. A. Laubengayer, R. W. Lefler, Eli Lilly, A. A. Lindsey, J. F. Mackell, M. S. Markle, M. G. Mellon, A. H. Meyer, H. H. Michaud, J. D. Mizelle, B. E. Montgomery, W. P. Morgan, Benjamin Moulton, F. Payne, C. L. Porter, H. M. Powell, R. R. Ramsey, B. B. Scarborough, F. E. Throw, S. S. Visher, F. N. Wallace, W. J. Wayne, P. Weatherwax, J. Webster, Winona Welch, F. J. Welcher, T. G. Yuncker.

### BUDGET COMMITTEE

(President, Secretary, Treasurer, Editor, and Chairmen of  
Committees on Junior Academy, Library, Program  
and Relation of Academy to State)

A. H. Meyer, W. A. Daily, F. J. Welcher, Benjamin Moulton, H. H. Michaud, N. M. Coats, J. D. Mizelle and F. N. Wallace.

## COMMITTEES ELECTED BY THE ACADEMY

**Trustees of the Academy Foundation** (term four years): Chairman, R. N. Harger, Indiana University School of Medicine, Indianapolis (term expires 1956); Ward J. Rice (term expires 1955).

**Bonding of Trustees** (elected annually): Chairman, Scott McCoy, Technical High School, Indianapolis; W. P. Morgan.

**Research Grants** (term 5 years): Chairman, T. G. Yuncker, DePauw University (term expires 1959); W. H. Johnson (1957), M. G. Mellon (1955), Paul Weatherwax (1956), J. F. Mackell (1958), A. H. Meyer and W. A. Daily (*ex officio*)

## STANDING COMMITTEES

(Appointed by the President)

**Auditing:** Chairman, W. P. Morgan, Indiana Central College; S. E. Elliott.

**Biological Survey:** Chairman, Mrs. F. K. Daily, Butler University; S. D. Gerking, F. Buser, D. G. Frey, H. H. Michaud, S. A. Minton, F. N. Young, W. Welch.

**Fellows:** Chairman, H. M. Powell, Bacteriology, Eli Lilly and Company; C. F. Voeglin, Anthropology; A. T. Guard, Botany; M. G. Mellon, Chemistry; G. E. Gould, Entomology; A. H. Meyer, Geology and Geography; S. S. Visser, History of Science; P. D. Edwards, Mathematics; J. F. Mackell, Physics; F. K. Daily, Plant Taxonomy; F. D. Brooks, Psychology; W. R. Breneman, Zoology.

**Index:** Chairman, Benjamin Moulton, Butler University; N. M. Coats, F. N. Wallace.

**Indiana Talent Search:** Chairman, R. W. Lefler, Purdue University; L. H. Baldinger, T. W. Torrey and P. D. Edwards. Walter Leckrone and A. H. Meyer (*ex officio*).

**Invitations:** Chairman, J. F. Mackell, Indiana State Teachers College; R. A. Laubengayer, T. G. Yuncker.

**Junior Academy:** Chairman, H. H. Michaud, Purdue University; N. E. Adams, W. H. Carnahan, R. Cooper, Paul Klinge, R. McDougal, R. E. Martin, R. E. Niswander, J. E. Potzger, Mary L. Stork, P. L. Whitaker.

**Library:** Chairman, N. M. Coats, Indiana State Library; M. G. Mellon, Eli Lilly.

**Membership:** Chairman, R. A. Laubengayer, Wabash College; M. Burton, J. O. Cottingham, H. E. Crull, L. Farquharson, M. Garner, W. H. Headlee, Z. D. Hurlbut, R. Kent, W. G. Kessel, E. Kintner, R. G. Larson, L. S. McClung, R. E. Martin, D. E. Miller, J. Pelton, H. R. Youse.

**Necrologist:** W. E. Edington, DePauw University.

**Nominating:** Chairman, H. M. Powell, Eli Lilly and Company; P. Weatherwax, O. B. Christy.

**Program:** Chairman, J. D. Mizelle, Notre Dame University; R. M. Cable, A. L. Delisle, C. Dineen, B. Moulton, D. J. Plunkett, P. Weatherwax.

**Publication of Proceedings:** Chairman, Benjamin Moulton, Butler University; A. A. Lindsey, P. Weatherwax.

**Relation of Academy to State:** Chairman, F. N. Wallace, State Department of Conservation; J. A. Clark, Eli Lilly, H. J. Reed.

**Representative on Council of A.A.A.S.:** Sears Crowell, Indiana University.

**Resolutions:** Chairman, T. G. Yuncker, DePauw University; J. Seybert, O. B. Christy.

# MINUTES OF THE SPRING MEETING

BROWN COUNTY STATE PARK  
ABE MARTIN LODGE, NASHVILLE, INDIANA  
MAY 13-14, 1955

President A. H. Meyer called the Executive Committee Meeting to order at 5:00 P. M. in the Abe Martin Lodge.

The officers and committees reported as follows:

**Treasurer:** F. Welcher stated that the Academy is steadily losing ground financially and that definite steps should be taken during the next fall meeting at the University of Notre Dame to correct this process. This was originally discussed by our president, Dr. Meyer, during the Budget Committee Meeting, December 11, 1954. The total membership remains nearly the same from year to year.

**Editor:** Benjamin Moulton reported that the Proceedings will be issued this summer.

**Library:** Nellie M. Coats remarked that the Academy Library is being used extensively from over the United States and that new journals are being added from time to time.

**Press Secretary:** James Clark mentioned that the usual news releases had been made.

**Program Committee:** John Mizelle reported that plans had gone well for the spring meeting and that all would be in readiness for the fall meeting.

## **Old Business:**

1. It was decided that the fate of the Natural Areas Preservation Committee be deferred until the fall meeting.

## **New Business:**

1. The secretary read a letter from a federal government tax official which stated that the Research Endowment Foundation Fund as well as the Academy was ruled tax-exempt.

2. The secretary displayed a copy of an Indiana Annual Non-profit Corporation Report which will have to be filed annually in the office of the Secretary of State. The Academy had been inadvertently omitted from the mailing list since 1935 and had not filed, but it is now up-to-date at a cost of twenty dollars. The charge will be one dollar annually.

All reports were accepted. The meeting adjourned at 6:00 P. M.

**Dinner Meeting:** Following the dinner in Abe Martin Lodge, the short business session was called to order by President Meyer in the dining room.

1. R. A. Laubengayer reported that 11 applications for membership had been received. These were duly acted upon and the applicants accepted for membership in the Academy.

2. Announcements of the field trips to be taken the next day were given by the leaders.

3. Dr. Raymond A. Gutschick of the University of Notre Dame presented a well illustrated and interesting lecture on the Grand Canyon-A Classical Geological Laboratory.

4. Mr. Frank Wallace presented his excellent kodachromes on Indiana flora in relation to the seasons of the year.

Eighty-five members and guests signed the Academy roll.

All scheduled hikes were made on May 14 in cloudy but pleasant weather.

W. A. DAILY,  
Secretary

# MINUTES OF THE EXECUTIVE COMMITTEE

UNIVERSITY OF NOTRE DAME, OCTOBER 13, 1955

The Executive Committee of the 71st session was called to order by President Meyer in Room 107, Biology Building, at 8:00 P. M.

The minutes of the Spring Meeting, held at Brown County State Park, were read and approved.

The reports of officers and committee representatives were presented and accepted as follows:

**Treasurer.** Report of the Treasurer from January 1, 1954 through December 31, 1955.

## Receipts

Balance on hand January 1, 1955.....	\$1,454.18
Dues and initiation fees.....	2,028.00
Publications sold .....	39.00
A.A.A.S. refunds for research grants.....	275.00
Author's reprints, Vol. 62.....	61.00
Author's reprints, Vol. 63.....	50.49
Author's reprints, Vol. 64.....	225.56
Contributions for Proceedings (Entomology Dept. Purdue University).....	200.00
Designated gift .....	50.00
Talent Search .....	1,990.85
Binding Proceedings for members.....	3.00
Total.....	\$6,377.08

## Disbursements

Editor Vol. 64 .....	\$ 200.00
Expenses of President .....	3.13
Expenses of Secretary .....	156.19
Expenses of Treasurer .....	125.60
Stationery .....	46.75
Binding Proceedings .....	35.00
Talent Search .....	1,990.85
Program Committee .....	283.32
Research Grants .....	335.00
Secretary of State .....	20.00
Mailing Proceedings .....	125.73
Returned check .....	3.00
Expenses of five officers as directed by action of 1947 Executive Committee .....	100.00
Binding, Academy of Science Library.....	694.70
Academy Conference .....	10.00
Author's reprints, Vol. 64.....	598.92
Expenses of Regional Science Fair.....	50.00
Refunds on Reprints, Vol. 62.....	189.98
Shipping Reprints .....	23.25

Balance on hand December 31, 1955.....	\$4,991.42
	1,385.66
	\$6,377.08

FRANK J. WELCHER, *Treasurer*

**Editor and Publication of Proceedings.** Dr. Ben Moulton reported that the delay in the publication of this year's Proceedings was because of a heavy load of state printing orders by our printer.

**Trustees of the Academy Foundation.** The secretary presented the report for Oct. 1, 1954 to Sept. 30, 1955:

Oct. 1, 1954. Beginning balance.....	\$ 1,477.27
Oct. 1, 1954 to Sept. 30, 1955—Total receipts.....	358.36
Oct. 8, 1954 to Sept. 30, 1955—Bank Fees.....	33.89
Sept. 30, 1955—Transfer to principal .....	1,000.00
Total disbursements .....	\$ 1,033.89

Ending cash balance ..... 801.74

Bonds and shares of stock—Total carrying value . . . . \$13,412.00

**Bonding of Trustees.** The secretary read the following report from Chairman Scott McCoy: The bond covering the Treasurer and the Trustees is still in force. The expiration date is Nov. 18, 1956.

**Auditing Committee.** The secretary read the report received from Chairman, Dr. W. P. Morgan, as follows: The treasurer's report for 1954 has been carefully checked. All items are accounted for and the records are in good form. All amounts are correctly stated.

**Press Secretary.** James Clark reported that the usual news releases were made. Good cooperation was obtained from the Notre Dame publicity staff. Few popularized abstracts were sent in by the members. Greater effort would be helpful to popularize papers for newspaper and other publicity releases.

**Research Grants.** Dr. T. G. Yuncker gave the following report: During the past year the following grants have been made by the Research Grants Committee of the Indiana Academy of Science:

Mr. J. W. Wood—\$100 to assist in his study of fossil cones.

Dr. Winona Welch—\$100 for use in her study of the moss family, Hookeriaceae.

Dr. J. S. Karling—\$100 to assist in the collection and study of Indiana, Illinois and Wisconsin species of the genus, *Synchytrium*.

Dr. A. T. Guard—\$75 for use in connection with field work in a study of the genetics of *Helianthus*.

It should be understood that the Academy has a rule of long standing to the effect that no person is eligible for a grant unless he has been a member of the Academy in good standing for at least two years.

**Nominations.** Dr. H. M. Powell reported the following nominations: Mr. Ward J. Rice to serve another term as trustee of the Academy Foundation, Mr. Scott McCoy to continue as chairman and Dr. W. P. Morgan to serve on the Bonding of Trustees Committee. Dr. M. G. Mellon to serve another term on the Research Grants Committee.

**Fellows:** Dr. H. M. Powell reported that after due deliberation the following names are presented to the Executive Committee with the recommendation that they be elected as Fellows of the Indiana Academy of Science:

Dr. Otto K. Behrens, Eli Lilly and Company, Indianapolis.

Dr. Milton Burton, Department of Chemistry, University of Notre Dame.

Dr. Robert Cooper, Department of Biology, Ball State Teachers College.

Dr. Ray Thomas Everly, Department of Entomology, Purdue University.

Dr. Margaret H. Fulford, Department of Botany, University of Cincinnati.

Dr. Charles W. Hagen, Jr., Department of Botany, Indiana University.

Dr. Frank N. Young, Jr., Department of Zoology, Indiana University.

For Fellow of the American Association of the Advancement of Science:

Mr. William A. Daily, Microbiological Research, Eli Lilly and Company.

**Biological Survey.** Fay K. Daily reported that the response was very satisfactory to completion and return of the Biological Survey Questionnaire, the results of which are available in the Proceedings of the Indiana Academy of Science, Vol. 64.

Some reports of work completed or in progress have been made by members of the committee. In the next two or three months, a new issue of "Investigations of Indiana Lakes and Streams" will be published including a paper by D. G. Frey on the distribution of Ciscoes of the state and a paper by S. D. Gerking on a key to the fishes of Indiana. Dr. Sherman A. Minton, Jr., completed a paper on the Herpetology of Indiana, but has no publisher as yet. He also sent a list of recent papers on this subject to supplement the list which he has provided for the Biological Survey Committee files. Dr. Winona H. Welch completed the manuscript for an Indiana Moss Manual to be published soon. She prepared an illustrated key to Indiana mosses for use by park naturalists last year. Dr. H. H. Michaud published "Conservation Teaching Tips" with P. L. Whitaker as co-author. Studies in progress include one by Drs. Frank Young and I. J. Cantrall on grasshoppers and another by W. A. and F. K. Daily on the algae.

**Library.** Miss Nell M. Coats presented the following: The Indiana Academy of Science Proceedings, v. 64, 1954, published September 14, 1955, have been distributed to members, the Indiana State Library supplying envelopes and labor for the process.

The volume will be mailed shortly to the 537 scientific and technical institutions and societies with which the Academy's library has exchange agreements. Of these exchanges 229 are domestic and 308 foreign, representing all areas of the United States and 68 nations other than the United States, an important geographic range. Currently these agencies send to the Academy 869 serial titles, an increase of 55 from the last report period. These include such titles as the *Amsterdam Naturalist*; *Applied Photography*; a publication of the Argentine Atomic Energy Commission; *Land Research*, from Australia; the *Australian Journal of Zoology*; *Beiträge zur Entomologie* issued by the Deutsche Entomologische Institut; a publication of the Iraq Natural History Museum; *Memorias* from a museum in Mozambique; *Publications in Anthropology*, from the Milwaukee Public Museum; the *Nagoya Mathematical Journal*; *Reinwardtia* from the botanic gardens at Bogor on Java. The figure of 869 titles compares favorably with the 229 received in 1935. In addition to much paper covered material, the library contains 4958 bound volumes. Mrs. Harold Burton has prepared 212 volumes for binding which will bring the total to 5170 volumes.

**Junior Academy.** Dr. H. H. Michaud gave the following report:

The twenty-second annual meeting of the Indiana Junior Academy of Science was held jointly with the Purdue Sci-Math Assembly Saturday, October 16, 1954, in the Union Building at Purdue University, Lafayette,

Indiana. Approximately 1600 high school students, teachers, and guests registered for the combined sessions.

In addition to the usual program of exhibits and papers by Junior Academy members, the program included career conferences with scientists, visits to instructional and research laboratories, and an opportunity for students to discuss projects in science with specialists.

Two new science clubs have been enrolled in the Junior Academy since the last report. They include the Science Club of Chesterton High School and the Phi-Chi Club of New Haven High School. There are forty-four clubs listed on the present roll of the Junior Academy.

The twenty-third annual meeting of the Junior Academy of Science will convene this Saturday, October 15. Registration and exhibits will be held in the Nieuwland Science Center, Notre Dame University. The general assembly and afternoon program will be held in the auditorium of the engineering building.

The titles of papers to be read by club members represent a wide variety of scientific interest from mathematics to geology. Students will be given the opportunity again this year to visit the scientific laboratories of Notre Dame as they did at Purdue last year.

The Junior Academy is an excellent medium for stimulating interest in science among both students and teachers. One student on the program this year, for example, has developed an unusual technique for making bacterial counts in milk. He has discussed this method with the head of the departmental of bacteriology at Indiana University and has received special encouragement because of his apparent ability.

Indiana Science Talent Search. Dr. R. W. Lefler stated that:

One hundred six Indiana high school seniors completed the requirements for entry in the Science Talent Search during the 1954-1955 school year. Ninety-seven of these students are attending 28 colleges; 74 are in 15 Indiana colleges.

Sixty-one students have been awarded scholarships by the colleges they attend. Fifty-four of the scholarships have associated stipends, which over the four year period of undergraduate study will amount to more than \$58,000. Forty-three received extra honors at high school graduation.

The Indiana Science Talent Search has found a devoted friend in Mr. Robert Gwin, Manager of the Indianapolis Industrial Exposition of the Indianapolis Chamber of Commerce. Mr. Gwin took charge of our fund raising which resulted in contributions of \$1727.35. This amount exactly balanced our expenditures. We are indebted to the Indianapolis Times, The Allison Division of General Motors, Eli Lilly and Company, The Indianapolis Power and Light Company and the P. R. Mallory Company for the contributions which made the 1954-55 Search possible.

The Search culminates in a Junior Scientists Assembly which will be held again on March 23-24 1956 in the Claypool Hotel in Indianapolis.

Dr. Lefler also reported on the Indiana Regional Science Fairs, which were held in eight centers during the spring of 1955. There were about 830 student exhibits entered in the fairs. Fifteen students and their teacher sponsors were sent to the national Science Fair in Cleveland, Ohio, with expenses paid.

Because of necessary operating expenses for each regional fair, it has been proposed that the Indiana Academy of Science approve an amount not to exceed \$75.00 to cover the difference between the actual cost of printing and distributing the 1956 science fair poster and the \$225 appropriated this year by the Indiana Engineering Council. This has been referred to the next meeting of the Budget Committee.

It was also moved and approved that the possibility of using some of the funds from the Research Endowment for research by high school students be referred for consideration to the proper committee.

Relation of Academy to State. Mr. Frank N. Wallace reported that the Legislature has appropriated \$4,000.00 for the publication of next year's Proceedings of the Indiana Academy of Science.

Invitations Committee. Dr. Richard Laubengayer, chairman *pro tem*, stated that an invitation had been received from Indiana University to hold the fall meeting on their campus in 1956.

Membership Committee. Dr. R. A. Laubengayer presented a progress report. The election of new members will be held during the dinner meeting tonight.

Program Committee. Dr. John Mizelle announced that registration, payment of dues and banquet tickets could be secured at Morris Inn. It was suggested that visual aids for presentation of papers at sectional meetings be requested by authors and chairmen earlier so that the materials could be procured in ample time by the chairman of the Program Committee.

Representative on Council of A.A.A.S. Dr. Sears Crowell sent a report stating that nothing of immediate concern to the Academy transpired during the last A.A.A.S. meeting.

#### Old Business.

1. It was decided that the Natural Areas Preservation Committee should remain on an inactive basis until further notice.

#### New Business.

1. It was recommended that Dr. Ralph Howard Carr, Orlando, Florida, formerly of Purdue University, become an Emeritus Member, without receipt of Proceedings each year.

2. The cost of preparing and sending a Presidential News Letter was referred to the Budget Committee for consideration.

3. A check for \$50.00 was recently received from Mr. C. M. Goethe of California to be used as the Academy chose for junior membership or married graduate students. It was decided to use this money to aid in defraying the cost of printing and distributing the 1956 science fair poster.

4. A movement to establish a commission to study the building of a State Museum Building was discussed. It was mentioned that each candidate for the legislature by county should be contacted on this matter.

The meeting adjourned at 10:15 P. M.

W. A. DAILY,  
Secretary

## MINUTES OF THE GENERAL SESSION

UNIVERSITY OF NOTRE DAME, OCTOBER 14, 1955

The Reverend T. M. Hesburgh, C.S.C., President of the University of Notre Dame, welcomed the Indiana Academy of Science to the Notre Dame Campus. A response was given by Dr. A. H. Meyer, President of the Indiana Academy of Science.

The minutes of the Executive Committee were read and approved.

Dr. O. B. Christy presented a biography of the members who had died during the year. They were: Rolla Roy Ramsey, John E. Potzger, William A. Myers, William Ray Allen, Joseph Lewis Hyatt.

Dr. Charles E. Brambel, Head, Department of Biology, University of Notre Dame, presented a provocative address entitled, *What is a Biologist?*

The meeting adjourned at 10:50 A. M.

Sectional meetings then began with a recess for lunch, after which meetings were resumed.

The annual dinner was held in the Bronzewood Room at the LaSalle Hotel, South Bend.

Vice-President Willis Johnson introduced the guests and officers at the speakers' table.

During the following short business session, Dr. R. A. Laubengayer presented the names of 49 applicants for membership. These were duly elected.

Dr. T. G. Yuncker presented the following resolutions:

Whereas:

The Indiana Academy of Science is deeply grateful to the University of Notre Dame for their invitation to hold its 71st annual meeting on their beautiful campus, and

Whereas:

Administration, faculty and students alike have cooperated in placing at the disposal of the Academy members all rooms and other facilities necessary for the holding of the numerous sectional meetings, be it

Resolved:

That the Academy members here assembled express their sincere thanks to Notre Dame through the Reverend T. M. Hesburgh, C.S.C., President of the University, for all the courtesies which have been shown the Academy during the meetings.

Thanks are also expressed to the laboratories of Bacteriology of the University for the conducted tours which enabled the Academy members the opportunity of visiting the world-famous Lobund, experimental germ-free laboratories.

Special appreciation and thanks are due Prof. J. D. Mizelle and his committee in charge of program and arrangements for the splendid and efficient manner in which all arrangements were made for the conduction of the business of the Academy and the comfort and convenience of the membership.

It was recommended that a copy of these resolutions be sent Pres. Hesburgh and Prof. Mizelle.

The Nominations Committee report was given by the Chairman, H. M. Powell. Divisional Chairmen for 1956 will be: Anthropology, Dr. George K. Neumann, Indiana University; Bacteriology, Dr. Eugene D. Weinberg, Indiana University; Botany, Dr. Charles W. Hagen, Indiana University; Chemistry, Dr. Donald J. Cook, DePauw University; Entomology, Dr. Donald L. Schuder, Purdue University; Geology and Geography, Prof. B. H. Schockel, Aurora, Indiana; History of Science, Dr. W. J. Tinkle, R. R. 1, Albany, Indiana; Mathematics, Dr. Harry Crull, Butler University; Physics, Dr. Allan Mitchell, Indiana University; Plant Taxonomy, Dr. Carrolle A. Markle, Earlham College; Psychology, Dr. J. P. Egan, Indiana University; Zoology, Dr. Enos G. Pray, Hanover College.

The following members were recommended to serve as 1956 officers: President, Dr. Raymond E. Girton, Purdue University; Vice-president, Dr. John Mizelle, University of Notre Dame; Secretary, Mr. W. A. Daily, Eli Lilly and Company; Treasurer, Dr. Frank Welcher, Indiana University Adult Education Center, Indianapolis; Editor, Dr. Richard Laubengayer, Wabash College; Press Secretary, Mr. James Clark, Conservation Department, Indianapolis.

President A. H. Meyer then gave a very interesting and timely address entitled, *Societal Responsibilities of Academies of Science at Mid-Century*.

The 71st annual meeting of the Indiana Academy of Science with a general attendance of 385 and a dinner attendance of 120 was adjourned.

W. A. DAILY,  
Secretary

## NEW MEMBERS 1955<sup>1</sup>

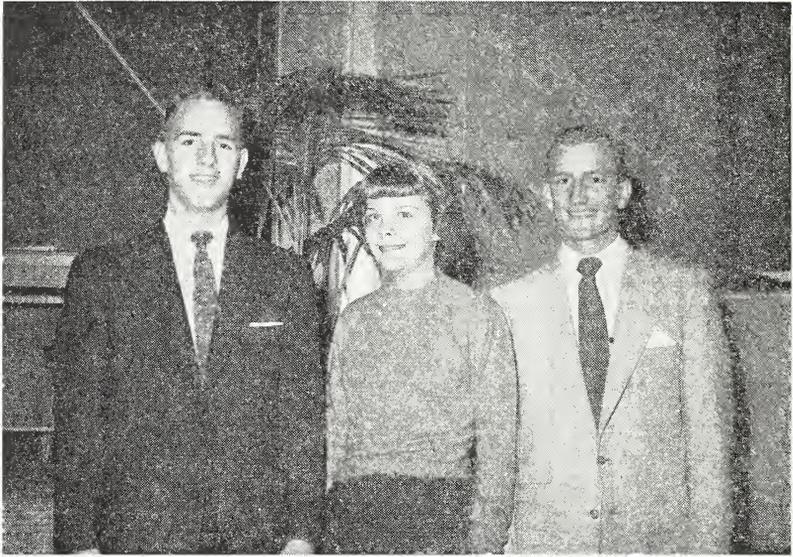
Ae, Shigeru Albert, Box 126, Notre Dame University, Notre Dame, Ind.	Bo, Z
Albright, Lewis E., Psychology Department, Purdue University, Lafayette, Ind.	Ps
Barr, Ernest G., Tippecanoe Laboratories, Eli Lilly and Co., Lafayette, Ind.	C
Borders, Donald, Chemistry Department, Indiana University, Bloomington, Ind.	C
Broyles, Dr. Ralph E., 5701 Fairfield Ave., Fort Wayne, Ind.	
Cantrall, Dr. Irving J., E. S. George Reserve, Pinckney, Mich.	E
Carter, Paul D., Box 181, Sanborn, Ind.	M
Cesari, Prof. Lamberto, 2801 Greenbush St., Lafayette, Ind.	M
Chao, Dr. Tai Siang, 591 Pelham Blvd., St. Paul, Minn.	C
Davis, Robert Earle, Department of Chemistry, Harvard University, Cambridge, Mass.	C
Egan, Dr. James P., Director, Hearing and Communication Laboratory, Psychology Department, Indiana University, Bloomington, Ind.	Ps
Elliott, Dr. Alice, Ball State Teachers College, Muncie, Ind.	Z
Ellis, Robert G., President, Ellis and Co., 205 W. Wacker Dr., Chicago 6, Ill.	Ph
Erd, Richard C., 2104 Hildarose Dr. -3, Silver Spring, Md.	G
Flaten, Clarence M., South Hoosier Hall, Indiana University, Bloomington, Ind.	Bo
Fry, William O., Jr., Eli Lilly and Co., Lafayette, Ind.	Ba, C
Gerjuoy, Dr. Herbert, Department of Psychology, Indiana University, Bloomington, Ind.	Ps
Gerjuoy, Dr. Irma, R. R. 1, Bloomington, Ind.	Ps
Gregory, Paul N., Tippecanoe Laboratories, Eli Lilly and Co., Lafayette, Ind.	Ba, C
Gutschick, Dr. R. C., Department of Geology, University of Notre Dame, Notre Dame, Ind.	G
Harris, Antonio, Department of Biology, University of Notre Dame, Notre Dame, Ind.	Z
Hart, Dr. John Fraser, Department of Geography, Indiana University, Bloomington, Ind.	G
Higgins, Calvin E., Lilly Research Laboratories, Eli Lilly and Co., 740 S. Alabama St., Indianapolis, Ind.	Ba, Bo
Hill, Sister Ann Gertrude, O.S.U., 1233 N. Notre Dame Ave., South Bend, Ind.	C
Hopp, Dr. William B., Department of Biology, Indiana State Teachers College, Terre Haute, Ind.	Z
Hume, Prof. James D., 1812 Ravinia Rd., West Lafayette, Ind.	G
Hunsucker, Jerry H., R.F.D. 2, Box 328 AB, Carmel, Ind.	C
Jones, Dr. J. A., Department of Anthropology, Indiana University, Bloomington, Ind.	A
Jordan, Wendell V., Arab Pest Control Co., 2701 Winthrop Ave., Indianapolis, Ind.	E

<sup>1</sup>Abbreviations following the members' listings indicate the sections of the Academy with which they are affiliated.

Judd, Dr. Gerard F., 624 O'Dell St., Austin, Texas	C
Kirsch, Arthur David, 340 South Grant St., West Lafayette, Ind.	Ps
Konetzka, Walter A., Department of Bacteriology, Indiana University, Bloomington, Ind.	Ba
Kortright, James M., Purdue University Center, Jefferson at Barr, Fort Wayne, Ind.	Ph
LaFollette, Robert, 2417 Kenwood Ave., Fort Wayne, Ind.	C
Lounsbury, Prof. Richard, 9 David Ross Rd., West Lafayette, Ind.	G
Manthey, John A., 2235 S. Ransdell, Apt. 7, Indianapolis 25, Ind.	Bo
Martin, Dr. Dudley C., General Chemical Division, 511 East Paterson St., Kalamazoo, Mich.	E
Melhorn, Dr. William N., Department of Geology, Purdue University, Lafayette, Ind.	G
Miller, Charles A., Department of Biology, Wabash College, Crawfordsville, Ind.	Z
Millis, Samuel C., 408 South Grant Ave., Crawfordsville, Ind.	Z
Murphy, Rev. Michael J., C.S.C., Department of Geology, University of Notre Dame, Notre Dame, Ind.	G
Myers, Robert D., Psychology Department, Biology Annex, Purdue University, West Lafayette, Ind.	Ps
O'Brien, Dennis M., Box 126, Department of Biology, University of Notre Dame, Notre Dame, Ind.	Z
Paradiso, S. M., 214 West Lutz, West Lafayette, Ind.	
Peacock, Dr. John, 36 Bullroyd Crescent, Girlington, Bradford 8, York, England	C
Peters, Lewis E., Jr., Biology Annex, Purdue University, Lafayette, Ind.	Z
Petras, Michael, Biology Department, University of Notre Dame, Notre Dame, Ind.	Bo, Z
Quinn, Sister Mary Lorita, R.S.M., Box 126, University of Notre Dame, Notre Dame, Ind.	Z
Roth, Paul L., 1033 N. Denison, Manhattan, Kas.	Bo, A
Schaap, Dr. Ward B., Department of Chemistry, Indiana University, Bloomington, Ind.	C
Speroff, B. J., Industrial Relations Center, The University of Chicago, Chicago 37, Ill.	Ps
Stitt, Loyd L., 321 West Prairie Ave., Wheaton, Ill.	E
Stone, Robert L., 536 South Washington, Bloomington, Ind.	Ba
Traynelis, Dr. Vincent J., Department of Chemistry, University of Notre Dame, Notre Dame, Ind.	C
Tucker, David A., Apt. 1, Building 3, Ross-Ade Dr., West Lafayette, Ind.	Ps
Van Scoik, William S., 1018 Maxine Dr., Fort Wayne 6, Ind.	E
Welter, C. Joseph, 916 E. Colfax Ave., South Bend, Ind.	Z
Whiting, Russell William, Arab Pest Control Co., 2701 Winthrop Ave., Indianapolis, Ind.	E
Wischnitzer, Saul, Department of Biology, University of Notre Dame, Notre Dame, Ind.	Z

## JUNIOR ACADEMY

Highland Science Club, Lincoln School, 2450 Lincoln St., Highland, Ind.



## INDIANA JUNIOR ACADEMY OF SCIENCE

### OFFICERS FOR 1955

President: BOB CONWAY, Science Club, Shortridge High School, Indianapolis.

Vice President: PAUL JUSTUS, Phy-Chem Club, Elmhurst High School, Fort Wayne.

Secretary: LUANNE SCHNEIDER, Science Club, Howe High School, Indianapolis.

Members of the Council: Arthur L. Smith, South Bend (1951-1955); Charles E. Karst, Mishawaka (1952-1956); Edith Wallace, Gary (1953-1957); Jerry Motley, Indianapolis (1954-1958); Jack Munsee, Bloomington (1955-1959).

PROGRAM OF THE TWENTY-THIRD ANNUAL MEETING  
OCTOBER 15, 1955

Auditorium, Engineering Building, University of Notre Dame, Notre Dame, Indiana.

8:30-9:30 a. m. Registration and Placement of Exhibits, Room 244, Nieuwland Science Hall.

9:30-10:30 a. m. General assembly on careers in mathematics and science by faculty representatives of the University of Notre Dame, Auditorium, Engineering Administration Building.

10:30-12:00 a. m. Visits to campus instructional and research laboratories.  
12:00-1:00 p. m. Luncheon.

1:00-2:00 p. m. Business meeting and election of officers. Auditorium, Engineering Administration Building.

2:00-4:00 p. m. The Assembly Program, Auditorium, Engineering Administration Building.

**Papers:** Bob Conway, presiding.

1. Wildlife Refuges. Bonnie Flora, National Scientific Honor Society, Bloomington High School, Bloomington.
2. Mechanical Model of Radar. Alfred and Ronald Welch, Albertus Magnus Science Club, Central Catholic High School, Fort Wayne.
3. Number Systems. Thomas Kovats, Albertus Magnus Science Club, Central Catholic High School, Fort Wayne.
4. Genetics and the Breeding of Fruit Flies (illustrated). Betty Jane Gough, Science Club, New Castle High School, New Castle.
5. Maryland Miocene Strata. Roger Cuffey, Science Club, University High School, Bloomington.
6. Corn Novelties. Suzanne Sears, Science Club, New Castle High School, New Castle.
7. Comparison of Bacterial Counts in White and Chocolate Milk. Robert N. Doyal, Science Club, Howe High School, Indianapolis.
8. Vertical Distribution of Bird Territories. Lewis Nading, Naturalists' Club, Shortridge High School, Indianapolis.
9. Diffusion Cloud Chamber Design and Operation. Brett Nordgren, Science Club, Central Junior-Senior High School, South Bend.
10. Induction Heating. Pete Diamondis, Science Club, Central Junior-Senior High School, South Bend.
11. Life Zones of Indiana Duneland. Marvin Frank, Science Club, Central Junior-Senior High School, South Bend.
12. Vacation Fun With Slides (illustrated). Helen Karr, Biology Club, Tolleston High School, Gary.
13. Let's Save Our Woodlot. Martha Aire and Larry Bess, Biology Club, Lew Wallace High School, Gary.
14. Radio-active Phosphorus and Paramecium. Carl Bredenber, Science Club, Shortridge High School, Indianapolis.
15. Fossils. Thomas Wilbur, David Nixon, and William Tersler, Science Club, Junior-Senior High School, Richmond.

## MINUTES

The twenty-third annual meeting of the Indiana Junior Academy of Science was held Saturday, October 15, 1955 in the auditorium of the Engineering Administration building, University of Notre Dame, Notre Dame, Indiana.

A large collection of science projects and exhibits by high school students was displayed in Room 244, Nieuwland Science Hall, beginning at 8:00 a. m.

Outstanding exhibits included a mechanical model of radar, charts and maps of a bird population study, varieties of corn developed through breeding experiments, a model of a modern sewage disposal system, and a display of fossils of the Richmond area.

A general assembly on careers in mathematics and science was held from 9:30-10:30 a. m. in the auditorium of the Engineering Administration building. Faculty representatives of the University of Notre Dame spoke to the students about opportunities in chemistry, physics, zoology, botany, and mathematics.

Following the talks, students were given an opportunity to visit instructional and research laboratories of Notre Dame from 11:30 until noon.

The annual business meeting of the Junior Academy was held at 1:00 p. m. with President Bob Conway presiding.

The following officers were elected for the year 1956: President, Roger Cuffey, Science Club, University High School, Bloomington; Vice President, Brett Nordgren, Science Club, Central Junior-Senior High School, South Bend; Secretary, Paula Erpelding, Albertus Magnus Science Club, Central Catholic High School, Fort Wayne.

Mr. Arthur L. Smith, chairman of the Junior Academy Council, announced that Robert N. Doyal, Howe High School, Indianapolis, and Lewis Nading, Shortridge High School, Indianapolis, were selected as "best boys" in science for 1955. The winners of these awards are chosen on the basis of information submitted each year by sponsors of the Junior Academy clubs. Each of the students is given a year's membership in the American Association for the Advancement of Science and will receive its monthly publication "The Scientific Monthly". Pete Diamondis, Central Junior-Senior High School, South Bend, was given honorable mention for his achievement in science. There was no "best girl" in science named because no applications were submitted.

Professor R. W. Lefler, Purdue University, chairman of the Indiana Science Talent Search Committee, explained the procedure for entering the national and state Science Talent Searches. He also called attention to the eight regional science fairs scheduled for the spring of 1956 in the following locations: Valparaiso University; Purdue Center, Fort Wayne; Purdue University; Ball State Teachers College; Butler University; Indiana State Teachers College; Indiana University; and Evansville College. Professor Lefler encouraged students to develop projects in science and to enter them in the regional science fairs.

Professor Howard H. Michaud, State Sponsor, Purdue University, reported the selection of Mr. Ernest Litweiler, Junior Walton Club

Sponsor, Adams High School, South Bend, as a member of the Junior Academy Council. Mr. Litweiler will replace Mr. Arthur L. Smith, Central Junior-Senior High School, South Bend, whose term expired in 1955.

Professor Michaud also mentioned the excellent progress that has been made by the Junior Academy during the past year. One new science club of the Lincoln School, Highland, Indiana, was added to the Junior Academy in 1955. Mrs. Catherine Dale is sponsor of the club.

There are forty-five science clubs enrolled in the Junior Academy and it is hoped that each will continue to play an active part in promoting interest in science projects in 1956.

The business session was adjourned at 2:00 p. m.

The afternoon session of papers by club members was opened at 2:00 p. m. with President Bob Conway presiding. A total of thirteen papers was read to the assembly. Two students who were scheduled to appear were unable to attend.

The Junior Academy will hold its twenty-fourth annual meeting at Indiana University in the fall of 1956. Plans will be made immediately to provide another attractive program. High school science clubs and sponsors are urged to cooperate and participate by preparing papers and exhibits for the annual session.

INDIANA JUNIOR ACADEMY OF SCIENCE CLUBS

FALL 1955

<i>Town</i>	<i>School and Club</i>	<i>Sponsor</i>
1. Attica	H. S., Sci-Math (1949)	J. Claude Daugherty
2. Bedford	H. S., Science (1951)	Elmer Wright
3. Bloomington	H. S., National Scientific Honor Society (1931)	Harold A. Stewart
4. Bloomington	University H. S., Jr. Academy (1938)	Jack Munsee
5. Chesterton	H. S., Science (1954)	Robert McCord
6. Clayton	H. S., Jr. Academy (1951)	Howard C. Lewis
7. Crawfordsville	H. S., Up-N-Atom (1950)	David Wells
8. Edinburg	H. S., The Alchemists (1954)	S. C. Harrell
9. Elkhart	H. S., Jr. Academy (1940)	Mrs. Evelyn Wagoner Miller
10. Fort Wayne	Central H. S., Biology (1940)	Iva Spangler
11. Fort Wayne	Central Catholic H. S., Albertus Magnus Science Club (1952)	Sr. Mary Agnita S.P.
12. Fort Wayne	Elmhurst H. S., Phy-Chem (1935)	Ruth Wimmer
13. Fort Wayne	North Side H. S., Nature (1936)	Vesta Thompson
14. Gary	Calumet Twp. H. S., Science (1952)	
15. Gary	Edison H. S., Beaker Breakers (1949)	Mrs. Martha B. Connor

<i>Town</i>	<i>School and Club</i>	<i>Sponsor</i>
16. Gary	Lew Wallace H. S., Biology (1935)	Lola Lemon
17. Gary	Lew Wallace H. S., Klub Kem (1941)	Mrs. Helen McKenzie
18. Gary	Tolleston H. S., Biology (1952)	Edith Wallace
19. Gary	Tolleston H. S., Future Scientists of America (1949)	Arthur Kline
20. Gary	Wirt H. S., Biology (1945)	Mrs. Frances Huddleston
21. Gas City	Mississinewa Joint H. S., Science (1936)	Roy McKee
22. Griffith	H. S., Science (1953)	George M. Bunce
23. Hamlet	H. S., Science (1954)	Lawrence Cushman
24. Hammond	Morton Jr. H. S., Science (1949)	Nancy Lou Ritter
25. Highland	Lincoln School, Science (1955)	Mrs. Catherine Dale Lola Stewart
26. Hobart	H. S., Science (1952)	Lola Stewart
27. Indianapolis	Shortridge H. S., Naturalists' Club (1947)	Max Forsyth
28. Indianapolis	Shortridge H. S., Science (1931)	Mrs. Henrietta A. Parker
29. Indianapolis	Technical H. S., Nature (1932)	Howard L. Cook
30. Indianapolis	Howe H. S., Science (1949)	Jerry Motley
31. Indianapolis	Washington H. S., Science (1931)	Estil Van Dorn
32. Lebanon	H. S., Jr. Explorers of Science (1953)	Helen E. Reed
33. Marion	Martin Boots Jr. H. S., Biology (1953)	John Clevenger
34. Mishawaka	H. S., Science (1936)	Darl F. Wood
35. New Albany	H. S., Science (1935)	L. S. Rose
36. New Castle	H. S., Science (1947)	Mary Rankin
37. New Haven	H. S., Phi-Chi (1954)	Keith Hunnings
38. Richmond	H. S., Science (1950)	Kathryn Coulter
39. Rossville	H. S., Science (1954)	Martin Silverthorn
40. Sandborn	H. S., Up and Atom (1954)	Paul D. Carter
41. South Bend	Central H. S., Jr. Izaak Walton (1939)	Arthur L. Smith
42. South Bend	John Adams H. S., Adams Walton (1953)	Ernest Litweiler
43. Sullivan	H. S., Camera (1939)	Ruth Hinkle
44. Terre Haute	State H. S., Senior Science (1939)	Russell McDougal
45. Valparaiso	H. S., Science (1931)	Gerald Doeden