

PROCEEDINGS

of the

Indiana Academy
of Science

Founded December 29, 1885

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Volume 60

1950

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ALTON A. LINDSEY, EDITOR

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Spring Meeting

May 5-6

VERSAILLES STATE PARK

Fall Meeting

November 2-4

HANOVER COLLEGE

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Published at Indianapolis, Indiana
1951

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2. **Exchanges.** Items sent in exchange for the Proceedings and correspondence concerning exchange arrangements should be addressed:
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4. **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.
5. The **Constitution** and by-laws reprinted from v. 44 and the **Membership** list reprinted from v. 56, are available to members upon application to the secretary, Wm. A. Daily, Eli Lilly Co., Indianapolis, Indiana. **Necrologies** reprinted from various volumes can be supplied relatives and friends of deceased members by the secretary.
6. **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 Dept. of Biological Sciences, Purdue University, Lafayette, Ind.

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OFFICERS AND COMMITTEES FOR 1950

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President, S. S. VISHER, Indiana University.
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Editor, A. A. LINDSEY, Purdue University.
Press Secretary, P. MCGRAIN.

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Entomology, GEORGE GOULD, Purdue University.
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Mathematics, WALTER H. CARNAHAN, Purdue University.
Physics, DUANE ROLLER, Wabash College.
Psychology, ROBERT BRUCE, Wabash College.
Zoology, SEARS CROWELL, Indiana University.

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

C. A. Behrens, R. Bruce, W. H. Carnahan, O. B. Christy, R. E. Cleland, N. M. Coats, S. Crowell, W. A. Daily, J. J. Davis, C. C. Deam, E. F. Degering, H. E. Driver, W. E. Edington, H. E. Enders, R. C. Friesner, G. Gould, C. B. Heiser, T. Just, E. Kintner, H. Koffler, A. A. Lindsey, R. W. Lefler, Eli Lilly, Preston McGrain, J. F. Mackell, E. G. Mahin, C. A. Malott, M. S. Markle, R. E. Martin, K. S. Means, M. G. Mellon, H. H. Michaud, W. P. Morgan, F. Payne, C. L. Porter, R. R. Ramsey, D. Roller, K. Seymour, O. F. Starkey, S. S. Visher, F. B. Wade, F. N. Wallace, Paul Weatherwax, W. Welch, J. S. Wright, T. G. Yuncker.

BUDGET COMMITTEE

(President, Secretary, Treasurer, Editor, and Chairmen of Junior Academy, Library, Program, and Relations of Academy to State)
Chairman: S. S. Visher, Indiana University; W. A. Daily, W. P.

Morgan, A. A. Lindsey, H. Michaud, Nellie M. Coats, R. E. Martin, Frank N. Wallace.

COMMITTEES ELECTED BY THE ACADEMY

Trustees of the Academy Foundation (Term 4 years): Chairman, J. S. Wright, Eli Lilly & Co., Indianapolis (term ex. 1952); F. B. Wade (term ex. 1951). Following Dr. Wade's death, Ward J. Rice of Eli Lilly & Co. was appointed his successor.

Bonding of Trustees (elected annually): Chairman, R. C. Friesner, Butler University; Scott McCoy.

Research Grants (term 5 years): Chairman, T. G. Yuncker, DePauw University (term ex. 1949); E. G. Mahin (1952), H. H. Remmers (1950), Paul Weatherwax (1951), J. S. Wright (1953), S. S. Visher and W. A. Daily (ex officio).

COMMITTEES APPOINTED BY THE PRESIDENT

Auditing: Chairman, K. S. Means, Butler University; S. E. Elliott.

Biological Survey: Chairman, C. B. Heiser, Indiana University; F. P. Allyn, W. B. Barnes, H. J. Brodie, F. K. Daily, H. O. Deay, R. C. Freisner, S. D. Gerking, H. H. Michaud, Winona Welch, Frank Young.

Fifty-Year Index: Chairman, Ray C. Friesner, Butler University; N. M. Coats, W. P. Morgan, F. N. Wallace, Paul Weatherwax.

Indiana Men of Science: Chairman, S. S. Visher, Indiana University; W. E. Edington, J. S. Wright, M. G. Mellon, Paul Weatherwax.

Junior Academy: Chairman, H. H. Michaud, Purdue University; N. E. Adams, F. R. Elliott, E. Kintner, W. P. Allyn, J. E. Potzger, R. H. Cooper, P. L. Whitaker, A. Strickler, R. E. Martin.

Indiana Science Talent Search: A sub-committee of the Junior Academy Committee—Chairman, R. W. Lefler, Purdue University; F. Payne, P. D. Edwards, W. H. Welch, L. H. Baldinger, C. L. Porter, Walter Leckrone (ex officio).

Invitations: Chairman, Edward Kintner, North Manchester College; A. H. Meyer, P. D. Edwards, J. E. Potzger.

Library: Chairman, N. M. Coats, State Library; R. C. Friesner, J. S. Wright.

Membership: Chairman, J. J. Davis, Purdue University; W. P. Allyn, Rev. C. P. P. S. Baechle, Juna Beal, H. T. Briscoe, R. M. Caldwell, J. R. Dragoo, P. D. Edwards, S. R. Esten, R. C. Friesner, Sister M. C. Fritsch, R. E. Girton, W. H. Headlee, G. F. Hennion, R. L. Hicks, G. E. Hines, L. B. Howell, B. A. Howlett, J. L. Hyatt, Alma Long, M. S. Markle, A. H. Meyer, Alvin Strickler, J. E. Switzer, W. H. Welch.

Necrologist: W. E. Edington, DePauw University.

Nominations: Winona Welch, Chairman; R. C. Friesner, F. Payne.

Program: Chairman, R. E. Martin, Hanover College; R. C. Friesner,

H. H. Michaud, C. Hire, Ned Guthrie, J. L. Hyatt, G. T. Wickwire,
J. S. Wright J. E. Potzger.

Publication of the Proceedings: Chairman, A. A. Lindsey, Purdue University; R. C. Corley, P. D. Edwards, Paul Weatherwax.

Relation of Academy to State: Chairman, F. N. Wallace, State Dept. of Conservation; Daniel Den Uyl, H. J. Reed, Eli Lilly, J. S. Wright.

Representative on Council of A.A.A.S.: E. F. Degering, Illinois Institute of Technology.

Resolutions: Chairman, R. E. Cleland, Indiana University; J. F. Mackell, A. H. Meyer.

MINUTES OF THE SPRING MEETING

VERSAILLES STATE PARK

HASSMER HILL CAMP

MAY 5, 6, 1950

President Visher called the Executive Committee meeting to order at 4:30 P. M. in the Hassmer Hill Dining Hall. Twenty members were present.

The officers and committees reported as follows:

Treasurer: W. P. Morgan gave a resume for the year 1949.

Editor: A. A. Lindsey reported that the corrected galley for vol. 59 is in the hands of the printer.

Press-Secretary: Preston McGrain added "Outdoor Indiana" as an outlet for favorable publicity.

Index: The index is up to date according to R. C. Friesner.

Indiana Men of Science: S. S. Visher read the following resolution proposed by John S. Wright:

RESOLVED, that if the committee on the preparation of the proposed directory and history of Indiana Men of Science finds it practicable to make a contract for its publication during the current year, it be empowered to act, provided that in so doing it shall not involve the Indiana Academy of Science in any expense therefor beyond amounts available in the treasury under "designated fund" contributions.

Junior Academy: H. H. Michaud reported that there are now about 30 clubs, almost double the number we had during the war period. The last Junior Assembly held in Indianapolis under the auspices of the Indianapolis Times, the Academy and Junior Academy was a success. Expenses for the Junior Academy have been about \$20.00.

A committee composed of R. W. Lefler, Winona Welch, and R. C. Friesner was appointed to investigate the possibilities of using the official seal of the Academy for the Junior Academy.

Library: In the absence of Nellie Coats, R. C. Friesner reported that the shelving had been ordered for the new Academy library.

Program: R. E. Martin reported that plans were well under way for the fall meeting, and that a tentative date of the first week in November had been set.

Relation of the Academy to State: It was moved, seconded and carried that Frank N. Wallace should ask the legislature to appropriate \$4,000 for the next year.

Dues: R. C. Friesner proposed an amendment which would increase the annual dues from one to two dollars beginning in 1951. This was approved.

Research Grants: T. G. Yuncker reported that the sum of 280 dollars is available for research projects.

New Business: A motion was proposed by R. C. Friesner that new members should not receive the Academy Proceedings for the previous year. This motion was tabled until the fall meeting.

The meeting adjourned at 5:45 P. M.

Dinner Meeting: Following the dinner at 6:30 P. M. an address of welcome was given by S. S. Visher.

S. W. Switzer reported 49 new applicants for membership which were duly elected.

Talks on geology and biology of the vicinity were given by Professor G. T. Wickwire and H. H. Michaud respectively. Kodachromes of the spring flowers were shown by Frank N. Wallace.

One hundred and twenty-seven attended the banquet.

On Saturday morning, May 6, three field trips were organized. These trips and leaders were:

Bird hike led by H. H. Michaud

Botany trip by J. E. Potzger

Geology trip by G. T. Wickwire.

W. A. DAILY, Secretary
Indiana Academy of Science.

MINUTES OF THE EXECUTIVE COMMITTEE

HANOVER, NOVEMBER 2, 1950

The Executive Committee of the 66th session was called to order by President Visher in Room 102, Classic Hall of Hanover College at 7:45 P. M. The minutes of the Spring Meeting, held at Versailles State Park were read and approved. The reports of officers and committee representatives were presented and accepted as follows:

Academy Trustees. In the absence of Chairman Wright, W. P. Morgan reported as follows for the year 1949-50:

Balance from the previous year	\$ 532.47
Total Receipts	1,519.99
Total	\$ 2,052.46
Expenditures	
Transfer to Principal from Income for investment ...	\$ 1,250.00
Postage and insurance charge on Series D bonds	2.50
The Union Trust Co. fee, 5% of \$1,519.99	76.00
Total	\$ 1,328.50
Cash Balance at the Union Trust Co.	\$ 723.96

Assets in the Fund as of September 30, 1950

(1) \$5,000.00 U. S. Savings Bond Series G—cost	\$ 5,000.00
\$6,900.00 U. S. Treasury Bonds Series G—cost	6,900.00
(6) Shares Standard Oil of Indiana common stock par	150.00
Total at par or cost	\$12,050.00

Treasurer. Final report of the treasurer for the year 1950:

Receipts

Balance on hand January 1, 1950	\$1,955.96
A.A.A.S. refund for research grants	100.00
Dues and initiation fees	1,491.00
Designated gifts	500.00
Publications sold	23.24
Authors' reprints Vol. No. 54	19.76
Authors' reprints Vol. No. 56	37.34
Authors' reprints Vol. No. 57	7.87
Authors' reprints Vol. No. 58	288.58
Authors' reprints Vol. No. 59	666.03
	\$5,089.78

Disbursements

1—Program Committee	\$ 274.66
2—Editor Vol. No. 58	74.14
3—Editor Vol. No. 59	200.00
4—Expenses of Secretary	130.50
5—Expenses of Treasurer	129.50
6—Mailing Proceedings	119.16
7—Stationery	100.65
8—Surety Bond	62.50

9—Bookwalter Co. balance due Vol. No. 59.....	279.45
10—Authors' Reprints Vol. No. 59	1,253.78
11—Jr. Academy Expenses	26.00
12—Author Award 1950, Paul Weatherwax	25.00
13—Author Award 1950, L. S. McClung	25.00
14—Winona Welch research grant	50.00
15—Duane Roller research grant	37.50
16—Returned Checks	11.58
17—Expenses to five officers as directed by action of 1947 Executive Committee	100.00
18—To the preparation of the manuscript of "Indiana Scientists under direction of S. S. Visher	843.42
	<hr/>
	\$3,742.24
*Balance on hand	1,347.54
	<hr/>
	\$5,089.78

*Balance includes \$359.58 designated for use in the publication of "Indiana Scientists" and \$50.00 designated for 1951 Author Awards.

(Signed) W. P. MORGAN
Treasurer

(Signed) KARL S. MEANS,
S. E. ELLIOTT,
Auditors.

Auditing Committee. The treasurer's report was audited and approved by the committee. The statement of the Union Trust Company as to the Society's account and holdings was checked by the trustees and the chairman of the auditing committee.

Bonding Committee. Ray C. Friesner, chairman, reported that the Academy carries with the Hartford Accident and Indemnity Company a bond in the amount of \$2,000.00 for the Treasurer and \$5,000.00 each for the Trustees. These are on a position basis. The bond is renewable triennially at a total cost of \$62.50 for the three-year period. The next expiration date is November 18, 1950, and the bond will be renewed on or before that time unless the Academy should instruct the Committee otherwise.

Research Grant. T. G. Yuncker, chairman, reported that the committee had made a grant of \$100.00 to Winona Welch, Department of Botany, DePauw University. M. G. Mellon was nominated to serve on this committee. At the request of E. G. Mahin to be released from this committee, W. H. Johnson was nominated to serve the remainder of the term.

Editor and Publication of Proceedings. Volume 59 of the Proceedings was published on September 15, 1950. The printer's bill for 1,000 cloth bound copies and 600 paper bound copies was \$3,279.45. The state has allotted \$3,000 for the volume.

8,615 reprints were made at a cost of \$1,253.78.

A short section "Instructions for Contributors" was added at the end of the Proceedings. Reprints were made for distribution to prospective authors.

The expenses of the Editorial office totaled \$176.00.

It was moved and carried that the Academy pay the difference of \$279.45 between the state appropriation and the bill for Vol. 59 of the Proceedings.

Concerning the assumption of partial payment for reprints by the Academy as done in recent years, it was moved by Ray C. Friesner and carried that the Editorial Committee make a report on the matter with recommendations at the Council meeting early in 1951 and that the Council have the power to act upon it.

Press Secretary. Preston McGrain reported that notices and final programs of the fall meeting were sent to Newsweek, Industrial Laboratories and Outdoor Indiana as well as the regular newspaper outlets. Ray C. Friesner sent several copies of the program to each college and university in the state for posting. The Academy is indebted to Mr. Frank S. Baker, Director of Publicity, Hanover College, for the splendid coverage which the fall meeting received.

For the benefit of publicity, it was moved and carried that when technical abstracts are called for in the fall, popular abstracts also be requested.

Biological Survey. Little new material in the way of faunistic and floristic work has come to the attention of the committee since the last report, according to C. B. Heiser, chairman. Winona Welch has continued her researches on the mosses of Indiana, and Ray C. Friesner in the report of the State Flora Committee lists 12 new species for the state.

W. E. Ricker, who has accepted a position outside of the state, has asked to be relieved of his duties on the committee.

Ten Year Index. Ray C. Friesner reported that all but Volume 59 of the Proceedings have been indexed; however, the latter is one-half completed.

Indiana Scientists. S. S. Visher reported that the volume will probably be completed by the end of 1950.

Indiana Science Talent Search. Ralph W. Lefler, chairman, reported as follows:

"The necessity for the early identification and for the continued development of our talented in all fields of science and mathematics is being recognized by the Academy through its Science Talent Search Committee. 28 high school seniors were honored at last year's Junior Scientists Assembly and were recommended for scholarships in Indiana Colleges. Though many of these have gone outside the state, they have been awarded more than \$33,000 to support their undergraduate programs of study.

The Junior Scientists Assembly will be held in the Riley Room of the Claypool Hotel in Indianapolis on March 24, 1951. Dr. H. J. Mueller, Nobel Prize Winner, Dept. of Zoology, Indiana University, will address the Assembly."

It was moved and carried that the secretary write a letter to Walter Leckrone, Editor of the Indianapolis Times, thanking him for his continued loyal support of the Junior Academy.

Junior Academy. Howard Michaud reported that there are at present thirty active clubs in the Junior Academy representing twenty-seven Indiana high schools. Four new science clubs were added during the past year including the science Club, Huntingburg; the Sci-Math Club, Attica; the future Scientists of America, Tolleston School, Gary; and the UP-N-Atom Club, Crawfordsville.

Official sanction for the Junior Academy meeting was received this year from the Activities Committee of the Association of Secondary School Principals. The need for obtaining sanction had not previously been called to our attention. The annual program of the Junior Academy has however, always conformed to the objectives, rules and regulations set forth by the committee.

The affiliation of the Junior Academy with Science Clubs of America, Washington, D. C., provides many services to the clubs that would otherwise be impossible. The sponsor handbook is an indispensable aid to club sponsors.

Most important items include suggested activities and projects, science service aids, recommended science books, and a list of free and low cost materials for science clubs. In fact, the service has proven so helpful that there are many more SCA than junior Academy clubs in the state.

The Junior Academy participated again in the national and state Science Talent Search in cooperation with Science Clubs of America and the Indianapolis Times. The state Science Talent Search Committee under the direction of Professor R. W. Lefler should be highly commended for the excellent work they are doing in the identification of science talented youth. Six of the twenty-eight state winners were Junior Academy members. Working cooperatively, as we are, it seems that more of the high schools participating in the talent searches should also be members of the Junior Academy.

The total expenditures for the Junior Academy in 1949 were \$20.72. This included expenditures for printing the News-Letter in 1949 and mailing costs. This year's cost of supplies and postage to date is \$21.55.

The Junior Academy has enjoyed a slow but steady progress since first organized in 1931. There are many more potential science clubs in Indiana that need just a little encouragement to become active in the work of the Academy. Members of the Junior Academy Committee, located by districts, might prove exceedingly helpful in making occasional contacts with science teachers in their areas.

Library. Chairman, Nellie M. Coats, reported that the major event has been the setting aside this year of separate stack space for the library's materials. Five-hundred and sixty linear feet of steel shelving were purchased by the State Library and installed in a separate room. Adjoining this stack area there is a small office for use of Academy officers and members.

The library continues to expand, thirty-seven new serial titles having been added this year from such institutions as the Polish Academy of Sciences and Letters, the Societé Neuchateloise des Sciences Naturelles, the Eastman Kodak Company, Escuela Agricola Pan Americana, Tegucigalpa, Honduras, and the Centre National de la Recherche Scientifique, Paris.

Thirty-three agencies previously on the exchange resumed shipments.

As usual the State Library supplied the manual labor involved in mailing the Proceedings to the members, this year sending out nine-hundred and seventy-eight copies of vol. 59 shortly before this meeting.

Membership. J. E. Switzer reporting for J. J. Davis stated that 50 applications for membership had been received to date.

Representative on Council of A.A.A.S. Ed. F. Degering sent the minutes of the Council meeting which he attended to the secretary.

Nominating. Winona Welch reported that her committee is recommending the following members for fellows: Harold J. Brodie, Indiana University; Willis H. Johnson, Wabash College; G. D. Koch, Indiana State Teacher's College; Alton A. Lindsey, Purdue University; John Seybert, Eli Lilly & Co.; Frank Welcher, Indiana University Extension.

New Business. Ray C. Friesner proposed an amendment which was approved that all new members receive the Proceedings current with the year for which they paid.

It was moved and carried that the Soil Science Society of Indiana become an affiliate of the Indiana Academy of Science.

The meeting adjourned at 10:15 P. M.

MINUTES OF THE GENERAL SESSION

HANOVER COLLEGE, NOVEMBER 3, 1950

President Albert G. Parker, Jr., of Hanover College welcomed the Academy to the Hanover campus and gave an extremely interesting talk on early Indiana scientists in the southern part of the state. The response to the welcome was given by President S. S. Visher.

The Men's Glee Club, Hanover College, rendered several delightful numbers.

The minutes of the Executive Committee were read by the secretary and approved by the Academy.

W. E. Edington presented the list of those members who had died during the year. They were: Charles F. Adams, Charles A. Behrens, Raymond K. Cassell, Benjamin D. Hitz, Clyde A. Malott, Frank B. Wade, Alfred T. Wiancko.

J. L. Hyatt, Hanover College, presented many beautiful western and local kodachromes.

J. I. Perrey, Flood Control and Water Resources Commission of Indiana, read an opportune paper on "Indiana's Growing Water Problem".

The meeting adjourned at 11:00 A. M. to meet in the various sections.

Luncheon was served in the Dining Hall of Donner Hall with 159 present.

At the annual dinner, the Hanover Harmonizers sang several appropriate numbers.

J. E. Switzer reported that there were 78 applicants for membership. These were duly elected.

Winona Welch, chairman of the nominating committee presented the following names for fellows: Harold J. Brodie, Willis H. Johnson, G. D. Koch, Alton A. Lindsey, John Seybert and Frank Welcher. These were duly elected.

The Divisional Chairmen who were elected to serve the various sections for 1951, are as follows: Anthropology, Glenn A. Black, Indiana University; Bacteriology, Edith Haynes, Indiana University Medical Center; Botany, William Gambill, Wabash College; Chemistry, R. L. Hicks, Franklin College; Entomology, James A. Clark, State Entomologist's Office; Geology & Geography, C. L. Bieber, DePauw University; History of Science, R. E. Girton, Purdue University; Mathematics, Vavaclav Hlavaty, Indiana University; Physics, Charles Hire, Indiana University; Psychology, George A. Zirkle, Hanover College; Zoology, Clarence J. Goodnight, Purdue University.

The following persons were recommended to serve as the 1951 officers: President, W. P. Morgan, Indiana Central College; Vice-Presi-

dent, J. Elmer Switzer, Bloomington, Indiana; Secretary, W. A. Daily, Eli Lilly & Co.; Treasurer, Frank Welcher, Indiana University Extension; Editor, A. A. Lindsey, Purdue University; Press Secretary, Benjamin Moulton, Butler University. This recommendation was approved and the officers unanimously elected.

Alton A. Lindsey reported for the awards committee as follows:

The fields of science selected for 1950 are bacteriology and history of science. The Charles A. Behrens prize in Bacteriology is awarded to L. S. McClung, Indiana University, for his paper entitled "Recent Developments concerning the Anaerobic Bacteria and their Activities", in volume 53 of the Proceedings. The John S. Wright prize in History of Science is awarded to Paul Weatherwax, Indiana University for his paper entitled "Early Contacts of European Science with the Indian Corn", in volume 54 of the Proceedings.

R. E. Cleland, chairman of the resolution committee read the following report:

"Whereas, the role of science in modern warfare is of such strategic importance that the welfare, or even the continued existence, of our nation may well depend to a large extent upon the conservation and proper utilization of our scientific manpower, and

Whereas, it is deemed essential, in view of this fact, to take stock of our scientific potential and to ensure a continuing supply of trained personnel, therefore

Be it resolved, that the Indiana Academy of Science commend the effort of the Federal Government, through the National Security Resources Board and the U. S. Office of Education, to build a register of scientific and technical manpower, and that the Academy request its members to cooperate to the fullest extent whenever they are called upon to assist in the formation of such a roster, and be it further,

Resolved, that the Indiana Academy of Science express its approval in principle of the proposed plan for educational deferment recently announced by General Hershey, based upon individual competence rather than field of study. We suggest that this plan be supplemented by a suitable national scholarship program which will open this opportunity to all qualified students. We further suggest that all individuals so deferred be subject, upon completion of their training, to a term of two years in the national service, either military or civilian, in the fields of their competency.

Resolved further, that the Secretary of the Academy be instructed to place copies of these resolutions in the hands of the United States Senators of Indiana.

Resolved, that it is the hope of the Indiana Academy of Science that the Bureau of the Census will publish a statistical atlas depicting in graphic form the tables to be found in the Census of 1950.

The Indiana Academy of Science desires to record its gratitude to President Parker and to the staff of Hanover College for the kind invitation to meet on this beautiful campus, and for the gracious manner in which they have contributed to the comfort and well-being of their guests. It has been a delightful experience to be the recipients of Hanover's noted hospitality and to have the privilege of visiting the well appointed and commodious new buildings in which such an excellent program is being maintained. We wish to thank the Hanover College Glee Club and the Harmonizers for their very welcome contribution. Another much appreciated feature of the meeting has been the scientific exhibit. Our best thanks go to Dr. Martin and his colleagues for their untiring efforts to make this meeting a truly notable one."

Vice-President O. B. Christy presented President S. S. Visher who delivered a scholarly paper entitled, "Indiana Scientists".

The Sixty-Sixth Annual Meeting of the Indiana Academy of Science, with 400 registrants and 124 attending the dinner, was adjourned.

W. A. DAILY, Secretary.