

PROCEEDINGS

of the

Indiana Academy
of Science

Founded December 29, 1885

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Volume 58

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E. ST. CLAIR GANTZ, EDITOR

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Spring Meeting

THE SHADES

May 14 and 15, 1948

Sixty-Fourth Annual Meeting

INDIANA UNIVERSITY

October 28, 29, and 30, 1948

Copies of the Proceedings may be purchased through the State Library, Indianapolis, Indiana, at \$3.00 per volume. All items sent in exchange for the Proceedings and all communications to officers of the Academy, when their names and addresses are not known, should also be sent to the State Library.

Reprints of certain parts of recent volumes of the Proceedings are available for distribution as follows: copies of the constitution and by-laws (Vol. 44), and complete membership list (Vol. 56), may be secured by members elected subsequent to the publication of those volumes; copies of the codified list of duties of officers (Vol. 48) may be secured by officers, divisional chairmen, and chairmen of committees; and copies of the necrology can be supplied to relatives and friends of the deceased members. Inquiries concerning these reprints should be addressed to the Secretary of the Academy, Dr. O. B. Christy, Ball State Teachers College, Muncie, Indiana.

Reprints of technical papers in recent volumes can often be secured from the authors. They cannot be supplied by the State Library nor by the officers of the Academy.

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OFFICERS AND COMMITTEES FOR 1948

OFFICERS

President, Winona H. Welch, DePauw University
Vice-President, Mason E. Hufford, Indiana University
Secretary, O. B. Christy, Ball State Teachers College
Assistant Secretary, Donald E. Miller, Ball State Teachers College
Treasurer, W. F. Morgan, Indiana Central College
Editor, P. D. Edwards, Ball State Teachers College
Press Secretary, William A. Daily, Butler University

DIVISIONAL CHAIRMEN

Anthropology, Arthur B. Carr, Indianapolis
Bacteriology, M. S. A. Campbell, Indianapolis
Botany, H. J. Brodie, Indiana University
Chemistry, E. St. C. Gantz, Purdue University
Entomology, W. P. Allyn, Indiana State Teachers College
Geology and Geography, Floy Hurlbut, Ball State Teachers College
History of Science, S. S. Visher, Indiana University
Mathematics, L. H. Whitcraft, Ball State Teachers College
Physics, J. C. Hendricks, Franklin
Psychology, D. G. Ellson, Indiana University
Zoology, J. W. Baechle, St. Joseph's College

EXECUTIVE COMMITTEE

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

W. P. Allyn, J. W. Baechle, C. A. Behrens, H. J. Brodie, M. S. A. Campbell, A. B. Carr, O. B. Christy, W. A. Cogshall, E. R. Cumings, W. A. Daily, J. J. Davis, C. C. Deam, E. F. Degering, W. E. Edington, P. D. Edwards, D. G. Ellson, H. E. Endres, R. C. Friesner, E. St. C. Gantz, W. G. Gingery, J. C. Hendricks, M. E. Hufford, Floy Hurlbut, Theodor Just, Eli Lilly, J. F. Mackell, E. G. Mahin, C. A. Malott, M. S. Markle, K. S. Means, M. G. Mellon, H. H. Michaud, D. E. Miller, W. P. Morgan, Naomi Mullendore, F. Payne, R. R. Ramsey, W. E. Ricker, J. W. Switzer, S. S. Visher, F. B. Wade, F. N. Wallace, Paul Weatherwax, Winona H. Welch, L. H. Whitcraft, J. S. Wright, T. G. Yuncker.

BUDGET COMMITTEE

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

Winona H. Welch, DePauw University; O. B. Christy, P. D. Edwards,
R. C. Friesner, W. G. Gingery, H. H. Michaud, W. P. Morgan, F. N.
Wallace, Paul Weatherwax.

COMMITTEES

(Elected by the Academy)

Trustees of Academy Foundation (Term 4 years): Chairman, J. S. Wright, Eli Lilly and Co., Indianapolis (term ex. 1952); F. B. Wade (term ex. 1951).

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 (1948), Winona H. Welch and O. B. Christy (ex officio).

STANDING COMMITTEES

(Appointed by the President, Chairmen named first)

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

Biological Survey: W. E. Rieker, Indiana University; W. P. Allyn, W. B. Barnes, H. J. Brodie, L. C. Cole, Fay K. Daily, H. O. Deay, R. C. Friesner, H. H. Michaud, H. H. Vogel, Winona H. Welch.

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

Invitations: Naomi Mullendore, Franklin College; A. R. Bechtel, T. P. Irving, C. L. Porter, B. H. Smith, O. H. Smith.

Junior Academy: H. H. Michaud, Purdue University; N. E. Adams, W. P. Allyn, F. R. Elliott, E. Kintner, M. S. Markle, R. Earl Martin, A. Strickler, F. B. Wade, P. L. Whitaker.

Library: W. G. Gingery, Washington H. S., Indianapolis; Nellie M. Coats, R. C. Friesner.

Membership: J. E. Switzer, Indiana University; M. H. Ahrendt, Juna L. Beal, E. Byrne, Jr., M. Chanin, J. J. Davis, S. R. Esten, G. F. Hennion, L. B. Howell, J. L. Hyatt, Alma Long, J. A. Marling, A. H. Meyer, Bessie Noyes, A. E. Reynolds, J. E. Seybert, W. Shepherdson.

Necrologist: W. E. Edington, DePauw University.

Nominations: (Announced at Executive Committee Meeting in October.)

Program: Paul Weatherwax, Indiana University; W. B. Adams, W. E. Breneman, Charles Hire, F. C. Mathers, L. S. McClung, S. S. Visher.

Publication of Proceedings: P. D. Edwards, Ball State Teachers College; R. C. Corley, Paul Weatherwax.

Relation of Academy to State: F. N. Wallace, State Dept. of Conservation; E. Y. Guernsey, H. J. Reed, J. S. Wright.

Representative on Council of A.A.A.S.: E. F. Degering, Purdue University.

Resolutions: J. F. Mackell, Indiana State Teachers College, F. B. Wade, J. S. Wright.

MINUTES OF THE SPRING MEETING

THE SHADES STATE PARK

May 14, 15, 1948

President Welch called the Executive Committee meeting to order at 4:40 p.m., Friday, May 14, in the pavilion, with 25 members present.

The officers and committees reported as follows:

Treasurer. W. P. Morgan reported as of January 1, 1947, receipts, \$5,247.65, with disbursements \$2,917.89, leaving a balance of \$2,329.76. This balance includes \$1,000 in gifts for completion of the Fifty-year Index.

Editor. P. D. Edwards made the following report:

Bill for reprints of articles in Volume 56 amounting to \$746.25 was received March 22, checked, approved, and forwarded to the President for her approval and payment by the Treasurer. Of this amount \$592.34 will be recovered from the authors.

Part of the copy and requisition for printing and engraving of Volume 57 was taken to the bureau of printing December 29. To date, May 14, it has not been possible to secure the necessary purchase orders since the balance to the account of the Academy is less than the estimated cost of Volume 57.

Relations of Academy to State. Frank Wallace reported that there was a possibility of receiving funds from the Governor's Emergency Fund, to meet the deficiencies of the 1947 proceedings.

Fifty-year Index. R. C. Friesner reported that 70 per cent of the material was ready for publication.

Library. Walter Gingery reported that forty new serial publications have been listed since October, 1947. These included several foreign publications.

Mr. Wallace reported that there was a possibility of receiving a special room to house the Academy Library, in the State Library, when several rooms would be vacated within the next few years.

Membership. J. E. Switzer submitted 31 applications for membership. These were duly elected.

Program. Paul Weatherwax explained the trips which had been planned over the park area the next day.

Flower Committee. Dr. Friesner recommended that the Academy take steps to change the State Flower from the Zinnia, to the Wild Aster. (*Aster novae-angliae*) The motion was made that the committee proceed

to try to obtain legislative action to make this change in the State Flower.

New Business. Dr. P. D. Edwards presented the matter of raising annual dues for membership. He pointed out that it would be necessary to change the constitution, then moved that the President appoint a committee to study the problem and present the matter in writing at the October meeting.

Stephen S. Visher presented the matter of handling reprints, and moved that the authors pay for all reprints received. Dr. Edwards seconded the motion which was carried.

A. W. Lefler, of Purdue, presented a plan, worked out by Lark-Horovitz, in which the Academy would sponsor a Science Speakers Bureau. The plan was to get the problems of Science closer to the people of Indiana by obtaining outstanding speakers for public occasions. Dr. Friesner moved and Dr. Edwards seconded the motion that such a committee be appointed by the President for study and recommendations made at the October meeting.

Mr. Howard Michaud presented plans for selecting Indiana Science talent from High School seniors and these would be eligible for scholarships in State Colleges or Universities where Science Fellowships would be offered.

The meeting adjourned at 5.45 p.m. Following the dinner, interesting pictures were shown and talks given concerning the Shades by Frank Wallace, and Fabian J. Frisz, manager of the Inn. 107 members attended the dinner.

MINUTES OF THE EXECUTIVE COMMITTEE

BLOOMINGTON, OCTOBER 28, 1948

The Executive Committee was called to order by President Welch in Room E of the Memorial Union Building of Indiana University, at 7:30 P.M. The minutes of the Spring Meeting, held at the Shades State Park, were read and approved. The reports of officers and committee representatives were presented and accepted as follows:

Academy Trustee. John S. Wright, chairman of the Trustees of the Foundation Fund, reported as follows for the year 1947-48.

Balance from previous year.....	\$	176.34
Receipts		209.55
		<hr/>
Total	\$	385.89
Expenditures		
Union Trust Co. Fee.....		10.48
Photostat copy of resolutions.....		.40
Cash Balance as of October 28, 1948.....	\$	375.01

Assets in the Fund as of September 30, 1948

Five \$1,000 U. S. Savings Bonds Series "D"—Cost.....	\$	3,750.00
\$6,900 U. S. Treasury Bonds Series "G"—Cost.....		6,900.00
Six Shares Standard Oil of Indiana Common Stock Par.....		150.00
		<hr/>
Total at Par or Cost.....	\$	10,800.00

Treasurer. W. P. Morgan presented a tentative financial report for the period from January 1, 1948 to September 1, 1948. His final report, approved by the Auditing Committee at the end of the year follows:

Receipts

Balance on hand January 1, 1948.....	\$2,329.76
Dues and initiation fees.....	1,205.00
Refund for research from A.A.A.S.....	150.00
Designated gift	200.00
Author's reprints Vol. No. 56.....	441.86
Author's reprints Vol. No. 57.....	116.56
Publications sold	3.00
	<hr/>
	\$4,446.18

Disbursements

1—Program Committee.....	\$	206.08
2—Editor Vol. No. 57.....		200.00
3—Expenses of Secretary.....		67.91
4—Expenses of Treasurer.....		94.50
5—Mailing Proceedings.....		84.00
6—Stationery		38.11
7—Publications for Library.....		49.58

8—E. J. Hecker (printing for Index).....	12.30
9—Bookwalter Co. (Index).....	770.15
10—Jr. Academy expenses.....	17.73
11—Author's Reprints Vol. No. 57.....	670.40
12—Author award 1948 C. A. Malott.....	25.00
13—Author award 1948 Ed. F. Degering.....	25.00
14—C. P. Hickman research grant.....	75.00
15—W. E. Thrun research grant.....	18.75
16—C. P. Hickman research grant.....	37.50
17—Expenses to five officers as directed by action of 1947 Executive Com.	100.00
19—Returned checks.....	4.00
	\$2,496.01
*Balance on hand.....	1,950.17

\$4,446.18

* Balance includes \$700.00 designated for the preparation for publication of the "Indiana Men of Science."

(Signed) W. P. MORGAN, *Treasurer*

(Signed) KARL S. MEANS,

S. E. ELLIOTT, *Auditors*

Auditing Committee. Dr. Means was not present, but Dr. Wright and Dr. Morgan reported the accounts of the Academy Trustees and of the Treasurer to be in good order.

Bonding Committee. Dr. Friesner reported that the Academy is bonded in advance for two years.

Editor and Publication of Proceedings. Dr. Edwards reported that the publication of Vol. 57 has been delayed. It is hoped that it can be published yet in 1948.

Research Grant. Dr. Yuncker reported five grants for the year 1948, totaling \$400. These grants were made to J. E. Potzger, \$50; A. E. Reynolds, \$75; W. E. Thrun, \$75; Robert Drummond, \$50; and C. P. Hickman, \$150.

Biological Survey. W. E. Ricker reported a continuation of the activities of the committee.

Fifty-Year Index. Ray C. Friesner reported that the index has been printed and that copies are being mailed to members upon receipt of their requests. The total cost of 2000 copies of the publication was \$3,977.95.

Library Committee. Walter Gingry reported that a number of serial titles, new to the library, have been added during the year—43 in all. He also reported an increased use of the library.

Press Secretary. W. A. Daily reported the usual press releases and printed announcements were sent to all the colleges and universities in the state. Photographs of all but two past presidents of the Academy have been secured for the files.

Membership. J. C. Switzer presented a tentative report.

Junior Academy of Science. Howard H. Michaud reported an increased interest during the year. Twenty-five clubs representing 20 different schools are active.

The program for the 1948 Meeting promises to be unusually good, with 12 students on the program.

Special arrangements have been made to provide overnight accommodations for Friday night at McCormick's Creek State Park, for club members who are attending the meeting Saturday.

The outstanding achievement for the year was the Indiana Science Talent Search conducted in cooperation with the science clubs of America. Nineteen of the 21 state winners are now attending college; majoring in science, medicine, or engineering.

Relation of Academy to State. Frank Wallace reported the State is paying \$2,500 toward the publication of the Index. The State is also cooperating in the publication of Vol. 57.

Mr. Wallace and Dr. Edwards recommended that we ask the Budget Committee for \$3,500 for each of the next two years, toward the publication of the Proceedings. There was general agreement on this amount.

Relation of Academy to A.A.A.S. E. F. Degering reported that he represented the Academy at the Council meeting at Washington, D. C., September 13. He reported an excellent meeting.

Relation of Academy to State Academies of Science Conference. Dr. Degering reported that an interesting meeting was held September 17 in Washington, D. C.

Nomination Committee. Dr. Welch announced the members of the committee to be R. R. Ramsey, C. A. Behrens, and T G. Yuncker. They recommended for election as Fellows the following: Nellie M Coats, State Library; Clyde G. Culbertson, I. U. Medical Center B.Z.; D. E. Miller, Ball State Teachers College, Bo.Z

Old Business. Will E. Edington reported that progress is being made in securing biographical data on men who were prominent in science in Indiana before 1900. It may take several years to complete the work, in order to have completeness and accuracy.

Dr. Friesner reported for the State Flower Committee. The recommended change from Zinnia to Aster (*novae-angliae*) will be presented to the legislature.

Dr. Degering reported for the "Speaker Bureau Committee." The Committee feels that it would take about \$1,500 to initiate the program, and perhaps \$500 per year to keep it going thereafter. A motion was passed that a committee of 3 to 5 members be appointed to investigate the problems further.

Committee on Editorial Problems. Dr. Edwards presented a statement of the condition of finances as it relates to the publication of the *Proceedings*. The following suggestions were made by the committee.

1. As soon as possible after the completion of the printing of Vol. 57, the bill should be presented and an effort made to have the state legislature grant a deficiency bill to pay the deficit and restore us to a current basis.
2. Plan to hold costs of future volumes to the amount of the appropriations or pay the excess from Academy funds.

3. Support a request to the legislature to change the 1947 law relating to purchases so that printing may be ordered if the estimated cost does not exceed the amount which will be in the account when the printing is completed.

Dr. Edwards reported for the Committee on Dues. The committee proposed the following amendments:

Amendments to Constitution

1. Article II. Section 2. Third sentence changed to read: New members shall pay an admission fee of \$1 and the annual dues for one year.
2. Article II. Section 4. Paragraph 3. Changed to read: Each applicant club, upon meeting Academy affiliation requirements, payment of an entry fee of \$1 and an affiliation fee equal to the annual dues of annual members, and upon recommendation of the committee in charge, shall receive for its files a certification of membership signed by the President, Secretary, and Treasurer of the Academy. Such affiliation shall continue upon payment of annual affiliation fee so long as the club continues to meet requirements of affiliation. Each affiliated club will receive one copy of the Proceedings of the Indiana Academy of Science.

Amendment to By-Laws

1. Article V. Section 2. (New section)

The annual dues shall be determined by the Executive Committee.

A motion was passed that the Executive Committee recommend that these amendments be presented at the business meeting Friday.

New Business. Mr. Wright presented the following resolutions, which were approved:

RESOLUTION AUTHORIZING THE TRUSTEES OF THE RESEARCH
ENDOWMENT FUND OF THE INDIANA ACADEMY OF
SCIENCE TO CONFORM TO THE PRESENT INDIANA
LAW REGARDING INVESTMENT
TRUST FUNDS

WHEREAS, the rules governing the investment of the Research Endowment Funds were written in 1919 and were the same as prescribed by the Indiana law of that time for the legal reserves of life insurance companies; and

WHEREAS, the present law is less strict, nevertheless safeguards the principal of trust funds; therefore be it

RESOLVED: that the first three lines of the section on "Investments" now reading—

"Investments—

The trustees shall keep all research endowment funds invested in standard securities, such as are prescribed by law in Indiana for the investment of the legal reserve of life insurance companies."

be changed to read as follows:

"The trustees shall keep all endowment funds invested in standard securities such as are permitted by law in Indiana for the investment of TRUST FUNDS.

John S. Wright presented the following resolutions regarding the Research Endowment Fund:

WHEREAS, the rules and regulations governing the management of the Research Endowment Fund have not been reprinted since their original publication in the Academy Proceedings for 1919; and

WHEREAS, it is the duty of the Research Committee to cooperate with the trustees of the Fund and the Executive Committee in giving suitable publicity to the Fund and to invite contributions; therefore be it

RESOLVED: that the trustees and Research Committee be authorized to have reprinted a suitable statement of the origin and of the purposes of the Fund and of the regulations governing its administration for use in answering inquiries and in the promotion of interest in the Fund; and further be it

RESOLVED: that this statement incorporate any changes in the management of the Fund that may be authorized by resolution at this meeting.

A motion was passed that the Union Trust Company, 120 East Market Street, Indianapolis 9, Indiana, be authorized to notify the United States Treasury and others who send dividend checks to the Indiana Academy of Science Research Endowment Fund, that all checks payable to this fund should be forwarded in care of this Trust Company fiscal agent and custodian of the Fund.

Dr. Friesner presented the matter of keeping the accumulated Index up-to-date. There was general agreement that this should be done.

A motion was passed that the Executive Committee authorize the beginning of work on a ten year Index and that a committee be appointed to carry on the work.

Mr. J. S. Wright was elected to succeed himself as a trustee. He was also elected to succeed himself as a member of the Research Grant Committee for a five year term.

Dr. R. C. Friesner and Scott M. Coy were elected to continue as the committee on the bonding of trustees.

The meeting was adjourned at 10:15 p.m.

MINUTES OF THE GENERAL SESSION

BLOOMINGTON, OCTOBER 29, 1948

Dean John W. Ashton, College of Arts and Sciences, delivered the Address of Welcome. President Welch responded in behalf of the Academy.

W. E. Edington presented the necrology consisting of the following names: Emil Dietz, Milton Matter, Charles Knip and Gladys Knott.

Minutes of the Executive Committee meeting of October 28, 1948 was read by the Secretary and approved by the Academy.

Dr. Konrad Birkhaug of New York State Department of Health delivered an interesting and informational lecture on Experimental and Clinical Aspects of BCG Vaccination against tuberculosis.

The resolutions presented by J. S. Wright at the Executive meeting were read and approved.

The following members were elected to fellows:

Nellie M. Coats, State Library; Clyde G. Culbertson, Indiana University Medical Center; and Donald Miller, Ball State Teachers College.

At the annual dinner in the Alumni Hall, Union Building, J. E. Switzer presented 79 applications for membership. These were duly elected.

Dr. Ramsey, chairman of the Nominating Committee, presented the following names for officers:

President, Charles L. Porter, Purdue University; *Vice-President*, Stephen S. Visher, Indiana University. *Secretary*, O. B. Christy, Ball State Teachers College; *Treasurer*, W. P. Morgan, Indiana Central; *Editor*, P. D. Edwards, Ball State; *Press Secretary*, W. A. Daily, Butler University.*

The Divisional Chairmen elected in the sectional meetings for 1949 were announced as follows:

Anthropology—William Wallace, Indiana University; *Bacteriology*—Robert F. Ervin, Notre Dame; *Botany*—R. A. Laubengayer, Wabash College; *Chemistry*—William G. Kessel, Indiana State; *Entomology*—Edward Kintner, Manchester College; *Geology and Geography*—Preston McGrain, Ind. Flood Control & Water Comn.; *History of Science*—Paul Weatherwax, Indiana University; *Mathematics*—Paul Overman, Purdue University; *Physics*—Ancil R. Thomas, Valparaiso University; *Psychology*—E. J. Asher, Purdue University; *Zoology*—Murvel R. Garner, Earlham College.

* Dr. Edwards declined the nomination as Editor and E. St. C. Gantz, Purdue University was elected.

Dr. P. D. Edwards reported for the awards committee as follows:

Clyde A. Malott, Indiana University to receive the E. R. Cumings award in Geology and Dr. Edward Degering, Purdue University, the Wm. A. Noyes award in chemistry.

James F. Mackell expressed the appreciation of the Academy to the faculty and administration of the University for the excellent manner in which the members were received.

The chairman of the Invitations Committee announced that the invitation from Wabash College for the 1949 Fall Meeting had been accepted.

Dr. James F. Mackell, Chairman of the Resolutions Committee read the following report:

"The Committee on Resolutions for the sixty-fourth annual meeting of the Indiana Academy of Science begs to submit the following:

1. The Academy wishes to express its sincere appreciation for the splendid program arranged by the program committee headed by Professor Paul Weatherwax. Mr. Prevo Whitaker of the University School is also commended for his part in arranging the program for the Junior Academy. The Academy wishes to thank Mr. Charles Weatherwax for helping to make the speakers table more attractive with the beautiful floral centerpiece.

Dr. Michaud is commended for his untiring efforts to make the Junior Academy a vital part of our Academy and for keeping our young Indiana people abreast of the times in scientific thought.

2. To the Indiana University Convention Bureau and to the Administrative officers of the University, the Academy extends its sincere thanks. Lodging rooms for our members were secured, meeting rooms were graciously provided, and we are especially grateful for the provision made for this banquet room and this excellent Academy dinner.

Indeed our hosts have made us feel very much at home on our own State University Campus."

Dr. Mason E. Hufford, Vice-President, presented President Winona H. Welch, who read a well prepared paper on, "Mosses And Their Uses."

The Sixty-fourth Annual Meeting of the Indiana Academy of Science with a general attendance of approximately 375 and a dinner attendance of 146, was adjourned.

O. B. CHRISTY, *Secretary.*

TAXONOMISTS MEETING

Dr. Naomi Mullendore, Chairman. The Plant Taxonomists held their annual meeting on Saturday morning. Professor Daniel Den Uyl was elected chairman for 1949.

INDIANA JUNIOR ACADEMY OF SCIENCE

Officers for 1948:

President: Donald Krebs, Science Club, William A. Wirt High School, Gary.

Vice President: Robert Craig, Biology Club, Lew Wallace High School, Gary.

Secretary: Jane Niles, Junior Academy of Science, Elkhart High School, Elkhart.

Members of the Council: Roy McKee, (1944-1948); Ruth Wimmer, (1945-1949); Darl Wood, (1946-1950); G. Donald Klopp, (1947-1951); Evelyn Wagoner, (1948-1952).

PROGRAM OF THE SIXTEENTH ANNUAL MEETING

October 30, 1948

Auditorium, University High School, Indiana University
Bloomington, Indiana

9:00 a. m. Exhibits, University High School Gymnasium

10:00 a.m. Morning session, Auditorium, University High School

General session, Donald Krebs, presiding.

Greetings, Prevo L. Whitaker, University High School.

Reading of minutes of the 1947 meeting, read by Robert Craig, Vice President.

Papers by club members.

1. "Experiments with a Radio Frequency Oscillator," Charles B. Ellis, Junior Academy of Science, University High School, Bloomington.

2. "Atomic Fission and Energy (illustrated)," Dick Miller and Virginia Horon, Science Club, Mishawaka.

3. "Experiments with Dry Ice," Donald Goss and Ted Logan, Phi Chem Club, Elmhurst High School, Fort Wayne.

4. "Atomic Age," Arleen Scheer, Science Club, William A. Wirt High School, Gary.

5. "Blood," Margaret Overbeck, Science Club, William A. Wirt High School, Gary.

6. "The Sand Dunes of Indiana," Tom Moon, Junior Academy of Science, Central High School, South Bend.

1:15 p.m. Afternoon session, Auditorium, Social Science Building,
Indiana University

Business session

1. "The New Castle Science Fair," Marjorie Tapscott, Biology Club, New Castle.

2. "Indian Relics," Robert Burch, Biology Club Lew Wallace High School, Gary.

3. "Birds and their Habits, (illustrated)," Judith Douthitt, National Scientific Honor Society, Bloomington High School, Bloomington.

4. "Regarding New Drugs," Mary E. Howard, 1948 Indiana State Science Talent Search Winner, Indiana University.

5. "Some Ear Marks of Glacial Period Drainage Systems," Thomas Todd, Chemistry Club, Shortridge High School, Indianapolis.

6. "The Indiana State Science Talent Search," Howard H. Michaud, State Sponsor, Purdue University.

MINUTES

The sixteenth annual meeting of the Indiana Junior Academy of Science was held Saturday October 30, 1948 in the auditorium of the University High School, Indiana University, Bloomington.

The meeting was called to order at 10:05 a.m. by the president Donald Krebs, Science Club, William A. Wirt High School, Gary, by introducing his fellow officers as follows: Vice president, Robert Craig, Biology Club, Lew Wallace High School, Gary, and Secretary, Jane Niles, Junior Academy of Science, Elkhart High School, Elkhart. The roll call of active clubs was read. An attendance of one hundred and forty five members, visitors and sponsors was registered. The minutes of the 1947 meeting were read by the vice president, Robert Craig, while Jane Niles recorded the minutes of the meeting. Mr. Prevo Whitaker, Science teacher at the University High School, welcomed the Junior Academy and expressed thanks to the Biology Club of New Castle for planning the overnight accommodations for clubs and sponsors at one of the group camps at McCormicks Creek State Park, Spencer.

The first speaker on the program, Charles B. Ellis, Junior Academy of Science, University High School, Bloomington, explained the operation of a radio frequency oscillator. He expressed enthusiasm for his hobby and stated that he hoped to continue with his studies in the future.

A team composed of Dick Miller and Virginia Horon, Science Club, Mishawaka, illustrated atomic fission and energy, using lantern slides. The structure of the atom, the relationship between plutonium and uranium and the opportunities for wise use of atomic energy were presented.

The Phi Chem Club, Elmhurst High School, Fort Wayne, represented by Donald Goss, Ted Logan and several assistants, demonstrated some practical and impractical uses of dry ice. A hammer was made from frozen mercury; kerosene was solidified to form a candle and a fire was extinguished with a dry ice and water extinguisher. All in all, it was a very colorful demonstration.

The question of atomic energy was discussed by another club member, Arleen Scheer, Science Club, William A. Wirt High School, Gary. After describing the development of and the destruction caused by the atomic bomb, her conclusion was, "The only answer to the atomic question is to live in one world, peaceably."

The president then introduced Margaret Overbeck, Science Club, William A. Wirt High School, Gary, who presented a talk on blood. She discussed blood plasma and many diseases of the blood.

The last speaker in the morning session was Tom Moon, Junior Academy of Science, Central High School, South Bend, who took us on a delightful excursion to the sand dunes of northern Indiana. He accompanied his descriptions of some of the plant and animal associations found in the dunes with beautiful kodachrome slides and closed with a cordial invitation to visit the beauty of the dunes.

The morning session was adjourned at 11:45 a. m.

The afternoon session was called to order by the chairman in room 100, Social Science Building, Indiana University, at 1:30 p. m. The first item of the business session was the election of new officers. A slate was presented by the council. The results of the election were as follows for the officers for 1949:

President: Richard Elzay, Phi Chem Club, Elmhurst High School, Fort Wayne; *Vice President:* Tom Moon, Junior Academy, Central High School, South Bend; *Secretary:* Marjorie Tapscott, Biology Club, New Castle High School, New Castle.

It was next announced that the Junior Academy Council had selected Mr. Max Forsyth, sponsor of the New Castle Biology Club, to succeed Mr. Roy McKee as the new Council member to serve from 1948 to 1953.

Robert Burch, Biology Club, Lew Wallace High School, Gary, opened the afternoon program with a talk on Indian relics. He had a fascinating collection of Indian arrow heads, bird points and small pieces of Indian pottery from many parts of the United States. He believes this to be a fine hobby as archeology is one of our important fields for investigation.

Mary E. Howard, 1948 Indiana State Science Talent Search winner and now attending Indiana University spoke on her favorite topic "New Drugs." She explained how streptomycin had been used to cure many diseases which were thought incurable. She spoke of the great progress that has been made in using vitamin E in the cure of heart disease. She is studying at Indiana University to become a laboratory technician.

The president next presented Marjorie Tapscott, Biology Club, New Castle. Marjorie gave a summary of their New Castle Science Fair held last spring. Good publicity brought visitors from many other schools. The judges for the fair included local people and representatives from several surrounding colleges. The one hundred and ten entries included some standard laboratory equipment, but home made equipment added much interest because of its originality. The Science Fair was made realistic to the group through the showing of colored motion pictures taken by the physics teacher at the New Castle High School.

Judith Douthitt, National Scientific Honor Society, Bloomington High School, Bloomington, showed slides of bird adaptations and explained how these adaptations fitted the birds in their environment.

Some Earmarks of Glacial Period Drainage Systems were then discussed by Thomas Todd, Chemistry Club, Shortridge High School, Indianapolis. An area from Anderson to Ingle was studied. Twenty foot drillings were made in bogs near Fairmont and although detailed analysis had not been made, they believe these bogs to be glacial deposits. Using colored movies taken on a field trip through these bogs last spring, the speaker described the bog flora. The group plans to continue the project next spring.

The last speaker of the meeting was Howard H. Michaud, State Sponsor, Purdue University. Professor Michaud spoke on "The National and State Science Talent Search." The National Science Talent Search selects forty winners who are given a trip to Washington, D. C. From this group two national winners each receive a four year college scholarship of \$2,800 and \$2,000 respectively. Eight more winners receive \$400 each and \$3,000 additional in scholarships is awarded at the discretion of the judges.

Last year Indiana had seventy-five entries who completed the requirements. Margaret M. Sawyer of Terre Haute received the trip plus one hundred dollars. Theodore Hopkins, Indianapolis, Joseph Harris, Evansville, Oscar Beumel Jr., Evansville, and Donald W. Zimmerman, Logansport, received honorable mention in the national competition. Of the seventy-five entries, a group of twenty-one students were chosen as the top ranking contestants in the state science talent search. These winners were offered scholarships to various colleges and universities of Indiana. Several winners received Indiana scholarships and more than half are attending colleges of the state. A number of the winners are enrolled in schools of other states on scholarship grants.

The eighth annual Science Talent Search will be conducted this year by the Westinghouse Science Talent Search in cooperation with the Science Clubs of America.

The president announced that the Council had selected Ted Logan, Elmhurst High School, Fort Wayne, as the "best boy" of the year and Marjorie Tapscott, New Castle, as the "best girl" of the Junior Academy. They will receive a year's honorary membership in the American Association for the Advancement of Science and also are invited to attend the National Junior Scientist's Assembly meeting in Washington, D. C. during the last week of December.

After expressing his thanks to those who took part in the program and to everyone who attended the president adjourned the meeting at 3:30 p. m.

EXHIBITS

Photographs: Camera Club, Sullivan High School, Sullivan, Ruth Hinkle, Sponsor.

Indian exhibit, Leaf booklets, Insect collection: Biology Club, Lew Wallace High School, Gary, Lola Lemon, Sponsor.

Physics apparatus and experiments: Phi Chem Club, Elmhurst High School, Fort Wayne, Ruth Wimmer, Sponsor.

Amphibian's of St. Joseph's County: Junior Academy of Science, Central High School, South Bend, Arthur Smith, Sponsor.

Lantern slides of special interests: National Scientific Honor Society, Bloomington High School, Bloomington, Harold Stewart, Sponsor.

Song recordings and kodachrome projections of birds: Biology Club, New Castle High School, New Castle, Max Forsyth, Sponsor.

Polished wood samples, Frog dissection, Insect collections: Junior Academy of Science, University High School, Bloomington, Prevo L. Whitaker, Sponsor.

Bulletins, Science helps for teachers: Display by the State Sponsor.

NEW MEMBERS OF THE YEAR 1948, INDIANA ACADEMY

Alexander, Mr. Paul Stephen, Indiana Central College, Indianapolis 3	Bo, Z
Ball, Miss Henrietta S., Centennial School, 6th and Bronn, Lafayette	GS
Barber, Mr. Leonard Cretes, P. O. Box 191, Washington	Bo
Bower, Miss Esther, 306 West State Street, Fortville	Bo
Brey, Mr. Wallace S., Jr., 701 E. Seminary Street, Greencastle	Ch
Britz, Mr. Edwin J., Jr., 1362 N. Ewing Street, Indianapolis 1	Ph
Brown, Miss Lucy Alace, R. 1, Vevay	Bo
Burroughs, Mr. John D., 119 Columbia Street, West Lafayette	Bo
Bushey, Dr. Clinton J., Upland	E
Carpenter, Mr. Irvin, Jr., 140 S. Salisbury, West Lafayette	Bo
Castro, Mr. Elias Adis, Anthropology Dept., Indiana University, Bloomington	A
Cedars, Miss Mary Elizabeth, 2200 N. Washington, Roosevelt School, Kokomo	G
Chandler, Mr. Leland, Friendship	Z
Christian, Mr. Howard H., 547 Prospect St., Westfield, New Jersey	Z
Clark, Miss Ann, 511 W. Columbia, Oakland City	Ba
Clark, Mr. Herbert, Jr., Route 2, Box 483, Terre Haute	Bo
Clem, Miss Gladys Marie, Eli Lilly & Co., Indianapolis 6	Ba
Clevenger, Miss Sarah Beth, 717 S. Henderson Street, Bloomington	Bo
Cockran, Mr. Glenn Ray, 1216 Hendricks St., Anderson	C
Coffing, Miss E. Charlene, Eli Lilly & Co., Indianapolis 6	Ba
Colby, Mr. Alonso Clark, Room 416, Indiana State Library Bldg., Indianapolis	G
Collier, Miss Patricia A., 1830 Clinton Street, Rockford, Illinois	Ba
Coulombre, Mr. Alfred Joseph, Wabash College, Crawfordsville	Z
Crane, Mr. William Earl, Fountaintown	C
Dean, Mr. Russell, 157 Austin Avenue, Rensselaer	Ph
Dreiling, Rev. M. M., St. Joseph's College, Collegeville	M
Easterday, Mr. Otho Dunreath, 224 N. Calvert St., Auburn	Ba, C
Easterday, Mr. Wayne G., Anderson High School, Anderson	Ba
Ebel, Miss Louise, Dept. of Biology, Valparaiso Univ., Valparaiso	Z
Eggerding, Mr. Milferd H., Geography Dept., Valparaiso Univ., Valparaiso	G
Evans, Miss Barbara Ann, 6674 North Pennsylvania, Indianapolis	Ba
Feltis, Miss Thora Jean, Route 18, Box 457, Indianapolis	C
Ferguson, Dr. James W., Butler University, Indianapolis	C
Fix, Mr. William Lloyd, P. O. Box 159, Princeton	Bo

Fuller, Prof. Forst D., Zoology Dept., DePauw Univ., Greencastle	Z
Fuller, Mr. Paul R., Psychology Dept., Indiana Univ., Bloomington	Ps
Fuller, Dr. Thomas C., Dept. of Botany, Hanover College, Hanover	Bo
Fuller, Mr. Wm. Richard, Butler University, Indianapolis	M
Gianotti, Mr. Eden J. J., Hanover College, Hanover	G
Gill, Mr. Charles W., Jr., Route 2, Wabash, c/o Loren Elliott	Z & C
Gourley, Miss Frances M., 905 Madison St., LaPorte	Bo, Z
Glaser, Mr. Robert, Psychology Dept., Indiana Univ., Bloomington	Ps
Gucker, Prof. Frank T., Jr., Chemistry Dept., Indiana Univ., Bloomington	C
Guennel, Mr. G. K., 4323 Kingsley Dr., Indianapolis	Bo
Guernsey, Mr. J. L., 18 Home Avenue, Terre Haute	G
Hallam, Mr. Kenneth Leslie, 5456 N. Capitol Ave., Indianapolis 8	Ph
Hamp, Miss Ruth Marie, Eli Lilly & Co., Indianapolis	Ba
Hare, Mr. Robert R., Jr., 3F Observatory Court, Greencastle	Ph
Hawkins, Prof. Harry Leslie, DePauw Univ., Greencastle	Ps
Hawley, Mr. Martin J., 7733 Gregier Avenue, Chicago 49, Illinois	Z
Hayes, Mr. John Clifford, Prefab. 86, Court E., W. State St., W. Lafayette	C
Hays, Mr. Robert L., 125 South Mill St., Westfield	Bo
Heckman, Rev., Norman L., St. Joseph's College, Collegeville	C
Hendrickson, Mr. Thomas M., 110½N. Lincoln St., Bloomington	G
Hickman, Mr. Cleveland P., Jr., 315 Greenwood Ave., Greencastle	Z
Hogan, Mr. Robert Eugene, 617 Second St., Columbus	G
Honeay, Mr. John S., Box 13, Whiteland	Bo
Hutchinson, Mr. Emory J., Route 1, Norman	Bo, Z
Hyer, Miss Ann, Audio-Visual Center, Indiana Univ., Bloomington	A
Jackson, Mr. Robert F., 522 Board of Trade Bldg., Indiana Flood Control Commission, Indianapolis	E
Johnson, Mr. Robert L., Dept. of Biology, Purdue University, W. Lafayette	Bo
Jump, Dr. John Austin, Biology Dept., Univ. of Notre Dame, Notre Dame	Bo
Kalter, Mr. Louis B., 717 North Ave., Dayton 6, Ohio	Z, G
Karling, Prof. John S., Biological Sciences Dept., Purdue Univ., Lafayette	B, Z
Keck, Mr. Bert Marion, Route 1, Paulding, Ohio	Bo
Kottlowski, Mr. Frank E., Dept. of Geology, Indiana Univ., Bloomington	Geo, G
Landerbaugh, Mr. E. E., Moores Hill High School, Moore Hill	Ph, C
Leininger, Mr. Richard K., Geology Div., Indiana Univ., Bloomington	C
McConnell, Mr. Rex, 2049 N. Meridian, Apt. 15, Indianapolis	C
McQueeney, Mr. Carl Ray, 4905 Matthews Ave., Indianapolis	Bo
Miller, Dr. George J., Geography Dept., Indiana Univ., Bloomington	Geo, G
Mitchell, Mr. Allen C., Physics Dept., Indiana Univ., Bloomington	Ph

Motley, Miss Jerry Anne, 1726 N. Alabama St., Indianapolis	Bo, Z
Mullins, Prof. A. G., Physics Dept., Indiana Central College, Indianapolis	Ph
Noyes, Mr. Bradford, 4087 N. Illinois St., Indianapolis	P
Oberbacher, Mr. Marion F., Stanley Coulter Hall, Purdue Univ., Lafayette	Bo
Omara, Miss Jean Anne, Mason Hall, DePauw Univ., Greencastle	Z
Osmun, Prof. John V., Entomology Dept., Purdue Univ., Lafayette	E
Peake, Dr. John Spencer, Chemistry Dept., Indiana Univ., Bloomington	C
Phillips, Mr. Travis J., 1419 Sweetser Ave., Evansville	Ph, C
Pitman, Mr. Joe A., Corydon	Z
Ramsay, Mr. Robert Skinner, Anderson College, Anderson	Ps
Rector, Miss Avis, 317 S. Grant, Bloomington	C
Rehm, Mr. Robert A., Phi Alpha House, DePauw Univ., Greencastle	Z
Reynolds, Miss Theo, Anderson College, Anderson	Ps
Roney, Mr. Claud H., Anderson High School, Anderson	M
Rothrock, Miss Dorothy, 1310 S. Kentucky Ave., Evansville 13	Bo
Rueve, Rev. Charles R., St. Joseph's College, Collegeville	M
Ryan, Mr. Paul J., 830 Drexel Ave., Fort Wayne	Z, Bo
Sanders, Mr. W. Leo, Senior High School, Anderson	Ps, Bo, Z
Sayler, Mr. Max W., New Market	M
Schaeffer, Prof. Harold F., Chemistry Dept., Valparaiso Univ., Valparaiso	C
Scheffe, Mr. Charles Earl, 609 Middle Drive, Woodruff Place, Indianapolis	Bo
Schmidt, Mr. Frederic Cowles, Chemistry Dept., Indiana Univ., Bloomington	C
Schwan, Mr. T. C., Valparaiso Univ., Valparaiso	C
Scofield, Mr. Robert E., Route 1, Box 105, Chesterton	Bo, Z
Scott, Miss Frances I., 1048 N. Beville Ave., Indianapolis	Bo
Seidel, Mr. Eugene M., Chemistry Dept., Indiana Univ., Bloomington	C
Shalucha, Dr. Barbara, Botany Dept., Indiana Univ., Bloomington	Bo
Shepherd, Mr. Ralph H., North Main St., Road, Bicknell	Z
Sherockman, Mr. Andrew Antolcik, Evansville College, Evansville	C
Sibert, Mr. George W., Wyandotte	G
Sister Mary Blanche, Central Catholic High School, Clinton & Lewis Sts., Fort Wayne	Ph
Sister Mary Rose Stockton, Marian College, Route 17, Box 56, Indianapolis 44	C
Starr, Dr. Donald D., Taylor Univ., Upland	C
Stephens, Miss Mary Alice, 474 South Street, Franklin	Ba
Stoneman, Mr. Elvyn A., Geography Dept., Indiana Univ., Bloomington	Geo & G
Totten, Dr. W. Fred, Wabash College, Crawfordsville	M
Tsareff, Mr. Thomas C., Jr., 1702 N. Lynhurst Drive, Indianapolis 24	C

Verplanck, Dr. William S., Psychology Dept., Indiana Univ., Bloomington	Ps
Von Wicklen, Dr. Frederick C., Indiana Central College, Indianapolis 3	C
Waldschmidt, Mr. Rudolph Charles, Psychology Dept., Valparaiso Univ., Valparaiso	Ps
Wantland, Mr. Kenneth W., 6036 Haverford Ave., Indianapolis	C
Warren, Mr. Kenneth J., Anderson High School, Anderson	Ps
Wayne, Mr. William John, R. F. D. No. 6, Bloomington	G
Williams, Dr. Eliot C., Jr., Zoology Dept., Wabash College, Crawfordsville	Z
Williams, Mr Marvin D., 328 Lawn Ave., West Lafayette	HS
Winkel, Mr. Theodore A., 607 N. East St., Madison	C
Wittig, Mr. Donald R., Butler Univ., Indianapolis	Ph
Yocom, Mr Wilbur J., Five Maples, Rosedale	Z

JUNIOR ACADEMIES

Centennial Science Club, Centennial School, 6th and Bronn Sts., Lafayette	GS
Science Club, Thomas Carr Howe High School, Indianapolis	Bo, Z, C, Ph

