

PROCEEDINGS  
*of the*  
Indiana Academy  
*of Science*

*Founded December 29, 1885*

•  
Volume 68  
1958

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RICHARD A. LAUBENGAYER, Editor  
Wabash College  
Crawfordsville, Indiana

•  
Spring Meeting  
May 23-24  
Earlham College Conference Grounds  
at  
Dewart Lake

Fall Meeting  
November 6-8, 1958  
MARION COLLEGE

Published at Indianapolis, Indiana  
1959

1. The permanent address of the Academy is the Indiana State Library.
2. **Instructions for Authors** appear at end of this volume, p. 324.
3. **Exchanges.** Items sent in exchange for the Proceedings and correspondence concerning exchange arrangements should be addressed:  
John Shepard Wright Memorial Library of the Indiana Academy of Science.  
c/o Indiana State Library  
Indianapolis 4, Indiana.
4. **Proceedings** may be purchased through the State Library at \$3.00 per volume.
5. **Reprints of technical papers** can often be secured from the authors. They cannot be supplied by the State Library nor by the officers of the Academy.
6. The Constitution and By-Laws reprinted from v. 62 and the Membership List reprinted from v. 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.

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

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

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OFFICERS AND COMMITTEES OF THE INDIANA  
ACADEMY OF SCIENCE

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Spring Meeting: May 23, 24, Dewart Lake, Indiana.

Fall Meeting: November 6, 7, 8, Marian College, Indianapolis.  
THE TREASURER, EDITOR, PRESS SECRETARY, AND COMMITTEE CHAIRMEN ARE EXPECTED TO PRESENT WRITTEN REPORTS AT THE *FALL MEETING*.

OFFICERS FOR 1958

President . . . . . W. A. DAILY, Eli Lilly & Company  
Vice President . . . . . A. A. LINDSEY, Purdue University  
Secretary . . . . . H. E. CRULL, Butler University  
Treasurer . . . . . F. J. WELCHER, Adult Ed. Center, Ind. Univ.  
Editor . . . . . R. A. LAUBENGAYER, Wabash College  
Press Secretary . . . . . F. N. YOUNG, JR., Indiana University

CHAIRMEN ELECTED BY THE DIVISIONS

Anthropology . . . . . E. BLASINGHAM, Indiana University  
Bacteriology . . . . . W. A. KONETZKA, Indiana University  
Botany . . . . . MRS. FAY DAILY, Butler University  
Chemistry . . . . . E. T. MCBEE, Purdue University  
Entomology . . . . . J. FAVINGER, State Dept. of Conservation  
Geology & Geography . . . . . J. F. HART, Indiana University  
History of Science . . . . . H. MICHAUD, Purdue University  
Mathematics . . . . . I. BURR, Purdue University  
Physics . . . . . L. SALTER, Wabash College  
Plant Taxonomy . . . . . M. HALL, Butler University  
Psychology . . . . . G. LOVELL, Wabash College  
Zoology . . . . . W. HOPP, Indiana State Teachers College

EXECUTIVE COMMITTEE

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

Bernard, Sister M.	Hall, M.	Mellon, M. G.
Blasingham, E.	Hart, J. F.	Meyer, A. H.
Breneman, W. R.	Hopp, W.	Michaud, H. H.
Burr, I.	Johnson, D. F.	Mitchell, A.
Christy, O. B.	Johnson, W. H.	Morgan, W. P.
Coats, N. M.	Just, T. K.	Payne, F.
Crull, H. E.	Kent, R. L.	Porter, C. L.
Cumings, E. R.	Klinge, P.	Powell, H. M.
Daily, Fay	Konetzka, W. A.	Salter, L.
Daily, W. A.	Laubengayer, R. A.	Schulz, R. W.

Davis, J. J.	Lilly, Eli	Visher, S. S.
Degering, E. F.	Lindsey, A. A.	Wallace, F. N.
Edington, W. E.	Lovell, G.	Weatherwax, P.
Edward, P. D.	Mackell, J. F.	Welch, W. H.
Enders, H. E.	Markle, C. A.	Welcher, F. J.
Favinger, J.	Markle, M. S.	Young, F. N., Jr.
Girton, R. E.	McBee, E. T.	Yuncker, T. G.

## BUDGET COMMITTEE

Consisting of President, Secretary, Treasurer, Editor, Chairman of Junior Academy, Library, Program, and Relation of Academy to State: W. A. Daily, H. E. Crull, F. J. Welcher, R. A. Laubengayer, H. H. Michaud, N. M. Coats, Sister Marie Bernard, F. N. Wallace.

## COMMITTEES ELECTED BY THE ACADEMY

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

**Bonding of Trustees** (elected annually): Chairman, Scott McCoy, Technical H. S., Indianapolis; R. E. Cleland.

**Research Grants** (term 5 years): Chairman T. G. Yuncker, DePauw University (term expires 1959); M. G. Mellon (1960); Paul Weatherwax (1961); J. J. Mackell (1958); J. F. Hart (1962); W. A. Daily and H. E. Crull (ex officio).

## COMMITTEES APPOINTED BY THE PRESIDENT

**Auditing:** Chairman, W. P. Morgan, Ind. Central Col.; S. E. Elliot.

**Biological Survey:** Chairman, C. A. Markle, Earlham College; F. K. Daily; D. G. Frey; C. J. Goodnight; H. H. Michaud; S. A. Minton; Winona H. Welch; F. N. Young.

**Fellows Committee:** Chairman F. K. Daily, Plant Taxonomy, Butler University; A. T. Guard, Botany; H. M. Powell, Bacteriology; C. F. Voeglin, Anthropology; M. G. Mellon, Chemistry; H. O. Deay, Entomology; T. F. Barton, Geology and Geography; M. S. Markle, History of Science; P. D. Edwards, Mathematics; A. C. Mitchell, Physics; H. H. Remmers, Psychology.

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

**Indiana Talent Search:** Chairman, R. W. Schulz, Purdue University; L. H. Baldinger; P. D. Edwards; T. W. Torrey; C. A. Markle; M. Correll.

**Invitations:** Chairman, D. F. Johnson, Ind. St. Teachers College; W. P. Morgan; Keith Seymour.

**Junior Academy:** Chairman, H. H. Michaud, Purdue University; N. E. Adams; R. Cooper; J. Cope; S. D. Gerkin; P. E. Klinge; Lola Lemon; R. McCougal; R. E. Martin; R. E. Niswander; M. Stork.

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

**Membership:** Chairman, R. L. Kent, Ind. Cent. College; R. Fletcher, DePauw University; R. M. Cable, Purdue Univ.; Lois Farquharson, Franklin; M. Garner, Earlham; W. H. Headlee, Ind. Univ. Med. Center; Z. Hurlbut, Anderson; E. Kintner, Manchester; R. G. Larson, Valparaiso; R. E. Martin, Hanover; L. S. McClung, Ind. Univ.; R. J. Sheehan, Notre Dame; C. Brumfiel, Ball St. Teachers Col.; D. F. Johnson, Ind. St. Teachers Col.

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

**Program:** Chairman, Sister Marie Bernard, Marion College; M. T. Hall; J. M. McGuire; Sister M. Adelaide; Sister Marie Rose; M. S. Markle.

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

**Publicity:** Chairman, F. N. Young, Indiana University; Sister Gertrude Marie; Father Paul Courtney.

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

**Representative on Council of the AAAS:** W. H. Johnson, Wabash College.

**Resolutions:** Chairman, W. Welch, DePauw University; L. Farquharson; R. Starr.

**Science Education:** Chairman, Paul Klinge, Indiana University; R. R. Armacost; C. W. Dale; R. Schulz; Max Forsyth.

## SPRING MEETING EXECUTIVE COMMITTEE

DEWART LAKE

May 23, 1958

The meeting was called to order by the president, Wm. A. Daily. Frank Welcher gave no formal report as continued from the last fall meeting. He reported approximately 50 per cent gain in net amount collected due to the increase in dues. He reported that there is about \$900 available for use in the talent search.

Editor Richard Laubengayer reported that the *Proceedings* were at the printers. 1,600 copies are being printed and reprints are about the same as last year.

Nelle Coats, librarian, reported that the library has received favorable publicity particularly through various displays at the state library during National Library Week. The location has been cited in a new and widely distributed pamphlet.

Press Secretary Frank Young reported that the Spring Meeting had been publicized and that he was making plans for the fall meeting.

Program Chairman Sister Marie Bernard reported that plans were coming along for the meeting in the fall.

A discussion was held concerning research grants. A letter from Professor Salter of Wabash College stating that he would not be able to serve as chairman of the Physics Division due to absence from the country was read, and his resignation was accepted. Dr. Bessey of Butler University was appointed by the Executive Committee as chairman of the Physics Division. At the suggestion of Mr. Daily, Mrs. Lois Burton, assistant to Miss Coats at the library, was elected to the Academy as an honorary member. This was done in recognition of the many favors and services that Mrs. Burton has provided for the Academy. Mr. Hart moved and Mr. Girton seconded a motion that a Soils Science Division be created. This motion was unanimously passed, and this division will appear at the fall meeting. Mr. Kent reported on membership and made some pertinent remarks about publicizing membership in the Academy. Mr. Michaud reported that a representative of the chain store council had been in contact with him regarding rewards to high schools for outstanding science activities such as are given by the Kroger Company of Ohio.

HARRY E. CRULL, Secretary

## DINNER MEETING

DEWART LAKE

May 23, 1958

Words of welcome to members were given by W. A. Daily and a welcome to Dewart Lake was given by M. S. Markle. Dr. Garner reported on the Marine Biological Laboratory at Earlham College. The officers were introduced and a report of the Executive Committee was given including the honorary membership of Mrs. Burton and the addition of the Soils Science Division. A motion was made, seconded, and passed to accept the action of the Executive Committee. Mr. Kent of the membership committee reported that nine people had been accepted to membership in the Academy. The resolutions committee presented the attached resolution which was unanimously adopted.

Sherman A. Minton, Jr., of Indiana University Medical Center presented films on "Wanderings of a Naturalist in Texas and Central America"; and Robert H. Cooper of Ball State Teachers College spoke on "Higher Science in the Northwest."

Field trips were announced, and the meeting was adjourned.

HARRY E. CRULL, Secretary

## MINUTES OF THE EXECUTIVE COMMITTEE

November 6, 1958

MARIAN COLLEGE, INDIANAPOLIS, INDIANA

The Executive Committee of the Indiana Academy of Science was called to order by President William Daily at 7:30 p.m. Central Daylight Time in Room 207 Administration Building, Marian College, Indianapolis, Indiana. The minutes of the spring meeting at Dewart Lake were read and approved.

Reports of officers and chairmen of committees:

**Editor.** Richard A. Laubengayer: There were ordered 1,200 cloth bound copies and 400 paper bound copies of Volume 67 of the *Proceedings*. The overprint was ten copies of each. Included in the volume this year is the complete membership list. Copies were in the mail to the members by early August. There were thirty-five papers reprinted. After the bills had been sent out—the estimates were supplied by the Bookwalter Company—it was brought to the editor's attention that one item had not been included, viz. the composition cost for the reprints. This composition cost for all of the reprints—183 pages—@ \$1.59 per page, totaled \$290.97. At the time this information came to the editor's attention, it was impossible for him to correct the billings to each author. The editor requests that this cost be defrayed by the Academy. (It was moved, seconded and passed that this cost be defrayed by the Academy.)

After the report of the editor there was a discussion of the cost of reprints from the *Proceedings*. It was voted that a committee be appointed by the president to investigate and report on this matter.

Secretary, Harry E. Crull:

#### Income Cash Statement

October 1, 1957 Beginning Balance . . . . .	\$	584.51
October 1, 1957 to September 30, 1958		
Total Receipts . . . . .		401.63
October 1, 1957 to September 30, 1958		
Bank Fees . . . . .	\$	20.08
Interest . . . . .		1.16
September 30, 1958 Balance . . . . .	\$	964.90
Total Carrying Value Stocks and Bonds		\$14,354.02

#### Principal Cash Statement

October 1, 1957 Beginning Balance . . . . .		00
October 1, 1957 to September 30, 1958		
Total Receipts, USA Ser. G Bonds . . . . .	\$	500.00
October 1, 1957 to September 30, 1958 . . . . .	\$493.66	
Total Disbursements		
BOT 500 Par at 98 <sup>22</sup> / <sub>32</sub> and purchase		
expense USA Treas. Bonds, Noncallable		
September 30, 1958 Balance . . . . .	\$	6.34

**Press Secretary**—F. N. Young: Announcements of the spring and fall meetings were sent to several newspapers and to the Associated Press and United Press International. Several special releases on individual papers were also prepared and sent to newspapers or the press services. Arrangements were made with Mr. Bruce Cox of WLW-I-TV to present a special program concerning the Academy. Special thanks are due Miss Nelle Coats of the State Library and Mr. Hugh Hazelrigg of the Indiana News Bureau for their help and advice.

There followed discussion concerning a popularized abstract for newspaper use. There was a suggestion that an outline be printed on the back of the call for papers, but no action was taken.

**Research Grants**—T. G. Yuncker: Two grants were made during the year. Dr. W. H. Welch was granted \$100 for library expenses in connection with her continuing work on the moss family Hookeriaceae. Dr. C. L. Bieber was granted \$100 to aid in covering field expenses in his problem on "The Breccias of Northwest Putnam County, Indiana." The committee has in hand at the present time two applications for grants of \$100 each to be acted upon at this meeting. The amount of money available is relatively small and it is recommended that requests be restricted in their size so as to benefit the greatest number of applicants possible.

**Nominating Committee**—by W. H. Johnson for S. S. Visher: A. A. Lindsey was nominated for the Research Grants Committee and Scott McCoy and F. J. Welcher were nominated for the Bonding of Trustees Committee.

**Fellows Committee**—Mrs. Fay Daily: The following members were recommended for fellows in the A.A.A.S.: Dr. Herbert C. Brown, Purdue University, Chemistry; Prof. Edward Lauth Haenisch, Wabash College, Chemistry. The following members were nominated for fellows in the Indiana Academy of Science: Dr. Goethe Link, Indianapolis, Indiana, Surgeon; Dr. Herbert Charles Brown, Purdue University, Chemistry; Prof. Felix Haurowitz, Indiana University, Biochemistry and Microbiology; Dr. Donald J. Cook, DePauw University, Biochemistry; and Dr. Richard Starr, Indiana University, Phycology (Botany).

**Biological Survey Committee**—Carroll Markle:

**Publications of 1957-1958 Dealing With the Flora and Fauna of Indiana**

- |                 |  |
|-----------------|--|
| Bryophyta       | Welch, Winona H. 1957. Mosses of Indiana. Division of Forestry, Indiana State Department of Conservation. 478 pp., 254 figs.   |
| Platyhelminthes | Williams, Eliot C., Jr. 1958. Preliminary Studies on Pigmentation in Cave Planarians. Proceedings of the Indiana Academy of Science <b>67</b> :300-301. (Abstract)   |
| Insecta         | <ol style="list-style-type: none"> <li>1. Krekeler, Carl H. 1958. Speciation in Cave Beetles of the Genus <i>Pseudonophthalmus</i> (Coleoptera, Carabidae). <i>American Midland Nat.</i> <b>59</b>:167-189.</li> <li>2. Siverly, R. E. 1958. Occurrence of <i>Culiseta melanura</i> (Coquillett) in Indiana. Proceedings of the Indiana Academy of Science <b>67</b>:137. (Abstract)</li> <li>3. Stahl, John B. 1958. The developmental history of the chironomid and Chaoborus faunas of Myers Lake, and the relationship of these faunas to microlaminæ in the sediments. Ph.D. Thesis, Indiana University. 142 pp.</li> </ol> |
| Vascular Plants | Markle, Carrolle A. 1958. Contributions to the Flora of Wayne County, III. Proceedings of the Indiana Academy of Science <b>67</b> :290-291.   |
| Mammalia        | Cope, James B., Russell E. Mumford and Nixon Wilson. 1958. Some Observations on a Summer Colony of <i>Myotis lucifugus</i> . Proceedings of the Indiana Academy of Science <b>67</b> :316-321.   |

**Work in Progress or Completed in 1957-1958 but Not Yet Published.**

- |                 |  |
|-----------------|--|
| Algae           | <ol style="list-style-type: none"> <li>1. Daily, Fay Kenoyer. Some Observation on the Occurrence and Distribution of the Characeae of Indiana.</li> <li>2. Daily, William A. In Search of Some Blue-Green Wanderers.</li> <li>3. Webster, Rex N. Work on <i>Batrachospermum</i>.<br/>Work on <i>Euglena viridis</i> life cycle.</li> </ol>   |
| Bryophyta       | Welch, Winona H. Additions to Mosses of Indiana<br><i>Hookeria acutifolia</i> in Indiana   |
| Vascular Plants | <ol style="list-style-type: none"> <li>1. Clewell, Andre. A Study of the genus <i>Lespedeza</i></li> <li>2. Hall, M. T. Variation in <i>Hudsonia</i><br/>Variation in <i>Juniperus</i><br/>Variation in <i>Maianthemum</i><br/>Studies in hybridization in <i>Tragopogon</i><br/>Population studies in <i>Podophyllum peltatum</i></li> <li>3. Heiser, Charles B. Indiana Distribution Records<br/>Monograph of the genus <i>Helianthus</i></li> <li>4. Humbles, Jack. Variation in Indiana <i>Desmodiums</i></li> </ol> |

5. Laubengayer, Richard A. Inventory of Plants in the Allee Memorial Woods along Sugar Creek
  6. Markle, Carrolle A. Flora of Wayne County, continued
  7. Rector, Mrs. Marion. Vascular plants in the vicinity of Muncie, Indiana
  8. Stares, Mrs. Helene. General collection and county records of Vascular Plants. Special attention to grasses and sedges.
- Annelida
1. Goodnight, Clarence J. Continued work on the opilionids and oligochaetes.
  2. Joyner, James. Earthworms of Wayne County, Indiana
- Crustacea
1. Everly, William R. Littoral and temporary pond endostraca, chiefly in Wabash and Kosciusko Counties
  2. Frey, D. G. Distribution of the Chydorid Cladocera in the lakes of Indiana as determined from remains in sediments.
  3. Hickmon, C. P. Eubranchipus, Ecological Relationships
- Insecta
1. Craig, George B., Jr. Mosquitoes of the Michigan region
  2. Krekeler, Carl H. Work on speciation of Indiana Cave Beetles, continued
  3. Siverly, R. E. Taxonomical and biological studies of the mosquito fauna of Delaware County, Indiana
- Amphibia
1. Gordon, Robert E. Taxonomy and ecology of *Amphystoma texanum*. Locomotive activity of amphibia and reptilia in relation to various environmental factors.
  2. List, J. C. Marking and life history study of *Pseudacris nigrita* (swamp tree frog)
- Reptilia
1. List, J. C. Anatomical Study of *Carphophis amoenus* (worm snake)
  2. Williams, Eliot C., Jr. Studies on population of box turtles, *Terrapene carolina* (L.) in the Allee Memorial Woods Preserve.
- Mammalia
1. Cope, James B. Further study of bats in Indiana
  2. Mumford, Russell E. Mammals of Indiana.
- Animals in general
- Laubengayer, Richard A. Survey of Animal Groups in the Allee Memorial Woods along Sugar Creek, Indiana

**Treasurer**—Frank J. Welcher: Financial report for the year 1958:

*Receipts*

Balance on hand January 1, 1958.....	\$ 9,469.93
Dues and Initiation Fees .....	3,434.50
Publications sold .....	103.05
Authors reprints Vol. 64.....	20.62
Authors reprints Vol. 65.....	88.12
Authors reprints Vol. 66.....	502.74
Authors reprints Vol. 67.....	320.97
Designated gifts .....	50.00
Talent Search .....	1,492.50
	\$15,482.23

\$15,482.23

*Disbursements*

Editor Vol. 67 .....	\$ 225.00
Expenses of Secretary .....	160.05
Expenses of Treasurer .....	177.04
Stationery .....	215.60
Talent Search .....	1,358.03
Program Committee .....	300.75
Research Grants .....	522.67
Mailing Proceedings Vol. 67 .....	54.55
Returned Checks .....	13.20
Error in Deposit .....	2.00
Expenses of 6 Officers as Directed by Action of 1947	
Executive Committee .....	125.00
Academy Conference .....	24.00
Reprints Vol. 67 .....	665.03
John Shepard Wright Memorial Library .....	1,461.63
Junior Academy of Science .....	14.24
Publishing Proceedings, Vol. 67 .....	209.15
Binding Academy Library .....	699.50
Academy Conference .....	29.35
A. A. A. S. ....	8.50
	<hr/>
	\$ 6,241.25
Balance on hand December 31, 1958.....	\$ 9,240.94

The balance on hand December 31, 1958 includes \$4,299.41 in the John Shepard Wright Memorial Library fund, and \$1,878.84 in the Talent Search fund.

(Signed) Frank J. Welcher, Treasurer.

(Signed) W. P. Morgan, Auditor

**Library Committee**—Nelle Coats: Chief effort has been upon completing files of serials currently received as contemplated by the Lilly Endowment in its grant to the Academy. This required a great deal of checking and listing, involving comparison to avoid duplication of materials in other Indiana libraries, to purchase first those titles not readily available elsewhere. Often such widely scattered numbers were required that dealers were loath to search for them. Eventually Kraus Periodicals, Inc., New York City, was able to supply missing numbers or volumes for something like fifty titles at a cost approximating \$1,400. Two hundred one volumes have been prepared for binding at an estimated cost of \$898.95. The library is currently receiving 983 titles from the United States and 75 foreign areas. Publication date of the *Proceedings* volume 67 was July 23, 1958. Labor and envelopes for mailing to members were as usual supplied compliments the Indiana State Library. Publicity has been given the library continuously by exhibits in the street floor lobby of the State Library and on specific occasions such as the meeting of the Junior Scientists Assembly, Claypool Hotel in March, State Library's celebration of National Library Week, particularly on a day given over to visits from state officials, including the Governor. By such means the Library's usefulness increases and becomes more apparent to Indiana people. Loans have been made out of state to such agencies as U. S. Navy Underwater Sound Laboratory, Fort Trumbull, New London; Michigan State University, Lansing, Michigan; Mountain Lake Biological Station, Pembroke, Pennsylvania; Duke University, Durham, North Carolina; State College of Washington, Pullman, Washington.

**Invitations Committee**—M. T. Hall: The President and Board of Butler University have invited the Academy to hold its 75th meeting next fall on the campus of Butler University in Indianapolis. The report was accepted. Manchester College invited the Academy for 1960 or later and the Indiana State Teachers College has extended an invitation for 1961.

**Membership Committee**—Robert L. Kent: Twelve colleges where there is no representative of the membership committee were contacted. Each was asked to distribute applications to the science faculty and encourage students to apply for membership. Total applications for membership received to date are 42. There was discussion of the membership application form and it was voted that the secretary and treasurer be instructed to work on a revision of the present form to take care of the new memberships for both husband and wife and for sustaining members.

**Program Committee**—Sister Marie Bernard: The program committee held no formal meetings. Business with members of the committee not living on the campus was transacted by mail or telephone. The spring meeting was arranged almost entirely by the members away from the Marian College campus. The fall meeting was arranged for mainly by the members of the committee at the College. Dr. Markle of Earlham College did a splendid task in making all detailed arrangements for the spring meeting at Dewart Lake. The chairman of the program committee takes this opportunity to thank all divisional chairmen for their cooperation in preparing the program.

**Junior Academy Committee**—H. H. Michaud: The twenty-fifth annual meeting of the Indiana Junior Academy of Science was held Saturday, October 19, 1957, at DePauw University. The morning program consisted of career conferences and visits to the instructional and research laboratories of the campus conducted by members of the science faculty of DePauw University. A special exhibit room was provided for club members to display projects and demonstrations that could be viewed during the day's program. Twelve papers were read by students during the afternoon session. Five new clubs have joined the Junior Academy since last year. The twenty-sixth annual meeting of the Junior Academy will convene this Saturday, November 8. Seventeen papers will be read by members of the Junior Academy. This represents the best response to our call for papers that we have had for several years. An award of \$25 will be given by the American Society of Bacteriologists to the student presenting the best paper on bacteriology or microbiology. The Kroger Grocery Company will present a top award of \$50 and a plaque and two runner-up awards of \$25 each and plaques based on questionnaires sent to all schools affiliated with the Junior Academy and others who requested them. Another prospect that holds considerable promise to stimulate science education and science club activity among high schools is a possible grant from the National Science Foundation. We have suggested that if travel funds could be made available to college science teachers to meet occasionally with

high school clubs, it would do a great deal to stimulate interest in science. An annual grant of \$1,000 to \$1,500 was proposed as needed for such a project. In a letter from Dr. John A. Yarbrough, President of the Academy Conference, dated October 31, it is indicated that our proposal stands a good chance of acceptance. We are continuing our cooperation with the Regional Science Fairs, the Science Talent Search and with Science Clubs of America. The fall issue of the Junior Academy Journal in cooperation with the Junior Academy Council has been promised for distribution on Saturday. The annual News-Letter was prepared by the Junior Academy officers last spring and distributed to the clubs. (There was discussion of encouragement of college undergraduate attendance and participation in the Academy and general agreement of the importance and desirability of this move.)

**Science Talent Search**—R. W. Schultz: One hundred forty-two Indiana high school seniors completed entry requirements for the 1957-58 Science Talent Search. Of this group, 25 were designated finalists on the basis of their written reports, aptitude test scores, and school records. The finalists and their sponsoring teachers were invited to the Junior Scientists' Assembly in Indianapolis, March 21-22, 1958. On the basis of a personal interview with the Search Committee, 16 of the finalists were declared winners in the 1958 Search and recognized at the annual Honors Luncheon on Saturday. Of the papers submitted by the finalists, 24% were related to the biological sciences, 16% to mathematics, 8% to earth science, 16% to chemistry, and 36% to physics. Ninety of the 142 participating students responded to a questionnaire sent them in June. Of these, 85 indicated they had enrolled in a college, 67 in Indiana schools and 18 in out-of-state schools. In addition, 45 participants reported they had been awarded scholarships with stipends totaling more than \$60,000. Twenty-nine of the participants anticipate careers in engineering, 27 in physics or chemistry, 13 in biological sciences or medicine, 9 in mathematics, and 12 in other fields. Total contributions in support of the 1958 program were \$1,492.50. The total expenditures were \$1,358.03. The contributions were made by Kappa Kappa Kappa, Inc.; Allison Division, GMC; Amos-Thompson Corp.; Duncan Electric Mfg. Co.; Foster-Forbes Glass Co.; Indianapolis Power and Light Co.; LaPorte Aircraft Division, Whirlpool-Seegar Corp.; Link-Belt Co.; Nuclear Measurements Corp.; Overhead Door Corp.; and Plastene Corp. During the past year a study was made of the present occupations of the finalists in the first three Indiana Searches, 1948-1950. Responses were made by about 70% of this group indicating that 98% have earned at least one college degree and 41% have completed doctoral work. The Junior Scientists' Assembly for the 1958-59 school year will be held on March 20-21, 1959.

**Science Education Committee**—Paul Klinge: One of the problems confronting the Committee is a precise outline of its functions, responsibilities, and the limit of recommendations which it is authorized to make. We are informed that our role with the Science Fairs in Indiana is simply one of an advisory capacity. It is our belief that this com-

mittee is in no way connected with the Indiana Science Talent Search, a very important program in science education in this state. We are interested in knowing how the role of science education can be more definitely emphasized in each of the sections. The increase in the number of papers presented to each of the sections on educational matters is encouraging along this line.

(It was voted that a permanent committee be appointed by the president from the membership common to the Academy and the Indiana School and College Committee on Mathematics to sponsor and guide the work of this latter committee which is working on the coordination of high school and college mathematics subject matter.)

It was announced that the Soils Science section would hold its Friday sessions in room 207 instead of as announced.

The Geology-Geography section called attention to their national meetings on the first weekend of November annually and asked that this be remembered in scheduling future Academy meetings. The section also was granted permission to elect a vice-chairman, this person not to be on the executive committee or to appear on the list of division chairmen.

P. D. Edwards reported briefly on the meeting of the committee on Teacher Education Professional Standards and introduced the following resolution which was adopted:

Resolved: That the Indiana Committee on Teacher Education and Professional Standards (TEPS) be urged to call a state meeting to follow up the National Bowling Green TEPS Conference and consider problems of teacher training and certification in Indiana; that members of the Indiana Academy of Science be invited to this meeting as representatives of subject matter fields.

A copy of the above resolution is to be sent to Howard Batchelder, Assoc. Dean, School of Education, Indiana University.

Mr. Schultz spoke on the need for funds to conduct the Science Talent Search, since the Chambers of Commerce have withdrawn their assistance in the writing of letters soliciting funds. After discussion it was voted that Mr. Schultz be authorized to solicit support for the talent search as the official representative of the Academy.

The secretary called the attention of all division chairmen to the regulation that their successors must be members of the Academy. The meeting adjourned at 10:45 p.m.

Respectfully submitted,

HARRY E. CRULL, Secretary

Approved November 7, 1958.

## MINUTES OF THE GENERAL SESSION

MARIAN COLLEGE, November 7, 1958

The meeting was opened by President William Daily. The Very Reverend Francis J. Reine, President of Marian College, welcomed the Academy to the campus. Harry E. Crull, Secretary, read the minutes of the Executive Committee meeting, and they were approved as read. Dr. W. E. Edington, Necrologist of the Academy reported the deaths of the following members of the Academy over the past year: Kenneth Victor Bryan, George Henry Alexander Clowes, Alvalon Conway Cox, Seth Earl Elliott, Howard Edwin Enders, Karl Lark-Horovitz, Edward Hulbert Niles, Herman Rudolph Reichenbach, and Kenneth Powers Williams.

Dr. Walter Edgell, Molecular Spectroscopist of Purdue University, gave the address on "Reflections on the Scientific Method."

The meeting was then adjourned for section meetings and lunch.

When the meeting reassembled, the report of the nominations committee was read and unanimously accepted. It is as follows: Officers: President, R. E. Cleland, Indiana University; Vice-President, A. T. Guard, Purdue University; Secretary, H. E. Crull, Butler University; Treasurer, Donald J. Cook, DePauw University; Editor, R. A. Laubengayer, Wabash College; Press Secretary, Frank N. Young, Jr., Indiana University.

New member and chairman of the Research Grant Committee is A. A. Lindsey. Those reelected and newly elected to the Bonding of Trustees Committee are Scott McCoy and F. J. Welcher.

Divisional Chairmen were selected as follows: Anthropology, George K. Newman, Indiana University; Bacteriology, Walter A. Zygmunt, Mead-Johnson Research Laboratory; Botany, Charles Heiser, Indiana University; Chemistry, Frank Welcher, Indiana University; Entomology, John Davis, Purdue University; Geology and Geography, R. W. Lounsbury, Purdue University; History of Science, Stephen Visser, Indiana University; Mathematics, G. N. Wollen, Purdue University; Physics, Marshall Dixon, Butler University; Plant Taxonomy, Scott McCoy, Technical High School, Indianapolis; Psychology, Charles Josey, Butler University; Soil Science, Carl W. Guernsey, West Lafayette, Purdue University; and Zoology, Forest Fuller, DePauw University.

It was voted that a note of appreciation be sent to Dr. and Mrs. Frank Welcher for their fine work as Treasurer.

It was announced that the Plant Taxonomy section and the Junior Academy would meet Saturday morning, November 8, 1958.

William Daily gave the presidential address entitled "In Search of Some Blue-Green Wanderers."

The meeting was then adjourned.

Respectfully submitted,

HARRY E. CRULL, Secretary

## NEW MEMBERS

Aczinowicz, Michael, R. R. 1, Box 62, Corydon, Ind.	Z
Badger, F. Sidney, 209 Forrest Dr., Kokomo, Ind.	
Baily, George William, 129 S. Grant St., W. Lafayette, Ind.	SS
Bass, Prof. T. C., 325 Smiley, W. Lafayette, Ind.	SS
Batts, Marion Monroe, R. R. 2, Jamestown, Ind.	C
Bertrand, Dr. Anson R., Agronomy Dept., Purdue Univ., W. Lafayette, Ind.	SS
Brown, Mr. Earle, 301 Caleb St., Salem, Ind.	Bo
Burton, Elmer M., 719 Sherman St., Oakland City, Ind.	Z
Cantin, Adelord Joseph, 708 S. 6th St., Terre Haute, Ind.	G
Clark, Mr. F. Bryan, 1521 15th St., Bedford, Ind.	Bo, SS
Damm, Dr. Henry C., 2328 Sycamore, Terre Haute, Ind.	Z
Danehy, James P., Box 31, Notre Dame, Ind.	C
Ferris, Dr. John M., Dept. of Entomology, Purdue Univ., W. Lafayette, Ind.	E
Galloway, Harry M., Room 3-417, Life Science Bldg., Purdue Univ., W. Lafayette, Ind.	SS
Goba, George B., Indiana Central College, Indianapolis 27, Ind.	Z
Golding, Harry Lawrence, 200 Olive St., Apt. No. 9, Greencastle, Ind.	C
Gosselink, Mrs. Evelyn M., Box 225, Hartford City, Ind.	G
Gosselink, Mr. John G., Box 225, Hartford City, Ind.	G
Green, Dr. Ralph J., 605 Vine St., W. Lafayette, Ind.	PT
Guernsey, Carl W., 921 Logan St., Lafayette, Ind.	G
Harwood, Daniel L., C. M. R. No. 8, Crawfordsville, Ind.	A, Z
Hayden, James F., 1053 N. 10th St., Noblesville, Ind.	Z
Hennen, Dr. Joe F., 425 N. 5th St., Terre Haute, Ind.	Bo, PT
Henry, Dr. Robert L., Wabash College, Crawfordsville, Ind.	Ph
Hess, Elmer B., Valparaiso Univ., Valparaiso, Ind.	G
Hyten, David Lawrence, 117 N. Green St., Brownsburg, Ind.	PT
Ingraham, Dr. Joseph S., 2121 N. Winfield, Indianapolis, Ind.	Ba
Johns, Dr. Robert M., Botany Dept., Indiana University, Bloomington, Ind.	Bo
Josey, Dr. Charles C., Butler University, Indianapolis, Ind.	Ps
Kallay, Dr. Ferencz Paul, Box 99, Valparaiso Univ., Valparaiso, Ind.	G
Kinsey, Philip Alan, Evansville College, Evansville, Ind.	C
Kirch, Dr. Robert Voss, 151 E. Hampton Dr., Indianapolis, Ind.	G
Levine, Dr. Alvin S., 5934 Grandview Dr., Indianapolis, Ind.	Ba
Meisel, Jay Lewis, 104 E. 4th St., New York 3, N. Y.	G
Messing, Ralph Allan, Ethicon Inc., Somerville, N. J.	C
Miles, Dr. Edward J., Geography Dept., Valparaiso Univ., Valparaiso, Ind.	G
Morrill, John Elliott, Mathematics Dept., DePauw Univ., Greencastle, Ind.	M
Motley, Miss Jerry Anne, 1726 N. Alabama St., Indianapolis, Ind.	
Murphy, Francis L., 155 E. New Albany, Vincennes, Ind.	Bo

Peri, Mrs. Barbara M., 901 E. Chicago St., Valparaiso, Ind.	Ba
Porter, Dr. Donald, 4105 S. Wigger St., Marion, Ind.	M
Powell, G. W. H., Evansville College, Evansville, Ind.	C
Richardson, Carolyn L., R. R. 3, Petersburg, Ind.	Z
Russell, Charles E., 5733 E. New York St., Indianapolis, Ind.	E, Z
Schnakenberg, G. H., Box 618, Indianapolis 6, Ind.	C
Shea, Gerald J., 427 Third Ave., Terre Haute, Ind.	G
Shinkle, Michael, 2112 Petty Road, Muncie, Ind.	E
Thomas, Robert Jay, 11 F. O. B., DePauw University, Greencastle, Ind.	M
Vincent, Nat H., 131 First Ave., Oakland City, Ind.	Z
Weller, Dr. Lowell E., 2051 E. Gum St., Evansville, Ind.	C
Workin, Martin D., 5924 Grandview, Indianapolis, Ind.	Ba
Yates, Marvin L., 521 N. Fess Ave., Bloomington, Ind.	C
Zimmerman, Dr. James R., 3701 Shelby, Apt. F-10, Indianapolis, Ind.	E
Zygmunt, Dr. Walter A., Research Labs., Mead Johnson & Co., Evansville, Ind.	Ba

## CHANGE OF ADDRESS

- Demaree, Delzie, 109 South Ave., Hot Springs, Ark.
- Bundy, Wayne H., George Kaolin Co., 433 N. Broad St., Elizabeth 3, N. J.
- Davis, Dr. Robert E., Chemistry Dept., Mass. Inst. Tech., Cambridge 39, Mass.
- Lefler, Prof. R. W., 115 W. Stadium, W. Lafayette, Ind.
- Edington, Mr. W. E., 703 E. Franklin St., Greencastle, Ind.
- Alexander, Mr. Paul Stephen, Tunghai University, Taichung, Taiwan
- Kaslow, Mr. Christian E., 414 Ballantine Rd., Bloomington, Ind.
- Reitz, Dr. Henry C., 701 Sugar Hill Dr., W. Lafayette, Ind.
- Waldschmidt, Mr. Rudolph Charles, 701 Chicago Ave., Valparaiso, Ind.
- Mumford, Mr. Russell E., Dept. of Forestry and Conservation, Purdue University, W. Lafayette, Ind.
- Erd, Mr. Richard C., U. S. Geol. Survey, 4 Homewood Pl., Menlo Park, Calif.
- Roth, Mr. Paul L., R. R. 1, Manhattan, Kansas.
- Inlow, Mr. Paul M., 2128 Winfield Ave., Indianapolis, Ind.
- Webb, Miss Laura B., 1010 Orchard Lane, Franklin, Ind.
- Cartwright, Mr. William B., Box 454, W. Lafayette, Ind.
- Parker, Dr. Dorothy, The Rockefeller Foundation, 49 W. 49th St., New York 20, N. Y.
- McCormick, Dr. Jack, The American Museum of Natural History, New York 24, N. Y.

# INDIANA JUNIOR ACADEMY OF SCIENCE

## OFFICERS FOR 1958



Officers of the Junior Academy: l. to r. Terry Myers, Vice-President, Lebanon High School, Lebanon; Tom Joyce, President, Central Junior-Senior High School, South Bend; Judy Francisco, Secretary, New Castle High School, New Castle.

President: TOM JOYCE, Science Club, Central Junior-Senior High School, South Bend.

Vice-President: TERRY MYERS, Junior Explorers of Science, Lebanon High School, Lebanon.

Secretary: JUDY FRANCISCO, Science Club, New Castle High School, New Castle.

Members of the Council: Jerry Motley, Indianapolis (1954-1958); Mrs. Mary Gough, New Castle (1955-1959); Ernest Litweiler, South Bend (1956-1960); Mrs. Elizabeth H. Crider, Indianapolis (1957-1961); Robert Weber, Fort Wayne (1958-1962).

### PROGRAM OF THE TWENTY-SIXTH ANNUAL MEETING

NOVEMBER 8, 1958

Assembly Room, Auditorium, Marian College, Indianapolis, Indiana.

8:30-9:45 a.m. Registration in Foyer of Auditorium and Placement of Exhibits, Room 153, Scotus Hall.

9:45-10:00 a.m. General Assembly, Auditorium.

Welcome to Marian College, Sister Mary Olivia, Dean of the College.

10:00-11:00 a.m. Career Conferences in Science and Mathematics by faculty representatives of Marian College.

11:00-12:00 noon. Visits to Instructional Facilities and Laboratories of Marian College.

12:15-1:15 p.m. Luncheon at the Cafeteria.

1:15-2:00 p.m. Business Meeting. Election of Officers and Presentation of the Kroger Awards, Auditorium.

2:00-4:15 p.m. The Assembly Program, Auditorium.

**Papers:** Tom Joyce, presiding.

1. Effect of Chemicals on Paramecia, Alice Quinlan and Elaine Merker, Science Club, Reitz Memorial High School, Evansville.
2. Electrically Driven, Punched Tape-Controlled Robot, John Winkelmann, Adams Walton Club, John Adams High School, South Bend.
3. Relation of Zone Inhibition to Activity of Antibiotics Patricia A. Coleman, Science Club, Washington High School, Indianapolis.
4. Device for Automatic Crystallization of Soluble Salts, Thomas E. Joyce, Science Club, Central Junior-Senior High School, South Bend.
5. Conditioning of *Escherichia coli* by Ultra-Violet Radiation, Carol Tetzlaff, Adams Walton Club, John Adams High School, South Bend.
6. A Study of *Citellus tridecemlineatus*, Fred Kuemmerle, Adams Walton Club, John Adams High School, South Bend.
7. The Effect of Temperature and Concentration of an Acid on E.M.F., Nicholas J. Kira (illustrated), Science Club, Washington High School, Indianapolis.
8. Applications of Kepler's Laws, John Hirshfelder, Albertus Magnus Science Club, Central Catholic High School, Fort Wayne.
9. Experiments in Crystal Growth, Joe Strain, Science Club, Howe High School, Indianapolis.
10. Principles of Servo-Mechanism, Edward Foster, Albertus Magnus Science Club, Central Catholic High School, Fort Wayne.
11. A Key to the Identification of Some United States Minerals with Special Emphasis on Their Chemical Properties, William Forgey, Biology Club, Lew Wallace High School, Gary.
12. The Effect of Light and Color on Photosynthesis, Terence Hooten, Aquinas Science Club, Washington Catholic High School, Washington.
13. Transmission of Sound Through Earth Materials, Donald Soderberg, Science Club, Central Junior-Senior High School, South Bend.

14. Control of Stream Pollution, Judith Bateman and Diana Mattingly, Aquinas Science Club, Washington Catholic High School, Washington.
15. The Effect of Various Compounds on the Multiplication Rate of *Escherichia coli*, David McMullen, Junior Academy of Science Club, University High School, Bloomington.
16. Effectiveness of Metals on Inhibitory Action of Kanamycin, Judith I. Brooks, National Scientific Honor Society, Bloomington High School, Bloomington.

### MINUTES

The twenty-sixth annual meeting of the Indiana Junior Academy of Science was held Saturday, November 8, 1958, in the Auditorium of Marian College, Indianapolis, Indiana.

Fifteen exhibits of science projects by high school students were displayed in room 153, Scotus Hall. The exhibits included the following: The Effect of Light and Color on Photosynthesis; Relation of Zone Inhibition to Certain Antibiotics; A Key for the Identification of Some Twenty-five Minerals With Special Emphasis on their Chemical Properties; Punched Taped-Controlled Robot; Demonstration of Luminescence; Causes, Effects and Control of Pollution; The Transmission of Sound Through Earth Materials; A Device for the Automatic Crystallization of Soluble Salts; Allen County Insects; *Drosophila*—Key to Irradiation Effects; The Effects of Temperature and Concentration of an Electrolyte on the Amperage and Voltage; Jacob's Ladder; Stem Structure; Double Acting Steam Engine and A.C. Generator; and The Effect of Chemicals on *Paramecia*.

Career conferences in science and mathematics were held at 10:00 a.m. by members of the faculty of Marian College. The science areas from which students could choose included bacteriology, botany, chemistry, geography, geology, mathematics, physics, psychology, and zoology. The contributions by the Marian College staff were greatly appreciated by the members of the Junior Academy. Faculty members who presented the career conferences also conducted tours through the instructional facilities and science laboratories of the college.

The annual business meeting was called to order at 1:15 p.m. in the Auditorium by the president, Tom Joyce of Central Junior-Senior High School, South Bend. The roll of Junior Academy of Science Clubs was called by the Secretary, Judy Francisco, New Castle High School, and new clubs for 1958 were welcomed as members of the Junior Academy.

It was announced that five new clubs were added in 1958 which included the Science Club, Reitz Memorial High School, Evansville; the Bi-Phi-Chem Club, LaPorte High School, LaPorte; the Sigma Tau Science Club, Saint Rose Academy, Vincennes; the Sigma Mu Science Club, Franklin Township High School, Wanamaker; and the Aquinas Science Club, Washington Catholic High School, Washington.

Mr. Harry McDaniel, Indianapolis Kroger Division, was introduced next to present the first annual Kroger awards. Mr. McDaniel gave an

excellent, brief explanation of Kroger's interest in high school science programs. A top award of fifty dollars and a plaque were presented to Shortridge High School, Indianapolis. Two runner-up awards of twenty-five dollars and a plaque were presented to both the University High School, Bloomington and to the Thomas Carr Howe High School, Indianapolis. The Kroger awards were given to the three high schools that showed evidence of the best science programs based on questionnaires prepared by the Junior Academy Council.

The next item of the business meeting was the election of officers. The list of nominees was submitted by the Council from names received from club sponsors and nominations were accepted also from the floor. The officers for 1959 were elected as follows: president, William Schall, Central Junior-Senior High School, South Bend; vice-president, Sheldon McCullum, Our Lady of Providence High School, Clarksville; secretary, Nancy Davis, Shawe Memorial High School, Madison.

Miss Jerry Motley, reporting for the Council, announced that Sister Mary Blanche, sponsor of the Aquinas Science Club, Washington Catholic High School, Washington, was named as the new Council member to replace Miss Motley whose term expired.

Miss Judith I. Brooks, National Scientific Honor Society, Bloomington High School, was given a special award of twenty-five dollars for the best paper on bacteriology. The title of her winning paper was "The Effectiveness of Metals on Inhibitory Action of Kanamycin." The annual award was presented by Dr. Robert Fletcher, DePauw University, on behalf of the American Society of Bacteriologists.

Awards for the "best boy" and "best girl" in science were received by Tom Joyce, Central Junior-Senior High School, South Bend, and Hazel Cuffey, University High School, Bloomington, respectively. A certificate of merit was presented to each together with a year's membership in the American Association for the Advancement of Science.

Professor H. H. Michaud, State Sponsor, Purdue University, expressed appreciation on behalf of the Junior Academy of Science for the excellent cooperation of Marian College in providing facilities for the annual meeting. Also, he stated that Sister Marie Bernard deserved special mention for her efforts in helping to make the 1958 meeting a success. Professor Michaud announced that the 1959 annual meeting will be held at Butler University, Indianapolis.

Miss Jerry Motley, retiring Council member, was commended for her splendid contribution to the Junior Academy of Science in preparing the issues of the Junior Academy Journal.

Alice Quinlan and Elaine Merker, Reitz Memorial High School, Evansville, opened the afternoon program of papers with a talk on "The Effect of Chemicals on Paramecia." The purpose of the project was to find what effect different germicides had on paramecia. Germicides used were nitric acid, mercuric chloride and copper sulfate. Only copper sulfate and mercuric chloride proved effective.

"Electrically Driven, Punched Tape-Controlled Robot" was the title of a paper given by John Winkelmann, John Adams High School, South Bend. It was explained that robots are being used more and more in industry. Tape control allows robots to work without remote control

and without the guidance of man. The tape is punched according to what the robot can and is supposed to do. The robots have an electric brain which interprets the impulses from the tape and thus operates the robot.

Patricia A. Coleman, Washington High School, Indianapolis, presented a paper on "The Relation of Zone Inhibition to Activity of Antibiotics." The antibiotic spectrum of both *Bacillus Subtilis* and *Escherichia coli* were observed with the use of the antibiotics of the myacin family. All proved successful in stopping the growth of the bacteria studied. However, as the antibiotic became older they became less effective which was probably due to degeneration of the antibiotic.

"A Device for Automatic Crystallization of Soluble Salts" was the topic discussed by Thomas E. Joyce, Central Junior-Senior High School, South Bend. Tom explained that the object of the project was to build a device by which the conditions for growing crystals could be controlled. The apparatus built was controlled by a mercury switch, connected with solenoid, which could make or break the electrical connection with the heating element when the temperature changed.

"A Study of *Citellus tridecemlineatus*" was presented by Fred Kuemmerle, John Adams High School, South Bend. Fred explained that this species of mammal was commonly known as a ground squirrel. The mode of living and other features of the rodent were described. One interesting feature mentioned was that during hibernation the body temperature may get as low as 3 degrees Centigrade.

The next paper on "The Effect of Temperature and Concentration on an Acid on E.M.F." was given by Nicholas J. Kira, Washington High School, Indianapolis. Nicholas said that electromotive force is the resistance of materials to the current of electricity through it. A chart was used to show the effect of the temperature and the concentration of the acid. This indicated that resistance went down while the voltage did not appear to vary much when the concentration and temperature were increased.

John Hirshfelder, Central Catholic High School, Fort Wayne, spoke on the topic, "Applications of Kepler's Laws." The mathematical equations of Kepler's Laws for determining the distances between the sun and the planets of the solar system were explained.

"Experiments in Crystal Growth" was the title presented by Joe Strain, Howe High School, Indianapolis. It was explained that crystals of the same materials grow into the same shape and size under normal conditions, but it was found that when conditions are altered the size and shape of crystals can be changed. Refrigeration, incubation at room temperatures, rocking containers, and dyes were some of the modifications of factors that altered the shape and size of crystals.

"Principles of Servo-Mechanism" was explained by Edward Foster, Central Catholic High School, Fort Wayne. A servo-mechanism, Edward said, was a type of motor that is very useful in such equipment as power steering and power brakes in automobiles.

"A Key to the Identification of Some United States Minerals with Special Emphasis on Their Chemical Properties," was presented by William Forgey, Lew Wallace High School, Gary. William explained

that the key was divided into two parts. For the first part, it was necessary to break up the minerals into small particles so they could be identified according to color, reagents, hardness, streaks, crystal structure, occurrence, and peculiar properties. The second part of the key is similar but adds information on where the minerals could be found.

The next paper on "The Effect of Light and Color on Photosynthesis," was given by Terence Hooten, Washington Catholic High School, Washington. Three experiments were performed to determine the relation of light to photosynthesis. In the first, certain colors in sunlight were filtered out before the light fell on the plants. Results showed that the filtered colors—blue, red, green, and yellow—were important to the plants in the order named. A second experiment proved that sturdiness of plants was related to the same colors. A third test showed that plants were unable to survive without light.

"Transmission of Sound Through Earth Materials," was presented by Donald Soderberg, Central Junior-Senior High School, South Bend. Donald explained that sound varies according to the material through which it passes. The purpose of the project was to determine the velocity of sound in different earth materials. The velocity of sound in subterranean soil and rocks was recorded with an oscilloscope. They were then catalogued according to their velocity.

Judith Bateman and Diana Mattingly, Washington Catholic High School, Washington, spoke next on "Control of Stream Pollution." They pointed out that dumping organic wastes into streams causes decomposition by bacteria. This, in turn, upsets the aquatic food chain by diminishing the supply of oxygen. It was suggested that pollution be controlled by restoring plants, soil and planting trees around water areas; and by filtering water through sand and gravel; and by building dams.

"The Effect of Various Compounds on the Multiplication Rate of *Escherichia coli*," was the topic discussed by David McMullen, University High School, Bloomington. David said that bacteria are needed in large quantities for industrial purposes as in the making of rubber. However, it is difficult to grow bacteria in quantities to meet the demand. Different compounds were used in an attempt to increase the reproductive rate of the bacteria. Root hormones, puric acid, manganese sulfate and ascorbic acid were tried. The results were as follows: root hormone proved one and one half times affective, puric acid one time as affective manganese sulfate seven times unaffactive, and with ascorbic acid the rate remained the same.

The final paper on "The Effectiveness of Metals on Inhibitory Action of Kanamycin," was given by Judith I. Brooks, Bloomington High School, Bloomington. Judith found that calcium, cobalt, magnesium, and manganese were metals that could be used to cause inhibitory action.

Four hundred and seventeen science club members, sponsors and guests registered for the 1958 annual meeting. This represented the largest attendance of any previous meeting with the exception of the

year the Junior Academy of Science combined with the Purdue Sci-Math Assembly. There are currently fifty-three high school science clubs affiliated with the Junior Academy.

JUDY FRANCISCO, Secretary

## INDIANA JUNIOR ACADEMY OF SCIENCE

FALL 1958

<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)	
3. Bloomington	H. S., National Scientific Honor Society (1931)	Harold A. Stewart
4. Bloomington	University H. S., Jr. Academy (1938)	E. Wayne Gross
5. Chesterton	H. S., Science (1954)	Robert McCord
6. Clarksville	Our Lady of Providence H. S., Phy-Chem (1956)	Sister Janet
7. Clayton	H. S., Jr. Academy (1951)	Howard C. Lewis
8. Crawfordsville	H. S., Up-N-Atom (1950)	David Wells
9. Edinburg	H. S., The Alchemists (1954)	S. C. Harrell
10. Elkhart	H. S., Jr. Academy (1940)	Robert Mahan
11. Evansville	Reitz Memorial H. S., Science (1958)	Sister Jean Margaret
12. Fort Wayne	Central H. S., Biology (1940)	Iva Spangler
13. Fort Wayne	Cental Catholic H. S., Albertus Magnus Science (1952)	Sister Anne Pauline
14. Fort Wayne	Elmhurst H. S., Phy-Chem (1935)	Ruth Wimmer
15. Fort Wayne	North Side H. S., Nature (1936)	Vesta Thompson
16. Fort Wayne	South Side H. S., Jr. Academy (1956)	Don Weaver Robert Weber
17. Gary	Calumet Twp. H. S., Science (1952)	
18. Gary	Edison H. S., Beaker Breakers (1949)	Martha B. Connor
19. Gary	Lew Wallace H. S., Biology (1935)	Lola Lemon
20. Gary	Lew Wallace H. S., Klub Kem (1941)	Helen McKenzie
21. Gary	Tolleston H. S., Biology (1952)	Mr. Moore John Reidel
22. Gary	Tolleston H. S., Future Scientists of America (1949)	

<i>Town</i>	<i>School and Club</i>	<i>Sponsor</i>
23. Gary	Wirt H. S., Biology (1945)	Frances Huddleston
24. Gas City	Mississinewa Joint H. S., Science (1936)	Roy McKee
25. Griffith	H. S., Science (1953)	George M. Bunce
26. Hamlet	H. S., Science (1954)	Lawrence Cushman
27. Hammond	Morton Jr. H. S., Science (1949)	
28. Hobart	H. S., Science (1952)	Lola Stewart
29. Indianapolis	Ladywood School, Guerin Science (1957)	Sister Mary Pius
30. Indianapolis	Shortridge H. S., Naturalist's Club (1947)	Robert A. Weaver
31. Indianapolis	Shortridge H. S., Science (1931)	Henrietta A. Parker
32. Indianapolis	Technical H. S., Nature (1932)	Charles A. Russell
33. Indianapolis	Howe H. S., Science (1949)	Jerry Motley
34. Indianapolis	Washington H. S., Science (1931)	Elizabeth H. Crider
35. LaPorte	H. S., Bi-Phi-Chem (1958)	Francis M. Gourley Byron Bernard Tom Fisher
36. Lebanon	H. S., Jr. Explorers of Science (1953)	Helen E. Reed
37. Madison	Shawe Memorial H. S. Science (1957)	Theodore A. Winkel
38. Marion	Martin Boots Jr. H. S., Biology (1953)	John Clevenger
39. Mishawaka	H. S., Science (1936)	Darl F. Wood
40. New Albany	H. S., Science (1935)	Erwin Steinkamp
41. New Castle	H. S., Science (1947)	Betty Jo Montag
42. New Haven	H. S., Phi-Chi (1954)	Keith Hunnings
43. Richmond	H. S., Science (1950)	Von C. Alexander
44. Rossville	H. S., Science (1954)	Martin Silverthorn
45. Sandborn	H. S., Up and Atom (1954)	Paul D. Carter
46. South Bend	Central H. S., Science (1939)	V. C. Cripe
47. South Bend	Adams H. S., Adams Walton (1953)	Ernest Litweiler
48. Sullivan	H. S., Camera (1939)	Ruth Hinkle
49. Terre Haute	State H. S., Senior Science (1939)	Russell McDougal
50. Valparaiso	H. S., Science (1931)	
51. Vincennes	St. Rose Academy, Sigma Tau (1958)	Sister Suzanne
52. Wanamaker	Franklin Twp. H. S., Sigma Mu (1958)	Jerry M. Colglazier
53. Washington	Catholic H. S., Aquinas Science (1958)	Sister Mary Blanche