

PROCEEDINGS

OF THE

Indiana Academy of Science

1920

FRED J. BREEZE, EDITOR

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BOTANICAL
GARDEN

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CONSTITUTION.

ARTICLE I.

SECTION 1. This association shall be called the Indiana Academy of Science.

SEC. 2. The objects of this Academy shall be scientific research and the diffusion of knowledge concerning the various departments of science; to promote intercourse between men engaged in scientific work, especially in Indiana; to assist by investigation and discussion in developing and making known the material, educational and other sources and riches of the State; to arrange and prepare for publication such reports of investigation and discussion as may further the aims and objects of the Academy as set forth in these articles.

WHEREAS, The State has undertaken the publication of such proceedings, the Academy will, upon request of the Governor, or one of the several departments of the State, through the Governor, act through its council as an advisory body in the direction and execution of any investigation within its province as stated. The necessary expenses incurred in the prosecution of such investigation are to be borne by the State; no pecuniary gain is to come to the Academy for its advice or direction of such investigation.

The regular proceedings of the Academy as published by the State shall become a public document.

ARTICLE II.

SECTION 1. Members of this Academy shall be honorary fellows, fellows, non-resident members, and active members.

SEC. 2. Any person engaged in any department of scientific work, or in any original research in any department of science, shall be eligible to active membership. Active members may be annual or life members. Annual members may be elected at any meeting of the Academy; they shall sign the constitution, pay an admission fee of two dollars and thereafter an annual fee of one dollar. Any person who shall at one time contribute fifty dollars to the funds of this Academy may be elected a life member of the Academy, free of assessment. Non-resident members may be elected from those who have been active members but who have removed from the State. In any case, a three-fourths vote of the members present shall elect to membership. Application for membership in any of the foregoing classes shall be referred to a committee on application for membership, who shall consider such application and report to the Academy before the election.

SEC. 3. The members who are actively engaged in scientific work, who have recognized standing as scientific men, and who have been members of the Academy at least one year, may be recommended for nomination for election as fellows by three fellows or members personally acquainted with their work and character. Of members so nominated a number not exceeding five in one year may, on recommendation of the Executive Committee, be elected as fellows. At the meeting at which this is adopted, the members of the Executive Committee for 1894 and fifteen others shall be elected fellows, and those now honorary members shall become honorary fellows. Honorary fellows may be elected on account of special prominence in science, on the written recommendation of two members of the Academy. In any case a three-fourths vote of the members present shall elect.

ARTICLE III.

SECTION 1. The officers of this Academy shall be chosen by ballot at the annual meeting, and shall hold office one year. They shall consist of a President, Vice-President, Secretary, Assistant Secretary, Press Secretary, Editor, and Treasurer, who shall perform the duties usually pertaining to their respective offices and in addition, with the ex-Presidents of the Academy, shall constitute an Executive Committee. The President shall, at each annual meeting, appoint two members to be a committee which shall prepare the programs and have charge of the arrangements for all meetings for one year.

SEC. 2. The annual meeting of the Academy shall be held in the city of Indianapolis within the week following Christmas of each year, unless otherwise ordered by the Executive Committee. There shall also be a summer meeting at such time and place as may be decided upon by the Executive Committee. Other meetings may be called at the discretion of the Executive Committee. The past President, together with the officers and Executive Committee, shall constitute the council of the Academy, and represent it in the transaction of any necessary business not especially provided for in this constitution, in the interim between general meetings.

SEC. 2. This constitution may be altered or amended at any annual meeting by a three-fourths majority of the attending members of at least one year's standing. No question of amendment shall be decided on the day of its presentation.

BY-LAWS:

1. On motion, any special department of science shall be assigned to a curator, whose duty it shall be, with the assistance of the other members interested in the same department, to endeavor to advance knowledge in that particular department. Each curator shall report at such time and place as the Academy shall direct. These reports shall include a brief summary of the progress of the department during the year preceding the presentation of the report.

2. The President shall deliver a public address on the morning of one of the days of the meeting at the expiration of his term of office.

3. The Press Secretary shall attend to the securing of proper newspaper reports of the meetings and assist the Secretary.

4. No special meeting of the Academy shall be held without a notice of the same having been sent to the address of each member at least fifteen days before such meeting.

5. No bill against the Academy shall be paid without an order signed by the President and countersigned by the Secretary.

6. Members who shall allow their dues to remain unpaid for two years, having been annually notified of their arrearage by the Treasurer, shall have their names stricken from the roll.

7. Ten members shall constitute a quorum for the transaction of business.

8. An Editor shall be elected from year to year. His duties shall be to edit the annual Proceedings. No allowance shall be made to the Editor for clerical assistance on account of any one edition of the Proceedings in excess of fifty (\$50) dollars, except by special action of the Executive Committee. (Amendment passed December 8, 1917.)

AN ACT TO PROVIDE FOR THE PUBLICATION OF THE REPORTS
AND PAPERS OF THE INDIANA ACADEMY OF SCIENCE.

(Approved March 11, 1895.)

WHEREAS, The Indiana Academy of Science, a chartered scientific association, has embodied in its constitution a provision that it will, upon the request of the Governor, or of the several departments of the State government, through the Governor, and through its council as an advisory board, assist in the direction and execution of any investigation within its province without pecuniary gain to the Academy, provided only that the necessary expenses of such investigation are borne by the State; and,

WHEREAS, The reports of the meetings of said Academy, with the several papers read before it, have very great educational, industrial and economic value, and should be preserved in permanent form; and,

WHEREAS, The Constitution of the State makes it the duty of the General Assembly to encourage by all suitable means intellectual, scientific and agricultural improvement; therefore,

SECTION 1. *Be it enacted by the General Assembly of the State of Indiana,* That hereafter the annual reports of the meetings of the Indiana Academy of Science, beginning with the report for the year 1894, including all papers of scientific or economic value, presented at such meetings, after they shall have been edited and prepared for publication as hereinafter provided, shall be published by and under the direction of the Commissioners of Public Printing and Binding.

SEC. 2. Said reports shall be edited and prepared for publication without expense to the State, by a corps of editors to be selected and appointed by the Indiana Academy of Science, who shall not, by reason of such service, have any claim against the State for compensation. The form, style of binding, paper, typography and manner and extent of illustration of such reports shall be determined by the editors, subject to the approval of the Commissioners of Public Printing and Stationery. Not less than 1,500 nor more than 3,000 copies of each of said reports shall be published, the size of the edition within said limits to be determined by the concurrent action of the editors and the Commissioners of Public Printing and Stationery: *Provided,* That not to exceed six hundred dollars (\$600) shall be expended for such publication in any one year, and not to extend beyond 1896: *Provided,* That no sums shall be deemed to be appropriated for the year 1894.

SEC. 3. All except three hundred copies of each volume of said reports shall be placed in the custody of the State Librarian, who shall furnish one copy thereof to each public library in the State, one copy to each university, college or normal school in the State, one copy to each high school in the State having a library, which shall make application therefor, and one copy to such other institutions, societies or persons as may be designated by the Academy through its editors or its council. The remaining three hundred copies shall be turned over to the Academy to be disposed of as it may determine. In order to provide for the preservation of the same it shall be the duty of the Custodian of the State House to provide

and place at the disposal of the Academy one of the unoccupied rooms of the State House, to be designated as the office of the Academy of Science, wherein said copies of said reports belonging to the Academy, together with the original manuscript, drawings, etc., thereof can be safely kept, and he shall also equip the same with the necessary shelving and furniture.

SEC. 4. An emergency is hereby declared to exist for the immediate taking effect of this act, and it shall therefore take effect and be in force from and after its passage.

PUBLIC OFFENSES—HUNTING WILD BIRDS—PENALTY.

(Approved March 15, 1913.)

SECTION 1. *Be it enacted by the General Assembly of the State of Indiana,* That section six (6) of the above entitled act be amended to read as follows: Section 6. That section six hundred two (602) of the above entitled act be amended to read as follows: Section 602. It shall be unlawful for any person to kill, trap or possess any wild bird, or to purchase or offer the same for sale, or to destroy the nest or eggs of any wild bird, except as otherwise provided in this section. But this section shall not apply to the following named game birds: The Anatidae, commonly called swans, geese, brant, river and sea duck; the Rallidae, commonly known as rails, coots, mud-hens and gallinules; the Limicolae, commonly known as shore birds, plovers, surf birds, snipe, woodcock, sandpipers, tattlers and curlews; the Gallinae, commonly called wild turkeys, grouse, prairie chickens, quails, and pheasants; nor to English or European house sparrows, blackbirds, crows, hawks or other birds of prey. Nor shall this section apply to any person taking birds or their nests or eggs for scientific purposes under permit as provided in the next section. Any person violating the provisions of this section shall, on conviction, be fined not less than ten dollars (\$10.00) nor more than fifty dollars (\$50.00).

AN ACT TO PROVIDE FOR THE PRINTING AND PUBLICATION OF THE PROCEEDINGS AND PAPERS OF THE INDIANA ACADEMY OF SCIENCE, AND APPROPRIATING MONEY THEREFOR.

(H. 294. Approved March 11, 1921.)

SECTION 1. *Be it enacted by the General Assembly of the State of Indiana,* That beginning with the first day of October, 1921, and annually thereafter, there is appropriated the sum of twelve hundred (\$1,200) dollars, said moneys to be used to pay for the printing of the proceedings and papers of the Indiana Academy of Science, provided that any unexpended balance of any of said sums shall be carried forward and be available for the use of said academy for future years.

INDIANA ACADEMY OF SCIENCE.

OFFICERS, 1920

President,

H. L. BRUNER.

Vice-President,

WM. A. MCBETH.

Secretary,

HOWARD E. ENDERS.

Assistant Secretary,

R. M. HOLMAN.

Press Secretary,

FRANK B. WADE.

Treasurer,

WILLIAM M. BLANCHARD.

Editor,

FRED J. BREEZE, 1920 Proceedings.

Executive Committee:

ARTHUR, J. C.,	COULTER, STANLEY,	MEES, CARL L.,
BIGNEY, A. J.,	CULBERTSON, GLENN,	MOENKHAUS, W. J.,
BLANCHARD, W. M.,	DRYER, CHAS. R.,	MOTTIER, DAVID M.,
BLATCHLEY, W. S.	EIGENMANN, C. H.,	MENDENHALL, T. C.,
BRANNER, J. C.,	ENDERS, HOWARD E.,	NAYLOR, JOSEPH P.,
BREEZE, F. J.,	EVANS, P. N.,	NOYES, W. A.,
BRUNER, H. L.,	FOLEY, A. L.,	WADE, F. B.,
BURRAGE, SEVERANCE,	HAY, O. P.,	WALDO, C. A.,
BUTLER, AMOS W.,	HESSLER, ROBERT,	WILEY, H. W.,
COGSHALL, W. A.,	JORDAN, D. S.,	WILLIAMSON, E. B.,
COULTER, JOHN M.,	MCBETH, W. A.,	WRIGHT, JOHN S.,

Curators:

BOTANY.....	J. C. ARTHUR.
ENTOMOLOGY.....	W. S. BLATCHLEY.
HERPETOLOGY	}..... A. W. BUTLER.
MAMMALOLOGY	
ORNITHOLOGY	
ICHTHYOLOGY.....	C. H. EIGENMANN

COMMITTEES ACADEMY OF SCIENCE, 1920

Program.

RAY C. FRIESNER, Butler College,
Indianapolis.
STANLEY COULTER, Lafayette.
E. R. CUMMINGS, Bloomington.

Nominations.

E. B. WILLIAMSON, Bluffton.
W. J. MOENKHAUS, Bloomington.
J. P. NAYLOR, Greencastle.

State Library.

AMOS W. BUTLER, State House, In-
dianapolis.
W. S. BLATCHLEY, 1558 Park Ave.,
Indianapolis.
A. L. FOLEY, Bloomington.

Biological Survey.

HERBERT S. JACKSON, Agr. Exper.
Station, West Lafayette.
RICHARD LIEBER, State House, In-
dianapolis.
RICHARD M. HOLMAN, Crawfords-
ville.
WILL SCOTT, Bloomington.

Advisory Board.

JOHN S. WRIGHT,
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STANLEY COULTER,
WILBUR COGSHALL.

*Academy Foundation
Trustees.*

AMOS W. BUTLER,
ROBERT HESSLER.

Directors of Research.

H. L. BRUNER,
R. W. McBRIDE,
JOHN S. WRIGHT,
GLENN CULBERTSON,
A. L. FOLEY,

Membership.

F. M. ANDREWS, Bloomington.
C. A. BEHRENS, West Lafayette.
A. D. THORBURN, Indianapolis.

Auditing.

E. B. WILLIAMSON, Bluffton.
ROLLO RAMSEY, Bloomington.

*Relation of the Academy to
the State.*

R. W. McBRIDE, 1239 State Life
Building, Indianapolis.
GLENN CULBERTSON, Hanover.
AMOS W. BUTLER, Indianapolis.
JOHN S. WRIGHT, 3718 Penna. St.,
Indianapolis.
W. W. WOOLLEN, Indianapolis.
D. A. POTHROCK, Bloomington.

Publication of Proceedings.

F. PAYNE, Editor, 1919.
J. A. BADERTSCHER, Bloomington.
D. M. MOTTIER, Bloomington.
GEO. N. HOFFER, West Lafayette.
FRED J. BREEZE, Editor, 1920.

Distribution of Proceedings.

HOWARD E. ENDERS, West Lafayette.
WM. M. BLANCHARD, Greencastle.
E. R. CUMMINGS, Bloomington.
AUTE RICHARDS, Crawfordsville.

Archaeological Survey.

FRANK B. WYNN, Indianapolis.
R. W. McBRIDE, Indianapolis.
W. N. LOGAN, Bloomington.
ALLEN D. HOLE, Richmond.
STANLEY COULTER, Lafayette.
CHAS. STOLTZ, South Bend.
H. B. VORHEES, Fort Wayne.
A. J. BIGNEY, Evansville.
GLENN CULBERTSON, Hanover.
W. A. McBETH, Terre Haute.
S. F. BALCOM, Indianapolis.

OFFICERS OF THE INDIANA ACADEMY OF SCIENCE.

YEARS.	PRESIDENT.	SECRETARY.	ASST. SECRETARY.	PRESS SECRETARY.	TREASURER.
1885-1886	David S. Jordan.	Amos W. Butler.			O. P. Jenkins.
1886-1887	John M. Coulter.	Amos W. Butler.			O. P. Jenkins.
1887-1888	J. P. D. John.	Amos W. Butler.			O. P. Jenkins.
1888-1889	John C. Branner.	Amos W. Butler.			O. P. Jenkins.
1889-1890	T. C. Mendenhall.	Amos W. Butler.			O. P. Jenkins.
1890-1891	O. P. Hay.	Amos W. Butler.			O. P. Jenkins.
1891-1892	J. L. Campbell*.	Amos W. Butler.			O. P. Jenkins.
1892-1893	J. C. Arthur.	Amos W. Butler.	Stanley Coulter		C. A. Waldo.
			W. W. Norman		C. A. Waldo.
1893-1894	W. A. Noyes.	C. A. Waldo.	W. W. Norman.		W. P. Shannon.
1894-1895	A. W. Butler.	John S. Wright.	A. J. Bigney.		W. P. Shannon.
1895-1896	Stanley Coulter.	John S. Wright.	A. J. Bigney.		W. P. Shannon.
1896-1897	Thomas Gray*.	John S. Wright.	A. J. Bigney.		W. P. Shannon.
1897-1898	C. A. Waldo.	John S. Wright.	A. J. Bigney.	Geo. W. Benton.	J. T. Seovell.
1898-1899	C. H. Eigenmann.	John S. Wright.	E. A. Schultz.	Geo. W. Benton.	J. T. Seovell.
1899-1900	D. W. Dennis*.	John S. Wright.	E. A. Schultz.	Geo. W. Benton.	J. T. Seovell.
1900-1901	M. B. Thomas*.	John S. Wright.	E. A. Schultz.	Geo. W. Benton.	J. T. Seovell.
1901-1902	Harvey W. Wiley.	John S. Wright.	Donaldson Bodine.	Geo. W. Benton.	J. T. Seovell.
1902-1903	W. S. Blatchley.	John S. Wright.	Donaldson Bodine.	G. A. Abbott.	W. A. McBeth.
1903-1904	C. L. Mees.	John S. Wright.	J. H. Ransom.	G. A. Abbott.	W. A. McBeth.
1904-1905	John S. Wright.	Lynn B. McMullen.	J. M. Ransom.	G. A. Abbott.	W. A. McBeth.
1905-1906	Robert Hessler.	Lynn B. McMullen.	J. H. Ransom.	Charles R. Clark.	W. A. McBeth.
1906-1907	D. M. Mottier.	Lynn B. McMullen.	J. M. Ransom.	G. A. Abbott.	W. A. McBeth.
1907-1908	Glenn Culbertson.	J. H. Ransom.	A. J. Bigney.	G. A. Abbott.	W. A. McBeth.
1908-1909	A. L. Foley.	J. H. Ransom.	A. J. Bigney.	G. A. Abbott.	W. A. McBeth.
1909-1910	P. N. Evans.	Geo. W. Benton.	A. J. Bigney.	J. W. Woodhams.	W. J. Moenkhaus.
1910-1911	C. R. Dryer.	A. J. Bigney.	E. B. Williamson.	Milo H. Stuart.	W. J. Moenkhaus.
1911-1912	J. P. Naylor.	A. J. Bigney.	E. B. Williamson.	Milo H. Stuart.	W. J. Moenkhaus.
1912-1913	*Donaldson Bodine.	A. J. Bigney.	C. M. Smith.	F. B. Wade.	W. J. Moenkhaus.
1913-1914	Severance Burrage.	A. J. Bigney.	H. E. Enders.	F. B. Wade.	W. A. Cogshall.
1914-1915	Wil. A. Cogshall.	A. J. Bigney.	H. E. Enders.	F. B. Wade.	Wm. M. Blanchard.
1915-1916	A. J. Bigney.	Howard E. Enders.	E. B. Williamson.	F. B. Wade.	Wm. B. Blanchard.
1916-1917	W. J. Moenkhaus.	Howard E. Enders.	P. A. Tetrault.	F. B. Wade.	Wm. M. Blanchard.
1917-1918	E. B. Williamson.	Howard E. Enders.	P. A. Tetrault.	F. B. Wade.	Wm. M. Blanchard.
†1918-1919	E. B. Williamson.	Howard E. Enders.	P. A. Tetrault.	F. B. Wade.	Wm. M. Blanchard.
1919-1920	H. L. Bruner.	Howard E. Enders.	R. E. Holman.	F. B. Wade.	Wm. M. Blanchard.
1920-1921	Howard E. Enders.	Walter N. Hess.	Harry A. Dietz.	F. B. Wade.	Wm. M. Blanchard.

*Deceased.

†Officers continued—Annual meeting not held because of influenza epidemic.

MEMBERS.*

FELLOWS.

Andrews, F. M., 110 E. 10th St., Bloomington.....	†1911
Associate Professor of Botany, Indiana University.	
Plant Physiology, Botany.	
Arthur, Joseph C., 915 Columbia Street, Lafayette.....	1893
Professor Emeritus of Botany, Purdue University.	
Botany.	
Badertscher, J. A., 312 Fess Ave., Bloomington.....	1917
Professor of Anatomy, Indiana University.	
Anatomy.	
Beede, Joshua W., 404 W. 38th St., Austin, Texas.....	1906
Bureau of Economic Geology and Technology, University of Texas.	
Geology.	
Behrens, Charles A., 217 Lutz Ave., West Lafayette.....	1917
Professor of Bacteriology, Purdue University.	
Bacteriology.	
Bennett, Lee F., 309 S. 9th St., Janesville, Wis.....	1916
With the H. W. Gossard Company, manufacturers.	
Geology, Zoology.	
Bigney, Andrew J., Evansville.....	1897
Professor of Physiology, Evansville College.	
Blanchard, William M., 1008 S. College Ave., Greencastle.....	1914
Professor of Chemistry, DePauw University.	
Organic Chemistry.	
Blatchley, W. S., 1558 Park Ave., Indianapolis.....	1893
Naturalist:	
Entomology, Botany and Geology.	
Breeze, Fred J., Muncie.....	1910
Professor of Geography and Geology, Indiana State Normal, East-	
ern Division.	
Geography and Geology.	
Bruner, Henry Lane, 324 S. Ritter Ave., Indianapolis.....	1899
Professor of Biology, Butler College.	
Comparative Anatomy, Zoology.	
Bryan, William Lowe, Bloomington.....	1914
President, Indiana University.	
Psychology.	
Butler, Amos W., 52 Downey Ave., Irvington, Indianapolis.....	1893
Secretary, Indiana Board of State Charities.	
Vertebrate Zoology, Anthropology, Sociology.	

*Every effort has been made to obtain the correct address and occupation of each member, and to learn in what line of science he is interested. The first line contains the name and address; the second line the occupation; the third line the branch of science in which he is interested. The omission of an address indicates that mail addressed to the last printed address was returned as undeliverable. Information as to the present address of members so indicated is requested by the secretary. The custom of dividing the list of members has been followed.

†Date of election.

- Cogshall, Wilbur A., 423 S. Fess Ave., Bloomington.....1906
 Professor of Astronomy, Indiana University.
 Astronomy.
- Coulter, Stanley, 213 S. 9th St., Lafayette.....1893
 Dean of Men, Dean of School of Science, Purdue University.
 Botany, Forestry.
- Culbertson, Glenn, Hanover.....1899
 Chair of Geology, Physics and Astronomy, Hanover College.
 Geology.
- Cummings, Edgar Roscoe, 327 E. Second St., Bloomington.....1906
 Professor of Geology, Indiana University.
 Geology, Palaeontology.
- Deam, Charles C., Bluffton.....1910
 Druggist, Botanist, State Forester.
 Botany.
- Dryer, Charles R., Oak Knoll, Fort Wayne.....1897
 Geography.
- Dutcher, J. B., 1212 Atwater Street, Bloomington.....1914
 Associate Professor of Physics, Indiana University.
 Physics.
- Eigenmann, Carl H., 630 Atwater Street, Bloomington.....1893
 Professor of Zoology, Dean of Grad. School, Indiana University.
 Embryology, Degeneration, Heredity, Evolution of Fishes.
- Enders, Howard E., 249 Littleton St., West Lafayette.....1912
 Professor of Zoology in Charge of General Biology, Purdue University.
 Zoology, Parasitology.
- Evans, Percy Norton, 302 Waldron St., West Lafayette.....1901
 Professor and Director of Chemical Laboratory, Purdue University.
 Chemistry.
- Fisher, Martin L., 325 Vine St., West Lafayette.....1919
 Professor of Crop Production, Purdue University.
 Agriculture, Ornithology.
- Foley, Arthur L., Bloomington.....1897
 Head of Department of Physics, Indiana University.
 Physics.
- Hessler, Robert, Logansport.....1899
 Physician.
 Biology.
- Hufford, Mason E., 710 Atwater St., Bloomington.....1916
 Physics, Indiana University.
- Hurty, John E., 31 E. 11th St., Indianapolis.....1910
 Secretary, Indiana State Board of Health.
 Hygiene and Chemistry.
- Hyde, Roscoe Raymond, 4101 Penhurst Ave., Baltimore, Md.....1909
 Associate in Immunology, Johns Hopkins University School of
 Hygiene.
 Zoology, Physiology, Bacteriology.
- Jackson, Herbert S., West Lafayette.....1919
 Chief of Botany, Agr. Exper. Sta., Purdue University.
 Plant Pathology.

Kenyon, Alfred Monroe, 515 University St., West Lafayette.....	1914
Head of Mathematics, Purdue University.	
Mathematics.	
Koch, Edward W., Buffalo, N. Y.....	1917
Care of University of Buffalo Medical School.	
Pharmacology.	
Logan, Wm. N., 924 Atwater St., Bloomington.....	1917
Professor of Economic Geology, Indiana University.	
State Geologist.	
McBeth, Wm. A., 1905 N. 8th St., Terre Haute.....	1904
Professor of Geography, State Normal School.	
McBride, Robert W., 1239 State Life Building, Indianapolis.....	1916
Lawyer.	
Ornithology.	
Markle, M. S., Richmond.....	1919
Professor of Botany, Earlham College.	
Middleton, Arthur R., 705 Russell St., West Lafayette.....	1918
Professor of Chemistry, Purdue University.	
Moenkhaus, W. J., Bloomington.	
Professor of Physiology, Indiana University.	
Morrison, Edwin, East Lansing, Michigan.....	1915
Associate Professor of Physics, Michigan Agricultural College.	
Mottier, David M., 215 Forest Place, Bloomington.....	1893
Professor of Botany, Indiana University.	
Morphology, Cytology.	
Naylor, Joseph P., Greencastle.....	1903
Professor of Physics, DePauw University.	
Nieuwland, J. A., Notre Dame.....	1914
Professor of Botany, Notre Dame University.	
Botany and Organic Chemistry.	
Payne, F., 620 Fess St., Bloomington.....	1916
Professor of Zoology, Indiana University.	
Cytology and Embryology.	
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Associate Professor of Physics, Indiana University.	
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Professor of Physiology, State Normal School.	
Animal Physiology.	
Rothrock, David A., 1000 Atwater St., Bloomington.....	1906
Professor of Mathematics, Indiana University.	
Schockel, Barnard, Terre Haute.....	1917
Professor of Physical Geography, State Normal School.	
Geology.	
Scott, Will, Bloomington.....	1914
Assistant Professor of Zoology, Indiana University.	
Zoology, Lake Problems.	
Shannon, Charles W., 518 Lahoma Ave., Norman, Oklahoma.....	1912
With Oklahoma Geological Survey.	
Geology.	

Smith, Albert, 500 University St., West Lafayette.....	1908
Professor of Structural Engineering, Purdue University.	
Physics, Mechanics.	
Smith, Charles Marquis, 152 Sheetz St., West Lafayette.....	1912
Professor of Physics, Purdue University.	
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Physician.	
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Chemistry, Administration.	
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Chemistry, Physics, Geology and Mineralogy.	
Williamson, E. B., Bluffton.....	1914
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Odonata.	
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Lawyer.	
Birds and Nature Study.	
Wright, John S., care of Eli Lilly & Co., Indianapolis.....	1894
Manager of Advertising Department, Eli Lilly & Co.	
Economic Botany.	

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Abbott, G. A., Grand Forks, N. Dakota, Fellow.....	1908
Professor of Chemistry, University of North Dakota.	
Aldrich, John Merton, Washington, D. C., Fellow.....	1918
Custodian of Diptera, U. S. National Museum.	
Dipterologist.	
Aley, Robert J., Orono, Maine, Fellow.....	1898
President, University of Maine.	
Mathematics and General Science.	
Branner, John Casper, Stanford, California.	
President Emeritus, Stanford University.	
Geology.	
Brannon, Melvin A., Beloit, Wisconsin.	
President, Beloit College.	
Plant Breeding, Botany.	
Burrage, Severance, Denver, Colorado, Fellow.....	1898
Professor of Bacteriology, University of Denver.	
Public Health.	
Campbell, D. H., Stanford, California.	
Professor of Botany, Stanford University.	
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Botany, Zoology.	

- Book, Mel T., New Brunswick, New Jersey, Fellow.....1902
 Plant Pathologist, New Jersey Agr. Exper. Station.
 Botany, Plant Pathology, Entomology.
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 Head Professor of Botany, Chicago University.
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 Ichthyology and Museum Administration.
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 Physiology, Zoology.
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 Hygiene, Embryology, Eugenics, Animal Behavior.
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 Vertebrate Palaeontology, especially that of the Pleistocene Epoch.
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 Zoology, Morphology.
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 Physics, Discharge of Electricity through Gases.
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 Physics and Chemistry.
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 Geologist.
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 Botany.
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 Head of Chemistry and Director of Chemical Laboratory.
 University of Illinois.
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 Research Chemist.

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 Botany, Geology, Palaeontology, Ethnology.
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 Science of Administration.
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 Mathematics, Mineralogy.
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 Biological and Agricultural Chemistry.
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Merchant.
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Genetics.
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Geology and Chemistry.
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Assistant State Geologist.
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Research in Biology.
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Professor of Botany, Butler College.
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Professor of Chemistry, Notre Dame University.
- Fugate, Mary, 2525 Park Ave., Indianapolis.
Junior in Butler College.
- Fuller, Frederick D., 3021 College Ave., Bryan, Texas.
Chemistry and Nutrition, Experiment Station.
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Disease of Eye, Ear, Nose, and throat.
- Galloway, Jesse J., Geology Dept., Columbia University, New York City.
Geology and Palaeontology.
- Gantz, Richard A., Muncie.
Professor of Zoology in Indiana State Normal School, Eastern Division.
- Gardner, Max William, West Lafayette.
Associate Botanist, Agr. Exper. Station, Purdue University.
Plant Pathology.
- Gatch, Willis D., 605 Hume-Mansur Building, Indianapolis.
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- Gayler, Dona G., 516 S. Sluss St., Bloomington.
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- Gillum, Robert G., Terre Haute.
Professor of Chemistry, State Normal School.
- Gingery, Walter G., Shortridge High School, Indianapolis.
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- Glenn, Earl R., 646 Park Ave., New York City.
The Lincoln School of Teachers College, Columbia University.
Physics and Chemistry.
- Goldsmith, William M., Winfield, Kansas.
Professor of Zoology, Southwestern College.
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- Gray, Harold, 511 Elwood Ave., Cuyahoga Falls, Ohio.
Chemistry.
- Greene, Frank C., 30 N. Yorktown St., Tulsa, Oklahoma.
Geology.
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Psychology.
- Happ, William, South Bend.
Botany.
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Tool-maker.
Microscopy, Diatomaceae.
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Physiology.
- Hedebol, Frederick C. N., 106 E. Jefferson St., Valparaiso.
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Botany.
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Railroad Engineering.
- Hess, Walter N., South College Avenue, Greencastle.
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Zoology.
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Medicine, Surgery, Electro-Therapeutics.
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Geology.
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- Holman, Richard M., Berkeley, California.
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Chemistry and Physics.
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Nature Study.

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Physician.
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Physics in University of Notre Dame.
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Conservation.
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Experimental Engineering in Steam and Gas.
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- Spitzer, George, 1000 Seventh St., West Lafayette.
Dairy Chemist, Agr. Exper. Station, Purdue University.
- Spong, Philip, 3873 E. Washington St., Indianapolis.
Student in Butler College.
- Stockdale, Paris, 521 E. Second St., Bloomington.
Assistant in Geology, Indiana University.
- Stone, Ralph B., 307 Russell St., West Lafayette.
Registrar and Professor of Mathematics, Purdue University.
- Sulzer, Elmer G., Madison.
Geology.
- Suter, E. M., 1437 Broadway, Ft. Wayne.
Teacher of Chemistry and General Science.
- Tatlock, Myron W., Indianapolis, Care Shortridge High School.
Teacher in Physics.
- Taylor, Joseph C., 117 9th St., Logansport.
(Medical Student.)
- Terry, Dr. Oliver P., 215 Sheetz St., West Lafayette.
Professor of Physiology and University Physician, Purdue.
- Tetrault, Philip A., 607 University St., West Lafayette.
Assistant Professor of Bacteriology, Purdue University.
- Test, Louis A., 222 North St., West Lafayette.
Professor of General Chemistry, Purdue University.
- Tevis, Emma L., 122 W. 18th St., Indianapolis.
Department of Experimental Medicine, Eli Lilly & Company.

Thompson, Clem O., Hanover.

Professor of Education, Hanover College.

Thompson, David H., Dept. Experimental Zoology, University of Ill.,
Urbana, Illinois.

Research Assistant: Genetics.

Thompson, James T., 334 Lafayette Ave., Lebanon.

Student, Wabash College.

Thorburn, A. D., 105 N. High St., Indianapolis.

Thurston, Emery W., 4144 Carrollton Ave., Indianapolis.

Pharmacist & Metallurgist, Eli Lilly & Company.

Archaeology.

Toole, Eben H., Department of Botany, University of Wisconsin, Mad-
ison, Wisconsin.

Graduate Student in Botany.

Treat, Frank M., Atwater Ave., Bloomington.

Instructor in Manual Training, Indiana University.

Troop, James, 123 Sheetz St., West Lafayette.

Professor of Entomology, Purdue University.

Tucker, William Mottier, Bloomington.

Department of Geology, Indiana University.

Turner, B. B., 1017 Park Ave., Indianapolis.

Associate Professor of Pharmacology, Indiana Univ. Sch. of Med.

Turner, William P., 222 Lutz Ave., West Lafayette.

Professor of Practical Mechanics, Purdue University.

VanNuys, Dr. W. C., Box No. 34, Newcastle.

Superintendent Indiana Epileptic Village.

Medicine.

Visher, Stephen S., 318 E. Second St., Bloomington.

Assistant Professor of Geology, Indiana University.

Voorhees, Herbert S., 804 Wildwood Ave., Fort Wayne.

Instructor in Chemistry and Botany in High School.

Walker, Enos G., 453 College Ave., Valparaiso.

Student, Valparaiso University: Pre-medic.

Watson, Carl G., School of Mines, Rapid City, South Dakota.

Instructor in Physics, South Dakota School of Mines.

Weatherwax, Paul, LeConte Hall, Athens, Georgia.

Associate Professor of Botany, University of Georgia.

Weems, Mason L., 102 Greenfield Ave., Valparaiso.

Professor of Botany, Valparaiso University.

Weninger, (Rev.) Francis J., Notre Dame.

Instructor in Zoology, University of Notre Dame.

Wiancko, Alfred T., 230 S. Ninth St., Lafayette.

Professor of Agronomy, Purdue University.

Wildman, Earnest A., Richmond.

Professor of Chemistry, Earlham College.

Wildasin, Pearl D., Kentland.

Senior Student in Botany, Butler College.

Wiley, Ralph B., 777 Russell St., West Lafayette.

Professor of Hydraulic Engineering, Purdue University.

- Williams, A. A., Valparaiso.
Professor of Mathematics, Valparaiso University.
- Wilson, Arthur J., 901 W. Wabash St., Crawfordsville.
Professor of Chemistry, Wabash College.
- Wilson, Charles E., Exper. Station, St. Croix, Virgin Islands, U. S. A.
Zoologist and Entomologist, Agricultural Experiment Station.
- Wilson, Mrs. Mildred N., St. Croix, Virgin Islands, U. S. A.
Plant Physiology.
- Wilson, Mrs. Etta S., 2 Clarendon Ave., Detroit, Michigan.
Field Secretary, Audubon Society.
Ornithology, Botany, Zoology.
- Wilson, Ira T., 521 Kirkland Ave., Bloomington.
Zoology, Indiana University.
- Winkenhofer, Walter, Huntingburg.
Graduate Student in Botany, Indiana University.
- Wolfe, Harold E., 314 N. Washington St., Bloomington.
Assistant Professor of Mathematics, Indiana University.
- Wood, Harry W., Bloomington.
Extension Division, Indiana University.
Geography and Biology.
- Wright, William L., Indianapolis.
Bacteriologist, Eli Lilly & Company.
- Wynn, Dr. Frank B., 421 Hume-Mansur Building, Indianapolis.
Professor of Pathology, Indiana University School of Medicine.
- Young, Gilbert A., 739 Owen St., Lafayette.
Head of School of Mechanical Engineering, Purdue University.
- Young, Paul A., 619 S. Randolph St., Garrett.
Senior in Botany, Wabash College.
- Yunker, Truman G., Wood St., Greencastle.
Professor of Biology, DePauw University.
- Zebrowski, George, 521 State St., West Lafayette.
Senior in Zoology, Purdue University.
- Zehring, William A., 303 Russell St., West Lafayette.
Associate Professor of Mathematics, Purdue University.

Fellows	58
Members and Fellows, Non-resident	34
Members, Active	260
	<hr/>
Total	352

MINUTES OF THE SPRING MEETING.

Spencer, Indiana.

The Spring Meeting of the Academy afforded its members and friends an opportunity to visit the Flatwoods of Owen and Monroe Counties—one of the most interesting regions of Indiana. The Flatwoods district, the site of a glacial lake, covers an area of about fifteen square miles southeast of Spencer. A considerable portion of the region, including the McCormack's Creek gorge, has been set aside as a State Park and placed under control of the Department of Conservation. A hotel, three miles from Spencer, is maintained on the reservation for the accommodation of visitors.

Boone's Cave, Porter's Cave, and Cataract Falls of the Eel River are other attractive points which may be reached from Spencer. Members of the Academy who know the region and are trained in the various branches of field work acted as guides.

The meeting was planned to cover three days, Thursday, Friday and Saturday, May 13th, 14th and 15th.

Good automobile roads into Spencer from all directions made it possible for members and guests to attend the meeting by automobile. Others who came by rail secured automobile service from the local garages.

Thirty-two members and fifteen guests were in attendance at the meetings and the trips.

THURSDAY, MAY 13.—Members of the Academy and their friends met on the courthouse square and at 1:30 P. M. the first party left for a half-day trip by automobile to the Eel River Cataract, about thirteen miles from Spencer. The heavy rains several days before the meetings made the cataract particularly attractive and spectacular. From the cataract the party went a-foot to the lower falls, a mile or more distant.

The second party left the courthouse about three o'clock and explored Green's Bluffs and the vicinity of Boone's Cave but the high water made a trip into the cave impossible.

Both parties returned in time for the informal luncheon served by the members of the Ladies Aid of the Christian Church. Immediately after the luncheon a short business session was held, and at its close the Academy adjourned to the auditorium of the Owen County courthouse, where Colonel Richard Lieber, Director of the State Conservation Commission, gave an address complimentary to the citizens of Spencer and vicinity, upon "Making the Most of the Resources of the State". The auditorium was well filled with an appreciative audience.

FRIDAY, MAY 14th.—Starting from Spencer at nine o'clock in the morning the entire day was spent in a study of the Flatwoods and McCormack's Creek gorge. The party was guided by members of the geological staff of Indiana University who are well acquainted with the region. The botanical and zoological interests were agreeably directed by Professors Mottier and Scott. Tours to visit the diversified interests of McCormack's Creek gorge were made before and after the sumptuous dinner served to about seventy persons by the proprietor of the hotel in this State Park.

SATURDAY, MAY 15.—The morning was devoted to a study of some of the geological formations which had not been visited in the course of the other trips, after which the last of the parties dispersed.

BUSINESS MEETING.

Spencer, Indiana,
May 13th, 1920.

After the luncheon served at six o'clock in the Christian Church by the members of the Ladies Aid Society, the meeting was called to order by the President, H. L. Bruner.

The following thirty-two members and three guests were present:

Flora Anderson	Jesse G. Liston
Frank M. Andrews	W. N. Logan
Mrs. Frank M. Andrews	Robert W. McBride
W. S. Blatchley	Clyde A. Malott
Fred J. Breeze	D. M. Mottier
H. L. Bruner	C. H. Parrish
E. R. Cummings	F. Payne
Chas. C. Deam	William P. Rawles
J. C. Diggs	J. R. Reeves
Fred C. Domroese	Will Scott
Howard E. Enders	James T. Thompson
Arthur L. Foley	Frank B. Wade
Mrs. Arthur L. Foley	Mrs. Frank B. Wade
Ray C. Friesner	F. N. Wallace
W. G. Gingery	M. L. Weems
Richard M. Holman	K. P. Williams
B. A. Howlett	Paul A. Young
Richard Lieber	

The plans for the Friday and Saturday trips were announced by Chairman Friesner of the Program Committee.

F. M. Andrews, chairman of the Membership Committee proposed the names of fifteen persons who were duly elected to membership:

Everett T. Burton, 301 E. Kirkland Ave., Bloomington.

Lila C. Curtis, 533 N. Washington St., Bloomington.

Ernest Danglade, Vevay.

John C. Diggs, 54 Kealing Ave., Indianapolis.

Fred C. Domroese, 815 N. Main St., Crawfordsville.

Charles Hire, 515 E. 5th St., Bloomington.

William P. Rawles, 924 E. 3rd St., Bloomington.

John R. Reeves, 1022 E. 3rd St., Bloomington.

Robert Ridgway, 1030 S. Morgan St., Olney, Illinois.

Russell Paul Smith, 721 Richmond St., Kendallville.

E. M. Suter, 1437 Broadway, Fort Wayne.

James T. Thompson, 334 Lafayette Ave., Lebanon.

Frank M. Treat, Atwater Ave., Bloomington.

Arthur J. Wilson, 901 W. Wabash St., Crawfordsville.

Paul A. Young, 606 Walnut St., Crawfordsville.

Report was made that the 1918 Proceedings have been issued and are now in transit from the printer to the State Librarian for distribution.

The matter of affiliation with the American Association for the Advancement of Science was discussed. It was the sense of the members present that affiliation should be completed if this is feasible.

Letters from former member, Harvey Wiley, and others in distant States, and greetings from President Henry B. Ward of the Illinois Academy of Science were read.

Adjourned at 7:55 to the Owen County courthouse to hear the public lecture by Colonel Richard Lieber.

H. L. BRUNER, President.
HOWARD E. ENDERS, Secretary.

MINUTES OF THE WINTER MEETING.

Indiana Academy of Science,
Claypool Hotel, Indianapolis,
December 2, 1920.

MEETING OF THE EXECUTIVE COMMITTEE.

The Executive Committee was called to order at 7:30 P. M., in Room 200, by President H. L. Bruner. The following members were present:

F. M. Andrews	Robert W. McBride
H. L. Bruner	D. M. Mottier
Amos Butler	Will Scott
C. C. Deam	Chas. Stoltz
C. H. Eigenmann	J. C. Naylor
Howard E. Enders	Frank Wade
R. C. Friesner	E. B. Williamson
W. A. McBeth	John S. Wright

The minutes of the last meeting of the Executive Committee were read and approved.

Committee reports were considered as follows:

BIOLOGICAL SURVEY.

The Secretary reported informally for the Chairman, H. S. Jackson, that no specific steps have been made to gain the cooperation of the State Conservation Commission in a systematic survey.

In the absence of formal report from Stanley Coulter of the Special Committee on Affiliation with the A. A. A. S. the meeting was considered informally.

At present 87 members of the Academy of Science are members of the A. A. A. S. and 57 of the A. A. A. S. members residing in Indiana are not members of the Academy. Affiliation would yield an immediate net gain of approximately 57 members.

President Bruner raised the question whether the new relation would

not interfere with the administration and development of our Endowment Fund. Mr. Butler advises that if, on careful consideration, the advantages outweighed the disadvantages affiliation should follow. Prof. Mottier suggested careful consideration of the fact that matters of bookkeeping would become complicated in order to recognize the designated State Members and National Members.

By consent the matter is to be referred to the General Meeting for consideration.

ON THE ACADEMY ENDOWMENT.

President Bruner reported that the efforts of the Committee during the summer were directed toward an initial movement for the foundation. Dr. Scott suggested that the small sum of \$100 or \$200 transferred annually from the Academy Treasury is too small to yield any marked income, or to make any funds available for the promotion of research within many years. Prof. Eigenmann suggested as a mode of procedure the Indiana Academy of Science should endorse some problem for research, and having done so to seek funds for the promotion of that particular piece of research. Robert McBride referred to the present money stringency and suggested only a very limited possibility of acquiring funds by the method named.

PROGRAM COMMITTEE.

R. C. Friesner presented the printed program of 66 titles to be read at the present meetings. He made the announcement of a slight change in location of rooms for the several sessions of the Academy, which involved change to Parlor B for the General Sessions and sectional meetings of the Physical Sciences. The Biological Section is to meet in the Assembly Room. The Banquet is to be held in the Florentine Room, the Evening Session in the Assembly Room. Programs have been sent to neighboring Academies and Scientific Societies. The Chairman reported correspondence with the Ohio Academy of Science relative to holding the Spring Meeting as a joint meeting. Their practice is to have their papers read at the Spring Meeting, therefore it is not possible to have a joint meeting this year, but the matter is to be referred to the Committee for future consideration.

NOMINATION COMMITTEE.

The report will be called tomorrow.

ON BIOLOGICAL SURVEY.

Informal report was made by the Secretary in the absence of Chairman.

STATE LIBRARY.

Amos Butler reported that the foreign papers have not been received in any numbers during the last six years but have now begun to come. Several boxes of foreign shipments have been received recently.

DISTRIBUTION OF PROCEEDINGS.

Chairman Enders reported the 1918 Proceedings were distributed June, last, but that the 1919 Proceedings have not gone to press as a result of reversion of the printing fund.

MEMBERSHIP COMMITTEE.

F. M. Andrews, Chairman, reported that he has 60 names to propose at the General Meeting tomorrow.

RELATION OF THE ACADEMY TO THE STATE.

Hon. Robert McBride reviewed the appropriation difficulties of the past two years. The Legislature at its special session in June re-appropriated an amount sufficient to cover the cost of the 1918 Proceedings and \$1200.00 for the 1919 Proceedings but the latter amount reverted to the State at the close of the fiscal year, Sept. 30, 1919, and therefore no funds are available at this time for the 1919 Proceedings.

It is proposed to follow up the matter at the next session of the Legislature and to secure a somewhat larger fund for future publication.

The old, and the proposed bill to be introduced at the Legislature were read. It is recommended that the Academy print the proposed bill, together with the original bill and a brief history of the relation of the Academy to the State and circulate it to the members of the State Legislature at its next session for its information.

On motion (Butler) the Academy is to print the matter as proposed and Judge McBride is to serve as Chairman in the discharge of the provisions of this motion.

Discussion brought out the fact that the State Printer refused to accept the manuscript for the 1919 Proceedings, stating that the very short time that remained would not permit engagement in the printing to an extent to render the funds available before they would revert at the close of the fiscal year.

On motion the Secretary is to furnish each member of the Academy two copies of the proposed bill together with a list of instructions to send these copies to their representatives in the Legislature and to make a personal solicitation for his support in favor of the printing of the bill of the Academy.

On motion the Editor of the Proceedings is to send, if possible, 100 copies of separates, original paging, gratis to the authors.

TREASURER.

No report.

ADVISORY COUNCIL.

No report.

President Bruner reported that he named John M. Coulter, of Chicago University, to represent the Indiana Academy of Science at the 50th Anniversary of the Wisconsin Academy of Science, April 23, 1920, Madison, Wisconsin.

Amos Butler, under the head of new business, spoke upon the proposed archaeological survey of Indiana. Such survey is being urged by the National Research Council which advises a cooperative activity in archaeological research in the central states. The Indiana Academy of Science is asked to start the movement in this State. The matter is to be brought up tomorrow at the General Session and it is proposed to have the State History Teachers take similar action at the session next week and thus seek to stir persons to action.

On motion the Secretary is to transmit to the Editor the sense of the Academy that rules, such as are used in the publications of the Wistar Institute, be embodied in the Proceedings, as rules for the presentation and publication of manuscripts in the Proceedings.

Professor Mottier spoke on the resolution of one year ago relative to asking the Legislature to adopt the flower of the tulip tree as the State Flower.

On motion Judge McBride is asked to prepare a bill to present the matter to the Legislature.

E. B. Williamson spoke on the matter of the possibility of holding a joint field meeting with adjoining State Academies on occasional years. These might be held, now in Indiana and again in one of the adjoining states.

On motion a standing Committee on Interstate Field Meetings is to be appointed.

Adjourned 9:30 P. M.

GENERAL SESSION.

9:00 A. M. Parlor B. Claypool Hotel—Dec. 3, 1920.

BUSINESS SESSION.

The Membership Committee proposed the following named persons for membership, and on motion they were duly elected:

The session was called to order by President Bruner. Attendance 75. The minutes of the Executive Committee were read and approved.

Lora M. Baker, 408 S. Grant St., Bloomington.

James Harvey Bailey, Sorin Hall, Notre Dame.

Stephen Francis Balcom, 3634 Birchwood Ave., Indianapolis.

Albert Raiff Bechtel, 209 W. College St., Crawfordsville.

Katherine Belzer, 320 S. Audobon Road, Indianapolis.

Lester Bockstahler, Physics Department, I. U. Bloomington.

Blanche Brown, 5911 Beechwood Ave., Indianapolis.

Emil V. Cassady, 1841 C. D. Woodruff Place, Indianapolis.

Alexander Cavins, 1232 N. Alabama St., Indianapolis.

Lila Curtis, Indiana University, Bloomington.

John June Davis, Agricultural Exper. Station, West Lafayette.

Delzie Demaree, Benham.

Ira Harris Derby, 5460 University Ave., Indianapolis.

Charles D. Dilts, Central High School, Evansville.

Joseph Nicholas Donahue, Notre Dame University, Notre Dame.

David Hanon Dunham, 429 Main St., West Lafayette.

Austin Etter, 327 S. Henderson St., Bloomington.

Horace Wenger Feldman, 138 Chauncey Ave., West Lafayette.

Henry Bernhart Froning, 415 Pokagon St., South Bend.

Luther S. Ferguson, State Geologist's Office, Indianapolis.

Mary Fugate, 2525 Park Ave., Indianapolis.

Richard A. Gantz, Normal School, Muncie.

Dona G. Gayler, 516 S. Sluss St., Bloomington.

John Willard Giffen, 361 Garfield St., Valparaiso.

Frank V. Graham, Normal School, Muncie.

Benjamin H. Grave, 604 E. Market St., Crawfordsville.

W. A. Guthrie, Conservation Commission, 923 Lemecke Bldg., Indianapolis.

George Lee Hagey, 123 State St., West Lafayette.

Engene H. Hardy, 1230 S. Keystone St., Indianapolis.

Frederik C. N. Hedebol, 106 E. Jefferson St., Valparaiso.

T. C. Hiestand, 514 S. Lincoln St., Bloomington.

Ralph W. Hufferd, College Ave., Greencastle.

Jacob Robert Kantor, 645 N. Walnut St., Bloomington.

Mable Clare Katterjohn, 213 S. Dunn St., Bloomington.

Alfred C. Kinsey, 7744 E. 3rd St., Bloomington.

Helen E. McDonald, 1826 E. 18th St., Anderson.

Arthur Clem McIntosh, 111 N. Dunn St., Bloomington.

Emma D. Mohr, 2210 N. Talbot St., Indianapolis.

Prentice Moore, Bloomington.

Will Morgan, University Heights, Indianapolis.

Frank W. Morgan, Science Hall, Valparaiso.

Hugh C. Muldoon, 361 Garfield St., Valparaiso.

Rev. P. Benedict Oberdoerfer, University of Notre Dame, Notre Dame.

Ralph L. Records, Edinburg.

Joseph H. Reichert, 522 E. Indiana Ave., South Bend.

G. H. Shadinger, Butler College, Indianapolis.

Frank Joseph Smigel, No. 4 Victoria Hall, Valparaiso.

Paul Smith, 122 E. Ohio St., Indianapolis.

Emory Wright Thurston, Care Eli Lilly & Co., Indianapolis.

Norman B. Tichenor, 5727 Oak Ave., Indianapolis.

Enos G. Walker, 453 College Ave., Valparaiso.

Frank N. Wallace, State Entomologist, Indianapolis.

Francis Joseph Wenninger, Notre Dame.

Pearl Dolores Wildasin, Butler College Res., Indianapolis.

Walter Winkenhofer, Bloomington.

Harold E. Wolfe, 314 N. Washington St., Bloomington.

Albert E. Woodruff, 24 S. Irvington, Indianapolis.

William L. Wright, Care Eli Lilly & Co., Indianapolis.

George Zebrowski, 521 State St., West Lafayette.

Ziegler,

The Treasurer's report was received.

Balance November 30, 1919.....	\$486.26	
Receipts, dues	305.00	
Expended	\$249.59	
Balance	541.67	
Total	\$791.26	\$791.26

Auditor E. B. Williamson reports on the accuracy of the Treasurer's Report. On motion the Treasurer is authorized, on signature of the President and Secretary, to transfer from the Treasury to the Trustees of the Research Endowment Fund the sum of \$300.00.

Adjourned.

GENERAL SESSION.

Greetings were received from the representatives of the State Societies:

Dr. H. W. Rodenhamell of the Eli Lilly Co., for the Branch of the American Chemical Society.

Mrs. Rossean McClellan, Shortridge High School, for Audubon Society.

Mr. Henry Foltz, of Indianapolis, for the Indiana Society of Architects.

Dr. Murray N. Hadley of Indianapolis, for the Indiana Medical Association.

Miss Ida M. Andrus of the Manual Training High School, for the Nature Study Club of Indiana.

Mr. Horace Shonle of the Eli Lilly Company, for the Science Club of Indiana.

The representative of the Audubon Society suggested the advisability of arranging at some time or other for a joint Spring Meeting with the Indiana Academy of Science.

The papers of the General Session were then read in their order. At the close of the paper number 9, entitled "A State Archaeological Survey", the following resolution was adopted:

RESOLVED, That the Indiana Academy of Science, recognizing the value of the pre-historic remains in this state, from the scientific, historic, esthetic and economic standpoint, and knowing full well the destruction of these important objects, objects that are now gone from mankind forever, which is continually going on, expresses its interest in and its desire to record its support of an archaeological survey of Indiana.

BE IT FURTHER RESOLVED, That it is the sense of this Academy that this survey should be undertaken by a trained person under the direction of the Conservation Commission. That the officers of the Academy be directed to transmit a copy of these resolutions to the Conservation Commission and urge its acceptance of this work, and at the same time pledge the co-operation of this Academy therein. That the Chair appoint a committee of not less than seven (7) members to assist in bringing this matter to the attention of the Legislature, and act as a co-operative body with the Conservation Commission and with any similar committees that may be appointed by other organizations to further this work.

Committee on Archaeological Survey.

F. B. Wynn, Hume-Mansur Bldg., Indianapolis, Chairman.

R. W. McBride, State Life Building, Indianapolis.

W. N. Logan, Indiana University, Bloomington.

Allen D. Hole, Earlham College, Richmond.

Stanley Coulter, Purdue University, Lafayette.

Charles Stoltz, South Bend.

H. S. Vorhees, Fort Wayne.

A. J. Bigney, Evansville College, Evansville.

Glen Culbertson, Hanover College, Hanover.

W. A. McBeth, State Normal School, Terre Haute.

S. F. Balcom, 3634 Birchwood Ave., Indianapolis.

At the close of the reading of the papers of the General Session the Academy adjourned for luncheon.

1:30 P. M. Business Meeting—

The personnel of the Committee on Interstate Field Meetings was announced:

E. B. Williamson, Chairman.

R. C. Friesner.

W. Q. McBeth.

A resolution was presented by J. J. Davis requesting that the U. S. National Museum provide for additional facilities for the care of insects in conformity to the investigation and recommendation made by the American Association of Economic Entomologists. The following resolution was adopted:

RESOLVED, That the Indiana Academy of Science, realizing the value of the Division of Insects, U. S. National Museum, to the economic need and intellectual development of the people of the entire United States and the immediate need of additional facilities for maintaining this work, does hereby approve the report of the Committee of the American Association of Economic Entomologists and the Entomological Society of America at their St. Louis meeting, December 30 to January 2, 1920, and urge the National Congress to support the budget of \$86,000.00 submitted to its Appropriations Committee, and that the Secretary of the Indiana Academy of Science be instructed to mail a copy of this resolution to the Chairman of the Appropriations Committee and to the Indiana Representatives and Senators in Congress.

COMMITTEE ON NOMINATIONS.

The following named persons were proposed for the offices for 1921: On motion they were duly elected as follows:

President—Howard E. Enders, West Lafayette.

Vice-President—F. M. Andrews, Bloomington.

Secretary—W. N. Hess, Greencastle.

Ass't Sec.—Harry A. Dietz, State Entomologist's Office, Indianapolis.

Treasurer—William M. Blanchard, Greencastle.

Editor—F. J. Breeze, Muncie.

Press Sec.—F. B. Wade, Shortridge High School, Indianapolis.

Adjourned for Sectional Meetings—2:00 P. M.

Biological Section of 36 titles, Assembly Room; Physical Section of 18 titles, Parlor B.

Seventy-five guests participated in the Academy dinner at 6:00 P. M. At the close of the dinner the Academy met in the Assembly Room for a general session open to the citizens of Indianapolis. The following interesting illustrated lectures were presented:

"Mountain Climbing in Glacier National Park", by F. B. Wynn.

"Glaciers and Glacial Phenomena", President W. E. Stone.

This closed the 35th Session of the Indiana Academy of Science.

H. L. BRUNER, President.

HOWARD E. ENDERS, Secretary.

Program

OF THE

THIRTY-FIFTH ANNIVERSARY

OF THE

Indiana Academy of Science

CLAYPOOL HOTEL, INDIANAPOLIS

THURSDAY AND FRIDAY

DECEMBER 2 AND 3

1920

OFFICERS

H. L. BRUNER, Indianapolis.....	President
W. A. McBETH, Terre Haute.....	Vice-President
HOWARD E. ENDERS, West Lafayette.....	Secretary
R. M. HOLMAN, Crawfordsville.....	Assistant Secretary
FRANK B. WADE, Indianapolis.....	Press Secretary
W. M. BLANCHARD, Greencastle.....	Treasurer
F. PAYNE, Bloomington.....	Editor

PROGRAM COMMITTEE

STANLEY COULTER
 F. B. WYNN
 E. R. CUMMINGS
 R. C. FRIESNER

LOCAL COMMITTEE

A. W. BUTLER

J. S. WRIGHT

R. W. McBRIDE

OUTLINE OF PROGRAM

THURSDAY, DECEMBER 2

8:00 P. M. Executive Committee.

FRIDAY, DECEMBER 3

9:00- 9:30 A. M. Business Meeting, Palm Room.

9:30-12:00 A. M. General Session, Palm Room. Representatives of the various State Societies will be given an opportunity to present greetings at this session.

1:30- 2:00 P. M. Business Meeting, Palm Room.

2:00- 6:00 P. M. Sectional Meetings: Biological Sciences in the Palm Room, Physical Sciences in Parlor "B."

6:00- 8:00 P. M. Annual Academy Dinner, in the Riley Room.

8:00 P. M. General Session.

GENERAL SESSION

FRIDAY, 9:30-12:00 A. M.

1. The Growth and Distribution of Population in Indiana. 20 minutes. Charles R. Dryer, Fort Wayne, Indiana.
2. Health Service at Purdue University. 10 minutes. O. P. Terry, Purdue University.
3. Ulysses Orange Cox (In Memoriam). 10 minutes. Barton W. Evermann, Indiana State Normal School.
4. An Appeal by an Ignoramus. 10 minutes. Robert W. McBride, Indianapolis.

5. Report of a Study of Mental Ability of Children in One Orphans' Home in Indiana. 10 minutes. Arthur A. Estabrook, Indianapolis.
6. Tests for Measuring the Emotions. 12 minutes. S. L. Pressey, Bloomington.
7. Undergraduate Research in our Colleges and Universities. 20 minutes. Horace Shonle, Eli Lilly & Co., Indianapolis.
8. Natural Resources and Education in Indiana. 15 minutes. Bernard H. Shockel, Indiana State Normal School.
9. A State Archaeological Survey. 10 minutes. Amos W. Butler, Indianapolis.
10. Our Fuel Supply. 5 minutes. A. L. Foley, Indiana University.
11. Address of Retiring President—Biological Laws and Social Progress. Henry Lane Bruner, Butler College.

SECTIONAL PROGRAM

FRIDAY, 2:00 P. M.

BIOLOGICAL SCIENCES—PALM ROOM

Zoology

12. Whistling Swans. Lantern. 15 minutes. Mrs. Etta S. Wilson, Detroit, Michigan.
13. Notes on the Termites of Indiana. Lantern. 10 minutes. Harry F. Dietz, Division Entomology, Indianapolis.
14. The Fresh Water Medusae of Boss Lake, Elkhart, Indiana. 10 minutes. F. Payne, Indiana University.
15. Additions to the Indiana List of Dragon Flies. 5 minutes. E. B. Williamson, Bluffton.
16. Observations. II: Extension of Attack of Eriophyes upon Norway Maples. 5 minutes. Howard E. Enders, Purdue University.
17. The Anatine Genus *Nyroca*, and Its Nearest Allies. By title. Harry C. Oberholser, U. S. National Museum, Washington, D. C.
18. Some Observations Upon the Pythons. 20 minutes. W. Henry Sheak, Philadelphia, Pennsylvania.
19. Some Mallophaga of Our Native Birds. 30 minutes. Edwin J. Kohl, Purdue University.
20. On the Principle of the Order of Addition in Immunological Reactions. 10 minutes. Roscoe R. Hyde, Johns Hopkins University.
21. Interdependence of Agglutinin and Cytolysin in an Immune Serum. 10 minutes. Roscoe R. Hyde.
22. Some Rare Indiana Birds. 10 minutes. Amos W. Butler.
- 22a. Influence of Adrenin on Retina and Skin of Frog. 10 minutes. A. J. Bigney, Evansville College.

Botany

23. A New Chromogenic Bacillus Isolated from Laboratory Media. 5 minutes. P. A. Tetrault, Purdue University.
24. The Soil Flora as Affected by Cultivation and Seasonal Variations. 15 minutes. Ira L. Baldwin, Purdue University.

25. A Modification of the Romanowsky Stain. 15 minutes. Charles L. Behrens, Purdue University.
26. Effect of Centrifugal Force upon Plants. 5 minutes. F. M. Andrews, Indiana University.
27. Studies on the Aeration of Plants. 5 minutes. F. M. Andrews.
28. Phyllotaxis in *Specularia perfoliata*. 5 minutes. F. M. Andrews.
29. An Improved Method for Regulating the Thickness of Microtome Sections. 5 minutes. F. M. Andrews.
30. Studies on Pollen, III. 5 minutes. F. M. Andrews.
31. Some work with Claviceps Cultures. Lantern. 15 minutes. W. W. Boms, Botanical Research Laboratory, Eli Lilly & Co., Indianapolis.
32. The Ustilaginales of Indiana. 5 minutes. H. S. Jackson, Purdue Agricultural Experiment Station.
33. Uredinales of Indiana, III. 5 minutes. H. S. Jackson.
34. A Convenient Plant Press. 5 minutes. H. S. Jackson.
35. Indiana Plant Diseases, 1920. 15 minutes. Max W. Gardner, Purdue Agricultural Experiment Station.
36. Corn Diseases in Indiana. 10 minutes. G. N. Hoffer, Purdue Agricultural Experiment Station.
37. Indiana Fungi, V. 10 minutes. J. M. Van Hook, Indiana University.
38. The Pycnidium of *Cicinnobolus*. 5 minutes. J. M. Van Hook.
39. A Tricotyledonous Bean. 3 minutes. J. M. Van Hook.
40. Native Plants of White County, III. By title. Louis F. Heimlich, Purdue University.
41. Plants New to Indiana, IX. 10 minutes. Charles C. Deam, Bluffton.
42. A Species of *Cuscuta* Not Hitherto Reported for Indiana. 1 minute. T. G. Yuncker, DePauw University.
43. A List of Mosses Occurring in the State of Indiana. 3 minutes. T. G. Yuncker.
44. Mitotic Rhythms in *Pisum sativum* L. 10 minutes. Ray C. Friesner, Butler College.
45. A Curious Variation in the Common Milkweed, *Asclepias syriaca* L. By title. C. A. Ludwig, Clemson College.
- 45a. The White Pine Blister Rust Educational Campaign in New York. Burr N. Prentice, Purdue University.
- 45b. Growth Rate of Red Cedar. 10 minutes. Stanley Conter, Purdue University.

PHYSICAL SCIENCES—PARLOR B

Geology and Geography

46. Some Phases of Indiana Geology. 15 minutes. W. N. Logan, Indiana University.
47. Some Evidence Indicating the Importance of Frost Action in Widening Valleys. 10 minutes. Glenn Culbertson, Hanover College.
48. Relationship of Stream Trenching to Uplift. 10 minutes. Clyde A. Malott, Indiana University.
49. Planation Stream Piracy. 15 minutes. Clyde A. Malott.
50. The Muncie Esker Belt. 10 minutes. Fred J. Breeze, Indiana State Normal, Eastern Division.
51. The Highest Point in Indiana. 10 minutes. Fred J. Breeze.

Physics and Chemistry

52. What Puts the "Pop" in Popcorn. Lantern. 10 minutes. R. H. Carr and E. F. Ripley, Purdue University.
53. Recent Progress in the Use of Ozone in Ventilation. 10 minutes. F. O. Anderegg, Purdue University.
54. Training Research Chemists in Indiana. 10 minutes. Edward G. Mahin, Purdue University.
55. Behavior of Copper, Lead, and Aluminum Under Stretching. Lantern. 20 minutes. Albert E. Woodruff, Butler College.
56. A Resistance Radio Phone. Lantern. 10 minutes. R. R. Ramsay, Indiana University.
57. Note on Antennæ Resistance. Lantern. 10 minutes. R. R. Ramsay.
58. A Long-Wave Receiver. Lantern. 10 minutes. R. R. Ramsay.
59. An Experiment on the Transmutation. Lantern. 10 minutes. A. L. Foley, Indiana University.
60. The Effect of the Electrodes on the Luminosity of an Electric Spark. Lantern. 5 minutes. A. L. Foley.
61. Light Intensity from Different Parts of an Electric Spark. Lantern. 5 minutes. A. L. Foley.
62. Sources of Error in Measurements of the Velocity of Sound. Lantern. 10 minutes. A. L. Foley.
63. Some Facts About Phonographs. 5 minutes. A. L. Foley.

GENERAL PROGRAM

FRIDAY, 8:00 P. M., RILEY ROOM

64. The Academy Research Fund. Stanley Coulter, Purdue University.
65. Mountain Climbing in Glacier National Park. Lantern. F. B. Wynn, Indianapolis.
66. Glaciers and Glacial Phenomena. Lantern. W. E. Stone, President, Purdue University.

