

PROCEEDINGS

OF THE

Indiana Academy of Science

1919

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F. PAYNE, Editor.

Bloomington, Ind.

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CONSTITUTION.

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ARTICLE I.

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

SEC. 2. The object of this Academy shall be scientific re-earch 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 resources 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 follows 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 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, 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. 3. 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 mem-

bers 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

*Failure of Legislature at its 1919 session to appropriate anything for publication of the Proceedings for 1919 and 1920.

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 manuscripts, 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).

INDIANA ACADEMY OF SCIENCE.

OFFICERS, 1920

President,

H. L. BRUNER.

Vice-President,

W. A. MCBETH.

Secretary,

HOWARD E. ENDERS.

Assistant Secretary,

R. M. HOLMAN.

Press Secretary,

FRANK B. WADE.

Treasurer,

WILLIAM M. BLANCHARD.

Editor,

F. PAYNE.

Executive Committee:

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

Curators:

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

COMMITTEES ACADEMY OF SCIENCE, 1920.

Program.

R. C. FRIESNER, Butler College, Indianapolis.
 STANLEY COULTER, Lafayette.
 E. R. CUMMINGS, Bloomington.
 F. B. WYNN, Indianapolis.

Nominations.

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

State Library.

AMOS BUTLER, State House, Indianapolis.
 W. S. BLATCHLEY, Indianapolis.
 A. L. FOLEY, Bloomington.

Biological Survey.

H. S. JACKSON, Agr. Exp. Sta., West Lafayette.
 RICHARD LIEBER, Dept. of Conserv., Indianapolis.
 R. M. HOLMAN, Crawfordsville.
 WILL SCOTT, Bloomington.

Distribution of Proceedings.

HOWARD E. ENDERS, West Lafayette.
 W. M. BLANCHARD, Greencastle.
 E. R. CUMMINGS, Bloomington.
 A. RICHARDS, Crawfordsville.

Membership.

F. M. ANDREWS, Bloomington.
 C. A. BEHRENS, West Lafayette.
 A. D. THORBURN, Indianapolis.
 Care Pittman-Moore Co.

Auditing.

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

Relation of the Academy to the State.

R. W. MCBRIDE, 1239 State Life Bldg., Indianapolis.
 GLENN CULBERSON, Hanover.
 JOHN S. WRIGHT, Indianapolis.
 Care Eli Lilly Co.
 AMOS W. BUTLER, State House, Indianapolis.
 W. W. WOOLEN, Indianapolis.
 D. A. ROTHROCK, Bloomington.

Publication of Proceedings.

F. PAYNE, Bloomington.
 GEO. N. HOFFER, West Lafayette.
 J. A. BADERTSCHER, Bloomington.
 D. M. MOTTIER, Bloomington.

Advisory Council.

JOHN S. WRIGHT.
 R. W. MCBRIDE.
 GLENN CULBERTSON.
 STANLEY COULTER.
 WILBUR COGSHALL.

*Academy Foundation
Trustees.*

AMOS BUTLER.
ROBERT HESSLER.

Directors of Research.

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

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			C. A. Waldo.
1892-1893	J. C. Arthur	Amos W. Butler	Stanley Coulter W. W. Norman } 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. Schultze	Geo. W. Benton	J. T. Seovell.
1899-1900	D. W. Dennis*	John S. Wright	E. A. Schultze	Geo. W. Benton	J. T. Seovell.
1900-1901	M. B. Thomas*	John S. Wright	E. A. Schultze	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. Batebley	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. H. 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. H. Ransom	G. A. Abbott	W. A. McBeth.
1907-1908	Glenn Cullertson	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	John 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	Howard E. Enders	F. B. Wade	W. A. Cogshall.
1914-1915	Wilbur A. Cogshall	A. J. Bigney	Howard E. Enders	F. B. Wade	Wm. M. Blanchard.
1915-1916	A. J. Bigney	Howard E. Enders	E. B. Williamson	F. B. Wade	Wm. M. 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. M. Holman	F. B. Wade	Wm. M. Blanchard.

* Deceased

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

MEMBERS.*

FELLOWS.

- Andrews, F. M., 901 E. 10th St., Bloomington.....†1911
Associate Professor of Botany, Indiana University.
Plant Physiology, Botany.
- Arthur, Joseph C., 915 Columbia St., Lafayette.....1893
Professor Emeritus of Botany, Purdue University.
Botany.
- Badertscher, J. A., 312 S. Fess Ave., Bloomington.....1917
Associate 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 Street, Janesville, Wis.....1916
With the H. W. Gossard Company.
Geology, Zoology.
- Bigney, Andrew J., Evansville.....1897
Professor of Physiology, Evansville College.
- Blanchard, William M., 1008 S. College Ave., Greencastle, Ind.....1914
Professor of Chemistry, DePauw University, Greencastle, Ind.
Organic Chemistry.
- Blatchley, W. S., 1558 Park Ave., Indianapolis.....1893
Naturalist.
Botany, Entomology, and Geology.
- Breeze, Fred J., Muncie.....1910
Branch State Normal School.
Geography.
- Bruner, Henry Lane, 324 S. Ritter Ave., Indianapolis.....1899
Professor of Biology, Butler College.
Comparative Anatomy, Zoology.

*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 uncalled for. 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.

- 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.
- Cogshall, Wilbur A., 423 S. Fess Ave., Bloomington.....1906
 Associate Professor of Astronomy, Indiana University.
 Astronomy.
- Coulter, Stanley, 213 S. Ninth St., Lafayette.....1893
 Dean School of Science, Purdue University.
 Botany, Forestry.
- Cox, Ulysses O., P. O. Box 81, Terre Haute.....1908
 Head Department Zoology and Botany, Indiana State Normal,
 Botany, Zoology.
- Culbertson, Glenn, Hanover.....1899
 Chair Geology, Physics and Astronomy, Hanover College.
 Geology.
- Cunings, Edgar Roscoe, 327 E. Second St., Bloomington.....1906
 Professor of Geology, Indiana University.
 Geology, Paleontology.
- Dean, Charles C., Bluffton.....1910
 Druggist, Botanist, State Forester.
 Botany.
- Dryer, Charles R., Oak Knoll, Fort Wayne.....1897
 Geography.
- Dutcher, J. B., 1212 Atwater St., Bloomington.....1914
 Associate Professor of Physics, Indiana University.
 Physics.
- Eigenmann, Carl H., 630 Atwater St., Bloomington.....1893
 Professor of Zoology, Dean of Graduate School, Indiana Uni-
 versity.
 Embryology, Degeneration, Heredity, Evolution and Distribution
 of American Fish.
- Enders, Howard Edwin, 249 Littleton St., West Lafayette.....1912
 Professor of Zoology, Purdue University.
 Zoology.
- Evans, Percy Norton, 302 Waldron St., West Lafayette.....1901
 Director of Chemical Laboratory, Purdue University.
 Chemistry.
- Fisher, Martin L., 325 Vine St., West Lafayette.....1919
 Prof. 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., Bloomington.....1916
 Assistant Professor of Physics, Indiana University.
 Physics.
- Hurty, J. N., 31 E. 11th Street, Indianapolis.....1910
 Secretary, Indiana State Board of Health.
 Hygiene and Chemistry.
- Hyde, Roscoe Raymond, 4101 Penhurst Ave., Baltimore, Md.....1909
 Assistant Professor Physiology and Zoology, Indiana State Normal.
 Zoology, Physiology, Bacteriology.
- Jackson, Herbert S., West Lafayette.....1919
 Chief of Botany, Agr. Expr. Station, Purdue.
 Plant Pathology.
- Kenyon, Alfred Monroe, 515 University St., West Lafayette.....1914
 Professor 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.
- Markle, M. S., Richmond.....1919
 Professor of Botany, Earlham College.
- Middleton, A. R., 705 Russell St., West Lafayette.....1918
 Professor of Chemistry, Purdue University.
 Chemistry.
- Morrison, Edwin, East Lansing, Michigan.....1915
 Assoc. Professor of Physics, Mich. Agr. College.
 Physics and Chemistry.
- Mottier, David M., 215 Forest Place, Bloomington.....1893
 Professor of Botany, Indiana University.
 Morphology, Cytology.

- Naylor, J. P., Greencastle.....1903
 Professor of Physics, DePauw University.
 Physics, Mathematics.
- Nieuwland, J. A.....1914
 Notre Dame University.
 Botany and Organic Chemistry.
- Payne, F., 620 S. Fess St., Bloomington.....1916
 Professor of Zoology, Indiana University.
 Cytology and Genetics.
- Ramsey, Rolla R., 615 E. Third St., Bloomington.....1906
 Professor of Physics, Indiana University.
 Physics.
- Rettger, Louis J., 31 Gilbert Ave., Terre Haute.....1896
 Professor of Physiology, Indiana State Normal.
 Animal Physiology.
- Rothrock, David A., 1000 Atwater St., Bloomington.....1906
 Professor of Mathematics, Indiana University.
 Mathematics.
- Schockel, Barnard, Terre Haute.....
 Professor of Physical Geography.
 State Normal School.
- Scott, Will, Bloomington.....1914
 Associate Professor of Zoology, Indiana University.
 Zoology, Lake Problems.
- Shannon, Charles W., 518 Lahoma Ave., Norman, Okla.....1912
 With Oklahoma State Geological Survey.
 Geology.
- Smith, Albert, 500 University St., West Lafayette (Army Service).....1908
 Professor of Structural Engineering.
 Physics, Mechanics.
- Smith, Charles Marquis, 152 Sheetz St., West Lafayette.....1912
 Professor of Physics, Purdue University.
 Physics.
- Stoltz, Charles, 530 N. Lafayette St., South Bend.....1919
 Physician.
 Medicine.
- Stone, Winthrop E., Lafayette.....1893
 President of Purdue University.
 Chemistry, Administration.
- Van Hook, James M., 639 N. College Ave., Bloomington.....1911
 Assistant Professor of Botany, Indiana University.
 Botany.

- Wade, Frank Bertram, 1039 W. Twenty-seventh St., Indianapolis.....1914
 Head of Chemistry Department, Shortridge High School.
 Chemistry, Physics, Geology, and Mineralogy.
- Williamson, E. B., Bluffton.....1914
 President, The Wells County Bank.
 Dragonflies.
- Woollen, William Watson, Indianapolis.....1908
 Lawyer.
 Birds and Nature Study.
- Wright, John S., 3718 N. Pennsylvania St., Indianapolis.....1894
 Manager of Advertising Department, Eli Lilly Co.
 Economic Botany.

NON-RESIDENT MEMBERS AND FELLOWS.

- Abbott, G. A., Grand Forks, N. Dak., Fellow.....1908
 Professor of Chemistry, University of North Dakota.
 Chemistry.
- Aldrich, John Merton, Washington, D. C., Fellow.....1918
 Custodian of Diptera, U. S. National Museum.
 Dipterologist.
- Aley, Robert J., Orono, Me., Fellow.....1898
 President of University of Maine.
 Mathematics and General Science.
- Branner, John Casper, Stanford, California.
 President Emeritus of Stanford University.
 Geology.
- Brannon, Melvin A., President Beloit College, Beloit, Wis.
 Plant Breeding, Botany.
- Burrage, Severance, Denver, Colo., Fellow.....1898
 Professor of Bacteriology, University of Denver.
 Public Health Work.
- Campbell, D. H., Stanford University, California.
 Professor of Botany, Stanford University.
 Botany.
- Clark, Howard Walton, U. S. Biological Station, Fairport, Iowa.....
 Scientific Assistant U. S. Bureau of Fisheries.
 Botany, Zoology.
- Cook, Mel T., New Brunswick, N. J., Fellow.....1902
 Plant Pathologist, New Jersey Experiment Station.
 Botany, Plant Pathology, Entomology.
- Coulter, John M., University of Chicago, Chicago, Ill., Fellow.....1893
 Head Department of Botany, Chicago University.
 Botany.

- Davis, B. M., Oxford, Ohio.
 Professor of Agricultural Education.
 Miami University.
- Evermann, Barton Warren, Director Museum,
 California Academy of Science, Golden Gate Park, San Francisco,
 Cal.
 Zoology.
- Goss, William Freeman M., 61 Broadway, New York, Fellow.....1893
 President The Railway Car Manufacturers' Association.
- Greene, Charles Wilson, 814 Virginia Ave., Columbia, Mo.
 Professor of Physiology and Pharmacology, University of Missouri.
 Physiology, Zoology.
- Hargitt, Chas. W., 909 Walnut Ave., Syracuse, N. Y.
 Professor of Zoology and Director of the Laboratories, Syracuse Uni-
 versity.
 Hygiene, Embryology, Eugenics, Animal Behavior.
- Hay, Oliver Perry, U. S. National Museum, Washington, D. C.
 Research Associate, Carnegie Institute of Washington.
 Vertebrate Paleontology, especially that of the Pleistocene Epoch.
- Huston, H. A., 42 Broadway, New York City, Fellow.....1893
 Manager soil and crops service syndicate.
- Jordan, David Starr, Stanford University, California.
 Chancellor Emeritus of Stanford University.
 Fish, Eugenics, Botany, Evolution.
- Kingsley, J. S., University of Illinois, Urbana, Ill.
 Professor of Zoology.
 Zoology.
- Knipp, Charles T., 915 W. Nevada St., Urbana, Ill.
 Professor of Experimental Physics, University of Illinois.
 Physics, Discharge of Electricity Through Gases.
- McDougal, Daniel Trembly, Tucson, Ariz.
 Director, Department of Botanical Research, Carnegie Institute,
 Washington, D. C.
- Marsters, V. F., Kansas City, Mo., care of C. N. Gould, Fellow.....1893
 Geologist.
 Botany.
- McMullen, Lynn Banks, State Normal School, Valley City, N. D.,
 Head Science Department and Vice-President State Normal School.
 Physics, Chemistry.
- Miller, John Anthony, Swarthmore, Pa., Fellow.....1904
 Professor of Mathematics and Astronomy, Swarthmore College,
 Astronomy, Mathematics.

- Moore, George T., St. Louis, Mo.
 Director Missouri Botanical Garden.
 Botany.
- Noyes, William Albert, Urbana, Ill., Fellow.....1893
 Director of Chemical Laboratory, University of Illinois.
 Chemistry.
- Ransom, James H., Detroit, Mich., Fellow.....1902
 Chemistry.
- Reagan, A. B.
 Superintendent Indian School, Kayenta, Arizona.
 Geology, Paleontology, Ethnology.
- Smith, Alexander, care Columbia University, New York, Fellow.....1893
 Head of Department of Chemistry, Columbia University.
 Chemistry.
- Springer, Alfred, 312 E. Second St., Cincinnati, O.
 Chemist.
 Chemistry.
- Swain, Joseph, Swarthmore, Pa., Fellow.....1898
 President of Swarthmore College.
 Science of Administration.
- Waldo, Clarence A., 401 W. 18th St., New York City.....1893
 Mathematics, Mechanics, Geology and Mineralogy.
- Wiley, Harvey W., Cosmos Club, Washington, D. C., Fellow.....1895
 Professor of Agricultural Chemistry, George Washington Uni-
 versity.
 Biological and Agricultural Chemistry.
- Zeleny, Chas., 1003 W. Illinois St., Urbana, Ill.
 Professor of Experimental Zoology.
 Zoology.

ACTIVE MEMBERS.

- Acre, Harlan Q., Gordon, Nebr.
 Botany.
- Adams, Wm. B., 431 S. College Ave., Bloomington.
 Assistant in Botany, Indiana University.
- Allen, William Ray, 709 Atwater Ave., Bloomington.
 Zoology, Indiana University.
- Allison, Luna E., 435 Wood St., Lafayette.
 Care Agricultural Experiment Station.
 Botany.
- Anderegg, Frederick O., 322 Waldron St., West Lafayette.
 Assistant Professor of Chemistry, Purdue University.

- Anderson, Flora Charlotte, Route 5, Crawfordsville.
Botany.
- Atkinson, F. C., 2534 Broadway, Indianapolis.
Chemistry, American Hominy Company.
- Baldwin, Ira L., 601 University St., West Lafayette.
Instructor in Bacteriology, Purdue University.
- Baker, William Franklin, Indianapolis, care St. Vincent's Hospital.
Medicine, Roentgenology, Pathology.
- Barnhill, Dr. T. F., Indianapolis.
Professor of Surgery, Indiana University School of Medicine.
- Barr, Harry L., Stockland, Ill.
Botany and Physics.
- Bates, W. H., 403 Russell St., West Lafayette.
Associate Professor of Mathematics, Purdue University.
Mathematics.
- Beals, Colonzo C., 103 Russell St., Hammond.
Botany.
- Begeman, Hilda, Sanborn.
Physics.
- Begeman, Lulu, Sanborn.
Mathematics Teacher, Sanborn High School.
- Berteling, John B., 228 W. Colfax Ave., South Bend.
Medicine.
- Bishop, Harry Eldridge, 3344 Michigan Ave., Chicago.
Glass Container Association of Chicago.
- Bliss, G. S., Fort Wayne.
State School for Feeble Minded.
- Bond, Charles S., 112 N. Tenth St., Richmond.
Physician.
Biology, Bacteriology, Physical Diagnosis and Photomicrography.
- Bond, Dr. George S., Indianapolis.
Professor of Medicine, Indiana University School of Medicine.
- Bonns, Walter W., Indianapolis, care of Eli Lilly & Co.
Plant Physiology.
Director of Botanical Department.
- Bourke, A. Adolphus, 2304 Liberty Ave., Terre Haute.
Instructor, Physics, Zoology, and Geography.
Botany, Physics.
- Brossman, Charles, 1503 Merchants Bank Bldg., Indianapolis.
Consulting Engineer.
Water Supply, Sewage Disposal, Sanitary Engineering.

- Bruce, Edwin M., 2108 N. Tenth St., Terre Haute.
Professor of Chemistry, Indiana State Normal.
Chemistry.
- Bybee, Halbert P., University Station, Austin, Texas.
Adjunct Professor of Geology, University of Texas.
- Byers, Cecil W., 408 Russell St., West Lafayette.
Assistant in Physics, Purdue University.
- Campbell, Elmer G., 220 Sylvania St., West Lafayette.
Assistant Prof. Agricultural Botany, Purdue University.
- Canis, Edward N., Route A-2, Box 372-A, Indianapolis.
Nature Study.
- Caparo, Jose Angel, Notre Dame.
Professor of Physics and Mathematics, Notre Dame University.
Mathematics, Physics and Electrical Engineering.
- Carr, Ralph Howard, 27 N. Salisbury St., West Lafayette.
Professor of Agricultural Chemistry, Purdue.
- Carter, Edgar B., 2615 Ashland St., Indianapolis.
Director of Scientific Work, Swan-Myers Company,
Chemistry and Bacteriology.
- Chansler, Elias J., Bicknell.
Farmer.
Ornithology and Mammals.
- Chapman, Edgar K., 506 S. Grant St., Crawfordsville.
Professor of Physics, Wabash College.
- Christy, O. B., State Normal School, Muncie.
Botany and Agriculture.
- Clark, Jediah H., 126 E. Fourth St., Connersville.
Physician.
Medicine.
- Collins, Anna Mary, 2734 58th St., Seattle, Wash.
Zoology.
- Conner, S. D., 204 S. Ninth St., Lafayette.
Chemistry, Experiment Station.
- Coryell, Noble H., N. Y. City.
Department of Geology, Columbia University.
- Crockett, W. P., Shortridge High School, Indianapolis.
Physics Teacher.
- Dean, John C., University Club, Indianapolis.
Astronomy.
- Denny, Martha L., Manhattan, Kan.
Kansas Agricultural College.
Zoology.

- Deppe, C. A., Franklin.
Franklin College.
- Dietz, Harry F., State House, Indianapolis.
State Entomologist's Office.
Entomology.
- Dolan, Jos. P., Syracuse.
Lake Study.
- Douglas, Benjamin W., Trevlac.
Fruit Culture.
- Douglas, Mary, Attica.
Zoology.
- Downhour, D. Elizabeth, 1655 N. Alabama Street, Indianapolis.
Zoology and Botany, Teachers College.
- DuBois, Henry M., 1408 Washington Ave., LaGrande, Ore.
Paleontology and Ecology.
- Dukes, Richard G., Corner Seventh and Russell Sts., West Lafayette.
Purdue University.
Engineering.
- Earp, Samuel E., 634 Occidental Bldg., Indianapolis.
Physician.
Medicine.
- Edmonson, Clarence E., 822 Atwater St., Bloomington.
Dean of men, Indiana University.
Physiology.
- Eldred, Frank R., 3325 Kenwood Ave., Indianapolis.
Director, Scientific Dept., Eli Lilly & Co.
Chemistry.
- Emerson, Charles P., 602 Hume-Mansur Bldg., Indianapolis.
Dean Indiana University Medical College.
Medicine.
- Epple, Wm. F., 311 Sylvia St., West Lafayette.
Assistant in Dairy Chemistry, Experiment Station, Purdue University.
- Estabrook, Arthur H., Indianapolis, care Board of State Charities.
Heredity and Eugenics with Board of State Charities.
- Evans, Samuel G., 1452 Upper Second St., Evansville.
Merchant.
Botany, Ornithology.
- Felver, William P., Bay St., P. O. Box 486, Louis, Miss.
Geology, Chemistry.
- Fisher, L. W., Detroit, Michigan, care Parke, Davis & Co.
Zoology.
- Foresman, George Kedzie, 110 S. Ninth St., Lafayette.
Instructor in Chemistry, Purdue University.

- Friesner, Ray C., 71 Rutter Avenue, Indianapolis.
Charge of Botany, Butler College.
- Fuller, Frederic D., 4520 W. 28th St., Bryan, Texas.
Experiment Station,
Chemistry, Nutrition.
- Funk, Austin, 404 Spring Street, Jeffersonville.
Physician.
Diseases of Eye, Ear, Nose and Throat.
- Galloway, Jesse James, Geology Department, Columbia University, New
York City.
Geology, Paleontology.
- Gardner, Max W., West Lafayette, Purdue Experiment Station.
Plant Pathology.
- Gatch, Willis D., 605 Hume-Mansur Bldg., Indianapolis.
Professory of Surgery, Indiana University Medical School.
- Gates, Florence A., 3435 Detroit Ave., Toledo, O.
Teacher of Botany.
Botany and Zoology.
- Gidley, William, 236 Littleton St., West Lafayette.
Pharmacy, Purdue University.
- Gillum, Robert G., Terre Haute.
Professor of Chemistry, State Normal School.
Chemistry.
- Gingery, Walter G., Shortridge High School, Indianapolis.
Mathematics.
- Glenn, Earl R., 646 Park Avenue, New York City.
The Lincoln School of Teachers College, Columbia University.
Physics.
- Goldsmith, William Morton, Winfield, Kansas.
Professor of Zoology, Southwestern College.
Zoology.
- Gray, Harold, 511 Elwood Avenue, Cuyahoga Falls, Ohio.
Chemistry.
- Greene, Frank C., 30 N. Yorktown St., Tulsa, Okla.
Geology.
- Hadley, Joel W., 1127 Fairfield Avenue, Indianapolis.
Geology.
Teacher Chemistry and Biology.
- Hadley, Murray N., 608 Hume-Mansur Bldg., Indianapolis.
Physician.
Surgery.
- Hanna, U. S., Atwater Street, Bloomington.
Associate Professor of Mathematics, Indiana University.

- Hausford, Hazel Irene, S. Eastern Hospital for Insane, N. Madison.
Psychology.
- Happ, William, South Bend.
Botany.
- Harding, C. Francis, 503 University St., West Lafayette.
Head of Electrical Engineering, Purdue University.
- Harman, Paul M., 311 E. South Ave., Bloomington.
Physiology.
- Heimbürger, Harry V., St. Paul, Minn.
Instructor in Biology in Hamline University.
- Heimlich, Louis Frederick, 495 Littleton St., West Lafayette.
Instructor in Botany, Purdue University.
- Hemmer, Edwin John, Somerville.
Botany.
- Hendricks, Victor K., 5642 Kingsley Boulevard, St. Louis, Mo.
Assistant Chief Engineer, St. L. & S. F., Mo., Kan. & Texas; Mo.,
Okla. & Gulf Railroads.
Civil Engineering and Wood Preservation.
- Hess, Walter E., S. College Avenue, Greencastle.
Professor of Biology, DePauw University.
- Hetherington, John P., 417 Fourth St., Logansport.
Physician.
Medicine, Surgery, X-Ray, Electro-Therapeutics.
- Hinman, Jack J., Jr., State University, P. O. Box 313, Iowa City, Iowa.
Assistant Professor of Epidemiology, State University of Iowa,
Water Chemist and Bacteriologist, State Board of Health.
- Hitchens, A. Parker, care Eli Lilly & Co., Indianapolis.
Physician and Biologist.
- Hoffman, George L., care of Western Pennsylvania Hospital, Pittsburgh, Pa.
Bacteriology, Serology.
- Hole, Allen D., 615 National Road West, Richmond.
Professor of Geology, Earlham College.
Geology.
- Holman, Richard M., Crawfordsville.
Professor of Botany, Wabash College.
- Houseman, H. V., 300 S. Bradford St., Plattsville, Wis.
Chemistry and Physics.
- Howlett, Berton A., 503 Elm St., Valparaiso.
Associate Professor of Physics, Valparaiso University.
- Huber, Leonard L., Hanover.
Hanover College.
Chemistry and Biology.

- Hull, Julia, St. Anne, Ill.
Zoology.
- Hutchinson, Emory, Norman Station, Ind.
Zoology.
- Hutton, Joseph Gladden, Brookings, S. Dak.
Associate Professor of Agronomy, State College.
Agronomy and Earth Science.
- Hyslop, George, 200 Chatterton Parkway, White Plains, N. Y.
Cornell Medical School.
- Irving, Thos. P., Notre Dame.
Physics.
- Jackson, James W., Central High School, Chattanooga, Tenn.
Chemistry Teacher.
- Jackson, Thomas F., S N. Yorktown, Tulsa, Okla.
Geology.
- Jacobson, Moses A., 800 Fourth St., Portsmouth, Virginia.
Bacteriology.
- James, Evalyn G., 144 Butler Avenue, Indianapolis.
Botany.
- Jopling, John C., 119 W. Lake Avenue, Barberton, Ohio.
Chemist.
- Jordan, Charles Bernard, West Lafayette.
Director School of Pharmacy, Purdue University.
- Kaczmarcek, Regidius M., Box 54, Notre Dame.
Professor of Biology and Bacteriology.
Natural Science.
- Knotts, Armenis F., 800 Jackson St., Gary.
Nature Study.
- Kohl, Edwin J., University St., West Lafayette.
Instructor in Biology, Purdue University.
- Lieber, Colonel Richard, State House, Indianapolis.
Director, State Conservation Commission.
Conservation.
- Liston, Jesse G., R. F. D. No. 2, Lewis.
High School Teacher.
Geology.
- Ludwig, C. A., R. R. 1, Clemson College, S. C.
Agriculture, Botany.
- Ludy, L. V., 600 Russell St., West Lafayette.
Professor Experimental Engineering, Purdue University.
Experimental Engineering in Steam and Gas.

- Luten, Daniel B., 1056 Lemcke Annex, Indianapolis.
Bridge Engineer.
Applied Civil Engineering.
- Mahin, Edward G., 27 Russell St., West Lafayette.
Professor of Analytical Chemistry, Purdue University.
- Mains, E. B., 212 S. Grant St., West Lafayette.
U. S. Agricultural Experiment Station.
Plant Pathology and Mycology.
- Mallon, Marguerite, 221 Waldron Street, West Lafayette.
Instructor in Food Chemistry, Purdue University.
- Malott, Burton J., Indianapolis, Care Tech. High School.
Teacher in Physiography and Geology.
- Malott, Clyde A., 521 E. Second St., Bloomington.
Assistant Professor of Geology, Indiana University.
Geology.
- Mason, Thomas E., 130 Andrew Place, West Lafayette.
Assistant Professor of Mathematics, Purdue University.
- McCarty, Morris E.
- Miller, J. Ford, 946 N. Meridian St., Indianapolis.
Student in Zoology and Embryology.
- Miller, John W., 444 Littleton St., West Lafayette.
Instructor in Plant Physiology and Botany, Purdue University.
- Montgomery, Dr. H. T., 244 Jefferson Bldg., South Bend.
Geology.
- Morrison, Harold, Bureau of Entomology, Washington, D. C.
Entomology.
- Morrison, Louis, 80 S. West St., Richmond.
- Munro, G. W., 202 Waldron St., West Lafayette.
Mechanical Engineering.
- Myers, B. D., 321 N. Washington St., Bloomington.
Professor of Anatomy, Indiana University.
- Nelson, Ralph Emory, 232 Littleton St., West Lafayette.
Chemistry, Purdue University.
- Newman, G. B., Frysburg, Maine.
Entomology.
- Nicholson, Thomas E., 519 N. Fess Avenue, Bloomington.
Instructor in Psychology, Indiana University.
- Noyes, Harry A., 27 Cottage Street, Westfield, N. Y.
Research Chemist and Bacteriologist.
- Oberholzer, H. C., National Museum, Washington, D. C.
Biology.
- O'Neal, Claude E., Delaware, Ohio.
Botany.

- Orahoad, Harold, Kingman.
Geology.
- Orton, Clayton R., State College, Pa.
Professor of Botany, Penna. State College.
- Owen, D. A., 200 S. State St., Franklin.
Professor of Biology. (Retired.)
Biology.
- Papish, Jacob, Ithaca, N. Y.
Department of Chemistry, Cornell University.
Chemistry.
- Peffer, Harvey Creighton, 1022 7th St., West Lafayette.
Head School of Chemical Engineering, Purdue University.
- Petry, Edward J., 722 East 8th St., Brookings, South Dakota.
Professor of Botany, South Dakota State College.
- Pickett, Fermen L., Pullman College Station No. 36, Washington.
Botany.
- Pinkerton, Earl, Box 411, Walters, Okla.
Manager Walters Natural Gas Co.
- Prentice, Burr N., 400 Russell St., West Lafayette, Ind.
Assistant Professor of Forestry, Purdue University.
- Pressey, S. L., 801 Atwater Ave., Bloomington.
Instructor in Psychology, Indiana University.
- Pressey, Mrs. S. L., 801 Atwater Ave., Bloomington.
Student in Psychology, Indiana University.
- Price, Walter A., 123 Sheetz St., West Lafayette.
Associate Professor Entomology, Purdue University.
- Proulx, Edward G., 111 Waldron St., West Lafayette.
State Chemist, Agricultural Experiment Station.
- Richards, Aute, Norman, Oklahoma.
Professor of Zoology, Oklahoma University.
- Richards, Mrs Mildred Hoge, Norman, Oklahoma.
Zoology.
- Rifenburgh, S. A., Valparaiso, Ind.
Instructor Zoology, Valparaiso University.
- Rightsell, Raymond M., Shortridge High School, Indianapolis.
Teacher in Physics.
- Riley, Katherine Robert, 50 Whittier Place, Indianapolis.
- Roark, Louis, Box 1162, Tulsa, Okla.
Roxana Petroleum Company.
Petroleum Geologist.
- Roberts, R. Chester, Hougham Street, Franklin.
Chemistry Teacher.

- Sheak, William H., 162 N. 20th St., Philadelphia, Pa.
Mammalogy.
- Sherman, George W., 4 Murdock Flats, West Lafayette.
Assistant Professor of Physics, Purdue University.
- Shonle, Horace A., Care Eli Lilly & Company, Indianapolis.
Chemist.
- Showalter, Ralph W., Indianapolis.
Director Biological Department, Eli Lilly & Co.
Biology.
- Silvey, Oscar W., College Station, Texas.
Physics, University of Texas.
- Smith, Chas., Piper, 354 S. 10th St., San Jose, California.
Systematic Botany.
- Smith, John E., 63 S. Edwards Street, Franklin.
Professor of Physics.
- Snodgrass, R. E., 2063 Park Road, Washington, D. C.
U. S. Bureau of Entomology.
Entomology.
- Southgate, Helen A., 218 W. 6th St., Michigan City.
Biology.
- Spitzer, George, 1000 Seventh St., West Lafayette.
Dairy Chemist, Purdue University.
Chemistry.
- Spong, Philip, 3873 E. Washington St., Indianapolis.
Biology Student in Butler College.
- Stockdale, Paris, 521 E. 2nd Street, Bloomington.
Assistant in Geology, Indiana University.
- Stoné, Ralph Bushnell, 307 Russell St., West Lafayette.
Registrar and Assistant Professor of Mathematics, Purdue University.
- Sulzer, Elmer G., Madison.
Geology.
- Tatlock, Myron W., Shortridge High School, Indianapolis.
Teacher in Physics.
- Taylor, Joseph C., 117 Ninth St., Logansport.
Student in University of Wisconsin.
- Terry, Oliver P., 215 Sheetz St., West Lafayette.
Professor of Physiology, Purdue University.
- Tetrault, Philip Armand, 607 University St., West Lafayette.
Assistant Professor of Biology, Purdue University.
- Test, Louis A., 629 Russell Street, West Lafayette.
Professor of General Chemistry, Purdue University.
- Tevis, Emma Louise, 122 W. 18th St., Indianapolis.
Department Experimental Medicine, Eli Lilly & Co.

- Thompson, Clem O., Hanover.
Professor of Education, Hanover College.
- Thompson, David H., Champaign, Illinois.
Department of Experimental Zoology, University of Illinois.
Graduate Student in Zoology.
- Thornburn, A. D., 105 High Street, Indianapolis.
Chemist Pitman-Moore Company.
- Toole, E. H., Care Botany Dept., University of Wisconsin, Madison, Wis.
Botany, Plant Physiology and Pathology.
- Troop, James, West Lafayette.
Professor of Entomology, Purdue University.
- Turner, B. B., 1017 Park Ave., Indianapolis.
Associate Professor of Pharmacology, Indiana University School of
Medicine.
- Turner, William P., 222 Lutz Ave., Lafayette.
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- Voorhees, Herbert S., 804 W. Wildwood Ave., Fort Wayne.
Instructor in Chemistry and Botany, Fort Wayne High School.
Chemistry.
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Associate Professor of Botany, University of Georgia.
Botany.
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Professor of Botany.
Botany and Human Physiology.
- Wiancko, Alfred T., 230 S. Ninth St., Lafayette.
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Agronomy.
- Wildman, E. A., Earlham College, Richmond.
Chemistry.
- Wiley, Ralph Benjamin, 777 Russell St., West Lafayette.
Associate Professor of Hydraulic Engineering, Purdue University.
- Williams, A. A., Valparaiso.
Professor of Mathematics, Valparaiso University.
Mathematics, Astronomy.
- Wilson, Charles E., Agr. Exper. Sta., St. Croix, Virgin Islands, U. S. A.
Zoology and Economic Entomology.
- Wilson, Mrs. Mildred N., St. Croix, Virgin Islands, U. S. A.
Plant Physiology.

- Wilson, Mrs. Erita L., 2 Clarendon Ave., Detroit, Mich.
Botany and Zoology.
- Wilson, Ira T., 521 E. Kirkwood Avenue, Bloomington.
Assistant in Zoology, Indiana University.
- Wood, Harry W., Bloomington.
Geography and Geology, Extension Division, Indiana University.
- Wynn, Frank B., 421 Hume-Mansur Bldg., Indianapolis.
Professor of Pathology, Indiana University School of Medicine.
- Young, Gilbert A., 739 Owen St., Lafayette.
Head of Department of Mechanical Engineering, Purdue University.
- Yunker, Truman G., Wood Street, Greencastle.
Professor of Botany, DePauw University.
- Zehring, William Arthur, 303 Russell St., West Lafayette.
Assistant Professor of Mathematics, Purdue University.
Mathematics.

Fellows	58
Members, Active	198
Members and Fellows, Non-resident	34
	<hr/>
Total	290

SPRING MEETING.

State Forestry Reserve, Henryville, Indiana,
Thursday, May 22, 1919.

Business Meeting.

At 8:30 P. M. the meeting was called to order by the Vice President, Charles Stoltz, at the Forester's Residence of the State Forestry Reserve. The following named persons were present: Charles Stoltz, John S. Wright, D. M. Mottier, M. S. Markle, Frank B. Wade, H. F. Montgomery, Armanis Knotts, Mason L. Weems, Paul Weatherwax, J. M. Van Hook, Mabel Hansford, F. J. Pipal, Mr. Christie, B. A. Howlett, Walter Gingery, J. Ford Miller, and Howard E. Enders.

On motion, duly passed, the Academy is to make up the deficit incurred by the Ladies' Aid Society of Henryville in the preparation of supper for a larger number of visiting members than appeared.

The following named persons were nominated and duly elected to membership:

Frederick O. Anderegg, Assistant Professor Chemistry, Purdue University.
Hilda Begeman, Assistant in Physics, Indiana.
Lulu Begeman, Mathematics teacher, Sanborn H. S.
Mary Douglass, Student, Purdue, Attica.
Berton A. Howlett, Associate Professor Physics, Valparaiso University.
Julia O. Hull, Student, Purdue, St. Anne, Illinois.
Col. Richard Lieber, Director State Conservation Commission, Indianapolis.
J. Ford Miller, Student, Purdue, West Lafayette.
Edward G. Proulx, State Chemist, Purdue University.
George W. Sherman, Asst. Professor Physics, Purdue University.
Louis Agassiz Test, Prof. General Chemistry, Purdue University.

Armanis Knotts of Gary, introduced the matter of the next Spring Meeting. He invited the Academy to Gary and the Dunes, and guarantees free automobiles and provision to visit the points of interest on the dunes, the manufactories of Gary, and the Field Museum in Chicago. He also spoke of the work of the Dunes Park Association and its efforts to enlist interest in the project of making it a national park. Its preliminary step has been to secure an option on five hundred and twenty acres of land. Men of wealth are interested in its development but additional membership is solicited. Favorable expression was made by the members present.

John S. Wright explained the failure of the legislative appropriation for the publication of the Proceedings, through an oversight on the part of the enrolling clerk to include this item, together with two others, after they had been authorized. After a discussion of the subject it was moved and passed that the publication of the 1918 Proceedings proceed, and that the number of copies, and of free reprints to authors be reduced as much as necessary.

Announcement of plans for the next day was made.

Adjourned, 9:30 P. M. ♦

CHARLES STOLTZ, Vice President,
HOWARD E. ENDERS, Secretary.

FRIDAY MAY 23, 1919.

During the forenoon the members and guests joined Assistant Forester Deam in a tramp through the State Forestry Reserve, in a study of the various plantings and of the topography of the Reserve to the "Look-Out" and back to the Forester's Residence. At noon the party went by electric cars to New Albany and Silver Springs, thence by train to Marengo, where President E. B. Williamson and J. H. Williamson, together with F. M. Gange and A. C. Ruthven of the University of Michigan, joined in supper at the Murphy House. Twenty-one members and guests sat down to the supper, after which President Williamson called for informal remarks from a number of persons.

Informal business related to a reduction in the number of free reprints from the Proceedings so as to come within the unexpended balance of the publication fund.

Plans for the trip into Marengo Cave were announced, and immediately after supper the party made a tour of the cave under the leadership of a competent guide. The geological formations were studied and several cave animals were collected by Dr. Ruthven and others.

Heavy rains during the night led to a dispersal of the party early Saturday morning.

HOWARD E. ENDERS, Secretary.

WINTER MEETING.

Minutes of the Executive Committee.

Claypool Hotel, Indianapolis, Ind.,

December 4, 1919.

The Executive Committee was called to order at eight o'clock by President E. B. Williamson, in parlor "B". The following members were present: Wm. Blanchard, W. S. Blatchley, Amos W. Butler, W. A. Cogshall, Glenn Culbertson, C. H. Eigenmann, Howard E. Enders, A. L. Foley, Robert Hessler, W. A. McBeth, D. M. Mottier, Charles Stoltz, F. B. Wade, E. B. Williamson, John S. Wright, F. M. Andrews, C. C. Deam, H. S. Jackson and R. W. McBride.

The minutes of the last meeting of the Executive Committee were read and approved after which the reports of the standing committees were received.

Committee on Relation of Academy to State.

R. W. McBride reported on the failure of the legislative appropriation for 1919-1920. Through failure of the enrolling clerk, for some reason or other, to enter the twelve hundred dollar, (\$1,200) appropriation after it had passed the House and Senate. The history of the appropriation to the Academy was related and suggestions were made as to the mode of procedure.

The committee has prepared a resolution which it hopes may be communicated to every member of the legislature at its special session. It would also advise that each member of the Academy seek through his representative, to have the original appropriation restored.

It was pointed out that there had been no change in the wording of the original appropriation since it was made in 1909, and that it had thus passed the House and Senate but that it had been omitted by the enrolling clerk.

The report was received and on motion was duly passed. The Secretary is authorized to have five hundred (500) copies of this appropriation bill printed for distribution to members of the legislature, and a committee of three is to be appointed to formulate a letter to be sent by the Academy members to each member of the legislature.

A discussion followed on the advisability of asking for an increased appropriation but the consensus of opinion favored a request for twelve hundred dollars (\$1,200), the sum which the legislature intended to appropriate rather than to make an uncertain trial for a large amount, though the demands are urgent. The committee:

Howard E. Enders,
Stanley Coulter,
A. M. Kenyon.

Program Committee.

C. C. Deam and F. B. Wade reported that a program of fifty-seven (57) titles is printed, together with eleven delayed titles. Provision has been made with the Claypool Management for rooms to provide for a satisfactory rendering of the program and the banquet.

Committee on Biological Survey.

H. S. Jackson, chairman, reported that the work of the committee during the year had been chiefly to stimulate activity on the part of persons engaged in the work of the State, and it has thus secured the promise of two papers for the present meeting.

The report was then read which indicated, in part, the work accomplished in previous years and outlined the possibilities for early attention. It is advised that a committee be appointed to confer with the State Conservation commission, with a view to cooperate with it in extending the survey.

On motion: first, the report was received; second, a committee is to be named to prepare a resolution for presentation at the close of the Symposium on Friday evening. It is understood that the committee is to confer with the members of the Conservation Commission on this matter. Committee:

C. H. Eigenmann,
Glenn Culbertson,
H. S. Jackson.

Committee on State Library.

Amos W. Butler reported the very satisfactory condition of the Library of the Academy under careful direction of the State Librarian. Foreign publications are now beginning to arrive and are being bound as rapidly as volumes are completed. Extensive foreign and domestic exchanges are received. The report was accepted.

Committee on Distribution of Proceedings.

Howard E. Enders reported that the 1918 proceedings are on press and are promised for delivery in January or February.

The Membership Committee.

The Membership Committee nominates the following named persons for membership:

Wm. B. Adams, Asst. Botany, Indiana University.
 Price W. Allen, Asst. Prof. Entomology, Purdue University.
 Ira L. Baldwin, Instr. Bacteriology, Purdue University.
 Cecil W. Byers, Asst. Physics, Purdue University.
 Elmer G. Campbell, Asst. Prof. Agr. Botany, Purdue University.
 O. B. Christy, Prof. Botany and Agr., Muncie Normal School.
 G. H. A. Clowes, Physiological Chemist, Indianapolis.
 W. P. Crockett, Physics Teacher, Shortridge H. S., Indianapolis.
 Ray C. Friesner, Prof. Botany, Butler College.
 Max Wm. Gardner, Assoc. Botanist, Purdue Exper. Station.
 Joel W. Hadley, Teacher Chem. and Biol., Indianapolis.
 A. Parker Hitchens, Physician, Indianapolis.
 Evalyn G. James, Student in Botany, Indiana University.
 Marguerite G. Mallon, Instr. in Food Chem., Purdue University.
 John W. Miller, Instr. Plant Pathology, Purdue University.
 G. B. Newman, Instr. Entomology, Purdue University.
 Raymond M. Rightsell, Physics Teacher, Shortridge High School.
 R. Chester Roberts, Chemistry teacher, Franklin, Ind.
 Horace A. Shoule, Chemist, Indianapolis.
 John E. Smith, Professor of Physics, Franklin.
 Stephen S. Visher, Asst. Prof. Geology, Indiana University.
 Ira T. Wilson, Asst. in Zoology, Indiana University.
 Truman G. Yumcker, Professor of Biology, DePauw University.

Committee on Publication of Proceedings.

Editor L. F. Bennett's report was read in which he outlined the undue delay on the part of the printer, thus causing the unexpended funds of the Academy to revert to the General Fund of the State.

Treasurer's Report.

The balance in the Treasury, December 2, 1918.....	\$462.07
Dues collected	241.00
	\$703.07
Total	\$703.07
Expended	\$216.81
Balance, December 2, 1919	486.07
	\$703.07

On motion the report of Treasurer Blanchard is referred to the Auditing Committee for subsequent report.

Unfinished Business.

Chairman H. L. Bruner read the Revised Report of the Committee on the Establishment of a Research Endowment Fund.

On motion the report is accepted to be spread upon the minutes and is referred to the general business session.

The following named persons are nominated as fellows upon the recommendations of W. A. Cogshall, Amos Butler and F. B. Wade :

M. L. Fisher, Purdue University.

H. S. Jackson, Purdue University.

M. S. Markle, Earlham College.

Chas. Stoltz, South Bend.

Adjourned 10:30 P. M.

E. B. WILLIAMSON, President,
HOWARD E. ENDERS, Secretary.

Business Session.

Meeting called at 9 o'clock in Assembly Room of Claypool Hotel on December 5, 1919. The Executive Committee minutes were read and approved as read. Demarchus Brown, State Librarian, was called upon to present minutes on the relation of the State Library to our Proceedings and exchanges. The library serves as custodian, cataloguer, and binder.

President Williamson discussed causes that led to abandoning of the general winter meeting a year ago, prevalence of Influenza. The Conservation Bill went into effect April 1, 1919. It required the nomination of three members of Academy of Science from which the Governor of the State was to select one to serve on the committee. President Williamson appointed a canvassing committee to determine by correspondence who should be nominated. Stanley Coulter was so named by the Governor from the list of three submitted by the Secretary.

On motion, duly passed, the twenty-three persons nominated were elected to membership in the Academy.

On motion, the names of the four persons nominated for fellowship were elected fellows.

The Auditor's report was received.

The committee on The Establishment of the Research Endowment Foundation read its Revised Report.

On motion, duly passed, the plan as outlined is attempted as read with one correction as indicated on the printed copy.

Business having been concluded, the academy proceeded with the general program and papers, numbered one to seven, were taken up.

Adjourned, 12 o'clock noon.

Called Meeting of Executive Committee.

Meeting was called to order at 1:30 in Assembly Room. The report of the nominating committee was received as follows:

For Trustees of the Academy Foundation—

Amos Butler.

Robt. Hessler.

For Directors Research—

H. L. Bruner.

R. W. McBride.

John S. Wright.

Glen Culbertson.

A. L. Foley.

On motion, the nomination was accepted.

Adjourned, 1:35 P. M.

Business Session.

The meeting was called to order at 1:55 by President Williamson in Assembly Room. On motion, the two Trustees and five Directors proposed by the Executive Committee are elected to serve on the Research Endowment Foundation.

The Spring meeting was discussed. Invitations have been received from Gary, and Madison was suggested as a possibility.

Resolution on Metric System.

The general adoption of the Metric System was discussed and the following resolution was introduced.

WHEREAS, the Majority of the Nations are now using the Metric system.

WHEREAS, Science in all of its Departments, in all parts of the world, has adopted the Metric System.

THEREFORE, *Be it Resolved:* That the Indiana Academy of Science place itself on record as favoring and urging the compulsory use of the Metric system in the United States at once and that the Secretary of the Acad-

emy be instructed to send a copy of these resolutions to the President of the United States.

The suggestion of State Flower was discussed. The following resolutions were then presented.

The Resolution on State Flower.

WHEREAS the Indiana Legislature in 1913 (Acts of 1913 on page 967) passed a law making the Carnation the State Flower.

WHEREAS the Carnation is a native of Southern Europe and no specie or color is specified, and the Carnation does not lend itself to art.

THEREFORE, *Be it Resolved:* That the Legislature be asked to change the name of the State Flower to one that is a native of Indiana and is well adapted to art.

That the Flower should be native of every county of the State, and known to all, and by one name only, such as the Tulip Tree, Flowering Dogwood, May Apple, Blood Root, etc. On motion, the Academy expresses its approval of the resolution favoring a wild flower rather than a hothouse plant for the State Flower.

On motion, the Academy goes on record as favoring the blossom of the Tulip Tree as the State Flower.

Ajourned, 12 o'clock.

Sectional Meetings.

Physical Science including Geology, Geography, Physiology and Chemistry: The Biological sciences including Botany, Bacteriology, and Zoology. The Physical Science section was held in Parlor "B", W. A. Cogshall, chairman. The Biological section met in Assembly room, E. B. Williamson, chairman.

Academy Banquet.

The Academy Banquet in which sixty-three members participated, was held in the Claypool Hotel from 6:30 to 8:00 o'clock. A short business meeting was held at the close of the banquet at which Stanley Coulter, as chairman, read the report of the Nominating Committee. For President, H. L. Bruner; for Vice President, W. A. McBeth; Secretary, Howard E. Enders; Assistant Secretary, R. E. Holman; Press Secretary, F. B. Wade; Treasurer, Wm. M. Blanchard; Editor, F. Payne.

On motion, the above named officers were elected.

On motion, Stanley Coulter is to serve as committee, with the power to act, in an effort to bring about a closer affiliation between the State Academy and the American Association for Advancement of Science.

Suggestions were made favoring the latter part of May as most favorable time for the Spring meeting.

Adjournment.

General Evening Session.

An evening session at which papers of popular interest were presented was held in the Assembly Room of the Claypool Hotel beginning at 8:15. In a short business session the trustees and directors which had been nominated to serve on the Academy Research Foundation were elected.

Adjournment.

E. B. WILLIAMSON, President.
HOWARD E. ENDERS, Secretary.
INDIANAPOLIS, DECEMBER 5, 1919.

Revised Report of the Committee

Appointed To Consider the Establishment of a Research Endowment Fund.

TO THE MEMBERS OF THE INDIANA ACADEMY OF SCIENCE :

At the Bloomington meeting of the Academy, December, 1917, the report of the committee appointed to consider the advisability of establishing a research fund, was referred back to the committee for further revision, final action being postponed in order to give both the committee and the membership of the Academy ample time to consider the important project. Copies of the original report were sent to all members early in 1918. As a result of suggestions which have been received from many sources, the committee respectfully submits the following revised report.

R. W. McBRIDE,

J. S. WRIGHT,

H. L. BRUNER, Chairman,
COMMITTEE.

A PLAN FOR THE ESTABLISHMENT AND ADMINISTRATION OF A FUND FOR THE PROMOTION OF RESEARCH

Financial Management of the Fund.

Trustees—Election—Appointment—

The Academy shall organize a board of three trustees for the custody and financial management of a research endowment fund.

The treasurer of the Academy shall be *ex officio* a member of this board, and the other two members shall be nominated by the executive committee and elected by vote of the Academy membership.

The first board shall be constituted as follows: The treasurer of the Academy and one member elected for a term of three (3) years, and one member elected for a term of four (4) years.

Thereafter the trustees, other than the treasurer of the Academy, shall be elected for terms of four years. Vacancies in office caused by death or resignation shall be filled by appointment by the president of the Academy, but the appointment shall be merely to fill the unexpired term.

Bonds—

The trustees shall be required to furnish bonds in accordance with the amount of the funds intrusted to their keeping, the amount of bonds required to be subject to revision annually or with every accession to the fund of an amount of one thousand dollars (\$1,000.00) or more.

The fees for bonding the trustees shall be paid out of the current funds of the Academy, likewise all other expenses of administering the research endowment fund, until it shall reach an amount yielding twenty-five hun-

dred dollars (\$2,500.00) or more annually, whereon, at the option of the Academy, the cost of administration may, as far as compatible with the terms of the bequests to this fund, be paid out of the interest accruing from the fund.

The executive committee of the Academy shall appoint a standing committee which shall have charge of the bonding of trustees and be the custodian of the bonds.

Remuneration—

Trustees shall serve without pay, but shall be reimbursed for necessary expenses incurred in the actual performance of their duties.

Investments—

The trustees shall keep all research endowment funds invested in standard securities, such as are prescribed by law in Indiana for the investment of the legal reserve of life insurance companies. In the event real estate or property other than money is conveyed to the Academy for research purposes and is sold, the funds accruing from such sale shall be promptly reinvested in securities of the class named above.

The trustees shall select some well-established bank or trust company, having safety deposit boxes, as a custodian of all securities, moneys, and negotiable papers, etc.

Reports—

It shall be the duty of the trustees to make written sworn reports on the fund at each annual winter meeting of the Academy, and at such other times as the executive committee or the president of the Academy may designate.

Duties of Trustees—Financial—

The duties of the trustees of the fund shall be restricted chiefly to the financial management of the principal and the interest under the rules provided. They shall not as trustees have a voice in the appropriation of such proceeds as are available for research work, but shall turn them over to such committees or individuals as are properly designated by the Academy, to be employed in research work.

Establishment of the Research Endowment Fund.

This fund shall be established by the following methods:

(a) By annual appropriations from the current revenues of the Academy. It shall be the duty of the treasurer to report to the Academy at each annual meeting such an amount as in his judgment can be spared for this purpose. Funds so appropriated shall be irrevocable by the Academy.

(b) By conveying to this fund all fees from life members.

(c) By establishing the relationship of patron, with a fee of \$100.00, and conveying all such fees to this fund.

(d) By gifts, etc.

(e) Except when the conditions of individual bequests or gifts specify to the contrary, the annual proceeds of the fund shall be reinvested and become a part of the principal fund until the principal is sufficient to yield an annuity of two hundred dollars (\$200.00).

(f) In soliciting or accepting gifts an effort should be made to have the proceeds available for use at the discretion of the research committee, excepting those cases in which the donor wishes to favor special scientific interests and will contribute funds adequate to support researches in this line.

(g) It is recommended that donors of small bequests for special purposes should be persuaded, if possible, to give the Academy wide latitude in the use of the annuities, permitting them to accumulate, where necessary, until the total income shall be sufficient to accomplish substantial results.

(h) The establishment of prize funds is to be discouraged as incompatible with the main object of this fund, which is to aid men of proper training to do research work, by giving it support while in progress, especially where adequate resources would be unobtainable otherwise.

Scientific Administration.

The Academy, through its executive committee, shall organize a Research Committee composed of five *Fellows*, representing different departments of science, to administer the proceeds of this fund.

The first committee is to be nominated by the Executive Committee and elected by the members of the Academy—one for one (1) year, one for two (2) years, one for three (3) years, one for four (4) years, and one for five (5) years. Their successors are to be elected by the Academy members for terms of four years each, and two *Fellows* shall be nominated by the executive committee as candidates for each vacancy caused by the expiration of terms of office. Vacancies by resignation or death shall be filled by appointment by the president for the unexpired term, and if possible the one appointed shall represent the same department of science as the retiring member or a department not already represented on the committee.

Duties—

This committee shall receive and investigate applications for assistance in research work and present its recommendation in writing to the executive committee for confirmation.

Investigations in pure science shall have preference in making awards. Preference is likewise recommended for members of the Academy engaged upon valuable work for which other adequate resources are not available.

No awards shall be construed as binding on the Academy beyond the fiscal year for which they are made, nor for funds unearned by the endowment at the time at which the award is made. Nothing in this provision, however, is to be construed to prevent the Academy from continuing appro-

priations from year to year to aid in the completion of valuable work, but such continuance shall be by separate yearly allowances.

The research committee shall be the custodian of all apparatus of permanent value which shall be purchased through appropriations of the Academy.

Minor rules and regulations pertaining to other details of administration shall be made by the research committee and the executive committee of the Academy.

Remuneration—

Members of the research committee shall receive no remuneration for their services, but their necessary expenses, incurred in the actual performance of their duties, shall be paid by the Academy.

Beneficiaries' Requirements—

The research committee shall require from each beneficiary of the fund annually, or as frequently as it may deem expedient, a report regarding the progress of his research.

Researches supported by appropriations from the Academy may be published anywhere, provided in all cases, that due acknowledgment shall be made of such assistance. A copy of each publication not included in the Proceedings of the Academy shall be presented to the library of the Academy.

Apparatus purchased by beneficiaries from funds furnished by the Academy shall be the property of the Academy, and shall be subject to the order of the research committee, when the investigation for which it was provided is completed.

Notices—

Awards of financial assistance shall be made in writing, addressed to the trustees of the fund and signed by the chairman of the research committee, the president, and the secretary of the Academy.

Promotion Work—

It shall be the duty of the research committee to co-operate with the trustees of the fund and the executive committee, in giving suitable publicity to the plans of the Academy to establish this fund, and to invite contributions.

PROGRAM
OF THE
THIRTY-FIFTH ANNUAL MEETING
OF THE
Indiana Academy of Science
Claypool Hotel, Indianapolis
THURSDAY AND FRIDAY
December 4 and 5, 1919

OFFICERS

E. B. WILLIAMSON, Bluffton.....	President
DR. CHAS. STOLTZ, South Bend.....	Vice-President
HOWARD E. ENDERS, West Lafayette.....	Secretary
P. A. TETRAULT, West Lafayette.....	Asst. Secretary
FRANK B. WADE, Indianapolis.....	Press Secretary
W. M. BLANCHARD, Greencastle.....	Treasurer
LEE F. BENNETT, Janesville, Wis.....	Editor

General sessions of the Academy will be held in the Assembly Room of the Claypool Hotel. Section meetings in the Assembly Room and in the Palm Room.

Thursday, December 4, at 8:00 P. M., Executive Committee meets at Claypool Hotel.

GENERAL PROGRAM

Friday, December 4, at 9:00 A. M., Assembly Room, Claypool Hotel.

Business meeting.....	9:00 to 9:30 A. M.
General session.....	9:30 to 12:00 A. M.
Lunch	12:00 to 1:30 P. M.
Business meeting.....	1:30 to 2:00 P. M.
Section meetings.....	2:00 to 6:00 P. M.

Physical Sciences in Assembly Room. All lantern papers to be given in this room.

Biological Sciences in Palm Room.

Annual Academy Dinner, 6:30 P. M., Dining Room to be announced at meeting. Members who expect to be present at the dinner will please not fail to mail at once the enclosed card to Mr. F. B. Wade, 1039 West Twenty-seventh Street, Indianapolis, in order that plates may be reserved.

General session, 8:00 P. M., in Assembly Room.

No Saturday program is planned.

TITLES OF PAPERS TO BE READ.

The papers listed below will be read in the order in which they appear on the program except that certain portions of the program will be presented *pari passu* in sectional meetings. When a paper is called and the reader is not present, it will be dropped to the end of the list, unless by mutual agreement an exchange can be made with another, whose time is approximately the same. Where no statement of time was sent with the papers, they have been uniformly assigned ten minutes.

Opportunity will be given after reading of each paper for a brief discussion.

Whenever possible, authors should bring their papers typewritten and in shape for the editor of the proceedings to turn over to the printer. Drawings and other illustrations should also be ready for the engraver and delivered with the manuscript to the Secretary.

1. Whales and Whale Fisheries of the North Pacific Ocean—15 minutes—William Watson Woolen.
2. *Hydrangia Arborescens*, var. *sterilis* Torr. and Gray, as an Ornamental Plant—10 minutes—D. M. Mottier.
3. The Forest Problem in Indiana—20 minutes—lantern—B. W. Douglass.
4. The Irwin Expedition to Peru, Bolivia and Chile, lantern—35 minutes—Prof. C. H. Eigemann.
5. Lorenzo E. Daniels (Biographical Sketch)—5 minutes—W. S. Blatchley.
6. James E. Weyant (In Memoriam)—5 minutes—Frank B. Wade.
7. Trees as a Nature Lover Sees Them—20 minutes—lantern—Dr. Frank Wynn.
8. Correction of the Acoustics of the Auditorium of the Student Building of Indiana University—8 minutes—lantern—Arthur L. Foley.
9. A. New Method of Aerating Water—10 minutes—lantern—Arthur L. Foley and Will Scott.
10. Synchronous Leaping of Fish—5 minutes—Arthur L. Foley.

GENERAL PROGRAM.

8:00 P. M. Friday.

11. The Burden We Bear, a Study of the Problem of the Mental Defectives of Indiana—40 minutes—lantern—Amos W. Butler.

12. The Pelicans of Pyramid Lake—25 minutes—illustrated with moving pictures—Barton Warren Evermann, California Academy of Sciences, San Francisco, Cal.

13. The Department of Conservation, State of Indiana, Present and Future—The Division of Geology represented by W. N. Logan—5 minutes; The Division of Entomology, represented by Frank N. Wallace—10 minutes; The Division of Forestry, represented by Chas. C. Deam—5 minutes; The

Division of Lands and Waters, represented by Chas. G. Saners—5 minutes ;
 The Division of Fish and Game, represented by Geo. N. Mannfeld—15 minutes ;
 Concluding Remarks by the Director, Richard Lieber—10 minutes.

SECTION PROGRAM.

2:00 P. M. Friday.

Physical Sciences and all lantern papers in Parlor "B".
 Biological Sciences in Assembly Room.

PHYSICAL SCIENCES—GEOLOGY AND GEOGRAPHY.

14. Origin of Indianaite—15 minutes—lantern—W. N. Logan.
15. The Calumet Region—15 minutes—Chas. R. Dryer.
16. The Stratigraphy of the Chester Series of Indiana—10 minutes—charts—Clyde A. Malott and J. D. Thompson, Jr.
17. A Notable Case of Successive Stream Piracy—10 minutes—charts—Clyde A. Malott.
18. Nomenclature of Indiana Geological Formations—20 minutes—charts and maps—E. R. Cummings.
19. Beach Cusps—20 minutes—E. R. Cummings.

PHYSICS AND CHEMISTRY.

20. Ground Resistance—10 minutes—blackboard—R. R. Ramsey.
21. Defects in Mouthpieces of Telephones and Other Sound Recording Apparatus Shown by Sound Wave Photographs—10 minutes—lantern—Arthur L. Foley.
22. Retardation of a Sound Wave Moving Tangentially Along a Solid Wall—5 minutes—lantern—Arthur L. Foley.
23. A. New Method of Investigating the Electric Spark—5 minutes—lantern—Arthur L. Foley.
24. An Electric Device for indicating at a Power House, the Depth of Water in a Distant Reservoir—5 minutes—lantern—Arthur L. Foley.
25. The Spectrum of Phosphorescent Mercury—10 minutes—E. K. Chapman.
26. The Chemist and the Community—5 minutes—W. M. Blanchard.
27. Some Chemical Reactions with High Frequency Corona—20 minutes—lantern—F. O. Anderegg.
28. Segregation and Growth of Crystals in Bearing Metals—10 minutes—lantern—E. G. Mahin.
29. A Study of the Soils of Hancock County, Indiana—10 minutes—R. H. Carr, H. S. Copeland and E. Gentzler.

MATHEMATICS.

30. Checks on the Accuracy of Computations in the Solution of Triangles (by title only) A. M. Kenyon.

BIOLOGICAL SCIENCES.

Palm Room, 2:00 O'clock Friday.

BOTANY AND BACTERIOLOGY.

31. A Strange Phlox—4 minutes—charts—Elmer G. Campbell.
32. Additions to the Fungus Flora of Indiana—5 minutes—H. S. Jackson.
33. An Arrangement of the Ascomycetes of Indiana—10 minutes—Bruce Fink and Sylvia C. Fuson.
34. Indiana Plant Diseases, 1919—15 minutes—Max W. Gardner.
35. The Uredinales of Indiana, III—5 minutes—H. S. Jackson.
36. Prevalence of the Loose Smut of Wheat in Indiana—10 minutes—F. J. Pipal.
37. The Dodders of Indiana—10 minutes—T. G. Yunker.
38. Plants New or Rare to Indiana, IX—5 minutes—Chas. C. Deam.
39. Apparatus for Aerating Plants—5 minutes—F. M. Andrews.
40. A Study of Pollen, II—10 minutes—F. M. Andrews.
41. A Warming Needle for Arranging Specimens in Paraffin—5 minutes—F. M. Andrews.
42. The Relation of Hydrogen Ion Concentration and Titratable Acidity in Bacteriological Media—10 minutes—Ira L. Baldwin.
43. A List of the Parasitic Fungi of Montgomery County, Indiana—10 minutes—H. W. and P. J. Anderson, Massachusetts Agricultural College.
44. A Pipette for Holding and Measuring Sterile Fluids—5 minutes—Chas. A. Behrens.
45. The Cultivation of *Spirochaeta Novyii* Without the Use of Tissue—20 minutes—Chas. A. Behrens.

ZOOLOGY.

46. Influenza from a Biologic Viewpoint—10 minutes—Robert Hessler.
47. Notes on the Birds of Carroll, Monroe and Vigo Counties, Indiana—25 minutes—Barton Warren Evermann.
48. Selection for High and Low Bristle Number in the Mutant Strain "reduced"—15 minutes—F. Payne.
49. The Appearance of Fresh Water Medusae in Indiana—5 minutes—F. Payne.
50. The Inheritance of Orange Eye Color in *Drosophila*—10 minutes—F. Payne and Martha Denny.
51. An Ecological Note on the Andean Lapwing *Ptiloscoelus resplendens*—5 minutes—William Ray Allen.
52. Ecological Note on the Andean Frog, *Cyclorhynchus eulens*, Garman—5 minutes—William Ray Allen.
53. The Ingesting Mechanism of the Unioniade—10 minutes—charts—William Ray Allen.
54. Notes on the Biology of some common fireflies—10 minutes—specimens—Walter N. Hess.

55. The Orthoptera of Eastern North America—10 minutes—W. S. Blatchley.

56. Birds Singing at Night—5 minutes—M. L. Fisher.

57. The Life History of *Myobia Musculi*, a Parasite Upon Rats—10 minutes—chart—Howard E. Enders.

Come prepared to let the new program committee know where you want to go on the next annual spring trip.

Should the Academy do anything toward getting the metric system of weights and measures into more general use in this country?

Remember that we do not now plan to hold the meetings over to Saturday.

Our Treasurer will be on hand at the meeting to receive your annual dues. Perhaps you are in arrears on account of the loss of last year's meeting. Prescription, "Double the dose."

What did you do with that reply card in regard to the banquet? The Commissary Department must count noses. Mail it now.

ADDITIONAL TITLES.

58. A Case of Asphyxiation by Hydrogen Sulphide, Wm. M. Blanchard.

59. Stellite Mirrors for Astronomical Instruments, W. A. Cogshall.

60. Wild, or Indian Rice, (Title) Albert B. Reagan.

61. The Influenza and the Navajo, (Title) Albert B. Reagan.

62. A Trip in the Little Fork and Nett Lake Country, Minnesota, (Title) Albert B. Reagan.

63. A Trip Among the Rainy Lakes, (Title) Albert B. Reagan.

64. Bryozoa of the Stones River Group of Central Tennessee, (Title) H. N. Coryell.

65. A Synopsis of the Forms of Electron Platyrrhynchum, (Title) Harry C. Oberholser, U. S. National Museum.

66. Huffmans Lake: A Map, Its Original Conditions and Some Additional Observations on *Oscillatoria Prolifica*, Will Scott.

67. The Depletion of the Fishes of Lake Maxinkuckee by *Saprolegnia* sp., Will Scott and Howard E. Enders.

68. The Food of the Daphnids, Homer G. Fisher, with an introduction by Will Scott.

69. The Flood Myth of the Chippewas, A. B. Reagan.

70. Glacial Deposits in Pine River Valley, Colorado, A. B. Reagan.

71. Probable Eocene Deposits in the Fort Apache Region, Arizona, A. B. Reagan.

72. Some Notes on the Estimation of Chromium as Chromic Oxide, Wm. M. Blanchard and Pauline Norris.

73. The Mineral Resources of Indiana; How They Are Utilized, W. N. Logan.