

PROCEEDINGS

OF THE

Indiana Academy of Science

1912

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CHAS. C. DEAM, Editor

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INDIANAPOLIS :

WM. B. BURFORD, CONTRACTOR FOR STATE PRINTING AND BINDING

1913



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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, specially 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 discussions 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 of 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 or active members.

SEC. 2. Any person engaged in any department of scientific work, or in 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. Applications 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 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 this 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 Presidents, 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. 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.

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## BY-LAWS.

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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.

### 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 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.

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#### APPROPRIATION FOR 1912-1913.

The appropriation for the publication of the proceedings of the Academy during the years 1913 and 1914 was increased by the Legislature in the General Appropriation bill, approved March 9, 1909. That portion of the law fixing the amount of the appropriation for the Academy is herewith given in full:

For the Academy of Science: For the printing of the proceedings of the Indiana Academy of Science, twelve hundred dollars: *Provided*, That any unexpended balance in 1913 shall be available in 1914, and that any unexpended balance in 1914 shall be available for 1915.

#### AN ACT FOR THE PROTECTION OF BIRDS, THEIR NESTS AND EGGS.

SEC. 602. Whoever kills, traps or has in his possession any wild bird, or whoever sells or offers the same for sale, or whoever destroys the nest or eggs of any wild bird, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not less than ten dollars nor more than twenty-five dollars: *Provided*, That the provisions of 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 called rails, coots, mud-hens, gallinules; the Limicolæ, commonly called shore birds, surf birds, plover, snipe, woodcock, sandpipers, tattlers and curlew; the Gallinæ, commonly called wild turkeys, grouse, prairie chickens, quails and pheasants; nor to English or European house spar-

rows, crows, hawks or other birds of prey. Nor shall this section apply to persons taking birds, their nests or eggs, for scientific purposes, under permit, as provided in the next section.

SEC. 603. Permits may be granted by the Commissioner of Fisheries and Game to any properly accredited person, permitting the holder thereof to collect birds, their nests or eggs for strictly scientific purposes. In order to obtain such permit the applicant for the same must present to such Commissioner written testimonials from two well-known scientific men certifying to the good character and fitness of such applicant to be entrusted with such privilege, and pay to such Commissioner one dollar therefor and file with him a properly executed bond in the sum of two hundred dollars, payable to the State of Indiana, conditioned that he will obey the terms of such permit, and signed by at least two responsible citizens of the State as sureties. The bond may be forfeited, and the permit revoked upon proof to the satisfaction of such Commissioner that the holder of such permit has killed any bird or taken the nest or eggs of any bird for any other purpose than that named in this section.

#### PUBLIC OFFENSES—HUNTING WILD BIRDS—PENALTY.

[Approved March 13, 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, 1912-1913

PRESIDENT,

DONALDSON BODINE.

VICE-PRESIDENT,

SEVERANCE BURRAGE.

SECRETARY.

ANDREW J. BIGNEY.

ASSISTANT SECRETARY,

CHARLES M. SMITH.

PRESS SECRETARY,

FRANK B. WADE.

TREASURER,

W. J. MOENKHAUS.

EDITOR,

CHAS. C. DEAM.

### EXECUTIVE COMMITTEE:

ARTHUR, J. C.,	EIGENMANN, C. H.,	MOTTIER, DAVID M.,
BIGNEY, A. J.,	EVANS, P. N.,	MENDENHALL, T. C.,
BLATCHLEY, W. S.,	DENNIS, D. W.,	NAYLOR, JOSEPH P.,
BODINE, DONALDSON,	FOLEY, A. L.,	NOYES, W. A.,
BRANNER, J. C.,	HAY, O. P.,	STUART, MILO H.,
BUTLER, AMOS W.,	HESSLER, ROBERT,	WALDO, C. A.,
COULTER, JOHN M.,	JOHN, J. P. D.,	WILEY, H. W.,
COULTER, STANLEY,	JORDAN, D. S.,	WILLIAMSON, E. B.,
CULBERTSON, GLENN.	MEES, CARL L.,	WRIGHT, JOHN S.,
DRYER, CHAS. R.,	MOENKHAUS, W. J.,	

### CURATORS:

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

## COMMITTEES, 1912-1913

## PROGRAM,

J. W. BEEDE,	J. S. WRIGHT,	D. M. MOTTIER.
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## MEMBERSHIP,

E. R. CUMINGS,	E. S. JOHNNOTT,	F. B. WADE.
----------------	-----------------	-------------

## NOMINATIONS,

R. R. RAMSEY,	P. N. EVANS,	H. J. BANKER.
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## AUDITING,

L. J. RETTGER,		EDWIN MORRISON.
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## STATE LIBRARY,

H. E. BARNARD,	W. S. BLATCHLEY,	A. W. BUTLER.
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## RESTRICTION OF WEEDS AND DISEASES,

R. HESSLER,	J. N. HURTY,	A. W. BUTLER,
STANLEY COULTER,		D. M. MOTTIER.

## BIOLOGICAL SURVEY,

STANLEY COULTER.	J. C. ARTHUR,	J. M. VAN HOOK,
C. H. EIGENMANN,		U. O. COX.

## ACADEMY TO STATE,

R. W. McBRIDE,	G. CULBERTSON,	C. C. DEAM,
A. W. BUTLER.		W. W. WOOLLEN.

## DISTRIBUTION OF PROCEEDINGS,

H. E. BARNARD,	H. L. BRUNER,	G. W. BENTON,
W. J. MOENKHAUS,		A. J. BIGNEY.

## PUBLICATION OF PROCEEDINGS,

C. C. DEAM, Editor,	L. J. RETTGER,	C. R. DRYER.
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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 }		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. Scovell.
1898-1899	C. H. Eigenmann	John S. Wright	E. A. Schultze	Geo. W. Benton	J. T. Scovell.
1899-1900	D. W. Demis	John S. Wright	E. A. Schultze	Geo. W. Benton	J. T. Scovell.
1900-1901	M. B. Thomas	John S. Wright	E. A. Schultze	Geo. W. Benton	J. T. Scovell.
1901-1902	Harvey W. Wiley	John S. Wright	Donaldson Bodine	Geo. W. Benton	J. T. Scovell.
1902-1903	W. S. Blatchley	John S. Wright	Donaldson Bodine	G. A. Abbott	W. A. MeBeth.
1903-1904	C. L. Mees	John S. Wright	J. H. Ransom	G. A. Abbott	W. A. MeBeth.
1904-1905	John S. Wright	Lynn B. McMullen	J. H. Ransom	G. A. Abbott	W. A. MeBeth.
1905-1906	Robert Hessler	Lynn B. McMullen	J. H. Ransom	Charles R. Clark	W. A. MeBeth.
1906-1907	D. M. Mottier	Lynn B. McMullen	J. H. Ransom	G. A. Abbott	W. A. MeBeth.
1907-1908	Glen Culbertson	J. H. Ransom	A. J. Bigney	G. A. Abbott	W. A. MeBeth.
1908-1909	A. L. Foley	J. H. Ransom	A. J. Bigney	G. A. Abbott	W. A. MeBeth.
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.

## MEMBERS\*.

## FELLOWS.

††Abbott, G. A., Grand Forks, N. Dak.....	†1908
Professor of Chemistry, University of North Dakota.	
Chemistry.	
Aley, Robert J., Orono, Me.....	1898
President of University of Maine.	
Mathematics and General Science.	
Anderson, H. W., 1 Mills Place, Crawfordsville, Ind.....	1912
Professor of Botany, Wabash College.	
Botany.	
Andrews, F. M., 744 E. Third St., Bloomington, Ind.....	1911
Assistant Professor of Botany, Indiana University.	
Botany.	
Arthur, Joseph C., 915 Columbia St., Lafayette, Ind.....	1894
Professor of Vegetable Physiology and Pathology, Purdue Uni-	
versity.	
Botany.	
Barnard, H. E., Room 26, State House, Indianapolis, Ind.....	1910
Chemist to Indiana State Board of Health.	
Chemistry, Sanitary Science, Pure Foods.	
Beede, Joshua W., cor. Wall and Atwater Sts., Bloomington, Ind.....	1906
Associate Professor of Geology, Indiana University.	
Stratigraphic Geology, Physiography.	
Benton, George W., 100 Washington Square, New York, N. Y.....	1896
With the American Book Company.	

\* Every effort has been made to obtain the correct address and occupation of each member, and to learn what line of science he is interested in. 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.

††Non-resident.

- Bigney, Andrew J., Moores Hill, Ind. . . . . 1897  
 Vice-President and Professor of Biology and Geology, Moores Hill  
 College.  
 Biology and Geology.
- Bitting, Catharine Golden, West Lafayette, Ind. . . . . 1895  
 Microscopic Expert, Pure Food, U. S. Department of Agriculture,  
 Botany.
- Blatchley, W. S., 1558 Park Ave., Indianapolis, Ind. . . . . 1893  
 Naturalist.  
 Botany, Entomology and Geology.
- Bodine, Donaldson, Four Mills Place, Crawfordsville, Ind. . . . . 1899  
 Professor of Geology and Zoölogy, Wabash College,  
 Entomology and Geology.
- Breeze, Fred J., care American Book Company, New York, N. Y. . . . . 1910  
 With the American Book Company.  
 Geography.
- Bruner, Harry Lane, 324 S. Ritter Ave., Indianapolis, Ind. . . . . 1899  
 Professor of Biology, Butler College.  
 Comparative Anatomy, Zoölogy.
- Burrage, Severance, care Eli Lilly Co., Indianapolis, Ind. . . . . 1898  
 Charge of Biological Laboratory, Eli Lilly Co.  
 Bacteriology, Sanitary Science.
- Butler, Amos W., 52 Downey Ave., Irvington, Ind. . . . . 1893  
 Secretary, Indiana Board of State Charities,  
 Vertebrate Zoölogy, Anthropology, Sociology.
- Cogshall, Wilbur A., 423 S. Fess Ave., Bloomington, Ind. . . . . 1906  
 Associate Professor of Astronomy, Indiana University.  
 Astronomy and Physics.
- Cook, Mel T., New Brunswick, N. J. . . . . 1902  
 Professor of Plant Pathology, Rutgers College.  
 Botany, Plant Pathology, Entomology.
- Coulter, John M., care University of Chicago, Chicago, Ill. . . . . 1893  
 Head Department of Botany, Chicago University.  
 Botany.
- Coulter, Stanley, 213 S. Ninth St., Lafayette, Ind. . . . . 1893  
 Dean School of Science, Purdue University.  
 Botany, Forestry.

- Cox, Ulysses O., P. O. Box 81, Terre Haute, Ind. . . . . 1908  
 Head Department Zoölogy and Botany, Indiana State Normal.  
 Botany, Zoölogy.
- Culbertson, Glenn, Hanover, Ind. . . . . 1899  
 Chair Geology, Physics and Astronomy, Hanover College.  
 Geology.
- Cummings, Edgar Roscoe, 327 E. Second St., Bloomington, Ind. . . . . 1906  
 Professor of Geology, Indiana University.  
 Geology, Paleontology.
- Davisson, Schuyler Colfax, Bloomington, Ind. . . . . 1908  
 Professor of Mathematics, Indiana University.  
 Mathematics.
- Dean, Charles C., Bluffton, Ind. . . . . 1910  
 Druggist.  
 Botany.
- Dennis, David Worth, Richmond, Ind. . . . . 1895  
 Professor of Biology, Earlham College.  
 Biology.
- Dryer, Charles R., 35 Gilbert Ave., Terre Haute, Ind. . . . . 1897  
 Professor of Geography and Geology, Indiana State Normal.  
 Geography, Geology.
- Eigenmann, Carl H., 630 Atwater St., Bloomington, Ind. . . . . 1893  
 Professor Zoölogy, Dean of Graduate School, Indiana University.  
 Embryology, Degeneration, Heredity, Evolution and Distribution  
 of American Fish.
- Enders, Howard Edwin, 105 Quincy St., Lafayette, Ind. . . . . 1912  
 Associate Professor of Zoölogy, Purdue University.  
 Zoölogy.
- Evans, Percy Norton, Lafayette, Ind. . . . . 1901  
 Director of Chemical Laboratory, Purdue University.  
 Chemistry.
- Foley, Arthur L., Bloomington, Ind. . . . . 1897  
 Head Department of Physics, Indiana University.  
 Physics.
- Golden, M. J., Lafayette, Ind. . . . . 1899  
 Director of Laboratories of Practical Mechanics, Purdue Uni-  
 versity.  
 Mechanics.



- ††Goss, William Freeman M., Urbana, Ill. . . . . 1893  
Dean of College of Engineering, University of Illinois.
- Hathaway, Arthur S., 2206 N. Tenth St., Terre Haute, Ind. . . . . 1895  
Professor of Mathematics, Rose Polytechnic Institute.  
Mathematics, Physics.
- Hessler, Robert, Logansport, Ind. . . . . 1899  
Physician.  
Biology.
- Hurty, J. N., Indianapolis, Ind. . . . . 1910  
Secretary, Indiana State Board of Health.  
Sanitary Science, Vital Statistics, Eugenics.
- †Huston, H. A., Baltimore, Md. . . . . 1893
- Kern, Frank D., State College, Pa. . . . . 1912  
Professor of Botany, Pennsylvania State College.  
Botany.
- Lyons, Robert E., 630 E. Third St., Bloomington, Ind. . . . . 1896  
Head of Department of Chemistry, Indiana University.  
Organic and Biological Chemistry.
- McBeth, William A., 1905 N. Eighth St., Terre Haute, Ind. . . . . 1904  
Assistant Professor Geography, Indiana State Normal.  
Geography, Geology, Scientific Agriculture.
- †Marsters, V. F., Santiago, Chile . . . . . 1893
- Mees, C. L., Terre Haute, Ind. . . . . 1894  
President of Rose Polytechnic Institute.
- †Miller, John Anthony, Swathmore, Pa. . . . . 1904  
Professor of Mathematics and Astronomy, Swathmore College.  
Astronomy, Mathematics.
- Moenkhaus, William J., 501 Fess Ave., Bloomington, Ind. . . . . 1901  
Professor of Physiology, Indiana University.  
Physiology.
- Moore, Richard B., Denver, Colo. . . . . 1893  
With U. S. Bureau of Mines.  
Chemistry, Radio-activity.
- Mottier, David M., 215 Forest Place, Bloomington, Ind. . . . . 1893  
Professor of Botany, Indiana University.  
Morphology, Cytology.

- Naylor, J. P., Greencastle, Ind.,..... 1903  
 Professor of Physics, Depauw University.  
 Physics, Mathematics.
- †Noyes, William Albert, Urbana, Ill.,..... 1893  
 Director of Chemical Laboratory, University of Illinois.  
 Chemistry.
- Pohlman, Augustus G., 1100 E. Second St., Bloomington, Ind.,..... 1911  
 Professor of Anatomy, Indiana University.  
 Embryology, Comparative Anatomy.
- Ramsey, Rolla R., 615 E. Third St., Bloomington, Ind.,..... 1906  
 Associate Professor of Physics, Indiana University.  
 Physics.
- Ransom, James H., 323 University St., West Lafayette, Ind.,..... 1902  
 Professor of General Chemistry, Purdue University.  
 General Chemistry, Organic Chemistry, Teaching.
- Rettger, Louis J., 31 Gilbert Ave., Terre Haute, Ind.,..... 1896  
 Professor of Physiology, Indiana State Normal.  
 Animal Physiology.
- Rothrock, David A., Bloomington, Ind.,..... 1906  
 Professor of Mathematics, Indiana University.  
 Mathematics.
- Scott, Will, 731 Atwater St., Bloomington, Ind.,..... 1911  
 Assistant Professor of Zoölogy, Indiana University.  
 Zoölogy, Lake Problems.
- Shannon, Charles W., Norman, Okla.,..... 1912  
 With Oklahoma State Geological Survey.  
 Soil Survey, Botany.
- Smith, Albert, 1022 Seventh St., West Lafayette,..... 1908  
 Professor of Structural Engineering.  
 Physics, Mechanics.
- ††Smith, Alexander, care Columbia University, New York, N. Y.,..... 1893  
 Head of Department of Chemistry, Columbia University.  
 Chemistry.
- Smith, Charles Marquis, 910 S. Ninth St., Lafayette, Ind.,..... 1912  
 Professor of Physics, Purdue University.  
 Physics.

- Stone, Winthrop E., Lafayette, Ind. . . . . 1893  
 President of Purdue University.  
 Chemistry.
- ††Swain, Joseph, Swathmore, Pa. . . . . 1898  
 President of Swathmore College.  
 Science of Administration.
- Van Hook, James M., 639 N. College Ave., Bloomington, Ind. . . . . 1911  
 Assistant Professor of Botany, Indiana University.  
 Botany.
- ††Waldo, Clarence A., care Washington University, St. Louis, Mo. . . . . 1893  
 Thayer Professor Mathematics and Applied Mechanics, Wash-  
 ington University.  
 Mathematics, Mechanics, Geology and Mineralogy.
- ††Webster, F. M., Kensington, Md. . . . . 1894  
 Entomologist, U. S. Department of Agriculture, Washington, D. C.  
 Entomology.
- Westlund, Jacob, 439 Salisbury St., West Lafayette, Ind. . . . . 1904  
 Professor of Mathematics, Purdue University.  
 Mathematics.
- Wiley, Harvey W., Enos Club, Washington, D. C. . . . . 1895  
 Professor of Agricultural Chemistry, George Washington Univer-  
 sity.  
 Biological and Agricultural Chemistry.
- Woollen, William Watson, Indianapolis, Ind. . . . . 1908  
 Lawyer.  
 Birds and Nature Study.
- Wright, John S., care Eli Lilly Co., Indianapolis, Ind. . . . . 1894  
 Manager of Advertising Department, Eli Lilly Co.  
 Botany.

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*NON-RESIDENT MEMBERS.*

- Ashley, George H., Washington, D. C.
- Branner, John Casper, Stanford University, California.  
 Vice-President of Stanford University, and Professor of Geology.  
 Geology.

- Brannon, Melvin A., 207 Chestnut St., Grand Forks, N. D.  
 Professor of Botany.  
 Plant Breeding.
- 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, Zoölogy.
- Dorney, H. B., Urbana, Illinois.  
 Assistant Professor of Floriculture.  
 Botany, Floriculture.
- Duff, A. Wilmer, 43 Harvard St., Worcester, Mass.  
 Professor of Physics, Worcester Polytechnic Institute.  
 Physics.
- Evermann, Barton Warren, Bureau of Fisheries, Washington, D. C.  
 Chief, Alaska Fisheries Service.  
 Zoölogy.
- Fiske, W. A.
- Garrett, Chas. W., Room 718, Pennsylvania Station, Pittsburgh, Pa.  
 Librarian, Pennsylvania Lines West of Pittsburgh.  
 Entomology, Sanitary Sciences.
- Gilbert, Charles H., Stanford University, California.  
 Professor of Zoölogy, Stanford University.  
 Ichthyology.
- Greene, Charles Wilson, 814 Virginia Ave., Columbia, Mo.  
 Professor of Physiology and pharmacology, University of Missouri.  
 Physiology, Zoölogy.
- Hargitt, Chas. W., 909 Walnut Ave., Syracuse, N. Y.  
 Professor of Zoölogy, Syracuse University.  
 Hygiene, Embryology, Eugenics, Animal Behavior.
- Hay, Oliver Perry, U. S. National Museum, Washington, D. C.  
 Research Associate, Carnegie Institution of Washington.  
 Vertebrate Paleontology, especially that of the Pleistocene Epoch
- Hughes, Edward, Stockton, California.

- Jenkins, Oliver P., Stanford University, California.  
 Professor of Physiology, Stanford University.  
 Physiology, Histology.
- Jordan, David Starr, Stanford University, California.  
 President of Stanford University.  
 Fish, Eugenics, Botany, Evolution.
- Kingsley, J. S., Tufts College, Massachusetts.  
 Professor of Zoölogy, Tufts College.  
 Zoölogy.
- Knipp, Charles T., 913 W. Nevada St., Urbana, Illinois.  
 Assistant Professor of Physics, University of Illinois.  
 Physics, Discharge of Electricity thru Gases.
- MacDougal, Daniel Trembly, Tucson, Arizona.  
 Director, Department of Botanical Research, Carnegie Institute, Wash-  
 ington, D. C.  
 Botany.
- McMullen, Lynn Banks, State Normal School, Valley City, North Dakota.  
 Head, Science Department, State Normal School.  
 Physics, Chemistry.
- Mendenhall, Thomas Corwin, Ravenna, Ohio.  
 Retired.  
 Physics, "Engineering," Mathematics, Astronomy.
- Newsom, J. F., Palo Alto, California.  
 Mining Engineer.
- Purdue, Albert Homer, State Geological Survey, Nashville, Tenn.  
 State Geologist of Tennessee.  
 Geology.
- Reagan, A. B., Nett Lake School, Nett Lake, Minnesota.  
 Superintendent and Special Distribution Agent, Indian Service.  
 Geology, Paleontology, Ethnology.
- Slonaker, James Rollin, 334 Kingsley Ave., Palo Alto, California.  
 Assistant Professor of Physiology, Stanford University.  
 Physiology, Zoölogy.
- Springer, Alfred, 312 East 2d St., Cincinnati, Ohio.  
 Chemist.  
 Chemistry.

- Walker, Ernest, 524 Leverett St., Fayetteville, Arkansas.  
 Horticulturist, College of Agriculture, Arkansas University.  
 Horticulture.
- Wilson, Guy W

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*ACTIVE MEMBERS.*

- Allison, Evelyn, Lafayette, Ind.  
 Care Agricultural Experiment Station.  
 Botany.
- Baine, H. Foster, 120 Market St., San Francisco, Cal.  
 Editor, Mining and Scientific Press.
- Baker, Walter D., N. Illinois St., Indianapolis, Ind.  
 Care Walcraft Co.  
 Chemistry.
- Baker, Walter M., Amboy.  
 Superintendent of Schools.  
 Mathematics and Physics.
- Baiker, Howard J., 306 Hanna St., Greencastle.  
 Professor of Biology, DePauw University.  
 Botany.
- Bareus, H. H., Indianapolis.  
 Instructor, Mathematics, Shortridge High School.
- Barr, Harry L., Waveland.  
 Student.  
 Botany and Forestry.
- Barrett, Edward, Indianapolis.  
 State Geologist.  
 Geology, Soil Survey.
- Bates, W. H., 306 Russell St., West Lafayette.  
 Associate Professor, Mathematics.
- Bell, Guido, 431 E. Ohio St., Indianapolis.  
 Physician.
- Bellamy, Ray, Worcester, Mass.
- Bennett, Lee F., 825 Laporte Ave., Valparaiso.  
 Professor of Geology and Zoölogy, Valparaiso University.  
 Geology, Zoölogy.

- Bishop, Harry Eldridge, 1706 College Ave., Indianapolis.  
Food Chemist, Indiana State Board of Health.
- Blanchard, William M., 1608 S. College Ave., Greencastle.  
Professor of Chemistry, DePauw University.  
Organic Chemistry.
- Bond, Charles S., 112 N. Tenth St., Richmond.  
Physician.  
Biology, Bacteriology, Physical Diagnosis and Photomicrography.
- Bourke, A. Adolphus, 1103 Cottage Ave., Columbus.  
Instructor, Physics, Zoölogy and Geography.  
Botany, Physics.
- Brossmann, Charles, 1616 Merchants Bank Bldg., Indianapolis.  
Consulting Engineer.  
Water Supply, sewage disposal, sanitary engineering, etc.
- Brown, James, 5372 E. Washington St., Indianapolis.  
Professor of Chemistry, Butler College.  
Chemistry.
- Bruce, Edwin M., 2401 North Ninth St., Terre Haute.  
Assistant Professor of Physics and Chemistry, Indiana State Normal.  
Chemistry, Physics.
- Bryan, William Lowe, Bloomington.  
President, Indiana University.  
Psychology.
- Bybee, Halbert P., Bloomington.  
Graduate Student, Indiana University.  
Geology.
- Canis, Edward N., 2221 Park Ave., Indianapolis.  
Officeman with William Burford.  
Botany, Psychology.
- Carmichael, R. D., Bloomington.  
Assistant Professor of Mathematics, Indiana University.  
Mathematics.
- Caswell, Albert E., Lafayette.  
Instructor in Physics, Purdue University.  
Physics and Applied Mathematics.
- Chansler, Elias J., Bicknell.  
Farmer.  
Ornithology and Mammals.

- Clark, Jediah H., 126 East Fourth St., Connersville.  
 Physician.  
 Medicine.
- Comer, S. D., West Lafayette.
- Cox, William Clifford.
- Crowell, Melvin E., 648 E. Monroe St., Franklin.  
 Dean of Franklin College.  
 Chemistry and Physics.
- Cutter, George, Broad Branch Road, Washington, D. C.  
 Retired, Manufacturer of Electrical Supplies.  
 Conchology.
- Daniels, Lorenzo E., Rolling Prairie.  
 Retired Farmer.  
 Conchology.
- Davis, Melvin K., Anderson.  
 Instructor, Anderson High School.  
 Physiography, Geology, Climatology.
- Deppe, C. R., Franklin.
- Dietz, Harry F., 2719 Shriver Ave., Indianapolis.  
 Deputy State Entomologist.  
 Entomology, Eugenics, Parasitology, Plant Pathology.
- Dolan, Jos. P., Syracuse.
- Drew, David Abbott, 817 East Second St., Bloomington.  
 Instructor in Mechanics and Astronomy.  
 Astronomy, Mechanics, Mathematics and Applied Mathematics.
- Duden, Hans A., 5050 E. Washington St., Indianapolis.  
 Analytical Chemist.  
 Chemistry.
- Dutcher, J. B., Bloomington.  
 Assistant Professor of Physics, Indiana University.  
 Physics.
- Earp, Samuel E., 24½ Kentucky Ave., Indianapolis.  
 Physician.
- Edmonston, Clarence E., Bloomington.  
 Graduate Student, Physiology, Indiana University.  
 Physiology.



- Ellis, Max Mapes, Boulder, Colo.  
 Instructor in Biology, University of Colorado.  
 Biology, Entomology.
- Evans, Samuel G., 1452 Upper Second St., Evansville.  
 Merchant.  
 Botany, Ornithology.
- Ewers, James E., Terre Haute.  
 Instructor in High School.  
 Geology.
- Felver, William P., 325½ Market St., Logansport.  
 Railroad Clerk.  
 Geology, Chemistry.
- Fisher, Martin L., Lafayette.  
 Professor of Crop Production, Purdue University.  
 Agriculture, Soils and Crops, Birds, Botany.
- Frier, George M., Lafayette.  
 Assistant Superintendent, Agricultural Experiment Station, Purdue  
 University.  
 Botany, Zoölogy, Entomology, Ornithology, Geology.
- Fuller, Frederick D., 213 Russell St., West Lafayette.  
 Chief Deputy, State Chemist, Purdue Experiment Station.  
 Chemistry, Microscopy.
- Funk, Austin, 404 Spring St., Jeffersonville.  
 Physician.  
 Diseases of Eye, Ear, Nose and Throat.
- Galloway, Jesse James, Bloomington.  
 Instruction, Indiana University.  
 Geology, Paleontology.
- Gates, Florence A., 416 Irving St., Toledo, Ohio.  
 Teacher of Botany.  
 Botany and Zoölogy.
- Glenn, E. R., 535 North Walnut St., Bloomington.  
 Instructor in Physics, Bloomington High School.  
 Physics.
- Gottlieb, Frederic W., Morristown.  
 Care Museum of Natural History. Assistant Curator, Moores Hill  
 College.  
 Archaeology, Ethnology.

- Grantham, Guy E., 437 Vine St., West Lafayette.  
Instructor in Physics, Purdue University.
- Greene, Frank C., Missouri Bureau of Geology and Mines, Rolla, Mo.  
Geologist.  
Geology.
- Grimes, Earl J., Russellville.  
Care U. S. Soil Survey.  
Botany, Soil Survey.
- Haggerty, Melvin K., Bloomington.  
Professor of Psychology, Indiana University.  
Psychology.
- Harding, C. Francis, 111 Fowler Ave., West Lafayette.  
Professor of Electrical Engineering, Purdue University.  
Mathematics, Physics, Chemistry.
- Harman, Mary T., 611 Laramie St., Manhattan, Kansas.  
Instructor in Zoölogy, Kansas State Agricultural College.  
Zoölogy.
- Heimbürger, Harry V., 701 West Washington St., Urbana, Ill.  
Assistant in Zoology, University of Illinois.
- Hendricks, Victor K., 875 Benton Ave., Springfield, Mo.  
Assistant Chief Engineer, St. L. & S. F. R. R.  
Civil Engineering and Wood Preservation.
- Hetherington, John P., 418 Fourth St., Logansport.  
Physician.  
Medicine, Surgery, X-Ray, Electro-Therapeutics.
- Hilliard, Curtis M., West Lafayette.
- Hinman, J. J., Jr., 507 East Eleventh St., Indianapolis.  
City Chemist.  
Chemistry.
- Hole, Allen D., Richmond.  
Instructor, Earlham College.
- Hubbard, Lucius M., South Bend.  
Lawyer.
- Hutton, Joseph Gladden, Brookings, South Dakota.  
Associate Professor of Agronomy, State College.  
Agronomy, Geology.

- Hyde, Roscoe Raymond, Terre Haute.  
 Assistant Professor, Physiology and Zoölogy, Indiana State Normal.  
 Zoölogy, Physiology, Bacteriology.
- Ibison, Harry M., Marion.  
 Instructor in Science, Marion High School.
- Jackson, D. E., St. Louis, Mo.  
 Assistant Professor, Pharmacology, Washington University.
- Johnson, A. G., Madison, Wisconsin.
- Jones, Wm. J., Jr., Lafayette.  
 State Chemist, Professor of Agriculture and Chemistry, Purdue University.  
 Chemistry, and general subjects relating to agriculture.
- Kenyon, Alfred Monroe, 315 University St., West Lafayette.  
 Professor of Mathematics, Purdue University.  
 Mathematics.
- Kleinsmid, R. B., Jeffersonville.  
 Care Indiana Reformatory.
- Liebers, Paul J., 1104 Southeastern Ave., Indianapolis.
- Ludwig, C. A., 210 Waldron St., West Lafayette, Ind.  
 Assistant in Botany, Purdue University.  
 Botany, Agriculture.
- Ludy, L. V., 229 University St., Lafayette.  
 Professor, Experimental Engineering, Purdue University.  
 Experimental Engineering in Steam and Gas.
- Mason, T. E., Bloomington.  
 Graduate Student, Mathematics, Indiana University.  
 Mathematics.
- McBride, Robert W., 1239 State Life Building, Indianapolis.  
 Lawyer.
- McCulloch, T. S., Charlestown.
- Markle, M. S., Richmond.
- Middletown, A. R., West Lafayette.  
 Professor of Chemistry, Purdue University.  
 Chemistry.
- Miller, Fred A., 534 E. Twenty-ninth St., Indianapolis.  
 Botanist for Eli Lilly Co.  
 Botany, Plant Breeding.

Montgomery, Hugh T., South Bend.

Physician.

Geology.

Moore, George T., St. Louis, Mo.

Director, Missouri Botanical Garden.

Botany.

Morrison, Edwin, 80 S. W. Seventh St., Richmond.

Professor of Physics, Earlham College.

Physics and Chemistry.

Mowrer, Frank Karlsten, Interlaken, New York.

Cooperative work with Cornell University.

Biology, Plant Breeding.

Muncie, F. W.

Myers, B. D., 321 N. Washington St., Bloomington.

Professor of Anatomy, Indiana University.

Nieuwland, J. A., The University, Notre Dame, Ind.

Professor, Botany, Editor Midland Naturalist.

Systematic Botany, Plant Histology, Organic Chemistry.

North, Cecil C., Greencastle.

O'Neal, Claud E., Bloomington.

Graduate Student, Botany, Indiana University.

Botany.

Orton, Clayton R., State College, Pennsylvania.

Assistant Professor of Botany, Pennsylvania State College.

Phytopathology, Botany, Mycology, Bacteriology.

Osner, G. A., Ithaca, New York.

Care Agricultural College.

Owen, D. A., 200 South State St., Franklin.

Professor of Biology (Retired.)

Biology.

Owens, Charles E., Corvallis, Oregon.

Instructor in Botany, Oregon Agricultural College.

Botany.

Petry, Edward Jacob, 267 Wood St., West Lafayette.

Instructor in Agriculture.

Botany, Plant Breeding, Plant Pathology, Bio-Chemistry.

Phillips, Cyrus G., Moores Hill.

Pickett, Fermen L., Bloomington.

Botany Critic, Indiana University Training School.

Botany, Forestry Agriculture.

Pipal, F. J., 114 S. Salisbury St., West Lafayette.

Price, James A., Fort Wayne.

Ramsey, Earl E., Bloomington.

Principal High School.

Schultze, E. A., Laurel.

Fruit Grower.

Bacteriology, Fungi.

Silvey, Oscar W., 437 Vine St., West Lafayette.

Instructor in Physics.

Physics.

Smith, Chas. Piper, College Park, Md.

Associate Professor, Botany, Maryland Agricultural College.

Botany.

Smith, Essie Alma, R. F. D. 6, Bloomington.

Smith, E. R., Indianapolis.

Horticulturist.

Spitzer, George, Lafayette.

Dairy Chemist, Purdue University.

Chemistry.

Steele, B. L., Pullman, Washington.

Associate Professor of Physics, State College, Washington.

Stoltz, Charles, 530 N. Lafayette St., South Bend.

Physician.

Stoddard, J. M.

Stuart, M. H., 3223 N. New Jersey St., Indianapolis.

Principal, Manual Training High School.

Physical and Biological Science.

Sturmer, J. W., 119 E. Madison Ave., Collingswood, N. J.

Dean, Department of Pharmacy, Medico-Chirurgical College of Philadelphia.

Chemistry, Botany.

Taylor, Joseph C., Logansport.

Wholesale merchant.

Thompson, Albert W., Owensville.

Merchant.

Geology.

- Thompson, Clem O., Salem.  
Principal High School.
- Thorburn, A. D., Indianapolis.  
Care Pitman-Myers Co.  
Chemistry.
- Trueblood, Iro C. (Miss), 205 Spring Ave., Greencastle.  
Teacher of Botany, Zoölogy, High School.  
Botany, Zoölogy, Physiography, Agriculture.
- Tucker, W. M., 841 Third St., Chico, California.  
Principal High School.  
Geology.
- Turner, William P., Lafayette.  
Professor of Practical Mechanics, Purdue University.
- Vallance, Chas. A., Indianapolis.  
Instructor, Manual Training High School.  
Chemistry.
- Voorhees, Herbert S., 2814 Hoagland Ave., Fort Wayne.  
Instructor in Chemistry and Botany, Fort Wayne High School.  
Chemistry and Botany.
- Wade, Frank Bertram, 1039 W. Twenty-seventh St., Indianapolis.  
Head of Chemistry Department, Shortridge High School.  
Chemistry, Physics, Geology and Mineralogy.
- Waterman, Luther D., Indianapolis.  
Physician.
- Weems, M. L., 102 Garfield Ave., Valparaiso.  
Professor of Botany.  
Botany and Human Physiology.
- Weir, Daniel T., Indianapolis.  
Supervising Principal, care School office.  
School Work.
- Weyant, James E., Indianapolis.  
Teacher of Physics, Shortridge High School.  
Physics
- Wheeler, Virges, Montmorenci.
- Wiancko, Alfred T., Lafayette.  
Chief in Soils and Crops, Purdue University.  
Agronomy.

Williams, Kenneth P., Bloomington.

Instructor in Mathematics, Indiana University.

Mathematics, Astronomy.

Williamson, E. B., Bluffton.

Cashier, The Wells County Bank.

Dragonflies.

Wilson, Charles E., Bloomington.

Graduate Student, Zoölogy, Indiana University.

Zoölogy.

Wood, Harry W., 84 North Ritter Ave., Indianapolis.

Teacher, Manual Training High School.

Woodburn, Wm. L., 902 Asbury Ave., Evanston, Ill.

Instructor in Botany, Northwestern University.

Botany and Bacteriology.

Woodhams, John H., care Houghton Mifflin Co., Chicago, Ill.

Traveling Salesman.

Mathematics.

Yocum, H. B., Crawfordsville.

Young, Gilbert A., 725 Highland Ave., Lafayette.

Head of Department of Mechanical Engineering, Purdue University.

Zehring, William Arthur, 303 Russell St., West Lafayette.

Assistant Professor of Mathematics, Purdue University.

Mathematics.

Zeleny, Charles, University of Illinois, Urbana, Ill.

Associate Professor of Zoölogy.

Zoölogy.

Fellows .....	66
Members, Active .....	138
Members, Non-resident .....	29
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Total .....	233





MINUTES OF THE TWENTY-EIGHT ANNUAL MEETING  
INDIANA ACADEMY OF SCIENCE

CLAYPOOL HOTEL, November 28, 1912.

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The Executive Committee met at 7:30 p. m. in their annual session with Joseph P. Naylor, President, in the chair, and the following members present: Donaldson Bodine, A. L. Foley, W. S. Blatchley, W. A. Cogshall, D. M. Mottier, R. W. McBride, C. R. Dryer, W. J. Moenkhaus, L. J. Rettger, J. W. Beede, R. Hessler, J. S. Wright and A. J. Bigney.

The minutes of the meeting of the Executive Committee of 1911 were read and approved.

The reports of the standing committees were then taken up. The program committee, with J. W. Beede, Chairman, stated that their work had been performed as indicated by the published program.

The Membership Committee reported that they had sent out printed notices urging members to try to secure new members for the Academy. A goodly number of names would be reported on Friday.

On motion a committee consisting of Professors Bodine and Cogshall was appointed to revise the constitution.

The following persons were recommended as Fellows: Chas. W. Shannon, Brazil; H. W. Anderson, Crawfordsville; Chas. M. Smith, H. E. Enders, and Frank D. Kern, Lafayette.

Committees on Weeds and Biological Survey made no report.

The treasurer read a list of 47 members who were in arrears for dues for more than two years. On motion it was decided to drop these unless their dues are paid for by January 1, 1913.

J. S. Wright, reporting for the State Librarian, stated that not as many books had been bound as formerly on account of a lack of funds.

J. S. Wright also reported that of the 900 copies of the Proceedings printed, 108 had been sent to foreign exchanges, 88 to home exchanges, 200 to libraries, the remainder to the members and as reserves.

The Editor, L. J. Rettger, reported that his work had been completed as shown by the volume of Proceedings. He gave the committee some notion of the difficulty connected with this work.

The Treasurer made the following report:

Balance from 1911.....	\$263 70
Received from dues.....	236 50
	<hr/>
Total .....	\$500 20
Expenditures .....	225 82
	<hr/>
Balance .....	\$274 38

On motion, C. C. Deam was appointed Press Secretary, pro tem.

Dr. C. R. Dryer presented a communication from a Chicago committee relative to the conservation of Dune Park. On motion a committee was appointed to consider the communication. The following committee was appointed: Chas. R. Dryer, W. S. Blatchley, D. M. Mottier.

After discussing the general interest of the Academy, the committee adjourned.

GERMAN HOUSE, November 29, 1912.

The Indiana Academy of Science met in general session at 9:30 a. m. with President Joseph P. Naylor in the chair. The minutes of the Executive Committee were read and approved.

H. J. Banker stated that he had a number of separates of the List of Scientific Literature in College Libraries, as published in 1911 Proceedings, and that these were at the disposal of the members.

On motion the committee, consisting of H. J. Banker and Will Scott, was ordered to be continued.

On motion the powers of the above committee were extended to include other libraries in the State as they might deem wise and that the report should not be published until 1913 Proceedings.

The Committee on Revision of the Constitution reported through D. Badine, the report to be acted upon next year. The report is as follows:

### ARTICLE III.

SECTION 1. The President shall at each annual meeting appoint the standing committees.

SEC. 2. The annual meeting of the Academy shall be held in the city of Indianapolis on the Friday following Thanksgiving Day, 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 Program

Committee. Other meetings may be called at the discretion of the Executive Committee. The Executive Committee, together with the standing committees, shall constitute the Council of the Academy and represent it in the transaction of any necessary business not especially provided for in this Constitution: *Provided*, That no question of amendment shall be decided in the same session at which it is presented.

The Treasurer made the following report:

Balance from 1911.....	\$263 70
Receipts from dues.....	236 50
	<hr/>
Total .....	\$500 20
Expenditures .....	225 82
	<hr/>
Balance .....	\$274 38

Accepted and referred to Auditing Committee.

The Membership Committee reported the following applicants for membership:

Bryan, Wm. L. ....	Bloomington
Brown, James .....	Irvington
Bybee, Halbert P. ....	Bloomington.
Carmichael, R. D. ....	Bloomington.
Comer, S. D. ....	West Lafayette
Edmonson, C. E. ....	Bloomington
Hilliard, Curtis Morrison.....	West Lafayette
Hinman, J. J., Jr. ....	Indianapolis, 507 E. Eleventh
Kleinsmid, R. B. ....	Jeffersonville
Mason, T. E. ....	Bloomington
North, Cecil C. ....	Greencastle
O'Neal, Claude E. ....	Bloomington
Phillips, Cyrus G. ....	Meores Hill
Price, Hugh B. ....	Greencastle
Ramsey, Earl E. ....	Bloomington
Thomas, Cecil C. ....	Crawfordsville
Wilson, Chas. E. ....	Bloomington
Wood, Harry W. ....	Indianapolis
Yocum, Harry B. ....	Crawfordsville

On motion they were elected to membership.

The following members were elected as Fellows on recommendation of Executive Committee:

Anderson, H. W. ....	Crawfordsville
Enders, B. E. ....	West Lafayette
Kern, Frank D. ....	West Lafayette
Shannon, Chas. W. ....	Norman, Oklahoma
Smith, Chas. M. ....	West Lafayette

The Academy then took up the regular program in general session.

#### AFTERNOON SESSION.

Academy met in general session at 1:30.

On motion, H. J. Banker and L. J. Rettger were added to the Committee on Nominations.

President Naylor announced the following standing committees:

Program—J. W. Beede, J. S. Wright, D. M. Mottier.

Membership—E. R. Cummings, E. S. Johnnot, F. B. Wade.

Nominations—R. R. Ramsey, P. N. Evans, H. J. Banker.

Auditing—L. J. Rettger, Edwin Morrison.

State Library—H. E. Barnard, W. S. Blatchley, A. W. Butler.

Restriction of Weeds and Diseases—R. Hessler, J. N. Hurty, A. W. Butler, Stanley Coulter, D. M. Mottier.

Directors of Biological Survey—Stanley Coulter, J. C. Arthur, J. M. Van Hook, C. H. Eigenmann, U. O. Cox.

Relations of the Academy to the State—R. W. McBride, G. Culbertson, C. C. Deam, A. W. Butler, W. W. Woollen.

Distribution of Proceedings—H. E. Barnard, H. L. Bruner, A. J. Bigney, C. W. Benton, W. J. Moenkhaus.

Publication of Proceedings—C. C. Deam, Editor, L. J. Rettger, C. R. Dryer.

On motion the Program Committee was instructed to co-operate with the Executive Committee of the Conservation Commission in preparing a Symposium on Conservation to be presented as a part of the Academy program next year.

The State Librarian reported, per J. S. Wright, that foreign and home exchanges to the number of 365 volumes had been bound during the past year.

On motion it was decided to refer the preparation of a topographic map of Indiana to the committee on the Relation of the Academy to the

State, instructing them to urge the State Legislature to co-operate with the U. S. Government in making such a map.

The Committee on Nominations reported as follows:

Donaldson Bodine, President; Severance Burrage, Vice-President; A. J. Bigney, Secretary; C. M. Smith, Assistant Secretary; F. B. Wade, Press Secretary; W. J. Moenkhaus, Treasurer; C. C. Deam, Editor.

On motion of L. J. Rettger, the Program Committee was instructed to have the meeting next year late in October, or early in November. This closed the work of general session and the Academy passed to sectional meetings.

#### EVENING SESSION.

The Academy met in the Auditorium of the Y. M. C. A. Building. The following illustrated lectures were given and greatly appreciated:

An Experimental Investigation of Certain Pharmacological Reactions—D. W. Jackson.

The Photography of Sound Waves—A. L. Foley.

A Brief Account of the Indiana University Expedition to Columbia, South America—C. H. Eigenmann.

Adjournment.

J. P. NAYLOR, President.

A. J. BIGNEY, Secretary.



PROGRAM OF THE TWENTY-EIGHTH ANNUAL MEETING  
INDIANA ACADEMY OF SCIENCE

GERMAN HOUSE, INDIANAPOLIS, INDIANA.

November 28, 29, 1912.

JOSEPH P. NAYLOR, President.

DONALDSON BODINE, Vice-President.

A. J. BIGNEY, Secretary.

W. J. MOENKHAUS, Treasurer.

THURSDAY, NOVEMBER 28, 7:30 P. M.

*Meeting of the Executive Committee at the Claypool Hotel.*

FRIDAY, NOVEMBER 29, 9:00 A. M.

*Business.*

Birds that Destroy Grapes, 10 m.....	Amos W. Butler
The Protection of Our Rivers from Pollution, 15 m.....	Jay Craven
The Potability of Surface and Ground Waters of Indiana, 15 m.....	.....H. E. Barnard
*The Problem of the Psychology of Adolescent Crime, 20 m.....	.....R. B. Kleinsmid
The Human Factor, 30 m.....	M. E. Haggerty
Theory and Practice, 15 m.....	W. L. Bryan
A Natural Bridge in Parke County, Indiana, 5 m.....	Charles R. Dryer

FRIDAY, NOVEMBER 29, 1:30 P. M.

BUSINESS.

*Sectional Meetings.*

SECTION I.

A Heronry near Indianapolis, 10 m.....	Amos W. Butler
Further Notes on Indiana Birds, 15 m.....	Amos W. Butler
Food and Methods of Feeding of Fresh Water Mussels, 15 m.....	.....William R. Allen
Further Notes on the Seedless Persimmon in Indiana, 5 m.....	D. M. Mottier
A Revision of the Mosses of Monroe County, Indiana, 5 m.....	F. L. Pickett
On the Age of Corms in <i>Arisaema triphyllum</i> , 5 m.....	F. L. Pickett
Acetic Alcohol as a fixing Agent in Plant Histology, 5 m.....	F. L. Pickett
Plants New to Indiana, 15 m.....	Charles C. Deam

\* Papers not presented.

The Influence of Certain Environic Factors on the Development of Fern Prothallia. 10 m.....	D. M. Mottier
Report of the work in Corn Pollination—IV. 5 m.....	M. L. Fisher
Conjugation in Spirogyra. 10 m.....	F. M. Andrews
An Instructive Modification of an Old Experiment. 3 m.....	Howard J. Banker
*Summer Conditions of Indiana Lakes. 15 m.....	Will Scott
Photosynthesis in Submerged Terrestrial Plants. 5 m.....	H. V. Heimberger
Indiana Fungi—III. 5 m.....	J. M. Van Hook
*Observations upon Some Onion Diseases in Indiana. 15 m.....	C. R. Orton
Fungous Enemies on the Sweet Potato in Indiana. 10 m.....	C. A. Ludwig
Notes on Some Puff-Balls of Indiana. 10 m.....	Frank D. Kern
*Further Studies of the Growth Rate of the White Ash in Indiana. 10 m.....	Stanley Coulter
The Cultivation and Improvement of Medicinal Plants. 10 m.....	F. A. Miller
The Diagnostic Value of Certain Characteristics of the Starch Grain. 10 m.....	R. B. Harvey
*Cocklebur. 10 m.....	F. J. Pipal

## SECTION II.

An Experimental Investigation of Certain Pharmacological Reactions. (Lantern) 20 m.....	D. W. Jackson
Butter Fat Analysis. 20 m.....	George Spitzer
Nascent Elements. 15 m.....	J. H. Ransom
The Penetration of Wood by Zinc Chloride. 15 m.....	Edward G. Mahin
Coniology. 20 m.....	Robert Hessler
A Statistical Study of the Streptococci from Milk and from the Human Throat. 15 m.....	E. C. Stowell, C. M. Hilliard and M. J. Schlesinger
On the Atomic Structure of Energy. 15 m.....	A. E. Caswell
Some Observations upon the Crystal Habit of Synthetic Gems of the Corundum Type, with Application to the Problem of Proper Cutting of the Gems. 10 m.....	Frank B. Wade
On Linear Difference Equations of the First Order, with Rational Coefficients. 5 m.....	Thomas E. Mason
Notes on the Intersection of Osculating Planes to the Twisted Cubic. 10 m.....	A. M. Kenyon
Young's Modulus of Steel in a Magnetic Field. 10 m.....	Edwin Morrison
Terraces of the Wabash Valley in Parke, Vermillion and Vigo Counties. 10 m.....	Charles R. Dryer
The Raccoon Valley, Parke County, Indiana. 20 m.....	Charles R. Dryer



- \*Notes on the Relation of the Native Vegetation to Surface Geology  
as Observed in Indiana. By title.....C. W. Shannon
- \*The Mansfield Sandstone Area of Indiana. By title.....C. W. Shannon
- Remarks on the Value of Core Drilling in Regions of Questionable  
Stratigraphic Succession. 10 m.....J. W. Beede
- The Determination of Hydrogen, Methane and Nitrogen in Gas by  
Combustion in Quartz Tube. 2 m.....F. C. Mathers and Ira Lee
- New Methods for the Preparation of Selenates. 2 m.....  
.....F. Mathers and J. Otto Frank
- A New Qualitative Test for Chlorides in the Presence of Bromides  
and Iodides. 2 m.....F. C. Mathers and Ira Lee
- Electroplating in Colloidal solutions. 10 m.....James E. Weyant

EVENING SESSION, 8:15 P. M.

- The Photography of Sound Waves. Lantern. 20 m.....A. L. Foley
- A Brief Account of the Indiana University Expedition to Columbia,  
Lantern. 30 m.....C. H. Eigenmann
- Papers not Read at the Previous Sessions.

