

NEW YORK BOTANICAL
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Proceedings of the
Indiana Academy
of Science
1902

PROCEEDINGS

OF THE

Indiana Academy of Science

1902.

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JOHN S. WRIGHT.

INDIANAPOLIS, IND.

1903

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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 body, 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,

Preamble.

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.

Publication of the Reports of the Indiana Academy of Science.

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 services, 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

Editing Reports.

Number of printed Reports.

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,

Proviso.

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

Disposition
of Reports.

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 Indiana 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

Emergency.

immediate taking effect of this act, and it shall therefore take effect and be in force from and after its passage.

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

[Approved March 5, 1891.]

SECTION 1. *Be it enacted by the General Assembly of the State of Indiana,* That it shall be unlawful for any person to Birds.
kill any wild bird other than a game bird, or purchase, offer for sale any such wild bird after it has been killed, or to destroy the nests or the eggs of any wild bird.

SEC. 2. For the purpose of this act the following shall Game birds.
be considered game birds: the Anatidæ, commonly called swans, geese, brant, and river and sea ducks; the Rallidæ, commonly known as rails, coots, mudhens, and gallinules; the Limicolæ, commonly known as shore birds, plovers, surf birds, snipe, woodcock and sandpipers, tattlers and curlews; the Gallinæ, commonly known as wild turkeys, grouse, prairie chickens, quail, and pheasants, all of which are not intended to be affected by this act.

SEC. 3. Any person violating the provisions of Section 1 of this act shall, upon conviction, be fined in a sum not Penalty.
less than ten nor more than fifty dollars, to which may be added imprisonment for not less than five days nor more than thirty days.

SEC. 4. Sections 1 and 2 of this act shall not apply to any person holding a permit giving the right to take birds Permits.
or their nests and eggs for scientific purposes, as provided in Section 5 of this act.

SEC. 5. Permits may be granted by the Executive Board Permits to Science.
of the Indiana Academy of Science 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 said Board written testimonials from two well-known scientific men certifying to the good character and fitness of said applicant to be entrusted with such privilege and pay to said Board one dollar to defray the necessary expenses attending the granting of such permit, and must file with said Board a Bond.
properly executed bond in the sum of two hundred dollars, signed by at least two responsible citizens of the State as sureties. The bond shall be forfeited to the State and the permit become Bond forfeited.
void upon proof that the holder of such permit has killed

any bird or taken the nests or eggs of any bird for any other purpose than that named in this section and shall further be subject for each offense to the penalties provided in this act.

Two years. **SEC. 6.** The permits authorized by this act shall be in force for two years only from the date of their issue, and shall not be transferable.

Birds of prey. **SEC. 7.** The English or European House Sparrow (*Passer domesticus*), crows, hawks, and other birds of prey are not included among the birds protected by this act.

Acts repealed. **SEC. 8.** All acts or parts of acts heretofore passed in conflict with the provisions of this act are hereby repealed.

Emergency. **SEC. 9.** An emergency is declared to exist for the immediate taking effect of this act, therefore the same shall be in force and effect from and after its passage.

OFFICERS, 1902-1903.

PRESIDENT,

WILLIS S. BLATCHLEY.

VICE-PRESIDENT.

CARL L. MEES.

SECRETARY,

JOHN S. WRIGHT.

ASSISTANT SECRETARY,

DONALDSON BODINE.

PRESS SECRETARY,

G. A. ABBOTT.

TREASURER,

W. A. MCBETH.

EXECUTIVE COMMITTEE.

W. S. BLATCHLEY,	D. W. DENNIS,	J. L. CAMPBELL,
CARL L. MEES,	C. H. EIGENMANN,	O. P. HAY,
JOHN S. WRIGHT,	C. A. WALDO,	T. C. MENDENHALL,
DONALDSON BODINE,	THOMAS GRAY,	JOHN C. BRANNER,
G. A. ABBOTT,	STANLEY COULTER,	J. P. D. JOHN,
W. A. MCBETH,	AMOS W. BUTLER,	JOHN M. COULTER,
HARVEY W. WILEY,	W. A. NOYES,	DAVID S. JORDAN.
M. B. THOMAS,	J. C. ARTHUR,	

CURATORS.

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

COMMITTEES, 1902-1903.

PROGRAM.

MEL. T. COOK,

GLENN CULBERTSON.

MEMBERSHIP.

A. W. BUTLER,

DONALDSON BODINE,

G. A. ABBOTT.

NOMINATIONS.

THOMAS GRAY,

M. B. THOMAS,

C. H. EIGENMANN.

AUDITING.

W. S. BLATCHLEY,

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STATE LIBRARY.

A. W. BUTLER,

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LEGISLATION FOR THE RESTRICTION OF WEEDS.

STANLEY COULTER,

JOHN S. WRIGHT,

M. B. THOMAS.

PROPAGATION AND PROTECTION OF GAME AND FISH.

C. H. EIGENMANN,

A. W. BUTLER,

W. S. BLATCHLEY.

EDITOR.

DONALDSON BODINE, Wabash College, Crawfordsville.

DIRECTORS OF BIOLOGICAL SURVEY.

C. H. EIGENMANN,

M. B. THOMAS,

J. C. ARTHUR,

DONALDSON BODINE,

STANLEY COULTER.

RELATIONS OF THE ACADEMY TO THE STATE.

C. A. WALDO,

W. J. KARSLAKE,

R. W. MCBRIDE.

GRANTING PERMITS FOR COLLECTING BIRDS AND FISHES.

A. W. BUTLER,

STANLEY COULTER,

W. S. BLATCHLEY.

DISTRIBUTION OF THE PROCEEDINGS.

A. W. BUTLER,

J. S. WRIGHT,

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H. L. BRUNER.

OFFICERS OF THE INDIANA ACADEMY OF SCIENCE.

YEARS.	PRESIDENT.	SECRETARY.	ASST. SECRETARY.	PRESS SECRETARY.	TREASURER.
1885-6.....	David S. Jordan..	Amos W. Butler..	.....	.....	O. P. Jenkins.
1886-7.....	John M. Coulter..	Amos W. Butler..	.....	.....	O. P. Jenkins.
1887-8.....	J. P. D. John	Amos W. Butler..	.....	.....	O. P. Jenkins.
1888-9.....	John C. Brammer..	Amos W. Butler..	.....	.....	O. P. Jenkins.
1889-90....	T. C. Mendenhall.	Amos W. Butler..	.....	.....	O. P. Jenkins.
1890-1.....	O. P. Hay.....	Amos W. Butler..	.....	.....	O. P. Jenkins.
1891-2.....	J. L. Campbell...	Amos W. Butler..	.....	.....	C. A. Waldo.
1892-3.....	J. C. Arthur.....	Amos W. Butler..	Stanley Coulter) W. W. Norman )	.....	C. A. Waldo.
1893-4.....	W. A. Noyes.....	C. A. Waldo.....	W. W. Norman.....	.....	W. P. Shannon.
1894-5.....	A. W. Butler.....	John S. Wright...	A. J. Bigney.....	.....	W. P. Shannon.
1895-6.....	Stanley Coulter...	John S. Wright...	A. J. Bigney.....	.....	W. P. Shannon.
1896-7.....	Thomas Gray.....	John S. Wright...	A. J. Bigney.....	.....	W. P. Shannon.
1897-8.....	C. A. Waldo.....	John S. Wright...	A. J. Bigney.....	Geo. W. Benton	J. T. Scovell.
1898-9.....	C. H. Eigenman ..	John S. Wright...	E. A. Schultze.....	Geo. W. Benton	J. T. Scovell.
1899-1900..	D. W. Dennis.....	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. McBeth.

In Memoriam.

JOSEPH EASTMAN,

BORN

Fulton County, New York, January 29, 1842.

DIED

Indianapolis, June 5, 1902.

CONSTITUTION.

ARTICLE I.

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

SEC. 2. The objects of this Academy shall be scientific research and the diffusion of knowledge concerning the various departments of science; to promote intercourse between men engaged in scientific work, especially in Indiana; to assist by investigation and discussion in developing and making known the material, educational and other 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 there-

after 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 specially 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 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.

MEMBERS.

FELLOWS.

R. J. Aley.....	*1898.....	Bloomington.
J. C. Arthur.....	1893.....	Lafayette.
George W. Benton.....	1896.....	Indianapolis.
A. J. Bigney.....	1897.....	Moore's Hill.
A. W. Bitting.....	1897.....	Lafayette.
Donaldson Bodine.....	1899.....	Crawfordsville.
W. S. Blatchley.....	1893.....	Indianapolis.
H. L. Bruner.....	1899.....	Irvington.
Severance Burrage.....	1898.....	Lafayette.
A. W. Butler.....	1893.....	Indianapolis.
J. L. Campbell.....	1893.....	Crawfordsville.
Mel. T. Cook.....	1902.....	Greencastle.
John M. Coulter.....	1893.....	Chicago, Ill.
Stanley Coulter.....	1893.....	Lafayette.
Glenn Culbertson.....	1899.....	Hanover.
D. W. Dennis.....	1895.....	Richmond.
C. R. Dryer.....	1897.....	Terre Haute.
C. H. Eigenmann.....	1893.....	Bloomington.
Percy Norton Evans.....	1901.....	Lafayette.
A. L. Foley.....	1897.....	Bloomington.
Katherine E. Golden.....	1895.....	Lafayette.
M. J. Golden.....	1899.....	Lafayette.
W. F. M. Goss.....	1893.....	Lafayette.
Thomas Gray.....	1893.....	Terre Haute.
A. S. Hathaway.....	1895.....	Terre Haute.
W. K. Hatt.....	1902.....	Lafayette.
Robert Hessler.....	1899.....	Logansport.
H. A. Huston.....	1893.....	Lafayette.
Arthur Kendrick.....	1898.....	Terre Haute.
Robert E. Lyons.....	1896.....	Bloomington.
V. F. Marsters.....	1893.....	Bloomington.
C. L. Mees.....	1894.....	Terre Haute.
W. J. Moenkhaus.....	1901.....	Bloomington.

* Date of election.

Joseph Moore	1896	Richmond.
D. M. Mottier	1893	Bloomington.
W. A. Noyes	1893	Terre Haute.
J. H. Ransom	1902	Lafayette.
L. J. Rettger	1896	Terre Haute.
J. T. Scovell	1894	Terre Haute.
Alex. Smith	1893	Chicago, Ill.
W. E. Stone	1893	Lafayette.
Joseph Swain	*1898	Swarthmore, Pa.
M. B. Thomas	1893	Crawfordsville.
C. A. Waldo	1893	Lafayette.
F. M. Webster	1894	Champaign, Ill.
H. W. Wiley	1895	Washington, D. C.
John S. Wright	1894	Indianapolis.

NON-RESIDENT MEMBERS.

George H. Ashley	Charleston, S. C.
M. A. Brannon	Grand Forks, N. D.
J. C. Branner	Stanford University, Cal.
D. H. Campbell	Stanford University, Cal.
A. Wilmer Duff	Worcester, Mass.
B. W. Evermann	Washington, D. C.
Charles H. Gilbert	Stanford University, Cal.
C. W. Green	Stanford University, Cal.
C. W. Hargitt	Syracuse, N. Y.
O. P. Hay	Washington, D. C.
Edward Hughes	Stockton, Cal.
O. P. Jenkins	Stanford University, Cal.
D. S. Jordan	Stanford University, Cal.
J. S. Kingsley	Tufts College, Mass.
D. T. MacDougal	Bronx Park, New York City
T. C. Mendenhall	Worcester, Mass.
Alfred Springer	Cincinnati, Ohio.
L. M. Underwood	New York City.
Robert B. Warder	Washington, D. C.
Ernest Walker	Clemson College, S. C.

* Date of election.

ACTIVE MEMBERS.

G. A. Abbott.....	Indianapolis.
Frederick W. Andrews.....	Bloomington.
George C. Ashman.....	Frankfort.
Edward Ayres	Lafayette.
Arthur M. Banta.....	Franklin.
Edwin M. Blake.....	Lafayette.
J. W. Beede.....	Bloomington.
Lee F. Bennett.....	Valparaiso.
William N. Blanchard.....	Greencastle.
Charles S. Bond.....	Richmond.
Fred J. Breeze	Pittsburg.
E. M. Bruce.....	Weston, Oregon.
A. Hugh Bryan.....	Indianapolis.
E. J. Chansler.....	Bicknell.
Howard W. Clark.....	Culver.
Otto O. Clayton.....	Pleasant Mills.
George Clements	Springfield, Ill.
Charles Clickener	Tangier.
U. O. Cox.....	Mankato, Minn.
William Clifford Cox.....	Columbus.
J. A. Cragwall.....	Crawfordsville.
Albert B. Crowe.....	Ft. Wayne.
M. E. Crowell.....	Franklin.
Edward Roscoe Cumings.....	Bloomington.
Alida M. Cunningham.....	Alexandria.
Lorenzo E. Daniels.....	Laporte.
H. J. Davidson.....	Baltimore, Md.
Charles C. Deam.....	Bluffton.
Martha Doan	Westfield.
J. P. Dolan.....	Syracuse.
Herman B. Dorner.....	Lafayette.
Hans Duden	Indianapolis.
E. G. Eberhardt.....	Indianapolis.
Frank R. Eldred.....	Indianapolis.
M. N. Elrod.....	Columbus.
Samuel G. Evans.....	Evansville.

Carlton G. Ferris.....	Big Rapids, Mich.
E. M. Fisher.....	Urmeyville.
Wilbur A. Fiske.....	Richmond.
W. B. Fletcher.....	Indianapolis.
Austin Funk.....	New Albany.
Charles W. Garrett.....	Logansport.
Robert G. Gillum.....	Terre Haute.
Vernon Gould.....	Rochester.
Walter L. Hahn.....	Bascom.
Victor K. Hendricks.....	Indianapolis.
Mary A. Hickman.....	Greencastle.
John E. Higdon.....	Indianapolis.
Frank R. Higgins.....	Terre Haute.
John J. Hildebrandt.....	Logansport.
J. D. Hoffman.....	Lafayette.
Allen D. Hole.....	Richmond.
John N. Hurty.....	Indianapolis.
Lucius M. Hubbard.....	South Bend.
Alex. Johnson.....	Ft. Wayne.
Edwin S. Johannott, Jr.....	Terre Haute.
Ernest E. Jones.....	Kokomo.
Chancey Juday.....	Boulder, Col.
O. L. Kelso.....	Terre Haute.
Charles T. Knipp.....	Bloomington.
Henry H. Lane.....	Lebanon.
V. H. Lockwood.....	Indianapolis.
Dumont Lotz.....	Indianapolis.
William A. McBeth.....	Terre Haute.
Robert Wesley McBride.....	Indianapolis.
Rousseau McClellan.....	Indianapolis.
Richard C. McClaskey.....	Terre Haute.
Lynn B. McMullen.....	Indianapolis.
Edward G. Mahin.....	West Lafayette.
James E. Manchester.....	Vincennes.
W. G. Middleton.....	Richmond.
John A. Miller.....	Bloomington.
H. T. Montgomery.....	South Bend.

Walter P. Morgan.....	Terre Haute.
Fred Mutchler.....	Terre Haute.
J. P. Naylor.....	Greencastle.
Charles E. Newlin.....	Irvington.
John Newlin.....	West Lafayette.
John F. Newsom.....	Stanford University, Cal.
R. W. Noble.....	Chicago, Ill.
D. A. Owen.....	Franklin.
Rollo J. Peirce.....	Logansport.
Ralph B. Polk.....	Greenwood.
James A. Price.....	Ft. Wayne.
Frank A. Preston.....	Indianapolis.
A. H. Purdue.....	Fayetteville, Ark.
Ryland Ratliff.....	Bloomington.
Albert B. Reagan.....	Bloomington.
Claude Riddle.....	Lafayette.
Giles E. Ripley.....	Decorah, Iowa.
George L. Roberts.....	Greensburg.
D. A. Rothrock.....	Bloomington.
John F. Schnaible.....	Lafayette.
E. A. Schultze.....	Ft. Wayne.
John W. Shepherd.....	Terre Haute.
Claude Siebenthal.....	Indianapolis.
J. R. Slonaker.....	Bloomington.
Richard A. Smart.....	Lafayette.
Lillian Snyder.....	Rockville.
Retta E. Spears.....	Elkhart.
Charles F. Stegmaier.....	Greensburg.
William Stewart.....	Lafayette.
J. M. Stoddard.....	Indianapolis.
William B. Streeter.....	Indianapolis.
Frank B. Taylor.....	Ft. Wayne.
J. F. Thompson.....	Richmond.
A. L. Treadwell.....	Oxford, Ohio.
Daniel J. Troyer.....	Goshen.
A. B. Ulrey.....	North Manchester.
W. B. VanGorder.....	Worthington.

Arthur C. Veatch.....	Rockport.
H. S. Voorhees.....	Ft. Wayne.
J. H. Voris.....	Huntington.
B. C. Waldemaier.....	West Lafayette.
Daniel T. Weir.....	Indianapolis.
Jacob Westlund	Lafayette.
Fred C. Whitcomb.....	Delphi.
William M. Whitten.....	South Bend.
Neil H. Williams.....	Indianapolis.
William Watson Woollen.....	Indianapolis.
J. F. Woolsey.....	Indianapolis.

Fellows	47
Non-resident members	20
Active members	118
	—
Total.....	185

LIST OF FOREIGN CORRESPONDENTS.

 AFRICA.

Dr. J. Medley Wood, Natal Botanical Gardens, Berea, Durban, South Africa.

South African Philosophical Society, Cape Town, South Africa.

 ASIA.

China Branch Royal Asiatic Society, Shanghai, China.

Asiatic Society of Bengal, Calcutta, India.

Geological Survey of India, Calcutta, India.

Indian Museum of India, Calcutta, India.

India Survey Department of India, Calcutta, India.

Deutsche Gesellschaft, für Natur- und Völkerkunde Ostasiens, Tokio, Japan.

Imperial University, Tokio, Japan.

Koninklijke Naturkundige Vereeniging in Nederlandsch-Indie, Batavia, Java.

Hon. D. D. Baldwin, Honolulu, Hawaiian Islands.

 EUROPE.

V. R. Tschusizn Schmidhoffen, Villa Tannenhof, Halle in Salzburg, Austria.

Herman von Vilas, Innsbruck, Austria.

Ethnologische Mittheilungen aus Ungarn, Budapest, Austro-Hungary.

Mathematische und Naturwissenschaftliche Berichte aus Ungarn, Budapest, Austro-Hungary.

K. K. Geologische Reichsanstalt, Vienna (Wien), Austro-Hungary.

K. U. Naturwissenschaftliche Gesellschaft, Budapest, Austro-Hungary.
Naturwissenschaftlich-Medizinischer Verein in Innsbruck (Tyrol), Austro-Hungary.

Editors "Termeszetrázi Füzetk." Hungarian National Museum, Budapest, Austro-Hungary.

Dr. Eugen Dadaí, Adj. am. Nat. Mus., Budapest, Austro-Hungary.

Dr. Julius von Madarasz, Budapest, Austro-Hungary.

K. K. Naturhistorisches Hofmuseum, Vienna (Wien), Austro-Hungary.

Ornithological Society of Vienna (Wien), Austro-Hungary.

Zoologische-Botanische Gesellschaft in Wien (Vienna), Austro-Hungary.

Dr. J. von Csato, Nagy Enyed, Austro-Hungary.

Botanic Garden, K. K. Universität, Wien (Vienna), Austro-Hungary.

Malacological Society of Belgium, Brussels, Belgium.

Royal Academy of Science, Letters and Fine Arts, Brussels, Belgium.

Royal Linnean Society, Brussels, Belgium.

Société Belge de Géologie, de Paléontologie et Hydrologie, Brussels, Belgium.

Société Royale de Botanique, Brussels, Belgium.

Société Géologique de Belgique, Liège, Belgium.

Royal Botanical Gardens, Brussels, Belgium.

Bristol Naturalists' Society, Bristol, England.

Geological Society of London, London, England.

Dr. E. M. Holmes, British Pharm. Soc'y, Bloomsbury Sq., London, W. C., England.

Jenner Institute of Preventive Medicine, London, England.

The Librarian, Linnean Society, Burlington House, Piccadilly, London W., England.

Liverpool Geological Society, Liverpool, England.

Manchester Literary and Philosophical Society, Manchester, England.

"Nature," London, England.

Royal Botanical Society, London, England.

Royal Kew Gardens, London, England.

Royal Geological Society of Cornwall, Penzance, England.

Royal Microscopical Society, London, England.

Zoölogical Society, London, England.

Lieut.-Col. John Biddulph, 43 Charing Cross, London, England.

Dr. G. A. Boulenger, British Mus. (Nat. Hist.), London, England.

F. DuCane Godman, 10 Chandos St., Cavendish Sq., London, England.

Mr. Howard Saunders, 7 Radnor Place, Hyde Park, London W., England.

Phillip L. Selater, 3 Hanover Sq., London W., England.

Dr. Richard Bowdler Sharpe, British Mus. (Nat. Hist.), London, England.

Prof. Alfred Russell Wallace, Corfe View, Parkstone, Dorset, England.

Botanical Society of France, Paris, France.

Ministérie de l'Agriculture, Paris, France.

Société Entomologique de France, Paris, France.

L'Institut Grand Ducal de Luxembourg, Luxembourg, Lux., France.

Soc. de Horticulture et de Botan. de Marseille, Marseilles, France.

Société Linneenne de Bordeaux, Bordeaux, France.

La Soc. Linneenne de Normandie, Caen, France.

Soc. des Naturelles, etc., Nantes, France.

Zoölogical Society of France, Paris, France.

Baron Louis d'Hamonville, Meurthe et Moselle, France.

Pasteur Institute, Lille, France.

Museum d'Histoire Naturelle, Paris, France.

Botanischer Verein der Provinz Brandenburg, Berlin, Germany.

Deutsche Geologische Gesellschaft, Berlin, Germany.

Entomologischer Verein in Berlin, Berlin, Germany.

Journal für Ornithologie, Berlin, Germany.

Prof. Dr. Jean Cabanis, Alte Jacob Strasse, 103 A., Berlin, Germany.

Augsburger Naturhistorischer Verein, Augsburg, Germany.

Count Hans von Berlepsen, Münden, Germany.

Braunschweiger Verein für Naturwissenschaft, Braunschweig, Germany.

Bremer Naturwissenschaftlicher Verein, Bremen, Germany.

Ornithologischer Verein München, Thierschstrasse, 37½, München, Germany.

Royal Botanical Gardens, Berlin W., Germany.

Kaiserliche Leopoldische-Carolinische Deutsche Akademie der Naturforscher, Halle Saale, Wilhelmstrasse 37, Germany.

Königlich-Sächsische Gesellschaft der Wissenschaften. Mathematisch-
 Physische Classe. Leipzig. Saxony, Germany.
 Naturhistorische Gesellschaft zu Hanover. Hanover, Prussia, Germany.
 Naturwissenschaftlicher Verein in Hamburg. Hamburg. Germany.
 Verein für Erdkunde. Leipzig. Germany.
 Verein für Naturkunde. Wiesbaden. Prussia.

Belfast Natural History and Philosophical Society, Belfast, Ireland.
 Royal Dublin Society, Dublin.
 Royal Botanic Gardens. Glasnevin, County Dublin, Ireland.

Societa Entomologica Italiana. Florence, Italy.
 Prof. H. H. Giglioli. Museum Vertebrate Zoölogy. Florence, Italy.
 Dr. Alberto Perngia. Museo Civico di Storia Naturale, Genoa, Italy.
 Societa Italiana de Scienze Naturali, Milan, Italy.
 Societa Africana d' Italia, Naples, Italy.
 Dell 'Academia Pontifico de Nuovi Lincei. Rome, Italy.
 Minister of Agriculture, Industry and Commerce. Rome, Italy.
 Rassegna della Scienze Geologiche in Italia, Rome, Italy.
 R. Comitato Geologico d' Italia, Rome, Italy.
 Prof. Count Tomasso Salvadori. Zoölog. Museum, Turin, Italy.

Royal Norwegian Society of Sciences, Thronhjem, Norway.
 Dr. Robert Collett, Kongl. Frederiks Univ. Christiania, Norway.

Academia Real des Sciencias de Lisboa (Lisbon), Portugal.

Comité Geologique de Russie. St. Petersburg, Russia.
 Imperial Academy of Sciences, St. Petersburg, Russia.
 Imperial Society of Naturalists, Moscow, Russia.
 Jardin Imperial de Botanique, St. Petersburg, Russia.

The Botanical Society of Edinburgh, Edinburgh, Scotland.
 John J. Dalglish, Brankston Grange, Bogside Sta., Sterling, Scotland.
 Edinburgh Geological Society, Edinburgh, Scotland.
 Geological Society of Glasgow, Scotland.
 John A. Harvie-Brown, Duniplace House, Larbert, Sterlingshire, Scotland.
 Natural History Society, Glasgow, Scotland.
 Philosophical Society of Glasgow, Glasgow, Scotland.
 Royal Society of Edinburgh, Edinburgh, Scotland.
 Royal Physical Society, Edinburgh, Scotland.
 Royal Botanic Garden, Edinburgh, Scotland.

Barcelona Academia de Ciencias y Artes, Barcelona, Spain.
 Royal Academy of Sciences, Madrid, Spain.

Institut Royal Geologique de Suède, Stockholm, Sweden.
 Societé Entomologique a Stockholm, Stockholm, Sweden.
 Royal Swedish Academy of Science, Stockholm, Sweden.

Naturforschende Gesellschaft, Basel, Switzerland.
 Naturforschende Gesellschaft in Berne, Berne, Switzerland.
 La Societé Botanique Suisse, Geneva, Switzerland.
 Societé Helvetique de Sciences Naturelles, Geneva, Switzerland.
 Societé de Physique et d' Histoire Naturelle de Geneva, Geneva, Switzerland.
 Concilium Bibliographicum, Zürich-Oberstrasse, Switzerland.
 Naturforschende Gesellschaft, Zürich, Switzerland.
 Schweizerische Botanische Gesellschaft, Zürich, Switzerland.
 Prof. Herbert H. Field, Zürich, Switzerland.

AUSTRALIA.

Linnean Society of New South Wales, Sidney, New South Wales.
 Royal Society of New South Wales, Sidney, New South Wales.
 Prof. Liveridge, F. R. S., Sidney, New South Wales.
 Hon. Minister of Mines, Sidney, New South Wales.

Mr. E. P. Ramsey, Sidney, New South Wales.
 Royal Society of Queensland, Brisbane, Queensland.
 Royal Society of South Australia, Adelaide, South Australia.
 Victoria Pub. Library, Museum and Nat. Gallery, Melbourne, Victoria.
 Prof. W. L. Buller, Wellington, New Zealand.

NORTH AMERICA.

Natural Hist. Society of British Columbia, Victoria, British Columbia.
 Canadian Record of Science, Montreal, Canada.
 McGill University, Montreal, Canada.
 Natural Society, Montreal, Canada.
 Natural History Society, St. John's, New Brunswick.
 Nova Scotia Institute of Science, Halifax, N. S.
 Manitoba Historical and Scientific Society, Winnipeg, Manitoba.
 Dr. T. Mellwraith, Cairnbrae, Hamilton, Ontario.
 The Royal Society of Canada, Ottawa, Ontario.
 Natural History Society, Toronto, Ontario.
 Hamilton Association Library, Hamilton, Ontario.
 Canadian Entomologist, Ottawa, Ontario.
 Department of Marine and Fisheries, Ottawa, Ontario.
 Ontario Agricultural College, Guelph, Ontario.
 Canadian Institute, Toronto.
 Ottawa Field Naturalists' Club, Ottawa, Ontario.
 University of Toronto, Toronto.
 Geological Survey of Canada, Ottawa, Ontario.
 La Naturaliste Canadian, Chicoutimi, Quebec.

La Naturale Za, City of Mexico.
 Mexican Society of Natural History, City of Mexico.
 Museo Nacional, City of Mexico.
 Sociedad Científica Antonio Alzate, City of Mexico.
 Sociedad Mexicana de Geografía y Estadística de la República Mexicana,
 City of Mexico.

WEST INDIES.

Botanical Department, Port of Spain, Trinidad, British West Indies.

Victoria Institute, Trinidad, British West Indies.

Museo Nacional, San Jose, Costa Rica, Central America.

Dr. Anastasia Alfaro, Secy. National Museum, San Jose, Costa Rica.

Rafael Arango, Havana, Cuba.

Jamaica Institute, Kingston, Jamaica, West Indies.

The Hope Gardens, Kingston, Jamaica, West Indies.

 SOUTH AMERICA.

Argentina Historia Natural Florentine Amegline, Buenos Ayres, Argentine Republic.

Musée de la Plata, Argentine Republic.

Nacional Academia des Ciencias, Cordoba, Argentine Republic.

Sociedad Cientifica Argentina, Buenos Ayres.

Museo Nacional, Rio de Janeiro, Brazil.

Sociedad de Geographia, Rio de Janeiro, Brazil.

Dr. Herman von Jhering, Dir. Zoöl. Sec. Con. Geog. e Geol. de Sao Paulo, Rio Grande do Sul, Brazil.

Deutscher Wissenschaftlicher Verein in Santiago, Santiago, Chili.

Societé Scientifique du Chili, Santiago, Chili.

Sociedad Guatemalteca de Ciencias, Guatemala, Guatemala.

. . PROGRAM . . .

OF THE

EIGHTEENTH ANNUAL MEETING

OF THE

INDIANA ACADEMY OF SCIENCE,

STATE HOUSE, INDIANAPOLIS.

December 26 and 27, 1902.

EXECUTIVE COMMITTEE.

H. W. WILEY, President. W. S. BLATCHLEY, Vice-President. JOHN S. WRIGHT, Secretary.
DONALDSON BODINE, Asst. Secretary. J. T. SCOVELL, Treasurer.

M. B. THOMAS,	THOMAS GRAY,	J. C. ARTHUR,	JOHN C. BRANNER.
D. W. DENNIS,	STANLEY COULTER,	J. L. CAMPBELL,	J. P. D. JOHN,
C. H. EIGENMANN,	AMOS W. BUTLER,	O. P. HAY,	JOHN M. COULTER,
C. A. WALDO,	W. A. NOYES,	T. C. MENDENHALL,	DAVID S. JORDAN.

The sessions of the Academy will be held in the State House, in the rooms of the State Board of Agriculture.

Headquarters will be at the English Hotel. A rate of \$2.00 and upwards per day will be made to all persons who make it known at the time of registering that they are members of the Academy.

M. B. THOMAS,
M. E. CROWELL,
Committee.

GENERAL PROGRAM.

FRIDAY, DECEMBER 26.

Meeting of the Executive Committee at Hotel Headquarters 10:45 a. m.
General Session, followed by Sectional Meetings..... 2 p. m. to 5 p. m.
President's Address, Shortridge High School..... 8 p. m.

SATURDAY, DECEMBER 27.

General Session, followed by Sectional Meetings..... 9 a. m. to 12 m.

LIST OF PAPERS TO BE READ.

ADDRESS BY THE RETIRING PRESIDENT.

DR. HARVEY W. WILEY.

At 8 o'clock Friday evening, at Shortridge High School.

Subject: "Ye Shall Know Them by Their Fruits."

The following papers will be read in the order in which they appear on the program, except that certain papers 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 time is sent with the papers, they have been uniformly assigned ten minutes. Opportunity will be given after the reading of each paper for a brief discussion.

N. B.—By the order of the Academy, no paper can be read until an abstract of its contents or the written paper has been placed in the hands of the Secretary.

GENERAL.

1. Transmissible Diseases in College Towns, 8 m.Severance Burrage
2. Sewage Disposal at the Indiana State Reformatory at Plainfield, 10 m.Severance Burrage
3. Some Recent Mound Investigations in Jefferson County, Indiana, 8 m.Glenn Culbertson
4. The Water Supply of Havana, Cuba, 10 m.C. H. Eigenmann
5. Results of the Indiana University Expedition to Cuba, 15 m.C. H. Eigenmann
6. Naezhosh, or the Apache Pole Game, 8 m.Albert B. Reagan

MATHEMATICS AND PHYSICS.

7. Geodesic Lines on the Syntractrix of Revolution, 8 m.E. L. Hancock
8. Comparison of Gauss' and Cayley's Proofs of the Existence Theorem, 10 m.O. E. Glenn
9. Motion of a Bicycle on a Helix Track, 8 m.O. E. Glenn
10. A Generalization of Fermat's Theorem, 8 m.Jacob Westlund
11. On the Class Number of the Cyclotomic Numberfield $k \left(\epsilon \frac{2\pi i}{p^n} \right)$, 8 m.Jacob Westlund
12. Photographic Observations of Comet c 1902, 10 m.J. A. Miller

BOTANY AND ZOOLOGY.

13. The Genus *Puccinia*, 10 m.J. C. Arthur
14. Forestry Conditions in Montgomery County, Indiana, 10 m.S. J. Record
15. Notes on the Cleavage Plane in Stems and Falling Leaves, 8 m.Mary A. Hickman

16. On the Veins of the Head of the Snake (*Tropidonotus*),
15 m.....H. L. Bruner
17. On the Maxillary Veins of Lizards, 15 m.....H. L. Bruner
18. Some Rare Indiana Birds, 10 m.....A. W. Butler
19. The Catalpa Sphinx, *Ceratonia catalpa*, Destroyed by the
Yellow-Billed Cuckoo, *Coccyzus americanus*, in South-
ern Indiana, 10 m.....F. M. Webster
20. Notes on Reared Hymenoptera from Indiana, 10 m....F. M. Webster
21. Preliminary List of Gall-Producing Insects Common to In-
diana, 6 m.....Mel T. Cook
22. Notes on Deformed Embryos, 5 m.....Mel T. Cook
23. The Lake Laboratory at Sandusky, Ohio, 12 m.....Mel T. Cook
24. The Individuality of the Maternal and Paternal Chromo-
somes in the Hybrid between *Fundulus heteroclitus*
and *Menidia notata*, 8 m.....W. J. Moenkhaus
25. An Extra Pair of Appendages Modified for Copulatory Pur-
pose in *Cambarus viridis*, 8 m.....W. J. Moenkhaus
26. Description of a New Species of Darter from Tippecanoe
Lake, 5 m.....W. J. Moenkhaus
27. The Myxomycetes of Winona Lake, 10 m.....Fred Mutchler
28. The Plankton of Winona Lake, 10 m.....Chaney Juday
29. The Birds of Winona Lake, 15 m.....Clarence G. Littell
30. A List of the Dragonflies of Winona Lake, 5 m..Clarence H. Kennedy
31. A New Diagnostic Character for the Species of the Genus
Argia, 10 m.....Clarence H. Kennedy

CHEMISTRY AND GEOLOGY.

32. Investigation of the Action between Manganese Dioxide
and Potassium Chlorate in the Production of Oxy-
gen, 10 m.....Edward G. Mahin
33. The Action of Heat on Mixtures of Manganese Dioxide
with Potassium Nitrate and with Potassium Bichro-
mate, 5 m.....J. H. Ransom
34. Criticism of an Experiment Used to Determine the Combin-
ing Ratio of Magnesium and Oxygen, 5 m.....J. H. Ransom
35. An Apparatus for Illustrating Charles's and Boyle's Laws.
J. H. Ransom
36. Some Δ_2 Keto-R-Hexene Derivatives, 5 m..... J. B. Garner
37. Action of Hydrogen Peroxide on Cuprous Chloride, 10 m.
W. M. Blanchard

38. Geology of the Jemez-Albuquerque Region, New Mexico,
8 m.....Albert B. Reagan
39. The Jemez Coal Fields, 10 m.....Albert B. Reagan
40. Ripple Marks in Hudson Limestone in Jefferson County,
Indiana, 5 m.....Glenn Culbertson
41. Some Topographic Features in the Lower Tippecanoe Val-
ley, 8 m.....F. J. Breeze

THE EIGHTEENTH ANNUAL MEETING OF THE INDIANA ACADEMY OF SCIENCE.

The eighteenth annual meeting of the Indiana Academy of Science was held in Indianapolis, Friday and Saturday, December 26 and 27, 1902.

Friday, 11 a. m., the Executive Committee met in session at hotel headquarters. At 2 o'clock p. m. President Harvey W. Wiley called the Academy to order in general session in the room of the State Board of Agriculture, State House. The transaction of routine and miscellaneous business, occupied the first part of the session. Following this, papers of general interest were read and discussed. On the disposition of these, special technical subjects occupied the time until adjournment at 5 p. m.

The address of the retiring President, Harvey W. Wiley, was delivered in the auditorium of the Shortridge High School at 8 p. m. before the members of the Academy and a number of invited guests; subject, "Ye Shall Know Them by Their Fruits."

Saturday 27, 9 a. m., the Academy met in general session, before which the remaining papers of the program were read and discussed. Following the disposition of the papers unfinished business was considered.

Adjournment, 12 m.

THE FIELD MEETING OF 1902.

The field meeting was appointed for Madison and Hanover, May 22, 23 and 24. The President and some of the members assembled, but owing to the heavy rains and the inclemency of the weather all attempts to do field work were necessarily abandoned.