

PROCEEDINGS

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OF THE

*Indiana Academy*  
*of Science*

TWENTY-FIFTH ANNIVERSARY

1909

# PROCEEDINGS

OF THE

# Indiana Academy of Science

TWENTY-FIFTH ANNIVERSARY

1909

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EDITOR . . . . . H. L. BRUNER

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INDIANAPOLIS, IND.  
1910

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1910

THE STATE OF INDIANA,  
EXECUTIVE DEPARTMENT,

January 17, 1910.

Received by the Governor, examined and referred to the Auditor of State for verification of the financial statement.

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OFFICE OF AUDITOR OF STATE,  
INDIANAPOLIS, Feb. 7, 1910.

The within report, so far as the same relates to moneys drawn from the State Treasury, has been examined and found correct.

J. C. BILLHEIMER,  
*Auditor of State.*

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February 8, 1910.

Returned by the Auditor of State, with above certificate, and transmitted to Secretary of State for publication, upon the order of the Board of Commissioners of Public Printing and Binding.

MARK THISTLETHWAITE,  
*Secretary to the Governor.*

---

Filed in the office of the Secretary of State of the State of Indiana, February 8, 1910.

FRED A. SIMS,  
*Secretary of State.*

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Received the within report and delivered to the printer February 9, 1910.

A. E. BUTLER,  
*Clerk Printing Board.*

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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

**Preamble.** 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,

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

**Editing Reports.** 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

**Number of Printed Reports.** 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.

Proviso.

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 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.

Disposition  
of Reports.

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.

Emergency.

#### APPROPRIATION FOR 1910-1911.

The appropriation for the publication of the proceedings of the Academy during the years 1910 and 1911 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 1909 shall be available in 1910, and that any unexpended balance in 1910 shall be available in 1911.

Academy of  
Science—  
Regular.

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 Limicolae, commonly called shore birds, surf birds, plover, snipe, woodcock, sandpipers, tattlers and curlew; the Gallinae, commonly called wild turkeys, grouse, prairie chickens, quails and pheasants; nor to English or European house sparrows, 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.

# Indiana Academy of Science.

## OFFICERS, 1909-1910.

PRESIDENT

P. N. EVANS.

VICE-PRESIDENT

C. R. DRYER.

SECRETARY

GEO. W. BENTON.

ASSISTANT SECRETARY

A. J. BIGNEY.

PRESS SECRETARY

JOHN W. WOODHAMS.

TREASURER

W. J. MOENKHAUS.

### EXECUTIVE COMMITTEE

P. N. EVANS,	JOHN S. WRIGHT,	A. W. BUTLER,
C. R. DRYER,	CARL L. MEES,	W. A. NOYES,
G. W. BENTON,	W. S. BLATCHLEY,	J. C. ARTHUR,
A. J. BIGNEY,	H. W. WILEY,	O. P. HAY,
J. W. WOODHAMS,	M. B. THOMAS,	T. C. MENDENHALL,
W. J. MOENKHAUS,	D. W. DENNIS,	J. C. BRANNER,
A. L. FOLEY,	C. H. EIGENMANN,	J. P. D. JOHN,
GLENN CULBERTSON,	C. A. WALDO,	J. M. COULTER,
D. M. MOTIER,	THOMAS GRAY,	D. S. JORDAN,
ROBERT HESSLER,	STANLEY COULTER,	

### CURATORS

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



## 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. Brammer	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		J. T. Scovell.
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. 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.
1903-1904	C. L. Mees	John S. Wright	J. H. Ransom	G. A. Abbott	W. A. McBeth.
1904-1905	John S. Wright	Lynn B. McMullen	J. H. Ransom	G. A. Abbott	W. A. McBeth.
1905-1906	Robert Hessler	Lynn B. McMullen	J. H. Ransom	Charles R. Clark	W. A. McBeth.
1906-1907	D. M. Mottier	Lynn B. McMullen	J. H. Ransom	G. A. Abbott	W. A. McBeth.
1907-1908	Glenn Culbertson	J. H. Ransom	A. J. Bigney	G. A. Abbott	W. A. McBeth.
1908-1909	A. L. Foley	J. H. Ransom	A. J. Bigney	G. A. Abbott	W. A. McBeth.
1909-1910	P. N. Evans	Geo. W. Benton	A. J. Bigney	John W. Woodhams	W. J. Moenkhaus

## 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 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.



## MEMBERS.

## FELLOWS.

†G. A. Abbott.....	*1908.....	Fargo, N. D.
R. J. Aley.....	1898.....	Indianapolis.
J. C. Arthur.....	1894.....	Lafayette.
J. W. Beede.....	1906.....	Bloomington.
George W. Benton.....	1896.....	Indianapolis.
A. J. Bigney.....	1897.....	Moore's Hill.
Katherine Golden Bitting.....	1895.....	Lafayette.
W. S. Blatchley.....	1893.....	Indianapolis.
Donaldson Bodine.....	1899.....	Crawfordsville.
H. L. Bruner.....	1899.....	Indianapolis.
Severance Burrage.....	1898.....	Lafayette.
A. W. Butler.....	1893.....	Indianapolis.
W. A. Cogshall.....	1906.....	Bloomington.
†Mel. T. Cook.....	1902.....	Newark, Del.
†John M. Coulter.....	1893.....	Chicago, Ill.
Stanley Coulter.....	1893.....	Lafayette.
U. O. Cox.....	1908.....	Terre Haute.
Glenn Culbertson.....	1899.....	Hanover.
E. R. Cumings.....	1906.....	Bloomington.
S. C. Davisson.....	1908.....	Bloomington.
D. W. Dennis.....	1895.....	Richmond.
C. R. Dryer.....	1897.....	Terre Haute.
C. H. Eigenmann.....	1893.....	Bloomington.
Percy Norton Evans.....	1901.....	West Lafayette.
A. L. Foley.....	1897.....	Bloomington.
M. J. Golden.....	1899.....	Lafayette.
†W. F. M. Goss.....	1893.....	Urbana, Ill.
Thomas Gray (Died Dec. 19, 1908).....	1893.....	Terre Haute.
A. S. Hathaway.....	1895.....	Terre Haute.
W. K. Hatt.....	1902.....	Lafayette.
Robert Hessler.....	1899.....	Logansport.

\*Date of election.

†Non-resident.

†H. A. Huston.....	*1893.....	Baltimore, Md.
Edwin S. Johannatt .....	1904.....	Terre Haute.
Robert E. Lyons.....	1896.....	Bloomington.
W. A. McBeth.....	1904.....	Terre Haute.
V. F. Marsters.....	1893.....	Santiago, Chili.
C. L. Mees.....	1894.....	Terre Haute.
†J. A. Miller.....	1904.....	Swarthmore, Pa.
W. J. Moenkhaus.....	1901.....	Bloomington.
D. M. Mottier.....	1893.....	Bloomington.
J. P. Naylor.....	1903.....	Greencastle.
†W. A. Noyes.....	1893.....	Urbana, Ill.
Rolla R. Ramsey.....	1906.....	Bloomington.
J. H. Ransom.....	1902.....	Lafayette.
L. J. Rettger.....	1896.....	Terre Haute.
David Rothrock.....	1906.....	Bloomington.
J. T. Scovell.....	1894.....	Terre Haute.
Albert Smith.....	1908.....	Lafayette.
†Alex Smith.....	1893.....	Chicago, Ill.
W. E. Stone.....	1893.....	Lafayette.
†Joseph Swain.....	1898.....	Swarthmore, Pa.
M. B. Thomas.....	1893.....	Crawfordsville.
†C. A. Waldo.....	1893.....	St. Louis, Mo.
†F. M. Webster.....	1894.....	Washington, D.C.
Jacob Westlund.....	1904.....	Lafayette.
†H. W. Wiley.....	1895.....	Washington, D.C.
W. W. Woollen.....	1908.....	Indianapolis.
John S. Wright.....	1894.....	Indianapolis.

\*Date of election.

†Non-resident.

#### NON-RESIDENT MEMBERS.

George H. Ashley.....	Washington, D. C.
J. C. Branner.....	Stanford University, Cal.
M. A. Brannon.....	Grand Forks, N. D.
D. H. Campbell.....	Stanford University, Cal.
H. W. Clark.....	Washington, D. C.
H. B. Dorner.....	Urbana, Ill.
A. Wilmer Duff.....	Worcester, Mass.

B. W. Everman.....	Washington, D. C.
W. A. Fiske.....	Los Angeles, Cal.
C. W. Garrett.....	Pi tsburg, Pa.
Charle H. Gilbert.....	Stanford University, Cal.
C. W. Greene.....	Columbia, Mo.
C. W. Hargitt.....	Syracuse, N. Y.
O. P. Hay.....	Washington, D. C.
Edward Hughes.....	Stockton, Cal.
O. P. Jenkins.....	Stanford University, Cal.
C. T. Knipp.....	Urbana, Ill.
D. S. Jordan.....	Stanford University, Cal.
J. S. Kingsley.....	Tufts College, Mass.
D. T. MacDougal.....	Tucson, Arizona.
L. B. McMullen.....	Valley City, N. D.
T. C. Mendenhall.....	Worcester, Mass.
J. F. Newsom.....	Stanford University, Cal.
A. H. Purdue.....	Fayetteville, Ark.
A. B. Reagan.....	Orr, Minn.
J. R. Slonaker.....	Stanford University, Cal.
Alfred Springer.....	Cincinnati, Ohio.
Robert B. Warder (Deceased).....	Washington, D. C.
Ernest Walker.....	Fayetteville, Ark.
G. W. Wilson.....	Fayette, Ia.

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*ACTIVE MEMBERS.*

C. E. Agnew.....	Delphi.
L. E. Allison.....	West Lafayette.
H. W. Anderson.....	Ladoga.
Paul Anderson.....	Crawfordsville.
H. F. Bain.....	San Francisco, Cal.
Walter D. Baker.....	Indianapolis.
Walter M. Baker.....	Red Key.
Edward Hugh Bangs.....	Indianapolis.
Howard J. Banker.....	Greencastle.
H. E. Barnard.....	Indianapolis.
W. H. Bates.....	West Lafayette.
Guido Bell.....	Indianapolis.

Lee F. Bennett . . . . .	Valparaiso.
Thomas Billings . . . . .	West Lafayette.
Harry Eldridge Bishop . . . . .	Indianapolis.
Lester Black . . . . .	Bloomington.
William N. Blanchard . . . . .	Greencast'e.
Charles S. Bond . . . . .	Richmond.
A. A. Bourke . . . . .	Edinburg.
Omer C. Boyer . . . . .	Lebanon.
H. C. Brandon . . . . .	Bloomington.
Fred J. Breeze . . . . .	Lafayette.
Chas. Brossmann . . . . .	Indianapolis.
E. M. Bruce . . . . .	Terre Haute.
Wm. R. Butler . . . . .	Indianapolis.
Edward N. Canis . . . . .	Indianapolis.
E. Kate Carman . . . . .	Indianapolis.
Lewis Clinton Carson . . . . .	Detroit, Mich.
Herman S. Chamberlain (Deceased) . . . . .	Indianapolis.
E. J. Chansler . . . . .	Bicknell.
A. G. W. Childs . . . . .	Kokomo.
C. D. Christie . . . . .	Cincinnati, O.
J. H. Clark . . . . .	Connersville.
Otto O. Clayton . . . . .	Portland.
H. M. Clem . . . . .	Monroeville.
Charles Clickner . . . . .	Silverwood, R. D. No. 1.
Charles A. Coffey . . . . .	Petersburg.
William Clifford Cox . . . . .	Columbus.
J. A. Cragwall . . . . .	Crawfordsville.
M. E. Crowell . . . . .	Franklin.
Chas. M. Cunningham . . . . .	Indianapolis.
Lorenzo E. Daniels . . . . .	Laporte.
E. H. Davis . . . . .	West Lafayette.
Melvin K. Davis . . . . .	Terre Haute.
Charles C. Deam . . . . .	Indianapolis.
E. M. Deem . . . . .	Frankfort.
Harry F. Dietz . . . . .	Indianapolis.
James P. Dimonds . . . . .	Indianapolis.
Martha Doan . . . . .	Westfield.
J. P. Dolan . . . . .	Syracuse.

Hans Duden.....	Indianapolis.
Arthur E. Dunn.....	Logansport.
Herbert A. Dunn.....	Logansport.
M. L. Durbin.....	Anderson.
J. B. Dutcher.....	Philadelphia, Penn.
Samuel E. Earp.....	Indianapolis.
A. A. Eberly.....	Nowata, Okla.
C. R. Eckler.....	Indianapolis.
Max Mapes Ellis.....	Vincennes.
H. E. Enders.....	West Lafayette.
Samuel G. Evans.....	Evansville.
William P. Felver.....	Logansport.
C. J. Fink.....	Crawfordsville.
M. L. Fisher.....	West Lafayette.
A. S. Fraley.....	Linden.
Austin Funk.....	Jeffersonville.
John D. Gabel.....	North Madison.
Andrew W. Gamble.....	Logansport.
H. O. Garman.....	Indianapolis.
J. B. Garner.....	Crawfordsville.
Florence A. Gates.....	Wabash.
Robert G. Gillum.....	Terre Haute.
E. R. Glenn.....	Brookville.
Frederic W. Gottlieb.....	Morristown.
Vernon Gould.....	Rochester.
Frank Cook Greene.....	New Albany.
Earl Grimes.....	Russellv lle.
Walter L. Hahn.....	Springfield, S. D.
C. F. Harding.....	West Lafayette.
Mary T. Harman.....	State College, Pa.
Walter W. Hart.....	Indianapolis.
Victor Hendricks.....	St. Louis, Mo.
L. R. Hessler.....	Crawfordsville.
John P. Hetherington.....	Logansport.
C. E. Hiatt.....	Philadelphia, Pa.
John E. Higdon.....	Indianapolis.
Frank R. Higgins.....	Terre Haute.
S. Bella Hilands.....	Madison.

John J. Hildebrandt.....	Logansport.
Geo. N. Hoffer.....	Lafayette.
G. E. Hoffman.....	Logansport.
Allen D. Hole.....	Richmond.
Lucius M. Hubbard.....	South Bend.
Martha Hunt.....	Indianapolis.
O. F. Hunziker.....	West Lafayette.
John N. Hurty.....	Indianapolis.
Roscoe R. Hyde.....	Terre Haute.
J. Isenberger.....	Lebanon.
C. F. Jackson.....	Durham, N. H.
A. G. Johnson.....	Lafayette.
H. E. Johnson.....	Greenfield.
A. T. Jones.....	West Lafayette.
W. J. Jones, Jr.....	West Lafayette.
O. L. Kelso.....	Terre Haute.
A. M. Kenyon.....	West Lafayette.
Frank D. Kern.....	Lafayette.
L. V. Ludy.....	West Lafayette.
R. W. McBride.....	Indianapolis.
Richard C. McClaskey.....	
T. S. McCulloch.....	Crawfordsville.
N. E. McIndoo.....	
Edward G. Mahin.....	West Lafayette.
James E. Manchester.....	Minneapolis, Minn.
Wilfred H. Manwaring.....	Bloomington.
William Edgar Mason.....	Borden.
Clark Mick.....	Indianapolis.
A. R. Middleton.....	West Lafayette.
G. Rudolph Miller.....	Indianapolis.
F. A. Miller.....	Indianapolis.
Chas. R. Moore.....	West Lafayette.
Geo. T. Moore.....	St. Louis, Mo.
Richard Bishop Moore.....	Indianapolis.
Frank K. Mowrer.....	Marion.
F. W. Muncie.....	Crawfordsville.
Fred Mutchler.....	Terre Haute.
Leslie C. Nanney.....	Bedford.

Charles E. Newlin	Indianapolis.
J. A. Nieuwland	Notre Dame.
G. A. Osner	Crawfordsville.
D. A. Owen	Franklin.
Everett W. Owen	Indianapolis.
Ferman L. Pickett	Bloomington.
Rollo J. Pierce	Richmond.
Ralph B. Polk	Greenwood.
James A. Price	Ft. Wayne.
W. H. Rankin	Ithaca, N. Y.
C. A. Reddick	Crawfordsville.
C. J. Reilly	Syracuse.
Allen J. Reynolds	
George L. Roberts	Lafayette.
J. Schramm	Crawfordsville.
E. A. Schultze	Laurel.
Will Scott	Bloomington.
Charles Wm. Shannon	Brazil.
Fred Sillery	Indianapolis.
Oscar W. Silvey	W. Lafayette.
C. Piper Smith	Logan, Utah.
Essie Alma Smith Shannon	Bloomington.
E. R. Smith	Indianapolis.
Geo. Spitzer	Lafayette.
Brenton L. Steele	Pullman, Wash.
Chas. Stoltz	South Bend.
J. M. Stoddard	
Milo H. Stuart	Indianapolis.
Julius W. Sturmer	Lafayette.
J. C. Taylor	Logansport.
Albert W. Thompson	Owensville.
A. D. Thorburn	Indianapolis.
Iro C. Trueblood (Miss)	Greencastle.
W. P. Turner	West Lafayette.
Chas. A. Vallance	Indianapolis.
J. M. Van Hook	Bloomington.
W. B. Van Gorder	Lyons.
H. S. Voorhees	Ft. Wayne.



Frank B. Wade . . . . .	Indianapolis.	
Luther C. Weeks . . . . .	West Lafayette.	
Mason L. Weems . . . . .	Valparaiso.	
Daniel T. Weir . . . . .	Indianapolis.	
James E. Weyant . . . . .	Indianapolis.	
Virges Wheeler . . . . .	Montmorenci.	
A. E. White . . . . .	Connersville.	
Alfred T. Wiancko . . . . .	Lafayette.	
William L. Woodburn . . . . .	Bloomington.	
John W. Woodhams . . . . .	Indianapolis.	
Herbert Milton Woollen . . . . .	Indianapolis.	
J. F. Woolsey . . . . .	Cleveland, O.	
G. A. Young . . . . .	West Lafayette.	
Jacob P. Young . . . . .	Huntington.	
L. E. Young . . . . .	West Lafayette.	
W. J. Young . . . . .	Washington, D. C.	
Lucy Youse . . . . .	Terre Haute.	
W. A. Zehring . . . . .	West Lafayette.	
Charles Zeleny . . . . .	Urbana, Ill.	
Fellows, resident . . . . .		46
Non-resident . . . . .		12
Members, active . . . . .		183
Members, non-resident . . . . .		30
<hr/>		
Total . . . . .		271



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## THOMAS GRAY.

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Dr. Thomas Gray, a member of the Indiana Academy of Science since 1888, was President in 1897-8, died in Terre Haute, Ind., December 19, 1908.


He was born in Lochgelly, Scotland, February 4, 1850, received his early education in the schools of the district and, after serving an apprenticeship in handicraft, entered the University of Glasgow, graduating from the Mechanical Engineering course, with high honors, in 1874. After graduation he became Research Assistant to Lord Kelvin (Sir William Thompson). His work lay especially in the direction of absolute measurements in electricity and magnetism, electrical and heat conductivity of glasses of various compositions and the variation in conductivity of metals under stress. In 1878 he became Professor of Telegraph Engineering in the University of Tokio, Japan. While there he became interested in earthquake phenomena and invented several seismographs and investigated the elastic constants of many rocks. In 1881 he returned to Scotland, becoming Lord Kelvin's personal assistant, undertaking investigations in connection with practical problems in electricity then coming to the front. He developed and investigated methods for electrolytic measurements of electric currents and largely designed the well known Kelvin balances. He was Lord Kelvin's and Flemming Jenkin's representative as engineer for the Commercial Cable Companies and supervised the laying of the Bennett-Mackay transatlantic cables. In 1888 he came to Terre Haute, Ind., as professor of dynamic engineering in the Rose Polytechnic Institute, which position he held until his death. His investigational work was now mainly of an engineering character, too well known to recount. He was the author of several important works, the best known perhaps being the Smithsonian Physical Tables. The articles in the Encyclopedia Britannica on telegraphs and telephones were from his pen. He also edited the definitions in electricity and magnetism for the Century Dictionary. He was the author of about sixty papers on scientific subjects, communicated to engineering societies and scientific journals. He was a member of most of the American scientific and engi-

neering societies and held high offices in a number of them. His interest in the work of the Indiana Academy of Science made him a faithful and regular attendant at most of its meetings. On the roll of American and European scientists, his name stands high, and his contribution to science, as well as his work in the educational field while in this country, has been of the highest order.

*Be it Resolved*, That the Indiana Academy of Science recognize the services of Dr. Thomas Gray as investigator, experimentalist, teacher, and loyal supporter of the Academy by placing these resolutions and a sketch of his life upon the minutes of this meeting and print them in the volume of Proceedings.

The Committee: C. L. MEES.  
A. W. BUTLER.  
G. W. BENTON.

Adopted by the Indiana Academy of Science, in session in Indianapolis,  
Nov. 27, 1909.



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## W. H. RAGAN.

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W. H. Ragan, for many years connected with the United States Department of Agriculture, and who recently died, was one of the charter members of the Indiana Academy of Science. He was one of that company, of which a number of members are here today, who were present at the first meeting. At that time he was a member of the faculty of DePauw University. He has had a deep interest in the progress of science, and especially in its application to horticulture, to which line of usefulness his life was devoted.

We make a tribute herewith to his memory.

The Committee: C. L. MEES.

A. W. BUTLER.

G. W. BENTON.

Adopted by the Indiana Academy of Science, in session in Indianapolis, Nov. 27, 1909.

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TWENTY-FIFTH ANNUAL MEETING  
INDIANA ACADEMY OF SCIENCE

CLAYPOOL HOTEL, INDIANAPOLIS, IND.

NOVEMBER 25, 26 AND 27, 1909

*Officers and Ex-Officio Executive Committee*

A. L. FOLEY, President	A. J. BIGNEY, Assistant Secretary
P. N. EVANS, Vice-President	G. A. ABBOTT, Press Secretary
J. H. RANSOM, Secretary	W. A. MCBETH, Treasurer
GLENN CULBERTSON	STANLEY COULTER
DAVID MOTTIER	AMOS W. BUTLER
ROBERT HESSLER	W. A. NOYES
JOHN S. WRIGHT	M. B. THOMAS
C. L. MEES	J. C. ARTHUR
W. S. BLATCHLEY	O. P. HAY
H. W. WILEY	T. C. MENDENHALL
D. W. DENNIS	JOHN C. BRANNER
C. H. EIGENMANN	J. P. D. JOHN
C. A. WALDO	JOHN M. COULTER
THOMAS GRAY	DAVID STARR JORDAN

The meetings of the Indiana Academy of Science Thursday evening, November 25th; Friday, November 26th, morning and afternoon; Saturday, November 27th, morning; and the informal dinner Thursday night, the luncheon Friday noon and the banquet Friday night, will be at the Claypool Hotel.

The rates quoted by the management are \$2.00 per day and upward on the European plan and \$4.00 per day and upward on the American plan. Where two or more persons occupy a room, the rates are \$1.50 and upward per day, European plan, and \$3.50 and upward per day, American plan. Hotel reservation and reservations for the banquet should be made at once.

A stereopticon will be provided.

*Committee on 25th Meeting*

AMOS W. BUTLER, Chairman

M. B. THOMAS	C. L. MEES	H. L. BRUNER
W. E. STONE	W. J. MOENKHAUS	J. P. NAYLOR

*Local Committee*

GEORGE W. BENTON

JOHN S. WRIGHT

JOHN W. WOODHAMS

## OUTLINE OF GENERAL PROGRAM

*Thursday, November 25*

- 4:00 p. m. Meeting of the Executive Committee  
 6:30 p. m. Informal dinner  
 8:00 p. m. Opening session  
 Business  
 Address—"By Packtrain to the Tiptop of the United States  
 in Quest of the Golden Trout," B. W. Evermann, U. S.  
 Bureau of Fisheries, Washington D. C.

*Friday November 26*

- 9:00 a. m. Business  
 President's Address—"Recent Progress in Physics," Dr. A. L.  
 Foley, Bloomington  
 Address—"Recent Progress in Chemistry," Dr. H. W. Wiley,  
 Chief of the Bureau of Chemistry, U. S. Department of  
 Agriculture, Washington, D. C.  
 Address—"Recent Progress in Botany," Dr. John M. Coulter,  
 Department of Botany, Chicago University  
 Greetings from other societies  
 12:00 noon Informal luncheon  
 2:00 p. m. Address—"Darwin Fifty Years After," Dr. David Starr Jordan,  
 President Leland Stanford Jr. University, President  
 American Association for the Advancement of  
 Science  
 3:00 p. m. Section meetings  
 The Academy will meet in sections. A few papers, preferably  
 those of historical character, will be read  
 8:00 p. m. Banquet—D. W. Dennis, Toastmaster

*Saturday, November 27*

- 9:00 a. m. Business  
 Address—"Methods and Materials Used in Soil Testing," H. A.  
 Huston, Chicago  
 Address—"Federal Control of International and Interstate  
 Waters," B. W. Evermann, U. S. Bureau of Fisheries  
 Address—"The Speed of Migration of Salmon in the Columbia  
 River," Charles W. Greene, University of Missouri  
 Address—"Some Hoosier and Academy Experiences," C. A.  
 Waldo, Washington University, St. Louis, Mo.

## Suggestions: Plans for the Academy—

John S. Wright	W. E. Stone
Stanley Coulter	C. Leo Mees
H. E. Barnard	W. A. Cogshall

## PAPERS TO BE READ

Unless otherwise stated, papers will be understood to be limited to fifteen minutes. The first circular of the Committee stated: "These papers will be presented, and while probably few of them will be read at the meeting, they will be printed in the Proceedings."

*General*

Thought Stimulation, Under What Conditions Does It Occur? 10 minutes .....	Robert Hessler
Does Blood Tell? .....	William B. Streeter Greensboro, N. C.
Hygiene of Indoor Swimming Pools, with Suggestions for Practical Disinfection. 25 minutes .....	Severance Burrage
Indiana Problems in Sewage Disposal. 10 minutes.....	R. L. Sackett
Defective Elementary Science .....	William N. Heiney
Some Hoosier and Academy Experiences	C. A. Waldo, Washington University
Darwin Fifty Years After	David Starr Jordan, President Leland Stanford Jr. University
The Zia Mesa and Ruins .....	Albert B. Reagan
That Erroneous Hiawatha .....	Albert B. Reagan
The Medicinal Value of Eupatorium Perfoliatum .....	A. J. Bigney

*Chemistry*

Methods and Materials Used in Soil Testing. 25 minutes	H. A. Huston, Chicago, Ill.
The Discovery of the Composition of Water (illustrated)	W. A. Noyes, University of Illinois
Molecular Rearrangements of Derivatives of Camphor.....	W. A. Noyes
Use of Refractometer in Dry Substance Estimation	A. Hugh Bryan, U. S. Bureau of Chemistry
Conductivity and Ionization of Solutions of Certain Salts in Ethyl Amine. 10 minutes .....	E. G. Mahin
Recent Progress in Chemistry.	H. W. Wiley, Chief of the Bureau of Chemistry, U. S. Department of Agriculture
Electric Osmose. 15 minutes .....	Harry N. Holmes
A Study of the Chemical Composition of Butter Fat	O. F. Hunziker and George Spitzer



- On a New Complex Cyanogen Compound.....A. R. Middleton  
 The Determination of Endothermic Gases by Combustion...A. R. Middleton

*Mathematics*

- Methods in Solid Analytics. 15 minutes.....Arthur S. Hathaway  
 Motion of  $n$  Bodies. 20 minutes.....Arthur S. Hathaway  
 Discussion of the Regular Inscribed Pentagon. 5 minutes...John C. Gregg  
 If the Bisectors of Two Angles of a Triangle are Equal, Those Angles  
 are Equal. 5 minutes .....John C. Gregg

*Physics*

- Direct Reading Accelerometers. 20 minutes .....C. R. Moore  
 Recent Work in Wood Physics. 10 minutes .....W. K. Hatt  
 Expansion of Paving Blocks. 10 minutes .....W. K. Hatt  
 Notes on the Strength of Concrete Building Blocks. 10 minutes  
H. H. Schofield
 Slip of Riveted Joints. 10 minutes .....Albert Smith  
 Polarization of Cadmium Cells .....Rolla R. Ramsey  
 Investigation of a Point Discharge in a Magnetic Field....Oscar W. Silvey  
 The Tenacity of Gelatine .....Arthur L. Foley  
 Objections to LaPlace's Theory of Capillarity.....Arthur L. Foley  
 Cohesion of Water as Modified by Certain Dissolved Salts. 10  
 minutes .....Edwin Morrison

*Geology and Geography.*

- Some Features of Delta Formation. 15 minutes.....Charles R. Dryer  
 A Physiographic Survey of an Area Near Terre Haute, Ind. 25 min-  
 utes .....Charles R. Dryer, Melvin K. Davis  
 The Collecting Area of the Waters of the Hot Springs of Hot Springs,  
 Ark. 15 minutes .....A. H. Purdue, University of Arkansas  
 The Geographical and Geological Distribution of Some Pleistocene  
 Mammals .....O. P. Hay, U. S. National Museum  
 On the Restoration of Skeletous of Fossil Vertebrates.....O. P. Hay  
 Where Do the Lance Creek ("Ceratops") Beds Belong. in the Cretace-  
 ous or Tertiary?.....Oliver P. Hay  
 Paleontology and the Recapitulation Theory. 50 minutes....E. R. Cumings  
 The Tuppecanoe, an Infantile Drainage System. 10 minutes..W. A. McBeth  
 Observations on Cyclones and Anti-Cyclones of North Temperate Lati-  
 tudes. 10 minutes .....W. A. McBeth

*Zoology.*

- A Paired Entoplastron in Trionyx and Its Significance. 15 min-  
 utes .....Henry H. Lane, Oklahoma State University

- Physiological Explanation of the Psycho-Physical Law of Weber. 15  
minutes .....Guido Bell
- On the Nature and Source of Thrombin. 12 minutes.....L. J. Rettger
- Federal Control of International and Interstate Waters  
B. W. Evermann, U. S. Bureau of Fisheries
- By Packtrain to the Tiptop of the United States in Quest of the Golden  
Trout (illustrated) .....B. W. Evermann
- The History of Zoology in Indiana. 15 minutes.....C. H. Eigenmann
- An Analytic Study of the Faunal Changes in Indiana. 25 minutes  
Walter L. Hahn, South Dakota State Normal School
- Some Notes on Parasites Found in Frogs in the Vicinity of St. Paul,  
Minn. 20 minutes.....H. L. Osborn, Hamlin University
- The Mocking Bird About Moores Hill, Indiana.....A. J. Bigney
- Cross-Fertilization Among Fishes.....W. J. Moenkhaus
- Observations on Woodpeckers. 5 minutes.....John T. Campbell
- Paroxysmal Hæmoglobinuria. 10 minutes.....Oliver P. Terry
- The Evolution of Insect Galls as Illustrated by the Genus *Amphibolips* .....Mel T. Cook, Delaware College
- The Speed of Migration of Salmon in the Columbia River  
Charles W. Greene, University of Missouri
- Observations on Cerebral Localization  
J. Rollin Slonaker, Leland Stanford Jr. University
- The Nasal Muscles of Vertebrates.....H. L. Bruner

#### *Botany.*

- Physiological Apparatus .....Frank M. Andrews
- Some Monstrosities in Plants.....Frank M. Andrews
- A List of Algae .....Frank M. Andrews
- Re-Vegetation of the Salton Basin (illustrated)  
D. T. MacDonal, Director Desert Laboratory, Tucson, Ariz.
- Forest Conditions in Indiana. 15 minutes.....Stanley Coulter
- Additions to Indiana Flora, Number 4. 3 minutes.....Charles C. Deam
- The Development of the Reproductive Organs of *Chara fragilis*. 20  
minutes .....George N. Hoffer
- Right and Wrong Conceptions of Plant Rusts.....J. C. Arthur
- The Effect of Preservatives on the Development of Penicillium. 10  
minutes .....Katherine Golden Bitting
- Recent Progress in Botany.....John M. Coulter, Chicago University
- Further Notes on Timothy Rust.....Frank D. Kern

#### *Editorial Notice.*

All members of the Academy will doubtless be ready to assist in any efforts put forth having in view correct and early publication of the Pro-



ceedings. To this end the following conditions of publication are announced by the editor:

1. All papers to be included in the report of 1909 must be in the hands of the editor not later than December 15, 1909.

2. All papers should be typewritten as far as the nature of the subject will allow.

3. All tracings and maps should be drawn to correspond with the size of the page of the Proceedings, and must come within the following limits:  $4\frac{1}{2} \times 7$ . If necessary, it may be made to cover two pages, or measure  $8\frac{1}{2} \times 11$ .

4. Authors are especially requested to carefully mark and number all illustrations and to carefully indicate in the MSS. the exact location of such illustrations.

5. To secure proper representation of mathematical work, authors are particularly cautioned to send in carefully traced figures on separate paper.

6. The limits of the appropriation require that all illustrations shall be in one color, and either photographs or etchings. As a consequence, all illustrations must be in black and white.

RESOLUTION PROVIDING FOR THE CELEBRATION OF THE  
TWENTY-FIFTH ANNIVERSARY OF THE INDIANA  
ACADEMY OF SCIENCE.

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*Resolved*, That in view of the fact that the next meeting will be the Twenty-fifth Annual Meeting of this Academy, a special effort be made at that time to celebrate the quarter centennial of its organization.

That a committee of seven be appointed to have charge of the program and all necessary arrangements for such meeting.

That the time and place of the next meeting be left to said committee.

That an effort be made to have present all the living ex-presidents and all of the living charter members of the Academy. Also that all the universities, colleges and other educational institutions of the State, all scientific organizations, including the State Medical Society, Indiana Engineering Society, Indiana Section of the American Chemical Society, State Science Teachers' Association, and all individuals interested in scientific work and the press of the State be cordially invited to co-operate to make this a successful meeting and memorable occasion.

Adopted November 28, 1908.



## THE BEGINNING OF THE INDIANA ACADEMY OF SCIENCE.

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BY AMOS W. BUTLER.

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In my early years the lack of association with persons who were interested in scientific pursuits and of opportunity to refer to books on scientific subjects was greatly felt. I planned to interest several persons in establishing a local society which would bring kindred spirits together. This resulted in the organization of the Brookville Society of Natural History in 1881. That year, for the first time, I attended the meeting of the American Association for the Advancement of Science at Cincinnati. There I had the pleasure of meeting many persons of whom I had only known by reading. This was the beginning of many acquaintances that have been permanent, helpful and inspiring. In my efforts to study local natural history I found it difficult to obtain information from students in other parts of the State. In talking with others I found they had had the same difficulty. In the winter of 1883-1884, the need of a State organization was strongly impressed upon me. Correspondence was begun with a number of persons whose names were prominent in scientific work of the State, and the majority of them favored such an organization. Among these were Dr. David Starr Jordan, Dr. J. P. D. John, Professors John M. Coulter, Stanley Coulter, Philip S. Baker, Daniel Kirkwood, Richard Owen and Oliver P. Jenkins. There were others who discouraged it. The subject was fresh in mind at the time of the meeting of the American Association for the Advancement of Science at Ann Arbor in 1884. There opportunity was given to talk the subject over, and for the first time I met Dr. John C. Branner, who had just been appointed professor of geology at Indiana University, and he strongly urged the formation of such a society. Finally it was decided to call a meeting to organize an Indiana Society. The Brookville Society of Natural History, as the most active organization of its kind in the State, was asked to take the initiative and call the first meeting. Accordingly that society appointed a committee for that purpose, consisting of Rev. David R. Moore, its president, Dr. S. P. Stoddard and Amos W. Butler. The meeting was called for Indianapolis on December 29, 1885. The plan was to have a series of papers on the status of different branches of science in Indiana. The meeting was held in the Marion County court house. The program included the following papers:

"Meteorology" .....	Wm. H. Ragan
"Progress in the Study of Mammalogy in Indiana".....	Edgar R. Quick
"Sketch of the Work Accomplished for Natural and Physical Science in Indiana".....	Richard Owen
"Sketch of C. S. Rafinesque".....	D. S. Jordan
"Work Done in Ichthyology in Indiana".....	D. S. Jordan
"Work Done in Botany in Indiana".....	John M. Coulter
"Work Done in Physics in Indiana".....	J. P. Naylor
"Work Done in Study of the Lower Invertebrates".....	O. P. Jenkins
"Present Condition of the Study of Indiana Herpetology".....	O. P. Hay
"The Study of Entomology in Indiana".....	P. S. Baker
"The Present Knowledge of Indiana Mineralogy".....	Maurice Thompson
"Work Done for Geology in Indiana".....	Ryland T. Brown
"Chemistry" .....	R. B. Warder
"The Present Condition of Indiana Conchology".....	David R. Moore
"Indiana Statistics" .....	J. B. Conner
"The Past and Present of Indiana Ornithology".....	Amos W. Butler
"Geography" .....	J. T. Scovell
"Astronomy" .....	David Kirkwood

(Of these only Richard Owen and David Kirkwood were absent, and their papers were read by others.)

Dr. J. P. D. John was chosen president pro tem. There were about forty persons present, representing most of the educational institutions of the State, and including most of the scientific workers. Dr. David Starr Jordan was chosen first president and Amos W. Butler the first secretary. A constitution and by-laws were adopted. Since that time regular annual meetings have been held. All but one, which was held at Lafayette, have been held in Indianapolis, and until recently spring meetings at different points in the State. The first one of these was appropriately held at Brookville May 20-22, 1886.

The following persons are mentioned in minutes of December 29, 1885, as being present and taking part in the meeting:

J. P. D. John, Greencastle.	J. P. Naylor, Bloomington.
A. W. Butler, Brookville.	O. P. Hay, Irvington.
O. P. Jenkins, Greencastle.	*P. S. Baker, Greencastle.
J. C. Branner, Bloomington.	*Maurice Thompson, Crawfordsville.
S. P. Stoddard, M.D., Brookville.	
*W. H. Ragan, Greencastle.	J. B. Conner, Indianapolis.
E. R. Quick, Brookville.	*T. B. Redding, New Castle.
D. R. Moore, Brookville.	*Ryland T. Brown, Indianapolis.
D. S. Jordan, Bloomington.	*R. B. Warder, Lafayette.
J. M. Coulter, Crawfordsville.	J. T. Scovell, Terre Haute.

\*Deceased.

The following persons' names appear on the treasurer's book for that meeting, and they were probably present:

- |                                  |                                      |
|----------------------------------|--------------------------------------|
| D. W. Dennis, Richmond.          | C. A. Waldo, Terre Haute.            |
| *Joseph Moore, Richmond.         | C. W. Hargitt, Moores Hill.          |
| Stanley Coulter, Terre Haute.    | *W. P. Shannon, Greensburg.          |
| B. W. Evermann, Bloomington.     | *T. J. McAvoy, Indianapolis.         |
| S. E. Meek, Bloomington.         | L. D. Waterman, M. D., Indianapolis. |
| C. H. Eigenmann, Bloomington.    | John Hurty, M. D., Indianapolis.     |
| *J. L. Campbell, Crawfordsville. | F. M. Webster, Lafayette.            |
| D. A. Owen, Franklin.            | *F. Stein, Indianapolis.             |
| C. R. Dyer, Fort Wayne.          |                                      |
| A. J. Phinney, M. D., Muncie.    |                                      |

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\*Deceased.

Of about forty persons in attendance upon the first meeting, twelve are present at this meeting.



## GREETINGS FROM INDIANA ASSOCIATIONS.

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FROM THE INDIANA STATE TEACHERS' ASSOCIATION.

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BY GEO. W. BENTON.

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Mr. President and Members of the Academy: In the absence of Dr. Robert J. Aley, State Superintendent, and president-elect of the Indiana State Teachers' Association, it has devolved upon me and is my great privilege as retiring president to extend to you the greetings of the teachers of the State, and to congratulate you upon the completion of the series of notable meetings culminating in this anniversary.

It is peculiarly fitting that we do this in view of the importance of each of these societies, and of the part which each has had, and is destined to continue to perform in the life history of the State of Indiana.

The State Teachers' Association last December passed its fifty-fifth milestone, and in its uninterrupted history of fifty-four years has marked the successive stages of educational progress in the State, and has had an increasing influence in establishing standards and in directing the current of educational thought. Many of its officers and members have become prominent in the educational work of the State and nation, and many of them have enjoyed the privilege and honor of membership and active participation in the affairs of the Academy.

No less prominent in its own sphere, through the years of its activity, we recognize the importance of the great work which the Academy has done for the State and for the nation, in the spreading of scientific knowledge, in the encouragement of research, and in the inspiration of the younger generation of science teachers to greater effort and increased efficiency. We see in the Academy the most powerful agency in the solution of the great problem of fitting the highest development of scientific thought into the general scheme of education for all the people; and we confidently look forward to the achievements of the coming years of the Academy, believing that its services to the State and to education will con-



time to receive that recognition which it has so richly deserved in the past, and which we now so inadequately express.

The teachers of Indiana would consider me lacking in truth and courtesy, I am sure, should I fail to give expression to the deep pleasure and pride which we feel in the great history of the Academy, and in the exceptional capacity for usefulness with which it is so richly and generously endowed.

We greet you, and we bid you Godspeed!

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FROM THE INDIANA MEDICAL ASSOCIATION.

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BY DR. S. E. EARP.

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Mr. Chairman: It surely is a pleasure as well as an honor to be chosen to appear before you for the Indiana Medical Association. I am the custodian of the good-will and hearty congratulations of the Indiana State Medical Association, but it is not the casket that assumes any importance; it is the jewel I bring you. Now, when we extend our greetings we desire that they shall have a cultured application and not a provincial one. Perhaps an explanation is in order.

One of your splendid members, Prof. Stanley Coulter, recently delivered an address before The Young Physicians' Club, of which I am a member—and I am a member by virtue of the fact that all physicians are young, but some are younger than others—and Prof. Coulter in his address said that culture is an instinctive appreciation of the very best, and that provincialism is *narrowness*, the antithesis of culture. And that whenever he had come in contact with a provincialist he had two impulses, first to laugh at him, and second to kill him. He had done the first, but so far he had been able to control himself and not do the second.

So we appreciate that everything concerning you is the very best, and that it is the very best who can appreciate the best in you.

The Indiana State Medical Association has passed its golden anniversary by ten years. It has 2,690 members in good standing, and yet there are not more than twenty-five who are members of this splendid body of yours. There ought to be more. There are men who are authorities in

their line who should through this channel help themselves, help the association, help you and help the public by contributing what they possess. We must learn that, taking all the departments of science, "in union there is strength."

Another important factor is this: For a time in scientific medicine, on account of the number of medical institutions in this State, the interests were varied; but during the past year, for the first time in forty years, there has not only been an amalgamation of scientific medical interests, but there is complete unity. And now with the medical college we have here that is under the control of one of your best Universities, Indiana University, with its opportunities and facilities, we take it you will soon hear us rapping at your door, and we trust that the latch-string will be out.

We fully appreciate, as we congratulate you and bring our greetings, all that you have done and are doing for scientific medicine, and that it is valuable beyond price. Again I say, as I bring you our greetings, that we congratulate you most heartily.

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FROM THE INDIANA HISTORICAL SOCIETY.

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BY J. P. DUNN.

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I have been delegated by the Indiana Historical Society to extend its greetings to the Academy of Science. This is therefore an historic greeting; just what a scientific greeting should be, I am not quite certain. In the good old days that Dr. Couiter told about, I should think the proper thing was, "Have something with me," but in the course of the great progress that has been made in the last twenty years in the Pure Food Department, I do not know whether that would be safe. I judge that scientific people believe all the awful revelations that have been made, and that they are all on the water-wagon now.

There is one thing in which I think this society and the other learned societies of the State should be at a unit. We have a centennial in 1916. There has been some talk of having an exposition, but everybody knows that the recent expositions have been failures, and it would be a failure

in Indiana. But it has been suggested that instead of this we erect a permanent memorial building devoted primarily to the preservation of the history of Indiana. This is being done now through the State librarian and the State museum, but we have not room enough. Mr. Blatchley has not room enough to do his work, and I understand valuable gifts have had to be refused on account of lack of room in that museum. There is also scientific work being handled in the State House by Dr. Hurty and Dr. Barnard, and we really need a building of this sort. These things ought to have ample quarters. I would like to see that centennial of 1916 celebrated by an ample building in which a museum and library could be housed, in which there would be room for laboratories and other work of the State, room for the Academy of Science, room for the Historical Society and all these other bodies.

I trust you will take that matter into consideration as you go out from here. Keep it in mind, and when you talk to your Representatives and Senators and people who have influence in the Legislature, lay it before them, and thus help in a work which I believe is of very great importance to the State of Indiana, both scientifically and historically. (Applause.)

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FROM THE INDIANA BRANCH OF THE AMERICAN CHEMICAL SOCIETY.

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BY PROF. R. B. MOORE.

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Mr. President: As representative of the Indiana branch of the American Chemical Society I extend congratulations to the Academy upon its twenty-fifth anniversary. It is needless to argue the use of such a society in the State. It does a work which none of the national societies can do, and it is needless also to state that this work has been done well. Congratulations are especially in order, to those men who founded the Academy and have borne the burden of the work since that time.

I am also glad to see that the social life of the society is receiving sufficient attention at this meeting. We have little opportunity to get together during the year; it is all the more important therefore that the social side of our meeting should be emphasized.

The Indiana branch of the American Chemical Society extends to you congratulations and greetings. (Applause.)

## FROM THE STATE PHYSICS TEACHERS' ASSOCIATION.

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BY PROF. J. P. NAYLOR.

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Mr. President and Members of the Academy: I stand in the rather unfortunate position of belonging to the Committee of Arrangements for this meeting, and also representing one of the other societies. But I assure you that I did not make the assignment. The fact is I was simply held responsible for the presentation of the greetings of the State Physics Teachers' Association and tried to get a good man who could present the greeting in better words than I, although not in better spirit, I am sure.

As I look around over the faces of those present I see many members of the Physics Teachers' Association who are also members of the Academy, and it may occur to someone to ask why the Physics Teachers' Association should exist at all. The work in any science is many sided, and there are some things that can be done in the Indiana Academy and some things that can not be done. We, the physics teachers of the State, need to get together and compare notes. We want to know what the other man is doing and how he does it. This sort of work can not well be done by the Academy, for its province is rather along the line of investigation, and besides its program is always crowded; therefore the State Physics Teachers' Association.

Our association is, however, a sort of offspring of the Academy, and we look to it as the mother society. And as good children we come back at this time with our congratulations and hearty greetings, and hope for the Academy that the next two and a half decades may be even better than the past has been. We do not come like the Orientals, wishing that her shadow may never grow less but that her bright light may be ever enlarged, and that she may go on to larger accomplishments in the future. I bring you greetings. (Applause.)

## FROM INDIANA SOCIETY OF ENGINEERS.

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BY CHAS. BROSSMANN.

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Mr. President and Gentlemen: I feel that it is an honor to address your meeting, and am glad to speak a few words of greeting on behalf of the Indiana Engineering Society.

On your program I notice the names of more than one engineer and subjects relating to engineering work. I feel that the scientist and engineer need no introduction, for they have ever worked either together or in sequence for the betterment of man and civilization.

On the vital questions relating to the physical development of our vast industrial system the scientist has made the work of the engineer possible.

The first step belongs to your work. You took the initiative and advanced radical though perhaps unappreciated theories, labored for years to prove them, and had to work and keep the courage of your convictions to establish your point beyond question.

Your reward has not usually come from a grateful public, but you have the reward of a greater knowledge.

I wish to mention one or two papers on your program, one "A List of Algae." A list of algae means nothing to a community, but when an entire water system becomes clogged with *Crenothrix*, they cry for the scientist to find the remedy.

The subject, "The Problem of Sewage Disposal," does not appeal to a city until the stench is apparent, then succor from scientist and engineer is needed.

Most of the papers to be read, touch upon the betterment of the human race, the conservation of its health, and the country's resources.

Today Dr. Von Lendenfeld investigates the organs of flight of the best flyers of the insect orders, Lepidoptera, Hymenoptera and Diptera. The public hears and smiles.

Tomorrow the Wrights fly for hours in the upper air. The public sees and gasps in wonder and amazement.

And so the scientist needs be the silent man. Carlyle says: "The noble silent men—scattered here and there—each in his department—

silently thinking—silently working, whom no morning newspaper makes mention of—they are, the salt of the earth. A country that has none, or few of them, is in a bad way.”

I am glad we have many in this country, and that this State is so well represented in the “silent men”—although perhaps they will not be so silent in the ensuing two days.

Gentlemen, I am pleased and honored in extending to you the greeting and good wishes of a brother society which appreciates its debt to science. The Indiana Society of Engineers greets you and wishes you a successful meeting.

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FROM THE INDIANA ASSOCIATION OF SCIENCE AND MATHEMATICS TEACHERS.

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BY W. W. HART.

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Mr. Chairman: As I have sat here listening to the expressions of greeting on this occasion, I had the great pleasure of hearing the other gentlemen say the things I expected to say.

I feel that it is especially proper that our society should join with the other organizations today in expressing their interest in your Academy. In some respects, while not a child of the Academy, as is the Physics Teachers' Association, yet we might call ourselves a younger brother. Our interests are somewhat similar. We are interested in the sciences and mathematics, and I think that on that account we can appreciate better than others, possibly, the feeling of need which led to the organization of the Indiana Academy of Science twenty-five years ago. We are all of us working in a field in which we must look for sympathy, for encouragement, for inspiration, not to the public at large, because they frequently misunderstand us, but to our colleagues and fellow-workers. That, as I understand it, was one of the reasons for the organization of this society.

Also many of our number are directly indebted to some of you for the instruction and inspiration that led them to take up their life work. And we are all indebted to you for the standing you have given to scientific pursuits in the country at large.



So I bring to you today the most hearty congratulations upon your past history, and upon the glorious achievements of some of your number, and say that we wish you abundant success for the future. (Applause.)

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FROM THE INDIANA AUDUBON SOCIETY.

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BY WILLIAM WATSON WOOLLEN.

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Mr. President. Ladies and Gentlemen: The first Audubon Society was organized in New York in 1886. Its purpose was "the protection of American birds, not used for food, from destruction for mercantile purposes." In 1889 it seemed to have accomplished the purpose for which it was organized and the movement died out.

A subsequent revival of the demand for birds for millinery purposes led to a re-awakening of sentiment on the subject, and in January, 1896, a State Audubon Society was organized in Massachusetts and in October of the same year one was organized in Pennsylvania. Such societies now exist in all of the states, except perhaps a half dozen, the object of their organization being the preservation of our birds which were fast being exterminated. It was thought that the people must be educated as to the worth of our birds, and these societies entered upon that work.

In April, 1898, principally through the instrumentality of the Indiana Academy of Science, the Indiana Audubon Society was organized. I have in my office the minutes of that meeting, at which I was present. In looking over the minutes of that meeting I find the society was mainly constituted of members of this Association.

The work which has been accomplished by the Audubon Societies of the country has been immense. I am not sure that I know of any other organization which, with as little money, has accomplished so much good. Its work for good has been of such a character as to attract the attention of the people of the country and especially the Department of Agriculture at Washington. The annual reports of that department have taken account of these societies and commended them for the work which they have accomplished. You all must be aware of the legislation that



has been brought about through the influence of these societies, and especially the Lacey act passed by Congress for the protection and preservation of our birds.

I am glad to say that there is not a State in the Union which does not have its laws for the protection of our birds. In this State we have not lagged. We have placed upon our statute books the ideal law for that purpose, originally suggested by the American Ornithological Association.

Now, ladies and gentlemen, allow me to suggest in conclusion, that the membership roll of our Audubon Society contains but few names of the members of this association. We have a membership of about one hundred and fifty. Our first annual meetings under the provision of the constitution were held at Indianapolis. We learned, to our regret, however, that in this great and beautiful city there were very few people who were interested in this work. We changed our constitution. Since then we have gone to Franklin, Richmond, Shelbyville, Fort Wayne, and New Castle, where we have been received most cordially, and we hope we have done good.

Now, we bring our greetings to you, with the hope for future success, and that you will renew your love for this, one of your offspring. I have looked over the program arranged for this the twenty-fifth annual meeting of the Academy with its sixty-nine numbers and the additional numbers which Mr. Butler has read, and I find there are but two numbers which have any reference to our birds. These are No. 45, "The Mocking Bird in Indiana," and No. 47, "Observations in Woodpeckers." Now, ladies and gentlemen, to my way of thinking, this is not as it should be. I believe these other things which you have been writing and talking about are important, but of all of them the one particular thing which is of the greatest interest and value is the preservation of our birds. Without them you will have no occasion to talk about botany or any of the other things about which you have been writing and talking. It is the birds of our country to which we must look for its salvation. I thank you for the opportunity to say a word for them.

PLANS FOR THE INDIANA ACADEMY OF SCIENCE.

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JOHN S. WRIGHT: Mr. Chairman, the committee made arrangements for several persons to speak of the plans for the Academy, with reference to future expansion and development. Now, most of the points that I had in mind have been covered very adequately by the speeches which have been made at different times during the meetings, particularly last night by Dr. John M. Coulter with reference to the social side of the Academy, making the members better acquainted with each other. I feel sure that the program committee will endeavor in planning the next meeting to emphasize the social aspect more and more. Possibly a smoker will serve very well to this end. I do not suppose we would attempt a banquet of as large proportions as the one we had last night, as that would entail too much effort.

I believe the Academy will do well to enlist the interest of men who are in industrial lines. There are within this State at the present time a great many men who are in industrial lines. Mr. Brossmann, who represents the Engineering Society, referred particularly yesterday morning to the interest that engineers and chemists have in scientific work, and that their work rests upon developments along the lines of science. These men in industrial lines may properly be enlisted in the Academy interests, and I am certain we can thus enlarge the number of those engaging in the work of the Academy.

I believe that is all I care to say, because other features of the Academy work will be mentioned by those who follow.

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DR. STANLEY COULTER: Mr. Chairman, I think we are a unit upon the matter of the development of the social side of the Academy. It has occurred to me that one way in which that might be brought about would be to have the Executive Committee constitute itself a committee of introduction at each session, and make it a regular part of the program to introduce the new members to the older ones. I have frequently told young men that the only way for them to broaden out was by coming in contact with these older members, and they have come to the Academy meetings, stayed a day or two and have gone home without meeting a

single one of them. We should certainly have some committee that would see that the young members are properly introduced to those with longer years of service in the State.

Another matter which should be taken up by the Academy and the Executive Committee is the length of time taken to print our reports. A man who is doing a bit of scientific work which is worth publishing, the preparation of which involves much time and labor, must wait eleven months for its appearance if he presents it to the Academy. A paper that may be of value at the time of its presentation, may not be worth nearly so much after a year has elapsed. You can not be sure that the thing you say today is the thing you would say in the same form a year from now. I think the Executive Committee should take this matter up in some definite way, and see that the proceedings are ready for distribution in less than a year from the date of meeting.

Another thing, it seems to me, that we need is that our programs should not be made up as they are now, in a comparatively haphazard fashion. In the past we had some programs that were really capital, and those who had these programs in charge would begin, say, in March or April to send the various members letters, suggesting that it would be a good time to arrange in their minds the subject they would present to the Academy, and thus, long before the Academy meeting the Executive Committee had in hand a well organized program.

In conclusion, I suggest: a recognition of the social side, an improvement in the methods of getting out our reports, so that they may be received very much more promptly than heretofore, and a return to the old method of having the Executive Committee, made up of the President, Secretary and Program Committee, feel that a large part of their work must be done before summer vacation if the meeting is to be a success. The request for my subject, under the present practice, always comes at a time when I am busier than at any other time of the year. As a consequence I send in some title that sounds well, and does not take much preparation, and trust in the main to the inspiration of the moment.

I am thoroughly in accord with Mr. Wright's suggestion that this organization is losing a very great element of strength in not having associated with it more closely the industrial scientists of the State. (Applause.)

DR. H. E. BARNARD (Indianapolis): Mr. President and Members, I cannot but feel that it is presumption for me, whose name was enrolled in the Academy but yesterday, to attempt to give advice to you who were at Brookville, and who have guided the Academy from its infancy through youth to manhood. But if there is a word I can say this morning it is to the older members, whom I would urge to give of their wisdom and advice to these young men, not only in lectures, but in heart-to-heart talks and fraternity with them. I wish to express my thanks to Dr. Coulter for his admirable toast last evening. More fraternity and fewer scientific papers I believe will be the key-note of the future of the society. Some of the papers stand a poor chance of being appreciated, because they are not understood; but we all want to know the men who write the papers, not for the papers, but for themselves. One may gain quite as much inspiration in the company of the worker in other fields as in association with his fellows, not in their papers, but in the social hour.

So I would urge more and more this fraternity among the members, especially at the spring meetings. That first gathering at the swimming pool has taken hold of me; it gives us a glimpse of an esprit de corps that will carry the Academy far, and make an Academy that we will be as proud of twenty-five years hence as we are today. (Applause.)

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PRESIDENT W. E. STONE: Mr. Chairman and Members of the Academy, perhaps what I have to suggest will not permit of practical application, and yet as I have been in attendance upon this meeting I am impressed with this thought about the Academy. It has become in a sense a child of the State; it owes something to the State as an organization. It represents a body of men who certainly have a great deal of influence in shaping the future of the State. Now, it occurs to me that the particular thing which this Academy can do is in the direction of shaping public appreciation of scientific methods and scientific spirit. You can not formulate that policy for immediate action, but I submit to you if it would not be a very valuable thing if the public at large, the press, business men and public officials, had a better conception of what scientific methods and the scientific spirit stand for. How much we should be spared in the press of the sensational talk of scientific attainment; how much we should economize in the administration of the affairs of city and state: how much more it would mean to the private affairs of our citizens if there

was a conception of the idea that knowledge is to be gained on all of the common affairs of life which put into practice would result in efficiency and in economy.

Now, that is a matter of slow growth—public education. We are striving to bring people to a conception of that idea in all of our schools and colleges, and here is a public body which should be recognized as having influence and standing and weight in this State. What better service could it render in the course of a quarter century than to have promulgated steadily that notion of appreciation of scientific methods and scientific spirit? It is worth more than papers. It is the ultimate object of this Academy. It is the highest service it can render the State as a matter of public welfare and public education.

Now, that is very intangible, I realize, but I think it is an end worth thinking about. (Applause.)

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DR. C. L. MEES: It appears to me that the remarks I had prepared upon being notified to speak have been stolen by those who have preceded me. It is an old Chinese saying that it is dangerous to stoop down even to fasten your shoe strings in your neighbor's melon patch. So there is very little left for me to say.

I certainly am thoroughly in accord with all that has been said this morning, and by Dr. Coulter last evening, but there are one or two practical things which come to my mind now. Dr. Coulter referred to the fact that we are in danger of dissipation. Owing to the fact that the number of scientific workers in special lines in Indiana has increased very greatly in the last two years, papers presented to the Academy have become more and more technical in narrow specialties and the number capable of discussing them or even following them as presented was necessarily small and interest correspondingly flagged. This condition led to the formation of half a dozen or more of scientific societies made up of men especially interested along narrow lines of scientific research, commanding the interest and attendance of those having common interest and drawing their attention and membership from the Academy. Now the question is whether the Academy cannot devise some plan by which the work of these various societies could be co-ordinated and perhaps their meetings be arranged to occur about the same time as the Academy meeting. If the program of the Academy meeting could be somewhat shortened and the papers be



made of more general interest, they would serve the purpose, as Dr. Stone has just intimated, of developing the scientific spirit, and then let the different societies meet and discuss the technical papers they may have to offer. I merely offer this as a suggestion, and do not know whether it would be practical.

There is another suggestion which possibly might be worked out. The American Institute of Electrical Engineers has tried a somewhat similar plan, that is, to have scholars from the various colleges where more or less graduate work is being done, attend meetings, and thus give them an enthusiasm which contact alone will bring, and publish their papers, if worthy, and interest them in the work of the Academy later on.

These are some of the practical points that come to my mind in connection with the future plans of this Academy. I believe the danger is now that, unless the character of the activity of the society is somewhat changed, we will become a sort of body which exists upon paper and in lists of membership, rather than in active work.

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MR. W. A. COGSHALL (Bloomington): I have been very much interested in the statements during the last two days of the early work of the Academy—its early organization and membership, and in the large number of suggestions that have been made for the future of the Academy. I think most of these are good. It only remains to adopt some definite plans by which these suggestions can be put into something tangible. I do not know whether such plans can be worked out in the immediate future or not.

It seems to me the aim of this Academy is first to encourage scientific work among a good many who without the Academy would not do any such work. It does that to a certain extent. We have every year a long list of papers from men who do not belong to other scientific societies, and it is a good thing for them and a good thing for the State at large that these papers should be prepared and printed.

The other aim of the Academy, and which I believe to be the main one, is the bringing together of the scientific men of the State—not necessarily to hear the papers, as was very well said last night. I do not know that I should put the papers in quite so insignificant a place as was indicated, but we could well have the program the real excuse for meeting, and make that the frame-work of the whole thing. But I think a good

deal of the scientific benefit is lost or perhaps not realized, by having such a large number of papers of such short duration. To my mind it takes a man who is a good deal better than the average to prepare a paper of five or ten minutes in length, that has anything in it, and if that is all there is to the paper, I do not know that it is really worth while to read it. I believe the whole work of the Academy could be much better carried on if we did not try to crowd sixty or seventy papers into one short meeting.

With the great number of things that have come into life since this Academy was organized, it is not possible for us to give two or three days continuously to a meeting of this kind very often, and so we could not have sixty or seventy papers. But if we could have papers that are long enough to be beneficial, and put them into a shorter space of time, we could then devote more time to the social element of the meeting. I do not believe we get much social benefit from the meeting, as it only happens once a year. We come up here and meet a few men and go back home, and in the course of a few months we have forgotten who these men were and where they came from and what sort of work they are particularly interested in. I believe we should have meetings which would not be too scientific very much oftener than once a year, which would serve to bring the members of this Academy into closer touch with each other.

I would suggest that we have, if possible, some sort of Academy headquarters here in Indianapolis, and that once a month or once in two months, or once a quarter, as may seem advisable, notices be sent out to the members that there will be a meeting. Have not over one or two papers, that could be presented after a little dinner or lunch. I think this would be well worth while.

I was very much interested yesterday in the statements of the Librarian of the State, in regard to the new building that is proposed. If by any possibility that building could be obtained through appropriation from the Legislature, a permanent headquarters for the Indiana Academy could be secured, a most excellent place for carrying out some such idea. It would give us a place for our library, and it seems to me it would be a benefit to the Academy on every side. It would bring the whole scientific body of the State of Indiana together often enough to get acquainted and keep acquainted.

I believe that some sort of permanent headquarters, more frequent meetings and shorter meetings, would give us the best results in this State.



## BANQUET.

FRIDAY EVENING, NOVEMBER 29, 1909.

DAVID W. DENNIS, Toastmaster.

## SPEAKERS.

DAVID STARR JORDAN.  
 ALFRED SPRINGER.  
 GLENN CULBERTSON.  
 M. H. STUART.  
 JOHN M. COULTER.

GEORGE T. MOORE.  
 W. A. NOYES.  
 CHAS. W. GREENE.  
 B. W. EVERMANN.

## MEMBERS AND THEIR FRIENDS PRESENT.

Andrews, F. M.	Culbertson, Glenn.
Bangs, E. H.	Daniels, L. E.
Barnard, H. E., and wife.	Deam, C. C.
Barnhill, Dr. J. F., and wife.	Dennis, D. W.
Bennett, L. F.	Dillan, Miss F. E.
Benton, G. W.	Dryer, C. R.
Bigney, A. J.	Dunn, J. P.
Bitting, Dr. A. W.	Earp, Dr. S. E.
Bitting, Mrs. Katherine Golden.	Eigenmann, C. H.
Blanchard, W. M.	Enders, H. E.
Blatchley, W. S.	Evans, P. N.
Bodine, D.	Evermann, B. W.
Brayton, Dr. A. W.	Felver, W. P.
Breeze, F. J.	Foley, A. L.
Bross, Ernest.	Francis, J. R.
Brossman, C.	Gabel, J. D.
Brown, D. C.	Golden, M. J.
Brown, Hilton U.	Gottlieb, F. W.
Bruner, H. L.	Greene, C. W.
Burrage, S.	Greene, F. C.
Butler, A. W., and wife.	Hadley, A. N.
Bruce, E. M.	Hankinson, T. L.
Carmen, E. K., Miss.	Hart, W. W.
Cogshall, W. A.	Hathaway, A. S.
Coulter, J. M.	Hofer, G. N.
Coulter, Stanley.	Hole, A. D.
Cox, W. C.	Hyde, Roscoe.
Cox, U. O.	Johnson, A. G.

Johnson, S.	Springer, Dr. A.
Jordan, D. S.	Stoddard, Dr. S. P.
Kenyon, A. M.	Stoltz, Charles.
Kern, F. D.	Stoltz, Charles, Jr.
King, R. M.	Stone, W. E.
McBeth, W. A.	Stuart, M. H.
McBride, R. W.	Swift, L. B.
Mees, C. L.	Taylor, F. B.
Millis, W. A.	Thomas, M. B.
Moenkhaus, W. J.	Thompson, Willis S.
Montgomery, H. T.	Transeau, E. N.
Moore, G. T.	Turner, W. P.
Moore, R. B.	Van Gorder, W. B.
Morrison, E.	Waterman, Dr. L. D.
Mowrer, F. K.	Weems, M. L.
Noe, Fletcher M.	Williamson, E. B.
Noyes, W. A.	Woodhams, John W.
Pohlman, A. G.	Woolen, W. W.
Potter, Dr. Theodore.	Wright, John S. and wife.
Ransom, J. H.	Young, J. P.
Rettger, L. J.	Zimmer, H. E.
Smith, E. R.	

DR. A. L. FOLEY: It seems to me the Program Committee has shown particularly good judgment in the program it has provided, and in no way has that good judgment been better shown than in the selection of the Toastmaster for this evening.

There is no man in Indiana who has had more influence upon the teachers of the State, upon the schools of the State; there is no man who has been closer to the hearts of his pupils. There is no man who has had more to do with the development of science in Indiana than has Professor David W. Dennis, of Earlham College, who will preside. (Applause.)

PROF. DAVID W. DENNIS: I am sure, ladies and gentlemen, that I wish more than any of you possibly can that all of that was true.

In science we have many of us been very lately instructed by an eminent Hoosier that nothing at all is settled, and I came to the conclusion this morning when recapitulation went overboard that perhaps it is so. But the records of the Indiana Academy of Science would furnish many exceptions to this rule. During these twenty-five years we have been settling a considerable number of questions; some of these have been settled so effectually that they have never come up again. For instance,

many years ago—so many that I have forgotten the exact date—Dr. Jordan presented a discussion on "Fishing all the way from the Amazon to Greenland," and he said that the number of vertebrae in the fishes of the same species always increases with the latitude in which the fish is caught. He suggested that he knew no reason for it unless perhaps it is that life expresses itself in more vigorous terms at the pole than at the equator. But Prof. T. C. Mendenhall offered a theory that was received with much applause, and that everyone thought was right. He said the North always had more backbone than the South, anyway. (Laughter). So that is one question we have settled.

I remember also that twenty-four years ago our botanist presented to us what he was pleased to call a very important question. Several others have been presented that were more or less important, but this was really important, and it was, in general terms, the development of life from the plasmodium to the oak. He referred to the fact that mushrooms—I tried to get his exact words, but we did not publish in those days, so this is as I remember it—that mushrooms "are degenerates, mere driftwood cast up by the waves of life's ocean." Incidentally this idea was illustrated by another journey parallel to it, from the *Amoeba* by way of the ascidian to man. In the discussion which followed, our zoölogist arose and said the ascidians "are degenerates, mere driftwood cast up by the waves of life's ocean;" so the status of the mushroom and the ascidian was settled.

We really took up some serious questions. I remember that Professor Waldo in a wide discussion of mathematical questions, had a good deal to say about parabolas, hyperbolas, asymptotes and other similar things; Professor Neff then followed with a paper dealing with the refinements of organic chemistry, which he illustrated with what appeared to be colored chalk; all of us were lost some of the time and some of us were lost all the time for some hours. This was followed by a glowing vision of creation from a Darwinian standpoint. It was an interesting occasion; we all understood and took on a benevolent expression. But the many things we used to teach that are discarded now were useful in their day. Carlyle says somewhere that the present time is "child and heir of all the past and parent of all the future," and I could not help thinking this morning when Prof. Coulter was talking, that as one after another these theories have been set aside, there has been a reason for the existence of

each one, and it has called into existence something that is better than it was itself. Our criticism is constructive.

I believe scientific men—or at least if you will make it a little broader than that, the school-master today is the priest of today; and he is going to be the priest of the future. There were some questions submitted to the children of the schools in one of our cities; one of them was, "Where is Heaven?" In the answers one of the pupils (it was a girl, so there could not have been any malice in it) said that Heaven was said to be above the clouds, but she added that physical geography teaches that the atmosphere is only about forty-five miles high, and that even a very few miles up it is probably not possible for anybody to live, so Heaven could not be there at all. Whatever that child may have thought that was wrong or inadequate about Heaven, it is clear that she believed the things her teacher had taught her about the air. He, instead of her minister—if she had one—was her priest.

I happened to be present at the inception of this Society after Amos Butler brought it to us, and of course it would be very easy to continue these reminiscences; but that is not what the committee asked me to do, and I do not intend to do it. But this Society has been a great help to me and to all of us, not only in its meetings, but in the rambles we have had over all parts of Indiana in our Spring meetings. We went out to Fort Quiatanon and hunted beads the Indians had lost at the old trading post and were as happy when we found one as the Indians were sorry when they lost it; we have gone over the whole State getting acquainted with whatever of interest it had to offer. Even at the very first meeting down at Brookville, the home of the Academy, we went swimming, and naturally got acquainted with ourselves; saw ourselves in a sense in which others did not very often see us. (Laughter). These social occasions have been the best part to me, after all is said, of the meetings of the Academy from the beginning until now.

I have the pleasant and easy task of introducing first a man who needs no presentation to scientific men anywhere; a man who needs no title, but whose titles are so numerous that there would not be time to read them. He is an investigator and a teacher, was for a time the premier of Indiana teachers. He is an author to whom science owes much and man owes more; the man for whom the river Jordan was named. (Laughter). Dr. David Starr Jordan, President of Leland Stanford University. (Applause.)

DR. DAVID STARR JORDAN: Mr. Toastmaster and President, Members of the Academy, Ladies and Gentlemen: It is a pretty hard thing to respond, impromptu, to all that. I only hope there is some of it that is not true. It is a very great pleasure to me to get back here, and yet that pleasure is not unmixed with a certain kind of pain. I was just remarking to Dr. Coulter that in the "fierce democracy" of this Indiana Academy "there was a Brutus once who would have brooked the eternal devil to take his seat in Rome" as easily as he would have sat for dinner in a dress-suit. But to see this "fierce democracy" in the brook at Brookville—it gives me a certain sense of pain. (Laughter.) And speaking of Brutus calls to my mind Marc Anthony, and I remember an occasion when a gentleman was called upon to speak, and he had only one speech which he said over and over, and just before going in he asked if anyone could give him the address of Marc Anthony. A friend said, "You know Anthony's style of life and the people he associated with; I should think his address would be at the same old place." (Laughter.)

I saw a statement not long ago by Henry Fairfield Osborn, that he did not think it possible for an American University to produce a Darwin, and the reasons he gave were that first, he—that is, the student nowadays—did not have to contend in his early life with something that was distasteful to him, as Darwin did; second, scientific men do not have the appreciation here that scientific men do in England; and third, that the scientific men of this country do not have the leisure to become such as Darwin was. It does not seem to me that these reasons are very good. I do not think, perhaps Darwin did not think, that any appreciable part of his greatness was due to the work in the University which he said was incredibly dull, and which led him to feel that he would never read a book on a certain subject afterwards. And as for appreciation in this country, you have just heard how scientific men are appreciated in Indiana, and it is even so everywhere we go. And so we have this kind of treatment, in America, whereas Darwin was named "gas" by his fellow-students, because he confined himself more or less to chemical experiments. And as for leisure, I know a great many scientific men of leisure who have never made any pretense to being Darwins on that account. It seems to me that Darwin was first made by heredity. There will never be another; you cannot get a man of high scientific rank and quality unless heredity starts the thing. You have to get the right kind of stock. There is no reason why the right kind of stock should not be found in Indiana,



for there is such an amount of genius in this State that it spills over into all the other States. California is full of it that has been borrowed from Indiana, and so with the other States. The first thing, then, is heredity. The second thing is to be "up against it." We read in history that Darwin went to see horse races and watched them very closely; that he was interested in the beetles of England and gathered beetles in season and out of season. In other words, with all the scientific training a student gets he should be brought right up against nature; against the things that do not lie if you listen to what they have to say. Then the third thing. We read in the various historical sketches of Darwin that he "walked with Henslow," a man with enthusiasm, and this enthusiasm was passed from the teacher to him. I take it, then, that the making of a great man of science rests on these three things, and I do not think the other things have anything to do with it. I notice a man will do just as much when he has not any time, as he will when he has all the time there is.

Now, I think we have these elements to a greater or less extent in our modern Universities. Of course, heredity is not included, but the second element, that of coming up against it, is more or less within the power of every institution now. There was a time when institutions prided themselves that they did not let the students come up against any scientific knowledge. There was a time when the University teacher—an A. B.—was more interested in the song of the oriole than the students in his classes. But the Universities have recognized that defect. Now, the third element, "walking with Henslow." Jacques Loeb, of the University of Chicago, told me awhile ago that he received a very enthusiastic letter from a young man who said he wanted above all things to study the origin of life, and that he wanted above all things to study under Loeb and enjoy his fellowship. Then Loeb wrote back that, unfortunately, he had decided to go to California, and the young man wrote back: "Will you kindly turn my letter over to your successor?"

Now, to a large degree, young men are training themselves wrong. Instead of "walking with Henslow," they are going where they are hired for \$200 to \$500 a year. They are a bar to scientific research, for what professor can teach his students to do a thing which he cannot do himself? You may remember in the last number of the Atlantic Monthly, an article by Professor Showerman of the University of Wisconsin. The professor had worked for some time on the prefixes in P, of Plautus, he was then working on the suffixes in S, of Seneca, to be followed by the termi-

nations in T of Terence. The point I want to get at is that this is not advanced work, and the student will not gain enthusiasm. I do not think we ought to mistake for advanced study this very elemental work, the things that are of no consequence, and just so far as we allow our young men to do this elementary work, so far will we find them going out as teachers without enthusiasm, and saying that it is impossible in this country ever to see another Darwin. (Applause.)

MR. DENNIS: The next speaker is a member of the Academy, and has been for eighteen years. He came to us from the neighboring State of Ohio, and we expect him this evening to bring the greetings of his native State to the Academy. He is the gentleman who in his earlier scientific career invented the torsion balance. At the present time his specialty is fermentation.

Dr. Alfred Springer, of Cincinnati.

DR. ALFRED SPRINGER: Mr. Toastmaster, Ladies and Gentlemen: It certainly affords me great pleasure to be here with you this evening, and no little gratification to be permitted to address a body of men, many of whom have carved their names deeply in the records of scientific achievement. The achievements of those of you who have remained at home have become household words, and the fame of those who have left the State to spread such brightness as only science can convey, has loomed up conspicuously among many brilliant lights. Twenty years ago the American Association for the Advancement of Science, in looking over its list of eligible candidates, selected from your members T. C. Mendenhall as the man worthy to represent it as President. Chairmen for the various sections of the American Association have frequently been selected from the Indiana Academy on account of the good work they have done. As for the General Secretary of the American Association, where could a better and more popular one be found than in our own Amos W. Butler? He graced that position in 1892, and ornithologically speaking, he was a "bird." (Laughter.) This year the American Association for the Advancement of Science has honored itself in selecting one of your past presidents for its President. No one who knows Dr. David Starr Jordan doubts but that he will add additional lustre to its already bright pages.

Permit me, as a delegate from the Cincinnati Section of the American Chemical Society, to congratulate you on the twenty-five years of your existence, and to bespeak for the future, if such a thing be possible, greater success than in the past. (Applause.)



PROFESSOR DENNIS: The program committee wished a man to speak for the small college, and it has asked Professor Culbertson to do this. He was President of this Academy last year, and it is a fact that he has been a member of the Indiana State Legislature. I cannot understand how it came to pass, but will leave that for him to explain—it is true. If he occupies six minutes' time, he has obtained for us through the Legislature \$100 a minute every year for all of that time, and I think he will be entitled to at least that much. Prof. Glenn Culbertson, of Hanover College.

PROFESSOR GLENN CULBERTSON: Mr. Toastmaster, Ladies and Gentlemen: I shall not attempt to explain how I came to the Legislature. I enjoyed the experience very much, but I do not know that I shall care to go through it again, so you had better be looking up another candidate if you want the appropriation continued two years longer. I was very much pleased to hear the expression this morning, but there really was not very much difficulty in getting the appropriation. And I want to say this in regard to that appropriation, that I did not do anything that was against my conscience in attempting to get it. If I had not felt that there were good papers presented to this Academy every year that ought to be published in its report, I should not have worked for this \$600 additional appropriation.

My subject is "The small college in its relation to the Academy of Science." I think by going back twenty-five years in the history of the Indiana Academy of Science, every college in the State would come in that class. Since then, of course, some of them have moved forward into a higher class. I have been a member of the Academy for some fifteen or sixteen years, and it has been a great pleasure to come up here year after year to hear the papers read and the discussions entered into. They certainly have been an inspiration to me, and I take it they have to every man in a small institution in Indiana. We are spread out over a considerable territory, and we have a great deal of work to do. Dr. Jordan says that the more work a man has to do the more he will do, but it is true that if we have a great deal of work along different lines we do not have time to put in special work in preparing such papers as we have heard here year after year; nevertheless we have all done our part. Of course, we of the smaller colleges rather envy a good many of the teachers in larger institutions because of their ability and opportunity to pursue their work along certain lines, but there are compensations. We get a broader grasp

of things in a certain way, and we have certain relationships that are very pleasant to us. I will admit that with some of the papers, all I can do is to look wise, but I have received a great benefit from a good many of them, and have gone back home resolved to understand more fully these things that are brought to our notice.

So far as the work of the small institutions of the State is concerned, you have only to look at the program to see that the small institutions have done their share in producing the scientific men that have been an honor to Indiana. We are very proud of them today.

I want to thank you for listening to the words I have spoken, but I think you can listen to better advantage to those who are to follow me.

PROFESSOR DENNIS: Mr. Milo H. Stuart, of the Manual Training High School, has been requested by the committee to speak on the subject of High Schools. He was principal of the High School at St. Paul before coming here, and is certainly as well qualified to speak from that standpoint as any member of the Academy.

PROFESSOR MILO H. STUART: Mr. Toastmaster, Ladies and Gentlemen: It is easy to see, in the splendid addresses to which we have been listening, why the Academy has endeared itself to the people of Indiana. I would be pleased to add other reminiscences if I could do so, but I am too late a recruit to make any contribution along that line.

Coming from the High School field, I naturally think of the work of the Academy from that standpoint. As we have heard these inspiring addresses today I have been thinking how fine it would be if every science teacher of the State of Indiana could have been induced to come to this fount of inspiration. I believe he would have gone back to his classes with fresh ardor.

We all remember when we left our Universities and got into original work, how great a pleasure it was to feel that we had contributed just a little to the volume of knowledge. The compensation that comes from that kind of labor is certainly very great, and it seems to me if the teachers of the State could come into touch with the people who are doing it, they would feel their load a great deal lighter. I know they would take back to their boys and girls inspiration that would fast make scientists out of them.

This Academy of Science marks its twenty-fifth milestone today, and its face is set toward the golden anniversary. I am reminded of the story

of the Irishman who said he wished he knew just the spot where he would die. His brother asked him what he wanted to know that for, and he said if he knew the exact spot, he would spend the rest of his life keeping away from it. So I think the Indiana Academy of Science, through some of its officials, must have discovered the spot where it might die, and started in the opposite direction, and we are twenty-five years removed from that place tonight.

That leads me (with apologies to Tennyson) to conclude by saying, that

Scientists may come and scientists may go,  
But the Academy goes on forever.

(Applause.)

PROFESSOR DENNIS: Every word I said in introducing Dr. Jordan is true of the next speaker; every teacher in the state would forgive me for saying that after Dr. Jordan left us he became our premier. There was, however, one difference. Dr. Jordan, as President of the State University, had for his rule a motto "Die Luft der Freiheit weht."

The students hardly knew what this meant but finally concluded it was "No smoking in the buildings." Prof. Coulter succeeded Jordan and the first day he smoked in the office. (He sometimes smoked in those days.) The students made a bonfire of their best hats:—they had had but one rule and now they had none. Prof. John M. Coulter, of the University of Chicago.

DR. JOHN M. COULTER: Mr. Toastmaster and Friends: All these ancient and new members of the Academy, who have spoken, have about exhausted the subjects, and I hardly know where to find myself. One thing I had in mind when Dr. Jordan was suggesting that heredity perhaps determined in the first place whether a man was going to do anything or not, and that things that followed were more or less auxiliary. I remember to have heard Dr. Wiley some years ago raise the question why there were so many scientific men in this State as well as men who had achieved more or less distinction in other callings. He answered it then to his own satisfaction. I have never seen it tested, but he concluded that the men in Indiana who had made their mark in science or in any of the other professions were the men whose early life had been spent in the most forbidding parts of the State from an agricultural point of view, and that there was nothing to become interested in except education. Just how many scientific men were lined up in this roll-call. I do not know, but

when this State is unable to produce anything else, it can produce distinguished men.

I suppose a charter member is expected to be more or less reminiscent, and there are two or three things that the other speakers have left unmentioned.

In its early days, twenty-five years ago, this Academy meant a great deal to those who were members, and for two or three reasons. I think Dr. Jordan and Amos Butler, for example, will bear me out in this. In the first place this State science was comparatively new; it was new to us, new to the State, and new to the country. We came together as a set of young men who were interested in a new thing with a sort of fine enthusiasm with respect to the unknown that is found everywhere. In the next place, the instruction in science, with which all of us were more or less concerned, was just as new. It was even newer, because in those days the position of science in the colleges we represented was more or less doubtful and some of the things we taught were often looked at askance. The whole situation in the matter of scientific instruction was in its very beginnings. This also gave us a fine enthusiasm, a sort of feeling of comradeship in a campaign. We felt the need of companionship, and we found it in the Academy. We would come here from our various colleges, full of enthusiasm, and talk over the problems, and this formed a nucleus of sentiment, an esprit du corps that first developed among us, and which has since developed and given to the Academy the place it now occupies in the State. I think perhaps a feature that sustained us, and that made as much for the solidarity of this Academy as any other, was that one of our first campaigns in the State was educational. Science was fighting for its life, for a place in the colleges. There was another association that met at the same time in Indianapolis, known as the "College Association," and one of the functions of the Academy was to lay plans to assault that "College Association." I remember distinctly one of the things we had to combat. There was a tendency to antagonize the intellectual tastes of the students in those days, and one of the old professors said he thought that the very thing a student needed was the thing he disliked the most. If he disliked mathematics, *make* him take it; if he disliked Greek, *make* him take it. That was one of the educational slogans at that day,—every student needs what he dislikes. I have an idea that no one thing could have brought us closer together in our community of interest than the discussion of these educational questions.

But today you are threatened by a danger that we did not encounter. Every interest brought us together; every impulse was to come here to meet friends and associates. Now the tendency is rather the other way. We are becoming more and more independent; we are becoming more and more narrow; and we are in greater danger of working apart than ever before in our history. Many fine men are growing up who have the very smallest amount of interest in anything that is going on outside of their own field, and as a consequence there is a tendency to segregation which I feel to be a thing that must be combated.

There are two dangers I wish to call to your attention, two dangers that reunions of this kind will help to correct. One of these is the matter of personality, the kind of personality that can only be developed in contact with men, that cannot be developed in connection with one's own theories and one's own way of looking at things. It is the kind of personality that influences men and is sympathetic with them, and can only be obtained by knowing men, thus gaining a very much wider range than is possible within the limits of one's own field. It seems to me that is one of the striking features that ought to be thought of in connection with this Academy. Frankly, I think that papers are relatively very unimportant things. I never saw very much inspiration in papers. The inspiration comes from association with men, and that is the thing to cultivate—this opportunity to associate one with another.

The other thing we are in danger of losing sight of, and which this Academy can correct, is the tendency to become narrow in our vision and lose our perspective of the whole general field, not only of science but also of education. You will find that as scientific men become less and less interested in other fields of work, as they grind their own grooves deeper and deeper, they become less and less effective as teachers and less and less influential with their students. You will find men with broad outlook, clear and wide vision, men with sympathy—and men can only get these things by coming in contact with larger fields than their own—are the men who win with students.

These two things we want in these days, men with sympathetic personality, with a broad view over science in general, with an appreciation of the work of others, and with larger view of education as well. I hear that the art of teaching is disappearing. It seems to me that the fine enthusiasm which a teacher must impart to his student, is in danger of dis-



appearing from our scientific laboratories, which are too much in danger of becoming mere factories.

Your number is so small that you can really know one another and can know the work that is being done by one another, and that is just the sort of thing you need. You do not need to come here for training in science; the Academy is no place for training, it is for association and personal inspiration. (Applause.)

PROFESSOR DENNIS: Ladies and Gentlemen: Some years ago "plankton" got into the reservoir of our waterworks at Richmond, and we were a unit that we could not get along with it there any longer, and when we set out to procure a remedy we found that such a remedy had been worked out by a member of this Academy, and this man is the one I will now call on to speak. He is a graduate of Wabash College. He is the inventor of a means of culture for the nitrifying bacteria of the soil, which invention he did not patent, but gave to the American people. This puts us all under obligations to him.

Mr. George T. Moore, of the Botanical Gardens of St. Louis. (Applause.)

In his response Mr. Moore called attention in a humorous way, to some of the advantages of scientific knowledge, and in conclusion presented the greetings and best wishes of the St. Louis Academy of Science and the Missouri Botanical Garden.

PROFESSOR DENNIS: A number of telegrams and letters have been received since the adjournment, and I will ask Prof. Butler to read them now.

(The letter of Dr. Wiley is appended as it was the basis for action in the closing session on Saturday morning).

WASHINGTON, D. C., Nov. 22, 1909.

Mr. A. W. Butler, Indianapolis, Indiana.

Dear Mr. Butler—I have received from you and other members of the Academy of Science, cordial invitations to be present at the 25th anniversary meeting, November 25th-27th, 1909. Should I consult my personal desires I would surely accept the invitation. Just at this time, however, two extremely important cases are in preparation for trial before the United States courts, (1) the use of borax in foods, and (2) the use of peroxides of nitrogen in bleached flour. I am compelled to give every moment of my time to the preparation for these cases, the first one of which will be called in the federal court in Peoria on the 8th of December. I

therefore am constrained by reason of these public duties to decline the invitation to be present at the meeting of the Academy of Science. I want to say, however, just one word to the members of the Academy, and that is a word of congratulation on the work which has been accomplished by the Indiana Academy of Science in the quarter of a century which has passed.

I do not believe that any state association in the country of a similar character has accomplished so much, nor has brought together a band of men more devoted to research, more single in purpose and more enthusiastic in the pursuit of scientific truth. Many of the members of the Association have from time to time gone out into other parts of the country to pursue their work in other States. Not one of them, I believe, has lost his love for the Academy nor parted with his devotion to its cause and welfare.

I have been reading lately some of the early history of Indiana in its political and literary development. I should like to suggest that some member of the Society, before the data are scattered and while it is still possible to derive from the mouths of living witnesses important facts, should write the history of early scientific education in Indiana, beginning with the work of the Owens at New Harmony, almost a hundred years ago, and bringing it up to the era of the establishment of the new science, say about to 1875, or 1880. To write the work of scientific research of Indiana in the last twenty-five years would be too much of an undertaking for any one man, but the greatest interest would attach to a history of the scientific development of Indiana from the time of its beginning, or a little after, up to the date which I have mentioned above. I feel sure that there are enthusiastic and industrious members of the Society who would undertake to do this, either by collaboration or by helping some one who would voluntarily assume the burden of the work. Scientific men of Indiana whose experience goes back of 1875 might contribute personal recollections of scientific development which would prove of intense interest. The scientific work of the early colleges of Indiana is worth the most careful study and would make interesting chapters in the history of those days when the study of science was not considered to be a requisite for a liberal education as it is at the present time. The story of the work of such men as R. T. Brown, E. T. Cox, Dr. Levette, John Coburn, and others of that class would make most interesting contributions to a work of this description. At the present time when there is so much interest in the early political and literary history of the State it seems to me the scientific history should not be neglected.

I had hoped to present and read some paper of a scientific character at the meeting, but as this is not to be, I should like to present in lieu thereof this suggestion, which I hope will be given due consideration, because if it can be carried out it will be historical as well as a scientific



work which will prove of immeasurable interest in the near future, if not at the present time.

Let me close with the hope that this meeting may be all its promoters have intended it should be—a feast not only of science but of friendship—that it may result in the stronger cementation of the bonds which hold the love of the loyal Hoosiers firmly to the State, and excite a pride in the scientific work of Indiana which may rival that which so justly exists respecting its literary accomplishments.

Sincerely,

H. W. WILEY.

PROFESSOR DENNIS: The Committee wishes to honor many more members of the Academy by asking them to speak to you this evening, but on account of the lateness of the hour we will have to restrict the number. I will now call on our old comrade, Prof. W. A. Noyes, of the University of Illinois.

PROFESSOR W. A. NOYES: Mr. Toastmaster, Ladies and Gentlemen: I have been resting very quietly and easily all the evening, not seeing my name on the program, and not having the slightest hint that I would be called upon. It is surely a very great pleasure to be here, and I would like to say just a word about the old times when the Academy started. I believe I was one of the charter members, and one of the things I remember of that time was the discussion in regard to the name that we should adopt. It was finally agreed, if I remember correctly on the recommendation of Dr. Jordan, that we should call it the Indiana Academy of Science, not the Indiana Academy of Sciences. I think that in his mind and in ours, as we selected that name, was the thought that after all there should be but one science, which is all-embracing, and I feel that as one of the ideals of the Academy it has been of the greatest value to us. As we come together in these meetings of the Indiana Academy, we feel that no matter how separated our lines of work may be, how different—so different sometimes that we can understand but little of each other's language—yet after all we are simply working in different parts of one great whole of scientific knowledge, and that it is our place to look at our part, our field, as merely one part of the whole, all parts of which may in some way or other touch our own. And this opportunity of seeing, of catching even a little glimpse of this work that is so far removed, perhaps, from our own, and the acquaintance of these men who are working in the different fields, is, it seems to me, one of the features of greatest value in these friendships and associations which we have made here in this Academy.

PROFESSOR DENNIS: We shall now hear from Professor Charles W. Greene, of the University of Missouri.

PROF. CHARLES W. GREENE: Mr. Toastmaster: It seems rather unfortunate that a man such as I, of no ability as a speaker, should be called upon, but I will do the best I can to express the feeling of enthusiasm and encouragement this meeting has given me. It has been a great pleasure to meet so many friends and to recall old times when the Academy first began, the time when at DePauw, through the genial personality of Professor Jenkins, we began to catch the scientific spirit. I remember my first meeting with the Academy was at Greencastle. We went out on a field excursion and we younger men were brought into intimate contact with the stimulating personal enthusiasm which always characterizes Indiana scientists.

I think one of the features of this meeting has been the showing of the great tolerance that has been developed in our scientific lines of thought. Dr. Coulter showed us that this morning. It is certainly very encouraging to the physiologist to learn that in the life of the plant, in its growth from the plasmodium, it is not predestined to go through any fixed and inflexible schedule of development. I felt at the time that probably the calm cold conservatism of morphology was yielding to the seductive charms of physiology as expressed in environment, that a new era in botany was still possible to us. That was not the old botany but a glimpse of the new.

PROFESSOR DENNIS: Dr. Evermann for a long time a member of the Academy is with us and will tell us what members of the Academy are doing in Washington. He represents the Atlantic here as Dr. Jordan the Pacific. He gave us last night an account of a fishing trip to the "Tiptop of the United States" but he did not produce his "records or his instruments" or even his fishes; he gave us only fish stories. Perhaps he has the real article with him this evening. Dr. Barton Warren Evermann of the U. S. Fish Commission.

DR. BARTON W. EVERMANN: Mr. Toastmaster and Amos Butler—or the Indiana Academy—they mean the same thing. I have been looking at this program ever since I came into the room, and I notice what my friend, Dr. Coulter, also noticed, and mentioned in his remarks—the toast immediately following my name, which I fear bears some relation to what I have already said or what I may say in this meeting. "Lord, Lord, how

this world is given to lying!" But I am glad Dr. Coulter noticed this and put in a disclaimer, thus relieving me to some extent of the suspicion that my fish stories were the only ones in mind.

I would like to say a word regarding those of the Indiana Academy who are now in Washington, and to tell you something of what they are doing. I noticed, perhaps you noticed, in a recent magazine, a long article on "The Plunderers of Washington." There were a dozen or more of them, and I am glad to say to you that there was not among these plunderers who were pictured in this article, any Washington member of the Indiana Academy. We all escaped that distinction at least! I think I can also say that no member of the Indiana Academy in Washington has been seriously involved in the Cook-Peary controversy. We have kept clear of that, also. If there is anything the Indianian learned long ago, it is to take care of himself and not to get into embarrassing situations needlessly. So in this case the members of the Indiana Academy have read the very interesting article by George Kennan in the Outlook which proved very conclusively that Dr. Cook did not have more than one-tenth of the pemmican necessary to enable him and his dogs to reach the North Pole. They took that for what it was worth, and waited for something further. Then in another magazine some man from the West had the whole thing figured out, showing that Kennan had Cook's dogs continuing to eat pemmican at the rate of a pound a day even after they were dead and the Indiana Academy people in Washington hope Kennan may be able to explain why and how they did such an unusual thing.

Several of your friends in Washington are engaged in very interesting work which has an important bearing upon matters in this State. Our good friend, Dr. Wiley, the most distinguished Washington member from this State, is still continuing his pure food work and trying to answer the question "What is whisky?" Dr. Hay, a former President of the Academy, and now in Washington, is trying to determine, no doubt for the benefit of the Academy, the age of the Ceratops beds in Wyoming, Idaho and Montana.

One matter that I think will be of some interest to you here in the Mississippi Valley, is that the Bureau of Fisheries is establishing a biological station at Fairport, Iowa, in the interest of pearls and the pearl button industry, a matter which will appeal to the ladies. There was established some few years ago a small button factory at Davenport. A

German came over and saw the great numbers of mussels in the Mississippi River, and thought they might make good buttons. He began experimenting and soon demonstrated that they were well adapted to this purpose, and now more than fifty thousand tons of these fresh-water mussels are used annually. This is a greater quantity than natural production can supply. The supply, of course, cannot keep up. Fifty thousand tons a year will soon use up the supply. The Bureau of Fisheries realized the possibility of an early depletion of the supply of shells and arranged with Professors Lefevre and Curtis of the University of Missouri to experiment and see if they could not develop a method for the artificial propagation of fresh-water mussels; and they have succeeded, so that the propagation of fresh-water mussels will soon be an easy proposition. Congress made an appropriation for a biological station in which these experiments may be carried forward. We have acquired sixty-five acres of land at Fairport, and the construction work is now going on at that place. It is the ambition of those who are particularly interested in that station to see there a station which will appeal to every biologist in the Mississippi basin. We want to make it a fresh-water biological station where any biologist of the Mississippi Valley or elsewhere may go and find the facilities and material for the study of any fresh-water biological problem in which he is interested; and the Bureau of Fisheries not only hopes you may avail yourselves of the advantage of the station when completed but most cordially invites you to do so.

Again on behalf of the Washington contingent I extend greetings to the Indiana Academy of Science. I thank you.

PROFESSOR DENNIS: I hope you will permit me to take another minute. Reference has been made again and again to the large number of splendid men who have gone out from this Academy. It would be equally proper to refer to the large number of valuable men who have come into the Academy. Reference was made this morning by Mr. William Watson Woollen to the fact that the Audubon Society was an offspring of this Academy. I am sure the mother of that Society was necessity, and the father of that Society as well as of this was Amos Butler. I ask now that the Academy stand, and drink the health, in cold water, of Amos Butler, the father of the Indiana Academy of Science. (Applause.)



MINUTES OF THE TWENTY-FIFTH  
ANNUAL MEETING

# Indiana Academy of Science

CLAYPOOL HOTEL, INDIANAPOLIS, INDIANA,  
Nov. 25, 26, 27, 1909.

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*Friday Morning, November 26, 1909.*

Meeting called to order by the President, Dr. A. L. Foley.

Reading of the minutes dispensed with.

DR. FOLEY: We will now have the minutes of the Executive session of last evening.

ASSISTANT SECRETARY BIGNEY: The Indiana Academy of Science met in the Claypool Hotel at four p. m., November 25th. Eleven members were present and several visiting members of the Academy.

Members present were: A. L. Foley, President; J. H. Ransom, Secretary; A. J. Bigney, Assistant Secretary; Robert Hassler; John S. Wright; Carl L. Mees; W. S. Blatchley; M. B. Thomas; C. H. Eigenmann; A. W. Butler; D. S. Jordan.

A. L. Foley, President of the Academy, in the chair.

The report of the Committee on the 25th meeting, by A. W. Butler, as printed on program, with several additional papers, was read.

G. W. Benton, J. S. Wright and J. W. Woodhams reported that all plans for the banquet had been made.

Membership Committee made no report. Report of State Library Committee was made by J. S. Wright. He stated that the Proceedings of the Academy were being cared for in good order and that many volumes had been bound.

No report from Committee on Weeds and Diseases.

No report from Directors of Biological Survey.



No report from Committee on Relations to the State.

Committee on Distribution of Proceedings reported through J. S. Wright. All work had been performed.

Editorial Committee, by H. L. Bruner, reported work done as ordered.

Report of Secretary on non-resident list was taken up. On motion it was decided to place only those members on the non-resident list who had done work of marked credit to the Academy. The list was passed on by the Executive Committee.

Deaths of Dr. Gray and W. H. Ragan reported. Committee on Resolutions appointed, consisting of C. L. Mees, A. W. Butler and G. W. Benton.

Bills of expense were reported by A. W. Butler. They were referred to Auditing Committee.

Foreign Exchange list ordered to be revised and printed in next report.

Summer meeting to be passed on tomorrow.

Committee on Fellows also to consider a list of Honorary Fellows.

It was voted to place \$25.00 at the disposal of the Secretary for his official duties.

Resolution from California Academy of Science read.

Dr. Jordan extended greeting from the California Academy of Science, and thanks for books.

Committee of two on Fellows was ordered to be appointed by Academy.

Motion that the chairmen of Committees be retained, committees to be filled by chairmen.

Auditing, Membership, Program and Nominating Committees not to be covered by previous motion.

On motion G. W. Benton was chosen as another Assistant Secretary.

Adjourned.

J. H. RANSOM, Secretary.

A. J. BIGNEY, Assistant Secretary.

(Report adopted as read.)

DR. FOLEY: I will now call on Mr. A. W. Butler to make a statement in regard to this meeting of the Academy.

MR. A. W. BUTLER: Mr. Chairman, and Members of the Academy: The program as printed, and which I suppose the most of you have in

your hands, has on it a list of sixty-three papers. There are six additional papers which have been added. One of these, a paper by Prof. M. B. Thomas, was omitted from the original list. The additions are as follows:

"The Wood Lot," M. B. Thomas.

"The Nasal Muscles of Vertebrates," H. L. Bruner.

"Streamers that Show Reversal of Curvature in the Corona of 1893," J. A. Miller.

"On a New Complex Copper Cyanogen Compound," A. R. Middleton.

"Determination of Endothermic Gases by Combustion," A. R. Middleton.

"That Erroneous Hiawatha," A. B. Reagan.

This brings the number of papers up to sixty-nine.

At the conclusion of the business of the meeting there will be responses from other State societies, some six or eight in number.

The program as printed indicates a banquet this evening, to which attention has been called, and the program for which will be announced later.

The program for tomorrow morning is also printed here, including four principal addresses, and suggestions as to plans for the Academy.

I want to say in behalf of the Committee on the Twenty-fifth Anniversary that we have been very much gratified by the interest that has been taken by the educational and scientific societies throughout the State. The Indiana Medical Association, the Historical Society, the Teachers' Association, and a number of other associations have by formal resolution recognized this twenty-fifth meeting, and several of them have appointed delegates to attend the meeting.

I would also like to call attention to the fact that we have had a very large number of congratulatory letters on the period we have arrived at in the history of this Society, and there are three I would like to call attention to. One is from one of the ex-Presidents whom we always delighted to honor, Mr. T. C. Mendenhall. He is at present in Europe in search of health, and as he cannot be present, sends his congratulations. Also a letter from Professor Goss, of the University of Illinois, who had expected to be present until he found that this date is the same as that of the dedication of their new Physics building, so he could not come. Also one from Prof. Kingsley, of Tufts College, Mass. These three letters are particularly earnest and cordial in their words of greeting.

We hope you will find everything arranged for your comfort and convenience, and beg to assure you that if anything has been overlooked or if there is anything you do not like in connection with the arrangements, we are sorry that such is the case. The Committee tried to do its best. (Applause.)

DR. FOLEY: I will now call for reports from the different standing committees.

Program Committee, Mr. W. J. Moenkhaus, chairman: (This report included in the statement of Mr. Butler.)

Membership Committee:

(Moved and seconded that the Secretary cast the ballot of the Academy for the names read. Carried, and persons declared members upon signing of the Constitution and payment of dues.)

Treasurer's report, Mr. W. A. McBeth, Treasurer:

To the Indiana Academy of Science:

On hands, last report.....	\$424 39	
Received dues and fees for 1909.....	95 50	
		————— \$519 89
Expended as per receipts and vouchers.....		118 67
		—————
Balance on hand .....		\$401 22

The papers and vouchers are ready for the Auditing Committee.

W. A. McBETH, Treasurer.

State Library Committee, J. S. Wright, chairman: (Postponed until later, when State Librarian Brown will make the report.)

Committee on Restriction of Weeds and Diseases: No report.

Directors of Biological Survey: No report.

Relations of Academy to the State: No report.

Distributions of Proceedings, J. S. Wright, chairman:

MR. WRIGHT: There is no special report to make. The Committee has the work in hand. We are now engaged in compiling a domestic exchange list.

Committee on Election of Fellows: Passed.

Report of Advertising Committee: (Included in statement of Mr. Butler.)

## Report of Editor:

MR. H. L. BRUNER: The Proceedings for 1908 were published in the usual form. Each contributing author also received one hundred free reprints of his own article. (No reprints of abstracts were furnished.) The financial part of my report is as follows:

Balance in State Treasury from 1908.....	\$244 98	
Appropriation for fiscal year 1909*.....	600 00	
		<hr/>
Total .....		\$844 98
Cost of Proceedings for 1908 .....	\$438 74	
Cost of reprints for 1908 .....	85 68	
		<hr/>
Total .....		524 42
		<hr/>
Balance available for fiscal year 1910.....		\$320 56
Appropriation for fiscal year 1910.....		1,200 00
		<hr/>
Total available for printing the Proceedings of 1909 .....		\$1,520 56

I wish to call the attention of the members of the Academy to one or two matters. First in regard to the editorial statement on the program. We desire that papers be in the hands of the editor or secretary as early as possible, in order that the Proceedings may be gotten out more promptly than last year. Reprints will be furnished of all papers printed, excepting abstracts, and these may be furnished, if request is made. These reprints are paid for by the State Printing Board.

I desire to ask for suggestions as to changing the style of binding and improving the quality of the paper for the coming year.

I would also ask that each one sending a paper for publication should give his address on the paper, so proof can be sent and the reprints mailed. This is a very important thing and I hope it will not be overlooked.

DR. FOLEY: Does anyone have any suggestions to make?

MR. J. S. WRIGHT: I am sorry to occupy so much time on the floor this morning, but I feel there is one thing that should be recognized, and that is the fact of the service rendered the Indiana Academy of Science by the past President, Mr. Glenn Culbertson, who succeeded in doubling the amount of money available for publishing. We now have \$1,200 per

\* The fiscal year 1909 began Oct. 1, 1908, and closed Sept. 30, 1909.

year, as against \$600 before Mr. Culbertson took this in hand. I think this Academy owes him a debt of gratitude. (Applause.)

DR. FOLEY: I wish to second what Mr. Wright has said. I also wish to point out another fact, that formerly any money left reverted to the State, while now it can be carried over until the next year.

Are there any other suggestions?

MR. M. B. THOMAS: It seems to me it would be best to improve the quality of the paper and printing, and possibly of the illustrations, but that this matter should be left to the Committee on Printing, of which Prof. Bruner is the chairman.

(Taken by consent.)

MR. WRIGHT: I move that the Academy extend a vote of thanks to Mr. Culbertson for his unusual service.

(Seconded and carried.)

Report of Resolutions Committee: No report at this time.

MR. G. W. BENTON: I would like to suggest that the Academy is under obligations to the press of the city for courtesies extended, in giving us column after column of space for advertising this meeting. We have been unusually privileged in this regard, and I think it is proper and courteous that we should recognize it in some definite way. Therefore I move that we extend a vote of thanks to the press of the city for courtesies extended to the Academy in announcing this Anniversary meeting.

(Seconded and carried.)

DR. STANLEY COULTER, (for the Membership Committee): It seems to me it would be remarkably pleasant if we could mark this twenty-fifth anniversary by a large increase in membership, and if you will see that applications are in the hands of the committee some time during the forenoon, we will report on them at the afternoon session, so the neophytes will have the feeling that they are full-fledged members.

After an announcement by the Treasurer in regard to payment of dues; and another by Mr. Benton regarding the banquet tickets, etc., Dr. Foley called on Mr. D. C. Brown, the State Librarian, to report in regard to the Academy and its relation to the State Library.

PROF. D. C. BROWN: I am not a member of the Academy of Science, but as State Librarian I made an agreement with the Academy of Science by which the State Librarian is to classify, catalog and shelve the docu-



ments and reports belonging to the Academy, making them subject to removal by any members of the Academy, and subject to reference by the public. I am very greatly interested in having the State Library the center for reference of the entire State on every subject, and by the agreement made with the committee of your Academy two years ago this work has been begun and is progressing fairly well.

The agreement was that the catalog department of the State Library should, as fast as possible and as fast as funds would allow, proceed with this work. Up to the present time we have classified, cataloged, and made analytical catalogs of 143 volumes of domestic reports and 96 foreign reports, making a total of 239 volumes. These have all been bound, and there are about one hundred volumes at present ready to go to the bindery, some foreign and some domestic. These volumes are systematically cataloged and at the present time I have had them all bound alike in good buckram, with a certain kind of label on the back, with "Academy of Science" at the top and the library call number at the bottom. Inside, a label showing to whom the book belongs, and that it can be borrowed only by the members, but used for reference by the general public. I am not quite sure that it is advisable to bind all these books in exactly the same way, but it makes them easily understood when on the shelves. Members can tell instantly that that book belongs to the Academy of Science. A separate card list is also made in pencil and ink, and easily accessible at any moment.

I fancy you all understand that the binding is paid for by the library, with the understanding that if the Academy ever withdraws the books it must pay that amount, so the bills for binding are kept separate, and the public has the use of the books. The Academy would also have the right to have the cards that are made showing the books properly cataloged. Whether that will ever come, I do not know.

I am struggling as best I can for a State Library and Historical Museum, in which all the valuable records and scientific reports of the State can be kept, and in making the argument for that I have said that the Academy of Science would help.

I do not know that I can make any further statement about it, only to have it known to you that the reports are cataloged now about as fast as they come in. I have one request to make—that we may have a definite and correct list of your foreign exchanges, your domestic exchanges, and



your membership. I have had considerable trouble about that, but have worked it out fairly well so far. The foreign exchanges are made through the Smithsonian Institute at Washington. The files of the reports sent to members are paid for by the Academy. The library pays for the others, and through the library they are distributed.

I am very anxious that the members come to the library, as their coming there to use these reports will make it known to the public that the reports are there and can be used.

I believe I have nothing further of interest, but I am very anxious to see you in the library. (Applause.)

DR. FOLEY: I am sure I voice the sentiments of the Academy when I thank our Librarian for the efforts he has put forth in getting the Academy library in good shape, available for use.

The program calls for greetings from the various other scientific societies after the addresses of the morning. I am informed, however, that Mr. Brossmann, representing the Indiana Engineering Society, is here and cannot remain, therefore I will call upon Mr. Brossmann at the present time.

Mr. Brossmann's address will be found in full on page 44.

DR. FOLEY: I might ask if there are any other representatives of societies here that cannot remain during the period. If so, we will have the greeting at this time.

There is just one other point that might be taken up at this time, and that is the question of a summer meeting. The question was mentioned at the Executive Committee meeting last evening, but was not settled. Are there any suggestions as to whether we shall or shall not have a summer meeting? I think the Program Committee would like to have an expression from the Academy. It does not wish to announce a meeting unless somebody meets. On the other hand, it does not wish to discontinue this meeting if it is the desire of any considerable number of members to continue them. What is the wish of the Academy?

If no one has any suggestions, I will call on Dr. S. E. Earp, who fears he may not be able to remain during the entire morning, to respond for the Indiana Medical Society.

Dr. Earp's remarks will be found in full on page 40.

(Mr. P. N. Evans, Vice-President, in the chair.)

MR. EVANS: We will now proceed with the regular order of business, and will hear the President's Address by Dr. A. L. Foley, of Bloomington.

Dr. Foley's address will be found on page 89.

Following the President's address:

MR. EVANS: Evidently this chair should be occupied by a physicist instead of a chemist, so I will vacate in favor of Dr. Foley. (Applause.)

DR. FOLEY: It now gives me great pleasure to introduce one who needs no introduction, Dr. John M. Coulter, of Chicago University, who will speak to us on "Recent Progress in Botany." (Applause.)

Dr. Coulter's address will be found on page 101.

Following Dr. Coulter's address:

DR. FOLEY: You will note from the program that Dr. Harvey Wiley was to have been here this morning to address us. I understand Dr. Barnard has a letter from Dr. Wiley. We would be glad to hear from Dr. Barnard.

DR. H. E. BARNARD: Mr. President, I just this morning received a communication from Dr. Wiley, in which he said he was engaged in the preparation of a very important case involving one of the basic principles of the Pure Food Law. He said if he came on here for four days, he did not know what would happen to the case, and that while he would be with us in spirit and thought, it would be impossible for him to leave his work in Washington to attend this convention. He sends to you his best wishes and hopes for a successful meeting.

DR. FOLEY: You will note from the program that we now have greetings from several associations, scientific and otherwise, who have sent delegates to this association at this time. I will call first for the Indiana Teachers' Association, through its President, Mr. Geo. W. Benton.

(See page 39.)

DR. FOLEY: We will now hear from the Indiana Branch of the American Chemical Society, through Mr. R. B. Moore.

(See page 42.)

Following the various society greetings the Academy adjourned until 2:00 p. m.

*Saturday Morning, November 27, 1909.*

Meeting called to order by President Foley.

(After asking the members who had not already done so to leave their names at the desk, so that a complete list of those in attendance at this meeting might be obtained, Dr. Foley called for the report of the Committee on Resolutions. Mr. C. L. Mees; chairman.)

For this report see page 24.

(Moved and carried that the report be adopted.)

DR. FOLEY: It seems to me that the Academy is under great obligations to the Program Committee, especially to Mr. Butler, and I think a vote of thanks to this committee would be in order.

(Moved and carried that a vote of thanks be extended to the Program Committee, especially Mr. Butler, for the great amount of work that has been put on the program.)

#### REPORT OF NOMINATING COMMITTEE.

President, P. N. Evans, Lafayette.  
 Vice-President, Chas. R. Dryer, Terre Haute.  
 Secretary, George W. Benton, Indianapolis.  
 Assistant Secretary, A. J. Bigney, Moores Hill.  
 Treasurer, W. J. Moenkhaus, Bloomington.  
 Editor, H. L. Bruner, Indianapolis.

(Moved and carried that the report be accepted and that the Secretary cast the ballot of the Academy for these officers.)

#### REPORT OF AUDITING COMMITTEE.

We have gone over the vouchers of the Treasurer, the Program Committee, and the Editor's Report, and find the sums have been done correctly.

W. J. MOENKHAUS, Chairman.

(Moved and carried that the report be adopted.)

#### REPORT OF COMMITTEE ON MEMBERSHIP.

Thirty-five additional names reported.

Applicants for Membership elected by vote of Academy, 1909.

Thomas Billings .....	West Lafayette.
Earl Grimes .....	Russellville.

Earl Rouse Glenn .....	Brookville.
A. A. Bourke .....	Edinburg.
Geo. Hall Ashley .....	Indianapolis.
James Persons Dimonds.....	Washington, D. C.
Guido Bell .....	Indianapolis.
Florence Anna Gates .....	Wabash.
Oscar William Silvey .....	Bloomington.
James E. Weyant .....	Indianapolis.
John W. Woodhams .....	Indianapolis.
Melvin Knolen Davis .....	Terre Haute.
E. Kate Carman .....	Indianapolis.
Paul Anderson .....	Crawfordsville.
Howard J. Banker .....	Greencastle.
Charles Alexander Vallam .....	Indianapolis.
Thad. S. McCulloch .....	Crawfordsville.
Frank Karlston Mowrer .....	Marion.
E. M. Deem .....	Frankfort.
Milo H. Stnart .....	Indianapolis.
Charles Ruby Moore .....	West Lafayette.
L. R. Hesler .....	Crawfordsville.
Martha Hunt .....	Indianapolis.
Brenton L. Steele .....	Bloomington.
Alfred Theodore Wianco .....	Lafayette.
Walter W. Hart .....	Indianapolis.
Ira C. Trueblood, Miss.....	Greencastle.
Luther Cornelius Weeks .....	West Lafayette.
Fermen L. Pickett .....	Bloomington.
William Logan Woodburn .....	Bloomington.
Roscoe Raymond Hyde .....	Terre Haute.
Chas. M. Cunningham, Dr.....	Indianapolis.
Mason L. Weems .....	Valparaiso.
Edward N. Canis .....	Indianapolis.
G. A. Osner .....	Crawfordsville.
Frederick W. Gottlieb .....	Morristown.
Geo. T. Moore .....	St. Louis.
Samuel E. Earp .....	Indianapolis.
J. H. Clark .....	
Leslie C. Nanney .....	Bedford.
Everett W. Owen .....	Indianapolis.
Geo. Spitzer .....	West Lafayette.
Geo. N. Hoffer .....	West Lafayette.
Julius Wm. Sturmer .....	West Lafayette.
Virges Wheeler .....	Montmorenci.
Harry F. Dietz .....	Indianapolis.
Chas. Brossman .....	Indianapolis.

A. D. Thornburn .....	Indianapolis.
Chas. Stiltz, M. D. ....	South Bend.
Jacob P. Young .....	Huntington.
J. M. Van Hook .....	Bloomington.
Walter M. Baker .....	Red Key.
Wm. Reynolds Butler .....	Indianapolis.
W. H. Rankin .....	Ithaca, New York.
Omer C. Boyer .....	Lebanon.
W. M. Blanchard .....	Greencastle.

(Moved and carried that the Secretary cast the ballot of the Academy for these names, and that the persons be considered members after paying fees and signing the Constitution.)

DR. FOLEY: I should like to bring up a matter at this time which was brought up yesterday, but we could not get an expression from the Academy. That is, in regard to the Summer meetings. Does this Academy want a Summer meeting? I think the Program Committee would like to have an expression from the members.

DR. STANLEY COULTER: I want to say that in twenty-five years' membership I have found that the Summer meeting is equivalent to about three Winter meetings in the way of uplift and encouragement. Of course, one of the objections is that a good many members—mathematicians, chemists and physicists—would not be specially interested in these Summer meetings. I would very much regret to see the Summer meeting abolished. If, however, it does not seem feasible, I presume it might be dropped. I move that the Program Committee be instructed to proceed with plans for the Summer meeting, and if in their judgment the signs are not favorable for a session, they be authorized to drop it.

W. A. McBETH: I want to second that motion. I remember with great pleasure the Spring meetings. I made it a point to attend them regularly, and through the fact that we had Spring meetings I have visited some very interesting points in Indiana which are hard to get to unless you particularly go there. The town of New Harmony was one of these places; it is full of historical associations. We went to Madison, to Bloomington, to many of the caves, and to various other points throughout the State where we would probably not have gone if it had not been for this particular attraction. Now, my own way of thinking is that if we would resolve to go to these Spring meetings they would be worth two of the Winter meetings to those who go. I am heartily in favor of resuming the Spring meetings.

(At the suggestion of Mr. Butler a standing vote was taken, which resulted unanimously in favor of resuming the Spring meetings.)

MR. BUTLER: Mr. Chairman. We have a telegram of greeting from the Ohio Academy of Science, and I move that the Secretary be instructed to telegraph the greetings of the Indiana Academy in return.

(Taken by consent.)

MR. BUTLER: In reference to the letter from Dr. Harvey Wiley read at the banquet last night, I move that a committee, consisting of Stanley Coulter, Harvey W. Wiley and C. H. Eigenmann be appointed to see that the suggestions in Dr. Wiley's letter in regard to obtaining some one to prepare a history of early science in Indiana, are carried out.

(Seconded.)

J. H. RANSOM: I would like to amend that by adding Mr. A. W. Butler's name to that committee as a fourth member.

(Seconded.)

STANLEY COULTER: I suggest that Mr. Butler be the first member instead of the fourth.

MR. BUTLER: I think the purpose of the committee is simply to study the situation, and a smaller committee is better than a large one. The three first chosen are the proper members and would be able to do the work better than a larger committee.

(Amendment put and carried; motion as amended carried.)

MR. BUTLER: I move that the Treasurer and Secretary be directed to notify all delinquent members that the constitutional rules against such will be enforced, by order of the Academy.

(Seconded and carried.)

MR. BUTLER: Another matter I think should be acted upon by the Academy. The Editor this year has not put in any bill for expenses, and the expense of editing the Proceedings will probably be larger next year. I move that an appropriation of \$25 be allowed the Editor for the expenses of this year and the year coming.

(Seconded and carried.)

MR. J. S. WRIGHT: In view of the fact that the Academy has received many favors from the Claypool Hotel in giving us this room without charge, and a room for the section meetings, and other courtesies, I move



that we extend a vote of thanks to the management of the Claypool Hotel for courtesies shown the Academy.

(Seconded and carried.)

DR. FOLEY: We will now take up the program of the morning. The first number is an address by Dr. B. W. Evermann, of the U. S. Bureau of Fisheries, on "Federal Control of International and Interstate Waters."

For Dr. Evermann's address see page 119.

DR. FOLEY: The next paper is by Prof. Charles W. Greene, of the University of Missouri, on "The Speed of Migration of Salmon in the Columbia River."

An abstract of Professor Greene's address is given on page 125.

DR. FOLEY: The last paper on the program, "Some Hoosier and Academy Experiences," is by C. A. Waldo, of the Washington University, St. Louis, but Mr. Waldo is not here. The first paper, "Methods and Materials Used in Soil Testing," is by H. A. Huston, of Chicago. Mr. Huston is not here, but his paper is, and it will take about fifteen minutes to read it. It is contrary to precedent that a paper should be read by anyone but the author. However, the Academy can change that, of course, at will. What shall we do with this paper?

(Moved and carried that the paper be read.)

For Professor Huston's address see page 111.

DR. FOLEY: I am sure the members of the Academy would like to hear from anyone who has any suggestions to offer. This completes the list on the program, but we will be glad to hear from anyone else.

If you will pardon me, I would like to make a suggestion or two, one of which was made to me last evening.

Those of us who are members of the American Association know that when we register there, a number is given us corresponding to the name, address and business of the member. So all we need to do to find any man's pedigree is to refer to the number in the list, which is the registration list. Now, it seems to me that some scheme like that might be an advantage in connection with this Academy, so that any member can find out who the other man is. I know I am introduced to people a half-dozen at a time, whom I cannot place and name a few minutes afterwards. A great many people I find are like to me in that respect. We cannot associate names and faces after having been introduced to three or four persons at once. Perhaps some sort of a scheme might be adopted to advantage.

Another thing is that this meeting is the largest that we have ever had during my connection with the Academy, and the reason is evident. We have had men of national reputation to address us. I do not think this large attendance comes from the fact that this is an anniversary meeting, but from the fact that the program has been made worth while by having men who will draw people to the meeting.

You will note that the State is now doing our printing; we do not have to pay that ourselves, and you will note from the Treasurer's report that we have some money and that we are going to get more money, and we have nothing particular to do with this. Now, it seems to me that the Program Committee might arrange to bring one or two speakers here each year, speakers of national reputation, and spend some of this money for their expenses. If we could have some such program as we have had this year every year, with men like Dr. Jordan, and Dr. Coulter and Dr. Wiley, there is no question but what we would have a large attendance, and I think our funds will justify that. I merely offer these as suggestions.

II. L. BRUNER: As editor of the Proceedings I would urge the importance of getting the manuscripts in as soon as possible. The fact that the Proceedings were late this year is due largely to the tardy reception of the papers by the editor. If the members will turn over their papers promptly, I will see that they get into the hands of the printer as early as possible.

DR. FOLEY: I want to second what Mr. Bruner has said. I was Editor one year.

This completes the program, unless the Academy wishes to take up some of the papers which are departmental. What is your will?

(Motion to adjourn.)

