

PROCEEDINGS

OF THE

Indiana Academy of Science,

1893.

W. A. NOYES,
C. A. WALDO,
W. W. NORMAN, } Editors.

A. W. BUTLER,
C. H. EIGENMANN,
V. F. MARSTERS,
L. M. UNDERWOOD,
F. M. WEBSTER, }

Asst Editors.

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OFFICERS, 1893-94.

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SECRETARY,
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W. P. SHANNON,
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J. L. CAMPBELL,
J. C. ARTHUR.

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JOHN M. COULTER,
O. P. HAY,
J. C. BRANNER,

CURATORS.

Botany	JOHN M. COULTER.
Ichthyology	CARL H. EIGENMANN.
Ornithology	AMOS W. BUTLER.
Herpetology	O. P. HAY.
Entomology	F. M. WEBSTER.
Mammalogy	E. R. QUICK.

COMMITTEES, 1893-94.

PROGRAMME.

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D. W. DENNIS.

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M. B. THOMAS,

P. S. BAKER.

NOMINATIONS.

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R. W. McBRIDE.

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C. H. EIGENMANN.

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J. S. WRIGHT,

A. W. DUFF.

LEGISLATION FOR THE RESTRICTION OF WEEDS.

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J. S. WRIGHT.

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C. A. WALDO,

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J. P. D. JOHN,

O. J. CRAIG,

D. W. DENNIS,

F. A. WALKER.

BIOLOGICAL SURVEY.

L. M. UNDERWOOD,

A. W. BUTLER,

J. M. COULTER.

DIRECTORS BIOLOGICAL SURVEY.

L. M. UNDERWOOD,

C. H. EIGENMANN,

V. F. MARSTERS.

RELATIONS OF THE ACADEMY TO THE STATE.

C. A. WALDO,

L. M. UNDERWOOD,

A. W. BUTLER.

FINANCE.

C. H. EIGENMANN,

STANLEY COULTER,

ALEX. SMITH.

OFFICERS OF THE INDIANA ACADEMY OF SCIENCE.

	PRESIDENT.	SECRETARY.	ASST. SECRETARY.	TREASURER.
1885-6	David S. Jordan.	Amos W. Butler.	.....	O. P. Jenkins.
1886-7	John M. Coulter.	Amos W. Butler.	.....	O. P. Jenkins.
1887-8	J. P. D. John.	Amos W. Butler.	.....	O. P. Jenkins.
1888-9	John C. Branner.	Amos W. Butler.	.....	O. P. Jenkins.
1889-90	T. C. Mendenhall,	Amos W. Butler.	.....	O. P. Jenkins.
1890-1	O. P. Hay.	Amos W. Butler.	.....	O. P. Jenkins.
1891-2	J. L. Campbell.	Amos W. Butler.	.....	C. A. Waldo.
1892-3	J. C. Arthur.	Amos W. Butler.	Stanley Coulter. W. W. Norman.	C. A. Waldo.
1893-4	W. A. Noyes.	C. A. Waldo.	W. W. Norman.	W. P. Shannon.

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.

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, 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 programmes 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.

SEC. 3. This constitution may be altered or amended at any annual meeting by a three-fourths majority of attending members of at least one year's standing. No question of amendment shall be decided on the day of its presentation.

BY-LAWS.

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

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

3. 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.

4. No bill against the Academy shall be paid without an order signed by the president and countersigned by the secretary.

5. 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.

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

MEMBERS.

HONORARY FELLOW.

Daniel Kirkwood Riverside, Cal.

FELLOWS.

J. C. Arthur Lafayette.
 P. S. Baker Greencastle.
 W. S. Blatchley Terre Haute.
 J. C. Branner Palo Alto, Cal.
 A. W. Butler Brookville.
 J. L. Campbell Crawfordsville.
 John M. Coulter Lake Forest, Ill.
 Stanley Coulter Lafayette.
 H. T. Eddy Terre Haute.
 C. H. Eigenmann Bloomington.
 W. F. M. Goss Lafayette.
 Thos. Gray Terre Haute.
 O. P. Hay Chicago, Ill.
 H. A. Huston Lafayette.
 J. P. D. John Greencastle.
 D. S. Jordan Palo Alto, Cal.
 V. F. Marsters Bloomington.
 T. C. Mendenhall Washington, D. C.
 D. M. Mottier Bloomington.
 W. W. Norman Greencastle.
 W. A. Noyes Terre Haute.
 W. P. Shannon Greensburg.
 Alex. Smith Crawfordsville.
 W. E. Stone Lafayette.
 M. B. Thomas Crawfordsville.
 L. M. Underwood Greencastle.
 T. C. Van Nuys Bloomington.
 C. A. Waldo Greencastle.

NON-RESIDENT MEMBERS.

D. H. Campbell	Palo Alto, Cal.
B. W. Evermann	Washington, D. C.
Charles H. Gilbert	Palo Alto, Cal.
C. W. Green	Palo Alto, Cal.
C. W. Hargitt	Syracuse, N. Y.
Edward Hughes	Palo Alto, Cal.
O. P. Jenkins	Palo Alto, Cal.
J. S. Kingsley	Tufts College, Mass.
Alfred Springer	Cincinnati, Ohio.
Robert B. Warder	Washington, D. C.

ACTIVE MEMBERS.

J. Alex. Adair	Hanover.
R. J. Aley	Bloomington.
Harry F. Bain	Des Moines, Iowa.
Timothy H. Ball	Crown Point.
H. H. Ballard	Terre Haute.
George W. Benton	Indianapolis.
A. W. Bitting	Lafayette.
Alexander Black	Greencastle.
Henry L. Bolley	Fargo, N. D.
M. A. Brannon	Ft. Wayne.
Chas. C. Brown	Indianapolis.
W. V. Brown	Greencastle.
H. L. Bruner	Irvington.
Wm. Lowe Bryan	Bloomington.
J. B. Burris	Cloverdale.
Noble C. Butler	Indianapolis.
R. Ellsworth Call	Louisville, Ky.
J. L. Campbell	Crawfordsville.
J. T. Campbell	Rockville.
J. Fred Clearwaters	Greencastle.
U. O. Cox	Mankato, Minn.
M. E. Crowell	Indianapolis.
Will Cumback	Greensburg.
George L. Curtiss	Greencastle.
B. M. Davis	Irvington.
D. W. Dennis	Richmond.
Chas. R. Dryer	Terre Haute.
A. Wilmer Duff	Lafayette.
Joseph Eastman	Indianapolis.
E. S. Elder	Indianapolis.
Samuel G. Evans	Evansville.

E. M. Fisher	Urmeyville.
J. J. Flather	Lafayette.
Robert G. Gillum	Terre Haute.
U. F. Glick	Newbern.
Katherine E. Golden	Lafayette.
Michael Golden	Lafayette.
C. F. Goodwin	Brookville.
S. S. Gorby	Indianapolis.
Vernon Gould	Rochester.
Edwin Stanton Hallett	Corydon.
A. S. Hathaway	Terre Haute.
Wm. Perry Hay	Irvington.
Franklin W. Hayes	Indianapolis.
Robert Hessler	Indianapolis.
T. H. Hibben	Indianapolis.
Geo. C. Hubbard	Moore's Hill.
J. W. Hubbard	Bloomington.
Thomas M. Iden	Irvington.
Alex. Jameson	Indianapolis.
A. E. Jessup	Carmel.
Sylvester Johnson	Irvington.
W. B. Johnson	Franklin.
E. M. Kindle	Bloomington.
J. G. Kingsbury	Irvington.
W. H. Kirchner	Minneapolis, Minn.
Ph. Kirsch	Columbia City.
Daniel Layman	Indianapolis.
W. S. Lemen	Indianapolis.
Robert E. Lyons	Bloomington.
Herbert W. McBride	Chicago, Ill.
Robert Wesley McBride	Indianapolis.
Kate McCarthy	Wabash.
D. T. McDougal	Minneapolis, Minn.
F. M. McFarland	Palo Alto, Cal.
J. W. Marsee	Indianapolis.
C. Leo Mees	Terre Haute.
W. J. Moenkhaus	Bloomington.
G. T. Moore	Crawfordsville.
Joseph Moore	Richmond.
Warren K. Moorehead	Xenia, Ohio.
J. P. Naylor	Greencastle.
Charles E. Newlin	Indianapolis.
E. W. Olive	Crawfordsville.
J. H. Oliver	Indianapolis.
D. A. Owen	Franklin.

Elwood Pleas	Dunrieth.
Ryland Ratliff	Fairmount.
Thomas B. Redding	New Castle.
D. C. Ridgley	Delphi.
George L. Roberts	Greensburg.
L. J. Rettger	Terre Haute.
John F. Schnaible	Lafayette.
J. T. Scovell	Terre Haute.
C. E. Schafer	Huntington.
G. W. Sloan	Indianapolis.
Harold B. Smith	Lafayette.
M. C. Stevens	Lafayette.
Joseph Swain	Bloomington.
A. E. Swann	Indianapolis.
Geo. A. Talbert	Laporte.
Frank B. Taylor	Ft. Wayne.
Erastus Test	Lafayette.
F. C. Test	Washington,*D. C.
Wm. M. Thrasher	Irvington.
A. L. Treadwell	Oxford, Ohio.
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E. B. Uline	Lake Forest, Ill.
A. B. Ulrey	Bloomington.
F. A. Walker	Anderson.
W. O. Wallace	Wabash.
F. M. Webster	Wooster, Ohio.
M. W. Wells	Indianapolis.
J. R. Wiest	Richmond.
H. W. Wiley	Washington, D. C.
A. J. Woolman	Duluth, Minn.
J. S. Wright	Indianapolis.
Honorary fellow	1
Fellows	28
Non-resident members	10
Members	107
Total	146