

PROCEEDINGS

OF THE

Indiana Academy of Science.

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1892.

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BROOKVILLE, IND.

# PROCEEDINGS

OF THE

## Indiana Academy of Science,

1892.

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O. P. HAY,  
C. A. WALDO, } Editors.  
J. M. COULTER, }

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

TERRE HAUTE, IND.  
PRESS OF MOORE & LANGEN.  
1893.

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## OFFICERS, 1892-93.

PRESIDENT,  
J. C. ARTHUR.

VICE-PRESIDENT,  
W. A. NOYES.

SECRETARY,  
AMOS W. BUTLER.

ASSISTANT SECRETARY,  
\*STANLEY COULTER.

† W. W. NORMAN.

TREASURER,  
C. A. WALDO.

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### EXECUTIVE COMMITTEE,

J. C. ARTHUR.	W. A. NOYES,	AMOS W. BUTLER,
W. W. NORMAN.	C. A. WALDO,	JOHN M. COULTER,
J. P. D. JOHN,	T. C. MENDENHALL,	O. P. HAY,
D. S. JORDAN.	J. L. CAMPBELL.	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.

\* Resigned.

† To fill vacancy.

# COMMITTEES, 1892-93.

## PROGRAMME.

L. M. UNDERWOOD,

W. A. NOYES.

## MEMBERSHIP.

C. H. EIGENMANN,

P. S. BAKER,

D. T. McDOUGAL.

## NOMINATIONS.

O. P. HAY,

H. A. HUSTON,

W. P. SHANNON.

## AUDITING.

P. S. BAKER,

W. W. NORMAN.

## PLAN FOR PUBLICATION.

STANLEY COULTER,

L. M. UNDERWOOD,

A. W. BUTLER.

## STATE LIBRARY.

C. A. WALDO,

J. M. COULTER,

W. A. NOYES.

## LEGISLATION FOR THE RESTRICTION OF WEEDS.

J. C. ARTHUR,

J. M. COULTER,

W. H. EVANS.

## EDITORS.

O. P. HAY,

C. A. WALDO,

J. M. COULTER.

## PRESERVATION OF ABORIGINAL EARTHWORKS NEAR ANDERSON.

J. M. COULTER,

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,

J. M. COULTER,

A. W. BUTLER.

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.

## CONSTITUTION.

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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.

SEC. 3. Members of this Academy shall consist of three classes, active, non-resident and honorary. 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. Honorary members 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 to membership. Applications for membership in any of the foregoing classes shall be referred to a committee on applications for membership, who shall consider such application and report to the Academy before the election.

SEC. 4. 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, a 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. 5. 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. 6. 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.

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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 a 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 MEMBER.*

Daniel Kirkwood . . . . . Riverside, Cal.

*NON-RESIDENT MEMBERS.*

John C. Branner . . . . . Palo Alto, Cal.  
 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.  
 David S. Jordan . . . . . 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.  
 J. C. Arthur . . . . . Lafayette.  
 Harry F. Bain . . . . . Iowa City, Iowa.  
 Philip S. Baker . . . . . Greencastle.  
 Timothy H. Ball . . . . . Crown Point.  
 George W. Benton . . . . . Indianapolis.  
 Alexander Black . . . . . Greencastle.  
 Willis S. Blatchley . . . . . Terre Haute.  
 Henry L. Bolley . . . . . Fargo, N. D.  
 M. A. Brannon . . . . . Ft. Wayne.  
 W. V. Brown . . . . . Greencastle.  
 H. L. Bruner . . . . . Irvington.  
 J. B. Burris . . . . . Cloverdale.  
 Amos W. Butler . . . . . Brookville.  
 Noble C. Butler . . . . . Indianapolis.  
 J. L. Campbell . . . . . Crawfordsville.

J. T. Campbell . . . . .	Rockville.
J. Fred Clearwaters . . . . .	Greencastle.
John M. Coulter . . . . .	Lake Forest, Ill.
Stanley Coulter . . . . .	Lafayette.
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.
Joseph Eastman . . . . .	Indianapolis.
H. T. Eddy . . . . .	Terre Haute.
Carl H. Eigenmann . . . . .	Bloomington.
E. S. Elder . . . . .	Indianapolis.
Samuel G. Evans . . . . .	Evansville.
E. M. Fisher . . . . .	Lake Forest, Ill.
Wilbur A. Fisk . . . . .	Richmond.
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.
W. F. M. Goss . . . . .	Lafayette.
Vernon Gould . . . . .	Rochester.
Thomas Gray . . . . .	Terre Haute.
Edwin Stanton Hallett . . . . .	Corydon.
A. S. Hathaway . . . . .	Terre Haute.
O. P. Hay . . . . .	Chicago, Ill.
Wm. Perry Hay . . . . .	Irvington.
Franklin W. Hayes . . . . .	Indianapolis.
Robert Hessler . . . . .	Indianapolis.
W. A. Hester . . . . .	Evansville.
T. H. Hibben . . . . .	Indianapolis.
Geo. C. Hubbard . . . . .	Moore's Hill.
J. W. Hubbard . . . . .	Bloomington.

H. A. Huston . . . . .	Lafayette.
Thomas M. Iden . . . . .	Irvington.
Alex. Jameson . . . . .	Indianapolis.
A. E. Jessup . . . . .	Carmel.
J. P. D. John . . . . .	Greencastle.
Sylvester Johnson . . . . .	Irvington.
W. B. Johnson . . . . .	Franklin.
J. G. Kingsbury . . . . .	Irvington.
W. H. Kirchner . . . . .	Terre Haute.
Daniel Layman . . . . .	Indianapolis.
W. S. Lemen . . . . .	Indianapolis.
Robert E. Lyons . . . . .	Bloomington.
Herbert W. McBride . . . . .	Chicago, Ill.
Robert Wesley McBride . . . . .	Indianapolis.
D. T. McDougal . . . . .	Minneapolis, Minn.
F. M. McFarland . . . . .	Palo Alto, Cal.
J. W. Marsee . . . . .	Indianapolis.
Vernon F. Marsters . . . . .	Bloomington.
C. Leo Mees . . . . .	Terre Haute.
T. C. Mendenhall . . . . .	Washington, D. C.
Joseph Moore . . . . .	Richmond.
Warren K. Moorehead . . . . .	Xenia, Ohio.
David M. Mottier . . . . .	Bloomington.
J. P. Naylor . . . . .	Greencastle.
Charles E. Newlin . . . . .	Indianapolis.
W. W. Norman . . . . .	Greencastle.
W. A. Noyes . . . . .	Terre Haute.
J. H. Oliver . . . . .	Indianapolis.
D. A. Owen . . . . .	Franklin.
Wallace C. Palmer . . . . .	Columbia City.
Alfred E. Phillips . . . . .	Lafayette.
Elwood Pleas . . . . .	Dunrieth.
E. R. Quick . . . . .	Brookville.
Ryland Ratliff . . . . .	Fairmount.
Thomas B. Redding . . . . .	New Castle.
D. C. Ridgley . . . . .	North Manchester.
Herman B. Ritter . . . . .	Indianapolis.
George L. Roberts . . . . .	Greensburg.

L. J. Rettger . . . . .	Terre Haute.
John F. Schnaible . . . . .	Lafayette.
J. T. Scovell . . . . .	Terre Haute.
C. E. Schafer . . . . .	Huntington.
W. P. Shannon . . . . .	Greensburg.
G. W. Sloan . . . . .	Indianapolis.
Alexander Smith . . . . .	Crawfordsville.
W. J. Spillman . . . . .	Monmouth, Ore.
Sidney T. Sterling . . . . .	Camden.
M. C. Stevens . . . . .	Lafayette.
Winthrop E. Stone . . . . .	Lafayette.
A. E. Swann . . . . .	Indianapolis.
Frank B. Taylor . . . . .	Ft. Wayne.
Erastus Test . . . . .	Lafayette.
F. C. Test . . . . .	Washington, D. C.
Mason B. Thomas . . . . .	Crawfordsville.
Wm. M. Thrasher . . . . .	Irvington.
A. L. Treadwell . . . . .	Oxford, Ohio.
Joseph H. Tudor . . . . .	Baltimore, Md.
E. B. Uline . . . . .	Lake Forest, Ill.
A. B. Ulrey . . . . .	Bloomington.
L. M. Underwood . . . . .	Greencastle.
T. C. Van Nuys . . . . .	Bloomington.
C. A. Waldo . . . . .	Greencastle.
F. A. Walker . . . . .	Anderson.
F. M. Webster . . . . .	Wooster, Ohio.
M. W. Wells . . . . .	Indianapolis.
J. R. Wiest . . . . .	Richmond.
H. W. Wiley . . . . .	Washington, D. C.
William S. Wood . . . . .	Seymour.
A. J. Woolman . . . . .	Duluth, Minn.
A. Harvey Young . . . . .	Hanover.
Honorary member . . . . .	1
Non-resident members . . . . .	12
Active members . . . . .	121
Total . . . . .	134

## SPRING MEETING.

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The spring meeting of the Academy was held at Terre Haute, Ind., May 17, 18 and 19, 1893.

The meeting was called to order by Vice President Noyes, at 3 o'clock p. m., May 17, in the chemical lecture room of Rose Polytechnic Institute.

J. M. Coulter, W. W. Norman and J. T. Scovell were appointed Membership Committee.

L. M. Underwood presented a report from the committee on State Biological Survey, of which he is chairman. The chairman was instructed to appoint two other members to serve on the committee with him and to present plans at this meeting for carrying on the work.

Acting president Noyes announced an excursion for the next day, leaving the Terre Haute House early in the morning, crossing the river, thence to Durkee's Ferry, returning to Terre Haute in time for supper.

In the evening the Academy met in the Normal school. President Arthur presided.

Dr. T. C. Mendenhall spoke of "The Summit of the Continent." Dr. J. M. Coulter spoke on "Forestry."

Later in the evening another meeting was held at the Terre Haute House. Prof. Underwood announced he had requested to serve with him on the committee on Biological Survey, J. M. Coulter and A. W. Butler.

The members then discussed the question of the relation the Academy should sustain to the State.

C. A. Waldo, J. M. Coulter and A. W. Butler were appointed a committee to consider this.

The resignation of Prof. Stanley Coulter, as assistant secretary, was accepted.

A meeting of the Academy was held on the evening of May 18th, at the same place.

The committee on Biological Survey announced that for the present

three directors, one representing Botany, one Zoology and one Paleontology be appointed. The recommendation was approved. L. M. Underwood, C. H. Eigenmann and V. F. Marsters were appointed such committee.

Instructions were given the Programme Committee regarding arrangements for the winter meeting.

W. W. Norman was elected assistant secretary.

The day was spent along the west side of the Wabash river, above Terre Haute, and was greatly enjoyed. Some of the members continued their investigations the following day.