

# PROCEEDINGS

OF THE

THIRTY-EIGHTH ANNUAL  
MEETING

OF THE

# INDIANA ACADEMY OF SCIENCE

1922

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J. J. DAVIS, EDITOR

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INDIANAPOLIS:

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

1923



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OFFICERS AND COMMITTEES FOR 1922.

*President*, F. M. ANDREWS, Indiana University, Bloomington.  
*Vice-President*, C. A. BEHRENS, Purdue University, Lafayette.  
*Secretary*, WALTER N. HESS, DePauw University, Greencastle.  
*Assistant Secretary*, HARRY F. DIETZ, State Conservation Commission, Indianapolis.  
*Press Secretary*, FRANK B. WADE, Shortridge High School, Indianapolis.  
*Treasurer*, WILLIAM M. BLANCHARD, DePauw University, Greencastle.  
*Editor, 1922 Proceedings*, J. J. DAVIS, Purdue University, Lafayette.

*Executive Committee:*  
 (Officers and Past-Presidents)

ANDREWS, F. M.	COULTER, STANLEY	JORDAN, D. S.
ARTHUR, J. C.	CULBERTSON, GLENN	MOENKHAUS, W. J.
BEHRENS, C. A.	DAVIS, J. J.	MOTTIER, DAVID M.
BIGNEY, A. J.	DIETZ, H. F.	MENDENHALL, T. C.
BLANCHARD, W. M.	DRYER, CHAS. R.	NAYLOR, JOSEPH P.
BLATCHLEY, W. S.	EIGENMANN, C. H.	NOYES, W. A.
BREEZE, F. J.	ENDERS, HOWARD E.	PAYNE, F.
BRUNER, H. L.	EVANS, P. N.	WADE, F. B.
BURRAGE, SEVERANCE	FOLEY, A. L.	WALDO, C. A.
BUTLER, AMOS W.	HAY, O. P.	WILEY, H. W.
COGSHALL, W. A.	HESS, W. N.	WILLIAMSON, E. B.
COULTER, JOHN M.	HESSLER, ROBERT	WRIGHT, JOHN S.

*Curators:*

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ENTOMOLOGY .....	W. S. BLATCHLEY
HERPETOLOGY } .....	A. W. BUTLER
MAMMALOGY } .....	
ORNITHOLOGY } .....	C. H. EIGENMANN
ICHTHYOLOGY .....	

*Advisory Council.*

JOHN S. WRIGHT, Eli Lilly and Co., Indianapolis.  
 R. W. MCBRIDE, 1239 State Life Building, Indianapolis.  
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*Trustees of Academy Foundation.*  
 AMOS W. BUTLER, State Board of Charities, Indianapolis.  
 ROBERT HESSLER, 25 S. Bolton Ave., Indianapolis.

## COMMITTEES ACADEMY OF SCIENCE, 1922.

*Archeological Survey*

- FRANK B. WYNN,\* Indianapolis.  
 R. W. McBRIDE, 1239 State Life Building, Indianapolis.  
 W. N. LOGAN, Indiana University, Bloomington.  
 ALLEN D. HOLE, Earlham College, Richmond.  
 STANLEY COULTER, Purdue University, Lafayette.  
 CHAS. STOLTZ, 311 W. Jefferson Blvd., South Bend.  
 A. J. BIGNEY, Evansville College, Evansville.  
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 W. A. McBETH, State Normal, Terre Haute.  
 S. F. BALCOM, 3634 Birchwood Ave., Indianapolis.

*Auditing.*

- E. B. WILLIAMSON, Bluffton.  
 ROLLO R. RAMSEY, Indiana University, Bloomington.

*Biological Survey.*

- H. S. JACKSON, Purdue Agricultural Experiment Station, Lafayette.  
 RICHARD LIEBER, State Conservation Commission, Indianapolis.  
 J. J. DAVIS, Purdue University, Lafayette.  
 WILL SCOTT, Indiana University, Bloomington.

*Distribution of Proceedings.*

- WALTER N. HESS, DePauw University, Greencastle.  
 WM. M. BLANCHARD, DePauw University, Greencastle.

*Membership.*

- HARRY F. DIETZ, State Conservation Commission, Indianapolis.  
 W. A. COGSHALL, Indiana University, Bloomington.  
 RALPH H. CARR, Purdue University, Lafayette.  
 M. L. WEEMS, Valparaiso University, Valparaiso.

*Nominations.*

- H. E. ENDERS, Purdue University, Lafayette.  
 C. C. DEAM, Bluffton.  
 H. L. BRUNER, Butler College, Indianapolis.

*Program.*

- R. C. FRIESNER, Butler College, Indianapolis.  
 H. L. BRUNER, Butler College, Indianapolis.  
 W. M. BLANCHARD, DePauw University, Greencastle.

*Publication of Proceedings.*

- F. PAYNE, Indiana University, Bloomington.  
 O. B. CHRISTY, State Normal, Muncie.  
 HARRY F. DIETZ, State Conservation Commission, Indianapolis.

*Relation of Academy to the State.*

- R. W. McBRIDE, 1239 State Life Building, Indianapolis.  
 GLENN CULBERTSON, Hanover College, Hanover.  
 JOHN S. WRIGHT, Eli Lilly and Co., Indianapolis.  
 AMOS W. BUTLER, State Board of Charities, Indianapolis.  
 D. A. ROTHROCK, Indiana University, Bloomington.

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 GLENN CULBERTSON, Hanover College, Hanover.  
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 E. B. WILLIAMSON, Bluffton.  
 J. P. NAYLOR, DePauw University, Greencastle.

*State Library.*

- AMOS W. BUTLER, State Board of Charities, Indianapolis.  
 W. S. BLATCHLEY, 1558 Park Ave., Indianapolis.  
 A. L. FOLEY, Indiana University, Bloomington.

\* Died July 27, 1922.

## PAST OFFICERS OF THE INDIANA ACADEMY OF SCIENCE

YEARS	PRESIDENT	SECRETARY	ASST. SECRETARY	PRESS SECRETARY	TREASURER
1885-1886	David S. Jordan	Amos W. Butler			O. P. Jenkins.
1886-1887	John M. Coulter	Amos W. Butler			O. P. Jenkins.
1887-1888	J. P. D. John	Amos W. Butler			O. P. Jenkins.
1888-1889	John C. Branner	Amos W. Butler			O. P. Jenkins.
1889-1890	T. C. Mendenhall	Amos W. Butler			O. P. Jenkins.
1890-1891	O. P. Hay	Amos W. Butler			O. P. Jenkins.
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1892-1893	J. C. Arthur	Amos W. Butler	Stanley Coulter		C. A. Waldo.
1893-1894	W. A. Noyes	C. A. Waldo	W. W. Norman		W. P. Shannon.
1894-1895	A. W. Butler	John S. Wright	A. J. Bigney		W. P. Shannon.
1895-1896	Stanley Coulter	John S. Wright	A. J. Bigney		W. P. Shannon.
1896-1897	*Thomas Gray	John S. Wright	A. J. Bigney		W. P. Shannon.
1897-1898	C. A. Waldo	John S. Wright	A. J. Bigney	Geo. W. Benton	J. T. Seovell.
1898-1899	C. H. Eigenmann	John S. Wright	E. A. Schultz	Geo. W. Benton	J. T. Seovell.
1899-1900	*D. W. Dennis	John S. Wright	E. A. Schultz	Geo. W. Benton	J. T. Seovell.
1900-1901	*M. B. Thomas	John S. Wright	E. A. Schultz	Geo. W. Benton	J. T. Seovell.
1901-1902	Harvey W. Wiley	John S. Wright	DonaldsonBodine	Geo. W. Benton	J. T. Seovell.
1902-1903	W. S. Blatchley	John S. Wright	DonaldsonBodine	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	J. W. Woodhams	W. J. Moenkhaus.
1910-1911	C. R. Dryer	A. J. Bigney	E. B. Williamson	Milo H. Stuart	W. J. Moenkhaus
1911-1912	J. P. Naylor	A. J. Bigney	E. B. Williamson	Milo H. Stuart	W. J. Moenkhaus.
1912-1913	*Donaldson Bodine	A. J. Bigney	C. M. Smith	F. B. Wade	W. J. Moenkhaus.
1913-1914	Severance Burrage	A. J. Bigney	H. E. Enders	F. B. Wade	W. A. Cogshall.
1914-1915	W. A. Cogshall	A. J. Bigney	H. E. Enders	F. B. Wade	Wm. M. Blanchard.
1915-1916	A. J. Bigney	Howard E. Enders	E. B. Williamson	F. B. Wade	Wm. M. Blanchard.
1916-1917	W. J. Moenkhaus	Howard E. Enders	P. A. Tetrault	F. B. Wade	Wm. M. Blanchard.
1917-1918	E. B. Williamson	Howard E. Enders	P. A. Tetrault	F. B. Wade	Wm. M. Blanchard.
*1918-1919	E. B. Williamson	Howard E. Enders	P. A. Tetrault	F. B. Wade	Wm. M. Blanchard.
1919-1920	H. L. Bruer	Howard E. Enders	R. E. Holman	F. B. Wade	Wm. M. Blanchard.
1920-1921	Howard E. Enders	Walter N. Hess	Harry F. Dietz	F. B. Wade	Wm. M. Blanchard.
1921-1922	F. M. Andrews	Walter N. Hess	Harry F. Dietz	F. B. Wade	Wm. M. Blanchard.
1922-1923	Charles A. Behrens	Walter N. Hess	Flora C. Anderson	Harry F. Dietz	Wm. M. Blanchard.

\*Deceased. †Officers continued—Annual meeting not held because of influenza epidemic.

## MINUTES OF THE SPRING MEETING.

French Lick, Indiana.

The Spring Meeting of the Academy afforded its members and friends an opportunity to study the remarkable Lost River district of Orange County. The underlying rocks of this region are limestone, and due to spectacular stream trenching, are largely responsible for the hills, valleys and caves of the present time.

In addition to exploring the Lost River basin, the party visited the springs and rock formations of the French Lick valley, including Cross Cave. Prof. C. A. Malott, together with other members of the Academy who were familiar with the region, acted as guides.

The meeting was planned to cover three days, Thursday, Friday and Saturday, May 11, 12 and 13, 1922.

Thirty-eight members and eleven guests were in attendance at the meetings and on the trips.

## THURSDAY, MAY 11.

Members of the Academy and their friends met at the Windsor Hotel, French Lick. At 2:00 p.m. the party started on a field trip through the French Lick valley for the purpose of visiting the numerous mineral springs, rock formations and hills which have been left as a result of valley erosion.

After dinner at the Windsor Hotel, the members and their guests assembled at the Christian Church for a brief business meeting. Following the business meeting, Prof. C. A. Malott, of Indiana University, gave a very interesting and instructive lecture on the geology of Lost River. By means of clear descriptions and excellent charts Prof. Malott also discussed the geology of the country that was to be visited on Friday.

## FRIDAY, MAY 12.

The party left the Windsor Hotel at 8:00 a.m. for Stamper's Creek in order to study this creek at the point where it becomes subterranean.

Lost River was next studied. It was first viewed as a rather large stream flowing over a rather flat limestone country. A few miles below, it was found to disappear by means of small sinks in the river bottom. The next stop was made at the first storm swallow-hole which, under moderate rainfall, takes care of all the water that does not disappear farther up the stream. The second storm-hole, which receives the overflow during severe rains, was also visited.

The party arrived at Wesley Chapel at noon, where a sumptuous chicken dinner was served. The early part of the afternoon was spent in Wesley Chapel Gulf, which is a collapsed sink of the Lost River subterranean channel.

On the way back to French Lick the party stopped at Orangeville, where Lost River once more rises to the surface.

After supper the evening was spent at the Windsor Hotel in making and renewing acquaintances.

SATURDAY, MAY 13.

Before starting home several of the company visited the "Gorge" about two miles southeast of French Lick for the purpose of studying the geological formations.

Those of the party who went by automobile to Bloomington greatly enjoyed a visit to the caves at Mitchell with Prof. and Mrs. Eigenmann.

BUSINESS SESSION.

FRENCH LICK, INDIANA, May 11, 1922.

The members of the Academy assembled in the Christian Church, where the meeting was called to order at 7:30 p. m. by President F. M. Andrews.

The request of Prof. A. Richards, formerly of Wabash College, to be placed on the non-resident list was declined but it was voted that since he and Mrs. Richards did not desire to each carry active membership, that their names be made to read Dr. and Mrs. A. Richards and be considered as one membership.

A communication from Prof. Ehlers of the Michigan Academy was read. He extended an invitation to the Geological Section of the Indiana Academy to join them in their spring meeting.

Prof. Cogshall of the Membership Committee proposed the names of the following persons who were duly elected to membership:

Allee, W. N., 221 E. Fourth St., Bloomington.

Barnett, Horace L., Department of Geology, Indiana University, Bloomington.

Dean, Miss Grace, French Lick.

Pearson, Nathan E., Department of Zoology, Indiana University, Bloomington.

Senour, Frank C., 323 N. Grant St., Bloomington.

A letter was read from Dr. H. W. Wiley expressing his regret at not being able to attend the Spring Meeting.

President Andrews read a letter from Mrs. Frank Sheehan regarding the Dunes Summer Camp. He stated that several members of the University of Chicago staff were helping to promote this camp, which indicated that it was for educational and scientific purposes.

The following suggestions were made as to the possible place of holding the meeting next year: Dunes, Culver Military Academy and vicinity, Anderson, Richmond, Madison, lakes region of Steuben County. It was suggested that the Michigan Academy might wish to join us in a meeting if held in the lakes region.

Adjourned at 8:10 p. m.

F. M. ANDREWS,

WALTER N. HESS,

President.

Secretary.

WINTER MEETING.

PROGRAM OF THE THIRTY-EIGHTH ANNUAL MEETING

OF

THE INDIANA ACADEMY OF SCIENCE

HELD AT

LINCOLN HOTEL, INDIANAPOLIS.

December 7 and 8, 1922.

PROGRAM COMMITTEE.

R. C. FRIESNER.

H. L. BRUNER.

W. M. BLANCHARD.

DECEMBER 7, 1922.

8:00 p. m.            Executive Committee Meeting.  
                      Reports of Committees.

DECEMBER 8, 1922.

9:00- 9:30 a. m.    General Business Meeting.

9:30-12:00 m.     General Session.

Estimating the Comparative Richness of Indiana. Stephen S. Visher,  
Indiana University.

\*A Photographic Study of Architectural Acoustics. (Illustrated.)  
Arthur L. Foley, Indiana University. (Published in *The American  
Architect and Architectural Review*, November 8, 1922.)

Francis Galton, Life and Work. Robert Hessler, Indianapolis.

The Paleolithic Stone Age in Indiana. (Illustrated.) S. Frank Bal-  
com, Indianapolis.

Recent Archeological Discoveries in Jefferson County, Indiana. Glenn  
Culbertson, Hanover College.

\*The Smog Problem. Robert Hessler, Indianapolis.

Life and Mind. Robert W. McBride, Indianapolis.

\*The Scientific Work of the Conservation Commission. (By title.)  
Stanley Coulter, Purdue University.

The Southern Ute Indians of Pine River Valley, Colorado. (By title.)  
Albert B. Reagan, Cornfields, Ganado, Arizona.

\*Indian Funerals. (By title.) Albert B. Reagan, Cornfields, Ganado,  
Arizona.

Twinkling Star. (By title.) Albert B. Reagan, Cornfields, Ganado,  
Arizona.

Frank Barbour Wynn: In Memoriam. Robert W. McBride, Indian-  
apolis.

Alexander Smith: In Memoriam. R. E. Lyons, Indiana University.

Earl Jerome Grimes: In Memoriam. Harry F. Dietz, State Conserva-  
tion Commission.

Address of the Retiring President: Some Problems in Plant Physiology.  
Frank M. Andrews, Indiana University.

1:30- 2:00 p. m.    General Business Meeting.

2:00- 5:30 p. m.    Sectional Meetings.

\* Papers starred (\*) not published in this Proceedings.

## GEOLOGY AND GEOGRAPHY.

- History of the Lakes near Laporte, Indiana. William Motier Tucker, Indiana University.
- \*Mineral Resources of Indiana. W. N. Logan, Indiana University.
- Goniobasis livescens* Menke, a Pleistocene Shell in Furnessville Blowout, Dunes of Porter County. (Illustrated.) Marcus W. Lyon, Jr., South Bend.
- \*Valley-Heads and Sheet-Wash Erosion. Clyde A. Malott, Indiana University.
- \*The Role of Sheet-Wash in Erosion. Clyde A. Malott, Indiana University.
- A Review of the Present Knowledge of Fossil Scorpions with the Description of a new species from the Pottsville Formation of Clay County, Indiana. (By title.) John Irvin Moore, Owensville.
- Some Contrasts between Geographic Regions in Indiana. Stephen S. Visher, Indiana University.
- Abandoned Channels in Randolph and Delaware Counties, Indiana. Frederick J. Breeze, Indiana State Normal School, Eastern Division.
- \*The Muncie Esker. Frederick J. Breeze, Indiana State Normal School, Eastern Division.
- \*The Entrenched Meanders and Associated Terraces in the Muscatatuck River, near Vernon, Indiana. Burton J. Malott, Technical High School, Indianapolis.
- †A new Pleistocene Gastropod from Maryland. (By title.) Ernest Rice Smith, DePauw University.
- Archeology in Posey and Vanderburg Counties, Indiana. Andrew J. Bigney, Evansville College.

## CHEMISTRY AND PHYSICS.

*Chemistry.*

- Qualitative Analysis—Tin Group. Ralph W. Hufferd, DePauw University.
- Qualitative Analysis—Iron Group. Ralph W. Hufferd, DePauw University.
- \*The Normal System in Quantitative Analysis. E. G. Mahin, Purdue University.
- The Effect of Non-Metallic Impurities on Cementite Distribution in Steel. (Illustrated.) G. B. Wilson, Purdue University.
- \*Some Toxic Soils of Indiana. (Illustrated.) R. H. Carr, Purdue University. (Published under the title "Manganese, Aluminum, and Iron Ratio as Related to Soil Toxicity," in Journal of Industrial and Chemical Engineering, June, 1923.)
- A Study of, and a Modified Method for, Vogel's Reaction for Cobalt. F. J. Allen and A. R. Middleton, Purdue University.
- Thiocyanatocobaltous Acid and Its Alkali Salts. F. J. Allen and A. R. Middleton, Purdue University.

\* Papers starred (\*) not published in this proceedings.

† Another title substituted in this Proceedings.

- Evaporation of Solutions in Burettes. M. G. Mellon, Purdue University.
- The Use of Solutions of Inorganic Salts as Permanent Color Standards, M. G. Mellon, Purdue University.
- An Improved Murexide Test for Teaching Purposes. Samuel E. Earp, Indianapolis.
- Fog Formation in Air Which Has Passed Through a Silent Discharge. (Illustrated). F. O. Anderegg and K. B. McEachron, Purdue University.
- A Type of Silent Discharge Involving Catalysis. (Illustrated.) F. O. Anderegg and E. H. Bowers, Purdue University.
- A Further Study of Pressure Reversals in the Corona Discharge. (Illustrated.) F. O. Anderegg, Purdue University.
- \*The Peculiar Properties of Water in light of its Molecular Structure. (Illustrated.) F. O. Anderegg, Purdue University.

*Physics.*

- \*Some Untenable Acoustic Theories. Arthur L. Foley, Indiana University. (Published under title "A Photographic Study of Sound Pulses between Curved Walls and Sound Amplification by Horns," in *Physical Review*, S.S., vol. 20, no. 6, December, 1922.)
- Improved Designs of Sound Condensers. (Illustrated.) Arthur L. Foley, Indiana University.
- Locomotive Whistle Experiments. (Illustrated.) Arthur L. Foley, Indiana University.
- \*Energy Losses in Commercial Hammers. (Illustrated.) Edwin Morrison, Michigan Agricultural College.
- \*Scattering of Light by Small Particles. (Illustrated.) Edwin Morrison, Michigan Agricultural College.
- \*Spectrum of Phosphorescent Mercury. (Illustrated.) E. K. Chapman, Wabash College.
- A Method of Measuring the Amplification of Two or More Stage Amplifiers. (Illustrated.) R. R. Ramsey, Indiana University.
- A Method of Securing Accurate High Frequency Standard. R. R. Ramsey, Indiana University.
- An Oscillographic Study of an Induction Coil with High Frequency Load. F. O. Anderegg and K. B. McEachron, Purdue University.
- An Investigation of the Foley Telephone Mouthpiece. (Illustrated.) James E. Brock, Sweetser.
- \*Diffraction of Light through Circular Openings. (Illustrated.) Mason E. Hufford, Indiana University.

BIOLOGICAL SCIENCES.

*Zoology.*

- \*Some Genes Modifying Crossing-Over. F. Payne, Indiana University.
- The Occurrence of Secondary Parasitism in the Frog. (By title.) George Zebrowski, Purdue University.

\* Papers starred (\*) not published in this proceedings.

- \*Relation of Insects to Human Life and to the other Sciences. John J. Davis, Purdue University.
- \*Content of First Course in Zoölogy. R. A. Gantz, Indiana State Normal School, Eastern Division.
- Notes on Mammals of the Dune Region of Porter County, Indiana. (Illustrated.) Marcus W. Lyon, Jr., South Bend.
- \*Notes on the Termites of Indiana. (Illustrated.) Harry F. Dietz, Indianapolis.
- \*Complement-deficient Guinea-pig Serum. (By title.) Roscoe R. Hyde, Johns Hopkins University. (To be published in American Journal of Hygiene, 1923.)
- Reactions to Light and Photoreceptors of *Lumbricus terrestris*. Walter N. Hess, DePauw University.
- Chromosomal Variations in the Earwig, *Anisolabris annulipes* Lucas. W. P. Morgan, Indiana Central College.
- A Hygrothermograph Puzzle. W. H. Larrimer, U.S. Entomological Laboratory, West Lafayette.
- \*A Study of the Virginia Opossum. W. H. Sheak, Ijamsville.

#### Bacteriology.

- Nagana (*Trypanosoma brucei*): The Course of the Disease in Laboratory Animals when Injected with Cultures Grown *in vivo* and *in vitro*. Charles A. Behrens, Purdue University.
- The Use of Clark and Lubs Indicators for the Detection of Acid Production by Colon-Typhoid Group. P. A. Tetrault, Purdue University.
- Soil Bacterial Types and Green Manuring. I. L. Baldwin, Purdue University.
- A Simple Method of Determining the Thermal Death-point. James B. Kendrick and Max W. Gardner, Purdue Agricultural Experiment Station.

#### Botany.

- Further Notes on the Unusual Stipules of *Acer nigrum* Michx. Flora Anderson, Indiana University.
- †Unusual Branching in *Cladophora*. Flora Anderson, Indiana University.
- Plants New to Indiana. XI. C. C. Deam, Bluffton.
- \*Attack of Fungi on the Lids of Water Culture Jars. F. M. Andrews, Indiana University.
- The Effect of Pressure on Seedlings. F. M. Andrews, Indiana University.
- The Convolvulaceae of Indiana. Truman G. Yuncker, DePauw University.
- Recent Indiana Weeds. Albert A. Hansen, Purdue Agricultural Experiment Station.
- Wild Corn as a Weed Problem in Indiana. Albert A. Hansen, Purdue Agricultural Experiment Station.

\* Papers starred (\*) not published in this proceedings.

† Another title substituted in this Proceedings.

- \*List of Indiana Plants, Chiefly from Putnam County. Collected 1911-1915 by Earl Jerome Grimes. (By title.) Mrs. Eileen W. Grimes, University of Michigan.
- \*Polyembryony in Species of *Osmunda* and *Dryopteris*. David M. Motier, Indiana University.
- Embryonic Selection in Certain Nut Bearing Pines. David M. Motier, Indiana University.
- Phytophthora Rot of Tomato, Eggplant and Pepper. James B. Kendrick, Purdue Agricultural Experiment Station.
- Differences in the Susceptibility of Clover to Powdery Mildew. (Illustrated.) E. B. Mains, Purdue Agricultural Experiment Station.
- Notes on Microtechnique. II. M. S. Markle, Earlham College.
- Chloroplasts of *Martynia fragrans*. F. M. Andrews, Indiana University.
- Quantitative Estimation of Aeration in Leaves. F. M. Andrews, Indiana University.
- \*Indiana Plant Diseases, 1922. (Illustrated.) Max W. Gardner, Purdue Agricultural Experiment Station.
- †Indiana Fungi. VII. J. M. Van Hook, Indiana University.
- \*Relation of Barberry to Stem Rust of Wheat: Results of Indiana Survey. (Illustrated.) K. E. Beeson (introduced by H. S. Jackson), Purdue Agricultural Experiment Station.
- An Unusual Iris. F. M. Andrews, Indiana University.
- Second Blooming of a Snowball Bush in the Same Year. F. M. Andrews, Indiana University.
- The Present Status of the Hot Water Treatment of Wheat in Indiana. Charles Gregory, Purdue Agricultural Experiment Station.
- Onion Smut in Indiana. Charles Gregory, Purdue Agricultural Experiment Station.
- Plants of White County. V. Louis F. Heimlich, Purdue University.
- \*The Microscopy of Flour. (By title.) Harold E. Turley, American Institute of Baking, Chicago, Ill. (Published in *Baking Technology*, November 15, 1922.)
- 6:00- 8:00 p. m. Annual Academy Dinner.
- 8:00-10:00 p. m. General Session.
- \*The Fundamental Principles of Radio Transmission and Reception. (Illustrated.) R. R. Ramsey, Indiana University.
- \*The Scientific Propagation of Black Bass in Ponds as Conducted at the Riverside Station in Indianapolis. (Two reels motion pictures.) G. M. Mannfeld, State Conservation Commission.
- \*The Artificial Propagation of Pike-Perch. (One reel motion pictures.) G. M. Mannfeld, State Conservation Commission.

\* Papers starred (\*) not published in this proceedings.

† Another title substituted in this Proceedings.

## MINUTES OF BUSINESS SESSION.

LINCOLN HOTEL, INDIANAPOLIS.

## MEETING OF THE EXECUTIVE COMMITTEE.

December 7, 1922.

The Executive Committee was called to order at 8:15 p. m. in Parlor E, by President F. M. Andrews. The following members were present: F. M. Andrews, C. A. Behrens, W. M. Blanchard, F. J. Breeze, W. A. Cogshall, Stanley Coulter, Glenn Culbertson, H. F. Dietz, H. E. Enders, A. L. Foley, R. C. Friesner, W. N. Hess, R. W. McBride, D. M. Mottier, J. P. Naylor, F. Payne, E. B. Williamson, J. S. Wright.

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

Committee reports were considered as follows:

*Committee on Program.*

Chairman R. C. Friesner presented the printed program of 95 titles to be read at the general sessions tomorrow. He called attention to the crowded condition of the program and that each branch of science had sufficient number of papers for a section of its own. A letter from the Ohio Academy reiterated its desire to hold a joint meeting with the Indiana Academy in the near future. Professor Friesner stated that there had been some criticism because the programs were mailed out early. He explained that the printed programs contained all titles received up to November 9 and that they were mailed out on November 17. He further stated that the supplementary list contained all titles received up to and including December 7.

Professor Friesner asked for an expression from the Academy concerning the advisability of having the meeting next year at one of the educational institutions. After some discussion Judge McBride moved that the Executive Committee select the place of meeting instead of the Program Committee. Passed.

*Committee on Membership.*

Mr. Dietz reported 51 new names to be presented at the meeting tomorrow. He spoke of the fine co-operation received from all who were asked to aid in securing new members.

*Committee on Biological Survey.*

No report.

*Committee on Distribution of Proceedings.*

Professor Hess reported that the 1921 Proceedings were mailed out in August. He requested help in keeping the mailing list correct and asked all members who did not receive their copy of the Proceedings to advise him.

*Committee on Relation of the Academy to the State.*

Judge Robert W. McBride reported that the present cuts in appropriations would not affect the funds of the Academy.

*Report of the Treasurer.*

Balance on hand December 1, 1921.....	\$299 16
Dues collected during the year.....	385 00
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Total .....	\$684 16
Total expenditures .....	351 59
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Balance in treasury December 1, 1922.....\$332 57

(The treasurer's account does not include the funds appropriated by the State for the publication of the Proceedings. Editor.)

*Committee on Auditing.*

Mr. E. B. Williamson reported on the accuracy of the treasurer's report. A motion authorizing the transfer of \$100.00 from the treasury to the trustees of the Research Endowment Fund was introduced by Professor Blanchard. Passed. This motion was later rescinded.

*Committee on Publication of Proceedings.*

Chairman F. Payne stated that it had been demonstrated as possible to secure prompt publication of the Proceedings. He stated that we still owed the Fort Wayne Printing Company about \$150.00 on an old account. After some discussion it was moved and passed that this sum be paid from the surplus funds of the State which were left from the publication of the last Proceedings. This motion was later rescinded.

*Advisory Council.*

Chairman John S. Wright suggested we pay the account owing the Fort Wayne Printing Company from the funds of our own treasury. It was moved by Judge McBride that we reconsider the motion to transfer \$100.00 to the trustees of the Endowment Fund, and pay the Fort Wayne Printing Company account from the treasury of the Academy. On motion the money was returned to the treasury and the Fort Wayne Printing Company bill ordered paid.

*Committee on Research.*

Professor J. P. Naylor announced that the Committee on Research was appointed without duties. In explanation Mr. Wright stated that the committee would probably be inactive until sufficient funds were available for research work.

*Committee on Academy Foundation.*

No report.

*Committee on Archeological Survey.*

No report.

*Committee on Indexing Proceedings.*

Mr. Dietz stated that there was not sufficient money at the disposal of the State Library to do this work. He suggested that the work be divided up into its natural divisions of Botany, Zoölogy, Chemistry, etc., and assigned to individuals. It was moved by Dr. Stanley Coulter that this plan be followed provided that capable men can be found who will undertake the work. Motion passed.

*General Business.*

Dr. A. L. Foley called attention of the Academy to the fact that, if we are to do anything about choosing a place for our meetings next year, it must be done tonight. After brief discussion it was moved by Judge McBride and passed that the incoming President, Secretary, and Treasurer be authorized to choose the place for our next winter meeting.

Professor Glenn Culbertson invited the Academy to Hanover, but stated that he thought the first meeting away from Indianapolis might better be held at some more centrally located point.

President Andrews brought up the question of an Academy seal. Mr. Wright advised the purchase of a seal and suggested the use of membership certificates. After some discussion it was moved that a committee, with power to act, be appointed to consider the purchase of a seal and the adoption of membership certificates. Passed. The following committee was appointed: Dr. Stanley Coulter, Dr. A. L. Foley, Mr. John S. Wright.

Adjourned 9:45 p. m.

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## MINUTES OF GENERAL SESSION.

9:00 a. m., December 9, 1922.

### BUSINESS SESSION.

The session was called to order by President Andrews. The minutes of the Executive Committee were read and approved.

The Membership Committee proposed the following named persons for membership: On motion they were duly elected.

Auble, Robert N., 409 Wolcott St., Indianapolis.

Beecher, Alva, Crawfordsville, Ind.

Beeson, K. E., 427 State St., West Lafayette.

Bell, Alva Marie, 511 Smith Ave., Bloomington.

Berg, George F. Jr., 3518 Balsam Ave., Indianapolis.

Bolen, Homer R., 314 S. Grant St., Bloomington.

Book, William F., 516 N. Fess Ave., Bloomington.

Boots, Edwin B., 125 N. 6th St., W. Terre Haute.

Brock, James E., Sweetser, Ind.

Brossey, Charles L., 766 West Drive, Woodruff Place, Indianapolis.

Bushnell, T. M., Agr. Expt. Sta., West Lafayette.

Chitty, Ethel, Indiana State Normal, Muncie.

Clay, Mrs. Celia, 320 N. State St. Kendallville.

Cox, C. F., 364 N. Audubon Ave., Indianapolis.

Davis, Charles, 217 Sylvania St., West Lafayette.

Doan, Richard L., 802 E. Third St., Bloomington.

Donaghy, Frederick, Indiana State Normal, Terre Haute.

Dugan, Elizabeth, 717 N. Tremont St., Indianapolis.

Eaton, Dunwald L., Indiana Central College, Indianapolis.

Esarey, Ralph E., 924 Atwater St., Bloomington.  
Gregory, Charles T., 1022 First St., W. Lafayette.  
Hills, Donald H., 2127 Talbott St., Indianapolis.  
Hoffer, George N., 434 Littleton St., W. Lafayette.  
Hoffman, A. C., 920 East Drive, Woodruff Place, Indianapolis.  
Kennedy, Clarence H., Ohio State Univ., Dept. of Zoöl., Columbus, O.  
Kiester, Jackson A., 300 S. Green St., Crawfordsville.  
Klipinger, Walter C., 2234 Park Ave., Indianapolis.  
Knecht, Christian, 207 N. Dunn St., Bloomington.  
Koehring, Vera, Butler College, Indianapolis.  
Kurtz, J. M., Goshen College, Goshen.  
Lanham, Bess, 610 E. Wabash Ave., Crawfordsville.  
Lyon, Marcus Ward, Jr., 214 LaPorte Ave., South Bend.  
McDonald, Clinton C., 415 S. Dunn St., Bloomington.  
Madenwald, Frederick A., 621 E. 10th St., Bloomington.  
Malott, Ruth Boyd, Butler Ave., Indianapolis.  
Mannfeld, George N., 1235 Central Ave., Indianapolis.  
Martin, Essie S., 134 N. Drexel St., Indianapolis.  
Martin, Mrs. Viva Dutton, 134 N. Drexel St., Indianapolis.  
Michael, Lyle Jordan, Indiana Central College, Indianapolis..  
Montgomery, Basil E., Poseyville Ind.  
Moore, John Irwin, Owensville.  
Moorhead, John G., 124 DeHart St., W. Lafayette.  
Mullendore, Naomi, Franklin.  
Noble, Willis Bernard, Box 95, W. Lafayette.  
Osbon, Clifford Leroy, 201 Russel St., W. Lafayette.  
Payne, Mary, South Downey Ave., Indianapolis.  
Pitkin, Edward M., 519 N. College St., Bloomington.  
Protchard, R. V., Butler College, Indianapolis.  
Roberts, Harry John, Route A, Lafayette.  
Robertson, Ray B., 702 Evergreen St., W. Lafayette.  
Smith, Lee T., R. F. D. No. 7, Bloomington.  
Stirrett, George M., 521 State St., W. Lafayette.  
Strickler, Alvin, Evansville College, Evansville.  
Tasker, Roy C., 612 Anderson St., Greencastle.  
Taylor, George O., 502 S. Sluss Ave., Bloomington.  
Teeters, Charles E., 346 N. Audubon Ave., Indianapolis.  
Ward, Mary Mallory, 405 E. William St., Kendallville.  
Wilson, E. R., 2830 E. Vermont St., Indianapolis.  
Young, Herman, 602 N. College St., Bloomington.  
Zierer, Clifford M., Geography Dept., Indiana University, Bloomington.

Mr. Demarchus Brown, State Librarian, announced that there were, in the State Library, about 5,500 separate items belonging to the Academy. He stated that the library was behind in binding and that many of the foreign exchanges were only beginning to come in.

Mr. Brown called the attention of the Academy to the fact that the general public did not use the exchanges of the Academy as it is a rule of the Academy that such publications cannot be loaned except

to Academy members. After brief discussion Professor Cogshall moved, and it was passed, that the loaning of the exchanges of the Academy be left to the discretion of the State Librarian.

Mr. Brown stated, in conclusion, that the State Library was very seriously in need of more funds, and he urged the members to advise their legislators of the library needs.

Mr. Butler expressed the appreciation of the Academy for the work of Mr. Brown and his associates, and strongly urged the co-operation of each member in securing, through legislation, more funds for the use of the State Library.

Professor Enders, as chairman of the Committee on Nominations, recommended the election of the following to fellowship. Adopted: Ralph H. Carr, Harry F. Dietz, Edward G. Mahin, Paul Weatherwax.

Chairman Enders, also announced the following nominations for officers for 1923:

President.....	C. A. Behrens, Lafayette
Vice-president.....	F. Payne, Bloomington
Secretary.....	W. N. Hess, Greencastle
Assistant Secretary.....	Flora Anderson, Bloomington
Treasurer.....	W. M. Blanchard, Greencastle
Editor.....	J. J. Davis, Lafayette
Press Secretary.....	H. F. Dietz, Indianapolis

On motion, the above named officers were elected.

Professor Enders requested that the list of the former officers of the Academy be printed each year in the Proceedings.

It was moved that the secretary be instructed to write a letter expressing our appreciation to the management of the Lincoln Hotel for the courtesies shown. Motion passed.

Professor W. M. Blanchard, in behalf of the science departments of DePauw University, invited the Academy to hold its next winter meeting at Greencastle. It was moved by Dr. Stanley Coulter that this invitation be accepted. Motion carried.

Professor J. P. Naylor introduced the following resolution which was acted upon favorably: Resolved, "That hereafter it be the sense of the Academy that no member shall occupy more than ten minutes in the presentation of a paper or abstract, except that the president's address may occupy thirty minutes. The president, or person appointed by him, shall notify the speaker when he has exhausted the time, and he can continue only by vote of the assembly to extend the time."

Dr. W. N. Logan reported for the Archeological Survey that work was being continued on the county maps, which were for the purpose of indexing archeological material.

Adjourned for sectional meetings at 2:15 p. m.

Sixty-one members and guests participated in the dinner at 6:00 p. m. At the close of the dinner the members of the Academy and their friends assembled in the Travertine room for the evening program.

The evening program included an illustrated lecture by Professor R. R. Ramsey of Indiana University, on "The Fundamental Principles of Radio Transmission and Reception". This was followed by several motion pictures, presented by Mr. G. M. Mannfeld, on the propagation of black bass and pike-perch.

At 10:30 p. m. the 38th annual meeting of the Indiana Academy of Science closed.

F. M. ANDREWS,  
President.

WALTER N. HESS,  
Secretary.

