

PROCEEDINGS

of the

Indiana Academy of Science

Founded December 29, 1885



Volume 83

1973



MARION T. JACKSON, *Editor*

Indiana State University

Terre Haute, Indiana



Spring Meeting

May 11-12, 1973

BROWN COUNTY STATE PARK, Nashville, Indiana

Fall Meeting

October 26-27, 1973

INDIANA CENTRAL COLLEGE, Indianapolis, Indiana

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Zoological Record

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PART 1

THE WORK
OF THE
ACADEMY

1973

W. B. HOPP, *President*

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A. J. ULLSTRUP (1973)	Department of Botany and Plant Pathology Purdue University West Lafayette, IN 47907
H. G. DAY (1974)	Department of Chemistry Indiana University Bloomington, IN 47401

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S. N. POSTLETHWAITE	Department of Biological Sciences Purdue University West Lafayette, IN 47907

Academy Representative on Indiana Natural Resources Commission

D. W. OSGOOD	Department of Zoology Butler University Indianapolis, IN 46208
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SPRING MEETING

BROWN COUNTY STATE PARK, Brown County, Indiana

MINUTES OF THE EXECUTIVE COMMITTEE MEETING

May 11, 1973

The meeting was called to order at 4:00 PM at Abe Martin Lodge, in Brown County State Park by President William B. Hopp. The minutes of the general session meeting of November 3, 1972, were approved.

Treasurer: Clyde Metz reported that the 1972 books have been closed and the audit is complete.

Academy Foundation: James Magee, of the Indiana National Bank, Indianapolis, reported on the three investment funds of the Academy. These funds are 1) the John S. Wright Fund, 2) the John S. Wright Invested Income Account, and 3) the Foundation Account. Mr. Magee explained the basis for the three types of funds and how each should be used in the management of Academy business.

Publications Committee: Marion Jackson reported that the State appropriation for support of the *Proceedings* had been reduced from \$4,000 to \$1,200. Following discussion concerning ways to realize savings in publication costs, Dr. Jackson made the following motion which was seconded and passed.

Motion: That Vol. 83 of the *Proceedings* be published only in soft bound cover.

The advantages and disadvantages of assessing page charges were presented. No action was taken.

The Executive Committee was requested to give reactions to the Publications Committee on the advisability of instituting an editorial board which would 1) assist the editor in evaluating manuscripts and 2) assist the editor in identifying reviewers. Action on this item of business will be requested at the Fall Meeting.

Announcements: President Hopp made the following announcements.

The History of Science Division will be reactivated for the 1973 Fall Meeting with John J. Favinger serving as Chairman.

A request has been received to reactivate the Psychology Section under the new name of Animal Behavior. The request will be taken under advisement for possible action at the Fall Meeting.

A committee will be identified to study possible realignment of divisions in the areas of the earth sciences, hydrology, and atmospheric sciences.

Valparaiso University has invited the Academy for the 1976 meetings.

The Minton Monograph may be obtained for \$3.00 by contacting Lois Burton at the Indiana State Library, Indianapolis, IN 46204.

The Science and Society Committee worked with the State Legislature in an effort to establish a State Council on Science and Technology. The bill was passed by the House Committee, but the Senate Committee had insufficient time to act on the bill prior to end of the legislative session.

Executive Secretary Feasibility Study: Otto Behrens presented a report from the Executive Secretary Feasibility Study Committee. The possibility of generating funds for the salary of an Executive Secretary through sustaining memberships was suggested. The possibility of establishing a central office for mail service was proposed as an interim measure for expediting business affairs of the Academy. The report was received with no action taken on the proposals.

New Business: Consideration was given to the possibility of establishing earlier dates in October and earlier dates in April for Academy meetings.

Consideration was given to the idea of having the election of officers conducted at the Business Session of the Fall Meeting rather than at the Dinner Session.

The meeting adjourned at 5:15 PM.

Approved October 25, 1973.

Respectfully submitted,
JERRY J. NISBET, Secretary

MINUTES OF THE GENERAL SESSION

May 11, 1973

The meeting was called to order at 8:55 PM at Abe Martin Lodge, Brown County State Park, Brown County, Indiana, by President William B. Hopp. Announcements were made relative to the actions and reports of the May 11, 1973, meeting of the Executive Committee.

A special meeting for Chairmen of Academy Divisions was held to discuss responsibilities of Chairmen and to clarify points related to publication of the *Proceedings*.

Responsibilities of Division Chairmen:

- 1) Arrange Division program for the Fall Meeting. An announcement about paper sessions is made by the Newsletter editor during June. A preliminary call for papers is made in the late summer Newsletter. A list of Division members is sent to the Division Chairman in August. The chairman may use this list to prepare a separate mailing to solicit papers.
- 2) Arrange for election of Division Chairman and Chairman-elect for succeeding year. Conduct election as the last item of business in the morning session of the Fall Meeting. Report the results of the election to the secretary of the Academy.

Points Related to Publication:

- 1) In the call for papers mention that three (3) copies of the abstract are required.
- 2) The *full* address of authors is required.
- 3) Abstracts are submitted to the Division Chairman at the time a person requests the privilege of presenting a paper.
- 4) The abstract is automatically printed in the *Proceedings* (except for papers selected to be printed in full) unless the author requests that his/her abstract not be printed.
- 5) Selection of papers to be printed in full is based upon editorial decisions. Papers submitted are not automatically printed in full in the *Proceedings*.
- 6) A three-week deadline following the Fall Meetings must be observed for contributors to submit manuscripts to the editor. Two copies of each manuscript are requested.
- 7) Instructions for contributors are available from the editor of the *Proceedings*.
- 8) Publication of papers is restricted to members of the Academy (or at least one of the authors must be a member).
- 9) Papers in the *Proceedings* will follow the order in which they are read at the paper session.

- 10) Papers are not accepted for publication in the *Proceedings* unless they have been read at an Academy meeting.

The meeting adjourned at 10:15 PM.

Approved October 25, 1973.

Respectfully submitted,
JERRY J. NISBET, Secretary

FALL MEETING

MINUTES OF THE EXECUTIVE COMMITTEE MEETING

INDIANA CENTRAL COLLEGE, Indianapolis, Indiana

October 25, 1973

The meeting was called to order by President William B. Hopp at 7:35 PM in Schwitzer Center, Indiana Central College, Indianapolis, Indiana. The minutes of the executive committee meeting and of the general session of the spring 1973 meeting of the Academy were approved with editorial changes. The following reports were accepted by general consent unless a specific motion is recorded.

Treasurer: Clyde Metz made a financial report for the period January 1 through October 15, 1973. The summary from this report follows:

	Academy Accounts	Administered Accounts	Total
Balance: January 1, 1973 -----	\$8,138.52	\$20,913.33	\$29,051.85
1973 Income -----	8,948.73	57,388.00	66,366.73
1973 Expenditures -----	7,687.58	56,223.06	63,910.64
Balance: October 25, 1973 -----	9,399.67	22,078.27	31,477.94

The Treasurer reported that transfer of funds from the J. S. Wright fund to Academy funds in the amount of \$4,226.87 for attorney fees was not required. Attorney fees were paid from regular Academy funds. Following discussion, the following motion was moved, seconded and carried; "that the money authorized to be transferred from the J. S. Wright fund to Academy funds for the purpose of paying attorney fees, be left in the J. S. Wright fund." (The authorization to transfer this money to Academy funds was not necessary to meet the cost of attorney fees. The money has remained in the J. S. Wright fund. The Executive Committee is empowered to decide how this reserve money may be used in the future.)

Bonding Committee: No report

Research Grants Committee: James Newman, Chairman, reported that \$5,441.40 had been granted to 10 individual research projects this year. Nine grants were made to institutional scientists and one to a high school student. Dr. Newman indicated that grants covered supplies and expenses with very little funding considered for capital expenses and no funding allowed for institutional overhead. He suggested that grants up to \$1,000 might be considered and that the number of grants could be extended.

Trustees of the Academy Foundation: W. A. Daily presented the following summary report:

I. Foundation Fund as of September 30, 1973	
Last year's balance as of Sept. 30, 1972 -----	\$ 994.52
Receipts -----	721.09

Disbursements -----	300.00
Balance -----	\$ 1,415.61

As of Oct. 5, 1973, \$1,000 was removed and invested in commercial paper.

II. John S. Wright Fund

Last year's balance as of Sept. 30, 1972 -----	\$26,000.00
Cash balances as of Sept. 30, 1972 -----	635.32
Receipts this past year -----	13,633.84
Disbursements -----	22,969.41
Balance -----	\$17,299.75
Commercial paper remaining as of Sept. 30, 1973 -----	16,000.00
Principal cash on hand -----	\$ 1,299.75

Academy Representative on the AAAS Council: Willis Johnson reported that the provision for direct representation on the AAAS Board has been abolished. He urged that the Academy continue to maintain affiliation with AAAS through representation on the AAAS State Academy body. (AAAS Section X)

Auditing Committee: No report

Youth Activities Committee: Donald Winslow reported that one of the major accomplishments of the year was realized through working with the Indianapolis Humane Society in the preparation of a joint resolution on the use of animals in the classroom. Details of the 26th annual Indiana Science Talent Search and of the Science Club Activity grants were described.

Indiana Junior Academy of Science: Lawrence Poorman reported on steps which are being taken to reorganize sponsored Academy youth programs. Plans call for the development of eight regions within the state, each with local sponsors. A Junior Academy Council is to be organized and a constitution committee will be formed. Dr. Poorman also reported that eight representatives from the Junior Academy will visit sessions of the Academy at the 1973 fall meeting. Six invited student papers will be presented on the second day of the Fall 1973 Academy Meeting.

Library Committee: Lois Burton reported that the special project to re-catalog the Academy's library collection has been completed. The project has involved re-cataloging 3,263 titles with the cards filed in the public catalog of the State Library. During the year, additional shelving was installed and the entire library collection has been shifted and is now housed in one location. Monograph Number 3, *Amphibians and Reptiles of Indiana* by Sherman A. Minton, Jr., was received from the printer on January 31, 1973, and is available from the Academy library. The Academy's *Proceedings* Volume 81, was received from the printer on February 28, 1973, and was mailed to 1,147 members and science clubs. Copies of Volume 81 were also mailed to foreign and domestic exchange agencies.

Program Committee: Edward Vondrak reported that all arrangements had been completed for the fall meeting. Some problems arose in the area of budget, and the suggestion was made that the budget for the Program Committee be enlarged for next year.

Publications Committee: Marion Jackson reported that Volume 82 of the *Proceedings* should be available from the printer before the end of December 1973. Division chairmen are reminded to send two copies of each abstract to the editor. One hundred seventy-five papers are scheduled for presentation at the 1973 fall meeting. This is the largest number of papers ever scheduled for a fall meeting of the Academy. Dr. Jackson reported that the Indiana State Museum has invited the Academy to allow the Museum to sell Academy monographs. Following discussion the following motion was seconded and passed: "That the Publications Committee be permitted discretion in authorizing sales of monographs to the Indiana State Museum at appropriate discounts."

Director of Public Relations: Clarence Dineen reported that copies of the Newsletter have been sent to schools in addition to members of the Academy this year. Efforts to expand news coverage for the Academy through the Newsletter are being implemented. Officers and members of the Academy are encouraged to send pertinent items to Dr. Dineen.

Membership Committee: Damian Schmelz reported that one Academy member in each science department of each college and university in the state has been asked to share information about the Academy with faculty. This action has been taken to stimulate interest in membership. The dues structure approved by the Executive Committee for 1972 and which is now in effect is:

Individual and club membership -----	\$6.00
Student membership -----	\$3.00
Family membership -----	\$8.00

A recommendation was made that an effort be made to systematically identify members who have reached retirement age and are thus eligible for emeritus membership. Following a discussion of the need for revision in membership categories, a motion to create the following categories of membership was seconded and passed:

1. Corporate Membership

Eligibility: any profit corporation

Dues: \$150-500 annually, according to size and technological base

Privileges: non-voting

Publications: 1 copy of *Proceedings* and monographs; Newsletter and notices to 5-10 personnel.

2. Institutional Membership

Eligibility: colleges, universities, non-profit organizations in Indiana

Dues: \$50 (fewer than 5,000 students), \$100 (more than 5,000) annually

Privileges: non-voting

Publications: 1 copy of *Proceedings* and monographs; Newsletter and notices to 5-10 science chairmen, deans, etc.

Privileges: non-voting; may present and publish papers

3. Individual Memberships

a. Annual Memberships

1) Student Memberships

Eligibility: undergraduate or graduate student (5-year limit)

Dues: \$2.00

Publications: Newsletter and notices

- 2) Membership
 - Eligibility: any person interested in science
 - Dues: \$5.00
 - Privileges: all
 - Publications: Newsletter and notices
 - 3) Senior Membership
 - Eligibility: any person interested in science
 - Dues: \$10.00
 - Privileges: all
 - Publications: Newsletter, notices, *Proceedings*
 - 4) Sustaining Membership
 - Eligibility: any person interested in science
 - Dues: \$25.00
 - Privileges: all
 - Publications: Newsletter, notices, *Proceedings*, monographs
 - 5) Fellows Membership
 - Eligibility: recommendation by Committee on Fellows, approval by Executive Committee
 - Dues: \$15.00
 - Privileges: all
 - Publications: all
 - b. Emeritus Membership
 - Eligibility: recommendation by Emeritus Member Selection Committee, approval by Executive Committee
 - Dues: none
 - Privileges: all
 - Publications: all
 - c. Life Membership
 - Eligibility: any individual member in good standing
 - Dues: \$300.00
 - Privileges: all
 - Publications: all
 - d. Honorary Membership
 - Eligibility: recommendation by Executive Committee
 - Dues: none
 - Privileges: all
 - Publications: all
4. Club Membership
- Eligibility: any Indiana Junior or Senior High School Science Club, recommendation by Director of the Junior Academy, approval by Executive Committee
 - Dues: \$5.00
 - Privileges: non-voting; according to Junior Academy activities
 - Publications: Newsletter, notices

Fellows Committee: Benjamin Moulton moved: That the following individuals be elected as Fellows of the Academy:

- | | |
|--------------------|-----------------------|
| DAMIAN V. SCHMELZ | ROBERT D. MILES |
| GEORGE BICK | WALTER J. WEBER |
| JOHN M. FERRIS | THEODORE J. CROVELLO |
| VIRGINIA R. FERRIS | WILLARD F. YATES, JR. |

Seconded and passed.

Invitations Committee: Philip St. John moved: That the following invitations to host Academy meetings for the years indicated be accepted:

- Valparaiso University 1976
- Indiana University/Purdue University at Indianapolis 1977
- Anderson College 1978

Seconded and passed.

Necrologist: No report

Parliamentarian: No report

Science and Society Committee: Harry Day reported that the committee has been active in sponsoring legislative action to establish a Science and Technology Council in Indiana. The bill will be presented again in this year's legislative session.

Resolutions Committee: Howard Youse discussed two resolutions and received the approval of the Executive Committee to present these resolutions at the General Session of the Academy on October 26, 1973.

Emeritus Member Selection Committee: Winona Welch moved: That the following individuals be awarded Emeritus Membership in the Academy:

WILLIAM C. BABCOCK, SR., Palm Desert, California
ARTHUR TALLMAN, Hendersonville, North Carolina
HAROLD E. WOLFE, Bloomington, Indiana
ANDREW T. SMITHBERGER, South Bend, Indiana

Seconded and passed.

Speaker-of-the-Year Committee: Willis Johnson reported that Dr. Durward L. Allen, Professor of Wildlife Ecology, Purdue University, has been selected speaker of the year for 1973-74. The topic of his address is, "The ecology of wolves and their prey on Isle Royale."

Executive Secretary Committee: Otto Behrens reported that after studying financial implications the committee recommends that no action be taken on establishing the office of Executive Secretary at this time.

Academy Representative on Indiana Natural Resources Commission: D. W. Osgood reported that input by the Academy representative was favorably received and was considered to be useful by the Commission. Mr. Osgood recommended that the term of office for the Academy's representative on the Commission be increased from one to several years to make greater use of the knowledge and contribution which the representative could thus have as a working member of the Commission.

New Business: William Gommel moved that the name of the Soil Science Division be changed to Soil and Atmospheric Sciences Division. Seconded and passed.

The meeting adjourned at 10:15 PM.

Respectfully submitted,
JERRY J. NISBET, Secretary

MINUTES OF THE GENERAL SESSION

October 26, 1973

The meeting was called to order by President William B. Hopp at 1:05 PM in Esch Hall Auditorium, Indiana Central College, Indianapolis, Indiana.

Dr. Gene E. Sease, President of Indiana Central College welcomed the Academy to Indiana Central College.

The secretary presented a summary of action taken by the Executive Committee at the Spring 1973 and at the Fall 1973 meetings.

Fay Daily presented the Necrologist's report. The report included the names of eight members:

O. B. CHRISTY	FLOY HURLBUT
P. D. EDWARDS	EARL T. MCBEE
PAUL R. FOLTZ	C. S. MORRIS
FRANK T. GUCKER	O. H. SMITH

A new procedure for electing officers of the Academy was initiated this year. The Nominating Committee presented its slate to the membership during the Business Session rather than at the evening banquet. Howard Youse, Chairman of the Committee, placed the following slate in nomination:

President:	DAMIAN V. SCHMELZ
President Elect:	JOHN B. PATTON
Research Grants:	CHARLES M. KIRKPATRICK (5-year term 1978)
Bonding Committee:	ROBERT M. BROOKER
Academy Foundation:	FRANK A. GUTHRIE (2-year term 1975)

The slate was accepted and a motion was made: That the secretary cast a unanimous ballot for the candidates. Seconded and passed.

Howard Youse moved the adoption of the following resolution on behalf of the Resolutions Committee:

That the Academy members here assembled express their appreciation to Dr. Gene E. Sease, President of Indiana Central College, for all the courtesies which have been extended the membership of the Academy during this meeting. We are particularly grateful to Professors Kenneth D. Borden and Edward A. Vondrak who were Co-chairmen of the Program Committee for their fine work in the preparation of the program. The arranged facilities for all programs at this annual meeting were excellent. Further, the Academy members are appreciative of the address of Dr. Durward L. Allen, who is Indiana Academy of Science Lecturer-of-the-Year. We also wish to thank Dr. Harry G. Day and the panel members for their discussion of a bill to establish an Indiana Council on Science and Technology.

Seconded and passed.

Howard Youse moved the adoption of the following resolution on behalf of the Resolutions Committee:

WHEREAS: State government needs scientific and technological counsel in dealing with many of the problems facing government and society today; and

WHEREAS: The creation of a highly competent *Council on Science and Technology* would provide the Governor and General Assembly a ready source of relevant information, which would facilitate good decision making; and

WHEREAS: Many competent scientists and engineers in this state have expressed an interest in assisting the Governor and General Assembly in this way, be it therefore

RESOLVED: That the Indiana Academy of Science strongly supports the establishment of a *Council on Science and Technology* as provided for in a bill to be sponsored in the 1974 session of the General Assembly by Representatives Gaylord and Hall, and Senators Andrews and Bruggenschmidt, and be it further

RESOLVED: That the Secretary of the Academy be instructed to convey this resolution to the Governor of the State, the Speaker of the House, and the President pro tem of the Senate; and that the Academy's Director of Public Relations be empowered to release this resolution to the public media.

Seconded and passed.

The Academy Speaker of the Year, Durward L. Allen, was introduced by William Hopp. Dr. Allen's illustrated lecture on "The ecology of wolves and their prey on Isle Royale" proved to be both fascinating and educational.

Harry G. Day presided over a special panel discussion on "The role of an Indiana Council on Science and Technology." Panel members were:

Legislators—Senator Jess C. Andrew, Jr., Senator Joseph G. Bruggenschmidt, Representative Francis Gaylord, Representative Thomas W. Hall.

Committee on Science and Society—Otto K. Behrens, Robert E. Henderson, Willis Johnson, Robert D. Miles, John B. Patton.

The meeting was temporarily adjourned and was reconvened at 6:30 PM with President-elect Damian V. Schmelz presiding at the annual banquet in Schwitzer Hall, Indiana Central College.

The Presidential Address titled, "Snakes Alive" was presented by Dr. William Hopp. His use of living specimens contributed an unusual element of intrigue to his entertaining lecture.

Respectfully submitted,
JERRY J. NISBET, Secretary

FINANCIAL REPORT OF THE INDIANA ACADEMY OF SCIENCE

JANUARY 1-DECEMBER 31, 1973

I. ACADEMY ACCOUNTS

	Income		Expenditure	Budgeted
Dues	\$ 5,951.00	-----	-----	(\$ 5,600.00)
Reprints: Vol. 81	2,863.20	-----	2,845.44	(100.00)
Interest	1,057.41	-----	-----	(1,000.00)
Miscellaneous	-----	-----	-----	-----
Secretary	-----	-----	652.30	600.00
Clerical	-----	620.00	-----	-----
Office	-----	32.30	-----	-----
Treasurer	-----	-----	203.82	225.00
Clerical	-----	-----	-----	-----
Office	-----	203.82	-----	-----
General Office	-----	-----	151.60	250.00
Travel, AAAS Dues, etc.	-----	-----	207.50	200.00
Membership Committee	-----	-----	63.39	75.00
Transfer to Administered Accounts ..	-----	-----	2,750.00	2,750.00
Junior Academy	-----	300.00	-----	-----
Science and Society	-----	300.00	-----	-----
Natural Areas	-----	200.00	-----	-----
Library Binding	-----	1,000.00	-----	-----
<i>Proceedings</i> : Publication	-----	750.00	-----	-----
<i>Proceedings</i> : Mailing	-----	200.00	-----	-----
President's Fund	-----	-----	-----	100.00
Newsletter	-----	-----	75.09	225.00
Speaker of the Year	-----	-----	-----	-----
Honorarium	-----	-----	500.00	500.00
Administrative Expenses	-----	-----	-----	50.00
Program Committee	-----	-----	705.28	600.00
Chairman's Local Expenses	-----	25.00	-----	-----
Printing	-----	595.00	-----	-----
Mailing	-----	85.28	-----	-----
Publications Editor's Expenses	-----	-----	500.00	500.00
Youth Activities	-----	-----	25.00	50.00
Public Relations	-----	-----	18.50	50.00
CPA Fees	-----	-----	525.00	500.00
Miscellaneous	-----	-----	60.00	-----
Attorney Fees	-----	60.00	-----	-----
	\$ 9,871.61	-----	\$ 9,282.92	\$ 6,675.00

II. ADMINISTERED ACCOUNTS

	January 1 Balance	1973 Income	1973 Expenditures	December 31 Balance
Junior Academy	\$ 200.00	\$ 300.00	\$ 51.39	\$ 448.61
Science Talent Search	1,828.29	1,772.46	1,682.42	1,918.33
Science Fairs	4,334.06	20,850.54	22,739.70	2,444.90
Science and Society	1,875.57	300.00	301.87	1,873.70
Research	402.47	5,438.00	5,441.40	399.07
Natural Areas	826.50	200.00	-----	1,026.50
J. S. Wright Library	134.28	-----	-----	134.28
Lilly III Library	2,632.76	-----	-----	2,632.76
Lilly IV Library	2,693.95	-----	2,693.95	-----
Lilly V Library	-----	13,100.00	5,579.30	7,520.70
Library Binding90	1,000.00	955.35	45.55
Publications:	-----	-----	-----	-----
<i>Proceedings</i>	2,358.34	4,680.00	6,146.36	891.98
Mailing of <i>Proceedings</i>	139.32	200.00	-----	339.32
Monographs	-----	12,483.00	12,054.98	428.02
Natural Features	-----	-----	-----	-----
HEW Grant	3,486.89	750.00	4,236.89	-----
	\$20,913.33	\$61,074.00	\$61,883.61	\$20,103.72

III. SUMMARY

	Academy Accounts	Administered Accounts	Total
Balance: January 1, 1973	\$ 8,138.52	\$20,913.33	\$29,051.85
1973 Income	9,871.61	61,074.00	70,945.61
1973 Expenditures	9,282.92	61,883.61	71,166.53
Balance: December 31, 1973	8,727.21	20,103.72	28,830.93

IV. BANK BALANCES

First Bank and Trust Company, Indianapolis, Indiana	\$10,743.42
Great Western Savings and Loan, Los Angeles, California	12,551.45
First Western Savings and Loan, Las Vegas, Nevada	5,536.06
	\$28,830.93

V. TRUST FUND STATUS AS OF DECEMBER 31, 1973

	Ind. Acad. Sci.		Ind. Acad. Sci. Inv.		J. S. Wright Fund	
	Market Value	Carrying Value	Market Value	Carrying Value	Market Value	Carrying Value
Income Cash						
and Reserves \$	353.04	\$ 353.04	\$ 493.33	\$ 493.33	\$ 2,889.07	\$ 2,889.07
Principal Cash	362.57	362.57	25.15	25.15	212.47	212.47
Total Cash --- \$	715.61	\$ 715.61	\$ 518.48	\$ 518.48	\$ 3,101.54	\$ 3,101.54
Investments						
Stocks	\$10,286.00	\$ 9,558.48	-----	-----	\$642,319.50	\$264,257.47
Bonds	9,000.00	9,000.00	\$ 15,000.00	15,000.00	62,412.50	62,001.25
Total	\$19,386.00	\$18,558.48	\$15,000.00	\$15,000.00	\$704,732.00	\$326,258.72
Total Value --	\$20,101.61	\$19,274.09	\$15,518.48	\$15,518.48	\$707,833.54	\$329,360.26

VI. NOTES

Transfer to Administered Accounts:

By mail ballot, members of the budget committee approved an additional \$200.00 transfer to the Junior Academy Account to cover travel expenses during the establishment of regional units and other reorganization of the Junior Academy.

Membership Dues:

According to the Treasurer's records, the current status may be summarized as follows:

- 1016 paid, emeritus, life, honorary and paid club members
- 142 on file from 1972, but not yet paid for 1973
- 110 new members for 1973 (included in above totals)
- 22 previous members reinstated during 1973 (included in above totals)
- 108 members and clubs dropped for nonpayment of 1972 dues

Dues Structure for 1973:

- \$6.00 for regular and club memberships
- 3.00 for student memberships
- 8.00 for family memberships
- 1.00 initiation and reinstatement fee for regular, club or student membership
- 2.00 initiation and reinstatement fee for family memberships

Savings:

The treasurer, from the total assets of both Academy and Administered accounts, has maintained sufficient funds in the checking account to pay current bills throughout the year; the remaining funds have been invested in savings certificates.

Certificates redeemed in 1973

1. \$4,465.07 invested at 5.75% April 1970; April 1973 redemption value \$5,306.91
2. \$6,000.00 invested at 6.00% April 1970; April 1973 redemption value \$7,183.78

Certificates Current

1. (FWSL) \$5,000.00 invested at 6.00% April 1972; current value \$5,536.06; maturity at April 1974
2. (GWSL) \$5,000.00 invested at 6.00% April 1973; current value \$5,229.25; maturity at April 1975
3. (GWSL) \$7,000.00 invested at 6.00% April 1973; current value \$7,322.20; maturity at April 1975

Reprints:

Reprint charges to authors for Vol. 81 are being collected. Charges to three authors are outstanding for a total of \$167.70 giving a net profit to the Academy of \$185.46 in excess of printing costs.

Research:

Grants totalling \$5,441.40 were made to R. N. PHEIFER (Geology), H. R. AINSCOUGH (Geography and Geology), J. O. WHITAKER, JR. (Life Sciences), A. J. RUDMAN (Geology), G. M. HUITINK (Chemistry), A. RAVINDRAN (Industrial Engineering), J. W. REISING (Biology), W. H. WELCH (Botany), T. R. WEST (Geosciences), G. B. WILLIAMSON (Zoology), and W. T. ANDERSON, JR. (High School Science Club).

Attorney Fees:

Ice, Miller, Donadio & Ryan of Indianapolis have been representing the Academy in clarification of our tax-exemption status. The Academy was informed last year by the Internal Revenue Service and by the State of Indiana of favorable classifications, but a listing of exempt organizations published by the IRS in January did not include the Academy. The Academy will be included in supplemental printings. The Academy is currently seeking information on reprints and roles of various publications. The executive committee voted at the Fall Meeting to delay the reimbursement of \$4,226.87 for attorney fees to the Academy operating funds from the J. W. Wright fund until these funds are needed for operating expenses.

Publications:

Sales include \$30.00 for *Proceedings* and \$428.00 for *Monographs* with charges for 9 *Monographs* outstanding. The actual cost for publishing Vol. 81 of the *Proceedings* was \$10,146.36 of which the State of Indiana paid \$4,000.00 leaving a balance of \$6,146.36 to be paid by the Academy. *Monograph* #3 was published for a total cost of \$12,077.00.

HEW Grant (OEG-0-72-5014), Environmental Education Program:

	Honoraria	Travel	Textbooks	Materials	Total
Clinton -----	\$ 700.00	\$130.20	-----	\$ 74.06	\$ 904.26
Peru -----	795.00	166.70	-----	98.15	1,059.85
Versailles -----	800.00	210.63	-----	102.01	1,112.69
Jasper -----	850.00	113.29	-----	100.00	1,063.29
General -----	100.00	9.20	\$437.85	33.36	580.41
Total -----	\$3,245.00	\$630.07	\$437.85	\$407.58	\$4,720.50
<p>\$6,100.00 received from HEW 4,720.50 expended \$1,379.50 balance refunded to HEW</p>					

VII. BUDGET FOR 1974

The following budget was approved by the Budget Committee at their meeting at the Indiana State Library, Indianapolis, on December 1, 1973:

Anticipated Income	
Dues, Initiation and Reinstatement fees -----	\$6,000.00
Interest on Savings -----	1,050.00
Reprints: Net Profit on Sales to Authors -----	150.00
	\$7,200.00
Budgeted Expenditures	
Secretary -----	\$ 650.00
Treasurer -----	275.00
General Office Supplies -----	250.00
Officer Travel, AAAS dues, etc. -----	225.00
Membership Committee -----	100.00
Transfer to Administered Accounts -----	2,650.00
Junior Academy -----	\$ 100.00
Science and Society Committee -----	300.00
Natural Areas Committee -----	-----
Library Binding -----	1,000.00
Proceedings: Publication -----	1,000.00
Proceedings: Mailing -----	250.00
President's Fund -----	100.00
Newsletter -----	225.00
Speaker of the Year -----	550.00
Honorarium -----	500.00
Administrative Expenses -----	50.00
Program Committee -----	750.00
Publications Editor's Expenses -----	500.00
Youth Activities -----	50.00
Public Relations -----	50.00
Section Chairman Expenses -----	150.00
CPA Fees for tax return preparation, etc. -----	600.00
	\$7,125.00

Respectfully submitted:

Clyde Metz, Treasurer

December 31, 1973

We, the undersigned, have audited the Treasurer's records for the Indiana Academy of Science for the year 1973 and have found them to be accurate and in order.

CURTIS A. DHONAU

ROBERT E. DOLPHIN

February, 1974

THE INDIANA JUNIOR ACADEMY OF SCIENCE

The 41st Annual Meeting

The Forty-first annual meeting of the Junior Academy of Science was held October 27 at Lilly Hall, Indiana Central College, at 8:00 AM. Those that attended the meeting registered at 8:00 AM. Fifty-seven people were present from various high schools throughout the state. At 8:30 AM there was a rap session with the following scientists:

DR. WILLIAM R. GOMMEL, Indiana Central College
Soil and Atmospheric Sciences

DR. WILMER K. FIFE, Indiana Univ.-Purdue Univ., Indianapolis
Chemistry

DR. JAMES CLARK, State Office Building
Entomology

DR. JAMES BROWN, Indiana Univ.-Purdue Univ., Indianapolis
Geology

DR. JOHN SWEZ, Indiana State University
Biophysics and Computer Science

DR. E. M. VONDRAK, Indiana Central College
Physics

Meanwhile, a council meeting was in session.

The meeting was called to order at 10:30 AM by President Laura Fisher. Dr. Borden, professor at Indiana Central College, gave a warm welcome and Dr. Schmelz, President-elect of the Indiana Senior Academy of Science, was introduced. Next, Dr. William Hopp, President of the Indiana Academy of Science and Professor of Zoology at Indiana State University, gave a presentation on snakes entitled "Dr. Hopp and Friends". The meeting was adjourned at 12:00 NOON for a lunch break.

At 1:15 PM the meeting resumed beginning with papers presented by the following students:

MR. CHRISTOPHER RITTER, Bloomington High School North

"The Effect of Acupuncture on the Production of 17-Hydroxycorticosteroids"

MISS LINDA RUTH OUTLAW, Roosevelt High School, Gary

"Improving Cariogenic Breakfast Cereals"

MIKE PELLETIER, New Haven High School

"Analysis of Aldehydes in the Cellulose Distillate"

MR. KEVIN L. POORMAN, Terre Haute North Vigo High School

"Polygraph Interpretation of the Stimulus-Response in Selected Plants"

JIM PAVELKA, Hobart Science Club

"Extra Sensory Perception"

The minutes were read by Karen Brugge, Secretary, and were approved as read. There was no old business discussed. For the new business Ray Lichtenhan, chairman of a committee to write a constitution, presented a new constitution and stated that the adoption of the constitution with revisions made, would be voted upon at the next meeting.

There was a discussion on electing new officers for the coming year. A motion was made that the officers be elected in the same manner as in

the previous meeting, but the motion was withdrawn. Another motion was made that there be no elections and that the present officers remain as the officers. They are: President—Laura Fisher, Vice-President—Jonathan Dean, and Secretary—Karen Brugge. The motion was seconded and carried.

Dr. Lawrence E. Poorman, Department of Physics, Indiana State University, announced the Best Boy and Girl Scientists who are Mike Pelletier from New Haven High School, New Haven, and Laura Fisher from Lew Wallace High School, Gary. The meeting was adjourned at 3:00 PM by President Laura Fisher.

Secretary, KAREN BRUGGE

DIRECTOR'S REPORT

The Indiana Junior Academy of Science Council, meeting in Indianapolis July 25, 1973, to revitalize the program of the Academy, agreed to set up eight regional centers around the state. Each region will have a director who in turn will agree to serve on the council for the state organization. Each regional director will choose a student director to act as regional liaison between club members and the regional director. The eight student directors will be encouraged to attend the state council meeting annually held at the time of the Indiana Academy of Science meetings.

REGION	COUNTIES	NAME(S)
I	Lake, Porter, LaPorte, St. Joseph, Marshall, Starke, Newton, Jasper, Pulaski, Fulton, Benton	DR. MARY J. PETERSON Hammond Morton MR. LEE MOSS Gary Wallace
II	Elkhart, LaGrange, Steuben, DeKalb, Noble, Kosciusko, Whitley, Allen, Wabash, Huntington, Wells and Adams	MR. KEITH HUNNINGS New Haven High School
III	White, Cass, Miami, Howard, Carroll, Tippecanoe, Clinton and Tipton	ROY APPLLEGATE Tentative: Harrison High School Lafayette, IN
IV	Grant, Blackford, Jay, Madison, Randolph, Delaware, Henry & Wayne	DR. KEITH AULT Ball State University Chemistry Department Muncie, IN 47306
V	Warren, Fountain, Montgomery, Putnam, Parke, Vermillion, Vigo, Clay, Owen, Sullivan and Greene	MR. STEVE THOMPSON Crawfordsville High School
VI	Boone, Hamilton, Hendricks, Marion, Hancock, Morgan, Johnson, Shelby, Monroe, Brown, Bartholomew, Rush, Decatur, Fayette, Union and Franklin	MR. ELLIOT KOYANOI MR. GEORGE IUGINBILL Bloomington H.S., North
VII	Knox, Daviess, Martin, Gibson, Pike, Dubois, Posey, Vanderburgh, Warrick and Spencer	MR. JAMES SCHWENGEL Harrison High School Evansville, IN
VIII	Lawrence, Jackson, Jennings, Ripley, Dearborn, Ohio, Switzerland, Jefferson, Scott, Washington, Orange, Crawford, Harrison, Floyd, Clark, Perry	DR. J. MOODY Indiana University, South-east New Albany, IN

Mr. Ray Lichtenhan has agreed to serve as state student director. Ray is a past president of Indiana Junior Academy of Science and is now a student at Wabash College. He also is chairman of a constitution committee and will have a constitution ready for review at the October meeting.

In essence, the State of Indiana has been arbitrarily divided into eight regional areas which will better serve students as science club members in their association with the Indiana Academy of Science.

Each region will have a director and a student director. These two persons will coordinate regional programs and assist science clubs in becoming members or continuing worthy activities.

Science Club sponsors and officers consult with regional directors on matters of state-wide concern.

The regional directors will constitute the Junior Academy Council and the student regional directors will constitute the student advisory council.

BIOLOGICAL SURVEY COMMITTEE

JACK R. MUNSEE, Chairman, Indiana State University

Publications of 1971, 1972, and 1973

Dealing with the Biota of Indiana

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- SHEAR, LOIS D. 1973. A biosystematic study of Queen Anne's Lace, *Daucus carota* (Linnaeus), from four different Indiana Habitats. M.A.E., Ball State Univ.
- Platyhelminthes: BAUMAN, MALCOLM J. 1971. Helminth endoparasites of the bobwhite quail, *Colinus virginianus*, in northern Indiana. M.S., Ball State Univ.
- Amphibia: CALDWELL, R. S. 1973. Seasonal activity of the red-backed salamander, *Plethodon cinereus*. M.A., Indiana State Univ.
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- Aves :
- MANNAN, WILLIAM. 1973. A comparative study of the breeding bird populations of Clifty Creek and Crooked Creek Valleys. B.A., Hanover College.
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- ROY, MARSHA. 1971. Contents of southern Indiana wild turkey droppings. M.A., Ball State Univ.
- Mammalia :
- DIETZ, JAMES M. 1973. The effects of sodium deficiency, cover availability, and high temperature extremes on certain physiological parameters in confined cottontail rabbits. M.S., Purdue Univ. 68 p.
- FISH, PAUL G. 1971. *Moniliformis Clarki* in small mammals in Vigo County, Indiana. M.A., Indiana State Univ.
- HOUTCOOPER, WAYNE C. 1971. Soil and available food as factors affecting the distribution and abundance of *Peromyscus maniculatus bairdii* and *Mus musculus* in Vigo County, Indiana. M.A., Indiana State Univ.
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- SOTALA, DENNIS J. 1972. Foods of white-tailed deer on Crane Naval Ammunition Depot, Martin County, Indiana. M.S., Purdue Univ.
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- Lichens :
- GOUGH, L. P. Oakland City College. Effect of high water on the vertical trunk distribution of epiphytic lichens on *Taxodium distichum* in southwestern Indiana.

- Tracheophyta : BARNES, W. B., and M. T. JACKSON. Indiana Division of Nature Preserves and Indiana State Univ. Studies of old-growth forests on planosol soils in southeastern Indiana.
- CHANEY, W. R. Purdue Univ. Impact of sulfur dioxide on physiological processes of woody plants.
- DAVIS, M. A., and G. R. PARKER. Purdue Univ. Distribution, biomass and productivity of *Hydrastis canadensis* in Bryan Nature Preserve.
- HOLLETT, BYRON P. Indiana State Univ. The role of mycorrhizae in the ecology and distribution of *Fagus grandifolia* Ehrh.
- HURLEY, RICHARD T. St. Francis College. Competitive studies with the closely related species *Dicentra canadensis* and *D. cucullaria*; *Erythronium americanum* and *E. albidum*; and *Setaria viridis* and *S. lutescens*.
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- Coelenterata : YOUNG, FRANK N. Indiana Univ. The Coelenterate, *Cordylophora lacustris* Allman, abundant along the east coast in brackish water, has been recorded inland from Illinois and more recently from Cleveland, Ohio. It has not yet been recorded from Indiana, but probably occurs here. Species of *Cordylophora* look something like a branching hydra with the tentacles scattered over the sides of the "head".
- Nematoda : WHITAKER, J. O., JR., D. RUBIN, and J. MUNSEE. Indiana State Purdue Univ. Nematodes of mammals of Indiana.
- Insecta : MUNSEE, JACK R. Indiana State Univ. Ants of the genus *Smithistruma* Brown, collected in an Indiana Stripmine (Hymenoptera: Formicidae).
- Amphibia : WHITAKER, J. O., JR., D. RUBIN, and J. MUNSEE. Indiana State Univ., and Central State Univ., Ohio. Food habits of several species of the spade-foot toad, Genus *Scaphiopus* (Pelobatidae).
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- and R. A. SCHLEUTER. Indiana State Univ. Occurrence of the crustacean parasite, *Lernaea cyprinacea*, on fishes from the White River at Petersburg, Indiana. Amer. Midland Natur. (In press).
- Aves : LONNEY, LAWRENCE W., JR. Purdue Univ. Natural history of the white-breasted nuthatch (*Sitta carolinensis*).
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- MUMFORD, R. E., and C. E. KELLER. Purdue Univ. A check list of the birds of Indiana.
- SPORE, DONALD T. Purdue Univ. The birds of the Muscatatuck National Wildlife Refuge, Indiana.
- Mammalia : HAAG, BRIAN. Hanover College. Small mammal populations in Jefferson Proving Ground and their DDT contents.
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WHITAKER, JOHN O., JR., and W. A. MILLER. 1973. Indiana State Univ. Rabies in bats of Indiana: 1968-1972. Proc. Indiana Acad. Sci. (In press).

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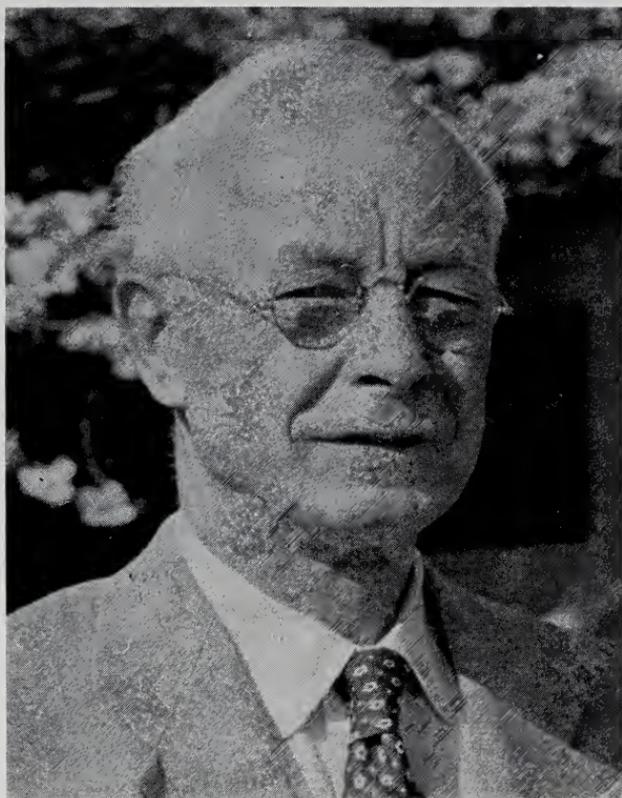
Biota:

HELMS, RONALD L. Indiana State Univ. An ecological inventory of Dobbs Park Natural Area, Terre Haute, Indiana.

NECROLOGY

FAY KENOYER DAILY, Butler University

O (TTO) B. CHRISTY



Riley, Indiana
December 15, 1883

Greenwood, Indiana
May 6, 1973

Dr. O. B. Christy, botanist, was born and died in Indiana and spent the largest part of his teaching career at Ball State University in Indiana.

He was born on a farm, December 15, 1883, at Riley, Indiana, near Terre Haute. He attended high school in Youngstown, Ohio, from 1900 to 1902 and received a diploma from Indiana State Normal in 1910. He graduated from the University of Illinois in 1916, received a Master of Science degree from Cornell in 1923 and a Doctor of Philosophy degree from Peabody College, Nashville, Tennessee, in 1936, and took additional

work at Purdue University. While at Peabody, he received the A.S. Sullivan Award for Scholarship.

Dr. Christy began teaching in the Vigo County, Indiana, rural schools in 1903 and continued until 1908. He was principal at the Prairie Creek High School from 1910 to 1913. He was also principal at Blackhawk High School from 1916 to 1917. He was an agricultural vocational teacher at Shelbyville High School from 1917 to 1918. During the summers from 1915 to 1917, he taught at Indiana State Normal. During the summers of 1922 and 1923, he taught at Cornell University and from 1933 to 1935 at Peabody College.

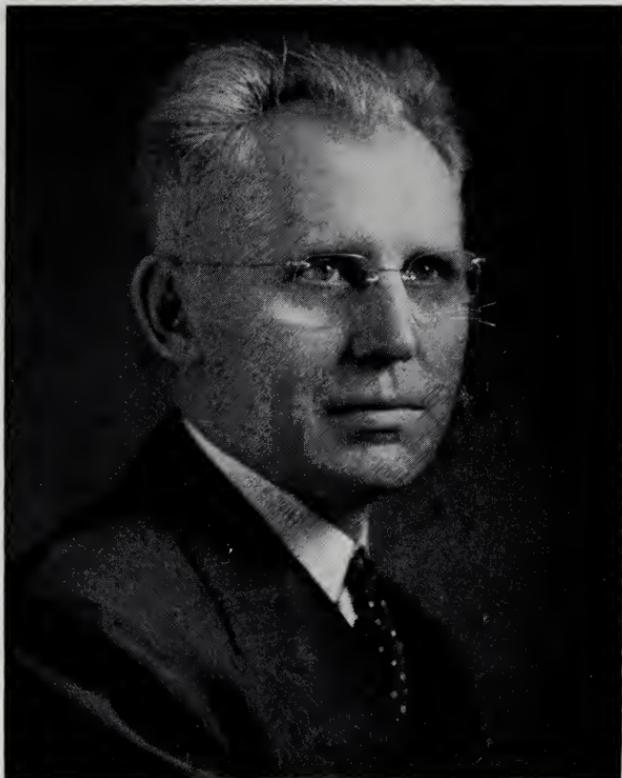
Dr. Christy became a member of the Ball State University Faculty in June 1918 and was made head of the department of botany and agriculture in 1937. He held that position until retirement in 1950, after teaching 47 years, 32 of which were spent at Ball State. Upon retirement, the faculty, staff and students presented him with a citation lauding his exemplary traits in teaching and administrative ability. He wrote a number of articles which appear in various publications including the *Proceedings of the Indiana Academy of Science*, American Tree Association publications, Procedures of the Society for Experimental Biology and Medicine, and Indiana Teachers and Farmers Exchange. One of his most rewarding achievements was the founding of Christy Woods, named in his honor by Ball State University. It is located on the campus and provides a nature study area for students of the university. Also, thousands of children and adults follow the trails through Christy Woods to enjoy the plant life and beauty of the internationally known arboretum.

Dr. Christy was very active in the Indiana Academy of Science which he joined in 1919. He was made a fellow in 1926. He served on the Membership Committee for over 10 years and the Junior Academy of Science Committee for over 15 years. He was also Program Chairman in 1940 and 1947 and served on the Invitations, Nominations and Resolutions Committees. He presented the Necrology Reports in 1955 and 1956. He was secretary of the Academy in 1948 and 1949; vice-president in 1950; and president in 1954. He was an emeritus member at his death.

Activities in other organizations include: president and vice-president of the Indiana Audubon Society; president, vice-president and honorary member of the Muncie Kiwanis Club; and president of Phi Delta Kappa. He was also a member of Kappa Delta Phi, National Education Association, American Association for the Advancement of Science, American School Garden Association, and the Indiana Nature Study Club.

After a successful and long life, Dr. Christy died at age 89 at the Westminster Village, teachers retirement home, in Greenwood, Indiana, May 6, 1973.

P(RENTICE) D(EARING) EDWARDS



Owensville, Indiana
December 21, 1895

Muncie, Indiana
February 2, 1973

Dr. P. D. Edwards, mathematician, was a native of Indiana having been born at Owensville, December 21, 1895. He was the son of Rev. J. R. Edwards and Rosalee Green Edwards. His early education was also obtained here graduating from Owensville High School in 1913, where he decided upon a teaching career. He obtained a B.S. degree at Oakland City College in 1915. He was principal of Zionsville High School from 1915 to 1917. He taught mathematics, physics, geography, music and coached the basketball team at that central Indiana school. In 1917, he accepted a position at Fort Wayne High School, but soon enlisted in the U.S. Army. He was with the 318th Engineers, Sixth Division, for 13 months. He also served the country as a civilian instructor for the army in 1946 during World War II in England and Germany, after serving with the U.S. Navy, Civil Aeronautics Administration in 1944.

After World War I, Dr. Edwards taught at Arsenal Technical High School and the Indiana University extension school in Indianapolis. He continued his education at Indiana University receiving an

A.M. degree in 1923. He was a fellow at Indiana University from 1928 to 1929 and received a Ph.D. degree in 1929. He was a graduate student and instructor at Harvard from 1924 to 1925 and also studied at the University of Chicago.

Dr. Edwards went to Ball State University as an associate professor in mathematics in 1926. He became a full professor in 1940 and the head of the mathematics department in 1952. He taught a full schedule of classes in addition to the administrative work and became a prominent educator. Recognition of his excellent teaching was given in 1968 when a residence hall in the La Follette Complex was named in his honor by Ball State University. Dr. Edwards retired in 1962. After that, he served as visiting professor at the Air Force Institute, Wright Patterson Air Force Base at Dayton, Ohio; and at Rose Hulman Institute of Technology, 1963 to 1967, before returning to Muncie to live.

Dr. Edwards joined the Indiana Academy of Science in 1927 and was elected to Fellow in 1939. He served as editor from 1941 to 1943 and from 1947 to 1948 and served on the Publication of the Proceedings Committee for 11 years. He was president of the Academy in 1952. His presidential address was on *The Role of Mathematics in Science*. He was Divisional Chairman of the Mathematics Section in 1939 and served on many committees through the years. His papers published in the *Proceedings of the Indiana Academy of Science* were primarily on mathematics education. His research interests included functional equations and the motions of double stars. He also belonged to the American Association for the Advancement of Science, National Council of Teachers in Mathematics, Phi Beta Kappa and Sigma Xi and was a member of the board of governors of the Mathematics Association of America for 3 years. He was also active as elder and deacon of the Muncie Presbyterian Church, a member of the Masonic Lodge and sponsor of the Lambda Chi Alpha social fraternity at Ball State University.

Dr. Edwards enjoyed traveling extensively in the United States of America, Mexico, Canada as well as England and Scotland.

The motto "*Nihil sine labore*", nothing without labor, expresses Dr. Edwards' personal philosophy. His diligence resulted in many positions of honor and responsibility until his death at Muncie, Indiana, February 2, 1973.

PAUL RAYMOND FOLTZ

Terre Haute, Indiana
May 27, 1943

Xuyen Province, South Vietnam
October 21, 1971

U.S. Navy Lieutenant, Paul R. Foltz, was born May 27, 1943, at Terre Haute, Indiana. He was educated there where he attended Sandison School, Woodrow Wilson Junior High School and Wiley High School. He was active in the Boy Scouts of America and earned the

Eagle Scout Award and was Vigil Honor Member of the Order of the Arrow. He later served as Scout Master at the First Baptist Church. In 1966, he graduated from Indiana State University where he received the B.S. and M.S. degrees in Life Sciences. He was a laboratory assistant for 2 years and was interested in ecology.

Upon graduation from Indiana State University, Lt. Foltz entered Officer's Candidate School and was commissioned in the U.S. Navy in 1968. He was a diving officer, qualified second class diver and salvage diver. He made three tours of duty in Vietnam. He was a member of the Officer's Christian Union and worked with Christian Service Men's Clubs. He continued his study of plants while in the service and was making a slide library of the plants he had seen.

He was decorated for his dedication to duty and awarded several medals: the Diver Officer Breast Insignia, the National Defense Service Medal, Vietnamese Service Medal, Vietnamese Campaign Medal, Purple Heart and Combat Action ribbon. He received a letter of commendation from the U.S. Department of Navy for his outstanding work.

Lt. Paul R. Foltz, at age 28, was killed on October 21, 1971. He was on the Trem Trem River in the Xuyen Province of South Vietnam when an enemy rocket attack was made on his salvage craft, bringing to a close the promising career of a well-loved and highly capable young man.

FRANK T (HOMSON) GUCKER

Philadelphia, Pennsylvania
April 8, 1900

Bloomington, Indiana
March 6, 1973

Dr. Frank T. Gucker was a research professor emeritus of Chemistry at Indiana University and formerly dean of the College of Liberal Arts and Sciences at his death in Bloomington, Indiana, March 6, 1973. He was born in Philadelphia, Pennsylvania, April 8, 1900. His college education was begun at Haverford College where he obtained an A.B. degree in 1920; was a fellow from 1920 to 1921, and received an A.M. degree in 1921. He was an Austin Fellow at Harvard from 1921 to 1922, Harris Fellow from 1923 to 1924, and received a Ph.D. degree in 1925. He was an assistant to Professor T. W. Richards from 1924 to 1925 and 1927 to 1928. He then was a National Research Council Fellow at the California Institute of Technology from 1925 to 1927. He was research chemist, ammonia division, of the E.I. du Pont de Nemours and Company from 1928 to 1929. In 1929, he went to Northwestern University as assistant professor of chemistry. He became associate professor in 1936 and full professor in 1942. Dr. Gucker left Northwestern in 1947 to come to Indiana University where he was chairman of the department of chemistry. He became dean of the College of Arts and Sciences in 1951, holding that position until 1965 when he became research professor. He retired in 1970 with emeritus status.

Dr. Gucker held many responsible positions. He was a fellow of the Carnegie Institution from 1940 to 1950. He was a member of the committee on physical chemistry and the subcommittee on fundamental constants of the National Research Council from 1951 to 1954, the committee on awards in chemistry under the Fulbright Act from 1954 to 1959, and chairman 1955 to 1959. He was consultant and member of the advisory panel in chemistry, Division of Mathematics, Physics and Engineering Sciences for the National Science Foundation from 1957 to 1960 and chairman from 1958 to 1959. He was a member of the Oakridge National Laboratory Advisory Commission on Reactor Chemistry from 1961 to 1963. He was a technical aide for a division of the National Defense Research Committee in 1941 to 1942 and Regional Councilor for the Army's Office of Ordinance Research from 1952 to 1954. In this capacity, he acted as coordinator and advisor for civilian research projects sponsored by the Office of Ordinance Research. He served on the executive committee of the American Council of Academic Deans from 1961 to 1963. In 1966, the Association of American Colleges appointed him to a 3-year term on the Commission of Liberal Learning.

Dr. Gucker had a long standing grant while at Indiana University from the National Air Pollution Control Administration for a study of the properties of aerosol gases. In addition, his research interests covered thermochemistry, precise calorimetry, specific heats, heats of dilution, densities and compressibilities of solutions of electrolytes and amino acids, photoelectric counting and sizing of colloidal particles and the refrigerating power of two-component systems. He developed an aerosol particle counter with both wartime and peacetime applications. It could detect airborne germs, dust, moisture and radioactive particles. Dr. Gucker was the author of textbooks and articles and was associate editor of *Chemical Reviews* from 1950 to 1953.

Dr. Gucker joined the Indiana Academy of Science in 1948, a year after moving to Indiana, and was made a fellow in 1954. The papers which he presented at Academy meetings concerned education in chemistry and a calorimeter. Other organizations in which Dr. Gucker was involved were many. He was a fellow of the American Association for the Advancement of Science, member of the American Society of Testing Materials, American Chemistry Society (councilor, chairman of the council policy committee, 1959 to 1961, member of the nominations committee, secretary from 1964 to 1966), Phi Beta Kappa (president of Gamma chapter 1965 to 1966), Sigma Xi, Alpha Chi Sigma, Phi Lambda Upsilon, Presbyterian Club, and Faculty Men's Club at Indiana University.

Dr. Frank T. Gucker was almost 73 years old when he died after a distinguished career in chemical research and consulting for the government and industry.

FLOY HURLBUT

Kearney, Nebraska
April 29, 1888

Muncie, Indiana
January 2, 1973

Born of a Methodist minister and wife in Kearney, Nebraska, April 29, 1888, Dr. Floy Hurlbut, geographer, was to combine a religious and academic career.

Her college training began at John Fletcher College and she completed the A.B. degree at Taylor University in 1911. In 1912 to 1926, she served as a missionary and taught in the Foochow Women's College in South China. She returned to Fukien Province in 1947 to attend the Centenary Celebration of the Methodist Church of China.

Dr. Hurlbut continued her education after returning to the United States of America and received an A.M. and Ph.D. degree from the University of Nebraska in 1928 and 1930, respectively.

Dr. Hurlbut's earliest teaching assignment was at the Dunbar, Nebraska High School. Then she taught at the University of Nebraska before coming to Ball State University in 1931. She became a professor in 1949. Not content with only her teaching duties, she established a weather bureau about 3 years after coming to Ball State University and provided weather reports for the Muncie Evening Press and WLBC radio station. She was a meteorologist under the United States Civil Service Commission and Civil Aeronautics Authority. She also found time to teach a Bible Class at the High Street Methodist Church. In 1965, Dr. Hurlbut was honored for many years of service well done by having a residence hall in the Studebaker Complex at Ball State University named for her. She retired from Ball State in 1954 as professor emeritus of science, and became a full-time director of the Muncie Travel Service.

Dr. Hurlbut joined the Indiana Academy of Science in 1933 and was made a fellow in 1953. She was on the Program Committee in 1947, chairman of the Geology and Geography Division in 1948, served on the Resolutions Committee in 1954, and on the Fellows Committee from 1961 to 1964. She was author or co-author of several papers presented at the Academy dealing with the Far Eastern conflict; *Our Highways, an Indian Heritage*, and the *Influence of Salt in the Early Life of America*. Other publications include *The Climate of Fukien Province*, published by the Natural History Society of Fukien Christian University and the book, *The Fukienese: A Study in Human Geography*. Dr. Hurlbut was elected to Sigma Xi, Psi Chi and Sigma Delta Epsilon honorary societies and was the first woman president of Sigma Zeta, national science honorary organization. She was also a member of the American Association for the Advancement of Science.

Dr. Hurlbut's sister, Dr. Zylpha Hurlbut, also came to Indiana to become head of the department of Biology at Anderson College.

Dr. Floy Hurlbut, age 85 years, was still director of the travel agency in Muncie when she died at Ball Hospital, January 2, 1973, after a long and varied career.

FRANK DUNN KERN

Reinbeck, Iowa
June 29, 1883

State College, Pennsylvania
September 28, 1973

The first dean of the Graduate School at Pennsylvania State University and botanist, Dr. Frank D. Kern, was 90 years old when he died September 28, 1973. Born in Reinbeck, Iowa, June 29, 1883, Dr. Kern was educated at the University of Iowa receiving a B.S. degree in 1904. He received an M.S. degree from Purdue University in 1907, and a Ph.D. degree from Columbia University in 1911. He was a fellow at Columbia from 1910 to 1911. He was an assistant in animal morphology and physiology at Iowa from 1902 to 1904; special agent for the Bureau of Plant Industry, U.S. Department of Agriculture from 1904 to 1905; and assistant botanist to associate botanist at the Purdue University Experiment Station from 1905 to 1913. He was research scholar at the New York Botanical Garden from 1906 to 1908 and 1910.

Dr. Kern went to teach at Pennsylvania State University in 1913. He was professor of botany and head of the department until 1950. He became dean of the Graduate School when it was established in 1922 and held that position also until his retirement in 1950. During those years, a number of graduate programs in various fields were developed by Dr. Kern. He became an emeritus professor and dean at retirement.

Dr. Kern took a leave of absence from Penn State in 1926 to 1927 and again in 1933 to 1934 and served as acting dean of the University of Puerto Rico, Colleges of Agriculture and Engineering. He received the honorary Doctor of Science degree from the University of Puerto Rico in 1926 and also received a public instruction medal from Venezuela in 1934. He made botanical explorations in both countries and also the Dominican Republic. He was "starred" in *American Men of Science* for his distinguished research.

In addition to his research and administrative duties at Pennsylvania State University, he taught 51 courses through the years, primarily elementary botany and plant pathology.

Dr. Kern joined the Indiana Academy of Science in 1905, the year he came to Purdue University. He presented a paper at annual meetings of the Academy almost every year he was in Indiana. These were chiefly on the rust fungi, puffballs, and plant diseases—particularly crop plants. He was invited to address the general session of the Indiana Academy of Science at Purdue University, November 4, 1938, when he spoke on *The Life and Work of Joseph Charles Arthur*. He was co-author of a paper on the *History of the Arthur Herbarium at*

Purdue University given at the History of Science Section of the Indiana Academy of Science in 1961. Dr. Kern was elected a fellow in 1912 and was an emeritus member at death.

Throughout Dr. Kern's career, he was the author of numerous publications. After retirement, he published more than 20 papers and early in 1973 published a new book on cedar apple rusts, a revision of work started more than 60 years previously.

Among other organizations which Dr. Kern joined was the American Phytopathological Society of which he was vice-president in 1914. He was past president (1945) of the Mycological Society of America. He was a past vice-president of the American Association for the Advancement of Science and member of the Botanical Society of America and Torrey Botanical Club. He was a member of the division of biology and agriculture on the National Research Council from 1946 to 1950. He was elected to Sigma Xi, Gamma Sigma Delta (agriculture honorary), Phi Epsilon Phi (botany honorary) and Alpha Zeta (professional agricultural fraternity). He was elected to Phi Kappa Phi honor society of which he was national president and took an active part in the organization in various facets of its work. He was honored by the Phytopathological Society in 1958 as a charter member and as author of the first scientific paper published by that society.

Dr. Frank D. Kern had been a member of the Indiana Academy of Science for 68 years at his death even though he had moved away and had been a resident in Pennsylvania since 1913. A tribute to his loyalty!

E (ARL) T (HURSTON) MCBEE

Braymer, Missouri
July 6, 1906

Fort Lauderdale, Florida
January 2, 1973

Dr. Earl T. McBee was a chemistry faculty member at Purdue University from 1935 until his death January 2, 1973.

Born July 6, 1906, in Braymer, Missouri, Dr. McBee studied at William Jewell College and received an A.B. degree in 1929. He was an assistant in chemistry from 1927 to 1929. He then went to Purdue University receiving an M.S. degree in 1931, was a fellow from 1930 to 1935 and received a Ph.D. degree (chemistry) in 1936.

Dr. McBee held almost 100 patents on chemical processes and products, some of which were responsible for the development of commercial plants which produced chlorinated chemicals in the manufacture of agricultural chemicals, pesticides, a fire retardant, plastics, etc. He was chairman of the board and president of the Great Lakes Chemical Corporation at Lafayette; president of the Arkansas Chemical and Bromet Company at Magnolia, Arkansas; and was also executive vice-president of the Great Lakes Natural Gas Company. This was in addition to his service on the faculty at Purdue University where

he began teaching in 1935 while still working on his graduate training. He became a full professor in 1943, was head of the department of chemistry from 1949 to 1967 when he was named Shreve professor of industrial chemistry. He held this title at his death.

He was a civilian with the U.S. Army, U.S. Army Air Force, and U.S. Navy. In 1945, he received a certificate of public service from the United States of America War Department and Office of Science Research and Development for his contribution to the Manhattan Project, the atom bomb development program, in devising a process for a satisfactory coolant. Papers by Dr. McBee and associates on recent advances in fluorine chemistry were presented at a symposium held by the American Chemical Society in Chicago, September, 1946. A paper in the *Proceedings of the Indiana Academy of Science* (Volume 56) discusses some of these. Dr. McBee received further honors including the Modern Pioneer Award from the National Association of Manufacturers, the rank of Fellow from the American Association for the Advancement of Science, the American Institute of Chemistry and the New York Academy of Science. He was also elected Director of the American Institute of Chemistry in 1970 and received a Sigma Xi Research Award.

Dr. McBee joined the Indiana Academy of Science in 1951, was made a Fellow in 1954, was Chairman of the Chemistry Division in 1958 and served on the Resolutions Committee in 1959. He was senior author of about a dozen papers delivered at annual paper sessions during the 1950's and 1960's. His research interests covered organic halides, pharmaceuticals, synthetic fibers and derivatives of natural gas hydrocarbons.

Dr. Earl T. McBee died suddenly while on vacation at Fort Lauderdale, Florida. He was 66 years of age.

CHARLES S (STEPHEN) MORRIS

Hutchison, Kansas
August 5, 1892

LaVerne, California
April 12, 1973

Dr. Charles S. Morris died April 12, 1973, in La Verne, California, where he had moved after retirement. He was a professor emeritus of physics at Manchester College, North Manchester, Indiana.

Dr. Morris was born in Hutchison, Kansas, August 5, 1892, but was brought to Indiana when only 6 months old. He attended rural grade school near Peru, Indiana, and high school at Nead, Indiana, a few miles southwest of Peru. The influence of Mr. Tom Shively, a stimulating high school teacher, probably was responsible for the selection of physics as a career by Dr. Morris.

Dr. Morris received an A.B. degree from Manchester College in 1913, an A.M. degree from Ohio State University in 1915 and also a

Ph.D. degree in 1930. Several summers were also spent in study at the University of Chicago.

Dr. Morris began teaching in elementary schools for a year. From 1913 to 1914, he taught physics and chemistry at Blue Ridge College. He was an assistant in physics at Ohio State University from 1914 to 1915. From 1915 to 1917, he was head of the department of physics and mathematics at Mount Morris College. He was professor of mathematics and physics at McPherson College from 1917 to 1926. He became professor of physics and head of the department at Manchester College, North Manchester, Indiana, in 1926, teaching both physics and astronomy. He published a laboratory manual in general college physics (Edwards Brothers Lithoprint). He also became known not only for his scholarship in science but also his quiet work in religion. His interest in astronomy involved the contribution it could make to expanding personal experiences. In 1959, Dr. Morris received a Distinguished Service Certificate from the General Brotherhood Board (Christian Education Commission) for his 45 years of service (33 of which were at Manchester College) to 4 colleges of the Church of the Brethern. This was in recognition of his long, able dedicated career. Construction on the Charles S. Morris Observatory, being built in his honor, was begun at Manchester College, August, 1973, and is planned for completion by 1974. Friends and former students contributed to the fund for the structure.

For several years, significant grants from the National Science Foundation and Research Corporation were given for his research in gamma ray spectroscopy. He was also interested in the raman effect in organic liquids. He became professor emeritus in 1962.

Dr. Morris joined the Indiana Academy of Science in 1935 and was honored as fellow in 1961. He served as Chairman of the Physics Division in 1960 and was also on the Program Committee that year. He was appointed to the Fellows Committee in 1964. He presented a paper at an annual fall meeting on *Physics Research in a Small Institution*.

Other organizations to which he belonged were: the American Association for the Advancement of Science, the American Association of Physics Teachers, American Institute of Physics, Indiana Association of Physics Teachers, Sigma Xi and Sigma Pi Sigma. He was also an elder, Sunday school superintendent and member of boards in the Church of the Brethern and belonged to the Kiwanis Club.

Dr. Morris traveled widely over the United States of America including Alaska, parts of Mexico and Cuba. He visited the physics departments of most of the leading universities and prominent observatories in the United States. He did metal shop work as a hobby, and for relaxation, visited with friends and former students who came from many parts of the country to visit with him. He retained a personal interest in the achievements of his students even after retirement and was highly regarded by them.

Dr. Charles S. Morris was 80 years old at his death. His accomplishments attest to his long life and high standards of achievement.

ORRIN HAROLD SMITH

Iveyville, Iowa
September 1, 1884

Everett, Washington
September 12, 1973

Dr. Orrin Harold Smith was an emeritus professor of physics from DePauw University at his death and nationally recognized for his exceptionally good educational methods.

Born in Iveyville, Iowa, September 1, 1884, Dr. Smith attended a one room rural school in Corning, Iowa. He received an A.B. degree from Knox College, Galesburg, Illinois, in 1908 and an honorary Sc.D. degree in 1961. Dr. Aladine Longden of that university is credited with first interesting Dr. Smith in physics while a student of Dr. Longden. He obtained an A.M. degree from the University of Illinois in 1909 and a Ph.D. degree in 1914.

Dr. Smith taught high school in Illinois from 1909 to 1910 and was an assistant in physics at the University of Illinois from 1910 to 1914. He was a professor at Cornell College of Mount Vernon, Iowa, from 1914 to 1925. As a visiting professor sponsored by the Rockefeller Foundation, Dr. Smith taught at Southeastern University, Nanking, from 1922 to 1923; Lawrence College, 1952 to 1953. Sponsored by the Hill Family Foundation, he was visiting teacher at Macalester College and Hamline from 1953 to 1954 and Grinnell College from 1954 to 1956. Sponsored by the John Hay Whitney Foundation, he was visiting teacher at Kalamazoo College in 1957 to 1958.

Dr. Smith received emeritus rank from DePauw University in 1952, but was still teaching three classes a week in March, 1959, when an article appeared in the *DePauw Alumnus* about his receiving the Golden Key Award at the American Association of School Administrators convention in Atlantic City. He was also featured in a story by *Parade Magazine* (Feb. 15, 1959) after receiving the Golden Key Award. Two people are honored annually—a citizen who has contributed significantly to the national welfare and the teacher whom the citizen deems to have influenced his career the most. Dr. Lee DuBridge, President of the California Institute of Technology and later science advisor to President Nixon was the Golden Key recipient who chose Dr. Smith as co-recipient of the honor. Dr. DuBridge wrote a tribute to Dr. Smith for the *DePauw Alumnus* (April, 1959) describing his genius for stimulating teaching. Dr. Smith also received the Oersted Medal in 1950 from the American Association of Physics Teachers as the outstanding physics teacher of the year. In 1951, he was chosen by students as DePauw's best teacher. Secondary to Dr. Smith's interest in teaching and assisting students toward research careers was Dr. Smith's own research activities on retrograde rays from the cold cathode.

Dr. O. H. Smith joined the Indiana Academy of Science in 1925 and was made a fellow in 1935. He was Chairman of the Physics Section in 1942 (no meeting) and 1943. He was made an emeritus member. Dr. Smith also was a member of the American Association

for the Advancement of Science, American Association of Physics Teachers, and Phi Beta Kappa.

Dr. O. H. Smith died September 12, 1973, at 89 years of age. He was living at Everett, Washington, where memorial services were held as well as at Greencastle, Indiana, where he was buried.

NEW MEMBERS FOR 1973

The following list contains the names and addresses of all new members who joined during 1973. The letter(s) following the address indicates the Section(s) of the Academy in which the member has indicated his major interest, according to the following code:

A—Anthropology	N—Engineering
B—Botany	O—Cell Biology
C—Chemistry	P—Physics
D—Science Education	R—Microbiology and Molecular Biology
E—Entomology	S—Soil Science
G—Geology and Geography	T—Plant Taxonomy
H—History of Science	Y—Psychology
L—Ecology	Z—Zoology
M—Mathematics	

- MR. HARLEEN R. AINSCOUGH, R. R. 3, Box 457A, W. Terre Haute, IN 47885, GCP
 MRS. ROSALIE J. AKEY, R. R. 1, Mooreland, IN 47360, BLD
 DR. EUGENE D. ALBRECHT, Biological Science Section, Purdue Univ., Fort Wayne, IN 46805, ZRO
 DR. WALTER L. BALCAVAGE, Medical Education, Holmstedt Hall, Indiana State Univ., Terre Haute, IN 47809, RCO
 DR. DWIGHT B. BEERY, Physics Dept., Manchester College, North Manchester, IN 46962, PLD
 DR. BENJAMIN BECKER, Purdue Univ. Fort Wayne, IN 46805, ROC
 DR. WILLIAM J. BEGUE, Eli Lilly and Co., Greenfield Lab., P. O. Box 708, Greenfield, IN 46140, RC
 DR. PAUL L. BOCK, Dept. Chemistry, Ball State Univ., Muncie, IN 47306, CDH
 MR. KENNETH LEON BOWERS, R. R. 8, Box 237, Muncie, IN 47302, PNH
 MR. GARY L. BROUILLARD, Dept. Anthropology, Rawles Hall, Indiana Univ., Bloomington, IN 47401, A
 MR. J. WESLEY BURGESS, 103 Shreve, W. Lafayette, IN 47906, EZA
 MR. ROBERT L. BURTCH, 329 N. Van Buren, Batavia, IL 60510, D
 MR. MICHAEL C. CARPENTER, Dept. Geology, 1005 E. 10th St., Bloomington, IN 47401, GLC
 MR. PHILLIP CASERATTI, Dept. Geology, Indiana Univ., Bloomington, IN 40471, GPN
 MR. ROBERT K. CAUDELL, Science Teaching Center, Indiana State Univ., Terre Haute, IN 47809, DLE
 DR. VICTOR CHIU, 1400 E. Hanna Ave., Indiana Central College, Indianapolis, IN 46227, PRD
 MR. LEONARD R. CROW, 530 South 4th St., Vincennes, IN 47591, PD
 DR. JAMES R. CURRY, Franklin College, Franklin, IN 46131, ZL
 MRS. J. MCCARTHY DAVIS, University Apts., W. 13, Bloomington, IN 47401, AZR
 DR. DON B. DEYOUNG, Physical Science, Grace College, Winona Lake, IN, PGN
 MR. HENRY M. DONSELMAN, Dept. Horticulture, Purdue Univ. W. Lafayette, IN 47907, LBT
 MR. WILLIAM V. DOUGLAS, 801 N. Walnut St., Muncie, IN 47305, LZ0
 DR. ROLLA M. DYER, 618 Bridle Ct., Evansville, IN 47712, CRS
 DR. JOHN E. EBINGER, Botany Dept., Eastern Illinois Univ., Charleston, IL 61920, TLB
 DR. HAROLD EDDLEMAN, Palmyra, IN 47164, ROC
 MR. JAY R. ELKINS, 17416 McErlain St., South Bend, IN 46635, LZA

- MR. BRIAN A. FIELDS, Dept. Anthropology, Rawles Hall, Indiana Univ., Bloomington, IN 47401, AZL
- MR. JEFF FISHER, 831 S. 6th St., W. Terre Haute, IN 47885, LRZ
- DR. SOLOMON GARTENHAUS, Physics Dept., Purdue Univ., W. Lafayette, IN 47907, PDH
- DR. JOHN J. GAVIN, Director, Molecular Biology Dept., Miles Res. Div., Miles Lab., Elkhart, IN 46514, ROC
- MR. RICHARD H. GILBERT, 727 W. Ralston Rd., Indianapolis, IN 46217, GTS
- DR. CARL W. GODZESKI, Eli Lilly Co., Indianapolis, IN 46206, ORC
- DR. LARRY P. GOUGH, Biology Dept., Oakland City College, Oakland, IN 47660, LBT
- MR. TERRY F. GRAY, Bionucleonics Dept., Purdue Univ., W. Lafayette, IN 47907, LSD
- MISS REBECCA J. GRIFFIN, Dept. Life Sciences, Indiana State Univ., Terre Haute, IN 47809, ZL
- DR. RAY A. GSELL, Chemistry Dept. Grace College, Winona Lake, IN 46580, CPD
- DR. JAMES D. HADDOCK, Dept. Biology, Purdue Univ., Fort Wayne, IN 46805, EZL
- DR. JERRY HAMELINK, Dept. For. and Cons., Purdue Univ., W. Lafayette, IN 47906, LZC
- MISS PEGGY HARGER, 46 W. 52nd St., Indianapolis, IN 46208, LZA
- MR. PHILLIP W. HARLAN, 2533 Derbyshire Ct., W. Lafayette, IN 47906, SGL
- DR. TODD HARRIS, Entomology Dept., Purdue Univ., W. Lafayette, IN 47907, E.
- MRS. JULIA K. HARRISON, R. R. 1, Box 86, West Baden, IN 47469, LBZ
- MR. JOHN M. HARTMAN, Indiana State Museum, 202 N. Alabama, Indianapolis, IN 46204, AGL
- DR. LESTER L. HEARSON, Dept. Biology, Wabash College, Crawfordsville, IN 47933, ZOH
- MISS NANCY HENDRICKS, Radio TV Dept., Public Schools, 931 Fletcher Ave., Indianapolis, IN 46203, AGL
- DR. EARL B. HERR, JR., 12011 Eden Gleen Dr., Carmel, IN 46032, OCM
- MR. WILLIAM C. HERRING, Div. Water, Dept. Natural Res., State Office Bldg., Indianapolis, IN 46204, GNL
- DR. JOHN L. HIDORE, Dept. Geography, Indiana Univ., Bloomington, IN 47401, G
- MR. WARREN O. HILGEMAN, 347 Bedford Hts., Bedford, IN 47421, LGB
- DR. WILLIAM J. HINZE, Geosciences, Purdue Univ., W. Lafayette, IN 47907, G
- MR. MICHAEL L. HOLCOMB, Dept. Life Sciences, Indiana State Univ., Terre Haute, IN 47809, ELZ
- MR. JAMES F. HUTCHINS, 2700 Dell Zell Dr., Indianapolis, IN 46220, OCR
- MR. GLEN P. IVES, Evansville Museum Arts Sci., 411 S.E. Riverside Dr., Evansville, IN 47713, D
- MISS MICHELE A. JACK, 2106 E. 2nd St., Apt. 10, Bloomington, IN 47401, BLR
- DR. HAROLD H. JAUS, Education Building, Purdue Univ., W. Lafayette, IN 47907, DAC
- DR. MICHAEL D. JOHNSON, Dept. Zoology, DePauw Univ., Greencastle, IN 46135, ELZ
- DR. DUVALL A. JONES, Dept. Biology, St. Joseph's College, Rensselaer, IN 47978, ZCL
- MR. ALVAN KARLIN, Dept. Life Sciences, Indiana State Univ., Terre Haute, IN 47809, ZLA
- DR. ROBERT W. KECK, IUPUI, 1201 E. 38th St., Indianapolis, IN 46205, BLR
- MS. KATHLEEN KINDSVATTER, R. R. 3, Box 172P, Brownsburg, IN 46112, GSL
- MR. RONALD L. KIRKPATRICK, P. O. Box 2083, Kokomo, IN 46901, ZRD
- MR. JAMES G. KIRKWOOD, Director, Bio Labs, Indiana Univ., Kokomo, IN 46901, RLZ
- DR. & MRS. E. KLINGHAMMER, R. R. 1, Battle Ground, IN 47920, ZLD
- DR. WILLIAM D. KOVACS, School Civil Engineering, Purdue Univ., W. Lafayette, IN 47907, NGS
- DR. TERRY L. KRUGER, Chemistry Dept., Ball State Univ., Muncie, IN 47306, C
- DR. GUNNAR KULLERUD, Geosciences, Purdue Univ., W. Lafayette, IN 47907, GND
- MR. THOMAS M. LEE, 13 W. Drive, Burlington Park, Muncie, IN 47302, EDC
- DR. THOMAS A. LESH, Dept. Physiology & Health Sci., Ball State Univ., Muncie, IN 47306, ZD

- MR. ELI LEVINE, Dept. Entomology, Purdue Univ., W. Lafayette, IN 47907, ELZ
MR. RAYMOND F. LICHTENHAN, 6550 Idaho Ave., Hammond, IN 46323, PND
DR. JAMES E. LINDELL, Dept. Civil Engineering, Univ. Notre Dame, Notre Dame, IN 46556, NGS
DR. WAYNE E. MAGEE, Dept. Life Sciences, Indiana State Univ., Terre Haute, IN 47809, ROC
DR. PAUL MAHLBERG, Dept. Plant Sciences, Indiana Univ., Bloomington, IN 47401, O
DR. JOAN M. MAHONEY, Med. Educ., Holmstedt Hall, Indiana State Univ., Terre Haute, IN 47809, ROC
DR. JACKSON L. MARR, Dept. Life Sciences, Indiana State Univ., Evansville, IN 47712, ZOR
DR. IAN H. MATHER, Dept. Animal Sciences, Purdue Univ., W. Lafayette, IN 47907, CS
DR. ANN MATTHYSSE, 5587 Scarlet Terrace, Indianapolis, IN 46224, ROB
DR. ROMESH C. MEHRA, 1825 Northside Blvd., South Bend, IN 46615, OBR
DR. GARY F. MEUNIER, General-Exp. Psychology, Ball State Univ., Muncie, IN 47306, A
DR. RALPH L. NICHOLSON, Dept. Botany & Plant Path., Purdue Univ., W. Lafayette, IN 47906 OBR
DR. HERBERT W. OHM, Dept. Biological Sciences, Purdue Univ., W. Lafayette, IN 47906, BSL
DR. LYMAN H. O'NEAL, Dept. Biology, Oakland City College, Oakland, City, IN 47660
DR. MARSHALL E. PARKS, Science Teaching Center, Indiana State Univ., Terre Haute, IN 47809, DLB
MR. CHARLES PETERSEN, 7317 McCook Ave., Hammond, IN 46323, ZAL
MR. WALTER H. PIERCE, Dept. Geology, Ball State Univ., Muncie, IN 47306, G
MR. WOODROW LEE PITRE, Indiana State Univ., Terre Haute, IN 47809, GS
MR. ROBERT PRIDDY, Huntington College, Huntington, IN 46750, BLT
MR. PAUL J. PROVOST, Dept. Anthropology, Indiana Univ., Bloomington, IN 47401, ALH
DR. BARTH H. RAGATZ, Medical Education, Indiana University NW, Gary, IN 46408, COR
DR. A. R. RAO, Civil Engineering, Purdue Univ., W. Lafayette, IN 47907, NLG
MR. VAN A. REIDHEAD, Dept. Anthropology, Indiana Univ., Bloomington, IN 47401, ABG
MR. JOHNNY W. REISING, Biology Dept., Ball State Univ., Muncie, IN 47306, LZD
MR. MAURO RESENDE, 219-9 Halsey Drive, Purdue Univ., W. Lafayette, IN 47907, SGL
MRS. VIRGINIA RHODES, Country Club Hills, R. R. 3, Kendallville, IN 46755, RZD
MR. RODNEY E. RIGGS, R. R. 2, Blanchester, OH 45107, ALZ
DR. ROGER W. ROESKE, Dept. Biochemistry, Indiana Univ. School Medicine, Indianapolis IN 46202, CRD
DR. DARRYL SANDERS, Dept. Entomology, Purdue Univ., W. Lafayette, IN 47907, E
DR. ALAN SIEGEL, Dept. Chemistry, Indiana State Univ., Terre Haute, IN 47809, C
MR. CHARLES SINCLAIR, 1120 N. Leland Ave., Indianapolis, IN 46219, RZL
MR. MALCOLM SLAVIN, Dept. Zoology, Indiana Univ., Jordan Hall, Room 224, Box 7, Bloomington, IN 47401, ZEL
MR. LESTER H. SMITH, 800 Hitt St., W. Lafayette, IN 47901, DSL
MR. GREGORY L. SOANGLER, R. R. 4, Kokomo, IN 46901, ECZ
DR. JOHN SPOONER, School Civil Engineering, Purdue Univ., W. Lafayette, IN 47907, NGS
DR. PAUL E. STANLEY, School Aeronautics & Astronomy, Purdue Univ., W. Lafayette, IN 47907, NPD
MR. GARY C. STEINHARDT, Agronomy Dept., Purdue Univ., W. Lafayette, IN 47907, SGL
MR. MAX W. TALBOTT, Physiology & Health Science, Ball State Univ., Muncie, IN 47306, RZD
MR. WILLIAM J. TODD, L.A.R.S., Purdue Univ., 1220 Potter Dr., W. Lafayette, IN 47907
MS. MARY ANN TURNER, Geology Dept., Univ. Nebraska, Lincoln, NB 68508, GZL
MR. H. MERRILL UNDERWOOD, Indiana Central College, 1400 E. Hanna Ave., Indianapolis, IN 46227, LGD

- DR. DAYTON G. VINCENT, Geosciences, Purdue Univ., W. Lafayette, IN 47907, GSD
- DR. EUGENE S. WAGNER, Chemistry Dept. & Center Med. Educ., Ball State Univ., Muncie, IN 47306, C
- DR. JOHN G. WHITNEY, Eli Lilly & Co., 307 E. McCarty St., Indianapolis, IN 46206
- MR. BRUCE WILLIAMSON, Dept. Zoology, Indiana Univ., Bloomington, IN 47401, LBD
- DR. CLAUDE E. WILSON, Dept. Chemistry, IUPUI, 1201 E. 38th St., Indianapolis, IN 46205, CDL
- MR. GARY N. YOUNG, 2604 Ethel Ave., Muncie, IN 47303, RBO
- MRS. CHARLES W. YOUNGMAN, 60 N. Kenmore Rd., Indianapolis, IN 46219, BAL
- SCIENCE CLUB, Gavit Jr. Sr. High School, 1620 175th St., Hammond, IN 46324

PART 2

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The address, "Snakes Alive" was presented by retiring president, DR. WILLIAM B. HOPP, Department of Life Sciences, Indiana State University, Terre Haute, Indiana 47809, at the annual Fall Meeting dinner at the Indiana Central College Dining Hall, Indiana Central College, Indianapolis, Indiana, on Friday, October 26, 1973.