

1992

## 76th Annual Meeting, 1992. Secretary's Report and Financial Statement

Academy Editors

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# PROCEEDINGS ARKANSAS ACADEMY OF SCIENCE

Volume XXXXVI

1992

Michael W. Rapp  
President

Art Johnson  
President-Elect

John D. Rickett  
Secretary

Robert Wiley  
Treasurer

NAAS Delegate

Henry Robinson  
Historian

## Secretary's Report

### MINUTES OF THE SEVENTY-SIXTH MEETING - APRIL 1992

#### FIRST BUSINESS MEETING

28 members present

1. President Rapp called the meeting to order at 11:28 a.m. by calling attention to the available handouts (Treasurer's report and Secretary's copies of the minutes of last year's Business Meetings).
2. Rapp recognized Robert Wright, Local Arrangements Chair, to introduce Dr. Winfred Thompson, President of UCA, who extended formal welcome of the Academy to the UCA campus. Dr. Thompson referred to widespread criticism of math and science competency levels and our obligation to respond to these criticisms. He also briefly referred to their bid for the new state math and science high school.
3. Rapp recognized Henry Robison, Historian, who reported that this meeting is the fifth time on the UCA campus. Other meeting years were 1934, 1964, 1974 and 1983.
4. Rapp invited the members present to submit comments and/or corrections to the minutes of last year's business meetings.
5. Rapp recognized Robert Wiley, Treasurer, who reported on the solid financial status of the Academy. Rapp asked about profit from the 1991 meeting, but there was none because of a miscommunication with the Arkansas Science Teachers Association, who were not advised of the extent of the expenses of using the facilities at the Continuing Education Center in Fayetteville. Richard Spears asked how widespread or systematic is the distribution of copies of the *Proceedings* to abstracting services. No precise figures were forthcoming, but general consensus agreed that our journal is being broadly abstracted.

#### DISTRIBUTION OF FUNDS - as of 3 October 1992:

Union Bank and Trust Co., (Monticello, AR) Interest Bearing Account	\$1677.04
Certificates of Deposit:	
Dwight Moore Endowment	\$2045.70
Life Membership Endowment	\$9244.90
Arkansas Academy of Science Endowment	\$5527.72
Arkansas Academy of Science General 1	\$2200.00
Arkansas Academy of Science General 2	\$1300.00
Total	\$21,995.36

#### INCOME - Anticipated prior to Annual Meeting:

Interest - Checking Account (\$5.00 x 7)	\$35.00
Interest - Certificates of Deposit	\$496.99
Payment of 1992 dues - an estimate based on 1991 - (Reg. \$945; Sust. \$280; Spon. \$60; Life \$450; Assoc. \$10)	\$1745.00
Institutional Memberships (\$100.00 x 1)	\$100.00
Proceedings - Page Charges Vol 45 (\$25.00 x 30.5)	\$762.50
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	\$3139.49

#### EXPENSES - anticipated prior to Annual Meeting:

Newsletter (\$50.00 x 2)	\$100.00
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#### DISTRIBUTION OF FUNDS - as of 12 October 1991:

Union Bank and Trust Co., (Monticello, AR) Interest Bearing Account (Interest varies - currently 3.25%)	\$1564.40
Certificates of Deposit:	
Dwight Moore Endowment	\$1790.02
Life Membership Endowment	\$8424.18
Arkansas Academy of Science Endowment	\$5184.27
Arkansas Academy of Science General	\$4000.00
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Total	\$20,962.87

#### INCOME - Anticipated prior to Annual Meeting:

Interest - Checking Account (\$5.00 x 7)	\$35.00
Interest - Certificates of Deposit	\$731.72
Payment of 1991 dues - an estimate based on 1990 - (Reg. \$840; Sust. \$60; Spon. \$90; Life \$75; Assoc. \$5)	\$1070.00
Institutional Memberships (\$100.00 x 4)	\$400.00
Proceedings - Subscriptions Vol 44 (\$25.00 x 1)	\$25.00
Proceedings - Page Charges Vol. 44 (\$25.00 x 4)	\$100.00
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	\$2361.72

#### EXPENSES - anticipated prior to Annual Meeting:

Newsletter (\$50.00 x 2)	\$100.00
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## Arkansas Academy of Science

6. Rapp recognized Harvey Barton, Editor of the *Proceedings*, who requested attendees to pick up their copies of the journal and campus representatives return with unclaimed copies destined for that campus. Sections chairs of paper presentations also need to pick up manuscripts from the presenters if publication is desired. Barton also explained the error Phillips Litho had made by placing the 1990 Table of Contents on the cover of the 1991 journal and that an erratum sheet will be available for distribution soon. Barton also moved (2nd: R. Spears) that \$500 be appropriated for editorial consulting for the 1992 volume (#46).
7. Rapp recognized Richard Kluender, Editor of the *Newsletter*, who explained his department's support of the production of the *Newsletter* and projected that if that support declined or ceased, the approximated cost to the Academy would be \$800. He moved (2nd: J. Gaiser) that \$800 be appropriated by the Academy to support the *Newsletter* in the event that departmental support ceases.
8. Rapp reported, on behalf of the Nominations Committee, that Walt Godwin (Chemistry, UAM), James Peck (Biology, UALR), and John Peck (Biology, UCA) had been submitted as candidates for Vice President. He called for nominations from the floor. None were made at this meeting.
9. Rapp recognized Art Johnson, Chair of Constitution Committee, to present proposed revisions to the Constitution. He did and moved (2nd: H. Robison) to accept these changes.
10. Rapp recognized Tom Lynch, Chair of Science Education Committee, to distribute copies of a proposed Position Statement, prepared by members of Project ADVISE, regarding proposed science curriculum changes for K-12. They are seeking the Academy's support of this position statement. Lynch moved (2nd: H. Barton) that the Academy support this statement. Lynch also announced presentations to be done in the Science Education Section of this meeting.
11. Rapp recognized John Peck, Director of Science Talent Search, who reported on the achievements of young Arkansas scientists at the national level. One student was a semi-finalist with a project in physics; others achieved third place and honorable mention with projects in immunology and math. Peck moved (2nd: J. Wear, that the Academy appropriate \$150 to buy plaques and certificates for winners and their teachers.
12. Rapp recognized R. Wiley to read a letter from Ms. Pat Knighten, Director of the Junior Academy of Science. She expressed the need for assistance or replacement as director and issued a motion (2nd: R. Watson) for the appropriation of \$250 to support the Junior Academy.
13. Rapp also recognized the functions of the State Science Fair and the eight regional divisions. He requested that Wiley also move (2nd: R. Mehta) that the Academy appropriate \$400 to renew the Academy's support of the regional and state science fairs and send winning students to the international science and engineering fair. The appropriation will be divided equally among the eight regional science fairs. Rapp also recognized Rudy Timmerman, President of ASTA, and expressed appreciation that ASTA is meeting with us this year (second in succession). Rapp also submitted to the Secretary a tally of Junior Academy membership and activities for the past six years for possible inclusion in the minutes for information.

	1987	1988	1989	1990	1991	1992
Junior Academy	67	94	65	83	62	
Central Reg. Fair	100	100	210	221	200	156
N. Cent. Reg. Fair	150	110	94	75	70	65
N. East Reg. Fair	115	100	85	81	99	95
N. West Reg. Fair	192	174	169	140	132	120

S. Cent. Reg. Fair	150	200	150	181	164	169
S. East Reg. Fair	135	135	125	115	124	100
S. West Reg. Fair	143	116	0	71	72	41
State Science Fair	243	248	199	229	219	

14. President Rapp asked for any other items of old business or committee reports. Hearing none, he continued with new business.
15. President Rapp announced the compositions of the Auditing Committee (Stan Trauth, Chair), Awards Committee (John Peck, Chair), the Resolutions Committee (Gary Heidt, Chair).
16. Rapp recognized Robert Watson, who asked if a representative from Henderson State University was present. Receiving no response, Watson announced that HSU has invited the 1993 meeting of the Academy to their campus. The Executive Committee has accepted that invitation.
17. President Rapp announced that Pat Knighten, Director of the Junior Academy, would like to be replaced. Give any suggestions to Art Johnson (incoming President).
18. Rapp asked if a member of Sigma Xi from the Fayetteville Chapter was present to respond to a question about judging graduate student paper presentations. No response came, so the "local arrangements-awards committee" will handle all the judging.
19. Rapp recognized Robert Wright and the Local Arrangements Committee (Paul Krause, Harold Pray, David Dussourd, and Ken Freiley). Wright reported that there were no major changes in the paper sections and provided information on local eating establishments.
20. Rapp again recognized H. Barton who requested authors submit manuscripts for publication to section chairmen.
21. Rapp announced the location and time of the banquet and the banquet speaker, Lincoln Brower, whose topic will be on the life history of monarch butterflies.
22. President Rapp adjourned the first business meeting at 12:15 p.m.

## SECOND BUSINESS MEETING

President Rapp called the meeting to order at 12:04 p.m.

- Rapp asked for any additions/corrections to the minutes of last year's business meetings as distributed. Receiving none, he asked for a motion to approve (Rickett; 2nd: W. Godwin). Passed by voice vote.
- Rapp reminded the membership of the Treasurer's 5 report and explanation. R. Wiley moved (2nd: A. Johnson) the acceptance of the report. A report from the Auditing Committee (Stan Trauth and David Saugey) proved the Treasurer's records were appropriate and in order. H. Robison moved (2nd: R. Wright) the acceptance of the Auditing Committee's report. Passed. Treasurer's report was also accepted by voice vote.
- Rapp then asked the Secretary to restate the series of motions asking for financial support initially made at the first business meeting (Barton: editorial consulting for *Proceedings*, vol. 46 [\$500]; Kluender: *Newsletter* preparation [\$800]; Peck: Science Talent Search [\$150]; Wiley (for P. Knighten): Junior Academy of Science [\$250]; Wiley (for Rapp): State Science Fair Association [\$400]. K. Beadles asked for the sum (= \$2100). Beadles then moved (2nd: H. Robison) approval of these requests as a group. Passed.

## Secretary's Report

4. Rapp recognized A. Johnson to present proposed changes in the Constitution. He also asked if anyone needed (and distributed) copies of the old or the "new" Constitution. Johnson explained the changes and recognized other committee members, George Harp and John Rickett. Two minor errors (the date should be corrected and the word "operate" be reinserted into section 13.a.). The motion (made during the first business meeting) to accept the revisions passed, but in the process of voting, President Rapp pointed out that first-year members were not allowed vote on Constitutional matters, and took the opportunity to have new members identify themselves. The revised and approved Constitution is attached as Appendix A.
5. President Rapp recognized the Nominations Committee (Mustafa Hemmati, Chair, Collis Geren, and Ed Bacon). Hemmati announced again and recognized the nominees for Vice President. No nominations came from floor; K. Beadles moved (2nd: R. Wiley, that nominations cease. Passed. Regular balloting and one runoff elected James Peck to the office of Vice President. While voting progressed, President Rapp recognized life members of the Academy.
6. Rapp recognized the Resolutions Committee, and R. Spears read the resolutions composed by them (Appendix B). Spears moved (2nd: J. Guenter) acceptance. Two minor additions (Stan Trauth was also moderator for the Vertebrate Zoology Section, and Cameron Dorey for Chemistry) were made, and the resolutions were accepted.
7. Rapp recognized M. Hemmati again to announce other nominations--Robert Wiley for Treasurer and Richard Kluender for *Newsletter* Editor. Additional nominations were called; none came. Walt Godwin moved (2nd: H. Robison) that nominations for Treasurer cease and Wiley be elected by acclamation. Motion passed. Robert Watson moved (2nd: R. Spears) that nominations for *Newsletter* Editor cease and that Kluender be elected by acclamation. Motion passed.
8. President Rapp called for a representative from Henderson State University; getting no response, Rapp then deferred to Robert Watson to announce that HSU has been extended and accepted by the Executive Committee as the meeting site for 1993. Rapp also stated that invitations for the 1994 meeting site may be submitted to the Executive Committee.
9. Rapp then revisited and briefly explained and responded to some question regarding the intended content of the Position Statement developed by individuals participating in Project ADVICE (or formal approval. The motion to accept and support this document (made at the First Business Meeting) passed unanimously.
10. Rapp recognized John Peck to announce the student award winners. Jay Sims, Earth Science Department, UALR, won the Physical Science award with the paper, "Problems in the Detection and Delineation of a Contaminant Plume from a Leaking Underground Storage Tank." Brad Johnson, Biology Department, Hendrix College, won the Life Science award with the paper, "Fluorescein Angiography: An Effective Means of Assessing Retinal Vascular Pathology in Newborn Rats." Yau Kong Leong, Mechanical Engineering Department, UAF, won the graduate student award with the paper, "Thin Film Mechanical Property Measurements Using Micromachined Structures." The two undergraduate awards were designated for the first time "Dwight Moore Undergraduate Research Awards." President Rapp chose this opportunity to recognize Ms. Clementine Moore in the audience in honor of Dwight Moore's contributions to the Academy.
11. Rapp passed out a roster of individuals who are involved in restructuring science curricula in the state department. Academy members were encouraged to contact any of these persons to catch dates and times of hearings to be held.
12. President Rapp announced, at the request of M. Mazumder (UALR) to announce the availability of minority scholarships in Engineering Technology of approximately \$25,000.
13. Rapp then asked R. Wright to report on the attendance at this meeting. About 270 persons registered for this meeting.
14. Rapp asked for any other old business. R. Spears issued a plea for the Academy members (individually) to support the ten or so technical colleges in Arkansas in their growth efforts, particularly as they prepare for accreditation.
15. President Rapp asked for new business:
- Rapp reported a message from Pat Knighten, her work with the Junior Academy, and the absence of several regional directors. She would like to be replaced, and incoming President, Art Johnson, was charged with that responsibility.
  - Rapp announced that ASTA is jointly meeting with us and encouraged Academy members to stay and participate in their sessions this afternoon.
  - Rapp announced that unclaimed copies of the *Proceedings* be taken back to the various campuses and individually distributed to save mailing costs.
  - Rapp announced that Historian, H. Robison, would still like to receive memorabilia items relating to the history of the Academy for a roving display.
  - K. Beadles asked a question about the phrase "...higher order of thinking..." contained in the Position Statement. H. Barton opined that "critical thinking" was meant.
  - President Rapp called for additional new business, none.
16. Rapp expressed appreciation to the Academy, particularly individual members with whom he had worked closely. He then recognized Art Johnson as the incoming President and passed the gavel to him. Johnson presented Rapp with a plaque of appreciation.
17. President Johnson asked the membership for ideas and help for reaching groups we are not currently reaching and progressing in directions we are not currently going. He pointed out the accessibility of the Executive Committee, which usually meets again in September or, if necessary, at any time the President chooses to call a meeting.
18. President Johnson then called for any new business. Hearing none, he adjourned the meeting at 12:53 p.m.

Respectfully submitted,

John Rickett, Secretary

## MEMBERS 1992

FIRST_MI	LASTNAME	INSTITUT:
Robbin C.	Anderson	University of Arkansas at Fayetteville
Edmond J.	Bacon	University of Arkansas at Monticello
David	Chittenden	Arkansas State University
Robert H.	Dillard	University of Arkansas at Fayetteville
Mark	Draganjac	Arkansas State University
Daniel R.	England	Southern Arkansas University
William L.	Evans	University of Arkansas at Fayetteville
James H.	Fribourgh	University of Arkansas at Little Rock
Arthur	Fry	University of Arkansas at Fayetteville
Collis H.	Geren	University of Arkansas at Fayetteville
John	Giese	Ark. Dept. of Pollution Control & Ecol.
Walter E.	Godwin	University of Arkansas at Monticello
Joe M.	Guenter	University of Arkansas at Monticello
George L.	Harp	Arkansas State University
Phoebie A.	Harp	Arkansas State University
Gary A.	Heidt	University of Arkansas at Little Rock
Ronnie	Helma	University of Arkansas at Fayetteville
Carol A.	Jacobs	
Douglas	James	University of Arkansas at Fayetteville
Arthur A.	Johnson	Hendrix College
Donald H.	Hattison	University of Pittsburgh
Clementine	Moore	
Gaylord M.	Northrop	University of Arkansas at Little Rock
Tom	Palko	Arkansas Tech University
James H.	Peck	University of Arkansas at Little Rock
Michael W.	Rapp	University of Central Arkansas
John D.	Rickett	University of Arkansas at Little Rock
Henry W.	Robison	Southern Arkansas University
David A.	Sauger	U.S. Forest Service
Stephen A.	Sewell	University of Mississippi
Betty M.	Spears	Guachita Mtns. Biological Station
Richard K.	Spears	Guachita Mtns. Biological Station
George E.	Templeton	University of Arkansas at Fayetteville
Gary	Tucker	U.S. Forest Service
James L.	Wickliff	University of Arkansas at Fayetteville
Robert W.	Wiley	University of Arkansas at Monticello

## Arkansas Academy of Science

FIRST_MI	LASTNAME	INSTITUTION			
Calvin	Colton	Geographics Silk Screening Co.	Robert	Engelken	Arkansas State University
David L.	Davies	University of Arkansas/Medical Sciences	Don	England	Harding University
Leo Carlson	Davis	Southern Arkansas University	Carole	Engle	University of Arkansas at Pine Bluff
Jim	Edson	University of Arkansas at Monticello	Claude E.	Eyton	University of Arkansas/Medical Sciences
Lavana	England-Whaley	Arkansas State University	E. Kim	Fier	University of Arkansas/Medical Sciences
Lester C.	Rowick	University of Arkansas at Fayetteville	M. Doug	Fletcher	Riceland Foods Inc. (ASU)
Paul C.	Sharah	University of Arkansas at Fayetteville	E. P. (Perk)	Floyd	U.S. Public Health Service (retired)
Owen	Barber	Arkansas State University	Thomas L.	Poti	Natural Heritage Commission
Hacvey E.	Barton	Arkansas State University	Paul B.	Francis	University of Arkansas at Monticello
Judith A.	Bean	Harmony Grove High School	Kenneth	Fresley	University of Central Arkansas
Robert E.	Bowling	University of Arkansas/Medical Sciences	Gary	Fuller	University of Arkansas at Little Rock
Malcolm K.	Cleveland	University of Arkansas at Fayetteville	Kamesh	Oadepally	University of Arkansas at Little Rock
Edward E.	Dale, Jr.	University of Arkansas at Fayetteville	Charlie	Gagen	Arkansas Tech University
Sheldon	Fitzpatrick	University of Arkansas at Pine Bluff	Jack	Gaiser	University of Central Arkansas
Lisa C.	Gandy	FTB Associates	Diana	Garland	Memphis State University
Edmond E.	Griffin	University of Central Arkansas	Joe P.	Gentry	Arkansas Science & Technology Authority
John L.	Harris	Arkansas Highway & Transportation Dept.	Michael	George	Arkansas State University
Perry Mas	Johnston	University of Arkansas at Fayetteville	Wayne	Gildreth	University of Arkansas at Fayetteville
Daniel L.	Marsh	Henderson State University	John T.	Gimour	University of Arkansas at Pine Bluff
Roland E.	McDaniel	FTB Associates	Mattie	Glover	Univ. of Arkansas at Fayetteville
Alex R.	Hubert	Quachita Baptist University	Calvin	Goforth	
Lance	Peacock	The Arkansas Nature Conservancy	E. R.	Goforth	
Alan D.	Price	Ark. Dept. Pollution Control & Ecology	Jan W.	Gooch	Georgia Institute of Technology
Perry C.	Rothrock, III	University of Arkansas/Medical Sciences	William E.	Gran	University of Arkansas at Little Rock
Eric	Sundell	University of Arkansas at Monticello	Wayne L.	Gray	University of Arkansas/Medical Sciences
John T.	Thurmond	University of Arkansas at Little Rock	Robert A.	Green	Mississippi State University
Robert L.	Watson	University of Arkansas at Little Rock	Reid	Green	U.S. Geological Survey
James O.	Wear	Veterans Admin., No. Little Rock Div.	Carton	Gross	John Brown University
Robert E.	Adair	University of Arkansas/Fayetteville	Mark	Gross	University of Arkansas at Little Rock
Ashley	Bean	Hendrix College	Rao P.	Gullapalli	University of Arkansas at Little Rock
Mark	Clark	Henderson State University	Paul D.	Gwinup	Arkansas State University
Charles	Ekworomadu	Univ. of Arkansas for Medical Sciences	Jeffrey R.	Hammerley	UAMS/UAFR
William H.	Eversitt	University of Arkansas/Medical Sciences	Earl L.	Hambink	Arkansas State University
Thomas M.	Fletcher, III	Arkansas State University	Richard H.	Hanson	University of Arkansas at Little Rock
Heath	Garner	Arkansas State University	Joyce M.	Hardin	Hendrix College
Loren J.	Giesler	Chadron State College	Michael J.	Harvey	Tennessee Tech University
Kevin D.	Golden	University of Arkansas at Fayetteville	Soger M.	Hawk	University of Arkansas at Little Rock
Christopher C.	Hemann	Hendrix College	Huata	Hemmatt	Arkansas Tech University
Mark W.	Huskins	Arkansas State University	Larry	Hemmett	Arkansas State University
Michael L.	Martin	Arkansas State University	Sean	Hirschi	University of Central Arkansas
Eric	Mayes	Arkansas State University	Maxine R.	Hite	
Russell B.	McAllister	Arkansas State University	Lisa J.	Hiass	U.S. Corps of Engineers
Patricia J.	McMillan	University of Arkansas/Medical Sciences	Howard	Hodges	University of Arkansas at Little Rock
Angel	Mints	W. R. Grace & Co.	William O.	Hood	University of Arkansas at Little Rock
Donna	Mooney	University of Arkansas/Little Rock	Arthur, Jr.	Hood	University of Central Arkansas
Susan	Murray	University of Arkansas at Fayetteville	Feng Hou	Huang	University of Arkansas at Fayetteville
Joseph C.	Neal	University of Arkansas at Fayetteville	M. Keith	Hudson	University of Arkansas at Little Rock
Timothy J.	O'Brien	University of Arkansas/Medical Sciences	Jim	Huey	University of Arkansas at Monticello
Donna	Porter	University of Arkansas at Fayetteville	Julie	Huggins	Union University
John M.	Ryan	University of Arkansas/Fayetteville	Charles A.	Hughes	Arkansas State University
Jay	Sims	University of Arkansas/Little Rock	Paul	Hunkapiller	Phillips County Community College
Dora	Weyer	University of Arkansas at Fayetteville	Barry K.	Hurlbutt	Univ. of Arkansas for Medical Sciences
Philip K.	Wilkins	Arkansas State University	Philip E.	Hyatt	USDA, Forest Service
Michelle	Williams	University of Arkansas/Little Rock	Joseph U.	Igietseme	University of Arkansas/Medical Sciences
Jason	Willis	University of Arkansas at Little Rock	Celia	Ison	University of Arkansas at Little Rock
Roger	Abernathy	Arkansas State University	Duane	Jackson	University of Arkansas at Pine Bluff
Stephen H.	Al Adams	Univ. of Arkansas at Little Rock	M. T.	Jalaluddin	University of Arkansas at Pine Bluff
Jameel M.	Addison	University of Central Arkansas	Douglas L.	Jeffries	University of the Ozarks
Sam	Al-Khazri	University of Arkansas/Fayetteville	David	Jimerson	Arkansas State University
Robert T.	Allen	University of Arkansas at Little Rock	James E.	Johnson	University of Arkansas at Fayetteville
Cynthia	Annett	University of Arkansas at Fayetteville	Michael I.	Johnson	Nettleton High School
John T.	Annulis	University of Arkansas at Monticello	Hugh	Johnson	Southern Arkansas University
Robert	Bacon	University of Arkansas at Fayetteville	Suzanne M.	Jones	Arkansas State University
Claudia	Bailey	University of Arkansas at Fayetteville	Jay	Justice	Ark. Dept. Pollution Control & Ecology
Max L.	Baker	University of Arkansas/Medical Sciences	Raguopathy	Kannan	University of Arkansas at Fayetteville
Kenneth M.	Ball	El Dorado Public Schools	Alvan A.	Karlin	University of Arkansas at Little Rock
William H.	Baltosser	University of Arkansas at Little Rock	Mark	Karnes	The Ross Foundation
Adephia M.	Bartford	Henderson State University	Philip L.	Kehler	University of Arkansas at Little Rock
Salva	Bass	University of Central Arkansas	Raj V.	Kilambi	University of Arkansas at Fayetteville
Vernon	Sates	Arkansas State University	Haurice G.	Kleus	University of Arkansas at Little Rock
John Kenneth	Seadles	Arkansas State University	Richard	Kluender	University of Arkansas at Monticello
J. Edward	Bennett	Arkansas State University	Frank M.	Knight	University of Arkansas at Fayetteville
Ann Marie	Benson	University of Arkansas/Medical Sciences	Roger E., III	Koeppe	University of Arkansas/Medical Sciences
C.	Bhuvaneshwaran	University of Arkansas/Medical Sciences	Richard A.	Komoroski	Arkansas Tech University
Claine	Bickle	Univ. of Arkansas at Little Rock	Randall A.	Kopper	Hendrix College
Veryl	Boad	Arkansas College	Walter A.	Korfmacher	National Ctr. for Toxicological Research
Marilyn	Bockanack	Arkansas Tech University	Timothy	Kral	University of Arkansas at Fayetteville
Julia Reed	Bollinger	Arkansas State University	Paul	Krause	University of Central Arkansas
Leo H.	Bowman	Arkansas Tech University	Jack C.	Kreie	Fayetteville Public Schools
Patricia	Christian	Christian Brothers College	Forrest E.	Lane	University of Arkansas at Fayetteville
Jimmy D.	Brago	Henderson State University	Lavers	Lavers	Arkansas State University
Wilfred J.	Braithwaite	University of Arkansas at Little Rock	Linda A.	Lee	Fochantona Middle School
Joseph M.	Brown	Mississippi State University	J. Mitchell	Lockhart	University of Arkansas at Fayetteville
Susan G.	Brown	University of Arkansas at Little Rock	Thomas J.	Lynch	University of Arkansas at Little Rock
William D.	Brown	University of Arkansas at Little Rock	Siripong	Malazari	Christian Brothers University
Gaylen	Burnside	University of Arkansas at Little Rock	Jerry	Manion	
Susan	Cady	University of Arkansas at Little Rock	Herbert M.	Matthews	Henderson State University
Jody	Caldwell	University of Arkansas at Little Rock	Herbert	Matthews	
Stanley L.	Chariton	University of Arkansas at Fayetteville	M. K.	McAunder	University of Arkansas at Little Rock
Cindy	Chapman	University of Arkansas at Fayetteville	Chris T.	McAllister	Veterans Affairs Medical Center
Frances E.	Cisam	University of Arkansas at Fayetteville	Clark W.	McCarty	Quachita Baptist University (retired)
Betty S.	Clayton	University of Arkansas at Fayetteville	Boase	McConnell	University of Arkansas at Pine Bluff
Richard R.	Cochran	U.S. Forest Service	V. Rick	McDaniel	Arkansas State University
Larry	Cohoon	Arkansas Tech University	John A.	McLemore	USDA, Forest Service
R. Lilia	Coleman	University of Arkansas at Little Rock	Paul	McLeod	University of Arkansas at Little Rock
Robert L.	Compadre	University of Arkansas/Medical Sciences	Clarence E.	McMahon	(Hendrix College)
Robert M.	Cook	Mississippi State University	Dennis W.	McMasters	Henderson State University
Bob W.	Cordova	Cordco Consulting	Maclan	McMillan	Arkansas Tech University
Robert M.	Cowling	Malvern High School	Tamnie	McRae	National Ctr. for Toxicological Research
Donald	Crisp, Jr.	University of Arkansas at Fayetteville	Richard	Mehta	University of Central Arkansas
Fred	Culwell	University of Central Arkansas	Lawrence A.	Meyer	University of Arkansas at Fayetteville
James J.	Dalake	University of Arkansas/Medical Sciences	Richard S.	Mink	Arkansas State University
James T.	Daniels	Southern Arkansas University/Tech Br.	Sanjay K.	Mitra	University of Arkansas at Little Rock
Jerry A.	Darsey	University of Arkansas at Little Rock	Robert A.	Mittelstaedt	National Center for Tox. Research
Pat	Darsey	Holy Souls Catholic School	Bonnie	Moody	Henderson State University
Stanley R.	David	Arkansas State University	Phillip	Moore	Arkansas Highway & Transportation Dept.
Jerry W.	Davis	USDA, Forest Service	Jewel	Moore	
Jeffery R.	Dehessat	University of Arkansas at Fayetteville	Leland F.	Morvans	University of Arkansas at Little Rock
Ronald H.	Doran	Harding University	Stephen H.	Moulton, III	University of North Texas
Peggy Rae	Dorris	Henderson State University	Michael	Murphy	Arkansas State University
Robert H.	Doster	Ark. Highway & Transp. Dept.	Lawrence M.	Nmaai	Univ. of Arkansas at Pine Bluff
Robert L.	Douglas	Memphis State University	Nathaniel	Nehus	Ark. Dept. Pollution Control & Ecology
Marian	Douglas	University of Arkansas at Little Rock	Thomas	Neison	Arkansas Tech University
Benjamin T.	Duhart	University of Arkansas at Pine Bluff	M. Donald	Newton	Arkansas State University
David	Dussoud	University of Central Arkansas	Larry A.	Newton	Arkansas State University
Rudolph J.	Eichenberger	Southern Arkansas University	Derrick M.	Oosterhuis	University of Arkansas at Fayetteville
Hudson B.	Eldridge	University of Central Arkansas	Clifton	Ott	University of Arkansas/Pine Bluff
			Wilbur	Owen	University of Central Arkansas
			Don R.	Owens	University of Arkansas/Little Rock
			Bryan D.	Palmer	Henderson State University
			Leo J.	Paulissen	University of Arkansas at Fayetteville
			Mark A.	Paulissen	Arkansas State University
			John E.	Pauly	University of Arkansas/Medical Sciences
			John D.	Peck	University of Central Arkansas
			Bill	Peil	U.S. Forest Service
			Carlos H.	Pennington	USDA Waterways Experiment Station
			Charlotte A.	Peterson	Veterans Admin. Hospital

## Secretary's Report

Mark A. Pippenget	University of Arkansas/Medical Sciences	Richard B. Walker	University of Arkansas at Pine Bluff
Albert B. Pittman	Arkansas Natural Heritage Comm.	Stephen A. Walker	Eastern Kentucky University
Michael O. Plummer	Harding University	David L. Wankum	University of Arkansas at Little Rock
Roberta Dee Fond		David Weaver	Arkansas State University
Gayle L. Pounds	University of Arkansas at Pine Bluff	K. Casey Weaver	University of Central Arkansas
Harold Pray	University of Central Arkansas	Jerry Webb	University of Arkansas at Monticello
Mazo Price	University of Arkansas at Pine Bluff	G. J. Weidemann	University of Arkansas at Fayetteville
Denise L. Prince	University of Central Arkansas	David Wennerstrom	University of Arkansas/Medical Sciences
S. Ramaprasad	University of Arkansas/Medical Sciences	Jonathan White	Pulaski Academy
James A. Ramussen	Southern Arkansas University	T. Bentley White	Memphis State University
Jeff H. Rettig	George Washington National Forest	J. D. Wigley	University of Arkansas at Monticello
Ruby S. Reynolds	University of the Ozarks, retired	William Wilhide	Arkansas State University
Edward L. Richards	Arkansas State University	William Williams	University of Arkansas/Monticello
Thomas W. Rimmer	University of Arkansas at Little Rock	William Wallingham	University of Arkansas at Pine Bluff
Johnnie C. Roberts	Arkansas State University	Rebecca L. Willis	Southern Arkansas University
Michael R. Rodgers		Edmond W. Wilson, Jr.	Harding University
Amy L. Roe	Nat. Center for Toxicological Research	Duane C. Wolf	University of Arkansas at Fayetteville
Marty Roop	University of Arkansas/Medical Sciences	Heather L. Woolverton	University of Central Arkansas
Meraha Root	Southern Arkansas University	Robert D. Wright	University of Central Arkansas
Steven W. Rowe	Stamps High School	Chaoping Wu	University of Arkansas at Little Rock
Louise Runge	University of Central Arkansas	William V. Yaich	Arkansas State University
Noaa I. Russert-Kraemer	University of Arkansas at Fayetteville	Chia C. Yang	Arkansas Game & Fish Commission
Subhendra N. Sanches	University of Arkansas/Medical Sciences	Dominic T. Yang	Arkansas Tech University
John A. Sarkar	University of Arkansas at Fayetteville	J. Lyndal York	University of Arkansas at Little Rock
Leo Setian	John Brown University	David A. Young	University of Arkansas/Medical Sciences
Frank L. Setliff	University of Arkansas at Little Rock	Doy L. Zachry	Fayetteville Public Schools
Elwood B. Seward	John Brown University	Steven W. Zimmer	Arkansas Tech University
Ali U. Shaikh	University of Arkansas at Monticello		
Robert E. Shanks	University of Arkansas at Little Rock		
Samuel Shepherd	University of Arkansas at Little Rock		
Dewey N. Siegel	Arkansas Natural Heritage Comm.		
Robert Sifford	University of Arkansas at Fayetteville		
Tom Sims	Arkansas State University		
Edwin B. Slatton	University of Arkansas at Little Rock		
Kimberly G. Smith	NR High School, East Campus		
Hoy J. Smith, Jr.	University of Arkansas at Fayetteville		
L. Dale Snow	U.S.D.A./Univ. of Arkansas		
David C. Snyder	Louisiana Tech University		
W. Sherman Snyder	University of Arkansas at Monticello		
Stan Speight	Arkansas Natural Heritage Commission		
Richard W. Spiegel	Arkansas State Parks Department		
Kenneth F. Standage	University of Arkansas at Fayetteville		
Dennise Steele	U.S. Forest Service		
T. W. Steigerwald	University of Arkansas at Fayetteville		
Mark Steward	University of Arkansas at Monticello		
Keith Sutherland	Arkansas State University		
Phil Sutton	Hendrix College		
William B. Tappe	Hendrix College		
David O. Taylor	University of Arkansas at Monticello		
Lyell TeBeest	University of Central Arkansas		
Dan Thompson	Univ. of Arkansas at Fayetteville		
Lorraine Timmerman	University of Arkansas at Fayetteville		
Rudy Timmerman	Arkansas State University		
Stanley E. Trauth	Van-Cove High School		
Dalena Tull	Rich Mountain Community College		
Richard K. Tumison	Arkansas State University		
Victor K. Ulrich	University of Central Arkansas		
David L. Vere	Henderson State University		
George H. Vosburg	University of Arkansas at Fayetteville		
FIRST_MI	Arkansas Tech University		
	Arkansas State University		
	University of Arkansas at Fayetteville		
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## APPENDIX B RESOLUTIONS

The members of the Arkansas Academy of Science express their gratitude to the University of Central Arkansas at Conway for hosting the 1992 meeting of the Arkansas Academy of Science. In particular, thanks is given to the local arrangements committee: Robert Wright, Chairman; Ken Freiley; Paul Krause; Harold Pray; David Dussourd; and numerous UCA students. Appreciation is expressed for the use of UCA's outstanding facilities, hospitality, and excellent banquet. Also, thanks is given to Lincoln Brower for his presentation on monarch butterflies.

The Academy appreciates the efforts of the various section chairpersons and recognizes the important role they played in the conduct of the meeting. To be noted are: Mark Sutherland (Biomedical); Joseph Lombardi (Invertebrate Zoology); John Choinski and Ken Freiley (Botany); Jerry Manion, Williams Taylor and Cameron Dorey (Chemistry); Dean Hirschi and Rahul Mehta (Physics, Math, Engineering, and Geology); Heather Woolverton (Physics and Geology), Stephen Addison (Science Education); John Rickett (Aquatic and Environmental Biology); Steven Runge (Microbiology and Molecular Biology); Al Karlin and Stan Trauth (Vertebrate Zoology).

The Academy expresses gratitude to the various directors of the science youth activities which are supported by the Academy: Tom Lynch (Chair, Science Education Committee); Mike Rapp (Director, Arkansas State Science Fair); Tom Palko (Director, Junior Science and

Humanities Symposium); John Peck (Science Talent Search) and Pat Knighten (Arkansas Junior Academy of Science).

The Academy is only as successful as its leadership in planning, working, and directing the various activities. To Mike Rapp (President), Art Johnson (President-Elect), George Harp (Vice President), John Rickett (Secretary), Robert Wiley (Treasurer) Robert Watson (Past President), Harvey Barton (*Proceedings* Editor) Dick Kluender (*Newsletter* Editor), and Henry Robison (Historian), the Academy expresses its profound gratitude for an excellent year. In addition, the Academy wishes to express its appreciation to all of those individuals who have contributed their time and efforts by serving on the various committees of the Academy.

Finally, the Academy congratulates all of those who presented papers, most especially the student presenters, which have provided for the success of this meeting as well as science education and research in Arkansas.

Gary A. Heidt

Richard K. Spears, Jr.

Thomas L. Foti