

1970

## 54th Annual Meeting, 1970. Program

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# ARKANSAS ACADEMY OF SCIENCE

Volume XXIV

## Proceedings

1970

### Secretary's Report

The 54th Annual Meeting of the Arkansas Academy of Science was held at Arkansas Polytechnic College, Russellville, April 17 and 18, 1970, with Professor Maurice L. Lawson, Harding College, President of the Academy, presiding.

At the business meeting, Dr. J. P. Jones, Treasurer circulated the Financial Statement which is summarized below:

#### Summary of Financial Statement

April 1, 1970

Cash Balance on Hand, April 1, 1969	\$1863.91
Reserve Fund	1358.35
	<hr/>
Total Assets, April 1, 1969	3222.26
<b>Receipts — April 1, 1969 - March 31, 1970</b>	
Membership Dues	\$1251.25
Institutional Memberships	440.00
Sales of Proceedings	151.80
Reimbursement from AAAS for Junior Academy Research Grants	178.68
Banquet Tickets	162.50
Miscellaneous	81.60
	<hr/>
Total Receipts —	2265.83

#### Disbursements — April 1, 1969 - March 31, 1970

1969 Proceedings - Southwest Printing Co.	2140.24
Junior Academy Expenses	200.00
Junior Academy Research Grants	103.20
Banquet Expenses	325.00
Subscriptions — Science Talent Search	15.00
Mailing and Postage	87.62
Office Supplies	46.02

Executive Committee Expenses	73.41
Miscellaneous	55.79
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Total Disbursements — 3046.28

#### Summary

Original Balance, April 1, 1969	\$1863.91
Receipts — April 1, 1969 - March 31, 1969	2265.83
	<hr/>
Total	4129.74
Disbursements	3046.28
	<hr/>
Cash Balance, March 31, 1970	1083.46
Reserve Fund, April 1, 1969	1358.35
Interest on Reserve Fund	65.29
	<hr/>
Total Assets — April 1, 1970	2507.10

The Editor, Dr. L. C. Howick, reported that page costs are continuing to increase and this accounts for the major expenditure in the financial statement. The Editor indicated that the 1970 Proceedings would be published in a two column 8½x11 format which should reduce publication costs considerably.

Representatives of the following Academy sponsored activities presented reports which are summarized in the Minutes of the meeting:

- Junior Science and Humanities Symposium — Dr. Eugene Wittlake
- Collegiate Academy of Science — Dr. Joe Nix
- Junior Academy of Science — Mr. E. E. Hudson
- Arkansas Biology Curriculum Development Conference — Dr. Neal Buffaloe
- Science Talent Search — Dr. Leo Paulissen
- State Science Fair — Dr. Lowell Bailey

The President reviewed the discussion which had been held regarding the advisability of the Academy working with state agencies in an advisory capacity. Members of the Executive Committee had met with the State Science and Technology Council and the Council had asked the Academy to prepare some recommendations regarding possible activities of the state group. A statement on the position of the Arkansas Academy of Science on possible future activities of the Arkansas Science and Technology Council was circulated to the membership and approved. The President agreed to transmit the statement to the Chairman of the Science and Technology Council.

President Lawson asked for an expression from the membership of their willingness to see the Academy become involved in the formulation of science policy and in serving in an advisory role. The following resolution addressed to the Governor of the State was adopted:

WHEREAS we believe that the Chief Executive of the State of Arkansas and the Boards and Commissions appointed by him wish to utilize all resources available to them in the formulation and establishment of a sound science policy for making decisions affecting the health and welfare of the citizens of Arkansas, therefore be it

RESOLVED that we, the members of the Arkansas Academy of Science, do offer our separate and collective services to assist in the establishment of such science policy for the State of Arkansas.

The Nominating Committee appointed by President Lawson nominated Dr. George Templeton, Professor of Plant Pathology, University of Arkansas, for the position of President-Elect, and Dr. Templeton was elected unanimously. It was announced that the meeting for 1971 would be held at Harding College, Searcy, the meeting in 1972 would be at the University of Arkansas, Fayetteville, and the meeting in 1973 would be at State College of Arkansas, Conway. The nominating committee for AAAS Fellows, with Dr. Paul Sharrah chairman, recommended that Dr. Arthur Johnson, Hendrix College, and Dr. Walter Meyer, University of Arkansas, be nominated to be Fellows in the American Association for the Advancement of Science.

The Constitution and By-Laws were amended by a favorable vote of three-fourths of the members present so that Article 10 of the By-Laws now reads: "Dues for members of the Academy shall be \$8.00 per year for Regular Members and \$10.00 or more per year for Sustaining Members and will entitle the member to receive a copy of the Proceedings." The change increases the Regular Member dues from \$5.00 per year to \$8.00 per year.

The Minutes of the 54th Annual Business Meeting, April 17-18, 1970, have been circulated to the membership by mail.

Respectfully Submitted,

William C. Guest, Secretary

# PROGRAM

## Arkansas Academy of Science

Fifty-Fourth Annual Meeting  
ARKANSAS POLYTECHNIC COLLEGE  
Russellville, Arkansas

**Friday, April 17, 1970**

SENIOR, JUNIOR, COLLEGIATE ACADEMY—Registration

SCIENCE FAIR — Registration

SENIOR ACADEMY — Executive Committee

COLLEGIATE ACADEMY — Executive Committee

SCIENCE TALENT SEARCH

SENIOR ACADEMY — Business Meeting

Talk by RICHARD B. HOOVER, NASA

JUNIOR ACADEMY — Business Meeting

COLLEGIATE ACADEMY — Business Meeting

SENIOR ACADEMY — Archeology and Anthropology  
Section

JUNIOR ACADEMY — Papers

COLLEGIATE ACADEMY — Papers

SENIOR ACADEMY — Science Education Section

SCIENCE FAIR — Open to public

JUNIOR ACADEMY, COLLEGIATE ACADEMY,

SCIENCE FAIR PARTICIPANTS — Supper

SENIOR ACADEMY — BANQUET

ADDRESS: RICHARD B. HOOVER of

NASA: "X-Ray Astronomy"

SCIENCE FAIR, JUNIOR ACADEMY, OUTSTANDING  
BIOLOGY TEACHER — Awards

**Saturday, April 18, 1970**

ARKANSAS SCIENCE TEACHERS  
ASSOCIATION — Breakfast

SCIENCE FAIR — Open to public

SENIOR, JUNIOR ACADEMY — Registration

ADDRESS: HARLAN T. HOLMES of A.P. & L.:  
"Arkansas Nuclear One"

SENIOR ACADEMY SECTION MEETINGS

SENIOR ACADEMY — Business Meeting

SENIOR ACADEMY SECTION

MEETINGS CONTINUED —

## SECTION PROGRAMS

### SCIENCE EDUCATION SECTION

Business Meeting

WILLIAM W. TRIGG: The Use of the Programable Elec-  
tronic Calculator in the Undergraduate Laboratory

### COLLEGIATE ACADEMY,

### PHYSICAL SCIENCES SECTION

JIM PFEIFER: A Method for Determining Molecular Pho-  
toionization Cross Sections for Gaseous Vapors

GENE BANGS: Gas-Liquid Chromatography of Amino Acid and Carbohydrate Derivatives

JOHN B. CONE: A Linear Device for Measuring Pressures from Atmospheric to Ion-Gauge Range

BOB WELLES: Synthesis and Infra-Red Study of P-OH-3-Phenylindolizidine

DAVID ROLL: Synthesis and Infra-Red Study of O-OH-3-Phenylindolizidine

STEVEN C. MOSS: An Improvement on the Born Approximation

JOHN HOLSTON: Laboratory Simulation of Stratified Reservoir Conditions

LEE KUYPER: Factors Affecting the Distribution of Oxygen in Lake Hamilton, Arkansas

**COLLEGIATE ACADEMY,  
BIOLOGICAL SCIENCES SECTION**

RICHARD BROWN: Toads and Frogs as Predators in Southeast Arkansas Cropland

M. F. McFARLAND III: A Comparative Study of the Helminth Parasites Found in Grackles, Starlings, Cowbirds, and Red Wing Blackbirds in Faulkner County

FRANCES DUKE: A Comparison of the Algae Population of a Clean Water Supply

ROBERT J. MANIS: A Preliminary Study of the Trematode Fauna of Selected Arkansas Amphibians

PATRICK OSAM: Acid Phosphatase Activity of Lysosomes as an Index to Freeze-Thaw Induced Latent Injury in Hepatic Cells

JOHN RANSOM: Production and Growth of Channel Catfish Fingerlings. *Ictalurus punctatus* (Rafinesque)

RONALD HUBBARD and GEORGE HARP: The Limnology of Lakes Formed in Areas of Bauxite Strip-Mining Operations

**ARCHEOLOGY AND ANTHROPOLOGY**

**Chairman: Kenneth W. Cole**

MARTHA ROLINGSON: Archeological Investigation of Bayou Bartholomew, 1969

STEVE ADAMS: Profiling Techniques in Archeology

CHARLES JOHNSON: Art and Culture Among the Ashanti of Ghana

JOHN HUNER: A Classification of Some European Trade Beads from Louisiana and Mississippi

GLORIA YOUNG: Reconstruction of an Arkansas Hopewellian Panpipe

MICHAEL P. HOFFMAN: Crockett Curvilinear Incised — The Evolution of a Design Style in the Little River Region, Southwest Arkansas

Business Meeting

**BIOLOGICAL SCIENCES**

**Chairman: Gary E. Tucker**

MARGARET B. DAVIS and EDWARD E. DALE, JR: The Ecology of Bangle Grass (*Chasmanthium latifolium*) (Michx.) (Yates) in Northwest Arkansas

RICHARD L. MEYER, JAMES H. WHEELER and J. R. BREWER: The Freshwater Algae of Arkansas. II. New Additions

DANIEL L. MARSH: Observations of flowering in *Arundinaria gigantea* in Arkansas

EDWIN B. SMITH: Additions to the Arkansas Flora

GARY TUCKER and BILL GRABILL: Floristic Elements of the Pope County, Arkansas, Area

EDWARD E. DALE, JR. and THOMAS L. FOTI: Relationships of Vegetation Cover to Forage Weights in Deer Enclosures

RUSSELL McNALTY and E. LEON RICHARDS: The Vascular Plants of Lawrence County, Arkansas

JOE YATES: Land Use in Northwestern Arkansas: A Case Study

E. B.: WITTLAKE: *Glyptostrobus europaeus* in Arkansas

J. T. DANIEL and GEORGE TEMPLETON: Enzymatic Evidence that Leucine from Tentoxin is Levorotatory

H. B. BETTON, L. ROLFE, P. S. REED, and S. V. BRADLEY: The Effect of *Rhizobium phaseoli* on the Amount of Nodulation and Mineral Uptake of Snapbean var. Contender. I. Trifoloid vs. Seed Inoculation Stage.

H. B. BETTON and L. ROLFE: The Effect of *Rhizobium phaseoli* on the Amount of Nodulation and Mineral Uptake of Snapbean var. Contender. II. Cotyledon vs. Tri-lobed Stage

DAN TIMMERMANN, JR., HOWARD G. APPLGATE, and E. MARK ENGLEMAN: Macroscopic and Microscopic Response of *Gossypium hirsutum* L. to Hydrogen Fluoride Fumigation

H. B. BETTON: Taxonomy of the Genus *Bacillus*. I. Cultural and Biochemical Studies

H. B. BETTON and M. KELLEY: Taxonomy of the Genus *Bacillus*. II. Growth and Cytological Studies

H. B. BETTON and J. D. ALEXANDER: Physiology of Tomato Plants var. Bradley Inoculated with *Bacillus steareothermophilus*

REX L. ELEY: Community Metabolism and Oxygen Budget of Keystone Reservoir, Oklahoma

PEGGY RAE DORRIS: Observations on the Impact of Certain Insecticides on Spider Populations in a Cotton Field

TOM PALKO: A Preliminary Study of Zooplankton Over a Six Months Period on Lake Dardanelle

D. LEROY GRAY and RICHARD A. COLLINS: The Age and Growth of the Blue Catfish, *Ictalurus furcatus*, in the Arkansas River

ROLLIN REIMER: Notes on the Crawfishes of Arkansas

CHARLES LINCOLN and JACOB R. PHILLIPS: The Impact of Resistance to Insecticides on Cotton Insect Problems in Arkansas

J. W. E. WORTHAM and EARL L. HANEBRINK: A Road-Kill Census of Mammals in Northeastern Arkansas

JAMES HOUSTON: Notes on the Habitat and Distribution of the Odonata of Franklin County, Arkansas

JOHN K. BEADLES: Effects of Domestic Effluents on the Distribution of the Fish Fauna of Lost Creek, Craighead County, Arkansas, from 1966-1970

E. PHIL ROUSE: The Nymphalidae of Arkansas

## CHEMISTRY

Chairman: W. W. Trigg

JAMES O. WEAR: Apparatus for Dielectric Constant Measurements

EDGAR D. SMITH and KLUGH E. SORRELLS: A Quantitative Comparison of Gas Chromatography Septum Bleed

T. D. ROBERTS and TOM FANNING: Thiodiazocarboxylates

W. L. MEYER and R. J. HOFF: An A-B-C Approach to the Synthesis of Diterpenoid Alkaloids. Total Formal Synthesis of dl-Atisine

A. B. GOSNELL and J. T. EDMONDSON: Anionic Copolymerization of Dimethyl Sulfoxide and Divinyl Sulfone

C. T. BOUNDS and A. F. GREMILLION: The Gas Chromatographic Separation of the Open Chain C<sub>6</sub> Monoolefins

SAMUEL SIEGEL: Alkenes as Possible Intermediates in the Catalytic Exchange of Alkanes with Deuterium

WALTER L. MEYER: Computation of Non-Chair Conformations of Cyclohexanones

## MATHEMATICS

Chairman: C. E. Padgett, Jr.

DON STOKES: Simple Algebraic Extensions and Characteristic Polynomials

JOHN M. HOPPER: Current Trends in the Mathematics Curriculum

## PHYSICS

Chairman: H. E. McCloud

J. G. WEBB: Application of the Kohn Variational Principle to the Theory of Three Particle Inelastic Scattering

J. R. SINGER: Excess Ultra-sonic Attenuation and Volume Viscosity in Simple Liquids

C. J. BRONCO: Molecular Photo Dissociation

C. H. ROGERS: The Liquid Structure of Sulfur Dioxide

P. C. SHARRAH: The Solar Eclipse as Viewed from Southern Mexico

## BUSINESS MEETING

D. C. WOLD: A Microscopic Description of the Zirconium (alpha, alpha prime, gamma) Reaction

Program

- L. COLEMAN: Atomic Effects in Nuclear Resonances
- D. A. AVERY: The Thermagnetic Torque Effect in Ortho—  
and Para-Hydrogen
- J. E. MACKEY: Some Combinations of Third Order Elastic Constants of Strontium Titanate
- J. HENDREN: The Structure of Glass by X-Ray Diffraction

GEOLOGY

Chairman: R. R. Cohoon

- JOHN A. ROTH: The Ammonoid *Quinnoceras* from the Morrowan Series of Arkansas
- JAMES D. MORRISON: The Eddy Shelter of Beaver Reservoir

## Arkansas Collegiate Academy Of Science

### ABSTRACTS

**JIM PFEIFER:** A Method For Determining Molecular Photoionization Cross Sections For Gaseous Vapors.

This paper presents a mathematical procedure for computing molecular photoionization cross sections from experimental data taken by using a set of far ultraviolet filters. The basic advantages of this filter method will be pointed out.

**GENE BANGS:** Gas-Liquid Chromatography of Amino Acid and Carbohydrate Derivatives.

A brief discussion of the practical application of GLC to amino acid and carbohydrate analysis. The discussion is based on research performed during the summer of 1969 at Oak Ridge National Laboratories in Oak Ridge, Tennessee.

**JOHN CONE:** A Linear Device For Measuring Pressures From Atmospheric to Ion-Gauge Range.

An investigation of a pressure gauge based on the scattering of ultraviolet light. This type of vacuum pressure gauge should have a linear calibration curve over the region from atmospheric pressure down to the one micron range. This type of gauge should be able to replace the two or three gauges now needed to cover this range. Such a gauge would have the added advantage of introducing no contaminants into the system.

**BOB WELLS:** Synthesis and Infra-Red Study of *Para*-Hydroxy-3-Phenylindolizidine.

2-Pyridine carboxaldehyde was reacted with *para*-

hydroxyacetophenone by a crossed aldol condensation. The product was reductively cyclized with  $PtO_2$  catalyst to give *para*-hydroxy-3-phenylindolizidine. An infra-red spectrum was taken of the condensation product and the indolizidine. An infra-red dilution series was also carried out with the *para*-hydroxy-3-phenylindolizidine.

**DAVID ROLL:** Synthesis and Infra-Red Study of *ortho*-Hydroxy-3-Phenylindolizidine.

2-Pyridine carboxaldehyde was reacted with *ortho*-hydroxyacetophenone to give the crossed aldol condensation product, 2-pyridal-*ortho*-hydroxyacetophenone. This was then reductively cyclized to give the desired *ortho*-hydroxy-3-phenylindolizidine. Infra-red studies on the identification of the predominant epimer are discussed.

**STEVEN MOSS:** An Improvement On The Born Approximation.

An improvement on the Born Approximation is developed with calculations using the Kohn variation method.

**JOHN HOLSTON:** Laboratory Simulation of Stratified Reservoir Conditions.

Water conditions similar to those found in stratified reservoirs during the summer and early fall months have been simulated in a 50 gallon polyethylene tank. Mud taken from the bottom of Lake Hamilton was placed in the bottom of the tank. Water was introduced bringing