

1974

58th Annual Meeting, 1974. Program

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Recommended Citation

Editors, Academy (1974) "58th Annual Meeting, 1974. Program," *Journal of the Arkansas Academy of Science*: Vol. 28 , Article 4.
Available at: <http://scholarworks.uark.edu/jaas/vol28/iss1/4>

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PROGRAM

Arkansas Academy of Science

Fifty-Eighth Annual Meeting
STATE COLLEGE OF ARKANSAS
Conway

Meeting concurrently with sessions of:

The Collegiate Academy of Science

The Junior Academy of Science

Arkansas State Science Fair

Arkansas Science Teachers Association

Friday, 5 April

SENIOR, COLLEGIATE, JUNIOR ACADEMIES
-- Registration
ARKANSAS STATE SCIENCE FAIR -- Registration
COLLEGIATE ACADEMY -- Executive Committee
SENIOR ACADEMY -- Executive Committee
COLLEGIATE ACADEMY -- Papers (Biological Science)
ARKANSAS SCIENCE TEACHERS ASSOCIATION
-- Business Meeting
JUNIOR ACADEMY -- Tours
SENIOR ACADEMY -- Business Meeting
JUNIOR ACADEMY -- Papers (Westinghouse Talent Search)
JUNIOR ACADEMY -- Papers
SENIOR ACADEMY -- Papers (Science Education)
COLLEGIATE ACADEMY -- Mini-Symposium
SENIOR ACADEMY -- Papers (Environmental Science)
COLLEGIATE ACADEMY -- Papers (Physical Science)
COLLEGIATE ACADEMY -- Business Meeting
JUNIOR ACADEMY -- Executive Meeting
JUNIOR ACADEMY -- Banquet
COLLEGIATE, SENIOR ACADEMIES -- Banquet
JUNIOR ACADEMY -- Astronomy Session and Tour
SENIOR ACADEMY -- Symposium on Chemical Education

Saturday, 6 April

SENIOR ACADEMY -- Papers (Concurrent Sessions)
JUNIOR ACADEMY -- Business Meeting
JUNIOR ACADEMY -- Awards Presentation
SENIOR ACADEMY -- Business Meeting

Mini-Symposium: HEREDITARY DISEASE

Dr. Roosevelt Brown, D.D.S.
Associate Professor of Pediatrics
University of Arkansas Medical Center
(Chairman, Arkansas Sickle Cell Anemia Foundation)

Dr. Daisilee Berry, M.D.
Associate Professor of Pediatrics
University of Arkansas Medical Center
(Pediatric Hematologist)

SYMPOSIUM ON CHEMICAL EDUCATION

"Blue Spruce Sprouts at Hendrix"
Robert W. Shideler

Informal Discussion of Chemical Education in Arkansas

SECTION PROGRAMS

SCIENCE EDUCATION SECTION

Chairman: Jewel E. Moore

20 YEARS OF EXPERIENCE WITH THE UNIVERSITY OF ARKANSAS PLANETARIUM.

Paul C. Sharrah

CHEMISTRY DEPARTMENTS IN PREDOMINANTLY NEGRO INSTITUTIONS.

James O. Wear and Nirmal K. Shastri

COMPUTER PROGRAM FOR POPULATION ANALYSIS.

W. Ralph Rice and Walter L. Manger

PROVIDING A NATURAL AREA FOR OUTDOOR EDUCATION.

Helen F. Lynch

THE CAMPUS ARBORETUM AT STATE COLLEGE OF ARKANSAS.

Jewel E. Moore

ENVIRONMENTAL SCIENCE AND TECHNOLOGY SECTION

Chairman: Richard A. Collins

BIOCONTROL OF A RICE FIELD WEED WITH AN ENDEMIC FUNGAL DISEASE.

James T. Daniel, G. E. Templeton, R. J. Smith and W. T. Fox

A SURVEY OF RODENTS FROM SELECTED ECOLOGICAL SITES IN FAULKNER COUNTY, ARKANSAS.

Byron E. Holmes, Jr.

THREATENED FISHES OF ARKANSAS.

Henry W. Robison

A PREIMPOUNDMENT ICHTHYOFAUNAL SURVEY OF THE PINEY CREEK WATERSHED, IZARD COUNTY, ARKANSAS.

William J. Matthews and George L. Harp

ICHTHYOFAUNAL DIVERSIFICATION AND DISTRIBUTION IN THE JANE'S CREEK WATERSHED, RANDOLPH COUNTY, ARKANSAS.

Cheryl L. Fowler and George L. Harp

RESIDUAL EFFECTS OF N-K FERTILIZATION OF COASTAL BERMUDAGRASS ON SPRING POPULATIONS OF WEED SPECIES.

R. A. Allured, E. C. Gordon, Lyell F. Thompson and R. E. Frans

ANTHROPOLOGY SECTION

Chairman: Katherine J. Hardie

THE ECOLOGY OF HUMAN NUTRITION: A MODEL FOR RELATING HUMAN NUTRITION TO FACTORS OF THE PHYSICAL AND SOCIOCULTURAL ENVIRONMENTS.

Alberta A. Bennett

THE DEVELOPMENT OF RELEVANT CRITERIA FOR ADEQUATE LITHIC DESCRIPTION.

Robert L. Brooks

AGE AND SEX DIFFERENCES IN LEARNING AMERICAN KIN TERMINOLOGY.

Nancy W. Clendenen

A STRUCTURAL ANALYSIS OF PANPIPE BURIALS.

Gloria A. Young

BIOLOGICAL SCIENCES SECTION I

Chairman: Don Culwell

THE EFFECTS OF SUPPLEMENTAL FEEDS ON THE GROWTH RATES OF CHANNEL CATFISH IN COMBINATION WITH THE WHITE AMUR.

John Kenneth Beadles and Larry Thomas Atkins

ICHTHYOFAUNAL SURVEY OF THE CURRENT RIVER WITHIN ARKANSAS.

Joe F. Green and John Kenneth Beadles

FISH OF THE STRAWBERRY RIVER IN NORTH-CENTRAL ARKANSAS.

Henry W. Robison and John Kenneth Beadles

GROWTH AND PRODUCTION OF GOLDEN SHINER, *Notemigonus crysoleucas*, UNDER DIFFERENT STOCKING DENSITIES AND FEEDING RATES.

Gary D. Hickman and Raj V. Kilambi

THE ORIGIN OF GRASSY LAKE.

Robert Terry Huffman

EFFECTS OF MISSISSIPPI DELTA FLOODING ON SPIDER POPULATIONS.

Peggy Rae Dorris

THE WOODY PLANT FAMILY LAURACEAE IN ARKANSAS.

Gary E. Tucker

ZINC NUTRITION OF RICE PLANTS AS INFLUENCED BY SEED GERMINATED IN ZINC SOLUTIONS.

Narshimha R. Kasireddy and Lyell F. Thompson

SEED GERMINATION IN *Ginkgo biloba* L. I. EFFECTS OF STRATIFICATION, GIBBERELIC ACID AND RED LIGHT.

Michael I. Johnson and James L. Wickliff

BIOLOGICAL SCIENCES SECTION II

Chairman: James R. Nichols

EFFECTS OF VASECTOMY IN RATS WITH AND WITHOUT CONTINUED SEXUAL STIMULATION.

Richard VanGrouw and Jerry R. Hersey

Program

EFFECT OF PREDNISOLONE AND PILOCARPINE IN MUCUS SECRETION AND ULCER FORMATION IN RATS.

Edward Gaspar and Jerry R. Hersey

A LIGHT AND ELECTRON MICROSCOPE STUDY OF THE MITOTIC APPARATUS OF THE RING-LEGGED EARWIG.

Vonnie R. Prentice and William L. Evans

STUDIES OF THE EFFECTS OF HIGH ULTRASONIC OSCILLATIONS ON GRAM-POSITIVE BACTERIAL CELLS.

Richard Muha

ISOLATION AND CHARACTERIZATION STUDIES OF THREONINE DEAMINASE FROM YEAST.

David Turner

KARYOLOGY AND MORPHOMETRICS OF THE BAT, *Uroderma bilobatum* V.

Rick McDaniel

THE PHOTOPHOBOTACTIC RESPONSE OF *Oscillatoria formosa* Bory.

Judy Gabbard

THE EFFECTS OF SUPPLEMENTS ON BONE DENSITY AND NUTRITIONAL STATUS OF ELDERLY WOMEN.

G. Sue Thompson, Rossie L. Mason and Roy E. Beauchine

THE HISTOLOGY OF THE DIGESTIVE TRACT OF THE WHITE AMUR, *Ctenopharyngodon idellus*.

Leland F. Morgans and Gary A. Heidt

A STUDY TO DETERMINE THE OPTIMUM GROWTH TEMPERATURE FOR NUMEROUS ISOLATES OF THE GENUS *Basidiobolus* (ZYGOMYCETES).

Walter L. Kyle and James A. Hutchison

VARIATION IN LIGULE SPOTTING IN *Coreopsis basilis*.

Edwin B. Smith

CHEMISTRY SECTION

Chairman: John Stuckey

ADSORPTION OF ETHANOL, BENZENE AND CYCLO-HEXANE ON SilicAR TLC-7G.

David R. Matayo and Everett Wingo

THE RYDBERG DOUBLET OF ETHYLENE.

Fred H. Watson and Michael W. Nycum

IRRADIATION OF N-ACETYLANTHRANILIC ACID.

T. D. Roberts and R. Staudenmeyer

THE SYNTHESIS OF SOME DIHALONICOTINIC ACIDS OF POTENTIAL MEDICINAL INTEREST.

Frank L. Setliff

PENTAFLUOROPHENOXY TITANIUM (IV) COMPOUNDS.

Phil M. Stricklen and Harry B. Handy

SOME CHEMICAL PROBLEMS IN CONTROLLED THERMONUCLEAR REACTORS.

Warren R. Grimes

CUTOFF MODEL CALCULATIONS OF DEUTERIUM AND CARBON-14 ISOTOPE EFFECTS INVOLVING AROMATIC MOLECULES.

L. T. Netherton and L. B. Sims

A CARBON-14 KINETIC ISOTOPE EFFECT STUDY OF THE REARRANGEMENTS OF p-SUBSTITUTED NEOPHYL BROSYLATES DURING ACETOLYSIS.

Joe C. Wilson and Arthur Fry

A CARBON-13 TRACER STUDY OF THE ACID-CATALYZED REARRANGEMENT OF 2,2,4,4-TETRAMETHYL-3-PENTANONE 3-¹³C.

Richard D. Moore, Arthur Fry and James F. Hinton

GEOLOGY SECTION

Chairman: Chet Kennedy

THE HAZEN MAMMOTH (*Mammuthus columbi*), PRAIRIE COUNTY, ARKANSAS.

James A. Scholtz and William L. Puckette

PETROGRAPHY AND BIOSTRATIGRAPHY OF THE HINDSVILLE LIMESTONE (MISSISSIPPIAN) IN ITS TYPE AREA, NORTHWEST ARKANSAS.

Robert C. Grayson, Jr.

SAND BOILS: A MODERN ANALOGUE OF ANCIENT SAND VOLCANOS.

John G. Williams

PHYSICS AND MATHEMATICS SECTION

Chairman: Darrell Hutchins

CALCULATION OF INDUCED POTENTIAL ENERGY OF AN ELECTRON IN A NEGATIVE VACANCY IN A WURTZITE CRYSTAL.

W. F. Wei

THE PHYSICAL MEANING OF THE FIELD H.

Hal E. McCloud

FACES, EDGES, VERTICES ON SOME POLYHEDRA.

Charles H. Harbison

Collegiate Academy of Science

Arkansas Collegiate Academy of Science

Eddie Reed
President

Michael Wish
President-Elect

Linda Watson
Secretary

David Taylor
Treasurer

Sponsor: Mrs. W.B. Johnson
Co-sponsor: Michael Condren

MINUTES OF THE BUSINESS MEETING, 5 APRIL 1974

The business meeting of the Arkansas Collegiate Academy was called to order by the presiding President, Eddie Reed. The minutes of the last meeting were read and approved. Awards were made to the winning presenters of papers. A tie was declared in the Biological Science section, and a plaque and certificate were awarded to both Eddie Reed of Philander Smith College and Hugh Johnson of College of the Ozarks. A second place certificate was awarded to Paul Berringer of Arkansas Polytechnic College. The first place plaque and certificate in the Physical Science section were awarded to Bryan Hudson of Harding College. Second and third place certificates were awarded to James Cooley of Hendrix College and Caswell Price of Philander Smith College, respectively.

The following officers were elected for 1974-75:

- President — Mike Wish, College of the Ozarks
- President-Elect — Patricia Alexander, College of the Ozarks
- Secretary — Barbara Collins, College of the Ozarks
- Treasurer — Hattie Thompson, Philander Smith College
- Sponsor — Dr. Michael Condren, College of the Ozarks
- Co-sponsor — Dr. John F. Bridgeman, College of the Ozarks

The new President, Mike Wish, took charge of the meeting, and called for a Treasurer's report. However, the Treasurer, David Taylor, was absent from the meeting. Former President Eddie Reed commented about having difficulty contacting the Treasurer during his term. This was followed by a discussion of the handling of communications in general for the 1974 meeting. Suggestions regarding future communications for the annual meeting were duly noted by the new officers. The meeting was adjourned by the new President.

Respectfully submitted,

Barbara Collins, Secretary

PAPERS PRESENTED

BIOLOGICAL SCIENCE

TRENDS IN THE USE OF CONVENIENCE POTATO PRODUCTS IN THE CONWAY AREA.

Sherrye L. Briggler (State College of Arkansas, Conway).

Forty women, aged 20 to 60, in the Conway area participated in a survey designed to estimate trends in the uses of frozen french fries and instant mashed potatoes. Participants included 20 married women students, 12 non-employed homemakers and 8 professionally employed homemakers. Forty percent of those surveyed stated that they always use frozen french fries whereas 20% never use them; 10% always use instant mashed potatoes and 48% never use them. For each product about 40% acknowledged a preference for the fresh products but, upon occasion, use the convenience forms. No age trends were observed in the use of convenience potatoes; economy of time appeared to be more valuable than monetary savings.

COST OF SPICES AS INFLUENCED BY PART OF PLANT UTILIZED, REGION OF PURCHASE AND TYPE OF STORE FROM WHICH PURCHASED.

Deborah A. Morrow (State College of Arkansas, Conway).

A comparison of cost per 100 g of spice revealed that spices obtained from leaves and flowers were more expensive than those from berries and roots. Spices purchased in ground form were 30% less expensive than those packaged whole. A 9% saving in mean cost of 19 spices could be realized if purchase were made in chain stores in central Arkansas rather than in northeast Arkansas. Mean costs were also 9% greater in privately owned stores than in chain stores. No correlation was observed between costs and areas of origin of the spices, although the most expensive spices all were imported from the Mediterranean area.

STUDIES OF THE SYSTEMATICS AND LIFE CYCLE OF *Posthodiplostomum minimum centrarchi* Hoffman (Trematoda: Strigeidae) FROM JOHNSON COUNTY, ARKANSAS.

Hugh C. Johnson (College of the Ozarks, Clarksville).

Fish of family Centrarchidae brought into the laboratory were found to contain metacercaria encysted in the heart and viscera. Life cycle studies and detailed microscopic examina-

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tion were used to identify this bisegmented parasite as belonging to the family Strigeidae, and to be identical with *Posthodiplostomum minimum centrarchi* as described by Hoffman in 1958. This study establishes a new geographical record and a new definitive host record for this species as the adult was found in the small intestine of the little green heron (*Butorides virescens virescens*).

A STUDY OF THE MECHANISM OF CONVERSION OF N-5-FORMYLTETRAHYDROFOLIC ACID INTO ITS DERIVATIVES IN THE PRESENCE OF RAT LIVER HOMOGENATE.

Eddie Reed (Philander Smith College, Little Rock).

¹⁴C-labeled N-5-formyltetrahydrofolic acid was incubated in the presence of rat liver homogenate and the ¹⁴C-formyl moiety conversion to CO₂ was studied. The mechanism of conversion was destroyed by time and heat and thus was indicated to be enzymatic. There was a linear relationship between protein concentration and CO₂ production, and a coenzyme was probably involved. Conversion activity declined with age of rat. The data support Makulu's (1973) proposed mechanism concerning the interrelationships of vitamin B₁₂, choline and folic acid in one-carbon transfer reactions.

BIOMASS OF CHLOROPHYLLOUS ORGANISMS AT TWO SAMPLING SITES ON LAKE DARDANELLE.

P. A. Berringer, R. R. Odegard and T. N. Palko (Arkansas Polytechnic College, Russellville).

Phytoplankton community was sampled at two sites on Lake Dardanelle to determine vertical distribution of biomass. Dissolved oxygen and temperature were measured when samples were collected weekly at meter depths throughout a three-month autumnal period. Samples were analyzed for chlorophyll contents by extraction and spectrophotometry. By use of chlorophyll *a*, *b* and *c* levels as indicators of biomass and phytoplankton community composition, the distribution and numbers of planktons were calculated by Strickland's (1960) formula. Biomass, dissolved oxygen and temperature profiles correlated directly. Increases in biomass, indicative of organismic blooms, corresponded to increases in oxygen levels. When the water column attained thermal homogeneity, highest

biomass levels were recorded in the bottom two meters. Prior to diathermic conditions, highest biomass levels were recorded in the upper two meters of the water column. Biomass levels fluctuated during other sampling periods. Lowest biomass was recorded during the final week of sampling, and corresponded to lowest recorded temperature of the total sampling period.

PHYSICAL SCIENCE

DETERMINATION OF CURE RATE OF AN ACRYLIC ENAMEL.

Lawrence Landsverk, Jr. (College of the Ozarks, Clarksville).

[Abstract withheld at author's request.]

COMPLEXES OF UO₂⁺⁺ WITH ADENINE AND ADENOSINE.

Caswell Price (Philander Smith College, Little Rock).

The interactions of UO₂⁺⁺ ions with adenine and adenosine were studied spectrophotometrically. The mole ratio method for complex determination indicated a 1:1 complex between this ion and both adenine and adenosine.

THE ORGANIC SYNTHESIS AND A KINETIC STUDY OF FERROCENOYL CHLORIDE.

James R. Cooley (Hendrix College, Conway).

Ferrocenoyl chloride was synthesized from cyclopentadiene and inorganic reagents, and its hydrolysis in acetone was studied kinetically by spectrophotometry of the concentration change. When the compound was allowed to react with water in acetone at 24.73 C, a pseudo first order rate constant, $k = 7.57 \times 10^{-4}$ to 7.85×10^{-4} sec.⁻¹. Subsequent determinations of *k* at 29.00 C and 34.07 C allowed calculation of the activation energy $E_{act} = 182.06$ cal/mole, for the reaction.

A SYNTHESIS OF O-HYDROXYPHENYL INDOLIZIDINE.

Bryan Hudson (Harding College, Searcy).

[No abstract.]