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PROGRAM
Arkansas Academy of Science

Sixty-Fifth Annual Meeting
UNIVERSITY OF ARKANSAS AT LITTLE ROCK
Little Rock, Arkansas

Meeting concurrently with sessions of:
The Collegiate Academy of Science

Friday, 17 April

SENIOR AND COLLEGIATE ACADEMIES -- Registration
SENIOR ACADEMY -- Executive Board Meeting
COLLEGIATE BUSINESS MEETING
SENIOR ACADEMY -- First General Business Meeting
WESTINGHOUSE SCIENCE TALENT SEARCH AWARDS
Lunch
SENIOR AND COLLEGIATE ACADEMIES -- Registration
SENIOR AND COLLEGIATE ACADEMIES -- Papers [Concurrent Sessions]:
Chemistry I
Biology I -- Invertebrate Zoology/Physiology
Biomedical Science I
Science Education
Geology
SENIOR AND COLLEGIATE ACADEMIES -- Bar-B-Q
POST BAR-B-Q SPEAKER -- Dr. Kurt Benirschke,
Zoological Society of San Diego, "Research
Needs in Endangered Species"

Saturday, 18 April

SENIOR AND COLLEGIATE ACADEMIES -- Registration
SENIOR AND COLLEGIATE ACADEMIES -- Papers [Concurrent Sessions]:
Biology II -- Botany
Biology III -- Vertebrate Zoology
Aquatic Environment
Chemistry II
Biomedical Science II
SENIOR ACADEMY -- Second General Business Meeting

SECTION PROGRAMS

[Papers marked with * are presentations by Collegiate Academy members]

CHEMISTRY I

Section Chairperson: Alex Nisbet

*DETERMINATION OF STREPTOMYCIN BY GAS-LIQUID CHROMATOGRAPHY USING A MALTOL DERIVATIVE.

Mark W. Woods and Arthur Hoyt, Jr., Department of Chemistry, University of Central Arkansas, Conway, Ark. 72032.

*PROCAINEAMIDE: COLORIMETRIC DETERMINATION OF THE COOPER (II) COMPLEX.

James E. Whitaker and Arthur M. Hoyt, Jr., Department of Chemistry, University of Central Arkansas, Conway, Ark. 72032.

*THE SYNTHESIS OF A SERIES OF METHYL 2, 5- and 5, 6-DIHALONICOTINATES.

W. Reeves Huie and Frank L. Setliff, Department of Chemistry, University of Arkansas at Little Rock, Little Rock, Ark. 72204.

*SYNTHESIS OF N-CYCLOBUTYLMETHYL ANALOGS OF METHADONE, METHADOL, AND ACETYLMETHADOL.

Danny L. Martin and Mike Kowalsky, Department of Biopharmaceutical Sciences, College of Pharmacy, University of Arkansas for Medical Sciences, and Department of Chemistry, University of Arkansas at Little Rock, Little Rock, Ark. 72205.

*SYNTHESIS OF ENKEPHALIN-LIKE PEPTIDES WITH NARCOTIC ANTAGONIST ACTIVITY.

Danny P. Reese, Department of Chemistry, University of Central Arkansas, Conway, Ark. 72032; and Lisa D. Fox and A. Nelson Voldeng, Department of Biopharmaceutical Sciences, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

*PREPARATION OF AKLYLIDENECYCLOALKANE.

Dominic T. C. Yang, Ray Emmitt, and Jim Purser, Department of Chemistry, University of Arkansas at Little Rock, Little Rock, Ark. 72204.

*SYNTHESIS OF SOME METHYL ESTER DERIVATIVES OF POLYCYCLIC AROMATIC HYDROCARBONS.

Peter P. Fu, National Center for Toxicological Research, Jefferson, Ark. 72279; and Dominic T. C. Yang and Tim Blair, Department of Chemistry, University of Arkansas at Little Rock, Little Rock, Ark. 72204.

ANTI- AND PRO-COAGULANT FIBROGENASES FROM CROTALID VENOMS.

J. B. Moran and C. R. Geren, Department of Chemistry, University of Arkansas at Fayetteville, Fayetteville, Ark. 72701.

VENOM OF THE COMMON HOUSE SPIDER.

Ellen F. Young and Collis R. Geren, Department of Chemistry, University of Arkansas at Fayetteville, Fayetteville, Ark. 72701.

UTILIZATION OF MICROCOMPUTERS FOR SPECTROPHOTOMETRIC ENZYME ASSAYS AND AMINO ACID ANALYSIS.

Collis R. Geren and Bill Burham, Department of Chemistry, University of Arkansas at Fayetteville, Fayetteville, Ark. 72701.

INVERTEBRATE ZOOLOGY/PHYSIOLOGY

Section Chairperson: Robert Watson

USE OF DERMESTID BEETLES IN SKELETON PREPARATION AT THE UNIVERSITY OF ARKANSAS MUSEUM.

Nancy G. McCartney, University of Arkansas Museum, Fayetteville, Ark. 72701.

THE LAND PLANARIANS *BIPALIUM KEWENSE* AND *GEOPLANA VAGA* IN ARKANSAS.

James J. Daly, Department of Microbiology and Immunology, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

A COMPARISON OF SOIL TRAVERSING ARTHROPOD POPULATIONS IN SUNFLOWER AND THREE SURROUNDING COMMUNITIES AS SAMPLED BY PITFALL TRAPS.

Linda A. Lee and Harvey E. Barton, Department of Biological Sciences, Arkansas State University, State University, Ark. 72467.

THE PENTATOMIDAE OF ARKANSAS.

Harvey E. Barton and Linda A. Lee, Department of Biological Science, Arkansas State University, State University, Ark. 72467.

FLYING INSECT POPULATIONS AS SAMPLED BY MALAISE TRAP ON CROWLEY'S RIDGE IN NORTHEAST ARKANSAS.

Lynita M. Cooksey and Harvey E. Barton, Department of Biological Science, Arkansas State University, State University, Ark. 72467.

SIGNIFICANCE OF CHALKY DEPOSITS ON FOREWINGS OF *ONCOMETOPIA ORBONA* (F.) (HOMOPTERA: CICADELLIDAE).

Mark A. Mayse, Department of Entomology, University of Arkansas, Fayetteville, Ark. 72701.

A SEM STUDY OF THE CUTICLE OF THREE CASTES OF THE YELLOW JACKET WASP, *VESPULA squamosa*.

Richard A. Roller, William R. Bowen and Robert L. Watson, Department of Biology, University of Arkansas at Little Rock, Little Rock, Ark. 72204.

A FLUOROGRAPHIC TECHNIQUE FOR DETECTION AND RECORDING CHLOROPHYLL AND ITS DERIVATIVES ON PAPER OR THIN-LAYER CHROMATOGRAMS.

James L. Wickliff, Department of Botany and Bacteriology, University of Arkansas, Fayetteville, Ark. 72701.

GEOLOGY

Section Chairperson: Norman F. Williams

LOWER MISSISSIPPIAN LITHOSTRATIGRAPHY AND CONODONT BIOSTRATIGRAPHY OF NORTHWESTERN ARKANSAS.

W. M. Goodman, W. D. Hawkins, B. K. Jefferies, W. M. Liebe, D. J. Murdaugh, E. J. Post and C. R. Price, Department of Geology, University of Arkansas, Fayetteville, Ark. 72701.

TRANSPORT AND DEPOSITION HISTORY OF THE WEDDING-TON SANDSTONE OF NORTHWESTERN ARKANSAS.

Charles R. Price, Department of Geology, University of Arkansas, Fayetteville, Ark. 72701.

TAXONOMY OF THE AMMONOID *PHANEROCERAS*, MORROWAN-ATOKAN (LOWER PENNSYLVANIAN), SOUTHERN MIDCONTINENT, UNITED STATES.

Gary D. Harris, Department of Geology, University of Arkansas, Fayetteville, Ark. 72701.

THE MORROWAN-ATOKAN (PENNSYLVANIAN) BOUNDARY PROBLEM.

Walter L. Manger, Department of Geology and University Museum, University of Arkansas, Fayetteville, Ark., P. K. Sutherland, School of Geology and Geophysics, University of Oklahoma, Norman, Okla.

THE DISTRIBUTION OF FENITIZED CRUSTAL XENOLITHS IN CARBONATITE INTRUSIONS IN WEST-CENTRAL ARKANSAS.

John L. Sharp, Department of Geology, University of Arkansas, Fayetteville, Ark. 72701.

WARM SPRINGS OF ARKANSAS-EXCLUDING HOT SPRINGS NATIONAL PARK.

Kenneth F. Steele and George H. Wagner, Department of Geology, University of Arkansas at Fayetteville, Fayetteville, Ark. 72701.

STRUCTURAL FRAMEWORK OF THE OUACHITA MOUNTAINS, ARKANSAS.

Boyd R. Haley and Charles G. Stone, U. S. Geological Survey and Arkansas Geological Commission, Little Rock, Ark. 72204.

A CASE HISTORY OF A MAJOR LANDSLIDE ON CROWLEY'S RIDGE, VILLAGE CREEK STATE PARK, ARKANSAS.

John D. McFarland III and Charles G. Stone, Arkansas Geological Commission, Little Rock, Ark. 72204.

SMOKY QUARTZ IN RESIDUAL BAUXITE, SALINE COUNTY, ARKANSAS.

J. Michael Howard, Arkansas Geological Commission, Little Rock, Ark. 72204.

DEEP-WATER DEPOSITION OF ORDOVICIAN STRATA IN THE OUACHITA MOUNTAINS, ARKANSAS AND OKLAHOMA.

Charles G. Stone and Boyd R. Haley, Arkansas Geological Commission and U. S. Geological Survey, Little Rock, Ark. 72204.

BIOMEDICAL SCIENCES I

Section Chairperson: Grady Smith

OXIDATION OF NATIVE AND MODIFIED HEMOGLOBIN (Hb) AND MYOGLOBIN (Mb) BY SODIUM NITRITE IN THE PRESENCE AND ABSENCE OF OXYGEN, INOSITOL HEXAPHOSPHATE (IHP) AND CATALASE.

A. Mansouri, Department of Medicine, VA Medical Center and University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

UNAMBIGUOUS EVALUATION OF COUPLING CAPACITY OF ARSENATE-TREATED MITOCHONDRIA.

C. Bhuvaneshwaran, Department of Biochemistry, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

COPPER DEFICIENCY AND ADJUVANT-INDUCED POLYARTHRITIS IN RATS.

V. Kishore, N. Latman, J. Potter, L. Hohnson and J. R. J. Sorenson, Department of Biopharmaceutical Sciences, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

INFLUENCE OF CADMIUM (CdCl₂) ON THE PLASMA ANTI-TRYPTIC ACTIVITY (TIC) OF MICE.

Parimal Chowdhury and Phillip L. Rayford, Department of Physiology and Biophysics, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

EFFECT OF PARTIAL ILEAL BYPASS ON SERUM LIPOPROTEINS.

Charles A. Nelson and Manfred D. Morris, Department of Biochemistry and Pediatrics, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

EFFECTS OF SUPRACHIASMATIC AND HIPPOCAMPAL LESIONS ON THE CIRCADIAN INTAKE OF WATER AND ETHANOL IN MICE.

James N. Pasley and Ersin W. Powell, Departments of Physiology-Biophysics and Anatomy, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

DISCRIMINATION OF THE PHENCYCLIDINE DRUG STATE IN THE PIGEON: GENERALIZATION TO OTHER DRUGS.

D. E. McMillan, Department of Pharmacology and Interdisciplinary Toxicology, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

THE EQUIVALENCE OF MORPHOGENETIC MECHANISMS IN REGENERATING AND DEVELOPING FORELIMBS OF THE MEXICAN SALAMANDER, *AMBYSTOMA MEXICANUM*.

Patrick W. Tank, Department of Anatomy, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

***PURIFICATION AND PARTIAL CHARACTERIZATION OF CALMODULIN FROM THE MYXOMYCETE *PHYSARUM FLAVICOMUM*.**

Lou Ann Young and Thomas J. Lynch, Department of Biology, University of Arkansas at Little Rock, Little Rock, Ark. 72204.

IS CYCLIC 3'5' CYTIDINE MONOPHOSPHATE (cCMP) A NORMAL METABOLITE?

Joseph E. Stone, Department of Pharmacology, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

SCIENCE EDUCATION

Section Chairperson: Neal Buffaloe

A STUDY OF THE HIGH SCHOOL PHYSICS PROGRAM AND ENROLLMENTS IN THE STATE OF ARKANSAS.

Ralva Bass and Maurice Ayers, Department of Physics, University of Central Arkansas, Conway, Ark. 72032.

100 YEARS OF PHYSICS AT THE UNIVERSITY OF ARKANSAS.

Paul C. Sharrab, Department of Physics, University of Arkansas, Fayetteville, Ark. 72701.

APPLE COMPUTER PROGRAMS FOR PHYSICS AND ASTRONOMY EDUCATION.

Carl T. Rutledge, Department of Physics, Southern Arkansas University, Magnolia, Ark. 71753.

OF SIMPLE SUBSTANCES.

Billie G. Broach, Department of Chemistry, University of Arkansas at Little Rock, Little Rock, Ark. 72204.

POLYMERS AND MACROMOLECULES IN CHEMISTRY (AND BIOLOGY) PROGRAMS.

Robbin C. Anderson, Department of Chemistry, University of Arkansas, Fayetteville, Ark. 72701.

MODELS FOR THE STUDY OF CUBIC CRYSTALLOGRAPHIC POINT GROUPS.

A. F. Gremillion, Department of Chemistry, University of Arkansas at Little Rock, Little Rock, Ark. 72204.

OPERATION HEARTBEAT.

Dennis R. Glasgow, Thomas A. Bruce, John E. Pauly and Lawrence E. Scheving, Office of Science and Environmental Education, Little Rock Public School System; and Office of the Dean and Department of Anatomy, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

A SIMPLE CELL MODEL ANYONE CAN CONSTRUCT FOR A GENERAL BIOLOGY PRESENTATION.

Donald E. Culwell, Department of Biology, University of Central Arkansas, Conway, Ark. 72032.

SURVIVAL TECHNIQUES FOR FIELD PROGRAMS IN THE 80's.

James E. Edson, Department of Natural Sciences, University of Arkansas at Monticello, Monticello, Ark. 71655.

CROWLEY'S RIDGE BIOLOGICAL STATION—AN EDUCATION CENTER.

Jewel E. Moore, Department of Biology, University of Central Arkansas, Conway, Ark. 72032.

COMPUTER LITERACY IN SCIENCE EDUCATION.

N. Minx Olsen, NSF/CAUSE project, University of Arkansas at Monticello, Monticello, Ark. 71655.

A DISCUSSION OF A PERSONAL OPINION IN RELATIONSHIP TO SCIENCE VS RELIGION.

Joe Green, TRACE Corporation, North Little Rock, Ark. 72116.

BOTANY

Section Chairperson: Don Culwell

LICHENS OF ARKANSAS II. ADDITIONAL STATE RECORDS FROM COMPUTER SEARCH.

Jewel E. Moore, Department of Biology, University of Central Arkansas, Conway, Ark. 72032.

CHECKLIST OF ARKANSAS MOSSES.

Jewel E. Moore, Department of Biology, University of Central Arkansas, Conway, Ark. 72032 and Paul L. Redfearn, Jr., Department of Biology, Southwest Missouri State University, Springfield, Mo. 65801.

CHECKLIST OF ARKANSAS HORNWORTS AND LIVERWORTS.

Jewel E. Moore, Department of Biology, University of Central Arkansas, Conway, Ark. 72032 and Eugene B. Wittlake, Jr., Department of Biology, Arkansas State University, State University, Ark. 72467.

POLLEN STUDIES IN THE NOLANACEAE.

Johnnie L. Gentry, Jr., University of Arkansas Museum, Fayetteville, Ark. 72701.

THE FOREST VEGETATION OF HOT SPRINGS NATIONAL PARK, ARKANSAS.

Edward E. Dale, Jr. and Michael R. Watts, Department of Botany and Bacteriology, University of Arkansas, Fayetteville, Ark. 72701.

ORDINATION OF FOREST TYPES IN THE BLACK SWAMP.

J. Barton Fogleman and P. L. Raines, Department of Biological Sciences, Arkansas State University, State University, Ark. 72467.

CLASSIFICATION AND PROTECTION STATUS OF REMNANT NATURAL PLANT COMMUNITIES IN ARKANSAS.

William F. Pell, Arkansas Natural Heritage Commission, Little Rock, Ark. 72201.

NEW RECORDS AND UPDATES ON THE ARKANSAS FLORA.

Richard H. Davis, Arkansas Heritage Program, Little Rock, Ark. 72201.

VERTEBRATE ZOOLOGY

Section Chairperson: Maurice Kleve

WILDLIFE HABITAT IMPROVEMENT ON THE OUACHITA NATIONAL FOREST: AN UPDATE.

David A. Saugey, Ouachita National Forest, Hot Springs, Ark. 71901.

THE EFFECTS OF MICROHABITAT DISTRIBUTION ON PREY UTILIZATION OF SYMPATRIC POPULATIONS OF *PLETHODON GLUTINOSUS* AND *PLETHODON DORSALIS* IN NORTHWESTERN ARKANSAS.

James M. Britton, Department of Zoology, University of Arkansas, Fayetteville, Ark. 72701.

SUCCESS OF WILD-TRAPPED COMPARED TO CAPTIVITY-RAISED BIRDS IN RESTORING WILD TURKEY POPULATIONS TO NORTHWESTERN ARKANSAS.

Douglas James, L. Glen Fooks and John R. Preston, University of Arkansas, Fayetteville, Ark. 72701 and Southern Baptist College, Walnut Ridge, Ark. 72467 and Oklahoma City Zoo, Oklahoma 73111.

*IMMUNE RESPONSE OF THE COMMON GRACKLE TO FILARIAL INFECTION OF THE BRAIN WITH *CHANDLERELLA QUISCALI*.

Richard L. Hester, Roger G. Rank and Arthur A. Johnson, Department of Biology, Hendrix College, Conway, Ark. Department of Microbiology and Immunology, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

A CRITICAL HABITAT DETERMINATION FOR THE RED-COCKADED WOODPECKER IN ARKANSAS.

Fred L. Burnside and Douglas James, Arkansas Highway and Transportation Department, Little Rock, Ark. and University of Arkansas, Fayetteville, Ark. 72701.

*EFFECTS OF ETHANOL ON BRAIN ZINC CONCENTRATION IN THE RAT.

J. Russell, E. Riddell, R. E. Stull, College of Pharmacy, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

A NOTE ON THE INCIDENCE OF *DIROFILARIA IMMITIS* IN THE WILD CANIDAE OF NORTHEAST ARKANSAS.

Anthony W. King and Anna Marie Bohning, Department of Biological Sciences, Arkansas State University, State University, Ark. 72467.

ON TROPHIC ADAPTATIONS OF THE WILD CANID COMMUNITY OF NORTHEAST ARKANSAS.

Anthony W. King, Department of Biological Sciences, Arkansas State University, State University, Ark. 72467.

FOOD RESOURCE PARTITIONING IN A BAT COMMUNITY.

Ken N. Paige, Department of Biology, Arkansas State University, State University, Ark. 72467.

DISTRIBUTION OF THE RIVER OTTER (*LUTRA CANADENSIS*) IN ARKANSAS.

C. Renn Tumilson and Anthony W. King, Department of Biology, Arkansas State University, State University, Ark. 72467.

ANOMALIES OF BOBCAT SKULLS (*FELIS RUFUS*) IN ARKANSAS.

C. Renn Tumilson and V. Rick McDaniel, Department of Biology, Arkansas State University, State University, Ark. 72467.

A PROFILE OF SKUNK RABIES IN ARKANSAS: 1980.

Angy Yeager, Gary A. Heidt and Dale V. Ferguson, Department of Biology, University of Arkansas at Little Rock, Little Rock, Ark. 72204.

NOTES ON THE NESTING BEHAVIOR OF THE CHUCK-WILLS-WIDOW *CAPRIMULGUS CAROLINEUSIS*.

Ed Price and Earl L. Hanebrink, Department of Biological Sciences, Arkansas State University, State University, Ark. 72467.

CHEMISTRY II

Section Chairperson: Alex Nisbet

SIMPLE AMORPHOUS SALTS: SPECTR AND GLASS TRANSITION TEMPERATURES.

Keith Consani and J. Paul Devlin, Department of Chemistry, Oklahoma State University, Stillwater, Oklahoma 74078. Alex Ray, Henry Farrar III and Edmond W. Wilson, Jr., Department of Chemistry, Harding University, Searcy, Ark. 72143.

TUBE-FURNACE STUDIES OF THE VAPORIZATION REACTION OF K_2SO_4 .

Wade Martin Simpson and J. Edward Bennett, Department of Chemistry, Arkansas State University, State University, Ark. 72467.

KNUDSEN-MODE HIGH-TEMPERATURE THERMOGRAVIMETRIC ANALYSIS: VOLATILIZATION REACTION OF K_2SO_4 .

Wade Martin Simpson and J. Edward Bennett, Department of Chemistry, Arkansas State University, State University, Ark. 72467.

SYNTHESIS PROBLEMS ASSOCIATED WITH CYANOCHLOROCHROMATES.

David Jimerson and Richard Vanderpool, Department of Chemistry, Arkansas State University, State University, Ark. 72467.

SYNTHESIS OF (E)-1-ARYL-2-METHYL-3-ALKYL-2-PROPEN-1-ONES VIA ALLYLIC SULFOXIDE-SULFENATE ESTER REARRANGEMENTS.

T. E. Goodwin, D. G. Ratcliff, C. M. Crowder and N. K. Seitzinger, Department of Chemistry, Hendrix College, Conway, Ark. 72032.

ENZYME: A CBM-BASIC PROGRAM FOR SIMULATION OF ENZYME INHIBITION.

Tim Best, Department of Chemistry, Hendrix College, Conway, Ark. 72032.

THE REACTION OF ESTER ENOLATES WITH HEX-1-ENO-PYRAN-3-ULOSSES.

T. E. Goodwin, B. D. Curtner, J. F. Loomis, and D. G. Ratcliff, Department of Chemistry, Hendrix College, Conway, Ark. 72032.

THE REACTION OF PHENYLTHIO(ALKYL)CUPRATE REAGENTS WITH A HEX-1-ENOPYRAN-3-ULOSE.

T. E. Goodwin, C. M. Crowder and R. B. White, Department of Chemistry, Hendrix College, Conway, Ark. 72032.

PREPARATION OF AN AROMATIC SYNTHON FOR MAYTAN-SINOID SYNTHESIS.

T. E. Goodwin and L. A. Covey, Department of Chemistry, Hendrix College, Conway, Ark. 72032.

AN IMPROVED OXIDATION METHOD FOR THE SYNTHESIS OF 2,5- and 5,6-DIHALONICOTINIC ACIDS.

Frank L. Setliff and W. Reeves Huie, Department of Chemistry, University of Arkansas at Little Rock, Little Rock, Ark. 72204.

AQUATIC ENVIRONMENT

Section Chairperson: John K. Beadles

A NOTE ON THE FECUNDITY OF THE LEAST BROOK LAMPREY, *LAMPETRA AEPYPTERA* (ABBOTT), FROM NORTH-CENTRAL ARKANSAS.

Chris T. McAllister, Michael C. Wooten and Timothy L. King, North Texas State University, Denton, Tex. 76203. Arkansas State University, State University, Ark. 72467.

A PRELIMINARY REPORT ON THE FISHES OF THE UPPER SALINE RIVER IN POLK AND HOWARD COUNTIES, ARKANSAS.

Stephen A. Sewell, Arkansas State University, State University, Ark. 72467.

SEASONAL ABUNDANCE, MOVEMENT AND DIVERSITY OF FISHES IN AN OZARK STREAM.

Michael R. Dewey, University of Arkansas, Fayetteville, Ark. 72701.

RATION/DENSITY COMPARISONS WITH CAGED CHANNEL CATFISH.

Scott H. Newton and Walter R. Robison, University of Arkansas at Pine Bluff, Pine Bluff, Ark. 71601.

***WINTER FEEDING OF FINGERLING CHANNEL CATFISH IN CAGES.**

Darryl B. Burke and Walter R. Robinson, University of Arkansas at Pine Bluff, Pine Bluff, Ark. 71601.

THE AQUACULTURE INDUSTRY OF ARKANSAS IN 1980.

Donald H. Fiegel and Mike Freeze, Arkansas Game and Fish Commission, Little Rock, Ark.

MATURATION, SPAWNING PERIOD AND FECUNDITY OF THE WHITE CRAPPIE, *POMOXIS ANNULARIS* RAFINESQUE, IN BEAVER RESERVOIR, ARKANSAS.

Janet L. Thomas and Raj V. Kilambi, University of Arkansas, Fayetteville, Ark. 72701.

ECONOMICS OF RAINBOW TROUT PRODUCTION IN ARKANSAS.

Walter R. Robison and Scott H. Newton, University of Arkansas at Pine Bluff, Pine Bluff, Ark. 71601.

BIOLOGY OF THE STRIPED BASS, *MORONE SAXATILIS*, FROM BEAVER RESERVOIR, ARKANSAS.

Raj V. Kilambi and Alex Zdinak, University of Arkansas, Fayetteville, Ark. 72701.

DESCRIPTION OF THE NYMPH OF *GOMPHUS OZARKENSIS* WESTFALL (ODONATA: GOMPHIDAE).

George L. Harp, Arkansas State University, State University, Ark. 72467.

***WINTER FEEDING OF FINGERLING CHANNEL CATFISH.**

Scott H. Newton and Calvin J. Hoskins, University of Arkansas at Pine Bluff, Pine Bluff, Ark. 71601.

TEMPERATURE AND DISSOLVED OXYGEN PROFILES IN LAKE DARDANELLE, 1971-1980.

John D. Rickett, Department of Biology, University of Arkansas at Little Rock, Little Rock, Ark. 72204.

THE OBSERVED AQUATIC LIFE OF LAKE CUYABENO OF ECUADOR.

Michael F. Carter, Department of Biology, University of Central Arkansas, Conway, Ark. 72032.

BIOMEDICAL SCIENCES II

Section Chairpersons: Almen Barrons and Paul Morgan

***MOLECULAR CLONING OF CRICKET 5S RNA GENES IN *ESCHERICHIA COLI*.**

Helen Benes and M. Donald Cave, Department of Anatomy, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

***DEVELOPMENT OF A BILEVEL SCREENING PROCEDURE FOR POTENTIAL ANTI-TUMOR COMPOUNDS.**

David G. Ratcliff, Department of Biology, Hendrix College, Conway, Ark. 72032.

***THE EFFECTS OF GRADED EXERCISE ON SLEEP.**

Pedro Abad and E. A. Lucas, Department of Anatomy, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

***THE EFFECTS OF PURIFIED *SALMONELLA ENTERITIDIS* ENDOTOXIN ON THE IMMUNE RESPONSE OF BALB/C MICE.**

John B. Barnett and John Jutila, Department of Microbiology and Immunology, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205 and Department of Microbiology, Montana State University, Bozeman, Montana.

IDENTIFICATION OF AN ALPHA-ADRENERGIC BINDING SITE IN A TUMOR CELL LINE DERIVED FROM GOLDEN HAMSTER DUCTUS DEFERENS.

Lawrence E. Cornett and James S. Norris, Departments of Physiology-Biophysics and Medicine, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

NON-MEASLES HEMADSORPTION IN A CELL LINE PERSISTENTLY INFECTED WITH MEASLES VIRUS (BGM/MV).

Jay H. Menna and John D. May, Department of Microbiology and Immunology, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

CHROMOBIOLOGY AND ITS IMPORTANCE TO EXPERIMENTAL AND CLINICAL CHEMOTHERAPY.

Lawrence E. Scheving, John E. Pauly and Tien-Hu Tsai, Department of Anatomy, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

THE UTERUS AND FUNCTIONAL LIFE-SPAN OF THE CANINE CORPUS LUTEUM-PRELIMINARY REPORT.

Horace N. Marvin, Department of Anatomy, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

EFFECT OF NOCTURNAL ILLUMINATION OF SLEEP-WAKE (SW) PATTERNS OF THE CAT.

Edgar A. Lucas, Department of Anatomy, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205.

INHIBITION OF ETHIDIUM BROMIDE OF THE SYNTHESIS OF CIRCULAR DNA IN SPERMATOCYTES OF *RHYNCHOSCIARA HOLLAENDERI* LARVAE.

Clifton Orr, Department of Pharmacology, University of Arkansas for Medical Sciences, Little Rock, Ark. 72205 and John Papaconstantinou and Emilla M. Julku, The Biology Division, Oak Ridge National Laboratory, Oak Ridge, Tenn. 37830.

Jane Spradley
President

Reid Hardy
President-Elect

Dr. Arthur Johnson
Sponsor

MINUTES OF THE BUSINESS MEETING, 18 APRIL 1981

The meeting was brought to order at 11:00 A.M. The president-elect for the 1980-81 year, James Briggs, was not present, and would not be available to fulfill the presidency for the 1981-82 year.

A discussion was held by persons attending the meeting as to the function of the Collegiate Academy and what its future would be. Dr. Arthur Johnson announced that he has made a proposal to the Senior Academy that a committee from the AAS be appointed to investigate these matters during the 1981-82 year.

A new president, Reid Hardy from the University of Arkansas at Monticello, was elected. Brooks Gentry of Hendrix College was elected president-elect.

The meeting was adjourned at 11:30 A.M.

Respectfully Submitted,

Jane Spradley
President
Arkansas Collegiate Academy
1980-81

ABSTRACTS OF PAPERS PRESENTED BY COLLEGIATE ACADEMY MEMBERS

Editor's Note: Not included in the following abstracts is that of Darryl B. Burke, whose paper was accepted for publication and is presented elsewhere. Titles of papers presented by Collegiate Academy members are identified in the preceding Section Programs by *.

THE EFFECTS OF GRADED EXERCISE ON SLEEP.

Pedro Abad and E. A. Lucas, Dept. of Anatomy, University of Arkansas for Medical Sciences, Little Rock, AR 72205.

Restorative theories of sleep predict an increase in Slow Wave Sleep (SWS or Delta sleep) following exercise; however, several investigators have failed to find such an effect. We tested the effects of exercise on the sleep of eight healthy males between 22 and 27 years of age who had similar training backgrounds. They underwent all-night polysomnographic recordings for eight consecutive nights on a Grass 78 B polygraph at 15 mm/sec with simultaneous tape recordings. Each 20 seconds of record was scored blind for sleep stages according to the Rechtschaffen and Kales manual and evaluated by t-test statistics. There were three baseline, three exercise and two recovery nights. Each subject pedaled at a constant rate of 60 RPM at 50% of his pre-determined maximum work capacity on a bicycle ergometer in two 45 min periods between 1600 and 1745 hours. The results show that there are no significant differences between sleep measures including delta sleep when the three conditions are statistically compared. Comparisons restricted to the first half of the night also failed to reveal any significant differences; however, there was more stage 3, stage 4 and delta sleep for 6 of the 8 subjects in both half night and whole night comparisons. Although the amount of delta sleep may not be significantly increased, the relative amount of delta wave activity may be elevated following exercise. We are performing spectral analysis of each night's recording on magnetic tape to determine the relative power of low frequency activity.

MOLECULAR CLONING OF CRICKET 5S RNA GENES IN ESCHERICHIA COLI.

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The structure and expression of the 5S, 5.8S, 18S and 28S RNA genes are of considerable interest since their RNA transcripts are essential components of the ribosome. In the cricket, *Acheta domesticus*, the 18S and 28S rRNA genes are amplified during oogenesis and have been mapped by restriction endonucleases (RE). As a first step in a study of the 5S RNA genes of the cricket, molecular cloning techniques were applied to isolate these genes. Purified genomic DNA from cricket testes was digested with the RE Eco RI to obtain DNA fragments for cloning in the lambda (λ) bacteriophage, Charon 4. Recombinant phage DNA was generated by ligation of cricket DNA fragments to the long arms of Charon 4 DNA, packaged into viable phage particles and amplified by infection of *E. coli* strain CSH18. The resulting library of recombinant DNA molecules representing the cricket genome was screened by nucleic acid hybridization techniques to identify clones containing cricket 5S RNA genes. DNA from 8 such clones was purified, digested with Eco RI and analyzed by agarose gel electrophoresis and the Southern blotting procedure. Those Eco RI fragments shown to hybridize to ³²P-labeled 5S RNA (purified from *A. domesticus*) were inserted into the plasmid pBR322. Transformation of *E. coli* strain HB101 with the recombinant plasmids yielded clones which were screened for cricket 5S RNA genes by colony hybridization. Recombinant plasmid DNA containing cricket 5S RNA genes was resolated for subsequent RE mapping of the eukaryotic genes.

SYNTHESIS OF SOME METHYL ESTER DERIVATIVES OF POLYCYCLIC AROMATIC HYDROCARBONS.

Peter P. Fu, National Center for Toxicological Research, Jefferson, AR 72279 and Dominic T. C. Yang and Tim Blair, Dept. of Chemistry, UALR, Little Rock, AR 72204.

Introduction of methyl groups to polycyclic aromatic hydrocarbons sometimes can change profoundly the biological activity of the molecule, either enhance or eliminate its carcinogenic potential. Enzymatic oxidation of the side chain to carboxyl derivative leads to one of the known PAHs metabolites.

Reaction of some polycyclic aromatic hydrocarbons with oxalyl chloride, followed by methanolysis will be discussed.

IMMUNE RESPONSE OF THE COMMON CRACKLE TO FILARIAL INFECTION OF THE BRAIN WITH *CHANDLERELLA* *QUISCALI*.

Richard L. Hester, Roger G. Rank, and Arthur A. Johnson, Dept. of Biology, Hendrix College, Conway, Ark. 72032, Dept. of Microbiology and Immunology, University of Arkansas for Medical Sciences, Little Rock, Ark. 72204.

Adult *Chandlerella quiscali* were collected from the cerebral surface of common grackles (*Quiscalus quiscula*) and homogenized in phosphate buffered saline. Rabbits were injected intramuscularly (IM) with 4.5 mgs of the worm antigen (WA) in Freund's complete adjuvant and boosted IM with 1 mg 14 days later. The resultant antiserum (anti-WA) produced 3 precipitin bands when reacted with WA by immunodiffusion techniques. Sera were collected from infected grackles and of 24 sera tested against WA all were positive for circulating antibody. All grackle sera showed at least one line of partial identity with the anti-WA when both were tested against WA. Five of the grackle sera demonstrated two distinct lines, both showing identity with a single line formed by WA and anti-WA. These data demonstrate that grackles produce antibody against at least one and in some cases two *Chandlerella* antigens. The source of these antigens remains to be determined but it is interesting to note that both adults and microfilariae survive in the presence of specific antibody.

The following paper was a co-winner of the outstanding collegiate award.

SYNTHESIS OF N-CYCLOBUTYLMETHYL ANALOGS OF METHADONE, METHADOL, AND ACETYLMETHADOL.

Danny L. Lattin and Mike Kowalsky, Department of Biopharmaceutical Sciences, College of Pharmacy, University of Arkansas for Medical Sciences and Department of Chemistry, University of Arkansas at Little Rock, Little Rock, Arkansas.

The N-cyclobutylmethyl analogs of (+)-N-normethadone, (-)- α -normethadol, and (-)- α -acetyl-N-normethadol have been synthesized. This synthesis is part of an effort to determine the structural and stereochemical requirements for opiate antagonist activity of the methadone series (methadone, methadol, acetylmethadol) of opiate analgesics. The synthesis of the title compounds and the implications of these compounds to the study of opiate antagonists will be discussed.

This research was supported by the 1980 Undergraduate Research Participation program of the National Science Foundation, Grant No. NSF SPI-7926630.

THE SYNTHESIS OF A SERIES OF METHYL 2,5- AND 5,6-DIHALONICOTINATES.

W. Reeves Huie and Frank L. Setliff, Department of Chemistry, University of Arkansas at Little Rock, Little Rock, AR 72204.

The preparation of the methyl esters of various 2,5- and 5,6- dihalonic acids by the diazomethane procedure is discussed. Spectral properties of the esters are also presented, along with a brief description of the synthetic schemes for the preparation of the dihaloacids.

DEVELOPMENT OF A BILEVEL SCREENING PROCEDURE FOR POTENTIAL ANTI-TUMOR COMPOUNDS.

David G. Ratcliff, Dept. of Biology, Hendrix College, Conway, AR 72032.

In connection with ongoing organic synthesis research at Hendrix, a two level screen is presently being developed to investigate the cytotoxic activity of synthetic compounds. An initial *in vitro* study is described in which tubulin polymerization inhibition properties of the subject compound are assayed. A second *in vivo* screen is performed utilizing the Erlich ascites tumor system injected interperitoneally in mice. Suppressed tumor growth, increased survival time of the host, and stathmokinetic properties of the compound in question are investigated.

SYNTHESIS OF ENKEPHALIN-LIKE PEPTIDES WITH NARCOTIC ANTAGONIST ACTIVITY

Danny P. Reese, Department of Chemistry, University of Central, Arkansas, Conway, Arkansas 72032 and Lisa D. Fox and A. Nelson Voldeng, Department of Biopharmaceutical Sciences, University of Arkansas for Medical Sciences, Little Rock, Arkansas 72205.

Enkephalins are endogenous peptides composed of five amino acids (Met¹-enkephalin = try-gly-gly-phe-met) and have been shown to elicit brief, but remarkable opiate-like activity when tested in laboratory animals. Synthetic modifications of the enkephalins have yielded compounds which produce significant analgesia in mice or rats when administered parenterally or orally. Unfortunately these derivatives appear to possess the addiction liability common with potent analgesics. Discussion will include rationale for the synthesis of specific enkephalin derivatives whose conformation more closely conforms to the rigid structure of morphine, will be longer acting than the endogenous enkephalins, will be effective when administered orally, and will possess significant analgesic activity. In an effort to prevent the physical dependence associated with the enkephalins, organic

moietics which possess narcotic antagonist activity will be attached to specific sites in these peptides. Synthetic approaches to these peptides will also be presented.

This research was supported by the 1980 Undergraduate Research Participation program of the National Science Foundation, Grant No. NSF SPI-7926630.

EFFECTS OF ETHANOL ON BRAIN ZINC CONCENTRATION IN THE RAT.

J. Russell, E. Riddell, R. E. Stull, College of Pharmacy, University of Arkansas for Medical Sciences, Little Rock, Arkansas 72205.

Zinc concentrations were significantly diminished in select areas of the brains from rats fed a liquid diet obtained from Bio-Serv, Inc. which supplied approximately 35% of the caloric requirement as ethanol. Following various time periods of exposure to the diet, animals were sacrificed and brains quickly removed. Pair-fed animals which received an isocaloric diet served as controls. The brains were sectioned into cortex, upper and lower brain stem, hippocampus, and olfactory lobes. Atomic absorption spectroscopy revealed that zinc levels were significantly reduced within the hippocampus ten days following ethanol, within normal limits at 15 days and again reduced 28 days post ethanol. Zinc was likewise diminished in content in the upper brain stem section at 28 days. The concentration of zinc was not significantly altered in any of the other brain sections analyzed at time periods tested, nor were zinc levels diminished in plasma or livers taken from these animals.

This study was supported in part by a grant from the Distilled Spirits Council of the United States, Inc.

PROCAINEAMIDE HYDROCHLORIDE: COLORIMETRIC DETERMINATION OF THE COPPER (II) COMPLEX.

James E. Whitaker and Arthur M. Hoyt, Jr., Dept. of Chemistry, University of Central Arkansas, Conway, Arkansas 72032.

Procaineamide·HCl was complexed with copper (II), producing a new absorption centered at 380 m μ . The complex was found to be 1:1 procaineamide·HCl:Cu²⁺. Complex formation was maximized at pH 4.0-4.3. Acetate buffers produced the best results, but coordination was maintained even in biphthalate buffer although the reaction was damped by approximately 50%. Complex formation was shown to be linear with respect to the initial procaineamide·HCl concentration at drug concentrations less than 8 mg/ml. Preliminary work indicates possible applications of this reaction in the analysis of commercial preparations of the drug.

DETERMINATION OF STREPTOMYCIN BY GAS-LIQUID CHROMATOGRAPHY USING A MALTOL DERIVATIVE.

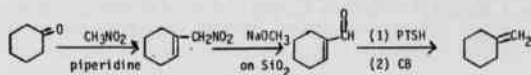
Mark W. Woods and Arthur Hoyt, Jr., Department of Chemistry, University of Central Arkansas, Conway, Arkansas 72032.

Current analytical methods for streptomycin range from biological assays using inhibition of bacterial growth to colorimetric methods. Current methods lack speed or specificity and some are only semi-quantitative. In this study gas-liquid chromatography of a streptomycin derivative was performed using a 10% SE30 packing on a support of 80/100 mesh Chromosorb W. The streptomycin was reacted with 1 N NaOH at 100°C to give maltol as one of the products. This basic solution was acidified and the maltol was extracted with chloroform. The maltol was derivatized with N-Methyl-N-TMS-Trifluoroacetamide. The derivatization was found to be quantitative as was the extraction of the maltol. A rate study was performed on the derivatization along with studies of temperature dependence, reagent dependence, and solvent dependence. Preliminary results show that streptomycin can be quantitatively analyzed over a wide range of concentrations and is independent of the purity of the sample.

PREPARATION OF AKYLIDENECYCLOALKANE.

Dominic T. C. Yang, Ray Emmitt, and Jim Purser, Dept. of Chemistry, UALR, Little Rock, AR 72204.

Classically the Wittig reaction has been well established as the method for the preparation of exocyclic double bonds. We wish to report an alternative method of preparing methylenecyclohexane via the reduction of 1-cyclohexene carboxylaldehyde. The following scheme is representative:



The following paper was a co-winner of the outstanding collegiate award.

PURIFICATION AND PARTIAL CHARACTERIZATION OF CALMODULIN FROM THE MYXOMYCETE *PHYSARUM FLAVICOMUM*.

Lou Ann Young and Thomas J. Lynch, Dept. of Biology, University of Arkansas at Little Rock, Little Rock, AR 72204.

Calmodulin, an important cellular regulatory protein, has been identified in the plasmodium of the myxomycete *Physarum flavicomum*. Calmodulin was purified by affinity chromatography techniques using the antipsychotic drug fluphenazine as the binding ligand with Sepharose 4B as the matrix. Calmodulin binds to fluphenazine in the presence of calcium and is preferentially released upon the addition of the calcium chelator ethyleneglycol-bis (B-aminoethyl)-N,N-tetraacetic acid (EGTA). Myxomycete calmodulin appears to be similar to calmodulins isolated from higher organisms. These include its response to calcium, lack of species specificity, and molecular weight as determined by polyacrylamide gel electrophoresis.