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61st Annual Meeting, 1977. Program

Academy Editors

PROGRAM
Arkansas Academy of Science

Sixty-First Annual Meeting

ARKANSAS TECH UNIVERSITY
Russellville, Arkansas

Meeting concurrently with sessions of:

The Collegiate Academy of Science
The Junior Academy of Science
Arkansas State Science Fair

Friday, 1 April

SENIOR, COLLEGIATE, JUNIOR ACADEMIES -- Registration

SENIOR ACADEMY -- Executive Board Meeting

COLLEGIATE BUSINESS MEETING I

SENIOR ACADEMY -- First General Business Meeting

JUNIOR ACADEMY -- Westinghouse Talent Search Paper Presentations

Lunch

SENIOR, COLLEGIATE, JUNIOR ACADEMIES -- Registration

SENIOR, COLLEGIATE ACADEMIES -- Papers [Concurrent Sessions]:

- Chemistry
- Mathematics and Physics
- Zoology I
- Environmental Science and Engineering
- Geology
- Anthropology
- Science Education
- Agriculture and Forestry

JUNIOR ACADEMY -- Papers [Biological and Physical Sciences, Concurrent Sessions]

JUNIOR ACADEMY -- Executive Meeting

SENIOR, COLLEGIATE, JUNIOR ACADEMIES -- Banquet

Saturday, 2 April

SENIOR, COLLEGIATE, JUNIOR ACADEMIES -- Registration

SENIOR, COLLEGIATE ACADEMIES -- Papers [Concurrent Sessions]:

- Zoology II
- Botany
- Environmental Science and Engineering II

JUNIOR ACADEMY -- Business Meeting

JUNIOR ACADEMY -- Awards Presentation

SENIOR, COLLEGIATE ACADEMIES -- Second General Business Meeting

SECTION PROGRAMS

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

CHEMISTRY SECTION
Chairman: Alex R. Nisbet

DETERMINATION OF THORIUM IN ENVIRONMENTAL WATER.
Jackson O. Lay, Jr., University of Arkansas at Little Rock

OXIDATION OF CLEAVAGE-PRONE SECONDARY ALCOHOLS TO KETONES IN HIGH YIELDS WITH PYRIDINIUM CHLOROCHROMATE.
Paul M. Nave, Arkansas State University

SELECTIVE REDUCTIONS WITH CATECHOLBORANE.
Dominic T.C. Yang and George W. Kabalka, University of Arkansas at Little Rock and the University of Tennessee

MATHEMATICS AND PHYSICS SECTION
Chairman: J.E. Mackey

*IRON AND MANGANESE INTERFERENCE IN THE DETERMINATION OF TOTAL PHOSPHORUS IN NATURAL WATER SYSTEMS.
Pat Bolding, Ouachita Baptist University

*A COMPUTER PROGRAM FOR THE RAPID ANALYSIS OF THE BEHR FREE-FALL LABORATORY EXPERIMENT.
Mike Chalenburg, Harding College

*POSSIBLE CAUSALITY VIOLATIONS IN DENSE MATTER.
Christopher Godfrey, University of Central Arkansas

ZOOLOGY I SECTION
Chairman: Mike Plummer

*IMMUNIZATION OF RATS AGAINST *MESOCESTOIDES CORTI* (CESTODA) BY SUBCUTANEOUS VACCINATION OF LIVING TETRATHYRIDIA.
Jerry Y. Niederkorn, University of Arkansas at Fayetteville

*HELMINTHES OF THE COMMON GRACKLE, *QUISCALUS QUISCULA*, IN FAULKNER COUNTY, ARKANSAS.
Jana Farris, Max Fleming, and Keith Smith, Hendrix College

A COMPARISON OF *ASCARIUS SUUM* LARVAL ENZYMES IN EGG FLUID AND HATCHING FLUID.
Lawrence W. Hinck, Arkansas State University

A CONTINUATION OF SPIDER RESEARCH IN ARKANSAS: OUACHITA MOUNTAIN AREA.
Peggy Rae Dorris and Fred L. Burnside, Jr., Henderson State University

CHECKLIST OF THE SPHINX MOTHS OF ARKANSAS.
Leo J. Paulissen, University of Arkansas at Fayetteville

ATTRACTION OF AERIAL INSECTS AS A FISH FOOD SUPPLEMENT.
Andrew J. Merkowsky, Ambus J. Handcock, and Scott H. Newton, University of Arkansas at Pine Bluff

CAVE FAUNA OF ARKANSAS - VERTEBRATE TAXA.
James E. Gardner and V. Rick McDaniel, Arkansas State University

*A SPECIES STUDY OF RAVINE FLORA IN INDEPENDENCE COUNTY, ARKANSAS.
Beth Haizlip, Arkansas College

ASPECTS OF THE REPRODUCTIVE BIOLOGY OF THE GRAY BAT, *MYOTIS GRISESCENS*, IN NORTH-CENTRAL ARKANSAS.
David A. Saugey, Arkansas State University

A SYSTEMATIC ANALYSIS OF THE PRAIRIE VOLE, *MICROTUS OCHROGASTER*, IN ARKANSAS.
James A. Huggins and V. Rick McDaniel, Arkansas State University

UTILIZATION OF NEST BOXES BY THE SOUTHERN FLYING SQUIRREL, *GLAUCOMYS VOLANS*, IN CENTRAL ARKANSAS.
Gary A. Heidt, University of Arkansas at Little Rock

THE RECENT WILD MAMMALS OF CROSS COUNTY, ARKANSAS.
Keith B. Sutton and V. Rick McDaniel, Arkansas State University

OXYGEN TOXICITY IN THE MAMMALIAN LIVER.
Dennis A. Baeyens, University of Arkansas at Little Rock

NATURAL AREAS PRESERVATION IN ARKANSAS.
Mina Austin Marsh, Arkansas Natural Heritage Commission

*THE EFFECTS OF 2,4,5 - TRICHLOROPHENOXYL ACETIC ACID ON SWISS-WEBSTER MICE.
Gerald S. Greer, University of Arkansas at Fayetteville

*STIMULATION OF THE [Na+ AND K+] ATP-ASE BY ATP.
Dan Hawkins, Hendrix College

ENVIRONMENTAL SCIENCE AND ENGINEERING SCIENCES I
Chairman: John K. Beadles

THE CONCENTRATIONS OF RADIONUCLIDES IN DARDANELLE.
D.M. Chittenden II and Larry McFadden, Arkansas State University

EVALUATIONS OF PLANTING FOR WILDLIFE ON A POWER LINE RIGHT OF WAY.
Robert Pierce and Robert T. Kirkwood, Cooperative Extension Service and University of Central Arkansas

BIOLOGICAL ASPECTS OF *ASELLUS ANTRICOLUS* (CREASER) (ISOPODA:ASELLIDAE) IN AN OZARK CAVE STREAM.
Kenneth L. Smith and George L. Harp, Arkansas State University

THE DRAGONFLIES (ANISOPTERA) OF ARKANSAS.
George L. Harp and John Rickett, Arkansas State University and the University of Arkansas at Little Rock

ALGAL ASSEMBLAGE DISTRIBUTION AS RELATED TO SEASONAL FLUCTUATIONS OF SELECTED METAL CONCENTRATIONS.
Ramona G. Rice and Richard L. Meyer, University of Arkansas at Fayetteville

PRINCIPLE COMPONENT ANALYSIS AS A MECHANISM FOR PHYTOPLANKTON ASSEMBLAGE RECOGNITION.
Wayne Poppe, University of Arkansas at Fayetteville

GEOLOGY SECTION
Co-Chairmen: Dick Cohoon and Norman Williams

DEVONIAN-LOWER MISSISSIPPIAN SANDSTONE LITHOSTRATIGRAPHY, NORTHERN ARKANSAS.
Jeffrey D. Hall and Walter L. Manger, University of Arkansas at Fayetteville

DEVONIAN-MISSISSIPPIAN BOUNDARY, BATESVILLE DISTRICT, NORTH EAST ARKANSAS.
Steven H. Terry and Deborah E. Coogan, University of Arkansas at Fayetteville

DEPOSITIONAL PATTERNS IN THE LOWER ATOKA FORMATION, WASHINGTON AND CRAWFORD COUNTIES, ARKANSAS.
John Gary Chapman, James P. Thornton, and Doy L. Zachry, University of Arkansas at Fayetteville

GEOLOGIC MAPPING FROM AERIAL PHOTOGRAPHY IN THE BOSTON MOUNTAINS, NORTHWEST ARKANSAS.
Mikel R. Shinn, University of Arkansas at Fayetteville

SIGNIFICANCE OF MAJOR NORTHEAST TRENDING LINEAMANTS OF LANDSAT IMAGERY OF NORTHWESTERN ARKANSAS.
David A. Smith, University of Arkansas at Fayetteville

THE CHEMICAL COMPOSITION OF CARBONATES IN CONWAY AND PERRY COUNTIES OF ARKANSAS.
George H. Wagner and Kenneth F. Steele, University of Arkansas at Fayetteville

WEATHERING OF LAMPROPHYRIC ROCK, CENTRAL ARKANSAS.
Kenneth F. Steele and Edward C. Robison, University of Arkansas at Fayetteville

HISTORY AND ANALYSIS OF THE FAYETTEVILLE METEORITE.
Timothy C. Creasy, University of Arkansas at Fayetteville

*SOIL THICKNESS IN THE RUSSELLVILLE, ARKANSAS AREA.
Bill Cains, Arkansas Tech University

*A STUDY OF THE DARE KNOB LANPROPHYRIC DIKE OF NORTHERN POPE COUNTY, ARKANSAS.
Stephen E. Laney, Arkansas Tech University

*MARE BASALTS IN SINOUS AESTUUM AND SINOUS MEDII.
Johnnie B. Sharp, University of Arkansas at Monticello

ANTHROPOLOGY SECTION
Chairman: Timothy C. Klinger

VIRGINITY AND EXOGAMY: MARRIAGE PATTERNS IN A MEXICAN PEASANT COMMUNITY.
Judith M. Brueske, University of Arkansas at Fayetteville

CURRENT AND POSSIBLE FUTURE APPLICATIONS OF AEROSPACE REMOTE SENSING IN CONTRACT ARCHEOLOGY: TECHNIQUES AND APPLICATIONS.
Roy J. Cochran, University of Arkansas at Fayetteville

AN EFFIGY CATLINITE PIPE FROM NORTHWEST ARKANSAS.
Michael P. Hoffman, University of Arkansas at Fayetteville

THE SOCIAL IDENTITY OF THE CHRONIC SCHIZOPHRENIC.
Paul C. Hooks and George Surman, University of Arkansas at Little Rock and University of California-Riverside

A LITHIC CACHE WORKSHOP IN THE OUACHITA MOUNTAINS: A POSSIBLE INTERPRETATION.
Mark A. Mathis, University of Arkansas at Fayetteville

FURTHER INSIGHTS INTO THE USE OF FRESHWATER MUSSEL SHELLS AS INDICATORS OF SEASONAL OCCUPATION OF PREHISTORIC SITES: A PROGRESS REPORT.
Robert H. Ray, University of Arkansas at Fayetteville

A PROGRESS REPORT ON THE COMPARATIVE FRESHWATER MOLLUSC COLLECTION AT THE ASU-STATION, ARKANSAS ARCHEOLOGICAL SURVEY.
Richard R. Rockwell, Arkansas State University

THE CUT LINE TECHNIQUE IN CERAMIC DECORATION: A CRITIQUE.
James A. Scholtz, University of Arkansas at Fayetteville

THE APPLICATION OF STATISTICAL TECHNIQUES TO DELINEATE DIFFERENTIAL DISTRIBUTIONS OF ARTIFACTS ON THE TOLTEC SITE.
Alan L. Stanfill, University of Arkansas at Fayetteville

SCIENCE EDUCATION SECTION
Chairman: Neal D. Buffaloe

THE USE OF CAI IN TEACHING BIOLOGY: A PRELIMINARY REPORT.
Robert T. Kirkwood, University of Central Arkansas

AN INTRODUCTION TO WINE TECHNOLOGY.
Cameron Jones and Dominic T.C. Yang, University of Arkansas at Little Rock

*THE EFFECTS OF LOWERED COMPETENCE IN CREATING ALLIANCES AS DEMONSTRATED IN ALTRUISTIC BEHAVIOR.
John Kendall Cameron and Roxanne Partain, Harding College

*THE EFFECTS OF GAIN AND LOSS OF ESTEEM ON INTERPERSONAL ATTRACTIONS.
Richard W. Emerson and Lee Anne Pate, Harding College

AGRICULTURE AND FORESTRY SECTION
Chairman: Gerald P. Hutchinson

EVALUATION OF A CEMENT PLANT KILN FLUE DUST AS A POTASSIUM FERTILIZER.
F.L. Haynes and Lyell Thompson, Arkansas Agricultural Experiment Station - Fayetteville

FOREST COMMUNITIES OF CROWLEY'S RIDGE.
G. Thomas Clark, Hendrix College

ZOOLOGY II SECTION
Co-chairmen: Gary A. Heidt and Phyllis J. Garnett

*TIME COURSE OF PR OF UV-INDUCED CHROMOSOMAL ABERRATIONS AND LETHAL DAMAGE IN G1 *XENOPUS* CELLS.
Jan Payne and Gaston Griggs, John Brown University

NAD NUCLEOSIDASE OF *AGKISTRODON BILINEATUS* VENOM.
E.M. Brunson, B.D. Johnson, and D.H. Stifford, Arkansas State University

EFFECTS OF INSULIN AND ADDED GLUCOSE OR GLUCONATE ON THE INCORPORATION OF PYRUVATE-3-14, INTO RAT UTERINE LIPIDS.
John S. Terkeurst and Jullie W. Harris, Arkansas State University

EFFECTS OF PARATHYROID HORMONE ON GASTRIC MUCUS TRANSPORT OF IONS.
Claudia McRaven and Jerry R. Hersey, Arkansas State University

EFFECT OF HYPOGLYCEMIA ON ION TRANSPORT OF GASTRIC MUCUS.
Nathan Bennett and Jerry Hersey, Arkansas State University

COMPARATIVE TONGUE HISTOLOGY AND SCANNING ELECTRON MICROSCOPY OF THE DIAMONDBACK WATER SNAKE (*NATRIX RHOMBIFERA*) AND BLACK RAT SNAKE (*ELAPHE OBSOLETA*).
Leland F. Morgans and Gary A. Heidt, University of Arkansas at Little Rock

ROLE OF OLFACTION IN 'TASTE-AVERSION' TO PTC IN MICE.
Richard C. Lewis, University of Arkansas at Little Rock

METABOLIC COMPENSATION TO TEMPERATURE IN THE SALAMANDERS *EURYCEA MULTIPLICATA GRISEOGASTER* AND *PLETHODON DORSALIS ANGUSTICLAVIUS*.
Arthur V. Brown, University of Arkansas at Fayetteville

EPIDERMAL RIDGE FORMATION DURING LIMB REGENERATION IN THE ADULT SALAMANGER, *AMBYSTOMA ANNULATUM*.
Henry E. Young, University of Arkansas at Fayetteville

ANOMALIES OF LIMB REGENERATION IN THE ADULT SALAMANDER, *AMBYSTOMA ANNULATUM*.
Henry E. Young, University of Arkansas at Fayetteville

*METAL COMPLEXES OF PROTO-PORPHYRIN 9.
Christine Curiel, Hendrix College

*THE ROLE OF LYSINE IN ENZYMATIC DIGESTION OF FIBRINOGEN.
Claudia J. Brailey, Hendrix College

FEATURES OF THE UPTAKE OF YOLK IN TELEOST EMBRYOS.
Claudia F. Bailey, University of Arkansas at Fayetteville

F.L. HARVEY, EARLY ARKANSAS NATURALIST.
Gary Tucker, Arkansas Tech University

BOTANY SECTION
Chairman: Joe H. Whitesell

BIOPRODUCTION, IDENTIFICATION, AND TOXICITY STUDY OF BREVIANAMIDE A.
Dale V. Ferguson and Dominic T.C. Yang, University of Arkansas at Little Rock

THE FRESHWATER ALGAE OF ARKANSAS: III RECENT ADDITIONS.
R.L. Meyer, M.A. McNutt, R.G. Rice, W.L. Poppe, L.L. Rippey, R.A. Anderson, N.J. Woomer, and L.H. Clark, University of Arkansas at Fayetteville

ULTRASTRUCTURAL ONTOGENY OF SPORANGIA IN *POLYPODIUM AUREUM* VAR. *UNDULATUM*: INITIAL SCANNING ELECTRON MICROSCOPICAL OBSERVATIONS.
David Williams and William R. Bowen, University of Arkansas at Little Rock

OCCURRENCE AND DISTRIBUTION OF PTERIDOPHYTES IN ARKANSAS.
Carl W. Taylor and Delzie Demaree, Milwaukee Public Museum and Hot Springs, Arkansas

NOTES OF THE ARKANSAS SAXIFRIGACEAE.
Edwin B. Smith, University of Arkansas at Fayetteville

A STATISTICAL ANALYSIS OF PHYSICAL NICHES OF SELECTED ORGANISMS IN NORTH CADRON CREEK, ARKANSAS.
Richard Hayes and Robert Kirkwood, University of Central Arkansas

CHECKLIST OF VASCULAR PLANTS OF JEFFERSON COUNTY, ARKANSAS.
Marie P. Locke, Pine Bluff, Arkansas

THE DISTRIBUTION OF CANE, *ARUNDINARIA GIGANTEA* (POACEAE: BAMBUSOIDEAE).
Daniel L. Marsh, Henderson State University

REMNANT PRAIRIE PLOTS OF BENTON COUNTY, ARKANSAS.
Maxine B. Clark, Fayetteville, Arkansas

DEVIL'S KNOB: AN UNUSUAL CEDAR GLADE.
Richard Davis, University of Arkansas at Fayetteville

COMPARATIVE STUDIES OF THE WITCH HAZELS, *HAMAMELIS VIRGINIANA* AND *H. VERNALIS* IN SOUTHWESTERN ARKANSAS.
Jack Bradford and Daniel Marsh, Henderson State University

THE USE OF LOW-ALTITUDE AIR PHOTOGRAPHY FOR DELINEATION OF PRINCIPAL FOREST TYPES IN ARKANSAS.
Edward E. Dale, Jr., University of Arkansas at Fayetteville

USING AMATEUR PLANT COLLECTORS TO ADD HERBARIUM COLLECTIONS.
Mrs. Jim Miller, Pine Bluff, Arkansas

ENVIRONMENTAL SCIENCE AND ENGINEERING SCIENCES II
Chairman: John K. Beadles

DISTRIBUTION, HABITAT NOTES, AND STATUS OF THE IRONCOLOR SHINER, *NOTROPIS CHALYBAEUS* (COPE), IN ARKANSAS.
Henry W. Robison, Southern Arkansas University

GROWTH, MORTALITY, FOOD HABITS, AND FECUNDITY OF THE BUFFALO RIVER SMALLMOUTH BASS.
Raj V. Kilambi, Walter R. Robison, and James C. Adams, University of Arkansas at Fayetteville

MOSQUITOFISH (*GAMBUSIA AFFINIS*) PRODUCTION IN EXTENSIVE POLYCULTURE SYSTEMS.
Scott H. Newton, Andrew J. Merkowsky, Ambus J. Handcock, and Max V. Meisch, University of Arkansas at Pine Bluff and University of Arkansas at Fayetteville

THE FISHES OF CROWLEY'S RIDGE IN ARKANSAS.
Robert F. Fulmer and George L. Harp, Arkansas State University

ADDENDUM TO: FISHES OF FOURCHE RIVER IN NORTH-CENTRAL ARKANSAS.
Steve M. Bounds, Arkansas State University

FISHES OF THE ELEVEN POINT RIVER SYSTEM WITHIN ARKANSAS.
Billy M. Johnson and John K. Beadles, Arkansas State University

FISHES OF SYLAMORE CREEK.
George C. Frazier and John K. Beadles, Arkansas State University

FISHES OF RANDOLPH COUNTY, ARKANSAS.
Steve M. Bounds, Billy M. Johnson, and John K. Beadles, Arkansas State University

Arkansas Collegiate Academy of Science

Phillip Goad	Susan Brady	Jim Hill
President	Secretary	Treasurer

Sponsor: Dr. Edmond W. Wilson
Co-Sponsor: Mr. Joe Guenter

MINUTES OF THE FIRST BUSINESS MEETING, 1 APRIL 1977

The first business meeting of the Arkansas Collegiate Academy of Science was called to order by the presiding president, Phillip Goad.

The following officers were elected for 1977-78.

President	- William H. Casson, UAM
President-Elect	- Rick Brown, Ouachita Baptist University
Secretary	- Bettina Casson, UAM
Treasurer	- Teri Garner, Ouachita Baptist University
Sponsor	- Mr. Joe Guenter, UAM
Co-Sponsor	- Dr. Glen Good, Ouachita Baptist University

At this meeting we had as our guest speaker, Dr. Ed Lazear from the National Center for Toxicological Research. He described the facilities and functions of the Toxocological Center.

The meeting was adjourned by the presiding president

MINUTES OF THE SECOND BUSINESS MEETING, 2 APRIL 1977

The second business meeting of the Arkansas Collegiate Academy of Science was called to order by the presiding president, Phillip Goad. The secretary was unable to attend this meeting and the minutes were not approved. The financial report was submitted by Jim Hill. The Collegiate Academy's account contained $58.90. It was decided that Mr. Guenter should request $175 from the Senior Academy.

The new president, William H. Casson, took charge and a discussion of the previous day's activities followed. It was suggested that the Collegiate Academy have only one business meeting to be held at 1:00 P.M. on the day of the beginning of the paper presentations. Also suggested was to again have a guest speaker at the business meeting next year. There was also a discussion on the planning of activities for the next Collegiate Academy meeting.

The names of the winners for the paper presentations were announced at this meeting. In the Physical Science Section, the first place certificate was awarded to John B. Sharp. The second and third place certificates were awarded to Christopher Godfrey and Pat Bolding, respectively. In the Biological Science Section, the first place certificate was awarded to Gerald S. Greer. The second place certificate was awarded to Dan J. Hawkins. The meeting was adjourned by the new president.

Respectfully submitted,

Bettina Casson
Secretary

ABSTRACTS OF PAPERS PRESENTED BY COLLEGIATE ACADEMY MEMBERS

Editor's Note: The following abstracts include those provided to the Editor by the president of the Collegiate Academy. Not included are the abstracts of papers presented by Gerald S. Greer, Jan Payne, and Johnnie Sharp, whose papers were accepted for publication and are presented elsewhere. Titles of papers presented by Collegiate Academy members are identified in the preceding Section Programs by *.

THE ROLE OF LYSINE IN THE ENZYMATIC DIGESTION OF FIBRINOGEN.

Claudia J. Brailey, Hendrix College

Previous studies have demonstrated that during tryptic digestion, cleavage at lysine residues is not necessary for fibrinogen to become nonclottable. This has been examined further by studying the differences in rates of enzymatic digestion of fibrinogen and fibrinogen which has had the lysine residues blocked by ethyl acetimidate.

The digestion rate with trypsin is the same for modified and nonmodified fibrinogen during the initial period of digestion within which trypsin renders fibrinogen nonclottable. Since trypsin can attack either lysine or arginine, these data indicate that trypsin has a preference for arginine during the initial digestion. After this initial period there is a difference in the digestion rates. Preliminary experiments utilizing polyacrylamide gels indicate that the fragmentation patterns of modified and nonmodified fibrinogen are indistinguishable.

Plasmin is the natural fibrinolytic enzyme. It's role is to digest and thereby to solublize fibrin clots *in vivo*. Like trypsin, it can cleave at either arginine or lysine. Contrary to what was observed with tryptic digestion the initial rate of plasmic digestion is five times greater for nonmodified fibrinogen than for modified fibrinogen. Thus plasma has a different specificity than trypsin and seems to prefer lysin to arginine. The preference of plasmin for lysine may be part of a mechanism to insure that plasmin does not clot fibrinogen *in vivo*.

SOIL THICKNESS IN THE RUSSELLVILLE, ARKANSAS AREA.

Bill Cains, Arkansas Tech University

Soil thickness in the Russellville, Arkansas area is directly related to topographic slope, geologic structure, and stream drainage patterns. The slope of the ground surface is the most significant factor controlling soil type, each soil having a characteristic range of thickness. Basically, two soil series are present in this area, the Linker and the Mountainburg.

A seismic timer was used to indirectly measure soil thickness at various locations. The use of the timer involved recording the time it takes a seismic wave to travel from the hammer impact point to the geophone. When the wave encounters bedrock, a significantly shorter travel-time results. The calculated values for thickness were plotted on a 7½ minute topographic quadrangle base map and contoured into a soil isopach map. The map shows the pattern of soil thickness as compared to topography on the nose and flanks of the Russellville anticline. The soils are relatively thin [less than 5 feet thick] excpet where alluvium of the Arkansas River is encountered.

A COMPUTER PROGRAM FOR THE RAPID ANALYSIS OF THE BEHR FREE FALL LABORATORY EXPERIMENT.

Mike Chalenburg, Harding College

The Behr Free Fall Apparatus is commonly used in the undergraduate physics laboratory to measure the acceleration due to gravity of a freely falling body. This computer program is designed to perform the calculations needed to obtain the acceleration due to gravity, given the measurements of the intervals. If desired, it will provide an error analysis and graphs of displacement versus time and instantaneous velocity versus time.

METAL COMPLEXES OF PROTOPORPHYRIN 9.
Christine Curiel, Hendrix College

Protoporphyrin 9 is synthesized by the oxidation and removal of Fe[2] from heme. Metalloporphyrins are subsequently prepared by the substitution of divalent cations into the protoporphyrin nucleus. The complexes are purified by adsorption chromatography, and the spectra studied.

HELMINTHS OF THE COMMON GRACKLE, *QUISCALUS QUISCULA*, IN FAULKNER COUNTY, ARKANSAS.
Jana Farris, Max Fleming, and Keith Smith, Hendrix College

A study of the helminths of the Common Grackle was undertaken in Faulkner County, Arkansas, during September and November, 1976, and January, 1977. Seventy-four grackles were trapped and examined. Parasitism was correlated with age [adults and juveniles], sex, weight, and month of examination. This study comprises the first examination of large numbers of *Quiscalus quiscula* for parasites in this area of the United States.

POSSIBLE CAUSALITY VIOLATIONS IN DENSE MATTER.
Chris Godfrey, University of Central Arkansas

In the report that follows we review the basis of gravitational physics and the principle of causality as it applies to physical considerations. We show that the standard Harrison-Wheeler Equation of state which gives the pressure as a function of the mass-energy density can be obtained from the law of entropy. Using this equation, we derive an expression for the energy of interaction of particles in matter in a strong spherically symmetric gravitational field. This interaction energy is different from the flat space case, the difference due exactly to the metric properties of the space. These results are shown to imply a possible violation of causality. Finally, the relationship between causality and Heisenberg's principle of uncertainty is examined with the result that causality has no meaning once a mass has collapsed beyond a certain radius.

A SPECIES STUDY OF RAVINE FLORA IN INDEPENDENCE COUNTY, ARKANSAS.
Beth Haizlip, Arkansas College

This project deals with the study of the species of ravine flora in Independence County, Arkansas. The ravine which was being studied is located approximately fifteen miles northwest of Batesville, Arkansas, which is in the Ozark Plateau.

The main purpose of this investigation was to examine the factors such as temperature, light intensity, protection, wind, and moisture and how they affect the distribution of herbaceous plants and trees in the ravine.

A species tabulation was taken beginning on March 17, 1976, and running to May 10, 1976. The second species tabulation was taken in the fall of 1976, beginning on September 9 and ending on October 7.

STIMULATION OF THE $[Na^+ + K^+]$ ATPASE BY ATP.
Dan J. Hawkins, Hendrix College

The Na-K dependent adenosine triphosphatase is thought to be the mechanism for the active transport of sodium and potassium ions across the cell membrane. Recent studies have indicated that ATP, the natural substrate for this enzyme, has two binding sites which may be either catalytic or regulatory in nature. This paper reports on investigations of the activity of ATP as a regulatory ligand in the membrane bound Na-K ATP'ase. In microsomal Na-K ATP'ase prepared from porcine kidney cortex, preincubation of the enzyme with free ATP can produce an approximate 20% increase in the ouabain sensitive ATP hydrolysis. Stimulation by free ATP is maximal after five minutes of preincubation. This stimulation can continue during the catalytic action of the enzyme in that the rate of enzymatic hydrolysis of ATP increases early in the incubation period so that non-linear kinetics are observed for the ATP preincubated enzyme. The enzyme preincubated without ATP exhibits linear kinetics as has been reported by others. The stimulation by ATP may be due to a time and/or temperature dependent binding of ATP to a catalytic and/or regulatory site, since the phenomena can only best be observed when the enzyme preincubation at 37°C is terminated by the addition of salts and ouabain on ice. It is plausible that free ATP present in the preincubation affects a conformational change which facilitates increased hydrolysis of ATP.

A STUDY OF THE DARE KNOB LAMPROPHYRIC DIKE IN NORTHERN POPE COUNTY, ARKANSAS.
Stephen E. Laney, Arkansas Tech University

The Dare Knob lamprophyric intrusion is located in Pennsylvanian sedimentary strata of the Lower Atoka Formation of the Boston Mountains in northern Pope Co., Arkansas. The dike is an ultrabasic lamprophyre up to ten feet wide by three hundred feet long and is located on the flank of a three hundred foot knob of alternating sandstone and shales. These enclosing sedimentary rocks show some minor contact metamorphism in the form of a 24 to 36 inch aureole of hornfels and quartzites.

The lamprophyre was dated at 83 ± 8 million years by the K/Ar mica concentrate method (Denison, 1976) which correlates well with the mid-late Cretaceous emplacement time given for the peridotites and syenites in the southern part of the state. The rock shows two generations of crystals, one large and one quite small. It consists mostly of a red titaniferous mica surrounded by chloritic pseudomorphs possibly of altered olivine or pyroxene phenocrysts. Sericite is abundant as an alteration of former feldspars or feldspathoids. There are traces of sodalite associated with calcite spar along fracture zones. Because of the extensive alteration, it is difficult to determine exactly what kind of lamprophyre this is.