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Cover photograph: Springtime on the campus of Jackson State University, Jacksonville, Alabama, site of the 80th Annual Meeting of the Alabama Academy of Science, March 20-22, 2004.

Photographer: Jim Bradley

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Journal of the Alabama Academy of Science, Vol. 74, No. 2, April 2003.

ABSTRACTS

Papers presented at the 80th Annual Meeting
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BIOLOGICAL SCIENCES

Epigenetic Mechanisms of hTERT Regulation in Aging Human Cells. Nathaniel J. Hansen, Liang Liu, Rebecca C. Wylie, Payal Patel, Brian M. Bowman, Mitchell S. Pate, Lucy G. Andrews and Trygve O. Tollefsbol. Dept. of Biology, Univ. of Alabama at Birmingham, Birmingham, AL 35294.

The enzyme telomerase is a critical component in the processes that control chromosomal stability, cellular senescence, and neoplastic transformation. While absent in most somatic cell lines, expression of telomeraseís catalytic subunit, hTERT, occurs in the highly proliferative tissues of the endometrium, hematopoietic cells, and greater than 90% of cancers. As hTERT mRNA levels correspond directly to enzymatic activity, regulatory mechanisms governing the transcription of this gene have thus been identified as important targets for a variety of potential therapies seeking to inhibit telomerase. The sodium bisulfite sequencing method, which distinguishes between methylated and unmethylated cytosine residues, will be used to assess 5-methylcytosine levels in WI-38 fetal lung fibroblasts, a well-characterized system for studying aging and telomerase. Despite the knowledge that upstream factors important in hTERT transcription are subject to methylation control and that others are known to interact with chromatin remodeling enzymes, the effects of epigenetics on telomerase expression remain controversial. While some researchers have shown an association between hTERT promoter hypermethylation and gene expression in cancer cell lines, exceptional cases of expression and associated hTERT hypomethylation have been reported in a lymphocytic leukemia and in a human teratocarcinoma cell line. This study proposes to analyze the effects of site-specific DNA methylation in the hTERT promoter region in aging cells. Understanding of the role of epigenetic processes in telomerase regulation during cellular senescence will provide critical information about the natural processes that lead to loss of expression stability with aging in this gene.

EVALUATION OF A PCR METHOD FOR IDENTIFYING SOURCES OF FECAL POLLUTION IN ENVIRONMENTAL WATERS.

Grant W. Goldenstar III, Allen Tartt, and Donald W. Salter, Department of Biological and Environmental Sciences, University of West Alabama, Livingston, AL 35470

Fecal contamination of consumable and environmental waters is measured by the presence of indicator bacteria. There is now considerable interest in determining the animal source of the fecal contamination. Identification of these sources would allow more efficient management of the contamination sources, which should eventually decrease fecal contamination of these waters. Of the several methods that have been published to determine the source of fecal contamination, detection of bacteria found specifically in different animal species by PCR appear to have some advantages. It is relatively fast, fairly inexpensive after an initial investment of moderately expensive equipment, reliable, and can be quantified. We are investigating such a PCR assay recently developed by Bernhard and Field (Appl. Environ. Microb., 2000, 66: 4571) to detect *Bacteriodes* specifically found in human and bovine feces. Water samples from streams near UWA were aseptically collected and a portion assayed for fecal coliforms by standard procedures. An identical portion was filtered through a 0.2 μm filter and the DNA purified from the trapped microbes using a commercial kit. The DNA was then amplified by PCR using the recommended conditions and two sets of primers for *Bacteriodes* found specifically in human or bovine feces. Amplified DNAs were separated by electrophoresis in agarose gels and detected by ethidium bromide. Six of eight samples that were positive for fecal coliforms were also positive for either B*acteriodes* DNA specific for human fecal material or bovine fecal material. Based on the intensity of the DNA amplicons, five of eight samples appeared to be positive for human feces and only one of eight appeared to be positive for bovine feces. Further research on these water samples will be reported.

TRAINING RED-BACKED SALAMANDERS (*PLETHODON CINEREUS*) IN EGG DISCRIMINATION.

Megan G. Peterson, Meredith J. Humber, and Allison C. Hargett, Dept. of Biology, Birmingham-Southern College, Birmingham, AL 35254.

In many organisms, egg recognition is an important aspect of parental care. Prior studies have shown that under laboratory conditions, female red backed salamanders (*Plethodon cinereus*) do not preferentially associate with their own eggs over the eggs of another female. We conducted an experiment in which we trained females of *P. cinereus* to move toward either their own eggs or the eggs of another female. A difference in learning curves for these two groups would indicate that salamanders were able to discriminate their own eggs from unrelated eggs. Although there were no significant differences in learning curves between the groups, reaction times indicated that learning took place and that the salamanders that were trained to move toward their own eggs made correct choices faster than those trained to move toward another females eggs. This method could be used in further studies investigating discrimination and learning.

EFFECTS OF WATER AND SEDIMENT EXTRACTS FROM WATERSHEDS NEAR THE MONSANTO PLANT (ANNISTON, AL) ON EARLY EMBRYONIC DEVELOPMENT OF THE FROG, *XENOPUS LAEVIS*.

Mary Millwood, Elizabeth Gilbert, Joseph Sikes, Robin Hardy, James Rayburn, and Roger Sauterer. Department of Biology, Jacksonville State University, Jacksonville, AL 36265.

The Monsanto/Solutia plant in Anniston, AL, is of environmental and public health concern due to soil and watershed contamination by PCB-laden runoff from on-site landfills. We analyzed water samples and aqueous sediment extracts from three PCB-contaminated study sites ranging from 1 – 30 km from the Monsanto plant using the FETAX developmental toxicity assay. None of the samples from the three sites showed significant differences in embryonic mortality or malformations, however, embryonic growth inhibition was observed at all three sites with more pronounced effects closer to the Monsanto plant suggesting that Monsanto plant contamination may contribute to the observed effects. The Snow Creek site, 1 km from the Monsanto plant and a site of heavy contamination, showed significant growth inhibition using both diluted and undiluted water and sediment extracts but a proximal Choccolocco Creek site showed growth inhibition only in undiluted water and sediment extracts and the distal Choccolocco Creek site showed growth inhibition only with undiluted water samples. Since PCB exposure induces Cytochrome P-450 1A (CYP 1A) in a variety of organisms, we are currently attempting to detect and quantitate CYP 1A in frog embryos by Western blotting using CYP 1A antibodies.

DISCOVERY OF A NEW POPULATION OF THE ENDANGERED WATERCRESS DARTER, *ETHEOSTOMA NUCHALE* (PISCES: PERCIDAE).

W. Mike Howell and L. J. Davenport, Dept. of Biology, Samford University, Birmingham, AL 35229.

On 18 October 2002, a Birmingham geologist, Mr. Randy Tipton, apprised us of his discovery of a spring ("Seven Springs") not labeled as such on U.S. Geological Survey topographic maps. The spring is located within the city limits of Birmingham (Powderly Community), Jefferson County, AL, sec 17, T18S, R3W. The spring basin is on the property of Faith Apostolic Church at 2001 Cleburn Ave. S.W. The creek issuing from the spring flows 460 meters before its confluence with Nabors Branch, a domestically polluted stream that flows for about one mile before entering Valley Creek, a major tributary of the Black Warrior River. The spring creek is choked with aquatic plants (*Nitella, Nasturtium*) all along its course. Mr. Tipton estimated the flow of the spring creek as 3,800 gpm.

On 29 October 2002, we visited Seven Springs and spring run where we dipnetted a single specimen of the endangered watercress darter, *Etheostoma nuchale* Howell & Caldwell. After notifying the U. S. Fish and Wildlife Service and obtaining a permit to survey the spring, we returned to Seven Springs on 14 November 2002 and found watercress darters from the spring basin throughout the entire length of the spring run and in Nabors Branch to a distance of 50 meters downstream. Fish species associates include: creek chub, *Semotilus atromaculatus;* largescale stoneroller, *Campostoma oligolepis*; and mosquitofish, *Gambusia affinis*.

This is only the third known natural population of watercress darters–the first, found at Glen Springs, Bessemer, in 1964; the second at Roebuck Spring, Roebuck, in 1979.

THE ROLE OF ORGANIC ACID DEHYDROGENASES IN ALUMINUM TOLERANCE IN *ARABIDOPSIS THALIANA*. Mijitaba Hamissou and Jason R Willingham, Dept. of Biology, Jacksonville State University, Jacksonville, AL 36265.

Aluminum toxicity is a major factor limiting plant growth and development and contributes to the acidification of aquatic environment. It is among the most widespread stresses in plants. Aluminum can have an adverse effect on plants and animals within a short period of time of exposure. Plant species differ in their mechanisms enabling them to grow and reproduce despite elevated concentrations of aluminum. Many plant species are thought to tolerate high concentrations of aluminum by secreting organic acids at the root zones. These organic acids are believed to chelate $Al^{3+}$and transform it into a less toxic form Al^{2+}. We have previously reported the expression of a classe of proteins in arabidopsis exposed to Aluminum. The objective of this study is to determine the relationship between the proteins observed to accumulate under aluminum toxicity and mitochondrial hydrogenases. The experimental procedures consist of growing arabidopsis plants in soil mixture in a growth chamber for 4 weeks before exposing then to different concentrations of $AlCl_3$ solution. In other instances, seeds were germinated and maintained on 6% agar plates in a growth chamber at 25°C, 18 hour-light and 6 hour-dark for 24 hours before transferring them to new agar plates containing different concentrations of $AlCl_3$. 24 hours after exposure, leaf and root samples were taken and processed for enzymes extraction and analysis. Mitochondrial dehydrogenases were assayed in the cell extracts biochemically and by Western blot analysis.

EFFECT OF PROBIOTICS ON *MACROBRACHIUM ROSENBERGII* LARVAE. Norrenna Porter, Benjie Blair, Mark Meade, Daniel McLaren, Kenneth McCullough, and Jennifer Wagnon, Dept. of Bio., Jacksonville State Univ., Jacksonville, AL 36265.

Probiotics is defined as the use of living microorganisms to enhance growth or survival of other organisms. In fish and shrimp hatcheries larvae are reared in overcrowded and stressful growth conditions. This can result in loss of larvae or fry, which translates into decreased revenue. Recently, probiotics have been used to enhance the nutritional status and immune response, resulting in shorter development time and increased survival through larval stages in many aquatic organisms. *Bacteroides thetaiotamicron* is an anaerobic bacterium that has been recognized as an important probiotic in both human and mice digestive systems. This research was designed to evaluate the effectiveness of this microorganism on the survival and growth of the freshwater Malaysian prawn, *Macrobrachium rosenbergii*. *B. thetaiotamicron* was added to the prey food source (*Artemia* naupllii) and then fed to *M. rosenbergii* during the first larval stage. After inoculation, the larvae were allowed to continue development under identical food and physiological conditions until the post-larvae stages were reached. The probiotic effect was then evaluated in the surviving shrimp by measuring dry weight. The rate of development was also recorded daily to determine if there was an advantage in transferring larvae through their eleven stages.

Detection of *Vibrio vulnificus* in Gulf of Mexico water and shellfish using molecular methods.

Gitika Panicker and Asim K. Bej, University of Alabama at Birmingham, AL-35294.

V. vulnificus is a Gram-negative, halophilic bacterium that causes septicemia and at times death in susceptible individuals through the consumption of raw oysters. In this study, two experimental approaches involved in rapid and reliable detection of this pathogen in the Gulf of Mexico water and shellfish were evaluated. First, a real-time PCR with SYBR Green I fluorescent dye, using oligonucleotide primers for the specific region of the cytolysin gene (*vvh*) was tested on 87 *V. vulnificus* isolates. Results exhibited a positive amplification of the 205 bp *vvh* fragment in all isolates. Following which, various concentrations of *V. vulnificus* were seeded in oyster tissue homogenate and sterile gulf water, and enriched with 0.2% (w/v) peptone for 5 h. Real-time PCR amplification exhibited detection of $\leq 10^1$ cells in 10 ml of enriched Gulf water or 1 g of oyster tissue homogenate. Next, a Phage-display assay involving the identification of peptide ligands capable of binding to cell surface receptors on target microorganisms was developed. Four biopanning reactions were carried out by incubating *V. vulnificus* cells with random peptides of PH.D.-7 peptide library (NEB). A 7-mer peptide sequence was identified as being specific for the detection *V. vulnificus*. Further, specificity studies using fluorescent microscopy were conducted to evaluate the binding specificities of other *Vibrio* sp. to the Alexa-Fluor 488 labeled phage displaying the peptide of interest. The development of these rapid and early detection methods would help ensure the supply of safer oysters for consumption and reduce the *V. vulnificus*-associated illnesses.

ASSESSMENT OF ICHTHYOFAUNAL ASSEMBLAGES AS INDICATORS OF SILTATION IN THE UPPER CAHABA RIVER AND ITS TRIBUTARIES.

Jaideep Honavar, R. A. Angus and K. R. Marion, Dept. of Biology, Univ of Ala at B'ham, Birmingham, AL 35294.

The Cahaba river system has historically supported a very diverse ichthyofaunal assemblage. The composition of ichthyofaunal communities is being altered in the upper part of the Cahaba River. These changes in fish populations have occurred in tandem with extensive urbanization and the resultant water and habitat degradation that has occurred in the watershed over the last 20 years. Anthropogenic sources cause an increase in the volume of sedimentation, which leads to severe increases in turbidity of the water as well as changes in the substrate. As sensitive indicators of aquatic ecosystem quality, fish reflect these changes in their environment by changes in their community structure. At our study sites in the upper Cahaba watershed, the percent relative abundance (PRA) of tolerant species like *Campostoma oligolepis* and *Cyprinella venusta* varied from 11.36 to 75.47 between undisturbed and disturbed sites. Disturbance-intolerant species like crevice spawning minnows and sensitive darters showed a decrease in the PRA from 29.63 to 0 and 13.48 to 0, respectively, between undisturbed and disturbed sites.

Retinoic Acid Inhibition of Dnmt Expression and Activity in HL-60 Cells.
Trygve O. Tollefsbol, Dept. of Biology, Univ. of Alabama at Birmingham, Birmingham Al 35294-1170. William K. Woodfin, Joel Berletch, Pile Patel, and Mitchell S. Pate.

There are three principle DNA methyltransferases, Dnmt 1, Dnmt 3a, and Dnmt 3b that catalyze the transfer of a methyl moiety from the cofactor S-adenosyl-L-methionine (SAM). Dnmt 1, found to be the most abundant methyltransferase in mammalian cells, principally has maintenance methylating activity. Dnmt 3a and 3b have been found to primarily have *de novo* methylating activity. The association of Dnmt activity with cellular senescence and carcinogensis has recently become a hot area of research. Epigenetic modulation through methylation as directed by DNA methyltransferases is particularly relevant in understanding tumorogenic etiology. Changing patterns of Dnmt expression might explain the changes in methylating patterns that accompany transformation of cells. Thus it is important to understand the regulatory mechanisms of the Dnmts. The goal of this study was to further elucidate the regulatory mechanisms of Dnmt activity by (i) measuring messenger RNA (mRNA) transcription with Reverse Transcription Polymerase Chain Reaction (RT-PCR), and (ii) Dnmt protein synthesis with immunobloting. These assays were performed in a system of Human Leukemia (HL-60) cells induced into terminal differentiation by Retinoic Acid (RA) treatment. Preliminary RT-PCR data show a decrease in Dnmt 1a, and an increase in Dnmt 3a and 3b mRNA over 12 days of RA treatment. This study further elucidates our understanding of the control mechanisms of Dnmt Regulation.

hTERT Inhibition by Retinoic Acid Derivatives in MCF-7 and T47D Breast Cancer Cells.
Rebecca C. Wylie, Nathaniel J. Hansen, Jonathan D. Matlock, James H. Jerkins, Mitchell S. Pate, Lucy G. Andrews and Trygve O. Tollefsbol. Dept. of Biology, Univ. of Ala. at Birmingham, AL 35294.

Breast cancer, one of the leading causes of cancer-related death in women, has presented limited treatment options due to several factors including associated toxicity and a lack of sustained drug potency. Retinoid-induced inhibition of the telomerase enzyme has offered new hope in potential treatment of breast tumors with a decreased likelihood of adverse side effects. This enzyme, which maintains the telomeric ends of chromosomes, is silenced in almost all normal somatic tissue but is active in up to 95% of neoplastic tissue, including breast tumors. Retinoic acids have been shown in previous cancer studies to effectively enact a down-regulation of transcription of hTERT, the catalytic subunit of telomerase, associated with a marked decrease in telomerase activity as well as growth inhibition of transformed cells. In this study, MCF-7 and T47D human breast cancer cells were treated with therapeutic doses of 9-*cis* and UAB-30 retinoic acids (RA). UAB-30 RA, specifically, is a synthetic compound proven to be effective in animal studies of the treatment of breast cancer, but to this point has yet to be tested in human models. Following treatment, RT-PCR, TRAP assay, and AlamarBlue were utilized to assess hTERT mRNA levels, telomerase activity, and cell proliferation, respectively.

Rapid detection of *Vibrio parahaemolyticus* in Gulf of Mexico water using real-time PCR.

Amy V. Rizvi and A. K. Bej, University of Alabama at Birmingham, AL-35294.

Vibrio parahaemolyticus is a Gram-negative bacterium and a natural inhabitant of warm costal waters. It is commonly found in shellfish and other crustaceans, and is responsible for causing gastroenteritis when consumed in raw or poorly cooked seafood. Conventional microbiological methods of detection of this pathogen is relatively time consuming and less precise. Therefore the need for rapid and more accurate detection of pathogens in seafood has lead to the development of a new multiplex real-time PCR assay. This assay not only detects the presence of all *V. parahaemolyticus* by targeting thermolabile hemolysin genes (*tl*), but also specifically identifies potential pathogenic strains, which contain the thermostable direct hemolysin gene (*tdh*) and the thermostable direct hemolysin-related gene (*trh*). By combining real-time PCR methods with SYBR Green I fluorescent dye, it was possible to identify multiple targets by melt curve analysis. Specific oligonucleotide primer sets showed positive PCR amplification of each gene to produce fragments of size 173 bp for *tl*, 270 bp for *tdh*, and 217 bp for *trh*. The analysis showed three distinct melting temperatures (T_m values) of approximately 81°C, 82°C, and 85°C, which corresponded to *tl*, *tdh*, and *trh*, respectively. Sensitivity of detection was 10^{10} cells per gram of enriched oyster tissue homogenate. Rapid detection using real-time multiplex PCR would help reduce *V. parahaemolyticus*-related disease outbreaks thereby increasing consumer confidence and economic success of the seafood industry.

POPULATION DYNAMICS FOR A POPULATION OF *AMBYSTOMA MACULATUM* IN ALABAMA.

Eric A. Blackwell, Univ. of Ala. at Birmingham, Birmingham, AL 35294. George R. Cline, Jacksonville St. Univ., Jacksonville, AL 36265 and Ken R. Marion, Univ. of Ala. at Birmingham, Birmingham, AL 35294.

Abystomatid salamanders migrate from their terrestrial habitats to nearby ponds to breed. In northeast Alabama the migration of the spotted salamander (*Ambystoma maculatum*) is a conspicuous event that occurs during late winter and early spring. For six breeding seasons (1997 - 2002) an intensive mark-recapture study was conducted on a breeding population of *A. maculatum* in Calhoun County, Alabama. A drift fence completely encircling an ephemeral pond was used to capture all adult salamanders migrating into or out of the pond. All captured salamanders were marked for identification with passive integrated transponders (PIT tags). The Jolly-Seber method was used to estimate the population size, gains and survivorship. Gains varied annually and population growth rate was low, suggesting inconsistent recruitment. Consistent with life-history parameters of long-lived, late-maturing species, survivorship and breeding population sizes remained essentially constant. From year to year there were no differences in survivorship. The only between-year difference for breeding population size was between 1999 and 2001.

WHAT IS THE NEXT STEP IN THE BIOLOGICAL MONITORING OF RIVERS AND STREAMS? Janna Owens, K. Marion, R. Angus and M. Lalor, UAB, Bham, AL. 35394, S. McKinney and E. Meyer, SWMA, Bham, AL. 35203.

Water quality monitoring for nonpoint source pollutants has progressed beyond its simple beginning of water chemistry sampling. The use of biological organisms as indicators of past and present pollutant exposure evolved to reflect the effects of a stressor on the biological community. The compositions of biological communities could be correlated with local site conditions, such as habitat quality, amount of bank vegetation and type of substrate to identify stressor sources. Focus beyond the instream area concentrated on upstream riparian zones and the ability to reduce bank erosion and filter runoff. Eventually, dynamic models of the watershed were constructed to characterize land usage and its associated runoff within the entire upstream catchment. Our previous studies have shown strong correlations of the benthic macroinvertebrate community structures with some site characteristics, such as sediment depths and habitat scores and watershed characteristics as quantified by a Sedimentation Potential Index. The next step in water quality monitoring will be a dynamic model that creates a linkage between land usage within a watershed and the receiving waterbody's characteristics, such as, substrate bank compositions, flow and discharge potentials. Sediment loads generated within a watershed as runoff during rain events and the loads generated by river erosion processes can then be predicted. Accurate estimates of sediment inputs are critical for identifying the best management practices to be employed in activities that cause land disturbance and in devising effective restorative measures for rivers. Biological monitoring will still be required to assess the status of the resident biota as improvements are initiated within a watershed.

BOTTLENOSE DOLPHINS' USE OF PERDIDO BAY. Claire M. Pabody, Spring Hill College, 220 E. 1st Ave Unit B, Gulf Shores, AL 36542. Gerald T. Regan, Marterra Foundation Inc., P.O. Box 646, Gulf Shores, AL 36547.

A survey of the free-ranging bottlenose dolphins (*Tursiops truncatus*) in Perdido Bay, AL was made between May and September 2002. The purpose was to determine general estimates of population size and distribution and whether the dolphins exhibited site fidelity to that area as well as to begin building Alabama's first ever photo-identification catalog of bottlenose dolphins. A total of 17 surveys were made from the stern of a 16.6m commercial dolphin watching vessel. The survey area is approximately 60 km^2 with depths ranging from .3 to 6.3m and an average depth of 3m. Dolphins were encountered on every survey and ranged in group size from 1 to 20 individuals and were observed in all manner of activities including socializing, traveling, feeding, and leaping. It can be concluded that dolphins exhibit site fidelity for all areas of Perdido Bay throughout the summer. A rough estimate of the population is less than 200. From extensive interviews with the captain of the vessel I made surveys from it can be concluded that the same dolphins reside in Perdido Bay summer after summer based on resightings of individuals with distinct dorsal fins over the years. Acknowledgment is made of the help of Captain Philip Taylor of Dolphin Cruises Inc., G.T. Regan, Charles Chester, and Tom Loehr.

EVALUATION OF THE ALABAMA WATER WATCH CITIZEN LEVEL MACROINVERTEBRATE PROTOCOL FOR ALABAMA COASTAL PLAIN STREAMS.

Christa Collins, Michael W. Mullen, Paul M. Stewart, Department of Biological & Environmental Sciences, Troy State University, Troy, AL 36082.

The Alabama Water Watch (AWW) macroinvertebrate bioassessment protocol is a citizen-level tool capable of providing a "first alert" regarding changes in stream health. The number of taxa in each indicator group is multiplied by an Index Value to obtain a Cumulative Index Value. For a more precise "professional-level" evaluation of stream health, the Index of Community Integrity (ICI) examines additional attributes of the macroinvertebrate community based on compositon, abundance, and condition of taxa collected from the stream. An ICI developed for the upper or Alabama portion of the Choctawhatchee River basin was used as the basis for revising the original AWW macroinvertebrate bioassessment protocol. The modification of the original AWW included moving the riffle beetle and mayfly to group two and the Stream Quality Assessment Scale was redivided into excellent, good, fair, poor, and very poor. Scoring of stream health using the modified AWW protocol more closely matched the ICI results and reduced the over prediction of the original AWW scores when compared to the ICI scores. Development and application of improved protocols may be useful for increasing the accuracy of citizen-level participation thus enhancing protection of water resources in Alabama and beyond.

THE STATUS OF THE FLATTENED MUSK TURTLE (*STERNOTHERUS DEPRESSUS*) IN SELECTED AREAS OF THE BANKHEAD NATIONAL FOREST AND SMITH LAKE: PRELIMINARY RESULTS.

Sherry Holmes and Ken Marion, Dept of Biology, Univ. of Ala. at B'ham, Birmingham, AL 35294.

Previous studies on the population status of *S. depressus* indicated that its numbers were declining. It is currently listed as threatened under the endangered species act. After one season of trapping efforts in the Bankhead National Forest and surrounding areas in 2002, preliminary results indicate populations are doing well in some areas, but that dense populations are spotty in distribution. In this study, the number of turtles captured per trap hour in the site that has historically held the densest population of flattened musk turtles compares favorably with a 1997 study and may indicate that the population is increasing in that area, though not to levels found in the 1981 or 1983 studies. Preliminary results also indicate that at least some recruitment is occurring in the upper inundation zones of Smith Lake in the Brushy Creek and Sipsey Forks and that populations exist in isolated pockets and coves of the reservoir. In the 2003 season there will be extensive trapping in selected areas, and transmitters will be placed on gravid females to obtain information on nesting preferences and nest success. This research is made possible by the support of the U.S.D.A. Forest Service, Alabama Power, The Nature Conservancy of Alabama, and the Birmingham Audubon Society.

THE EFFECTS OF ACUTE EXPOSURE TO NITRATE AND NITRITE ON THE METABOLIC PHYSIOLOGY OF NILE TILAPIA, *OREOCHROMIS NILOTICA*.

Chenein Segalas, Cherie Maxwell and Mark Meade. Jacksonville State University, Dept. of Biology, Jacksonville AL 36265.

Nitrogenous waste products such as ammonia and nitrite are well known toxicants to aquatic organisms. Nitrate, however, is considered relatively non-toxic to most aquatic organisms. Research has recently begun to re-evaluate the effects of elevated nitrate concentrations on commercially important tilapia species. Tilapia are among the oldest of known families of fishes existing today. Tilapias are native to Africa and the Middle East, however due to commercial exploitation, naturalized populations exist in many temperate and tropical regions worldwide. Tilapia are fast growers, obtaining market sizes near 1lb in a year. In the US, indoor recirculating systems are mainly used to produce the semi-tropical species year round. We acutely exposed tilapia fry (50-200mg) to nitrate concentrations of 0, 1, 10, 100, and 1000mg/l to determine the effects on metabolic rates. We also exposed fry to nitrite concentrations of 0, 1, 10, 100, and 1000mg/l (positive controls). Oxygen consumption rates of animals exposed to any concentration of nitrate were not significantly different from negative controls (0mg/l) and averaged 0.5-1 μmol O_2/min*mg fresh weight. Oxygen consumption rates nearly quadrupled when animals were acutely exposed to 1000mg/l nitrite. Overall, these data suggest that acute, short duration exposure of tilapia fry to high nitrate concentrations are not stressful. Future studies are underway examining the effects of chronic exposure to nitrates/nitrites on metabolism and will also be discussed.

EFFECTS OF CHRONIC EXPOSURE TO NITRITE ON THE RESPIRATORY PHYSIOLOGY OF POST-LARVAL PRAWN, *MACROBRACHIUM ROSENBERGII*.

Dustin Morin and Mark Meade. Dept. of Biology, Jacksonville State University, Jacksonville AL 36265.

The Malaysian freshwater shrimp, *Macrobrachum rosenbergii*, plays an important role in worldwide aquaculture. Large-scale indoor production relies on efficient filtration to reduce nitrogenous waste buildup. The detrimental effects of nitrogenous compounds, such as ammonia and nitrite, on prawn larvae and post-larvae are well documented. Nitrates are typically non-toxic to aquatic animals. Recent evidence suggests that the effects of all of these nitrogenous compounds be re-evaluated. Approximately 6000 larvae were produced from 2 female spawns and reared to post-larval stages at JSU. The effects of chronic exposure to 0 (control), 1ppm, 10ppm, and 100ppm nitrite solutions were evaluated by monitoring survival and measuring oxygen consumption rates in post-larvae. Larvae were held individually in small jars containing 50ml of experimental solution. Solutions were renewed every 24hr. Observations of animal condition and survival were monitored as well as aerobic respiratory rates determined for surviving individuals every 24hr. Preliminary data analysis suggests that low concentrations of nitrite (1ppm) effect both survival and metabolism in exposed animals.

THE EFFECTS OF LOW DOSE IONIZING RADIATION ON *GIARDIA LAMBLIA* TROPHOZOITES Scott Lenaghan, C. Sundermann, Dept. of Biological Sciences, Auburn University, AL 36849.

Low dose ionizing radiation causes damage in many bacterial and several protozoal species and therefore is potentially useful for treatment of contaminated food. The purpose of this study was to determine what types of damage result from gamma-irradiation in the parasitic flagellate, *Giardia lamblia*. Determination of lethal dose and recovery dose was achieved by direct observation of irradiated cultures of trophozoites. The "recovery doses" were found to be 0.25 kGy and 1.0 kGy based on microscopic quantification. Doses of 5, 7, and 10 kGy were termed "lethal doses". Structural damage was assayed using Nomarski interference, immuno-fluorescence, and scanning electron microscopy. Nomarski optics showed varying degrees of damage in cells viewed immediately after irradiation at 0.25, 1.0, 5.0, and 10.0 kGy in that there were lesions on the ventral surface of the adhesive disc. A significant number of trophozoites showed severe membrane blebbing when irradiated at 5 kGy and greater. Scanning electron micrographs revealed that lesions on the ventral cell surface had a characteristic "C" shape and were sometimes associated with tears in the cell membrane. As irradiation doses increased, lesions became more prominent. However, flagella remained intact, and no flagellar fusion was evident. In addition to lesions, the (normally) smooth periphery of the cell was fringed on the ventral surface around the adhesive disc and posteriorly. The dorsal cell surface appeared undamaged at any of the irradiation doses. Fluorescence microscopy of cells labeled with antibodies directed towards alpha- and acetylated-tubulin revealed no observable change between irradiated (all doses) and control (0 kGy) trophozoites. In all specimens, flagellar microtubles were unbroken, and there was no disruption of the adhesive disc.

PLANT STRESS IDENTIFICATION BY REMOTE SENSING. AL-HAMDANI, SAFAA, BIOLOGY DEPARTMENT, JACKSONVILLE STATE UNIVERSITY, JACKSONVILLE, AL, 36265.

This project was designed to evaluate the potential use of aerial remote sensing data to identify stress areas in agricultural fields. The project was carried out for two years evaluating cotton (*Gossypium hirsutum*) and corn (*Zea mays*) crops in different fields within northeast Alabama. The aerial photography data was analyzed and compared with similar data obtained on the ground level. In addition, the physiological status of plants within each field was evaluated. The aerial remote sensing data coincided with the ground level measurements indicating the potential benefit of the aerial photography in identifying problems within the agricultural fields. Light reflectance in the near infrared and infrared bands appears to be the most beneficial in identifying the stress areas of the agriculture field.

MOLECULAR ANALYSES OF PLANT DEFENSE FACTORS (PDF) OF *ARABIDOPSIS THALIANA* IN RESPONSE TO SIMULATED INSECT FEEDING.

Mijitaba Hamissou and Pamela A. Swaim, Dept. of Biology, Jacksonville State University, Jacksonville, AL 36265.

Throughout their life cycle, plants must respond to challenges from the environment and to changes in the seasons. Like any organism, plants are constantly subjected to attack by a wide variety of predators such as insects, bacteria, fungi, and viruses. Plants respond to predatory attacks by lignifying their cell wall, synthesizing lytic enzymes and secondary metabolites that interfere with predator's digestive track, production of volatile compounds, or by inducing a programmed cell death. Researchers have recently pointed out the existence of a sophisticated defense system in plants essential for their survival. The objective is this study is to understand some aspects of plants responses to simulated insect feeding. Wild type and mutant strains of arabidopsis were raised in pots containing a mixture of sand and vermiculite in a growth chamber at 25°C, 16 hours day, 8 hours dark for four weeks before subjecting them to leaf puncturing and micromolar application of a mixture of middle lamella dissolving enzymes pectinase and cellulase to mimic sucking insects. Leaf samples were taken for enzymes extraction. Plant defense factors (PDF) were studied in the cell extracts by assaying for several protease inhibitors and peroxidase activities and also by Western blot analysis against anti-tubulin antibody. Preliminary data indicated that plants respond to mechanical wounding and cell wall dissolving enzyme treatment by increasing the concentration of total cytoplasmic proteins. Western blot analysis

INDUCTION OF CALLOSE BIOSYNTHESIS IN ARABIDOPSIS, AN ACTIVATION OF THE_PLANT DEFENSE MECHANISM.

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When plant cells are wounded, they block the damaged sites and their plasmadesmata with a polysaccharide cement known as callose. This helps prevent the loss of cytoplasmic contents from adjacent cells. Callose is a beta – 1, 3-glucan polymer of glucose, a major component of inducible plant cell wall apposition and a barrier against fungal infection. The objective of this paper is to present the results of biochemical and microscopic analyses of callose biosynthesis by arabidopsis plants in response to mechanical injury and to chemical agents. Callose production in response to mechanical injury and to treatment of plants with cell wall degrading enzymes was investigated. Adult arabidopsis plants grown in pots containing a mixture of sand and vermiculite were mechanically wounded by crushing their leaves with a hemostat or by puncturing them with sterile needle. Some wounded plants were treated with solutions of pectinase, celluase, or drizilase at the wound sites. 6,12, 24, and 48 hours following the treatments, 0.2 grams of leaves per treatment, including the injured leaves, were harvested, and cleared in organic solvent for several days. Callose was extracted by differential centrifugation and analyzed biochemically based on its ability to bind to aniline blue.

EXPOSURE TEMPERATURE AFFECTS OVARIAN DEVELOPMENT IN THE REGULAR SEA URCHIN *LYTECHINUS VARIEGATUS*.

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Lytechinus variegatus (ca. 40mm diameter) were collected (n=88) in October 2001 from Saint Joseph Bay, Florida, and returned to the University of Alabama at Birmingham (UAB). The sea urchins were divided into nine 80-L aquaria maintained in enclosed incubators (three aquaria per incubator) at a specific constant temperature of 16°C, 22°C, or 28°C. Individuals were held in 1-liter containers placed inside the aquaria with recirculating 100% artificial seawater at 32 ppt salinity and were fed *ad libitum* a prepared pellet diet daily for 8 weeks. At the end of 8 weeks, female sea urchins held at 22°C showed the highest overall somatic growth and highest growth of ovarian tissues. The number of eggs found in each ovarian tubule (acinus), the number of mature egg number per acinus, and egg size were highest for females at this temperature, indicating increased fecundity and gametogenic maturity. Soluble protein levels were highest in the ovaries at this temperature. Females from the 16°C treatment did not exhibit gametogenic stimulation; however, nutrient storage in the surrounding follicle-like tissues (nutritive phagocytes) was enhanced by exposure to the low temperature. Females held at 28°C did not show substantial gametogenic stimulation or high nutrient storage capabilities, possibly because of an increased metabolic rate at the high temperature. These data indicate that nutrient allocation to reproduction is affected by culture temperature and may be related to temperature-dependent hormonal control mechanisms and/or changes in basal metabolic rates (energy allocation) at various temperatures.

CRYOPRESERVATION OF *TETRAHYMENA PYRIFORMIS*.

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The cryopreservation of *Tetrahymena pyriformis* is essential for long-term storage. Presented here is a laboratory procedure for freezing this freshwater protozoan. The cells were grown in a standard growth medium on a rotary shaker at 30°C. The tetrahymena were then harvested and resuspended in starvation medium for approximately three days. The cells were reharvested and resuspended in various concentrations of DMSO, gyceral or both and frozen at -70°C.The cells were thawed using various procedures and grown in a standard growth medium at 30°C on a rotary shaker. The various cryopreservation techniques were compared. Some contamination was observed along with cell growth.

EFFECT OF 4-ETHYL-4-AZA-5α-CHOLESTANE (ND-497) ON THE CARBOHYDRATE METABOLISM OF *STAPHYLOCOCCUS AUREUS.*

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Certain azasteroids, possessing the properties of cationic surface active agents, have been shown to inhibit the growth of Gram-positive bacteria, yeasts and molds. It had been demonstrated that the antimicrobial activity of azasteroids is due, at least partly, to membrane damage followed by loss of cytoplasmic constituents. This suggested that their primary site of action is the cytoplasmic membrane. More recently, it was found that inhibition of bacterial growth may not be due entirely to leakage of cellular components.

The purpose of this investigation was to study the effect of an active azasteroid, 4-ethyl-4-aza-5α-cholestane (ND-497), on the carbohydrate metabolism of *Staphylococcus aureus.* ND-497 was found to be a more potent in vrtro inhibitor or *S. aureus* than tetracycline hydrochloride, erythromycin, streptomycin sulfate, polymyxin B sulfate or neomycin sulfate. Of special interest was the discovery of the synergistic actions of ND-497 with neomycin sulfate, streptomycin sulfate or polymyxin B sulfate. Uranyl nitrate behaved as a competitive inhibitor of ND-497.

The metabolism of glucose, fructose and sucrose was effectively inhibited at concentrations which did not lyse cells indicating that the lethal action of ND-497 involved enzymes. Other data suggest that ND-497 may inhibit the oxidation/reduction system of *S. aureus* in a manner which is similar to that exhibited by tetracycline hydrochloride or erythromycin.

A PALEOCENE PLANT FOSSIL FROM THE SENTINEL BUTTE FORMATION.

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A stem fossil from the Sentinel Butte Formation (North Dakota) was investigated using brightfield and scanning electron microscopy. Within the surface periderm are vertically oriented fiber masses whose individual cells overlap. Centripetal to the fibers is a circle of vascular bundles separated by multiseriate rays. The bundles encircle the pith. Many cells throughout the stem contain fungal hyphae which can pass from cell to cell across cell wall regions. The hyphae are septate and probably represent signs of incipient decay of the stem prior to fossilization. The water-conducting tissue (xylem) consists of cells with annualar/helical thickenings or pits. The pits are present in opposite or scalariform arrangements. The water-conducting cells are probably tracheids and the architecture of the xylem in general is similar to that of the extant family Trochodendraceae.

EVALUATION OF *IN SITU* INCUBATION TEMPERATURES WITHIN KEMP'S RIDLEY NESTS AT THE PRIMARY NESTING BEACH.

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Like all species of sea turtle, the Kemp's ridley, *Lepidochelys kempi*, possesses temperature-dependent sex determination (TSD). Under TSD, the incubation temperature of the egg during the approximate middle third of incubation determines the sex of the developing hatchling. As suggested in previous studies, TSD can potentially result in the production of highly biased sex ratios, which may not be advantageous to the recovery of endangered sea turtle populations. Currently, the Kemp's ridley sea turtle is the most endangered sea turtle in the world. Therefore, it is of great importance to monitor the hatchling sex ratio production in the Kemp's ridley conservation program. The primary nesting grounds for the Kemp's ridley is located on a stretch of beach near Rancho Nuevo, Mexico, where an international conservation effort monitors all nesting and relocates all nests to protected egg corrals. During several previous nesting seasons, nest incubation temperatures were monitored within the egg corrals, and suggested the production of a significant female bias each season. During the 2001 and 2002 nesting seasons, nest incubation temperatures were monitored within the egg corrals, and additionally, within a subset of nests that remained *in situ* on the natural nesting beach. The data suggest that a significant female bias was produced during these nesting seasons in both the egg corrals and *in situ* nests. The biased sex ratios predicted during the current study exemplify the need to monitor hatchling sex ratios produced in sea turtle conservation programs. Such information is a prerequisite to the development of an effective management strategy for endangered populations.

ANURAN CALLING COMMUNITIES IN NORTHEASTERN ALABAMA.

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My students and I have been studying local anuran calling communities for the past eleven years. Several characteristics influence community structure in calling frog communities. Duration of the hydroperiod has a significant influence on the presence of several species, especially Ranids. Among-species-variation in the length of breeding season is significant. Breeding seasons of some species such as *Rana sylvatica* and *Bufo* americanus are notoriously short, while others (i.e. *Pseudacris crucifer* and *Pseudacris triserriata*) are notably longer. Within-species-variation in the length of the breeding season is driven by local weather. Timing of breeding has both seasonal and diel components. Hylid frogs call intensely from dusk to midnight, while Ranids tends to call at lower intensities for a longer period. These factors, along with perch site selection and calling intensity help mold community structure at any given pond. Examples of several communities will used to compare patterns of community structure in northeastern Alabama.

PRELIMINARY EVALUATION OF INCUBATION TEMPERATURES AND SEX RATIOS OF GREEN TURTLES IN HAWAII.

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The green sea turtle, *Chelonia mydas*, possesses temperature-dependent sex determination (TSD) in which the incubation temperature of the egg (during the approximate middle third of incubation) determines the sex of the hatchling. This form of sex determination is of evolutionary significance because it has the potential of producing a wide variety of sex ratios that do not always conform to a 1:1 sex ratio. Hatchling sex ratios resulting from TSD are also of conservational and ecological interest, since they can affect the recovery of endangered populations. French Frigate Shoals (FFS) is an atoll located approximately 800 km northwest of Oahu in the Hawaiian Archipelago. Over 90% of Hawaiian green turtle nesting occurs on FFS. The purpose of this study was to estimate hatchling sex ratios of green turtles on FFS during the 1998-2001 nesting seasons. Sand and nest temperatures were monitored on FFS during the nesting seasons, which typically last from May to September. The average incubation temperature during the middle third of incubation was used as a predictor of the overall clutch sex ratio. The pivotal temperature for Hawaiian green turtles is unknown. If the pivotal for Hawaiian green turtles is similar to that of green turtles in Suriname and Costa Rica, where the pivotals are known, then the majority of temperatures recorded in the current study would be below the pivotal. This would suggest an overall male-bias during each of the nesting seasons. Alternatively, the Hawaiian green turtles may have evolved a lower pivotal temperature, which could result in unbiased or even female-biased sex ratios at these temperatures.

THE TOXICITY EFFECTS OF ROSE BENGAL ON TETRAHYMENA PYRIFORMIS.

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Rose Bengal is a red, xanthene dye (including other members like phloxine b, erythrosine, and eosin yellow) that produces reactive, singlet oxygen when exposed to light. Oxygen in this state has been known to degrade membrane integrity as well as cause cell mortality. *Tetrahymena pyriformis* will be used to study the toxicity of various concentrations (0,1,5,10 ppm) of rose bengal on cell structures. *T. pyriformis* is a protist found in many aquatic environments, and is considered an ideal toxicological organism to study due to its expedient growth rate, and successful culturing methods. Previous research conducted in associated laboratories has illustrated that phloxine b has a negative effect on growth rate and cell integrity of *T. pyriformis*. Similar research has been conducted examining the effects of rose bengal on populations of *Tetrahymena pyriformis*. After being exposed to the dye in the dark for 6 hr and then exposed to the light for 1hr, *T. pyriformis* populations demonstrated decreased growth. Concentrations of 1ppm or greater demonstrated similar effects on population growth.

A BOTTLENOSE DOLPHIN IN FRESH WATER. Gerald T. Regan, Marterra Foundation Inc., P. O. Box 646, Gulf Shores, AL, 36547.

A 203 cm long male bottlenose dolphin (*Tursiops truncatus*), SHCM322, did not swim away from a widened segment of the extreme upper Magnolia River in Baldwin County, Alabama, from February 1, 2000 through the 87 days until its death on April 29. The widened segment contains fresh water (sp gr 1.002 surface, 1.008 bottom, temperature compensated) mainly flowing from a submerged spring. Observational effort was made by the residents of the banks, the boat–based U.S. Postal Service route man, several visits from a representative of NOAA/Fisheries, and several groups of divers and snorkelers, in addition to the author. A brown coating on the skin at the base of the fin was first observed after 81 days, on April 22. The coating had not been there on March 18, when a team of snorkelers made detailed observations, including seeing no signs of emaciation and positive energetic behavior.. NOAA/Fisheries and many volunteers tried gently to coax the dolphin to leave the fresh water and swim toward Mobile Bay on day 87, April 28. None of the methods succeeded: baiting it downstream with fish to eat, herding it with a human wall, or irritating it with noise. Yet it was lying on the grassy bank dead early the next day. Necropsy showed an extensive coating consistent with coatings previously identified as a combination of fungi, with *Mucor* overgrowing *Alternaria* and with degenerate epithelial cells and algal material among the hyphae. There was erosion of the epidermis and layers below it. The stomachs were empty, so none of the bait fish had been eaten. The left ventricle of the heart appeared to have hypertrophic cardiomyopathy. Acknowledgment is made of the divers and snorkelers Cheryl King, Claire Pabody, Laura Walls, and Stacey Williams.

EXPRESSION PATTERNS FOR AROMATASE AND STEROIDOGENIC FACTOR-1 IN THE DEVELOPING GONADS OF THE RED-EARED POND SLIDER TURTLE. Chris Murdock and Thane Wibbels, Dept. of Biology, U of Ala.-Birmingham, Birmingham, AL 35294.

Numerous studies have indicated that exogenous estrogens can initiate the sex reversal of males to females (at male-producing temperatures) during embryonic development in reptiles with temperature-dependent sex determination (TSD). These findings have lead to the current "estrogen hypothesis" of TSD, where it is speculated that incubation temperature exerts its effect on sex determination by controlling the production of endogenous estrogens. In the reported study, quantitative competitive RT-PCRs are being utilized to measure mRNA levels for both steroidogenic factor-1 (SF-1) and aromatase in the developing gonads of the red-eared slider turtle, a reptile with TSD. The expression patterns for these two factors (i.e., SF-1 and aromatase) are of particular interest when addressing the potential roles of estrogens during TSD, since both are believed to have regulatory effects during steroidogenesis. Gonadal total RNA samples are being assayed at various stages of embryonic development (i.e., stages during and following the sex determining period), at both male- and female-producing temperatures. The results of these studies will provide insights on the expression patterns for both SF-1 and aromatase in the developing gonads of a reptile with TSD.

PROPOSED RELATIONSHIPS BETWEEN THE SURFACTANT PROPERTIES AND THE DEVELOPMENTAL TOXICITY INDUCED IN FROG EMBRYOS OF HUMIC ACID.

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Humic acid (HA) is as an anionic surfactant that promotes the mobilization of a non-aqueous phase liquid (NAPL) in a porous medium. HA is extracted from peat by a simple series of acid/base extractions. The critical micelle concentration (CMC) was determined as the lowest concentration of HA needed to produce maximal effect on the surface tension in distilled water. Short-column tests of a HA solution at the critical micelle concentration (CMC) of 3.4 mg/ml were used to evaluate the applicability of HA as a surfactant. HA improved the NAPL removal efficiency up to about 81% as measured by simple column flushing tests. HA developmental toxicity was also tested using the Frog Embryo Teratogenesis Assay-Xenopus (FETAX) methods. ToxTools® was used to estimate 50% effect levels, 30% and 10% effect levels for HA. The 96-hr LC50 was approximately 4.0 mg/ml and the 96-hr EC50 (malformation) was greater than 4.05 mg/ml and therefore could not be estimated accurately. Although malformations were observed, no significant teratogenic effect is evident for HA in *Xenopus* embryos. The HA has an LC50 in the vicinity of the CMC, which is the optimum concentration for using the HA as a surfactant. This indicates that the toxicity maybe due to the disruption of cell membranes. This work was supported in part by a Faculty Research Grant from JSU.

TEMPORAL AND SPACIAL PATTERNS OF FECAL COLIFORM SOURCES.

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Existing methods for monitoring water-born fecal coliforms fail to address the origin of fecal contamination. We have tracked the sources of fecal coliform contamination in surface waters near Marion, Alabama by developing a database of antibiotic resistance patterns specific to human or nonhuman fecal coliforms. Comparison of antibiotic resistance patterns from natural water samples to the database reveals changes in sources of fecal contamination over time and space.

NEW RECORDS OF ALABAMA FISHES.

L. J. Davenport, W. Mike Howell and Ronald L. Jenkins, Dept. of Biology, Samford University, Birmingham, AL 35229.

New distribution records are reported for five species of fishes in the upper Mobile River Basin. The dusky darter, *Percina sciera* (Swain, 1883) and the banded pygmy sunfish, *Elassoma zonatum* Jordan, 1877, were collected from Ebenezer Swamp (Cahaba River System) at Shelby Co. Rt. 34, 4 mi N of Montevallo, Shelby Co., AL, on 25 February 2002 by the Samford University Vertebrate Field Zoology class. Distributional maps in the book, *Fishes of Alabama* (S. Mettee et al., 1996, Oxmoor House), do not document the dusky darter in the Cahaba River system; the banded pygmy sunfish was reported from the Cahaba River Coastal Plain, but not above the physiographic Fall Line.

The Tallapoosa shiner, *Cyprinella gibbsi* (Howell and Williams, 1971) was previously known only from the Tallapoosa River (Mettee et al., 1996; see above). We collected and released 82 specimens of the Tallapoosa shiner from Talladega Creek at Hanging Rock Road, Clay Co., AL, T19S, R7E, sec 28 on 27 November 2001. This is the first documented record from the Coosa River system (a previous record from Lake Chinnabee is thought to be a bait bucket introduction).

The chestnut lamprey, *Ichthyomyzon castaneus* Girard, 1858, has not been documented from the Cahaba River System above the Fall Line at Centreville. On 8 April 2002, an adult specimen, tentatively identified as *I. castaneus*, was collected in the Cahaba River, Old Overton Rd., at the canoe launch, B'ham, Jefferson Co., AL, sec 12, T18S, R2W, by Samford Vertebrate Field Zoology class.

A single specimen of the Cahaba shiner, *Notropis cahabae* Mayden & Kuhajda, 1989, was collected in the Cahaba River at Hwy. 52 bridge, Helena, Shelby Co., AL, T 20S, R3W, sec 20, on 14 May 2002. This is the first time this species has been taken at its uppermost site since 1969.

hTERT PROMOTER METHYLATION IN HUMAN PRIMARY EPITHELIAL CELLS.

Lucy G. Andrews and Trygve O. Tollefsbol, Dept. of Biology, Univ. of Alabama at Birmingham, Birmingham AL 35294-1170. Joel Berletch, William K. Woodfin and Mitchell S. Pate.

Telomerase is an enzyme known to be important in chromosomal stability and cellular senescence. By maintaining sequences of 5'-TTAGGG-3' on the ends of chromosomes telomerase keeps cells resistant to aging and unaffected by the restrictions imposed on them by the Hayflick limit. The enzyme's activity is regulated by transcription of its catalytic subunit, hTERT. The goal of this study was to (i) measure the amount of telomerase activity in primary human urethral epithelial cells using the Telomeric Repeat Amplification Protocol (TRAP assay) (ii) evaluate the amount of methylation in the promoter of the hTERT gene by performing sodium bisulfite sequencing and (iii) assess the amount of mRNA transcribed from the hTERT gene by performing a Reverse Transcriptase Polymerase Chain Reaction (RT-PCR assay). Preliminary TRAP assays have shown that primary human urethral epithelial cells are an immortalized cell line and have stem cell like properties. This study extends our knowledge of hTERT regulation in primary epithelial cells and further elucidates the mechanisms involved in control of this important gene.

VERONGID SPONGE PHYLOGENETICS AND SPECIFICITY OF ASSOCIATED CYANOBACTERIA.

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The evolutionary relationships of 24 Verongid sponges representing 7 species, 3 genera, and 2 families were examined using nuclear ribosomal DNA (rDNA) sequence data. A 700bp rDNA sequence corresponding to the entire ITS-2 region and partial 28S subunit was PCR-amplified, cleaned, and sequenced for each sponge sample. Molecular phylogenies were constructed using the variable ITS-2 region, the conserved partial 28S subunit, and both DNA sequences. All molecular phylogenies showed similar topologies with the ITS-2 region displaying the highest resolution at the genus and species level and the 28S partial subunit displaying the highest resolution at the ordinal and family level. Additionally, morphological and chemical data were examined for congruence with molecular phylogenies. A morphological matrix was constructed for the samples used in the molecular analysis using 10 traditional characters. A chemical matrix was created using 57 previously identified chemicals from 11 Verongid sponges to assess the utility of secondary metabolite data in phylogenetic analysis. Morphological and chemical data do not appear to be useful for resolving intra-ordinal relationships between Verongid sponges. Morphological analysis appears to be hindered by a low number of diagnostic characters and the intraspecific plasiticity of traditional characters commonly used in determining evolutionary relationships. Chemical analysis may be confounded by variable secondary metabolite production over time and the presence or absence of symbiotic microorganisms contributing to chemical production. Specificity of associated cyanobacteria identified from sponge genomic extracts were examined by 16S rDNA amplification and restriction enzyme analysis.

BIOSTABILITY OF WHEAT STRAW AS A SULFIDE-ENHANCED BIOFILTER.

Lisa Ann Blankinship, Dept. of Biology, Univ. of Ala., Birmingham, AL 35294. Sandra Nunezs and Robert Peters, Dept. of Civil and Environmental Engineering, Univ. Ala., Birmingham, AL 35294. Joseph J. Gauthier, Dept. of Biology, Univ. of Ala., Birmingham, AL 35294.

Heavy metals found in urban runoff pose a treat to aquatic ecosystems thereby making it desirable to filter such runoff. Wheat straw is an ideal biofilter as it is readily available at low costs. Current studies focus on the biostability of wheat straw treated with sulfide, iron, or a combination of both sulfide and iron solutions. The rational behind treating the straw is that since sulfide carries a negative charge, it should bind heavy metals found in urban runoff. However, it is unknown how treatment of wheat straw will affect straw stability. A series of PVC columns packed with straw where set up for varying amounts of time ranging from one week to sixteen weeks. For each time periods, three straw treatments (sulfide, iron, and iron + sulfide) were monitored for wheat straw degradation based on weight loss and decreases in lignin, total fiber, and cellulose. Control experiments using untreated straw were preformed for each time period.

HIGH LEVELS OF ANDROSTENEDIONE AND PROGESTERONE IN THE SEDIMENT OF A RIVER RECEIVING PAPER MILL EFFLUENT.

Ronald Jenkins, Dept. Biology Samford Univ., Birmingham, AL 35229, Elizabeth Wilson, Dept. Reproductive Biology, Univ. North Carolina, Chapel Hill, N.C., W. Mike Howell, Dept. Biology, Samford Univ., Robert Angus and Marione Kirk, Univ. Alabama at Birmingham, AL 35294.

The Fenholloway River near Perry, FL, USA receives effluent from a paper mill and contains populations of eastern mosquitofish, *Gambusia holbrooki,* with masculinized females. A previous study identified the androgen precursor androstenedione in low concentration (0.14 nM) in water samples from the river. The present study utilizes a toxicity identification and evaluation approach including solid phase extraction and HPLC purification, androgen receptor transcription assays and liquid chromatography mass spectroscopy to identify and characterize steroids in Fenholloway River sediment. No androstenedione and low levels of progesterone (0.3nM) were found in Spring Creek, a control tributary not receiving mill effluent and not containing masculinized mosquitofish. Androstenedione and progesterone (2.4 and 155 nM, respectively) were found in the sediment of the Fenholloway River at much greater concentrations than in the water column (0.14 nM and 6.5 nM, respectively). Other steroids from the sediment were detected with androgen receptor binding, but have not yet been identified by HPLC or LCMS. We hypothesize that pine pulp-derived phytosteroids in the paper mill effluent accumulate in the river sediment where they are converted by microbes into progesterone, androstenedione and other bioactive steroids.

FRESHWATER CYANOBACTERIAL RESISTANCE TO HERBIVORY BY A GENERALIST GRAZER: CHEMICAL VERSUS STRUCTURAL DEFENSE.

Frank A. Camacho and Robert W. Thacker, Dept. of Biology, Univ. of Alabama at Birmingham, Birmingham, AL 35294.

The freshwater cyanobacterium *Lyngbya wollei* forms dense mats in culturally impacted aquatic systems in Alabama and produces saxitoxin, a carbamate alkaloid neurotoxin. We explored the palatability of *L. wollei* compared to a filamentous green alga, *Rhizoclonium hieroglyphicum*, in feeding assays using the freshwater amphipod *Hyalella azteca* as an herbivore. Three types of feeding assays were conducted: (a) whole mats in the presence and absence of *H. azteca*, (b) ground *L. wollei* and *R. hieroglyphicum*, and (c) crude *L. wollei* extract coated onto artificial food strips. In general, algal growth rates declined as amphipod density increased for the whole mat assay. Furthermore, *H. azteca* avoided consumption of *L. wollei* and significantly reduced *R. hieroglyphicum* growth rates. Experiments using ground and extracted *L. wollei* showed that feeding deterrence was not due solely to the structural effect of the calcium carbonate sheath that surrounds the cyanobacterium. These results suggest that *L. wollei* may incur low rates of herbivory in freshwater ecosystems due to both structural and chemical defenses.

MICROSCOPIC EXAMINATION OF LARVAL SHRIMP, *MACROBRACHIUM ROSENBERGII*.

Daniel L. McLaren, Benjie G. Blair, and Mark E. Meade, Department of Biology, Jacksonville State University, Jacksonville AL 36265.

The Malaysian freshwater prawn *Macrobrachium rosenbergii* is a popular commercial food source and has a very high reproduction rate in artificial environments. Previous studies of the freshwater prawn have mainly focused on hatchery techniques. Classification of larval stages was originally conducted in the 1960's using light microscopy and 35mm photography. Other than this work, little has been done to examine the different developmental stages associated with the larval phase of growth. Females extrude up to 76,000 eggs dependent upon body size and multiple morphological stages can be found at any given time. Twelve larval stages have been previously reported and there were four main features associated with the classification of the different stages: eyestalks, pleopod formation, telson/uropod development, and number of rostrum teeth. Ovigerous females were hatched and reared at JSU. Larva were collected and examined using a Sony model DXC-960MD 3CCD color video camera linked to a Nikon SMZ-U Zoom 1:10 microscope and digitized using the Image-Pro Plus software version 4.1.0.0 (Media Cybernetics, L.P.). These results were confirmed using a JOEL 5600 scanning electron microscope. The SEM allowed for early detection of developmental characteristics. Our data corroborates with the early stages of larval growth, but not completely so with the later stages. The number of rostrum teeth is usually given precedence in these later stages, but the actual length of the rostrum and number of setae appear more definitive features of larval development. This project was funded in part by NSF-CCLI Grant #0088299.

COMPETITION BETWEEN THE CYANOBACTERIUM *LYNGBYA WOLLEI* AND GREEN ALGAE: EFFECTS OF SECONDARY METABOLITES AND HERBIVORY.

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Lyngbya wollei is a filamentous, mat-forming cyanobacterium that has been shown to produce saxitoxin, a paralytic shellfish poison. While the chemical compounds of *L. wollei* have been well characterized, experimental analyses of the potential role of saxitoxin in freshwater ecosystems are limited. Lake Guntersville contains persistent mats of *L. wollei* that occupy many shoreline areas, and in most cases are found with sympatric green algae and high densities of herbivorous snails (*Pleurocera annuliferum*). Competition between *L. wollei* and a common sympatric green alga, *Rhizoclonium hieroglyphicum*, was studied in a response surface design with and without the presence of *P. annuliferum* in order to characterize the relationship of the two species. Both *L. wollei* and *R. hieroglyphicum* show strong interspecific competition at high densities. However, while *L. wollei* growth is not significantly affected by *R. hieroglyphicum* density, *L. wollei* exhibited a density dependent facilitative effect on *R. hieroglyphicum* growth. Quantitative saxitoxin analysis was performed on the *L. wollei* samples from the experiment in order to determine if and when saxitoxin production may change according to changes in intra- and interspecific competition and the presence or absence of herbivory.

THE ANNUAL REPRODUCTIVE CYCLE OF THE SEA URCHIN *LYTECHINUS VARIEGATUS* FROM THE FLORIDA PANHANDLE

Adele W. Cunningham and Stephen A. Watts, Dept. of Biology, Univ. of Ala. at Birmingham, Birmingham, AL 35294-1170.

The reproductive cycle of *Lytechinus variegatus* was observed over a period of 18 months. The average gonad mass for females and males shows substantial increases from October of 2001 to March of 2002. Additional peaks for males and females occur in April 2001 and July 2002. Qualitative and quantitative analyses of gonad histology indicate the developmental state of gametes and the extent of nutrient storage in the accessory cells (nutrient phagocytes). In December and January of 2002, all gonad sections displayed accessory cell renewal and very limited gametogenesis. The presence of many mature gametes in April 2001 and May 2002 indicates ability to spawn. In July of 2001 and 2002, a wide range of reproductive states occurs in a single collection. Average germinal epithelium was thinnest in July 2001 and thickest in April 2001 and again in February and March of 2002. The germinal epithelium was similar for all other months. The largest oocytes and the greatest range of oocyte diameters occur in April and August 2001, and in March 2002. The range of oocyte diameters at peaks of reproductive activity suggests that *L. variegatus* produces overlapping cohorts of gametes. Evaluations of gamete development in this *L. variegatus* population suggest that peak reproductive activity is in the spring and mid to late summer and that *L. variegatus* spawns asynchronously in small spawning events over a period of months.

AN UNDESCRIBED SPECIES OF *CYCLOTELLA* (BACILLARIOPHYCEAE) FROM CLARKE COUNTY, AL.

Lisa A. Muellner and Roland R. Dute, Department of Biological Sciences, Auburn University, Auburn, AL 36849.

An undescribed *Cyclotella* species was collected from brackish waters in several locations within Clarke County, AL between October 2001 and September 2002. This novel species is similar to *Cyclotella stelligera* Cleve and Grunow and *Cyclotella pseudostelligera* Hustedt, but possesses a combination of characteristics that makes it unique. The taxon was not abundant in any samples but was found in low numbers throughout the study period. Cells ranged from 16 to 32 microns in diameter and were never observed to form chains. The concentrically undulate valves display a stellate central pattern externally. However, internally, the central area may be stellate or completely enclosed. External tubular marginal strutted processes are winged and occur on every third or fourth stria. On the inner surface of the valve, the marginal strutted processes are associated with two accessory pores. Spines, central strutted processes and cribra are absent. A single, stalked labiate process occurs on the valve mantle, opening as a simple pore on the outer valve surface. Further investigations will be required to determine geographic distribution, ecologic tolerance and morphological variability within the taxon. Funding for this project is provided through the Auburn University Dean's Research Initiative, Auburn University Graduate Research Award, and the Lands Division of the Alabama Department of Conservation and Natural Resources.

ACTIVITY OF CYTOCHROME P-450 IN *XENOPUS LAVEIS* EMBRYOS AS DETERMINED BY MODIFIED ENZYME ASSAY.

Greg Gibson and James Rayburn. Jacksonville State University, 700 Pelham Road North Jacksonville, AL 36265.

Cytochrome-P-450 is an important enzyme involved in detoxification. It is found in the mitochondrial membranes of liver cells. The objective of this experiment is to measure its activity in early stage *Xenopus laevis* (South-African Clawed frog) embryos. The Modified Nash Assay is a reliable metabolic system that measures the product of enzyme substrate/activity of Cytochrome-P-450 as a product of formalin from Aminopyrine. For the first part of this experiment *Xenopus* embryos were grown in Fetax and collected at 24,48,72,96 hour intervals, and frozen until S-9 preparation. Samples were homogenized and supernatant from 900g centrifugation were taken for S-9 preparation. Samples were then aliquoted at 100ul volumes with 2,900ul of prepared reaction mixture that served as a Metabolic Activation System. Reaction mixture used was a NADPH generator system consisting of: NADPH, glucose-6-phophate, glucose-6-phosphate dehydrogenase and magnesium chloride. Aminopyrine was used as a substrate in this system. The formalin produced by this reaction was measured using a spectrophotometer. Following this, remaining protein from S-9 was measured to give activity /mg of protein in the sample. Results suggest that while no significant amounts of Cytochrome-P-450 exist in early stage *Xenopus* embryos, the Nash assay can be used to demonstrate activity of Cytochrome P-450.

JUBILEES AND HYPOXIC EVENTS IN MOBILE BAY.

Tina Miller-Way, Dept. of Natural Sciences, University of Mobile, Mobile, AL 36663.

Jubilees, the mass shoreward migration of bottom-dwelling fauna, have been reported from Mobile Bay since the 1880's. Organisms are believed to migrate due to low dissolved oxygen levels in the bottom water. The appearance of jubilees (and by inference, the occurrence of hypoxia) has been anecdotally linked with specific weather conditions including high freshwater input to the bay. An array of Hydrolab™ monitoring units in surface and bottom waters was deployed at 4 stations covering 72 km^2 in the region of Mobile Bay known for its jubilees for 4-5 months during the summers of 1993, 1994 and 1995 to investigate these relationships. Records of jubilee occurrence were obtained from newspaper sources. During 1994 and 1995, bottom waters in this area were hypoxic (< 2 mg l^{-1}) approximately 36% of the deployment periods (June to November, May to September, respectively). Dissolved oxygen (DO) concentrations were less than 5 mg l^{-1} (but > 2 mg l^{-1}) for an additional 30% of this period. Discharge of the Mobile River system into Mobile Bay was below average annual flow during these years. However, DO levels were significantly correlated with salinity stratification (surface-bottom water salinity differences) during transition periods (hypoxia formation or breakdown). The occurrence of jubilees during this time frame did not match the frequency or duration of hypoxia offshore. The data suggest there is a lens of low dissolved oxygen water that moves around in this portion of the bay and is only periodically pushed shoreward resulting in a jubilee.

TORUS LIGNIFICATION IN HARDWOODS. Roland Dute, Michael Miller, Christina Coleman, and Brian Prather, Dept. of Biological Sciences, Auburn Univ., Auburn, AL 36849.

Pit membranes in plants function in water transport from cell to cell, and tori on the surface of the membranes act to inhibit the passage of air embolisms and reduce tearing under conditions of membrane displacement. In the past, it was thought that only gymnosperms contained tori, However, it is now known that some hardwoods (angiosperms) including *Daphne*, *Osmanthus*, *Celtis,* and *Ulmus* also possess these structures. The torus-bearing pit membranes in these genera have been studied in detail in this lab, and their structure, development, and function are fairly well understood. In *Daphne* and *Osmanthus* torus development is completed late in cell ontogeny and is associated with a microtubule plexus. In *Celtis* and *Ulmus* however, torus development is completed early and without benefit of microtubules. Now we are investigating torus chemistry. Specifically, we are trying to determine whether the tori are lignified. We have two tests for lignin: 1) sectioned specimens are stained with acriflavin and viewed with fluorescent confocal microscopy, and 2) ultrathin sections are stained with $KMnO_4$ and viewed with transmission electron microscopy (TEM). Preliminary results for *Daphne* and *Osmanthus* show their tori to be lignified. Acriflavin tests show tori of *Celtis* and *Ulmus* to be nonlignified, but $KMnO_4$ deposition indicates some lignification. The conflicting results for the latter two genera might result from the ability of $KMnO_4$ to oxidize tissue and to open up additional binding sites.

A COMPARISON OF THE EFFECTS OF PHLOXINE B AND EOSIN YELLOW UNDER VARIOUS LIGHT CONDITIONS ON POPULATION GROWTH OF *TETRAHYMENA PYRIFORMIS*. Jason . Glenn, Jason Hill, Christa Collins, Mark Meade, and C.P. Olander. Department of Biology, Jacksonville State University, Jacksonville, AL 36265

Phloxine B and Eosin Yellow are halogenated photoactive xanthene dyes, that are FDA approved for use in human cosmetics and drugs. Research examining the effectiveness of photoactive dyes, such as Phloxine B, as pesticides has been conducted since the early 1970's. Toxicity to target organisms varies among species and ranges in concentrations from 1-100 ppm. FDA approval of Phloxine B for possible use in treating aquatic pathogens such as, *Icthyophthirius multifiliis,* is contigent of toxicity studies examining both target and non-target species. Currently we report the effects of various levels of concentrations of Phloxine B, Eosin Yellow and exposure to light on population growth in a non-target species, *Tetrahymena pyriformis.*

VERTEBRATE ROAD-KILL SURVEY OF THE MOBILE BAY CAUSEWAY.

David H. Nelson and Cynthia Scardamalia-Nelson, Dept. of Biological Sciences, Univ. of South Alabama, Mobile, AL 36688.

A systematic, road-kill survey was conducted (by bicycle or automobile) on the Mobile Bay Causeway each week during 2001 and 2002 to assess the numbers of vertebrates killed by vehicular traffic. More than 1000 organisms representing 85 species of vertebrates were encountered: 8 amphibians, 25 reptiles, 39 birds and 13 mammals. Southern leopard frogs (*Rana utricularia*) were the most abundant amphibian (n=16). "Endangered" Alabama red-bellied turtles (*Pseudemys alabamensis*) were the most frequently encountered reptile (n=131); most specimens were hatchlings. Laughing gulls (*Larus atricill*, n=82) and American coots (*Fulica americana*, n=62) were the most commonly encountered birds. Raccoons (*Procyon lotor*, n=87), opossums (*Didelphis marsupialis*, n=82), and nutria (*Myocastor coypus*, n=59) were the most abundant mammals. Data were analyzed by taxon and season. The most significant finding in this ongoing study so far has been the emergence of 102 hatchlings of *Pseudemys alabamensis* during the months of March and April. These data confirm overwintering in the nest and document significant roadkill mortality of hatchlings of the Alabama red-bellied turtle.

CHEMISTRY

THE EFFECT OF SOLVENT ON THE ABSORPTION SPECTRA OF P-N,N-DIMETHYLAMINOCINNAMONITRILE.

Adam S. Olia and Steven E. Arnold, Dept. of Physical Sciences, Auburn Univ. Montgomery, Montgomery, AL 36124

Aromatic compounds containing both electron donor and acceptor substituents are highly polar and their UV spectra can be sensitive to solvent polarity and hydrogen bonding. The UV-visible absorption spectra of p-N,N-dimethylaminocinnamonitrile in many solvents of varying polarity and hydrogen bonding ability are presented. It is found that the spectra are highly sensitive to solvent polarity but are insensitive to solvent hydrogen bond donor or acceptor strength. The spectra obtained in water are the lone exception and possible explanations are explored. This research was partially supported by a grant from the Auburn University Montgomery Research Grant-In-Aid Program.

EFFECT OF pH ON GROWTH KINETICS AND HARDNESS OF TGS:LAP AND KDP:LAP CRYSTALS*, Jason Stephens, A. K. Batra, M. D. Aggarwal and R. B. Lal, Department of Physics, PO Box 1268, Alabama A&M University, Normal, AL 35762

Triglycine sulfate (TGS), and L-arginine phosphate (LAP) and Potassium dihydrogen phosphate (KDP) crystals have technological importance in infrared detecting and nonlinear optical devices respectively. However, their mixed crystals have not been investigated. In the present work, mixed crystals of TGS:LAP and KDP:LAP with various compositions were grown by isothermal constant evaporation method, and their microhardness values were determined by the Vicker's indentation method. Effects of pH of solution on the growth morphology were also investigated. In this presentation, results of our investigations will be presented and discussed.

* Work supported under NASA grants NAG8-1708 and NASA8-1623 and NSF project HRD-0236425

SYNTHESIS OF SOME 4-ALKYL AND 3,4-DIALKL-4-AZACHOLESTANES AND 4-ALKYL AND 3,4-DIALKYL-4-AZAPREGNANES. Norman J. Doorenbos, Dept. Pharmacal Sci., Auburn Univ., Auburn, AL. 36849; and Vithal C. Patel, FMC Corp., Baltimore, MD.

Since 1956 our program has contributed to the discovery of azasteroids with anabolic, antiandrogenic, antiprogestational, anti-inflammatory, antimicrobial, fertility control, BPH inhibition, hair growth stimulant, hypocholesterolemic, and neuromuscular blocking properties.

We wish to report the synthesis of some 3,4-dialkyl-4-azacholestanes and pregnanes synthesized for these ongoing studies. The steroidal enamine lactam intermediates used as starting materials were prepared as we first described in 1958.

Steroidal-4-en-3-ones such as 4-cholesten-3-one were treated with ozone to obtain a keto acid, 3,5-seco-4-norcholestan-5-on-3-oic acid (I), subsequently treated with amines to obtain enamine lactams which were discovered to react with Grignard reagents at elevated temperatures to yield novel unsaturated 3-alkyl derivativatives.

Azasteroids, whose synthesis will be described, include 4-methyl-4-aza-5α-cholestan-3-one, 3,4-dimethyl-5α-cholest-2-ene, 3β,4-dimethyl-4-aza-5α-cholestane, 4-ethyl-4-aza-5-cholestene, 4-ethyl-4-aza-5α-cholestane methiodide, 3β,4-dimethyl-4-aza-5α-pregnan-20β-ol and related azasteroids.

A VERSATILE SOLUTION CRYSTAL GROWTH SYSTEM FOR STUDYING GROWTH KINETICS*,

Jason Stephens, A. K. Batra, M. D. Aggarwal and R. B. Lal, Department of Physics, P O Box 1268, Alabama A&M University, Normal, AL 35762

In order to good quality crystals from solution, it is important to study the growth mechanisms and growth kinetics of crystals grown under various growth conditions such as degree of supersaturation, presence of impurities, stirring rate, pH of solution. The most frequently measured quantity is the investigation of in-situ growth rate as a function of the supersaturation degree $\Delta C = C-C^*$ and equation expressing this process is: $G = K_g(\Delta C)^g$.This equation has a power law form and it can be used to correlate experiments data for a given range of the supersaturation values. K_g is the global mass transfer coefficient and g is the growth kinetics order. To determine the growth rate by weighing method, a versatile system which consists of a glass 250 ml crystallizer provided with a jacketed system for heating water from thermostatic bath, with a temperature (±0.05°C) and agitation control along with an on-line recording system for continuous measurement of temperature and weight of growing crystal was designed and fabricated. The details of the system will be presented.

* Work supported under NASA grants NAG8-1708 and NASA8-1623 and NSF project HRD-0236425

CHARACTERISTICS OF PURE AND DOPED LITHIUM NIOBATE CRYSTALS*,

Tesfaye Gebre, M. D. Aggarwal, A. K. Batra and R. B. lal Department of Physics, PO box 1268, Alabama A&M University, Normal, AL 35762

Lithium niobate single crystal is an excellent material for various optical applications such as frequency conversion, optical switches, optical modulators and others. An automatic diameter control Czochralski crystals growth system has been designed and fabricated. With optimized growth parameters, pure and Fe/Mn doped crystals have been successfully grown using this system. The characterizations of these crystals will be presented along with groeth data..

* Work supported under NASA grants NAG8-1708 and NASA8-1623 and NSF project HRD-0236425

GEOGRAPHY, FORESTRY, CONSERVATION, and PLANNING

LAND BASED CLASSIFICATION SYSTEM APPLIED TO AN URBAN MIXED USE VILLAGE.

William K. McAllister, James Benderson, and Tarrence Houston. Dept. of Community Planning and Urban Studies, Alabama A & M University, Huntsville, Alabama.

An urban mixed-use village presents an array of issues to planners responsible for collecting and analyzing land uses as a first step in land use planning. In the field the first issue is to properly understand what uses are actually present when signs and other obvious clues are missing. Next, how much land actually goes with each use? Sometimes a single parcel can contain more than one use. Once the field data is recorded at its most basic level, some system of classifying then is used to group data into more useful information. For the study area, a turn-of-the-century cotton mill village located on the north side of downtown Huntsville, Alabama, the new American Planning Association system was selected. This Land Based Classification System (LBCS) responds well to high density mixed use situations, and is compatible with Geographic Information Systems (GIS). A potentially valuable feature is the capacity to classify up to five different dimensions (layers) in up to four levels of detail. Larger scale areas, such as a village, might require more land use details, while a city-wide study fewer details. The five dimensions are land-use activities, economic functions, structure types, site characteristics, and ownership types. Each of these dimensions is tested to find out an optimum amount of information useful for both planning and appropriate zoning codes tailored to a small area mixed-use environment where conventional zoning needs updating.

FACTORS OF RESTAURANT CHOICE IN JACKSONVILLE

Clarence W Blalock, Department of Geography, Jacksonville State University, Jacksonville, Al 36265

The City of Jacksonville, Alabama has many eating establishments from which to choose. It was hypothesized that the main factor influencing restaurant choice for lunch was distance from campus. A study group consisting of Jacksonville State University faculty and staff was surveyed regarding their lunchtime eating preferences. Analysis of survey data showed distance to be a less significant variable than price in influencing where lunch was eaten.

EFFECT OF SCALE ISSUE ON MEASURING JOB/HOUSING IMBALANCE: A METHODOLOGICAL DEBATE BY USING GIS. Selima Sultana, Department of Geology and Geography, Auburn University, Auburn, AL 36849.

There has been considerable concern about the geographical scale of analysis for measuring job/housing imbalance, when an area is unable to provide jobs for the local residents or an employment area has insufficient housing for workers. Arguably, larger areas are more likely to job/housing balance. As a result, many previous studies suggest measuring the jobs/housing balance at the meso-level, within a reasonable commuting distance from a given employment or residential site, rather than using a predefined administrative zone. Though the definition of a "reasonable" commute range is arbitrary, none of the research has yet looked at the effect of variation commuting ranges in measuring job/housing ratio. Using two geographical levels: (1) the super districts (SD)-- a predefined jurisdiction level and, (2) a seven-mile buffer for each TAZ-- an undefined jurisdiction level respectively, this paper investigates the effect of scale in the performance of the measuring job/housing ratio. The results show the regression model constructed using the a seven-mile buffer zone increases overall explanatory power and contributes to higher significance levels and greater consistency of individual coefficients. These findings suggest that in future research a GIS method should be used to simulate several undefined jurisdiction levels in order to select the appropriate scale of analysis for measuring job/housing imbalance.

SOIL MORPHOLOGY USED AS EVIDENCE IN A PCB-CONTAMINATION LAWSUIT. **Kelly D. Gregg, dept. of physical and earth sciences, Jacksonville State University, Jacksonville, AL 36265.**

Polychlorinated biphenyls present a significant risk to human health. In Anniston, Alabama, the Monsanto Corporation released some 600 tons of PCBs into surrounding neighborhoods. A survey conducted by residents indicated unusually high rates of disease within this community. This survey helped initiate a major lawsuit against Monsanto in early 2002. The defense maintained that Monsanto was not responsible and that these PCBs had been purchased by local industries for the formulation of casting sand. This contaminated sand was later used locally as fill dirt. To counter this argument, the plaintiffs requested a study to determine whether contaminated soils actually contained casting sands. Baseline morphologies for undisturbed soils were obtained by excavating profiles from around the roots of trees that pre-dated PCB production. Next, the physical properties of a variety of casting sand mixtures were determined. Soil profiles were then described for thirteen contaminated sites and compared to undisturbed soils and sands. Soil morphologies for ten sites were entirely consistent with natural soils, indicating that casting sands were not present in significant quantities. Three sites did contain fill, but analysis indicated that this material was not casting sand.

MONITORING URBAN GROWTH IN THE ACCRA METROPOLITAN AREA, GHANA USING SATELLITE IMAGERY.

Yaw A. Twumasi, and Tommy L. Coleman, Center for Hydrology, Soil Climatology, and Remote Sensing, Dept. of Plant and Soil Science, Alabama A&M University, Normal, AL 35762. Andrew Manu, Dept. of Agronomy, Iowa State University, Ames, IA 50011.

Increasing population growth and urbanization are among the major problems confronting Accra Metropolitan Area (AMA), the capital of Ghana. These growths have serious economic and environmental impact on the Metropolitan's economy in the form of excess spending on infrastructure, provision of social amenities as well as littering and solid waste generation. In order to assess the extent of this growth, we employed sequential Landsat Thematic Mapper imagery of 1991 and 2000. Both images were radiometrically corrected and pre-processed to remove speckles, clouds and scan lines. Two change detection techniques: image differencing and multi-date band insertions were used to identify the areas of urban encroachment. Result indicates that AMA has increased more that 200% between 1991 and 2000. With the Atlantic Ocean to the south, the city expanded mostly in the northern, northeastern and eastern directions. In order to minimize the impact of urban expansion, planning tools such as zoning, moratorium and other growth management strategies are suggested as a way of preventing the city from exceeding its carrying capacity.

DEMOCRATIC STRONGHOLD IN ALABAMA: THE BLACK BELT REGION.

Emory F. Wheatley, Jacksonville State University, Jacksonville, AL 36265.

In statewide elections, citizens in Alabama have voted primarily for the Democratic candidate. A shift has occurred over the past twenty years to voting for the Republican candidate. The gubernatorial election of 2002 revealed that although the Republican candidate won the race, the Democratic Party still has a region that voted overwhelmingly for the Democratic candidate. The region of Democratic dominance is the Black Belt. The Black Belt Region is a rural area characterized by low incomes, low education levels, and predominantly African Americans. The purpose of this study is to determine if the correlation between the strength of the Democratic vote and the percentage of a county's population that is African American is greater in the Black Belt Region than in the other Alabama counties. My hypothesis is that there is a stronger correlation between the percentage of the Democratic vote and the percentage of African American population in the Black Belt Region than in the other counties in Alabama. My study also provides the generalization that Alabama may become a Republican stronghold in cities and certain smaller places but where there are high concentrations of African Americans this place will remain a Democrat Party stronghold. This exists in the Black Belt Region.

IMPLEMENTION OF GIS IN SYRIA. Thomas Baucom, Dept. of Physical and Earth Science, Jacksonville State University, Jacksonville, AL 36265.

While the development and implementation of GIS began in the United States and Canada with the support and funding of governmental agencies and foundations and the efforts of academia, implcmentation of GIS in Syria has come about by the efforts of single individuals. These individuals come from academia and generally have had little formal training in GIS either within the country or outside the country. Their use of GIS is primarily discipline oriented and has been encouraged through contact with colleagues both in and outside Syria. They have, for the most part, implemented GIS on their own in order to obtain efficiencies in the contract work they perform for municipal and state governmental agencies. More succcssful institutional implementation is found in the activities supported by foreign funds, such as thc Old Aleppo Restoration Project or the United Nations' ICARDA research facility. The primary reasons for the problems in implementing GIS in Syria are the difficulty of getting past attitudes regarding the confidentially (secrecy) of government data, foreign restrictions on Syria's acquiring needed technology, the difficulty of funding equipment and software purchases, the quagmire of new course approval in academia, and the shortage of adequately trained and paid personnel to teach GIS courses or manage GIS operations.

HURRICANE ISIDORE IMAPCTS AT GULF SHORES AND DAUPHIN ISLAND, AL. Philip L. Chaney, Department of Geology and Geography, Auburn University, AL 36849.

In September 2002, Hurricane Isidore wreaked havoc in the Gulf of Mexico region by hitting Cuba and the Yucatan Peninsula (wind speeds >110 mph), then tracking northward where it made landfall along the U.S. Coast just west of Grand Isle, Louisiana. The counter-clockwise rotation pattern of the wind field associated with the tropical cyclone produced storm surge and intense rainfall conditions along the Alabama Coast that resulted in significant wind and flood damage to homes and infrastructure at Dauphin Island and Gulf Shores. Fortunately, few homes were completely destroyed because the potential impact of the storm surge was greatly reduced by a significant decrease in the intensity of the tropical cyclone prior to landfall (70 mph winds at landfall on September 26). However, Isidore completely destroyed the "protective beach berm" (i.e., artificial dune) constructed along the western end of Dauphin Island by FEMA after Hurricane Georges overwashed the island in September 1998. This paper reports the findings of a field trip to the damage sites at Gulf Shores and Dauphin Island on October 1st, 2002.

ENVIRONMENTAL INITIATIVES OF COMMUNITY-BASED DEVELOPMENT ORGANIZATION: THE CASE OF THE FEDERATION OF SOUTHERN CO-OPERATIVES OF ALABAMA. Edmund C. Merem, Dept. of Urban and Regional Planning, Jackson State Univ., Jackson, MS 39211. Yaw A. Twumasi, Center for Hydrology, Soil Climatology, and Remote Sensing, Dept. of Plant and Soil Science, Alabama A&M Univ., Normal, AL 35762.

One of the major gaps in contemporary community development discourse, despite all its good intent and purposes, is the inadequate coverage of the various environmental initiatives adopted by Community Based Development Organizations (CBDOs). Most of the challenges confronting communities from neighborhood decline to sprawl matters rank in the same order of importance like the environmental problems facing these places. Since there can be no livable community without a healthy environment, there are concerns about air and water quality, wetland protection and environmental justice issues in several communities. Some of these communities have initiated numerous projects to deal with these problems, with some degree of success. Yet their accomplishments suffer from utter disregard from mainstream scholarship. Reviews of the literature on community development show a slight emphasis on the environmental accomplishments of communities. These accomplishments continue to inform the broader environmental agenda due to partnerships, coalitions, and citizen's involvement. With the little work in this area, this paper analyzes the environmental initiatives of CBDOs. To buttress the scale of environmental efforts adopted by these organizations over the years, the research presents some initiatives involving an African American CBDO in Alabama (The Federation of Southern Cooperatives). The paper argues that the current level of scholarship in the community development literature should lend itself to adequate coverage of these initiatives given their contributions to society through policy development, and the current emphasis on local participation.

COMMUTING TIME CHANGE AS AN INDICATOR OF URBAN SPRAWL: SELECTED MSAs IN ALABAMA 1980-2000. Patrice S. Ruffin, Dept. of Community Planning and Urban Studies, Ala. A&M Univ., Normal, AL 35762.

Urban sprawl is the rapid spread of urban development and urban populations into non-urban areas. Growth is usually thought of as a good thing for cities, but unplanned, unregulated growth with characterized sprawl can become a major problem. Alabama's four largest metropolitan statistical areas (MSAs) are experiencing the effects of urban sprawl. Those MSAs include 1) Birmingham, 2) Huntsville, 3) Mobile, and 4) Montgomery. This study documents changes in time travel to and from work (commuting time) and described it as a predictor and indicator of sprawl. Each MSA was studied documenting changes in its population totals and changes in the length of commuting times during the period of 1980 to 2000. Over this time period, there were increases in the populations of all four metropolitan statistical areas. Preliminary findings for the Huntsville and Birmingham MSAs show longer commute times correlate with increased population in the MSA. The land use patterns also support the characterization of the growth as sprawl.

NEIGHBORHOODS IN TRANSITION: PROFILES OF OLDER HUNTSVILLE (AL) NEIGHBORHOODS BASED ON THE 2000 U.S. CENSUS. Constance J. Wilson Department of Community Planning & Urban Studies, Alabama A&M University, Normal, Alabama 35762.

The second half of the 20th Century ushered in a period of rapid to steady grown that transformed the economy and the landscape of Huntsville, Alabama. At the benchmark year of 1950, the City's population stood at 16,437, by 1970 it had increased by 738.4%. Based on the 1990 Census count for the City the population had reached 159,866, a 872.5% increase within the span of 40 years. The 2000 Census count revealed the influence of sprawl as the City's population declined by 2.86%, while the county's (Madison) increased by 15.8%. What inner city influences did the dynamics of sprawl and population decline have on older neighborhoods in Huntsville? Extraction, tabulation and analysis of 2000 census data for indicators including income, age, race, education, and homeownership, for older areas of the City provide insight. Five areas are profiled (Meadow Hills, Edmonton Heights, Dallas/Lincoln Mills, West Huntsville, and Terry Heights/Hillendale) to assess the changes in their social and economic character and how the indicators measured for these communities compare with a city –wide profile. These communities have been targeted since 1990 for structured intervention to halt decline. The analysis for each community shows the relationships patterns and common associations that exist among sets of indicators and which shape the social and economic dynamics of these communities.

THE EFFECTS OF URBANIZATION ON RARE SPECIES IN MUSCOGEE, HARRIS, AND MERIWETHER COUNTIES IN GEORGIA. Amanda Kruvand and Selima Sultana, Department of Geology and Geography, Auburn University, Auburn, AL 36849.

Five distinct physiographic provinces are represented in Georgia: the Cumberland Plateau, the Ridge and Valley, the Blue Ridge, the Piedmont, and the Coastal Plain, and each province has associations of plants and animals unique to Georgia or the southeastern U.S. There are currently 409 taxa of animals and 645 taxa of plants on Georgia's special concern list. The Georgia Natural Heritage Program has documented the occurrences of these plants and animals in hopes of conserving the remaining natural biodiversity of the state, and put them in to GIS files for rapid cross-referencing and retrieval of records. Using the rare species index files created by the Georgia Natural Heritage Program, the goal of this research is to analyze the effects of urbanization on the rare species biodiversity of the metropolitan Columbus area (the Georgia counties of Meriwether, Harris, and Muscogee), or focus on urbanization's effects on a single (or specific number of) plant or animal species. The research finds significant relationship between the growth of urbanization and diversity of endangered species.

RECONSTRUCTING THE HISTORY OF RAILROADING IN TUSCUMBIA AND SHEFFIELD, ALABAMA, THROUGH RELICTS ON THE LANDSCAPE. Frank N. Himmler, Dept. of Geography, Univ. of N. Ala., Florence, AL 35632.

Railroading began in Alabama when on January 16, 1830, the Tuscumbia Railway Company was chartered by the State of Alabama. This was the first railroad chartered west of the Appalachian Uplands. The line eventually connected Tuscumbia Landing on the Tennessee River below The Muscle Shoals with Decatur above The Shoals. The line ran east through downtown Tuscumbia on 5th Street and then angled southeast toward Leighton and Decatur. The 1926 U.S.G.S. topographic map of Tuscumbia shows this line and many others which do not appear on the 1971 U.S.G.S. topographic map of Tuscumbia. However, numerous relicts of this early line and others can still be found on the landscape of Tuscumbia and Sheffield. These include the Old Railroad Depot in downtown Tuscumbia on 5th Street even though the tracks have been removed except for a small section where a static display of a caboose and boxcar are located and a curious pattern of old weathered asphalt on 5th Street revealing where the old roadbed is located. Other relicts include linear patterns of trees in the residential areas of southeast Tuscumbia indicating where the old roadbed was located and an occasional linear depression where a cut was excavated to level the roadbed. Abandoned even before 1926 was the original line to the Old Railroad Bridge which crosses the Tennessee River to Florence. Traces of that route can be found in present day property lines and in linear patterns of trees. More recent abandonment can be found west of downtown Tuscumbia where warnings of a railroad crossing can be seen painted on Hook Street and old ties and even a segment of discarded rail can be seen where the tracks were torn up twenty five years ago.

EVALUATION OF CALHOUN COUNTY'S OUTDOOR WARNING SYSTEM. Laura K. Gosnold, Dept. of Physical and Earth Sciences, Jacksonville State Univ., Jacksonville, AL 36265.

As of 1992 the Federal Emergency Management Agency (FEMA) has provided the funds to install 106 outdoor warning sirens in Calhoun County, Alabama. Their main purpose is to warn residents in the event of a chemical spill at the Anniston Army Depot, but they will also sound during severe weather warnings, a hazardous materials spill, and monthly tests. It is important that all residents of the county are within hearing range of a siren. Factors that might hinder the transmission of sound should be identified, so that the proper measures can be taken to make the sirens more effective. When viewing a current map of the county and its cities, the sirens seem to be well distributed. However accurate conclusions cannot be drawn until the topography, buildings, city limits, and population densities have been taken into consideration.

RESIDENTIAL GROWTH IN MADISON COUNTY, ALABAMA AND THE EFFECTS ON MAJOR AND MINOR COLLECTORS.

Thomas J. Nunez, Dept. of Community Planning and Urban Studies, Ala. A&M Univ., Normal, AL 35762.

Since 1990 the population in Madison County has increased by 16%. As a corollary to this the number of housing units has grown from 97,855 in 1990 to 120,288 units being reported in the 2000 census. This growth has impacted the county and put a strain on the minor arterials and major collectors serving the county. This study raises the question of how has residential growth from the development of subdivisions affected average daily traffic on minor arterials and major collectors in Madison County, Alabama? The focus of the study will be on large scale subdivision developments (50 units or more) and roadways that collect and carry traffic from them to the major arterials.

THE VICTORIAN FRONT PORCH CHRISTMAS TOUR.

Tom L. Martinson, Department of Geology and Geography, Auburn University, Auburn, AL 36849.

The Victorian Front Porch Christmas Tour, held annually in Opelika, Alabama, is one of the South's premier tourist attractions. This is an example of community tourism, an effort to attract tourists, foster community identity, provide formal and informal education, and encourage economic regeneration. A multimedia presentation of the tour offers an example of how communities can promote heritage tourism and thereby attract visitors to their area.

PHYSICS and MATHEMATICS

ON REALIZATION OF INVERSE STIELTJES FUNCTIONS. Sergey Belyi, Dept. of Mathematics & Physics, Troy State University, Troy, AL 36082.

The major part of realization theory concerns the identification of a given holomorphic function as a transfer (characteristic) function of a system (colligation) or a linear fractional transformation of such a function. Systems whose main operator is bounded have been investigated thoroughly, and original results go back to the works of M.S. Brodskii and M.S. Livsic. However many realizations in different fields including system theory, scattering theory, and electrical engineering involve unbounded main operators and a complete theory is not yet available. The aim of the present discussion is to outline the necessary steps needed to obtain a more general realization theory for a special class of holomorphic functions along the lines of M.S. Brodskii and M.S. Livsic. We consider realization problems for a class of operator-valued inverse Stieltjes functions acting on a finite-dimensional Hilbert space. They appear as linear fractional transformations of the operator-valued transfer functions (characteristic functions) of linear stationary conservative dynamical systems (Brodskii-Livsic rigged operator colligations). Both the direct and inverse realization theorems are stated and proved.

CUMULATIVE DISTRIBUTION OF RIVER LENGTHS, THE NUMBER OF RIVERS AND THE TOTAL LENGTH OF ALL RIVERS. A. Tan and W. Sheng, Department of Physics, Alabama A & M University, Normal, AL 35762.

In some statistical studies, the concept of cumulative distribution is used. This distribution always betrays a smoother profile and requires a smaller sample of data. Further, the cumulative number is nothing but the rank of the quantity whose distribution is sought. Interestingly, the cumulative distribution of an exponential distribution is itself exponential. The cumulative distribution of river lengths, like those of many one-dimensional objects, is found to be nearly exponential. On the longer end of the scale, the river lengths are limited by the continental size. The amplitude of the exponential curve gives total number of river in the world, whereas the area under the curve yields the total length of all rivers.

LAMBDA-FOLD MULTIDESIGNS FOR GRAPH-PAIRS ON 4 AND 5 VERTICES.

Atif Abueida, Dept. of Mathematics, Univ. of Dayton, Dayton, OH 45469-2316. Mike Daven, Division of Computer Science and Mathematics, Mount Saint Mary College, Newburgh, NY, 12550. Kenneth Roblee, Dept. of Mathematics and Physics, Troy State Univ., Troy, AL 36082.

Let G and H be a pair of non-isomorphic graphs on either 4 or 5 vertices. A (G,H)-multidesign of order n is a collection of subgraphs of the complete graph on n vertices, each one of which is either isomorphic to G or to H, such that each edge of the complete graph on n vertices is in exactly one of these subgraphs. It has been determined by the first two authors the values of n for which such multidesigns exist. Now, the lambda-fold complete graph on n vertices has the property that there are exactly lambda-many edges incident to every vertex-pair. We define a (G,H)-multidesign of the lambda-fold complete graph to be a collection of subgraphs of that graph, each of which is either isomorphic to G or to H, such that each edge in the lambda-fold complete graph is an edge in exactly one of the subgraphs. Here, we also consider those same non-isomorphic graphs on either 4 or 5 vertices, and decide the values of n and lambda for which a (G,H)-multidesign of the lambda-fold complete graph on n vertices exists.

SAMFORD UNIVERSITY NEW TELESCOPE AND THE INTERNET.

Henry W. Glotfelty, Department of Physics, Samford University, Birmingham AL 35229.

The Department of Physics has recently acquired a 12" Meade LX200 GPS telescope. Its onboard database has more than 145,000 star locations. In addition, the Department has purchased a Santa Barbara Instrument Group CCD Camera, the SBIG ST-8E, with resolution of 1530 x 1020 pixels. Our future plans are to be able to remotely control the telescope, record star images, and transmit star images over the internet to the remote computer. While observing real time pictures of the sky from the CCD camera, the remote operator will be able to move and to direct the telescope to a star from its onboard database or to direct the telescope to specific astronomical coordinates. The complete implementation of our plans will require many years of hard work by the Physics Department. The benefits to Samford University will be in the accessability of the telescope to astronomy classes, to students and faculty doing research, and to our surrounding community.

INDUSTRY and ECONOMICS

WOMEN AND MONEY IN THE 21ST CENTURY: A SURVEY OF WOMEN IN TRANSITION. Kathy Lewis-Adler Ph.D. and Michelle Coole MBA. School of Business Univ. of N. Ala., Florence, Alabama 35632.

Marriage is no longer a sure bet for securing a woman's financial future. Today, 50 % of marriages fail and according to experts 90% of women will become the sole providers of their financial futures. Women are living longer than their male counterparts and many will become widowed, divorced or never married by the time they retire. Female earning power is up however, 67% of these women will be impoverished in their golden years due to inadequate savings plans and inexperience in financial matters. Understanding how women connect the meaning of money to their inner lives will move them past personal fears and social pressures and the frightening alternative of becoming "Gucci bag ladies". The sample frame included a diverse profile of women aged 21-62. The authors employed a simple category attitude scale to expand flexibility and gather descriptive and behavioral dimensions. Descriptive analysis and percentage cross-tabulations were used to define the nature of women's relationship to their money. Findings demonstrated that many young women put little thought in to saving and planning on the assumption that someone or something will rescue them. Boomers were neither aware of how they spent their discretionary income nor what they might need to retire. Finally, women entering their senior years rarely had adequate investments, savings, or retirement plans that would keep them from long-term negative financial outcomes.

THE PROSPECT OF THE COMMON MARKET FOR EASTERN AND SOUTHERN AFRICA, Aggrey Bigala and Eric Rahimian, Dept. of Economics, Finance and Office Systems Management, Alabama A&M University, Normal, AL 35762.

The Common Market for Eastern and Southern Africa, COMESA was formed in December 1994 to replace the former Preferential Trade Area (PTA) between Angola, Burundi, Comoros, Congo, Djibouti, Egypt, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, Somalia, Sudan, Tanzania, Swaziland, Uganda, Zambia, and Zimbabwe. This paper first describes the general purpose of an economic integration and reviews different forms of economic integration. The vision and objective of COMESA may be summarized as: Facilitating the removal of all structural and institutional weaknesses of member states and promoting regional peace, security and stability to enable the member countries to attain sustainable economic development, both individually and collectively. Today, COMESA is far from a full-fledged economic integration. Nevertheless, with reduction of the obstacles that the member countries are facing, the goal of economic integration is achievable. Also, our analyses show that despite all the obstacles that COMESA has so far faced, some progress has been made towards economic integration. Measures and policies have been introduced and put in place to achieve its long-stated objective and goal towards economic integration. In our view, COMESA holds the prospect of becoming the strongest regional economic community in Africa. However, to achieve this goal, member states should adopt and implement strategies, which will further enhance balanced economic development in member countries and the region as a whole. Since, there is still hope to achieve the needed level of cooperation between member nations, the outlook of COMESA as an economic integration is promising.

THE RELATIONSHIP OF CRIME AND POVERTY, Fesseha Gebremikael, Department of Economics, Finance and Office Systems Management, Normal, Alabama 35762.

While the country is struggling with a slow recovery and the possibility of a double deep recession, many concerned citizens are pondering over the extent of poverty, child poverty, and poverty among minority communities. Crime and poverty have affected the U.S. and other countries for years. The socioeconomic factors and lack of access to proper education are important causes of juvenile crimes and violence in today's America. The majority of crimes usually happen in the inner cities where crime has had its roots for quite some time. In additions, the crime rate is high in some low-income and minority populated rural areas. Poverty is widespread in communities that due to low income are living in public housing, and where overpopulation is an issue. The poverty stricken groups vary by ethnicity, age, residence and families. Poverty is caused by several factors including low labor productivity, underemployment, unemployment, structural changes in the economy, and budget cuts for antipoverty programs. Data on poverty rates, per capita and family median income and violent crime rates are compiled from The U. S. 1990 and 2000 Census, the Statistical Abstract of the United States and other related sources. The data are analyzed to show the relationship between crime and poverty. Some policy recommendations are forged to reduce the crime rate to sustain the economic well being of the affected populations, and to improve the prospect of economic growth through education.

NORTH ALABAMA REGIONAL ANALYSIS: SOCIAL & ECONOMIC CHARACTERISTICS, 1980-2000. Carlos L. Finkley, Department of Community Planning & Urban Studies, Alabama A&M University, Normal, Alabama 35762. Teshome Gabre, Constance Wilson.

The North Alabama Region has a very mixed economy evidenced by the presence and production of agricultural, industrial, and high-technological goods and services. Northeastern Mississippi, Southern Tennessee, and Northwestern Georgia geographically border the region. This paper analyzes changes in the region's demographic, social, and economic characteristics for three decennial periods (1980, 1990, & 2000). Those changes are then compared to the State of Alabama and the United States. This comparative analysis reveals those areas where the region is ahead and those where the region is behind both the State and the US. The variables compared include population by age & race, employment, income, educational attainment, and industry & agricultural growth characteristics. Data sources used for the analysis were Alabama County Data Books (1984-1997), and the Statistical Abstract of the United States (1992-2001). A twenty-year analysis shows that the North Alabama Region has higher population growth (4.7% greater), comparable median family income (averaged 94.7% of the State MFI), higher labor participation rate (1% greater), lower unemployment rate (0.4% lower), higher per capita income (32.5% greater rate of increase than the State between 1990 and 2000), and higher family poverty rate (1.8% greater) when compared to the State of Alabama. In general, the North Alabama Region performed economically better than the State of Alabama. True socio-economic balance of the North Alabama Region will require rousing exchange and complementation between the demographic, social, and economic growth potential.

A REGRESSION MODEL OF NEW HOUSING UNITS' CONSTRUCTION IN THE UNITED STATES, Yarah Abdallah and Eric Rahimian, Dept. of Economics, Finance and Office Systems Management, Alabama A&M University, Normal, AL 35762.

This paper uses a time series multivariable linear regression model to analyze the relationship between changes in the level of mortgage interest rates and changes in residential investments. More specifically, we try to determine the effects of interest rate changes on the number of housing units built per year. We have used the data published by the Department of Labor for the total number of housing unit constructions as our dependent variable, and the average prime rate, median household income, unemployment rate, and the consumer confidence index as the explanatory variables for the regression analysis. The period of time under study was 1970 through 2001. The results show that the four explanatory independent variables, namely, the Average Prime Rate (APR), the Median Household Income (MHI), the Unemployment Rate (UER), and the Consumer Confidence Index (CCI) are able to explain most of the variation in our dependent variable, Total Housing Units Constructions (THU). The coefficient of determination (R^2) that represents the proportion of the variation in (THU) that is explained by the set of four explanatory variables was found to be .82. When testing for the significance of the regression slope coefficients, it was found that all four explanatory variables were statistically significant at $\alpha = .05$. In addition, while there seems to be a negative correlation between the number of Total Housing Units and Average Prime Rate, and Unemployment Rate, there is a positive correlation between the number of Housing Units and the Median Household Income and Consumer Confidence Index.

POPULATION AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA, Fesseha Gebremikael and Eric Rahimian, Department of Economics, Finance, and Office Systems Management, Normal, Alabama 35762.

The populations of the developing countries are growing at a faster rate than ever before, particularly in Sub-Saharan Africa, whose socioeconomic development is most likely hindered by a high fertility rate. In most countries in this area the rate of economic growth has been declining for the last several decades with inability of these nations to support their human population. These conditions, of course, will impede opportunities for economic development, increase health risks for women and children, and erode the quality of life by reducing access to education, nutrition and employment. In this paper, we will examine the manner in which population growth rate affects and is affected by the development process. We also show the links between economic growth, low income and other ill effects of poverty. The data on GNP per capita, life expectancy, and population growth rate have been obtained from the United Nations development agencies and other related sources for comparison. Our analysis indicates that the staggering economies of this region must first be stabilized. In addition, the policies related to population growth and economic development in the Sub-Saharan Africa should spell out strategies for bringing about a decline in the population growth rate and an increase in sustainable economic development. The development strategies include but are not limited to family planning, improvement in health and education, particularly for women, and helping Sub-Saharan African countries to adopt more efficient production methods as they improve their infrastructure and production capabilities.

GOVERNMENT INTERVENTION IN A MARKET ECONOMY, Aggrey Bigala, Dept. of Economics, Finance and Office Systems Management, Alabama A&M University, Normal, AL 35762.

In a world of limited resources, every society has faced the fundamental economic problem of deciding what to produce, how to produce them, and for whom to produce. A market economy is by its very nature, decentralized, flexible, practical, and changeable. However, market economies are not without inequities and failures. These failures and inequities sometimes call for and lead to government intervention. The failures include the existence of monopolies (failure of competition), public goods, incomplete markets, externalities, lack of access to information, business cycles, unemployment, and inflation. The government intervention in a market economy can be justified based on the need for addressing the market failures. Economists identify six major functions of governments in market economies. These functions include providing legal and social frame work, maintaining competition, providing public goods and services, redistributing income, correcting for externalities, and stabilizing the economy. However, the intervention of the government in a market economy should not be over emphasized. Occasionally the ill-conceived and counter productive policy measures implemented by the government (price controls, rules and regulations, taxes, and subsidies) can lead to wasteful use of resources. It is also true that government intervention in the market has usually some implications on managerial decision making.

A REGRESSION MODEL OF CAUSES OF POVERTY: Eric Rahimian, Dept. of Economics, Finance and OSM, Alabama A&M University, Normal, AL 35762.

The U.S. has one of the highest poverty rates among industrial nations. Also, the southern states have the highest poverty rates in U.S., with Mississippi and Alabama having the highest ranks. This paper uses regression analysis to measure the effect of several variables on poverty rate. The state poverty rate is the dependent variable, with four explanatory variables including the state unemployment rate, the state median family income, the state percentage of Blacks and Hispanics in total population, and the state high school graduation rate, a proxy for literacy. There are 51 observations, the 50 states and the District of Colombia. The poverty rates data are the three-year averages for 1999-2001. The analysis suggests that all the slope coefficients have the expected signs and are statistically significant at $\alpha = .05$, except for the high school graduation rates. Reducing the state unemployment rate by 1% point leads to a 3.33% reduction in state poverty rate. A $1,000 increase in the state median income leads to 0.31% drop in the state poverty rate. A one-point increase in percentage of Blacks and Hispanics in state population leads to 0.62% increase in the state poverty rate. The R^2 is .81. To reduce the poverty rates, the policymakers should increase employment opportunities, train people for higher income jobs, and address the socioeconomic problems of Blacks and Hispanics. It is also advisable to increase the quality of education through technical skills training to enhance the qualification of the poor for securing more rewarding employment. If the United States succeeds in lowering the poverty rates across the nation, it will also succeed in reducing homelessness, increasing life expectancy, improving access to healthcare, prenatal care, and childcare, and alleviating the negative psychological impacts of poverty on poor families and communities.

THE CHRACTERISTIC OF KOREAN VENTURE CAPITAL, SeYoung Kwack, Chungju University, and Eric Rahimian, Dept. of Economics, Finance and Office Systems Management, Alabama A&M University, Normal, AL 35762

Since 1960's, Korean Economy has grown fast due to low wages and mass production system. However, due to the increase in wages and competition with other low wage and less-developed countries such as China and Thailand, the competitive power of Korea has become weaker. Thus, Korean government has tried to bolster its economy by developing its venture capital industry. The development of venture industry needs a vitalized venture capital market.

This study analyzes Korean venture capital industry and assesses the characteristics and investment performance of Korean venture capital.

The results show that the total volume of the Korean venture capital investments and the share of limited partnerships in Korean venture capital firms are relatively small as compared with the ones of the United States. The venture capital firms also seem to concentrate more in providing loans rather than investing directly in equity of venture firms, even though the latter is probably more desirable. Nevertheless, the Korean venture capital had 13.3% return in year 2000 and performed better than the Korean risk-free treasury bonds and the Korean stock market that returned 8.3% and -42.61% respectively.

SCIENCE EDUCATION

TOOLS FOR DNA ANALYSIS AND PHYSIOLOGICAL MEASUREMENTS USED FOR UNDERGRADUATE INSTRUCTIONAL TEACHING LABORATORY EXERCISES. Kataren Johnson, A. D. Johnson, Sr., Depart. of Biological Sciences, Univ. of Alabama in Huntsville, Huntsville, AL, 35899, J. U. Johnson, Depart. of Food and Animal Sciences, Alabama A&M Univ., Normal, AL 35762.

Hands-on teaching experiences have been used successfully in demonstrating basic concepts of the biological sciences, especially with undergraduate students. Techniques of electrophoresis using a commercial DNA fingerprinting kit and the ability to visualize physiological measurements using the computer based BIOPAC system, were found to be most beneficial for understanding basic physiological principles during instructional teaching laboratory exercises. Laboratory exercises will be developed using the DNA fingerprinting kit by creating a crime scene. Students then can collect crime scene DNA samples (e.g. urine, saliva, blood), then isolate, quantify, purify, and analyze DNA using electrophoresis by evaluating the band patterns. Laboratory exercises will be developed using the computer based BIOPAC system to allow students to collect data by taking actual physiological measurements during the laboratory period. Cardiovascular, respiratory, and muscle physiology data can be measured and evaluated during the laboratory periods. Both of these procedures can be modified to create new laboratory exercises and they provide real data analysis in a short period of time. The intended outcome for both the DNA finger printing kit and the BIOPAC system is for less time for instructional guidance, more time to collect data, and students better understand basic concepts in the biological sciences.

REAL-TIME EXPERIMENTATION OVER THE INTERNET AT SAMFORD UNIVERSITY, Perry A. Tompkins, Department of Physics, Samford University, 800 Lakeshore Dr. Birmingham, Alabama 35229

In order to expose physics students to high quality laboratory experiments with significance beyond the classroom, we have created a laboratory experiment that can be remotely operated through a web-browser across the Internet. This exercise was twofold. It allowed our students to experience and become familiar with new technologies that are currently used in industry, while providing other students, both on and off campus, with the benefits of actual hardware-based experimentation. The actual experiment is the simple measurement of the magnetic field of a long straight current-carrying wire. It uses a movable hall-probe to measure the magnetic field at various distances between 3 and 90 mm from the wire. The product of the experiment is a measurement of μ_0, the permeability of free space: one of the fundamental constants in Electricity and Magnetism. This experiment is currently accessible directly across the internet for anyone's use. For use of the experiment go to http://physics.samford.edu and select "Real Experimentation Over the Internet."

NEW PHARMACY INSTRUCTION: NUTRITIONAL SUPPLEMENT THERAPIES, A HEALTH PROBLEM/DISEASE STATE FOCUS ON THE LEARNING/ASSESSMENT OF NATURAL MEDICINES,

Norman J. Doorenbos, Department of Pharmacal Sciences, School of Pharmacy, Auburn Univ., Auburn, AL 36849.

The expansion of natural medicine use has been explosive since the Nutritional Supplement Act of 1994. In earlier times a majority of medicines and other pharmaceuticals were derived from natural substances (plant, animal, mineral or microbiologic). They were addressed in pharmacognosy, a discipline which essentially disappeared over 20 years ago. Consequently few pharmacists, like other health professionals, possess expertise today on natural medicines.

To address this need, "Herbal Drugs" and "Nutritional Supplement Therapies" have been offered as electives at Auburn for five years. Pre-med and nutrition students as well as faculty have elected these courses. I wish to share information about these new courses and the innovations which have contributed to their popularity. These include the use of tidbits, key point lists, self learning, literature searches utilizing the library, internet and a departmental nutritional supplement resource center with thousands of publications, an emphasis on clinical data, paper preparations and presentations, and daily discussions. Each student is required to write, as the final project, a publication of forty bound monographs on supplements selected by the student. The supplements should be among those the student would be comfortable recommending to health professionals and patients. Each monograph should be referenced and eontain desired information on the supplement.

Examples of tidbits, key points and final projects will be displayed..

PHYSICS TEACHING: BUILDING CONNECTIONS BETWEEN UNIVERSITY AND HIGH SCHOOL PHYSICS TEACHERS.

Laura M. Weinkauf and Nouredine Zettili, Dept. of Physical & Earth Science, JSU, Jacksonville, AL 36265.

During the past year, physics faculty at JSU and high school physics teachers from northeast Alabama have been building connections and lines of communication as part of Project SPINSEED (Strengthening Physics in Secondary Education), an Eisenhower grant funded by ACHE. Through a two-week Summer Institute and a series of weekend workshops, we have exchanged ideas about physics and physics teaching. Since many of the high school teachers are the only physics teachers at their respective schools, chances to compare notes with other teachers revealed common problems and some creative solutions. Most of these teachers are eager to enhance their knowledge of physics and to acquire new approaches to problems, new demonstration equipment and ideas for small, inexpensive student projects. University faculty have also benefited from the interaction, gaining a greater understanding of the challenges and concerns of high school faculty. Thus, developing connections between these groups of physics teachers has been advantageous to everyone involved.

TEACHING EVOLUTION IN A HOSTILE ENVIRONMENT. William R. Bowen, Dept. of Biology, Jacksonville State Univ., Jacksonville AL 36265.

Relocating from the Midwest to the South many years ago, I quickly found that the traditional approach to teaching evolution was confrontational to students entrenched in Biblical creationism. A critical self-evaluation led to: 1) The placement of evolution as fact and theory before the origin of life; and 2) Addressing scientific creationism by purposefully acknowledging there were "ideas" on the origin of life--One idea was "special creation" as based on religion and belief–but not on science, the other was "natural creation" as based on the accepted scientific view that life had an ancient biogeochemical origin with life forms subsequently evolving and subject to extinction over time. Basic differences between science and religion were noted after which the natural creation version was discussed in detail. At the end, it was stressed that each person had a right to his or her choice–be it natural creation or special creation–but that the choice should always be an "informed decision." To be informed, students were urged to consider such questions as: What is God? Is God's world the universe; if so, is it orderly or chaotic? What is one day in Genesis? What drives evolution at the molecular level? Can one accept both scientific and religious viewpoints without conflict? At the end, I never responded to the questions I raised. This approach, while focusing on the scientific version, did defuse an otherwise hostile classroom environment. Student response was positive, once even dramatic.

USING PROJECT LEARNING TREE TO MAKE ENVIRONEMNTAL EDUCATION FUN FOR HIGH SCHOOL AND COLLEGE STUDENTS. Robert E. Carter, Department of Biology, Jacksonville state University, Jacksonville, AL 36265.

Students often have difficulty understanding environmental concepts in the classroom and lab. In addition, they often are bored. Experiential methods of instruction allow students to understand concepts by participation. This keeps students interested and allows them to understand concepts through interactive problem solving. Project Learning Tree provides a curriculum for experiential environmental education for K-12 students. Much of the high school curriculum also can be applied in introductory biology and environmental science courses at the college level. Examples of activities and their potential use in high school and college curricula will be presented.

USING SCHOLARLY JOURNALS AND STATISTICAL REASONING IN BASIC SCIENCE CLASSES. Jan Case, Dept of Mathematical, Computing, and Information Sciences, Jacksonville State Univ., Jacksonville, AL 36265

In many ways, the formal procedure for statistical hypothesis testing parallels the scientific method. Hypothesis tests are conducted in all fields in which theory can be tested against observation. Scientific studies involving nutrition, health, medicine, and other topics are relevant and appropriate for inclusion in the basic science curriculum. The scholarly journals that publish these studies are an easily assessable yet underutilized source of examples for the classroom. Students can be taught the skills needed to read scientific reports critically. These skills are important because conclusions published in scholarly journals are sometimes barely recognizable in the media interpretations that are supplied to the general public. Students need to be aware of the importance of sample size, the concept of sampling error, and possible sources of bias. With instruction in basic probability and the concept of proof by contradiction, students can read scientific hypotheses and interpret the p-values reported in journals. This paper summarizes the basic preliminary concepts that are required knowledge and gives examples of activities that are appropriate for basic science classes.

TECHNOLOGY IN THE CHEMISTRY CURRICULUM. Cynthia Willingham, Science in Motion Project Instructor, Dept. of Chem., UAB, Birmingham, AL 35294-1240.

The Science in Motion program housed at state universities throughout Alabama has provided equipment and technology training for high school teachers since its inception in 1994. In the past year, PDA and Lab Pro technology has been incorporated into the offerings at the site at UAB. Last summer, participating teachers learned the new technology and developed labs for their students to use during this school year. Laboratory modules were written for gas laws, thermodynamics, and acid-base titration. These modules have been used this year in the high school chemistry curriculum in the UAB In-Service Area with a great deal of success. This type of probe and monitoring approach to lab activities allows for extensive data collection and provides the students with numerous opportunities to analyze their data immediately. Data has become "cheap" in terms of class time used for collection in that the same experiment can be repeated for additional analysis and follow-up. Like the CBL technology that preceded it, the PDA/Lab Pro combination provides real-time graphing, allowing students to better visualize processes and changes in conditions as the experiment progresses.

CHEMISTRY IN MOTION: GRADUATE STUDENT- TEACHER PARTNERSHIP IN EDUCATION.

Janet Youngblood, Pleasant Grove H.S., Pleasant Grove, AL 35127. Joy Johnston, Dept. of Chemistry, Univ. of Al. @ Birmingham, Birmingham, AL 35205.

The University of Alabama @ Birmingham (UAB) has a history of outreach with science education in public schools. The National Science Foundation GK-12 Program has enabled the programs in place at UAB to enlist the help of science graduate students in partnering with local public school teachers to enhance science education from elementary to high school. One such partnership between teacher Janet Youngblood and student Joy Johnston has kept the chemistry students at Pleasant Grove High School "In Motion" since the fall of 2001. Using resources available through Science in Motion at UAB, we have designed and integrated numerous labs and activities to engage Mrs. Youngblood's students and build their curiosity about science. In an attempt to foster an inquisitive nature in science students, we have put our own spin on classic demonstrations and labs encouraging use of the scientific method and observation techniques. The Crandon Mine Project not only focused on the scientific method, but also spurred the students on to independent study. We were pleased to see similar improvement from pre-lab to post-lab testing for C and below students as for A and B students. In a most recent project, we attempted to foster abstract thinking and processing skills in the context of chemical bonding. We continue to seek ways to improve student's abstract thinking skills while covering all the material called for in High School chemistry and not leaving any students behind.

BEHAVIORIAL and SOCIAL SCIENCES

WHAT MAKES A DIFFERENCE IN WELL-BEING?: ASSESSING THE IMPACT OF PERCEIVED PERSONAL AND SOCIAL CONDITIONS.

Janice Clifford Wittekind and Arthur S. Wilke, Department of Sociology, Anthropology and Social Work, Auburn University, Auburn, AL 36849.

There is an ongoing debate surrounding the influence that children have on adult well-being. While some studies find that children have a positive impact on emotional, physical and/or social well-being, other studies have found a negative association. In this paper, we test the relationship between several demographic variables and four constructed measures of well-being: mood, control over life events, life conditions and a general well-being measure. Using data from the 1996 General Social Survey Emotions Module, we examined the impact of the predictors on parents and non-parents. Analysis from OLS regression models indicated differing influences of the variables on all measures of well-being for each sample.

NEWSPAPER READING BEHAVIOR AND ATTITUDES ON RACE RELATIONS.

Larry Powell and Minabere Ibelema, Communication Studies Department, University of Alabama at Birmingham (UAB) 35294-2060.

This study tested the relationship between newspaper reading behavior and perceptions of media impact on race relations in Birmingham, Alabama. Birmingham was an appropriate choice for the study, given its history in the civil rights struggle. Civil rights demonstrators in the 1960s were hosed with water, Martin Luther King was jailed, and four young girls were killed by a bomb planted at the Sixteenth Street Baptist Church. Survey methodology was used to study the topic. The participants were four hundred registered voters in Alabama who were interviewed in a random sample of the three-county Birmingham metro area taken October 7-11, 1998. The results indicated that (1) most respondents felt that race relations had improved over the past ten years; (2) most – particularly those who rarely read a newspaper – thought the media had a significant impact on race relations; (3) most thought the local media coverage hurt race relations in the city; (4) most respondents – particularly those who rarely read a newspaper – thought the local media had a negative impact on race relations; (5) but they generally that national media coverage helped race relations; and (6) there was no significant difference in the responses of whites and blacks regarding the role of the media in race relations. At the practical level, these results show the impact that the media can have on perceptions of race relations. At the theoretical level, the results can be interpreted in terms of their implications for research on third-person effects.

STRESSFUL LIFE EVENT EXPERIENCES OF HOMELESS ADULTS: A COMPARISON OF SINGLE MEN, SINGLE WOMEN, AND WOMEN WITH CHILDREN.

Carole B. Zugazaga, Department of Sociology, Anthropology & Social Work, Auburn University, Auburn, AL 36849.

This article describes stressful life events experienced by a multi-shelter sample of 162 homeless adults in the Central Florida area. Participants included homeless single men (n = 54), homeless single women (n = 54), and homeless women with children (n = 54). Subjects were interviewed with a modified version of the List of Threatening Experiences (Brugha and Cragg, 1990). The two groups of women were more likely to have been both physically and sexually abused as children than single men. Single women were more likely to have experienced sexual violence over the age of 18 and to have experienced domestic violence. Single men were more likely to have abused drugs and alcohol, and to have been incarcerated. Women with children were more likely to have lived in foster care. Overall, single women experienced significantly more stressful life events. These findings suggest that the three groups are unique and require different interventions. This research was funded by the Fahs-Beck Fund for Research and Experimentation. New York, New York.

Predictors of Health Behaviors in College Students.

Diane Von Ah and Dr. Duck-Hee Kang, University of Alabama at Birmingham, Birmingham, Alabama, 35294.

Health behaviors formed during young adulthood may have a sustaining impact on one's health across later life. Because health behaviors can be affected by psychosocial factors, the purpose of this study was to examine the direct effects of perceived stress, perceived availability of and satisfaction with social support, and self-efficacy, and examine the intermediary roles of perceived threat (perceived susceptibility x perceived severity), benefits, and barriers on alcohol behavior, smoking behavior, physical activity and nutrition behavior, general safety behavior and sun-protective behavior in college students. A convenience sample of 161 college students enrolled in an introductory psychology course completed self-report questionnaires regarding stress, social support, self-efficacy, components of the Health Belief Model, and common health behaviors. Data were analyzed using step-wise multiple regression and structural equation modeling. Satisfaction with social support and self-efficacy significantly predicted sun-protective behavior. Self-efficacy also significantly predicted alcohol, smoking, physical activity and nutrition behavior, and general safety behavior. Under high-perceived threat, self-efficacy was mediated by perceived barriers on binge drinking and was moderated by perceived threat on alcohol use at 30 days and 6 months and physical activity and nutrition behaviors. Results of this study affirm the significant role of self-efficacy in reducing perceived barriers to performing protective health behaviors. Thus, future health promotion programs with college students may become more effective when interventions are designed to maximize self-efficacy to ultimately reduce the barriers to adopting a healthy lifestyle.

Sigma Theta Tau International – Nu Chapter, provided support for this study.

DATING AND COURTSHIP ABUSE AMONG AFRICAN-AMERICAN COLLEGE STUDENTS: CONSEQUENCES OF ABUSE.

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It has become increasingly evident that violence in intimate relationships is not limited to married couples but is also experienced during the dating and courtship phase among college students. A questionnaire exploring personal experience with physical and emotional abuse, feelings about self as a person and outcomes of violent episodes was administered to 215 college students attending a predominantly African-American university. In addition to certain general background questions students responded to a Global Screening Inventory Scale which provides a brief inventory of the extent to which someone may be having problems in one or more personal or social areas. Results show that respondents who were parents were more at risk for both types of abuse from partners in dating and courtship relationships. In addition, upper-level students were more likely to experience non-physical abuse than lower level students. The results found only non-physical abuse to be associated with the problem inventory. These findings are consistent with earlier research that demonstrates that the negative impact from psychological abuse is greater than that from physical abuse.

PERSONALITY FACTORS AND PRAYER: PRELIMINARY FINDINGS

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Dept. of Psychology, University of North Alabama, Florence, AL 35632

In order to further understand the relationship between personality factors and religious prayer, this research examined scales from the MMPI-2, Structure of Prayer Scale, and the Religious Orientation Scale – Revised, as well as the biographical data of subjects. In this preliminary report of an on-going project, details are given concerning the methods and preliminary results of our research. Data was collected on over 40 college students who agreed to record their prayers on cassette tapes and who completed the aforementioned questionnaires. Participants were assigned randomly to one of two groups according to order of testing and prayer, either testing-then-prayer or prayer-then-testing. Data were submitted to analyses of variance to examine the effect that this particular religious behavior has on personality testing. Of particular interest were the validity scales that may indicate increases or decreases in truthfulness or defensiveness after praying. Results from the newest MMPI-2 validity scale, the S scale (superlative presentation of self), are provided along with its five subscales. This research was partially funded by a research grant from the College of Arts & Sciences of the University of North Alabama.

USING INTERNET BASED QUESTIONNAIRES FOR DATA COLLECTION.

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There has been increased use of Internet based data collection (Fleitas, 1998; Jones, 1999; Simsek & Viega, 2001). Research has suggested that Internet based data collection offers some advantages over more traditional methods (Crawford, Couper, & Lamios, 2001). Research has generally shown that Web-based questionnaires are similar to more traditional paper-based questionnaires (Cook, et al., 2001; Miller, et al., 2002). One continuing issue is sample identification and expected questionnaire response using the Internet (Epstein, et al. 2001; Simsek & Viega, 2001). This paper explores the development of an Internet based questionnaire using Frontpage 2000 application software. Questionnaire design issues particular to Web-based questionnaires were addressed, as well as, data capturing options available with Frontpage 2000 software. A study was conducted using the developed on-line questionnaire. The study was designed to revise the Computer Hassles Scale, a measure of computer stress. A preliminary analysis of the results of the scale revision and typical correlates was presented. The advantages and disadvantages of this particular Internet based questionnaire development were discussed. Recommendations to other researchers in the behavioral and social sciences were offered.

OLDER ADULTS WITH ARTHRITIS: EXERCISE PERCEPTIONS.

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The objective of this study was to examine perceptions of exercise (POE) among older adults with arthritis. Using a convenience sample (n = 141) the perceived benefits of exercise was modeled with linear regression on six health-related quality of life (HRQL) variables and seven demographic/behavioral variables. Bivariate correlations of POE with the independent variables were examined and multivariable models were constructed to identify independent predictors of positive exercise perceptions. In the multivariate model significant relationships for POE were found for type of arthritis (RA, $B = 6.11$, $p = .01$), race (white, $B = 5.86$, $p = .01$), educational attainment (high school diploma, $B = 6.09$, $p = .01$), and current exercise behavior (exercisers, $B = 8.68$, $p < .001$). Bivariate correlations suggest that disease symptoms may be reduced and a degree of self-control and self-care be regained, simply by adherence to an exercise regimen. Therefore, clinicians who influence their patients to exercise by encouraging the continued development of cognitive skills, who reinforce positive perceptions of personal advocacy (while discouraging negative ones), who cultivate greater patient self-efficacy and self-control, and who promote exercise as an effective, overarching coping strategy, are essential to the effective management of the aging process, especially for those with chronic illness.

HEALTH SCIENCES

THE TURNER DECISION-MAKING MODEL: A FOUR-PERSPECTIVE FRAMEWORK.

Shelly E. Turner, Medical Center of Manchester, Manchester, TN 37355.

The nurse executive must be an effective decision-maker due to a rapidly changing healthcare market. Multiple models for decision-making have been developed within the industrial setting; however, a model unique to the challenges of the nurse executive is lacking. The Turner Decision-making Model (TDMM) was developed to assist the nurse executive in the decision-making process related to operational decisions in the hospital setting. The TDMM is guided by the systems approach and models from the literature. Four perspectives (employee, customer, organization, and unit) provide the framework for the TDMM.

A descriptive correlational pilot study of 24 mid and executive level nurse administrators from six hospitals in the southeastern region of the United States was performed. Questionnaires were distributed to a convenience sample. Descriptive statistics and a correlation coefficient were used for data analysis. Findings indicate a strong linear correlation exists between each of the constructs of the model and decision complexity.

PICO DELLA MIRANDOLA AND 21ST CENTURY BIOETHICS: CAN RENAISSANCE THOUGHT GUIDE OUR USE OF BIOTECHNOLOGY?
James T. Bradley, Department of Biological Sciences, Auburn University, Auburn, AL 36849.

Giovanni Pico (1463-1494) from the northern Italian village of Mirandola wrote about human nature in his 1486 essay, *Oration on the Dignity of Man*, considered by many scholars to be a manifesto for the Italian Renaissance. In the *Oration* Pico identifies the capacity for moral choice-making as the quintessential, species-specific characteristic that sets humans apart from all other creatures. The thesis that Pico's view of human nature is a valuable guide for using and regulating modern biotechnologies is developed here. A bioethical principle derived from Pico's notion of human nature is that the exercising of and capacity for freedom of choice ought to be honored and preserved in individuals and in the species. This principle is applied to ethical issues emerging from embyronic stem cell (ESC) and genetic engineering biotechnologies with the following results: 1) use of human blastocysts for ESC research and therapy, genetic engineering of human somatic cells, and genetic engineering of the human germ line to rid the species of heritable, debilitating diseases are justified, and 2) germ line engineering for genetic "enhancement" is not justifiable. Responses to possible objections to the above thesis and principle and their applications have been prepared.

IDIOPATHIC SCOLIOSIS IN ALABAMA. Tom E. Denton, Dept. of Biology, Auburn University at Montgomery, Montgomery, AL 36117

Each year, thousands of adolescents aged 10-14 are screened for idiopathic scoliosis (a lateral curvature of the spine of unknown cause) and for other spinal related disorders. This screening occurs in grades 5 through 9 in Alabama's 128 public school systems. During the census year of 2000, 138,000 students were screened for scoliosis and other spinal disorders. Some 9 children per 1000 screened were diagnosed as having scoliosis. However, only one-half of the parents of children screened reported back to screeners. Therefore, the actual prevalence is assumed to be greater than 9 per thousand. The national prevalence is approximately 18 per thousand. Additionally, 90 students had irregularities such as kyphosis (thoracic hump) or lordosis (lumbar sway) that were scoliosis unrelated. Alabama is one of 22 states with some form of mandated screening program for scoliosis.

STREPTOCOCCUS PNEUMONIAE: DIFFERENCES AND SIMILARITIES OF SEROGROUP 6 STRAINS, PERSISTENCE OF STRAINS OVER TIME.

D. B. Payne, D. E. Briles and S. K. Hollingshead, University of Alabama at Birmingham, Birmingham, AL.

Streptococcus pneumoniae remains a significant cause of mortality associated with bacterial pneumonia, meningitis, bacteremia and sepsis, causing over 1 million deaths worldwide each year. *S. pneumoniae* can also be carried asymptomatically, although the genetic relationship to clones causing disease has not been established. By comparing clones of current resistant strains and clones of pre-resistant age, persistence of strains over time will be shown. To test this hypothesis, strains of serogroup 6 isolated prior to 1980 will be screened with a rapid typing technique known as BOX PCR. Strains found to be similar in type with contemporary serogroup 6 strains will be further tested by the multilocus sequence typing technique. This will establish whether isolates today are related to those of 2 decades ago. If strains can persist, some isolates will show similarity to the Spanish-Iceland 6B clone (Spain ^{6B}-2) of *Streptococcus pneumoniae*, which is the most prevalent serogroup 6 clone worldwide. The Spanish-Iceland 6B clone is among the most prevalent drug-resistant clones appearing over the past twenty years and it is often seen in Alabama and elsewhere in the US since the 1990s but older isolates have not previously been examined. Certain genetic backgrounds may have a propensity to develop drug-resistance. Variations of the Spanish-Iceland 6B clone with altered resistant profiles have appeared.

CHARACTERISTICS OF A POSITIVE EXPERIENCE FOR WOMEN WHO HAVE UNMEDICATED CHILDBIRTH.

Amanda M. Hardin, University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL, 35294-1210

Childbirth is often regarded as a necessary evil and many women feel the only option they have is a medicated labor and delivery. Today, in the United States, fewer and fewer women are choosing to have unmedicated labors and deliveries. Classes to prepare for an unmedicated birth and/or midwife delivery are available, however these are not well publicized and under-utilized. The purpose of this qualitative descriptive study is to determine what characteristics women deem positive in their unmedicated childbirth experience and from those identify the criteria of a satisfying and meaningful unmedicated birth experience. The interview guide was developed by the researcher and has been reviewed for content validity. Thirteen women who delivered using no medication have been interviewed. Initial findings indicate that the overriding characteristic of a positive unmedicated birth is control over ones birth environment as well as one's body during labor and delivery. This control was manifested through the use of nonpharmacologic techniques including walking, controlled breathing, changing positions at will, massage, verbal encouragement, focusing inward on ones body and delivering a position chosen by the woman. Results from this study could be used to better prepare labor and delivery nurses in caring for the unmedicated client.

ANTICIPATION AND ACCEPTANCE: PERCEPTIONS OF PET THERAPY BY HOSPITALIZED CHILDREN AND THEIR PARENTS.

Alicia Weddington, Univ. of Ala. School of Nursing, Univ. of Ala. at Birmingham, Birmingham, AL, 35294-1210

It has been suggested that a child cannot attain healthy emotional development without the presence of an animal in his or her life. Thus, healthcare workers are increasingly integrating pet therapy into their care. This study utilized observation, questionnaires, and interviews to qualitatively look at the experience of pet therapy with hospitalized children and their parents. Sessions were provided by Hand-in-Paw, a community agency, for inpatients at a children's hospital. The children were allowed to hold and play with a variety of animals for 30 minutes in the lobby. A convenience sample of 10 children and 10 parents participated. Emerging themes are anticipation and acceptance. Upon observation, one little boy seemed very sad when he first came over to the animals. However, it was only a matter of seconds before he had the biggest smile on his face. One outstanding effect recognized by a majority of parents was an increase in morale for their child. Pet therapy also may support developmental processes of the hospitalized children responding to illness. Even sadness or separation could be effectively expressed as one 7-year old girl reported increased loneliness.This supports the importance of the natural bond a little girl has with her dog.

PARENTAL VIEWS OF THE SOCIAL ENVIRONMENT OF AN OUTPATIENT BONE MARROW TRANSPLANT CLINIC.

Jennifer Pritchett, School of Nursing, Univ. of Ala., Birmingham, AL 35294-1210.

The purpose of this project was to investigate, through the eyes of the parents, the social environment of the outpatient bone marrow transplant (BMT) clinic at a tertiary care children's hospital in the southeast. The outpatient BMT clinic provides children with post-transplant treatment and emergency care. The clinic consists of an open room with eight patient chairs where the doctors and nurses assess and treat the patients. Via questionnaires, 17 participants rated items on a 5-point Likert scale. The questions were created to explore the variables of privacy, quality of care, comparison with other children, and social support. Content validity was established through review by nurse clinicians. Findings indicated that the parents preferred the environment of this clinic to traditional clinics and that the informal social support they and their children received while in the waiting room was a main strength. However, parents also identified two negative aspects: comparing their children to others and lack of privacy. Overall, the parents reported the advantages of this clinic to outweigh the possible negative aspects. For nurses, the implication of this project is that the environment in which patients are treated can be as important as the actual treatments.

RELATIONSHIPS AMONG SOCIAL SUPPORT, INTENDEDNESS OF PREGNANCY, AND MATERNAL-FETAL ATTACHMENT.

Laura A. Frizzell, School of Nursing, Univ. of Ala., Birmingham, 35294.

Maternal-fetal attachment (MFA) is defined as the attachment that develops between a woman and her fetus prior to childbirth. This attachment is important because it allows a mother to begin bonding with her child before birth, beginning a relationship that is among the most meaningful she will experience in her lifetime. Previous research indicates that a positive correlation exists between MFA and positive health practices during pregnancy. This study's goal was to determine whether social support and intendedness of pregnancy affect MFA. Participants included twenty-six pregnant women in a university midwifery practice. Three questionnaires were used, and included the Prenatal Psychosocial Profile (Curry et al., 1994), the Maternal-Fetal Attachment Scale (MFAS) (Cranley, 1981), and a scale measuring intendedness of pregnancy (Poole, 1991). Findings revealed very similar MFAS scores, indicating a homogeneous sample. Neither intendedness nor social support was significantly related to MFA, and qualitative comments demonstrated that women with inadequate social support and unintended pregnancies were often still attached to their fetuses. Married subjects scored higher on the MFAS ($p<.05$). The effect size for this finding was 0.82. Future research may examine these variables using a larger, more diverse sample with a broader range in MFAS scores.

EMERGENT BEHAVIORS AT SHIFT REPORT: THE PROTAGONISTS AS THEME CARRIERS.

M. Peggy Hays, College of Nursing, Univ. of Ala., Huntsville, AL 35899.

This case study presents a dramaturgical analysis of the interactions of RNs at shift report to better understand the impact of behavioral roles on the environmental climate. The use of Goffman's social interaction model allowed an analysis of the emerging, short-lived, and emotional interactions of the RNs as actors and audience within the videotaped reports in a hospital critical care unit. Few supporting interactions were observed (Hays, 2002). Each report consisted of a performance by the charge nurse (CN). The CNs, as protagonists, acted as theme carriers by guiding the interactions and directing the length of time spent on individual patients, the duration of the report, and the emotional ebb and flow. In essence, the CNs controlled the shift report, despite their differing energy levels or demeanor, and set the tone for the variable environment across the reports. A future study will examine the performers' behavioral roles at shift report, end-of-shift nursing outcomes, and staff turnover rates to compare hospital units. This comparison group design will eventually address unit cost as related to staff performance.

EFFECT OF AGED GARLIC EXTRACT ON HUMAN RECOMBINANT CASPACE-3 ACTIVITY.

R. Jackson, B. McNeil, C. Taylor, G. Holl, D. Ruff, and E.T. Gwebu, Department of Research, Oakwood College, 7000 Adventist Blvd, NW, Huntsville, Al, 35896, USA.

In neurodegeneration, such as Alzheimer's disease (AD), apoptosis results in the loss of valuable neurons. A key mechanism in apoptosis is the activation of caspase-3. Caspace-3 activity first becomes detectable early in apoptosis, continues to increase as cells undergo apoptosis, and rapidly declines in late stages of apoptosis. Its activity is an early marker of cells undergoing apoptosis. Caspase-3 catalyzes the formation of B-amyloid, a hallmark of AD. The purpose of the study was to determine whether dietary aged garlic extract (AGE), with known antioxidant properties and neuro-protection against Alzheimer's B-amyloid cytotoxicity, inhibits the caspace-3 activity in-vitro. Caspace-3 activity was assayed according to the prescribed protocol and incubated overnight at ambient temperature. We report that AGE inhibits caspace-3 in dose dependent manner. Caspace-8 was not inhibited by AGE. As a caspase inhibitor, AGE may be effective in reducing apoptotic death of neurons since caspase inhibitors have been shown to inhibit neuronal cell death. We propose a scheme for the ameliorative effect of AGE on deleterious effects of B-amyloid and possibly uncontrolled caspace-3 activity. Supported in part by the NIH/NICHD/EAP/FRESP GRANT # 1G11HD37200, Oakwood College and Carmen/Carlton Sampson Fund

NEONATES, NAPS, AND NOISE: AN OBSERVATIONAL STUDY.

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Vulnerability of newborns in a Neonatal Intensive Care Unit (NICU) is an important concern in today's world of technology. In particular, the NICU's noise level may affect the infant's sleep state. Sleep and rest are necessary for growth and healing. With increasing noise levels and procedures, an infant's sleep state and vital signs are often negatively altered. The purpose of this study was to identify factors affecting the infant's ability to adjust to a lower sleep state following a standard procedure. In a children's hospital, at-risk neonates were observed for 15 minutes following a nursing care procedure. Heart rate, respiratory rate, and oxygen saturation were measured from monitors while noise level was measured with a decibel reader. The Brazelton Scale of infant sleep states (Likert-type scale of 1=deep sleep through 6=crying) was used as a guide for infant observation with lower scores indicating a better resting state. Data showed neonates in closed incubators demonstrated lower sleep state (mean of 1.58) and neonates in open beds had higher sleep states (mean of 4.4). Environmental noise levels were higher in open beds. The results from this study showed a positive relationship between sleep states and noise level in neonates.

Predictors of Health Behaviors in College Students.

Diane Von Ah and Dr. Duck-Hee Kang, University of Alabama at Birmingham, Birmingham, Alabama, 35294.

Health behaviors formed during young adulthood may have a sustaining impact on one's health across later life. Because health behaviors can be affected by psychosocial factors, the purpose of this study was to examine the direct effects of perceived stress, perceived availability of and satisfaction with social support, and self-efficacy, and examine the intermediary roles of perceived threat (perceived susceptibility x perceived severity), benefits, and barriers on alcohol behavior, smoking behavior, physical activity and nutrition behavior, general safety behavior and sun-protective behavior in college students. A convenience sample of 161 college students enrolled in an introductory psychology course completed self-report questionnaires regarding stress, social support, self-efficacy, components of the Health Belief Model, and common health behaviors. Data were analyzed using step-wise multiple regression and structural equation modeling. Satisfaction with social support and self-efficacy significantly predicted sun-protective behavior. Self-efficacy also significantly predicted alcohol, smoking, physical activity and nutrition behavior, and general safety behavior. Under high-perceived threat, self-efficacy was mediated by perceived barriers on binge drinking and was moderated by perceived threat on alcohol use at 30 days and 6 months and physical activity and nutrition behaviors. Results of this study affirm the significant role of self-efficacy in reducing perceived barriers to performing protective health behaviors. Thus, future health promotion programs with college students may become more effective when interventions are designed to maximize self-efficacy to ultimately reduce the barriers to adopting a healthy lifestyle.

Sigma Theta Tau International – Nu Chapter, provided support for this study.

HYPOCHOLESTEROLEMIC 3β-BENZYL-4-METHYL-4-AZA-5α-CHOLESTANE METHIODIDE .

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Since the mid-1950's, we have been developing procedures for and synthesizing target azasteroids and other heterocyclic steroids as potential medicinal substances. One goal was to develop novel steroids which might be effective hypocholesterolemic substances. 4,4-Disubstituted azacholestanes were selected as a priority It was anticipated that such derivatives might be effective by one or more of three mechanisms. They might (1) inhibit absorption from the GI tract by forming non-absorbable cholesterol complexes (2) complex bile acids making them unavailable to facilitate cholesterol absorption, or (3) inhibit cholesterol biosynthesis at the lanosterol step because of the presence of two methyl groups at this position.

The more potent hypocholesterolemic steroids developed were the 4,4-dimethyl-4-aza-cholestanes with nitrogen at position four. The most active of these was 3β-benzyl-4-methyl-4-aza-5α-cholestane methiodide. Evidence was obtained that it acts by at least two of the proposed possible mechanisms. It appears that this quaternary salt is absorbed because of its in vivo activity. It had been postulated that bulk around the quaternary nitrogen produced by the benzyl group might provide sufficient lipid solubility for absorption.The synthesis as well as in vitro and in vivo data will be presented..

KNOWLEDGE, ATTITUDE, AND PRACTICES OF TRADITIONAL MIDWIVES IN ZIMBABWE.

Keratiloe Gwebu, Ephraim T. Gwebu, Oakwood College, Huntsville Alabama. Nathaniel Dube, Blair Research Institute, Zimbabwe.

When Zimbabwe became sovereign state in 1980 it introduced a national program of primary health care delivery. One of the goals was to build cost-effective programs to improve rural health specifically, maternal child health for all Zimbabwe. S survey showed that over 60% of all births in rural Zimbabwe occurred at home under the car of traditional midwives. The purpose o f this study was to evaluate the knowledge, attitude, and practices of the traditional midwives. The main research technique used was structured interviews using questionnaires administered to individual respondents by six pairs of enumerators. Focus group discussions were the other technique used to supplement the information gathered through use of the questionnaire. Zimbabwe is divided, 8 provinces each containing districts. One of these provinces, Manicaland was selected and two districts were randomly chosen. The study showed that TMs are mainstay of maternal health care delivered in rural Zimbabwe. The skill is passes on to relatives through informal apprenticeship. A comparison was made between TMs who had been exposed to Western medical care and the others. Both groups are dedicated to their work. Those exposed to western medical care seemed more able to identify and refer high-risk pregnancies to a health center than the other group. International Department Research Center (Canada) and the Ministry of Health, Zimbabwe funded the study.

LEADERSHIP STYLES OF NURSING ADMINISTRATORS IN LONG-TERM CARE.

Dorothy Gargis Foote, College of Nursing, Univ. of Ala., Huntsville, AL 35899.

As the American population becomes an aging society, there is an increased demand for long-term health care facilities. Registered nurses in long-term care facilities are in administrative positions that are responsible not only for favorable health care, but also retaining employees, containing costs, obtaining reimbursement for services, and maintaining state and federal requirements. The literature confirms these nursing administrators/directors of nursing are not educated at the baccalaureate level, and lack the knowledge of the leadership styles needed for role complexities. The 35 participants in this study were from five southern states. The purpose of this study was to explore the self-perceived leadership styles of nursing administrators employed in long-term care facilities and to study the relationship between educational level, nursing institutional characteristics, and the self-perceived leadership styles. Using the Hersey and Blanchard (1979, 200) LEAD-Self instrument, the dominant primary self-perceived leadership style chosen by 65.7% of the participants was coaching (selling) and the secondary choice used by 42.9% of the respondents was supporting (participating). Over 86.7% of the reporting nursing administrators, had an annual turnover rate of 10% or greater of the directed personnel.

EFFECT OF A ZIMBABWEAN NDEBELE PLANT EXTRACT ON APOPTOTIC CASPASE-3 ACTIVITY.

Sheila Cooper, Courtney Brown and Ephraim T. Gwebu, Department of Research, Oakwood College, Huntsville, Alabama 35896. Samson Sibanda, Department of Applied Chemistry, National University of Science and Technology, Bulawayo, Zimbabwe.

The indigenous peoples of Africa have a rich heritage of traditional medicine based upon the native plants. Trial and error techniques have been used over hundreds of generations, thus discovering innumerable forms of plant-based treatment for various ailments and afflictions. It is very evident that Zimbabwean traditional medical practitioners routinely treat infections, types of cancer, and allergies, with remarkable success. It is possible that Zimbabwe has plants containing ingredients for the treatment of numerous illnesses responsible for millions of cases of morbidity and mortality in the USA today. Excessive apoptosis occurs in Alzheimer's disease. Caspase-3, a critical effector of neuronal apoptosis, may be inappropriately activated in Alzheimer's disease. The purpose of this study was to determine if an indigenous Ndebele plant, *isithundu* (*Xeromphis obovata*) extract inhibits Caspase-3 activity, *in vitro*. A physiological buffer was used to make serial dilutions of the Ndebele *Xeromphis obovata* (*X obovata*) extract. The Calbiochem protocol was used to assay the Caspase-3 activity. The duration of incubation of the enzyme and dilutions was four hours, at a temperature of 37°C. Absorbance was read at 405nm, using a microplate reader (BioRAD). The results indicate that the plant extract, *X. obovata* is an inhibitor of Caspase-3 activity. Funded by NIH/NIGMS/AREA Grant# 1 R15 GM5764, the NIH/NICHD/EAP/FRESP Grant# 1G11HD37200, the Carmen/Carlton Sampson Fund.

CHARACTERIZATION OF THE CARDIOVASCULATURE PERICYTES: VASCULAR REACTIVE OXYGEN SPECIES.

Marcy Floyd, Gerald Kelly, Ruth Washington, Dept. of Natural Sciences, Stillman College, Tuscaloosa, Al 35403.

There are two cell types that dominate the microvasculature endothelium. They are the endothelial cells and the pericytes. Because endothelial cells are the primary physical barriers between blood and surrounding tissues, much research has focused on the importance of the endothelial cell in cardiovascular physiology and injury. In contrast, the roles played by pericytes comprising the capillary wall in these processes are less well understood. The purpose of our study was to determine if the effect of hypoxia induce injury on pericytes or co-cultures of pericytes with endothelial cells leads to the formation of vascular reactive oxygen species. Primary pericytes were isolated from mice hearts. After incubations with various oxygen tensions, cell culture medium was removed and tested for the presence of nitrogen oxide, hydrogen peroxide, and superoxide by fluorometric detection. Our data indicates that vascular reactive oxygen species are release from cells during hypoxia.

EFFECT OF AGED GARLIC EXTRACT ON THE CYTOTOXICITY OF NITRIC OXIDE DONORS IN PC12 CELLS.

Donny Elliott, Robert Jackson, and Ephraim T. Gwebu, Department of Research, Oakwood College, 7000 Adventist Blvd, NW, Huntsville, AL 35896, USA

The mechanism of apoptosis is a biological process referred to as programmed cell death. It is an essential and highly regulated process as in normal development. However, when this regulatory process is lost, pathological conditions occur that can lead to such neurodegenerative diseases as Alzheimer's and Parkinson's. Nitric oxide (NO) is an essential metabolite for normal physiological function; however, at higher concentrations it can be neurotoxic, perhaps by inducing apoptosis. Attenuation of NO production may be a therapeutic strategy. NO donors such as S-nitroso-N-acetyl-DL-penicillamine (SNAP) and diethylenetriamine-NO adduct (NOC-18) induce apoptosis in PC12 cells. The purpose of this study is to determine whether Aged Garlic Extract (AGE) can protect the cells from the cytotoxicity of the NO donors. Studies from our laboratory have shown that AGE (1) protects cells from β-amyloid peptide cytotoxicity and (2) inhibits human recombinant caspase-3. Caspase-3 is intricately involved in apoptosis. PC12 cells are pre-incubated with AGE, and then exposed to different concentrations of NO donors. Cell viability is determined using an MTS-based assay kit. Our results show that AGE protects PC12 cells from the cytotoxicity of NO donors in a dose dependant manner. Support in part by NIH/NICHD/EA/FRESP Grant # 1G11HD3700 and Oakwood College.

CHARACTERIZATION OF THE CARDIOVASCULATURE PERICYTES: CYTOKINES.

Erica Johnson, Jacqueline T. Lowe and Ruth A. Washington, Dept. of Natural Sciences, Stillman College, Tuscaloosa, Al 35403.

Pericytes are cells of mesodermal origin that envelope microvessels. Pericytes are concentrated near EC junctions along venules where they are likely to participate in inflammatory events. They are defined by their location within the basement membrane of capillaries. These blood vessels, which are the smallest in the body, generally have a diameter of 5um or less and do not exhibit smooth muscle cells in their walls. The differences in distribution and structure among the pericytes suggest that they may have vessel or tissue specific roles. The aim of this study is to determine if pericytes during simulated heart injury produced immunological cytokines relevant to heart injury. After incubations with various oxygen tensions, cells were immediately processed for western blotting, or immunohistochemistry for the presence of various proinflammatory cytokines. The results indicate that pericytes may have a specific role in heart injury.

LET'S PRETEND HOSPITAL.

Marilyn S. Hargrave, College of Nursing, Univ. of Ala., Huntsville, AL 35899

Let's Pretend Hospital (LPH) is a program designed for first graders to help reduce the fear and anxiety they may experience if they must be hospitalized or visit the emergency room. The program began 17 years ago and has evolved into a six day event which serves approximately 3000 students in 60 public, private and home schools in Madison County. The event is held annually in March. Huntsville Hospital (HH) Department of Volunteer Services begins in the fall to coordinate registration and scheduling of the local schools. Vocabulary and resource lists are provided to each class in preparation for the visit. College of Nursing faculty and students write and coordinate these study guides with Child Life Coordinators and also prepare the skits that are performed in each hospital room. The "Pretend Hospital Rooms" are: Emergency Room, Operating Room, X-ray and Laboratory, Playroom, Patient Room, Safety Room, and an Ambulance. College of Nursing Juniors and Seniors perform the skits as doctors, nurses and technicians to provide information and demonstrations for the children. The success of Let's Pretend Hospital is the combined efforts of Huntsville Hospital Department of Volunteer Services, nursing faculty, students, staff and many volunteers who participate year after year. Nursing students who visited as first graders are now performing skits. Many volunteers have seen both their children and grandchildren attend. North Alabama area hospitals and campuses have observed this program and adopted many of the processes to create their own pretend hospital.

THE INVOLVEMENT, COPING, AND RELATIONSHIP OF PARENTS WITH A CHILD IN NEWBORN FOLLOW-UP CLINIC.

Lindsay C. McCoy, School of Nursing, Univ. of Ala. at Birmingham, Birmingham, AL 35294-1210.

Having a physically or mentally compromised child places a heavier emotional, financial, and psychological burden on the child's providers. Relationships between the mother and father are at risk for change, whether the change is positive or negative. A lack of research is available to determine the involvement, coping, and relationship between parents who must assume responsibility once their newborn has been discharged from the hospital. The purpose of this qualitative study was to answer the following questions: 1) What is the involvement and relationship of parents? 2) How has coping with the needs of the child affected the parents' relationship, and how has the relationship affected coping with the child's needs? Questionnaires were developed by the investigator and content validity obtained through review by clinicians and researchers. Fifteen participants were recruited during clinic hours at the Newborn Follow-Up Clinic. Mothers and fathers wrote brief and/or lengthy answers to the questions. Themes identified by parents included appreciation for family involvement, bonding with their spouse and better coping associated with stronger relationships. Results of this study surprisingly showed that having a child with a developmental or medical problem brought the majority of participants closer together as a family. Acknowledgement of support goes to the following people: Monica Collins, RN; Vivien Phillips, RN; Shirley Cosby, RN; Susan Johnson, RN, Nurse Coordinator of the Newborn Follow-Up Clinic; Dr. Kathleen Nelson, Professor and Associate Dean of UAB School of Medicine; Dr. Ellen Buckner, UAB School of Nursing Honor's Coordinator.

THE INVISIBLE AMERICANS: PRIMARY CAREGIVERS IN THE HOME CARE SETTING: A PHENOMENOLOGICAL STUDY OF LAY CAREGIVERS OF THE TERMINALLY ILL. Kathy Lewis-Adler Ph.D. School of Business Univ. of N. Ala., Florence, Alabama 35632.

Approximately 25 million Americans serve as informal caregivers for chronically and terminally ill individuals in their homes. They support a 196 billion dollar industry yet, they remain virtually innocuous to the majority of Americans. While research has focused on family-centered informal caregiving experiences, there is a paucity of research detailing caregivers of the terminally ill. While caregivers share similar experiences there are unique variables associated with caring for the terminally ill. The investigator employed qualitative methodology within phenomenological theory, and case study approaches to explore the human experiences of informal caregivers of the terminally ill during the first two weeks post discharge and the 30 day mark. Semi-structured interviews and participant observations were utilized to derive data from nine primary caregivers. Field notes and verbatim transcripts of those interviewed were analyzed through constant comparative method of data analysis to uncover the main themes, categories and subcategories. Findings reveal that care givers: 1) do not recognize or identify themselves as caregivers prior to initiating care in their homes, 2) believe the medical community does not provide basic caregiving survivor skills after discharge, 3) are ill prepared to meet the demands of the role, 4) found the shock and intensity of the tasks involved in caregiving experience to be overwhelming, and 5) desire training and education to build their self-esteem and confidence.

AGED GARLIC EXTRACT PROTECTS SERUM DEPRIVED PC12 CELLS FROM APOPTOSIS. Grace Mbyirukira and Ephraim T. Gwebu, Department of Research, Oakwood College Oakwood College 7000 Adventist Blvd. Huntsville, Alabama 35896

Apoptosis or programmed cell death is a normal physiological phenomena, however, uncontrolled apoptosis is a cause of neurodegeneration. Inhibition of such apoptosis is a viable therapeutic approach. Studies in our lab have shown that age garlic extract (AGE) inhibits apoptotic caspase-3. We hypothesize that AGE inhibits apoptosis induced by serum deprived PC12 cells. Apoptosis was induced by depriving PC12 cells of serum for a given amount of time. Once the cells started the apoptosis process, the cell viability was measured with the aid of a lactate dehydrogenase (LDH) kit. The cell viability was measured periodically to establish an optimal amount of time would result in 50% viability. Once this was established, the serum deprived PC12 cells were pre-incubated in 37C carbon dioxide incubator with AGE at different concentrations for a given period of time. The cellular viability was then taken again at the length of time that resulted in 50% viability. The results from this study strongly suggest that AGE acts as an inhibitor, and protects serum deprived PC12 cells from apoptosis. Supported in part by the NIH/NICHD/FRESP Grant# 1G11HD37200 and OAKWOOD COLLEGE

NEW INSIGHTS INTO ISCHEMIA REPERFUSION INJURY.

Ruth A. Washington, Brian Gibbs, Natasha Cox, Eric James, Dept. Natural Sciences, Stillman College, Tuscaloosa, AL 35403.

Ischemia-reperfusion (I/R) injury is a complex phenomenon that induces cell damage through a bi-phasic process. Ischemia initiates the injury by deprivation of the energy needed to maintain ionic gradients and homeostasis, which may ultimately, lead to cellular dysfunction and death. Reperfusion exacerbates this damage triggering an inflammatory reaction in which participate oxygen free radicals, endothelial factors and leukocytes. Ischemia-reperfusion disrupts the delicate balance that maintains homeostasis in the microcirculation with attraction, activation, adhesion and migration of neutrophils causing local tissue destruction by release of proteases and further oxygen free radicals. Mechanisms of ischemic injury are common to all solid organs, but there are some specific characteristics for each one of them.

The pathophysiology of myocardial ischemia-reperfusion injury suggests an inflammatory response. Due to anatomical and physiological reasons and myocytes in endocardium are the most vulnerable cells and most popular to study. However, because endothelial cells are the primary physical barriers between blood and surrounding tissues, much research has focused on the importance of the endothelial cell in cardiovascular physiology and injury. The endothelium consists of the endothelial cells and pericytes. Novel studies examine the mechanisms underlying pericytes adhesion molecule expression after I/R, what pro-inflammatory cytokines are produced to by pericytes to modulate microvascular dysfunction that is normally elicited by I/R, and the contribution of reactive oxygen metabolites by pericytes exposed to hypoxia and reoxygenation.

EFFECT OF ZIMBABWE'S TRADITIONAL MEDICINAL PLANT PRODUCTS ON THE CYTOTOXICITY OF ALZHEIMER β-AMYLOID PEPTIDE IN PC12 CELLS.

Kaarina Lokko, Grace Mbyirukira and Ephraim T. Gwebu, Department of Research, Oakwood College, 7000 Adventist Blvd. NW, Huntsville, AL 35896, USA

Among the elderly, the most common cause of memory loss is Alzheimer's disease (AD). Accompanying the disease is a build up of β-amyloid (β-AP), a confirmed neurotoxin. One way to treat this ailment may be to inhibit β-amyloid cytotoxicity. The Zimbabwean plant products were obtained from traditional medicines that have been used to treat various diseases for hundreds of years with remarkable success. The purpose of the study was to verify whether or not plant products from Zimbabwe's traditional medicine diminish the effect of neurotoxin β-amyloid 25-35 in PC12 cells. Plant extracts are dissolved in dimethylsulfoxide (DMSO). Cell viability is determined by using the MTS-based Assay (Promega). We report that plant products from Zimbabwe's traditional medicine may provide protection from β -amyloid cytotoxicity. This research was supported in part by NSF Grant # HRD-9908993 NIH/NICHD/EAP/FRESP Grant #1G11HD37200 and Carmen /Carlton Sampson Fund .

GRAMMATICALITY EFFECTS IN ACQUIRED DYSLEXIC PATIENTS. Nicole Sanders, Div. Speech and Hearing Sciences, UAB, Birmingham, AL 35294. M, Helen Southwood, Div. Speech and Hearing Sciences, UAB, Birmingham, AL 35294.

This study evaluated the effects of grammatical class (nouns, verbs, adjectives) on the reading ability of patients with acquired dyslexia after neurological damage. We also determined if the grammaticality effect was the result of a reading deficit or a generalized language deficit. Patients read extensive lists of nouns, verbs, adjectives and named pictures corresponding to the words read. Error patterns were analyzed extensively and reaction times (RTs) were measured. We analyzed the data of 3 patients with phonological dyslexia. Reading accuracy appeared to be influenced by grammatical class. For 2 of the 3 subjects reading accuracy of adjectives was significantly poorer than reading accuracy of nouns and verbs. For the third subject his reading accuracy of adjectives and verbs was significantly lower than his accuracy for nouns. RT data tended to corroborate that grammatical class affected the reading abilities of these patients. For two of the patients RTs for verbs and adjectives were significantly longer than RTs for nouns. Although accuracy was poorer for naming than for reading, grammatical class did not affect naming ability. Naming RTs were longer than reading RTs. However, grammatical class did not influence naming RTs. The data suggest that grammaticality effects observed in oral reading were not associated with a generalized language deficit. The results of this study will be discussed in relation to current neuropsychological models of single word reading. Our results show that the mechanisms involved in single word reading differ from those associated with picture naming. The study provides new insights about the underlying processes involved in single word reading.

EFFECT OF S-ADENOSYL-METHIONINE ON HUMAN RECOMBINANT CASPACE-3. Jeremy Nicholas Drummond, Courtney Brown and Ephraim Tobela Gwebu Department of Research, Oakwood College 7000 Adventist Blvd, Huntsville, Alabama 35896

S-Adenosyl-Methionine (SAM) induces apoptosis in PC12 cells. SAM causes Parkinson's disease in rats. Apoptosis is induced by activation of caspace-3. Activation of caspace-3 is pivotal in the progression of apoptosis. We hypothesize that SAM induces apoptosis by activating caspace-3. The purpose was to determine the effect of SAM on the human recombinant caspace-3 (Calbiochem). Caspace-3 activity is assayed according to manufacturer's protocol and the effect of different SAM concentrations determined. There is evidence that SAM may activate caspace-3. Supported in part by the NIH/NICHD/EAP/FRESP Grant #1G11HD37200 and OAKWOOD COLLEGE

BOLOGICAL PROPERTIES OF SOME 3,4-DIALKYL-4-AZA-CHOLESTANES. Norman J. Doorenbos, Dept. Pharmacal Sciences, Auburn Univ., Auburn, AL 36849; Kenneth Kerridge, Bristol Myers, Syracuse, NY; Masako Nakagawa, Hokkaido Univ., Sapparo, Japan, Vithal Patel, FMC Corp., Baltimore, MD; Donald Shay and Rodney Smith, Uniiv.Maryland, Baltimore, MD.

Azasteroids, steroids in which one or more carbons in the phenanthrene skeleton has been replaced with a nitrogen atom, have been the focus of one of our research programs since the mid-1950's. Such steroid derivatives do not occur in nature.

Among the novel steroids synthesized were several 3,4-dialkyl-4-azacholestanes. We wish to report and compare anti-microbial, anti-inflammatory and hypocholesterolemic activities observed in the following eight of these steroids:
(A) 3,4-Dimethyl-4-aza-5α-cholest-2-ene, (B) 3β,4-Dimethyl-4-aza-5α-cholestane, (C) 4-Ethyl-3-methyl-4-aza-5α-cholest-2-ene, (D) 4-Ethyl-3β-methyl-4-aza-5α-cholestane, (E) 3-Ethyl-4-methyl-4-aza-5α-cholest-2-ene, (F) 3β-Ethyl-4-methyl-4-aza-5α-cholestane, (G) 3β-Benzyl-4-methyl-4-aza-5α-cholestane and (H) 3β-Benzyl-4-methyl-4-aza-5α-cholestane methiodide.

In vitro inhibition of growth of Gram-positive bacteria, yeasts and molds in the range of 1 to 100 μg/ml were observed. Gradient plate and serial dilution techniques were used.

Substance B exhibited the greatest anti-inflammatory activity. In a granuloma assay in adrenalectomized adult male rats, it had 1/3 the activity of hydrocortisone.

In vitro and in vivo studies demonstrated not only reductions in intestinal cholesterol absorption but also in cholesterol biosynthesis. Low toxicity was observed in animal and human studies.

STEROID INDUCED PATHOLOGICAL FRACTURES. Melinda Redmon, College of Nursing, Univ. of Ala., Huntsville, AL 35899.

Multiple Sclerosis (MS) is a chronic inflammatory autoimmune disease that attacks the central nervous system (CNS) resulting in destruction of myelin and neuronal death. It is the leading cause of neurological disability in young adults ages 20-40. This progressive and degenerative disease is characterized by periods of remission and exacerbation. In an effort to slow progression of the disease or treat an exacerbation, it is standard practice for physicians to administer steroid therapy to suppress the autoimmune response. The administration of large doses of corticosteroids over an extended period of several years can have long-term complications, which may not be evident until many years after the administration of the drug. A case study of a 60-year-old white female demonstrates the complication of steroid induced osteoporosis that resulted in three pathological fractures ten years after receiving steroid therapy.

KNOWLEDGE, RESILIENCE AND EFFECTIVENESS OF A YOUNG TEEN ASTHMA CAMP, Ellen B. Buckner, Ashley K. Hawkins, Lynn Stover, Sharon Simmons, Jennifer Brakefield, Cynthia Foster, Sheree Payne, Jean Newsome, Gustavo Dubois, University of Alabama at Birmingham, Birmingham, AL 35294-1210.

Guidelines developed for asthma based on pulmonary function testing and peak expiratory flow (PEF) monitoring have gained widespread professional acceptance. However, written "asthma action" plans are not always used by practitioners. Young teens, ages 12-15 are in a particularly appropriate age range to acquire knowledge and skills in asthma self-care. There is also an additional need to deal with common factors related to teen coping such as denial, rebellion, peer pressure and finding a balance. A Young Teen Asthma Camp was held to provide a positive experience in the outdoors coupled with developmentally appropriate asthma education. Twelve campers (4 males, 8 females) participated in the 3-day residential summer camp. Nurses and nurse practitioners provided asthma education using "Power Breathing for Teens™" developed by the Asthma and Allergy Foundation of America (AAFA). Daily peak flow readings were done and campers were encouraged to adopt an individualized asthma action plan. Campers participated in all aspects of camp--swimming, canoes, horses, ropes, crafts and games--without increased difficulty. PEF rates increased each day with a mean increase from 318 to 336 from Day 1 to Day 4. Parents reported improved adherence with treatment regimens after camp. Knowledge, resilience and effectiveness of self-care increased from before to after camp. Camper's qualitative comments demonstrated marked change in attitudes about asthma. The camp was co-sponsored by a pulmonary medicine practice and an independent camp.

EFFECT OF AGED GARLIC EXTRACT ON CELL DEATH INDUCED BY SAM. Maisha Tenah Baker, Grace Mbyirukira, and Ephraim Tobela Gwebu Department of Research Oakwood College7000 Adventist Blvd. Huntsville, Alabama 35896,USA

S-Adenosyl-Methionine (SAM) induces apoptosis in PC12 cells. Apoptosis is programmed cell death. Apoptosis is induced by activation of Caspase-3. Studies from our laboratory have shown age garlic extract (AGE) not only protects cells from Alzheimer's Beta-amyloid but also inhibits Caspase-3. Alzheimer's disease is characterized by loss of neuronal cells, possibly due to apoptotic death. The purpose of this study is to determine whether AGE inhibits cell death induced by SAM in PC12 cells. LDH leakage (cell death) induced by SAM is measured using a commercial kit (Promega) and the effect of AGE garlic determined. AGE seems to provide protection against SAM. Supported in part by the NIH/NICHD/EAP/FRESP Grant #1G11HD37200 and Carmen/Carlton Sampson Fund and NSF Grant #HRD-9908993

EFFECT OF AGED GARLIC EXTRACT ON CASPASE-3 ACTIVITY IN PC12 CELLS.

Courtney Brown and Ephraim Tobela Gwebu, Department of Research, Oakwood College, 7000 Adventist Blvd, NW, Huntsville, Al, 35896, USA

In neurodegeneration, such as Alzheimer's disease (AD), apoptosis results in the loss of valuable neurons. A key mechanism in apoptosis is the activation of caspase-3. Caspase-3 activity first becomes detectable early in apoptosis, continues to increase as cells undergo apoptosis, and rapidly declines in late stages of apoptosis. Caspase-3 activity is an early marker of cells undergoing apoptosis. Caspase-3 catalyzes the formation of B-amyloid, a hallmark of AD. The purpose of the study was to determine whether pre-incubation of PC12 cells with dietary aged garlic extract (AGE) suppresses caspase-3 activity in these cells. After incubating PC12 cells with AGE, caspase-3 activity was assayed according to the prescribed protocol (Calbiochem). We report that AGE inhibits caspase-3 in dose dependent manner. Caspace-8 was not inhibited by AGE. As a caspase inhibitor, AGE may be effective in reducing apoptotic death of neurons since caspase inhibitors have been shown to inhibit neuronal cell death. We propose a scheme for the ameliorative effect of AGE on deleterious effects of B-amyloid and possibly uncontrolled caspase-3 activity. This research was supported in part by the NIH/NICHD/EAP/FRESP GRANT # 1G11HD37200.

SELF-PERCEPTION OF ADOLESCENTS WITH DIABETES: A COMPARISON OF THOSE WHO HAVE ATTENDED CAMP AND THOSE WHO HAVE NOT.

Andi Rigsby, University of Alabama at Birmingham School of Nursing, University of Alabama at Birmingham, Birmingham, AL 35294-1210

Being an adolescent is a very hard part of life. It is especially hard for those who also have a chronic illness such as diabetes. This study examines the issue of self-perception in adolescents with diabetes. This is a quantitative study. Data will be gathered through questionnaires about self-perception. The questionnaires will be graded based on answers from one to five with one being totally agree and five being totally disagree. Subjects will be attendants of Camp Seale Harris and patients of the Endocrinology Clinic at Children's Hospital. The goal of the study is to determine if attending a diabetic camp affects an adolescent's self-esteem. The relevance of the information is to help educate caregivers in the advantages or disadvantages of attending a diabetic camp. Data collection is still in progress. Seven questionnaires have been returned. Three were from the clinic and four were from camp. Four were males and three were females. The males had higher scores on the questionnaires with a mean score of 76.3 whereas females had a mean score of 72. Participants that were from the camp also had a higher mean score of 77.75 whereas the mean score of clinic participants was 67. The results are not yet significant due to small sample size.

SMOKING BEHAVIORS AND READINESS TO QUIT DURING PREGNANCY.

Jodelle R. Martin (Ellen B. Buckner), University of Ala. School of Nursing, University of Ala. at Birmingham, Birmingham, AL 35294-1210

Smoking during pregnancy is a significant but amenable cause of poor pregnancy outcome. The goal of the study was to investigate the smoking behaviors of pregnant women and their readiness to quit. Tools to measure knowledge and self-efficacy for smoking in pregnancy were developed by the investigator. A panel of nurse researchers determined content validity. Reliabilities of the scales were computed for the sample with coefficients of .68 and .74 respectively. Questionnaires were distributed at an obstetric referral clinic and two urban rehabilitation centers for pregnant women. Out of 26 participants, over one third (38.5%) smoked although 9 had cut down or quit since becoming pregnant. The results show that self-efficacy was significantly inversely related to smoking behaviors ($p<0.01$). Knowledge level was higher in non-smokers but not significantly. The effect sizes were a 1.35 for self-efficacy and a 0.78 for knowledge. Findings show that it may be important to encourage and motivate women to quit, rather than educate them regarding the risks of smoking during pregnancy.

STREPTOCOCCUS SANGUIS ADHERENCE TO DAMAGED ENDOTHELIAL CELLS.

Qshequilla Parham, Alphonso Morton, Candyce Curry, Jermaine Mitchell, Ruth Washington, Dept. of Natural Sciences, Stillman College, Tuscaloosa, Al 35403.

The linkage between gum disease and heart attacks has shown to be very strong. Previous research indicates that the relationship may be as strong as heart disease and cholesterol, body weight, or smoking. During coronary heart disease the cells that line the blood vessels called endothelial cells are altered. The normal metabolic activity of the vascular endothelial cells is to maintain blood flow. The purpose of the study was to determine if *Streptococcus sanguis,* the most common form of germ plaque would adhere to damaged endothelial cells. Bovine Aortic Endothelial Cells (BAEC) were grown to confluence on collagen coated cover staining dishes. Cells were damaged with Triton X-100 and *S. sanguis* was added to damaged and normal (BAEC). Adherence was determined by visual examination by differential interference contrast (DIC). Our study showed that BAEC damaged with Triton X causes bacteria to co-aggregation. Cells that were not damage had little to no bacteria adherence. Taken together, these results demonstrate that *S. sanguis* can adhere to damaged endothelial cells *in vitro* and therefore could adhere to blood vessels (*in vivo*).

SUPPORTIVE AND SELF RELIANCE IN MOTHERS AND FATHERS WHO HAVE EXPERIENCED A LOSS. Amy Williams, University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL, 35294-1210.

Grief is a difficult concept in nursing. This topic is avoided not only in the medical community, but also within life in general. This study explores the way mothers and fathers deal with the loss of a child, specifically using supportive or self-reliant coping. The quantitative aspect of data collection consisted of selected sections of the Jalowiec Coping Scale (Jalowiec, 1998), which measured coping styles on a 4-point scale. The qualitative aspect of the study asked respondents questions regarding their individual grieving process and how they coped using a revised Means in Suffering Test (Stark, 1981). The investigator developed the questionnaire from information specific to grief counseling available at the Amelia Center, the community agency where the study was conducted. Content validity was established through review by interdisciplinary clinicians. The questionnaires were distributed after the investigator attended a grief support group. The goal of this study was to provide updated information to nurses about the grieving process and strategies that help some parents cope. Results show mothers to be more likely to use supportive coping strategies and fathers more likely to be self-reliant. As nurses it is important to realize the complexity of the grieving process, and facilitate that process individually. Some preliminary themes within the study are the belief in a higher power, and the growth of that relationship, the effects of bereavement on the mind, body, and spirit, and the participation in public ceremonies.

ENGINEERING and COMPUTER SCIENCE

GAMMA SHAPES. Kenneth R. Sloan, Dept. of Computer & Information Science, Univ. of Ala. at Birmingham, Birmingham, AL 35294. Marietta E Cameron, Dept. of Computer Science, Birmingham southern College, Birmingham, AL 35254. Ying Sun, Dept. of Computer & Information Science, Univ. of Ala at Birmingham, Birmingham, AL 35294.

A novel method of reconstructing 3D shapes from unorganized sample points is presented in this paper. The method produces a new family of shapes, which we call Gamma Shapes. Gamma Shapes are an extension to Alpha Shapes. The key idea is to select a scale factor which is locally modulated by a scalar field. Efficient methods for determining this scalar field are part of the paper.

ASPECT-ORIENTED WEAVING OF DOMAIN MODELS.

Yuehua Lin, Dept. of Computer & Information Sciences, Univ. of Ala. at Birmingham, Birmingham, AL35205. liny@cis.uab.edu.

Domain-specific modeling helps to build and maintain complex software systems. Model-Integrated Computing (MIC) is an approach to the description and generation of software systems. Aspect-Oriented Software Development (AOSD) is a new model for software composition that contributes to better separation of concerns and improved modularity of software. Aspect-Oriented Domain Modeling (AODM) combines AOSD and MIC by weaving crosscutting constraints into domain models to enable separation of concerns and improved changeability in domain modeling. To accomplish this transformation, three things are needed: 1) constructs for specifying the location of elements in the domain model; 2) a language for describing the crosscutting behavior and its associated model transformation; and, 3) a weaving engine to perform the described transformations. My current work involves the design and construction of aspect weavers for domain models, with the primary functionality of interpreting the constraint specifications in order to carry out the corresponding transformations on the model. This research is currently conducted in the Generic Modeling Environment (GME), a domain-specific modeling environment based on the principles of MIC. The main benefit of model weaving is to facilitate rapid construction and evolution of domain models via flexible weaving of additive changes. Another benefit is that we are constructing the core of our weaving engine such that it can be adapted and used with other several modeling tools. This work is funded by the DARPA Information Exploitation Office (DARPA/IXO), under the Program Composition for Embedded Systems (PCES) program.

MORPHING BETWEEN MANY POLYGONS.

Xiaqing Wu, John K. Johnstone, Dept. of Computer Science, Univ. of Ala. At Bham., Birmingham, AL, 35294-1170.

Morphing between different numbers of polygons across a change in topology remains as an unsolved problem although there are many solutions for morphing between two polygons or one-to-one morphing. A new algorithm is presented in this paper for morphing between many polygons. Delaunay triangulation is used to set up the correspondence between vertices. An incremental Delaunay triangulation algorithm is implemented for this purpose. We also present a supersampling method of the polygons for making the Delaunay triangulation of the vertices in the supersampled polygon equal its constrained Delaunay triangulation. According to the correspondence, the gap between the source group and the target group will dynamically shrink until it is completely zipped up at the approximation of its medial axis. Our method can guarantee that there is no self-intersection during the zipping process. The morph requires no user interaction, is inexpensive, uses dynamic vertex correspondence, and follows nonlinear vertex paths.

CONTOUR EXTRACTION FROM AN UNORGANIZED POINT CLOUD.

Matthew J. Emerson, Birmingham-Southern College, Birmingham, AL 35254.

I present an automatic method for extracting a set of contours from an unorganized point cloud sampled from the surface of a three-dimensional object. The method works by slicing the point cloud into thin parallel regions along one axis and then finding the contours in each slice. In finding the contours, I make use of the voronoi diagram of a two-dimensional projection of the points in each slice. The contours found by this method can be used by various contour interpolation methods to reconstruct the original surface.

SOURCE QUANTIFICATION OF INAPPROPRIATE DISCHARGES TO STORM DRAINAGE SYSTEMS.

Veerabhadra Rao Karri and Dr. Robert Pitt, Department of Civil & Environmental Engineering, University of Alabama, Tuscaloosa, Alabama-35487.

Inappropriate discharges are non-stormwater discharges into a municipal separate storm sewer system (MS4) that are not covered by an existing National Pollutant Discharge Elimination System (NPDES) permit. Identifying and eliminating these inappropriate discharges to storm sewers is an important and very cost-effective Best Management Practice (BMP) in a non-point source water pollution problem. Field screening procedures of dry weather flows which monitor for certain chemical and visual tracers that indicate potential sources are necessary to identify the sources. In this research a chemical mass balance model with *Monte Carlo* statistical simulation using Microsoft Visual Basic 6.0 was developed, which involves a statistical analysis of the tracers using their mass balance at the outfall. The numerical technique used in this model is to estimate mass contributions of different identified sources for a mixture water quality data set. Each mixture-water quality data set consisted of statistical parameters like mean, coefficient of variance and the type of distribution (Uniform, Normal, or Log-Normal) for an individual tracer from every source that is to be evaluated. Simulations were performed on this data set, to estimate these mass contributions. The input for this model is observed outfall concentrations for the sources selected for evaluation. The output of this model gives the most likely fraction of flow for each source type and shows the spread of the solutions. Good agreement was obtained between the prediction using the current model and the experimental results. Thus, using this model one can predict the main contributor to the inappropriate discharges in storm drainage systems at the outfall considered.

MODEL-BASED SPECIFICATION AND SYNTHESIS OF CORBA COMPONENT MODEL (CCM).

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The CORBA Component Model (CCM) has addressed the limitations of earlier CORBA object models by extending features and services that enable developers to develop components that can integrate commonly used CORBA services seamlessly. However, CCM still has some drawbacks such as complexity due to heterogeneity, and lack of support of QoS provisioning for embedded systems that are distributed and must react in real-time. One solution is to combine Model-Integrated Computing (MIC) technologies with CCM. In MIC, domain-specific models are created and then synthesized into different artifacts (e.g., source code, or simulations). The Generic Modeling Environment (GME) is a generic, meta-configurable modeling environment developed by Vanderbilt University that idealizes the principles of MIC. We are using the GME to help model and synthesize standard component-based CCM middleware at high levels of abstraction. To provide better modularization and customizability, we are targeting CIAO (the Component Integrated ACE Orb) from Washington University. Another focus of our integration is the "Framework for Aspect Composition for an EvenT channel" (FACET), also under development at Washington University. This integration will assist in the modeling of distributed and embedded real-time systems within the GME to facilitate the generation of a componentized CORBA event channel that has been modularized using principles of aspect-orientation. This work is funded by the DARPA Information Exploitation Office (DARPA/IXO), under the Program Composition for Embedded Systems (PCES) program.

INTERACTIVE SILHOUETTES OF TRIANGULAR MESHES.

Chuanxi Xu and John K. Johnstone, Dept. of Computer and Information Science, Univ. of Ala at Birmingham, Birmingham, AL 35294.

We consider the construction of an interactive algorithm for computing the silhouette of a triangular mesh, and then explore the use of this interactive tool in recovering the shape of an object from its silhouette alone.

The silhouette of an object contains the boundary of its visible region. Silhouette computation is crucial in object-space visible surface algorithms as well as non-photorealistic rendering. We compare an interactive algorithm with two classical algorithms on various data models, analyzing their accuracy, efficiency and universality.

We use the interactive algorithm to develop a silhouette generator to probe the shape of an object. As the viewpoint is moved, the silhouette is recomputed and accumulated. We explore how well an object's shape can be recovered solely from its silhouettes.

A LANGUAGE-INDEPENDENT APPROACH TO REFACTORING THROUGH PROGRAM TRANSFORMATION ENGINES.

Hui Wu, Department of Computer and Information Sciences, University of Alabama at Birmingham., Birmingham, AL 35294.

Refactoring is a technique for reconstructing source code while preserving program semantics. The principles of refactoring are an effective approach for improving a program's internal structures, while also increasing flexibility, maintainability, readability, and reusability. Many Integrated Development Environments (IDEs) have built-in support for refactoring, but the current implementations of many refactoring tools are tied to a specific programming language. This makes the reuse and development of refactoring tools a more difficult task because each refactoring engine needs to be customized for each new language. Program Transformation Engines (PTEs) are tools that facilitate the transformation of one program into a new representation. A PTE provides the basic functionality for performing lower level transformation functions, such as parsing, AST generation/manipulation, and pretty printing. This paper presents a language-independent approach toward the construction of refactoring tools using PTEs. The refactoring rules and the syntax/semantics of the language will be specified at a high-level of abstraction so that language independent schemas of transformation can be captured and applied. We are investigating the use of the Design Maintenance System for transforming the code structure and injecting the refactoring transformations. Thus, we are using a language-independent transformation engine to perform refactorings. A key benefit is that new language-specific refactoring tools can be constructed by instantiating our generic framework with the specification mappings to each individual language.

USING PIECEWISE ALGEBRAIC CURVES IN A BERNSTEIN ENVIRONMENT.

Xiao Hu, Dept. of Computer Science, Univ. of Ala. at Bham., Birmingham, AL, 35294-1170. John K. Johnstone, Dept. of Computer Science, Univ. of Ala. at Bham., Birmingham, AL, 35294-1170.

Expressing algebraic curves in the Bernstein polynomial basis has advantage in application. We present an algorithm for converting an algebraic curve expressed in the power basis directly to its equivalent Bernstein form over an arbitrary triangular region. We also discuss how to convert Bezier surface form to power form.

FORMAL DISAMBIGUATION OF UNRESTRICTED REQUIREMENTS SPECIFICATIONS *. Beum-Seuk Lee, Dept. of Computer & Information Sciences, The University of Alabama at Birmingham, Birmingham, AL, USA 35294. leebs@cis.uab.edu

In software engineering, interpreting unrestricted natural language specifications and converting them into a formal specification is one of the most challenging tasks. This is due to the fact that the informal specifications tend to convey, even after a series of careful reviews, ambiguous information that misleads the engineers to build an erroneous system. In our research, we have built a system that guides the engineers throughout the system development lifecycle to detect and resolve ambiguity and errors at the linguistic as well as the programming logic level. This is carried out by using natural language processing and by adopting Two-Level Grammar (TLG) as an intermediate representation which is formal and flexible in its syntax, to automate the translation from an informal requirements document into a formal specification. It is worth mentioning that data used during the translation such as the specifications themselves and explicit domain-specification knowledge is expressed in eXtensible Markup Language (XML) to supplement the data with metadata and systematic structure. The outcome is a system that assists developers to build a formal representation from the informal requirements for rapid prototyping and even implementation.

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FUZZY WEB PLANNING MODELS WITH GENETIC ALGORITHM SOLUTIONS. Xidong Zheng and Kevin Reilly, Dept. of Comp. And Info. Science, Univ. of Ala., Birmingham, AL, 35294. James J. Buckley, Dept. of Math, Univ. of Ala., Birmingham, AL, 35294.

This paper deals with the specifics of computing (fuzzy) steady state probabilities using genetic algorithms to determine required minimum and maximum of the modeling system's fuzzy number outputs. Prominent fuzzy system performance variables, the ultimate outputs of the modeling, include Utilization, Number (of requests) in the System, Throughput, and Response; these are used for designing servers. The fuzzy steady state probabilities are determined within a framework, which utilizes fuzzy, finite, regular Markov chains. Genetic algorithm (GA) solutions employing floating-point computations reduce computer memory load and speed up computation (relative to using binary representations). The modeling scheme involves complex constraints which, when translated to linear ones, effect a convex space for the search with expedited genetic mutation and crossover. The GA approach, not surprisingly, is superior to conceptually simpler random schemes in terms of timing and precision; reported computational results document this point.
Keywords: Genetic Algorithm, fuzzy probability, optimization, web modeling.

A COMPARATIVE ANALYSIS OF META-PROGRAMMING AND ASPECT-ORIENTATION.

Suman Roychoudhury, Department of Computer and Information Sciences, Univ. of Alabama at Birmingham, Birmingham, AL 35205.

This paper presents an investigation into language constructs for supporting improved separation of crosscutting concerns. Traditionally, this separation has been performed using meta-programming and other related techniques. Although meta-programming provides a powerful mechanism for adaptation and concern separation, it often does so by sacrificing comprehensibility. A growing area of research, called aspect-oriented software development, offers a new approach for separating crosscutting concerns. As applied to programming languages, these new techniques assist a programmer in writing crosscutting concerns in a single, separated aspect that can be weaved into numerous locations in the source code. This capability offers significant improvements toward the maintenance and adaptability of software. In this work, we describe several characteristics between reflective meta-programming techniques and the new capabilities offered by aspect-oriented programming. We compare and contrast their capabilities with respect to their ability to modularize crosscutting concerns to satisfy sound principles of software development. Specifically, we compare the capabilities of OpenJava (a compile-time meta-object protocol for Java) and AspectJ (an aspect-oriented language for Java). The paper also reports on a survey that was conducted to assess software developers' general intuition relating to the comprehensibility of these techniques. Our initial research suggests that aspect-orientation offers several improved capabilities for realizing important software engineering principles. This work is funded by the DARPA Information Exploitation Office(DARPA/IXO), under the Program Composition for Embedded Systems(PCES) program.

META-MODEL SEARCH: USING XPATH AS A TOOL FOR SEARCHING DOMAIN-SPECIFIC MODELS.

Rajesh Sudarsan, Department of Computer and Information Science, University of Alabama at Birmingham, AL 35205.

Model Integrated Computing (MIC) is a model-based approach to software development, facilitating the synthesis of application programs from models created using customized, domain-specific program synthesis environments. MIC employs domain-specific models to represent the software, its environment, and their relationship and thus, is well suited for the rapid design of complex computer based systems. With MIC, a modeling environment operates according to a modeling paradigm, which is a set of requirements that govern how a system within a domain is to be modeled. The modeling paradigm is captured in the form of formal modeling language specifications called a meta-model. The Generic Modeling Environment (GME) is a meta-programmable tool that is based on the principles of MIC. A common task that is often needed in many tools is the capability to search the artifact that is being created. This capability is often absent in meta-programmable modeling tools like the GME. This can be a serious disadvantage as the size of a model increases to hundreds of modeling elements. As a remedy, this paper discusses a method to search the domain model using XPath – a W3C standard that uses logical predicates to search an XML document. The advantage of XPath over other search engines is that in XPath, expressions are resolved relative to the current node or to the root node. In our work, an XPath search engine is being developed that traverses the internal GME representation of the domain model and returns those model entities that match the XPath predicate expression.

BACTERIAL SOURCE CHARACTERIZATION IN STORMWATER. Sumandeep Shergill and Dr. R. Pitt, Department Of Civil and Environmental Engineering, University Of Alabama, Tuscaloosa, Al 35487-0205.

High concentrations of pathogens and indicator organisms found in urban receiving waters are a common cause of concern due to impacts on human health and restrictions on recreational use. This study was initiated with the main objective of characterizing the sources of bacteria or indicator organisms in stormwater. The secondary objective of the study was to determine if E-*coli* and Enterococci are suitable indicators of human fecal contamination. Eight sampling locations were selected with two from each of four designated land uses (Parking lots, open spaces, Rooftops and Streets). Birds and other animals are a large source of fecal contamination in stormwater. Sites were selected in pairs for each land uses such that one site was prone to bird or animal use and the other was not. All other characteristics of the paired sites were similar. Tree coverage (i.e canopies over residential roofs) encouraged bird population and hence samples taken from roofs with canopy coverage on them showed significant higher values of E- *coli* and Enterococci as compared to without such coverage. The open spaces, streets and parking lots gave mostly similar indicator concentrations, no matter if they are prone to animals and birds or not. Most Enterococci levels at all sites were higher than E-*coli*. Winter months with lower temperatures produced lower bacterial concentrations.

HEAVY METAL ASSOCIATIONS WITH STORMWATER PARTICULATES. Renee E. Morquecho and Dr. Robert Pitt, Dept. of Civil and Environmental Engineering, University of Alabama, Tuscaloosa, AL 35487-0205.

Many studies have identified heavy metals in urban runoff as a major contributor to the degradation of urban streams and rivers. Metals of most concern in urban runoff are copper, cadmium, chromium, lead, mercury, and zinc. An important characteristic affecting the treatability and fate of many pollutants, including metals, is their association with different particle sizes. The objectives of these tests were to determine the associations of heavy metals (along with some major constituents and nutrients) with different-sized particulates in stormwater. The binding strengths of these metals to the particulates were also examined by using a sequential extraction procedure using different acids and bases under several pH values. Results show that total phosphorus and phosphate are associated with the particulates while other nutrients such as nitrate are dissolved and their concentration is not effectively reduced by a reduction in particle size. Concentrations of all pollutants would be expected to decrease with filtration. However, there were periodic jumps in concentrations for some conditions, reflecting variability in the analytical method and the sample handling. These tests also indicated that the heavy metals of concern remain strongly bound to the particulates during long exposures at extreme pH conditions likely to occur in receiving water sediments. They will also likely remain strongly bound to the particulates in stormwater control device sumps or detention pond sediments where particulate-bound metals are captured.

EFFECTS OF SYNTHETIC DETERGENTS AND SURFACTANTS AND WAYS TO IDENTIFY THESE POLLUTANTS IN NATURE.

Sanju Kurian Jacob and Dr. Robert Pitt, Department of Civil and Environmental Engineering, University of Alabama, Tuscaloosa, AL 35401.

The pollution of water has started ever since the evolution of mankind. Once water has been used for any purpose it is polluted. The first major water pollution control in the United States was in 1972 with the Federal Water Pollution Control Act. It was then amended in 1977 and the law became Clean Water Act. The law established regulations on discharges in to the waters of the United States. It gave EPA the full authority to set standards for the water quality required before the discharge into streams and rivers. The Act recognized the need for addressing the key problems posed by non point source pollution. Examples include fertilizers, pesticides, motor oil, antifreeze, solvents, detergents and a variety of other common household products. Detergents are one of the very common pollutants in the waters of the United States. There are various methods of identifying detergents in wash waters. Florescence is a property of the surfactants used in detergents. Thus detergents could be found out using florescence too. Boron was a common ingredient in all the detergents. But nowadays boron is not used in all the detergents. Still it could be used as an indicator. This paper focuses on how to identify detergents in wash waters and how can detergents be used to evaluate the sources of the pollution. What are the constraints in using the above said methods for the evaluation of the detergents? Does different types of detergents behave differently with the same tests and same concentrations.? We will be finding answers to these questions during the presentation.

Quantum Computation.

Nikhil R. Garge, University of Alabama at Birmingham, Birmingham, AL-35294.

Quantum Computation is a very new field of science. It relates as much to Quantum Physics as it does to computer science. Quantum computers will be radically different from the computers to today. Current computers store information in bits. A quantum bit (qubit) however exists in a superposition of various states rather than only one particular state. This is contrary to the laws of classical physics, according to which a system can exist only in a specific state at a given point in time. If several qubits are combined in a quantum register, the state space of such a processor allows the handling of exponentially many data by superposition of entangled states. With this each operation of so-called quantum gates will act on all states simultaneously and massive parallel computation can be achieved. This phenomenon is the basis for quantum parallelism, which leads to a completely new model of computation. "Quantum algorithms" is one of the emerging research areas in this field. The real challenge is to device algorithms for computation using the principles of superposition, entanglement, and interference. Since, currently very few quantum algorithms are known and no general methodology exists for their construction, this area is wide open for research. Hence I intend to explore this very nascent field. My current research work focuses on understanding the basic principles of quantum mechanics and finding a way as to how these principles can be applied in the field of computation.

ANTHROPOLOGY

TWO DECADES OF INVESTIGATIONS AT THE DAVIS FARM ARCHAEOLOGICAL COMPLEX IN CALHOUN COUNTY, ALABAMA.

Harry O. Holstein, Jacksonville State University, Jacksonville, AL. 36265.

For over two decades Jacksonville State University Archaeological Resource Laboratory archaeologist and other professional archaeologist have extensively and intensively investigated the Davis Farm Archaeological Complex in Oxford, Alabama. Fourteen prehistoric sites lie along the banks of Choccolocco Creek, containing archaeological information on one of the largest prehistoric settlements in Northeast Alabama. By at least the 15th Century, these sites were contemporaneously occupied and a 30-foot high earthen flat-topped ceremonial mound had been constructed by a politically and culturally advanced society. This paper briefly reviews some of the archaeological investigations that have occurred at Davis Farm Complex over the last twenty years.

ARCHAEOLOGICAL INVESTIGATIONS ALONG WITH COOSA RIVER AT TEN ISLANDS.

Robert Perry, Mactec Engineering Inc., Hoover, AL.

This paper discusses the environmental history of the Ten Islands of the Coosa River. Utilizing historic maps and aerial photographs, the discussion explores how humans have interacted with their environment at this culturally significant site. Emphasis on natural resource extraction in the area during the twentieth century has come at great cost to cultural resources, with large-scale destruction of important Native American archaeological sites and an increased threat of destruction to the nationally significant Fort Strother site. Once thought to have been destroyed by sand & gravel operations in the area, scholars now believe intact deposits from the site remain. However, turbulent waters from the operations of Neely Henry dam may be eroding part of the site. More intensive archaeological investigations at Fort Strother could significantly increase our understanding of early historic period of Alabama.

FORCES OF CHANGE AND THE LOSS OF CULTURAL IDENTITY: AN ASSESSMENT AMONG THE CABECAR OF COSTA RICA.

Adam R. Corrado, General Studies Division, Harry M. Ayers State Technical College, Anniston, AL. 36201.

Several traits of the Cabecar culture have changed over the last half-century. Also, some cultural traits considered to be Cabecar are actually borrowed from other cultures. Current forces of change are identified which directly or indirectly result in the acculturation of the Cabecar or their assimilation into the "Tico" culture of Costa Rica.

THE BATTLE OF TALLASEEHATCHEE SITE, 1CA162, REANALYSIS AND A 21ST CENTURY PERSPECTIVE.

Hunter Johnson, Jacksonville State University, Jacksonville, AL. 36265.

The Battle of Tallaseehatchee took place in place in November of 1813 and was a retaliatory strike by Andrew Jackson and the Tennessee Militia against the Red Stick Creek for an earlier massacre at Fort Mims, Alabama. The battle was an important event in the history of the United States. Archaeological investigations, historical document research and landscape analysis by Jacksonville State University (JSU) provide a proposed location for the Battle of Tallaseehatchee at or near 1Ca162. Testing at 1Ca162 in 1988 resulted in the excavation of artifacts indicative of late eighteenth and early nineteenth-century Creek sites. A reanalysis of some artifacts from 1Ca162 have shed new light on the excavated assemblage is planned beginning in the summer of 2003.

AN ARCHEOLOGICAL INVESTIGATION OF 1DK49, A ROCKSHELTER IN DESOTO STATE PARK, DEKALB COUNTY ALABAMA.

Amy Eberhart, Jacksonville State University, Jacksonville, AL. 36265.

Jacksonville State University conducted a field school excavation at 1DK49, a multicomponent rock shelter situated within Desoto State Park, Fort Payne, Alabama. A total of 26 m^2 were excavated revealing stratified archaeological deposits. Artifacts recovered from the site indicated occupations ranging from the Archaic through historic periods. Aboriginal ceramics suggest that the primary component dates to the Woodland period. This paper will discuss the chronological assessment of sit occupation.

PROVENANCE OF THE MOUNDSVILLE GREENSTONE ARTIFACTS ALONG HATCHET CREEK IN NORTHEAST ALABAMA.

Kevin Harrelson, Jacksonville State University, Jacksonville AL.36265.

Geoarchaeological research has pinpointed the Hatchet Creek drainage of east Alabama as the source of some of the greenstone artifacts recovered from the Moundville site. Important questions remain concerning whether the greenstone was obtained through the Mississippian exchange systems or by Moundville procurement parties traveling to Hatchet Creek. This paper summarizes the results of a Jacksonville State University survey designed specifically to help address these issues.

COMPLICATED STAMPED POTTERY FROM THE QUARERMASTER SITE: PUBLISHED TYPE DESCRIPTIONS AND NUMERICAL TAXONOMY.

Virgil Roy Beasley, Panamerican Consultants Inc., Tuscaloosa, AL.

This paper will compare groups achieved by sorting complicated pottery from the Quartermaster site with those achieved through numerical taxonomy. A comparison between the two methods shows that despite some differences between the two methods, there is a considerable overlap between the groupings delineated using the two methods. Attributes utilized include thickness of sherds, width of lands and width of grooves of the stamping.

FORT ALABAMA IN THE SECOND SEMINOLE WAR.

Phillip E. Koerper, Department of History and Foreign Languages, Jacksonville State University, Jacksonville, AL. 36265.

In February 1836, two battalions of Alabama Volunteers answered the call to serve in the Second Seminole War (1835-1842) in Florida. They were sent to Fort Brooke at Tampa Bay. During their field duty, they constructed Fort Alabama on the Hillsborough River. This paper is an examination of the events involving this fort construction of Seminole War forts and the service of the Alabama is also examined in this paper.

ARCHAEOLOGICAL RESEARCH AND GIS: GEOARCHAEOLOGY AT JSU.

Miriam Helen Hill and Michael Rice, Jacksonville State University, Jacksonville, AL. 36265.

The Archaeological Resources Center and the Geographic Information Systems Laboratory of Jacksonville State University work together to explore and map evidence of the prehistoric and historic cultures that have resided in the region of Alabama. Students with a geography major concentrating in geoarchaeology or geographic techniques have the opportunity to combine field experience and computers to find artifacts and features and then to map these discoveries in multiple dimensions. Examples demonstrate the diversity of the experiences, software, and output that are the result of the combining archaeological research and Geographic Information Science.

PREHISTORIC OTHOPEDICS AT THE KING SITE.

MARY CASSANDRA HILL, Jacksonville State University, Jacksonville, AL. 36265

The King site was a 16th century Native American village on the Coosa River in northwestern Georgia. As part of an ongoing research project, this presentation describes several individuals from the King site who experienced orthopedic injuries that are problematic even in populations today.

POPULAR IMAGERY, PUBLIC POLICY, AND INDIGENOUS SURVIVAL IN THE AMERICAS: THE VIEW FROM COSTA RICA.

JAMES SEWASYNOWICZ, Jacksonville State University, Jacksonville, AL. 36265

Based on examination of legal statutes and ethnographic research in an Amerindian (Cabecar) community, this paper describes Costa Rican government policy with respect to its indigenous inhabitants and the impact of the policy on such communities. As will be demonstrated, to a large degree public policy has reflected popular views and stereotypes of Indians by the non-Indian mainstream; that is to say, it has been inconsistent and contradictory. Thus, while on paper Costa Rican legal guidelines appear enlightened in their attempts to preserve native cultural traditions and protect native rights, in practice they are frequently circumvented, often with disastrous consequences.

SORTING NEWSPAPER ARTICLES: A METHOD FOR USING NEWSPAPERS AS A SOURCE FOR ETHNOGRAPHIC INFORMATION.

Tom Lewis, Panamerican consultants, Tuscaloosa, AL.

Because of the limited use of newspapers as primary source material for historical research, their utility in helping to answer cultural and ethno historical questions remains, in many cases, unknown. To test t heir utility, a survey of 2,655 nineteenth-century newspapers published in seven counties within southwest Alabama was completed in which all articles containing reference to Indians or Indian groups were recorded. Seeking to determine the nature of changing Euro-American biases and attitudes towards Indians, each newspaper article was read and sorted into content-based groups, which were each defined by specific sorting criteria. This paper presents the sorting method created for this project and how it was applied to a specific ethno historical problem and offers ideas as to how it may be applied to other research endeavors.

A MANIFESTATION OF A WOODLAND PERID ARCHAEOLOGICAL CULTURE IN THE UPPER CAHABA RIVER DRAINAGE.

Steven Merdith, Mactec Engineering Inc., Hoover, AL.

Cultural m aterials r ecovered f rom 2 1 a rchaeological s ites l ocated w ithin t he u pper Cahaba River drainage in north central Alabama reveal the existence of a prehistoric cultural group whose presence is recognized by a pottery complex that appears to be diagnostic of the group. Additional artifacts found in consistent association with the pottery complex are projectile points recognized to be temporally diagnostic of the Middle Woodland period. A summary of the physical characteristics of the pottery is made, and relevant associated artifacts are summarized.

LITHIC REDUCTION STATEGIES: ANALYIS OF MATERIAL AT 1Dk71.

DANIEL BROOKS, Jacksonville State University, Jacksonville, AL. 36265

Recent excavations conducted by Jacksonville State University at 1Dk71, located in Big Wills Valley of northeast Alabama, have produced a large lithic artifact assemblage representing Early Archaic to Late Woodland components. These lithic arifacts provide a chance to examine lithic reductions strategies occurring through time. In this paper, lithic debitage attributes are examined stratigraphically in an attempt to reveal chronological changes in stone tool technology.

GORGAS SCHOLARSHIP AWARDS
March 21, 2003

Today the Gorgas Scholarship committee announced the rankings of the finalists of the 2003 Alabama Science Talent Search. The Search was held at the meeting of the Alabama Academy of Science at the Jacksonville State University, Jacksonville, Alabama.

The winner of the first-place tuition grant of $4000 was:

Michael Eric Taylor, 2170 Estaline Dr, Florence AL 35630, Henry A. Bradshaw High School, 1201 Bradshaw Dr, Florence AL 35630, Teacher-Shannon Uptain.

First alternate and winner of a tuition grant of $3000 was:

William Haynes Heaton, 912 Bainbridge Crossing, Muscle Shoals AL 35661, Coffee High School, 648 N Cherry St, Florence AL 35630, Teacher-Linda Kanipe.

Second alternate and winner of a tuition grant of $2000 was:

Adam Grant Georgas, 412 Stirrup Ct, Mobile AL 36608, UMS - Wright Preparatory School, 65 N Mobile St, Mobile AL 36607, Teacher-Tim Burgess.

Third alternate and winner of a tuition grant of $1500 was:

Jialing Xu, 2824 Cross Bridge Dr, Vestavia Hills AL 35216, Vestavia Hills High School, 2235 Lime Rock Rd, Vestavia Hills AL 35216, Teacher-Kay Tipton.

Fourth alternates and winners of a tuition grant of $500 each were:

Swaroop Reddi Bommareddi, 600 Wellingburg Rd, Huntsville AL 35803, Virgil I. Grissom High School, 7901 Bailey Cove Rd, Huntsville AL 35802, Teacher-Beth Andrada.

Drayton Louis Green, 3209 Overton Manor Dr, Birmingham AL 35243, Jefferson County International Baccalaureate School, 6100 Old Leeds Rd, Birmingham AL 35210, Teacher-Debbie Anderson.

(F) National Finalist, (S) National Semi-finalist

Unranked Finalists

Brian Hunt, 1200 CR 428, Killen AL 35645, Brooks High School, 5630 Hwy 72, Killen AL 35645- Teacher-Vicki Farina.

Darren Kinnaird, P.O. Box 1034, Gardendale AL 35071, Jefferson County International Baccalaureate School, 6100 Old Leeds Rd, Birmingham AL 35210, Teacher-Debbie Anderson.

Amy Pollard, 700 6th Way, Birmingham AL 35214, Jackson-Olin High School, 510 12th St, Birmingham AL 35218, Teacher-Martin Austin.

Steve Francis Snow, P.O. Box 68, Butler AL 36904, Patrician Academy, 901 S Mulberry Ave, Butler AL 36904, Teacher-Brett Evans.

The rankings were established by a panel of judges consisting of department heads, deans and professors from many of the leading universities and industries in Alabama. Winners and finalists in the Gorgas Contest receive offers of tuition scholarships to colleges and universities in Alabama for the study of science. The Gorgas Scholarship Program is named for General William Crawford Gorgas, the Alabama physician who conquered yellow fever in the Panama Canal Zone and later became the Surgeon General of the United States Army. The purposes of the Gorgas competition are to promote interest in science and to aid in the education of promising students.

Minutes
AAS Spring Executive Committee Meeting
President's Dining Hall
Jacksonville State University
Jacksonville, Alabama
March 19, 2003

A. Dinner

Immediately following dinner, President Stephen Watts called the meeting to order at 7:40pm. The minutes of the fall meeting of the Executive Committee (10/19/02, SRI, Birmingham) were distributed and approved. Much to the Secretary's satisfaction, one member of the Executive Committee referred to the Minutes as "awesome."

B. Officers Reports

1. Eugene Omasta (**Board of Trustees**) had no written report.

2. Steve Watts (**President**) submitted the following report:

    - I worked with Anne Cusic, Ron Jenkins and Larry Krannich to insure a successful transition of officers and the new Executive Director. The Steering Committee, particularly Dr. Cusic and Dr. Jenkins, have sought members of the Academy to fill some of the vacancies involved in several of the committees.
    - We had an excellent Steering Committee meeting at Birmingham Southern College in October, followed the next day by the Executive Committee meeting at SRI. Many thanks to all who participated.
    - Dr. Berte, President of Birmingham Southern College, has extended an invitation for the Academy to meet at BSC in the near future. This site is being considered by the Committee on Meeting Location.
    - An initial draft of the Constitution has been mailed to the Committee. We would like to have a mechanism for the revision of the Constitution in place and prepare for a vote by the October 2003 meeting. This revision will reflect the functional structure of the Academy.
    - I have continued to work with Richard Hudiburg to establish the on-line operational capabilities of the AAS. Due to the hard work of Richard, we can now conduct much of the Academy paperwork and information dissemination via the new web site, www.alabamaacademyofscience.org. Future work will include how to register payment on line and submit abstracts electronically. Most future communications among the Academy will be via email.

- We have continued an informal policy by which all communications concerning the Academy are forwarded to members of the executive committee (President, First VP, Second VP, Secretary, Executive Director) so that we can all be aware of any problems or issues as they arise, work together to solve these issues, and increase our general understanding of the workings of the Academy. This was quite effective in preparing for this meeting.
- I would like to extend a special thanks to Frank Romano and Mark Meade (and their colleagues) who have done an outstanding job in preparation for the spring meeting at JSU.
- We welcome the newest member of the Executive Committee, Betsy Dobbins (Sanford University), as the new treasurer.

3. Anne Cusic (**First Vice-President and President Elect**) submitted the following written report:

   I have spent the past year learning as much about the duties of the president as possible. I have assisted Steve Watts with several issues concerning the Academy. I have helped update the addresses of the Elected Officers and the committee members. I helped identify the elected officers and trustees whose terms were expiring and assisted Ron Jenkins with the nominating procedure. I have worked with the President on reviewing the current Constitution of the Academy and have suggested changes. This review of the Constitution will continue during the next year. I will continue to work with Steve Watts and Ron Jenkins to insure a smooth transition in the upcoming year of the Academy.

4. Ron Jenkins (**Second Vice-President**) submitted the following report:
   - Consulted with the current president, Anne Cusic, on the selection for the site of the Fall 2003 Executive Committee Meeting.
   - Attended the site visit to Montevallo University in July for review of the 2004 annual meeting.
   - Communicated to the Second Vice President, Dr. Larry Davenport, the duties of the second vice president.

5. Dail Mullins (**Secretary**) submitted the following report of his activities over the preceding five months:

   - Transferred all checks/cash received for dues to the Treasurer after recording information on the master roll (kept by Kathryn Pitt – kpitt@uab.edu);
   - Attended pre-conference planning site visit to Jacksonville State University;
   - Provided the editor of the *JAAS* with membership rolls and mailing labels as requested;

- Made requested mailing address and/or email address changes to the master roll upon receipt of information from individual members;
- Provided membership rolls/lists to Section Heads as requested by them or the Executive Officer;
- Submitted minutes of the fall AAS Executive Committee meeting (October 20, 2001) to the editor of the *JAAS* and AAS webmaster as requested;
- Corresponded with several out-of-state individuals and organizations about joining/renewing membership in AAS;
- Made modifications to dues notification cards and the academy website to reflect the new dues schedule.

My current 3-year term of office as secretary expires this year. Please note that I will be retiring from UAB and moving out-of-state effective July 1, 2004, and so will not be able to serve a full second term. I can agree to remain on as secretary through April or May of next year, but the Executive Committee needs to begin a search for my replacement as soon as possible.

6. Larry Krannich (**Treasurer**) submitted the following report, together with an extensive list of Tables (see below):

Total account balances as of 12/31/02 were $72,813.21 as compared with $75,812.83 on 12/31/01, which reflects a negative cash flow of 2,999.62. $2,500 of this amount reflects the December payment for 2003 ISEF room reservations. The 2002 budget had projected a deficit of $8,665.00. On the negative side, the Academy did not receive any revenue from the 2002 annual meeting and interest income was below projections. Dues revenue continues to decline and was approximately $1,200 less than for the previous budget period. Gorgas income, Journal support and subscriptions, and Mason Fund income were at or slightly above budget. We also received contributions in the amount of $1,000 in support of the Academy. One of these was in memory of Dr. Martha Crystal. On the expense side, total annual meeting, officer, and journal publication expenses were below budget and there was not a designated mason Fund Scholar in 2002. All other expenses were near budget. Again, all International Science Fair finances were handled directly by the Academy. As discussed at the [2002] October Executive Committee meeting, neither income nor expenses related to the Science Olympiad are being handled by the Academy.

For 2002, we are operating with a budget anticipating declining dues and no income, but $700 in expenses for the Science Olympiad. Although the flow through of funds for ISEF reflects the Cleveland location, our net commitment to the ISEF remains at $2,000. Income and expenditures are tracking what is expected for the first quarter of a fiscal year and we do not expect any unforeseen budgetary problems during 2003.

Treasurer's Report also consisted of the following:
For Calendar Year 2002 (1/1/02-12/31/02)
ALL ACCOUNT BALANCES as of 12/31/02
ACTIVITIES RELATIVE TO 2002 BUDGET
TREASURER'S SUMMARY REPORT BY QUARTER
TREASURER'S SUMMARY REPORT BY ACCOUNT
For Calendar Year 2003 (as of 2/28/03)
ALL ACCOUNT BALANCES
TREASURER'S SUMMARY REPORT BY QUARTER
ACTIVITIES RELATIVE TO 2003 BUDGET

As addenda to the Treasurer's Report, Jim Bradley indicated that the *Journal of the Alabama Academy of Science* actually costs ~$1,000-1,000, not $500; and Richard Hudiburg suggested that web-hosting expenses needed to be included in the budget.

7. Jim Bradley (**Journal Editor**) submitted the following report:

Publication of the *JAAS* is nearly behind [sic] schedule. The April-July, 2002, combined issue (Vol. 73, No. 2-3) has been at the printer for 6 weeks and is expected to be ready for mailing by the end of this month. The October, 2002, issue (Vol. 73, No. 4) has been assembled, and page proofs have been returned from the authors. It will go to the printer this month. Articles sufficient for the January, 2003, issue are on hand. Addition articles for the combined April-July, 2003, issue are needed.

In December, 2002, Auburn University President Walker made the surprise announcement that the AU Printing Service which has published the *JAAS* for over 20 years would be dissolved at the end of February, 2003. This has now happened. A few AU Printing Service staff members have been retained by the university, and they have informed me that they will continue accepting the *JAAS* for printing, but that they will contract the job out to another printer. I have been assured that the appearance of the *Journal* will remain unchanged, and that the cost will remain about the same as it has been. I recommend that we continue to have the *Journal* published in this fashion unless the cost increases dramatically.

I also recommend continuing to publish a combined April-July issue of the *Journal* for a total of three issues per year.

Continued support from the AU Library for publication of the *JAAS* in the amount of $4,500/year plus postage for mailing is expected.

8. B. J. Bateman (**Counselor to AJAS**) - ****

9. Virginia Valardi (**Science Fair Coordinator**) – No Report

10. Jane Nall (**Science Olympiad Coordinator**) sent her report by courier (Perry Tompkins):

Institutional faculty, staff, students and volunteers from five universities hosted five Division C (grades 9-12) tournaments, and four also hosted tournaments for Division B (grades 6-9). A total of 93 B teams and 81 C teams registered to participate in Alabama Science Olympiad 2002-2003 at Auburn University, Jacksonville State University, University of Alabama, University of Alabama Huntsville, and the University of South Alabama. Alabama Science Olympiad is continuing to grow at a rate of about eight percent each year. An additional host for a Division B (grades 6-9) tournament is needed.

Three Elementary Science Olympiad tournaments were scheduled this year involving fifty teams. Hosting schools included Geneva High School, Jacksonville High School, and Auburn University. Dr. David Salter, University of West Alabama, has formed a committee and will be hosting an A1 and A2 tournament next year. This will certainly provide an opportunity for children to participate in Science Olympiad in an area of Alabama not presently served.

Based on the membership on November 1, 2002, a total of 15 B teams will advance to the Alabama Science Olympiad Division B Tournament on April 5, 2003 hosted by Huntingdon College in Montgomery, and 16 C teams will compete at Samford University in Birmingham also on April 5.

Two teams from each state tournament will be invited to compete in the National Science Olympiad Tournament on the campus of Ohio State University, Columbus, OH, May 9-10, 2003. Alabama Science Olympiad ranked tenth in B and eleventh in C for registered teams in the United States.

The director presented a free Saturday workshop for the coaches of B teams competing at USA at the Mobile Exploreum last fall. Current interests including scheduling a meeting of all tournament directors perhaps near Clanton in the fall and hosting a summer coaches clinic.

Unless the National SO registration fee changes, registration fees for Alabama Science Olympiad teams will be the same as this year from May 15 - November 1, 2003, but increase after November 1. No registrations will be accepted after December 15, 2003.

The web master, David Peters, continues to maintain the Alabama Science Olympiad web page, which continues to receive many compliments from people across the United States. It is updated as often as necessary and continues to be a valuable resource.

Director Nall is most appreciative of all those involved in providing "science at its best" to the students of Alabama!

ALABAMA SCIENCE OLYMPIAD 2003-2004 (DRAFT)

Elementary Science Olympiad Tournaments

A1, 2 **University of West Alabama**, Dr. David Salter, Department of Biology, dsalter@uwa.edu, Livingston, AL

A2 **Jacksonville High School**, David Peters, 1000 George Douthit Drive SW, Jacksonville, AL 36265 (256) 435-4177, ESOatJHS@hotmail.com

A2 **Auburn University**, Greg Harris, Department of Mathematics, 218 Parker Hall, Auburn, AL 36830 harriga@mail.auburn.edu

Secondary State Science Olympiad Tournaments

B **Huntingdon College**, Dr. Sidney Stubbs, 1500 E Fairview Ave, Montgomery, AL 36106 (334) 833-4430 sstubbs@huntingdon.edu

C **Samford University**, Dr. Perry Tompkins. 800 Lakeshore Drive, Birmingham, AL 35229-2245, (205) 726-4121, patompki@samford.edu

National Science Olympiad, Juniata College, Huntingdon, PA, May 21-22, 2004

State Director: Jane Nall, 31110 Wakefield Drive, Spanish Fort, AL 36527 (251) 621-2911, Fax (251) 625-7032, email drnall@hotmail.com
Alabama Science Olympiad web page: **aso.jsu.edu**

C **Jacksonville State University**, Dr. David Steffy, Dept. of Physical/Earth Sciences, Jacksonville State University, 700 N Pelham Rd, Jacksonville, AL 36265
(256) 782-5966 dsteffy@jsucc.jsu.edu

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11. Steve Watts (**Counselor to AAAS**) submitted the following report:

All state Academies generally maintain an association with the American Association for the Advancement of Science. We are members of the Section on Agriculture, Food and Renewable Resources. There are several other committees that are currently being reorganized in response to the changing scientific environment and the AAS may have an opportunity to have direct input on these committees. These changes are currently in discussion. We welcome the opportunity for any AAS member to attend the AAAS meeting on our behalf.

12. Section Officers – written reports were submitted from Sections I (Biological Sciences), VI (Industry and Economics), and VIII (Behavioral and Social Sciences):

- Section I (**Biological Sciences**, Don Salter) – There are 40 oral (including 2 that have been withdrawn) and 16 poster presentations (including 1 that has been withdrawn) scheduled in the Biological Sciences Section at the 2003 Annual Meeting of AAS at Jacksonville University. The oral presentations are grouped into three sessions on Thursday morning, Thursday afternoon, and Friday afternoon to accommodate the Friday morning Symposium. The poster presentations will be given on Thursday and Friday afternoon along with those from several other sections.
- Section VI (**Industry and Economics**, Eric Rahimian) – Last year there were 13 papers presented in Section VI. Thanks to the AAS website and my continuous effort to recruit presenters for the Conference through email, there are now 16 papers on the program for the Conference. In the last meeting I requested that the time of the Conference be set before or after spring break to allow people to both participate in the program and also be with their families during the break. I am glad that my request has been somehow addressed this year. I think that may have helped marginally to attract some people to the Conference.

  One more request is to try to plan the annual meetings to be held in larger cities and where there are more activities for both presenters and the family members who may accompany the presenters.

  This is my second year of service as section chair and I am glad that despite difficulties, the number of papers during the last two years increased from 11 to 16, or by about 50 percent. I hope that with the effort of the next chair, the growth will continue
- Section VIII (**Behavioral and Social Sciences**, Janice Wittekind) – Section VII, the Behavioral & Social Sciences Section of the Alabama Academy of Sciences will meet on Friday, March 21, 2002 at Jacksonville State University, Jacksonville, Alabama. A total of seventeen papers are scheduled to be presented during two sessions.

A business meeting is scheduled during the annual meeting. The term of office for both the Chair and Vice Chair expires at the close of the meeting. Nominations are being accepted for new officers and elections will be held at the business meeting.

During the reports by the Section Chairs, Larry Krannich (reporting for David Allison (Section III, **Geology and Earth Sciences**) indicated that many geologists and earth scientists will doubtless no longer be able to participate in the AAS Conference because it conflicts with the Southeast Geological Society of America meeting. There then followed a lengthy discussion on whether to drop the "Geology & Earth Science" section from AAS, or perhaps merge it with Section IV ("Geography, Forestry, Conservation & Planning"). No action by the Executive Committee was taken.

Jim Bradley volunteered to serve in an ad hoc capacity to explore member interest and/or the feasibility of initiating a new AAS Section on "Bioethics and the History and Philosophy of Science." He indicated that he would report to the Executive Committee in the fall, at which time a decision will be made.

13. Larry Krannich (**Executive Director**) submitted a report on his activities since the first of the year:

Since January 1, 2003, I have been serving as the Executive Director of the Alabama Academy of Science and spending most of my time becoming acquainted with the activities associated with this position. To date, my major efforts have consisted of –

- Developing the program booklet, both PDF electronic and printed versions, for the 80th Annual Meeting of the Academy;
- Meeting with the President, Stephen Watts, to discuss the agenda for the Business meeting and Section Officers meeting;
- Distributing a list of suggested activities to the Section Officers (this was included as an attachment);
- Communicating with Section Officers concerning their distribution of the PDF version of the meeting program and annual meeting fliers to Section members;
- Initiating discussions on developing a future symposium on K-12 science outreach programs in Alabama

C. Committee Reports

1. Local Arrangements (Mark Meade representing Frank Romano) – no report

2. Finance (Eugene Omasta) – The AAS continues to be in excellent financial condition with total assets of $72,813 as of 12/31/02. The assets for the past four years as reported

at the Fall Executive Committee meetings and Annual Spring meetings of the Academy are listed below:

Period	Assets (End of Period)	Change	Period	Assets (End of Period)	Change
1/1-10/99	$76,219		1/1-12/31/99	$85,330	
1/1-10/16/00	$72,814	-$3,405	1/1-12/31/00	$74,049	-$11,281
1/1-10/12/01	$71,763	-$1,051	1/1-12/31/01	$75,813	$1,764
1/1-10/12/02	$72,197	$434	1/1-12/31/02	$72,813	-$3,000

I believe the time period has been insufficient to see the effects of changes adopted at last year's annual meeting:

- A $5.00 dues increase (effective 1/1/03); and
- A reduction in the number of *Journal* issues from four to three by combining the abstract issue with one of the other issues

Of some concern is the $1,200 decrease in dues income this past year. Examination of the dues income over the past three years (2000 - $3,935; 2001 - $11,180; 2002 - $8,920) reveals no particular trend. However, as we discussed at last year's annual meeting, increased membership should be a primary goal to complement the dues increase and the reduction in the number of issues of the journal as ways of eliminating the decreasing assets of the academy.

3. Membership (Mark Meade) – no written report ****

4. Research (Larry Boots) – While not in attendance himself, Larry sent a written report which was read by Steve Watts:

> The responsibilities of the Research Committee include awarding of research grants, travel grants, and research paper/poster awards. The Academy has budgeted amounts of $2,400, $600, and $550, respectively, for each of these categories. A total of 33 travel grants were awarded in the amounts of either $25 or $35, depending on distance traveled to the meeting. The total was $925. Five research grants were awarded totaling $1,522. Four students have entered the poster competition and another 20 students have entered the research paper competition. These awards will be determined by the appropriate sections during the meeting and the winners announced at the banquet on Friday.

5. Long-Range Planning (Ken Marion) - During the last several years, the Long-Range Planning Committee has primarily focused on the need to shore up and/or stabilize our monetary situation. Some of our recommendations (such as raising membership dues, increasing registration fees, reducing or monitoring the cost of The Journal) have now been acted upon. Accordingly, our major concern for long-range considerations should

now focus on membership, which has been declining in recent years. Our major recommendation is:

Establish a committee (Ad Hoc or Steering Committee or chairs of sections) to establish a plan for the recruitment/retention of members.

Additional recommendations from the Long-Range Planning Committee are:

- Establish a development committee to recruit monetary support for The Journal or other Academy endeavors
- Continue to monitor expenses associated with The Journal
- Continue to encourage the Place of Meeting Committee to seek centrally-located meeting sites on a reasonably regular basis
- Revise the Constitution
- Keep open the possibility of having joint meetings with other societies
- Continue the Steering Committee dinner before the fall meeting

6. **Auditing – Senior Academy** (David Schedler) – no written report ****

7. **Auditing – Junior Academy** (Danice Costes) – no written report ****

8. **Editorial Board and Associate Journal Editors** (Thane Wibbels) – I am pleased to announce that the following institutions have supported the *Journal of the Alabama Academy of Science* as benefactors:

Auburn University at Montgomery	$400
Troy State University	250
University of Montevallo	250
University of West Alabama	600
Birmingham Southern College	100
Samford University	500
University of Alabama	500
Jacksonville State University	250
University of Alabama at Birmingham	500
University of North Alabama	100
University of South Alabama	500
TOTAL	$3,950

9. **Place and Date of Meeting** (Thomas Bilbo) – the 81st Annual Meeting of the Alabama Academy of Science will be held March 17-20, 2004, at Montevallo University.

10. **Newsletter** – Committee Chair position is open

11. **Public Relations** (Myra Smith) – no report

12. **Archives** (Troy Best) – no report

13. **Science and Public Policy** (Dail Mullins) – no report

14. **Gardner Award** (Prakash Sharma) – a winner has been decided upon ****

15. **Carmichael Award** (Velma Richardson) – The article selected for the E. B. Carmichael Award this year is: "In Vitro External Factors Influencing Tight Junctions and the Accuracy of Transepithelial Electrical Resistance Measurement," by John G. Eley, Department of Pharmacal Sciences, Harrison School of Pharmacy, Auburn University, AL. This article appears in the January, 2002 issue of the *Journal of the Alabama Academy of Science* 73(1):21-29. All papers appearing in Volume 73(1,2/3 and 4) were included in the juding.

16. **Resolutions** (Priscilla Holland) -

Be it resolved by the Executive Committee that the following script be employed at the appropriate time (Presentations at the Annual Banquet):

- First and foremost we recognize William A. Meehan, President of Jacksonville State University, for graciously hosting the 80th Annual Meeting of the Alabama Academy of Science
- The Academy would also like to recognize Mark Meade and Frank Romano, Co-Chairs of the Local Arrangements Committee, for the many weeks of planning and hard work that enabled us to have this very successful meeting
- The Academy would like to recognize James R. Lowery for many years of service as mentor and guide to high school students competing in Alabama Academy of Science and International Science and Engineering Fair competitions
- The Academy would like to recognize Dr. Leven S. Hazelgrove for his dedicated service, which includes 12 years as Executive Director of the Academy and 30 years as Gorgas Foundation Director
- Lastly, the Academy thanks Stephen A. Watts for his able leadership of the Academy as its president during the past year

The Academy would like to take a moment to recognize the following member of the Academy whom it has lost through death over the past year: Samuel Booth Barker

17. **Nominating Committee** (Ron Jenkins) – Nominations for Elected Officers of the Alabama Academy of Science:

The following nominations are being made for elected officers:

2003-04	2nd Vice-President	Larry Davenport, Dept. of Biology Samford University
2003-04	Secretary	Dail Mullins, Honors Program University of Alabama at Birmingham
2003-06	Coordinator of State Science Fairs	Virginia Valardi Wetumpka High School

The following trustees are nominated for reappointment:

2003-06	Trustee	Dan Holliman, Dept. of Biology Birmingham Southern College
2003-06	Trustee	B.J. Bateman, Dept. of Mathematics/Physics Troy State University
2003-06	Trustee	Joseph C. Thomas 216 Doubletree Lane Florence, AL 35630

The following vacancy remains:

2003-06	Trustee

18. Mason Scholarship (Michael Moeller) - We had two completed applications for the William H. Mason Fellowship this year. After considering the application material, the committee has selected Kanessa Miller for the $1000 fellowship and she has been notified of this award. Ms. Miller will receive her B. S. with a major in major in biology and a minor in chemistry from Alabama A&M University. She plans to attend either Auburn University or Auburn University at Montgomery for her teacher certification program.

The committee chairperson is very appreciative of the work by Dr. Malcolm Braid and Dr. Sandy Caudle for their work in reading and rating the applications.

19. Gorgas Scholarship Foundation (Ellen Buckner) – The Gorgas Scholarship Committee is pleased to report that the Alabama Science Talent Search continues to grow in submissions from the State to the Intel National Science Talent Search. The competition is very close this year with students very prepared with top scores in science courses and grades.

The finals of the Gorgas Competition will be held Friday, March 21, in Room 110 of the McGee Science Center, Jacksonville State University campus. Finalists were named from nine high schools from across the state. The Committee would like to recognize the outstanding teacher-sponsors of these finalists. Their work in encouraging students to enter the competition is instrumental to both the success of the program and to the success of the students. These are as follows:

Brooks High School	Vicki Farina
Coffee High School	Linda Kanipe
Henry A. Bradshaw High School	Shannon Uptain
Jackson-Olin High School	Martin Austin
James Oliver Johnson High School	Rachel Purnell
James Oliver Johnson High School	Melonie Hanson
Jefferson County International Baccalaureate School	Debbie Anderson
Patrician Academy	Brett Evans
UMS – Wright Preparatory School	Tim Burgess
Vestavia Hills High School	Kay Tipton
Virgil I. Grissom High School	Beth Andrada

This year the Committee voted to continue to waive the rule limiting awards to only students attending Alabama colleges and universities. Awards will be given to the student's choice of in-state or out-of-state institutions. All ten finalists plan to participate this year. This promises to encourage a tight competition for the Gorgas awards.

I would like to thank Dr. Benjie Blair for his excellent assistance in recruitment of judges from the Jacksonville State University for this year's competition. Please attend the opening viewing of Gorgas exhibits from 3:00 to 5:00pm in room 110. The winners will be announced a the Joint Banquet.

20. Electronic Media (Richard Hudiburg) - I report the following activities:

1. Developed on-line paper and poster title submission forms for each section of the Alabama Academy of Science for the 80th annual meeting. The forms are located on the Academy website: http://www.alabamaacademyofscience.org . The web site has the on-line submission for forms for the Committee on Research paper and poster competition and travel.
Submission results for 2003 annual meeting

- There were 150 paper and poster on-line submissions to various sections.
- There were 20 paper and poster competition on-line submissions.
- There were 39 travel request submissions.

2. Updated information on the AAS website for officers and committees. Established links for 80th annual meeting information to the Jacksonville State University meeting website.

3. Responded to various requests from the President of AAS and other members concerning changes to the AAS website.

4. Linked a downloadable PDF file of the 80th annual meeting program provided by the Executive Director of AAS. A link was placed on the AAS web page to a downloadable copy of membership form to the AAS. The form showed membership rate changes effective January 1, 2003.

5. Provided a link on the website to information on the format of abstracts to be submitted, by mail, to the Editor of the *Journal of the Alabama Academy of Science*.

D. Old Business - None

E. New Business – Dr. Sharma would like the Academy to consider awarding Fellowships (Fellow of the Alabama Academy of Science), and will bring a formal resolution for the Executive Committee's consideration to the fall meeting.

Steve Watts has emailed a new draft of the Constitution with suggested changes. Please see this document for these items (in blue).

F. Adjournment – the meeting was adjourned at 10:08pm

Respectively submitted,

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Dail W. Mullins, Jr.
Secretary

****Please note: Several AAS officers, Section Chairs and Committee Chairs submitted reports to me via email following the annual meeting at Jacksonville State University. Unfortunately, all of these were lost several months later due to a computer mishap. At my request, several individuals kindly resubmitted their reports, but perhaps not everyone. Thus, those areas in the Minutes (above) marked by **** are meant to indicate this possibility.

INSTRUCTIONS TO AUTHORS

Editorial Policy: Publication of the *Journal of the Alabama Academy of Science* is restricted to members. Membership application forms can be obtained from Dr. A. Priscilla Holland, Office of Research, UNA Box 5121, University of North Alabama, Florence, AL 35632-0001. Subject matter should address original research in one of the discipline sections of the Academy: Biological Sciences; Chemistry; Geology: Forestry, Geography, Conservation, and Planning; Physics and Mathematics; Industry and Economics, Science Education; Social Sciences; Health Sciences; Engineering and Computer Science; and Anthropology. Timely review articles of exceptional quality and general readership interest will also be considered. Invited articles dealing with Science Activities in Alabama are occasionally published. Book reviews of Alabama authors are also solicited. Submission of an article for publication in the implies that it has not been published previously and that it not currently being considered for publication elsewhere. Each manuscript will receive at least two simultaneous peer reviews.

Submission: Submit an original and two copies to the editor. Papers which are unreasonably long and verbose, such as uncut theses, will be returned. The title page should contain the author's name, affiliation, and address, including zip code. The editor may request that manuscripts be submitted on a diskette upon their revision or acceptance.

Manuscripts: Consult recent issues of the *Journal* for format. Double-space manuscripts throughout, allowing 1-inch margins. Number all pages. An abstract not exceeding 200 words will be published if the author so desires. Use heading and subdivisions where necessary for clarity. Common headings are: **Introduction** (including literature review), **Procedures** (or **Materials and Methods**), **Results, Discussion,** and **Literature Cited.** Other formats may be more appropriate for certain subject matter areas. Headings should be in all caps and centered on the typed page; sub-headings should be italicized (underlined) and placed at the margin. Avoid excessive use of footnotes. No not use the number 1 for footnotes; begin with 2. Skip additional footnote numbers if one or more authors must have their present address footnoted.

Illustrations: Submit original inked drawings (graphs and diagrams) or clear black and white glossy photographs. Width must not exceed 15 cm and height must not exceed 20 cm. Illustrations not conforming to these dimensions will be returned to the author. Use lettering that will still be legible after a 30% reduction. Designate all illustrations as figures, number consecutively, and cite all figures in the text. Type figure captions on a separate sheet of paper. Send two extra sets of illustrations; xeroxed photographs are satisfactory for review purposes.

Tables: Place each table on a separate sheet. Place a table title directly above each table. Number tables consecutively. Use symbols or letters, not numerals, for table footnotes. Cite all tables in the text.

Literature Cited: Only references cited in the text should be listed under **Literature Cited.** Do not group references according to source (books, periodicals, newspapers, etc.). List in alphabetical order of senior author names. Cite references in the text parenthetically by author-date.

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