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ABSTRACTS OF PAPERS PRESENTED AT THE SPRING COLLEGIATE MEETINGS

EASTERN REGION

ROANE STATE COMMUNITY COLLEGE

Preliminary Water Quality Evaluation of Natural Wetlands and Ponds of the Cumberland Plateau, Randy M. Puckett, Eric L. Morgan, W. Paul Bonner, Tennessee Technological University and W. Michael Dennis, Tennessee Valley Authority. The objective of this study was to gather baseline physical/chemical water quality data from naturally occurring wetlands and ponds of the Cumberland Plateau. Information gained in this initial effort was evaluated in attempts to better understand and characterize the limnological processes within and between these systems. Physical/chemical parameters measured include temperature, turbidity, dissolved oxygen, hydrogen ion concentration (pH) alkalinity, acidity, hardness, conductivity, selected heavy metals, total carbon, organic carbon, nitrate, ammonia-N-Kjeldahl, free nitrogen, and free PO_4-P. Preliminary results reveal that the standing waters can be grouped and characterized by the psysical/chemical water quality parameters which were measured.

"Theoretical vs Applied Math, An Unending Circle," Lisa Liebig, Bryan College. A brief historical survey shows that the most productive approach to mathematics is to build a strong theoretical foundation before seeking applications.

1. Cis-Trans *Isomerization Catalyzed by Heterocyclic and Tertiary Amines.* Rob Crawford, Darrell Glisson and Irving T. Glover, Roane State Community College. The isomerization of maleate esters to fumarate esters is catalyzed by amines. The rate of the reaction is dependent upon steric effects, solvent polarity, and basicity of the catalyst. Tertiary amines appear to catalyze the isomerization, but only very slowly due to steric crowding in the transition state.

2. 2-(N-n-Butyl)-aminodiethylsuccinate. The Addition Product of n-Butylamine with an Unsaturated Diester, Robbie Edwards, Leedy Armstrong and Irving T. Glover, Roane State Community College. The rate of amine-catalyzed *cis-trans* isomerization of maleate to fumarate esters follows pseudo first order kinetics in nonpolar solvents. In polar solvents, addition of the catalyst to the double bond competes with isomerization and removes the catalyst as the reaction proceeds. The addition product of *n* butylamine with diethylmaleate (and/or diethylfumarate) has been synthesized and identified by C, H, N analysis, infrared spectroscopy, and proton magnetic resonance spectroscopy.

"A continuing study on the product of copper and trichloro acetic acid," Wesley Kolar, Lisa Liebig, David D. Witham, Bryan College. An excess of copper was reacted with trichloroacetic acid in a water medium. Upon evaporation of solvent, blue-green crystals formed. These crystals were soluble in several polar and non-polar solvents. The crystals are believed to be an organic copper compound.

Propagation of Red Dogwood (Cornus Florida *L.) from Cuttings,* Mack M. Harney III and Larry D. Smith, Tennessee Technological University. The rooting response of red dogwood (*Cornus florida* L. f. *rubra* West.) to three levels of hormone, three bedding media, and three setting dates was examined. The hormone concentrations were .1%, .3%, and .8% indole-3-butyric acid (IBA); the media were peat/Readymix, perlite, and sand; and the setting dates were May 18, June 25, and September 27, 1979. The highest percentage of cuttings that rooted in the first replication was 93.3% and in the second replication, 100%. None of the cuttings in the third replication rooted. When *C. florida 'rubra'* was propagated from cuttings, more plants rooted in the earlier two groups than the later one. Concentrations of .8% IBA showed an increase in rooted cuttings in comparison to those treated with lower concentrations (.1% and .3%). The results of the experiment indicate *C. florida 'rubra'* can be propagated from cuttings.

Effect of Biorythmic Influence on Academic Performance, Lori Dawn Smith, Roane State Community College. Few studies have empirically investigated the popular notion that biorhythmic patterns influence human behavior. The purpose of this study was to explore the relationship between biorhythmic phases and academic performance. Prior to taking a major class exam, students (N=185) completed a brief questionnaire. Biorhythmic charts, based upon *Ss* birthdate and exam date, were computed for each participant. Chi square comparisons between biorhythmic phases and obtained test scores failed to reveal any evidence supporting a belief in biorhythmic influence.

A Study of Unmarried Pregnant Females, Barbara Jean Beasley, Roane State Community College. One hundred unmarried pregnant females who were outpatients at the University of Tennessee hospital were surveyed. Observations were made on educational background, financial background, age, and self-concept. These observations were used to find factors which influence the female to keep her baby or place it for adoption. It was found that females with a high school education kept their babies more often than those without a high school education, females from families with a lower income kept their babies more often than those from families with a higher income, and those who placed their babies had a significantly higher self-concept before pregnancy than after pregnancy. Age was not found to be a factor.

Computer Assisted Instruction: A System Approach, John Bullock and Robert Safdie M.A., Roane State Community College. A computer narrative text reader on line (C.O.N.T.R.O.L.) was developed as a supplemental educational aid for students. In addition to the interactive mode which tests, reviews, and retests students over topical material, the CONTROL System is developed with a 3 command program which automatically stores a part, or all of a teacher's lesson into the student operating file. Data on student activity while in the program is also collected. During fall quarter, 1979 two psychology classes were used to test the effectiveness of the CONTROL System and the experimental tutorial materials completed for it. The computer user group (Class A) scored significantly higher than the non-user group (Class B) on a test designed to measure the basic concepts found in the first chapter of the introduction to psychology text. (Class A: Mean=24,N=28; Class B: Mean=21,N=38; Tind $p<.05$) In addition students consistently rated the computer as a more valuable and enjoyable helper than other aids given in class. Although data on a quarter by quarter bases is still being collected, as a viable educational aid, the CONTROL System looks very promising.

Archeoastronomy in Chaco Canyon, LaDonna Johnston, Amy Loring, Jean Slabaugh, Gary Heidinger, Roane State Community College. Archeoastronomy is the study of the relationship between astronomical events and past cultural behavior. Because culture is adaptive in nature, when any form of behavior is analyzed due consideration must be given to the possibility that it served an adaptive function. Archeoastronomy attempts to investigate the ways in which ancient man studied the heavens and the ways he used his knowledge to meet his religious, agricultural and psychological needs.

Observations of the sky were carried out by many North American Indian groups as is witnessed by the star charts of the Skidi, the Medicine Wheels and "American Woodhenge" at Cahokia. The Anasazi Indians of the Southwest are responsible for some of the most complex solar observing stations in the Americas. On Fajada Butte in Chaco Canyon, New Mexico they set up three parallel stones which mark the solstices and eqinoxes; in Pueblo Bonito use of solar energy is combined with architecturally based observation methods. Casa Rinconada is a giant indicator of the equinoxes. These as well as other remnants of Anasazi culture clearly indicate that these "ancient ones" were sophisticated sky watchers.

The Effect of Human Biorhythms on Production Efficiency and On-The-Job Accidents, Brenda Culpepper, Tennessee Wesleyan College. Cancer treatment, drug effectiveness, the intoxicating effects of alcohol, and the adrenaline level in urine all have one thing in common. Recent research indicates that all of these are affected by the body's circadian rhythm, which is the natural rhythm or regularity in which something occurs. We have all experienced peaks and dips in energy level and alertness. How does this affect our daily performance? The Aerospace Medical School of the U.S. Air Force has studies

that show pilot-performance drops as much as 50% when pilots are asked to work against their normal circadian rhythms. Assuming this to be true, how does this affect the second or third shift factory worker who is working when his body (under normal circumstances) should be at rest? Could this possibly lower his production efficiency, which would mean loss of money to him as well as his employer? Could this cause him to be less alert, inviting more on-the-job accidents?

Altruistic Behavior in the Order of Primates Consisting of Monkeys and Apes, Brenda Culpepper, Tennessee Wesleyan College. In this approach on the altruistic behavior of the monkeys and apes, one must be made acutely aware of the fact that the behavior is being described and analyzed by human standards. The behavior noted in this paper was broken into three parts: (1) Allogrooming in monkeys and apes, (2) Protective behavior on monkeys and apes, (3) The devoted Mother. Descriptions and analyses of these three parts are given and show how they would be considered altruistic behavior.

An Applicability Study of a Non-Point Pollution Assessment Model System, Wieck, M., J. Nourollahi, P. Bland, J. Eldridge, D. Warfield, G. Pickett, R. Steel, T. Merzbacher, D. Eason, and G. Litchford. The study of the EPA-URA urban, commercial, and industrial runoff model of non-point pollution assessment was undertaken to determine the validity of using it in the study of the South Chickamauga Watershed. Four subareas were defined whose runoff entered the creek between mile 0.5 and mile 1.5. Estimates of the number of acres, per cent impervious area, and lengths of hilly and flat terrain were made for each sub-area. Values for fourteen parameters (BOD_5, total and fecal coliforms, total and suspended solids, phosphates, ammonia, nitrates, zinc, copper, lead, chromium, iron, and manganese), stream flow, and the storm even were used for control and mixing point input.

Results showed that the amount any one of the four subareas contributed to the pollution load of South Chickamauga Creek was a factor of the runoff volume and the distance of the sub-area from the mixing point. EPA-URA proved to be a valid, although simplistic, model to use as a predictive tool for this portion of the South Chickamauga Creek Watershed.

MIDDLE REGION

AUSTIN PEAY STATE UNIVERSITY

Odds for Winning at TIC-TAC-DOUGH, Mark J. Ross, Austin Peay State University. The probability of winning on a popular TV game show was found by two independent means of solution and the calculated probability was verified by actual game show results. The problem was first solved by analyzing the mathematical probabilities involved. These same probabilities were then found by computer simulation. Finally, these results were checked with actual game show results and the three results were strikingly close.

Physical Aspects of Natural Gas Storage, William Karl Pitts, Austin Peay State University. The storage of natural gas is an integral part of the natural gas distribution system. Several different types of natural gas storage are examined and compared to one another. The gas systems of three Middle Tennessee cities (Clarksville, Springfield, and Nashville) were visited; these are used as examples of small and medium scaled natural gas storage facilities.

A Preliminary study of the Petrology of Cherts Exposed in the Cookeville Tennessee Area, Joe Faulkerson, Tennessee Technological University. This report is a preliminary petrological view of the cherts exposed about Cookeville. The methods employed to achieve this goal were X-ray diffraction, petrographic analysis, and scaning electron microscope. Samples were taken from the Bangor, Monteagle, Fort Payne, Bigby-Canon and Knox Formations.

A weathered "regolith" like material was found in many samples. This material was left after the carbonate components were removed by leaching. The weathered material was SiO_2. The amount of clay minerals in the sediments, associated with the cherts, was less than 6 or 7 percent. The clay minerals found were montmorillonite, illite, and chlorite. These minerals have the ability to release silica during their deposition. Chalcedony was found in over 75% of the thin-sections viewed. It typically has negative optic elongation, which is characteristic of an average depositional basin, but several of the samples tested had positive optical elongation. Positive elongation is characteristic of evaporite environments.

Two crystal forms of quartz were found: pyramidaly terminated hexagonal prisms and rhombohedrons. They were exposed on fractured surfaces (high S.E.M. magnification was used). An internal etching phenomenon was also found on many of the fractured surfaces.

Numerous samples contained carbonate rhombs that were very apparent in thin sections. Several of the rhombs left cavities after being removed by leaching fluids.

In more extensive research of chert, investigators will be challenged by questions such as: do the clay minerals contribute SiO_2 to chert deposits? Why do two crystal forms exist? Why can chalcedony have positive or negative optic elongation?

Gold in Southeastern United States: Past, Present, and Future, Paul Golden and D.M.S. Bhatia, Austin Peay State University. Southeastern United States was a major gold producing region in the last century. There is a renewed interest in this metal since its price exceeded $800.00 per ounce in the past year. We are investigating the history, current gold mining activity (particularly in Georgia), and the possibility of the application of regional exploration geochemistry for this metal.

The Effect of Sodium Propionate on Cholesterol Levels, Darrell Thomas, Belmont College. Sodium propionate was introduced into the drinking water of rabbits to raise the propionyl CoA levels and to record its effect on cholesterol levels.

Six male New Zealand rabbits of equal size and weight were selected and were randomly allotted to the following: 0.0 gms/wk, 3.0 gms/wk, 7.5 gms/wk and 12.0 gms/wk of sodium propionate. The study was carried out over a four week period. The results indicate a logarithmic relationship with a correlation factor of 0.4401. The treatments of 7.5 gms/wk and 12.0 gms/wk showed a close relationship and after propionate was withdrawn from the rabbits receiving these two treatments, cholesterol levels returned to their normal levels ($\pm$7 mg/100 mls blood). These results seem to indicate a direct relationship between propionyl CoA and cholesterol.

"Effect of Composition of Media on Soybean Callus Induction," Sarabjit M. Bhatti, Tennessee State University. Soybean Cotyledons (*Glycine max* L. Merrill) cultivar Tracy were used in these studies. Surface sterilized seeds were germinated on B-5 Agar Medium. Cotyledons obtained were cut into four pieces and placed on B-5 Medium supplemented with 2 mg/1 2,4-Dichlorophenoxyacetic acid (2,4-D). Callus obtained from this Medium was subcultured on Miller's Medium supplemented with 2 mg/1 kinetin. Callus from this experiment was kept in dark for 6 days and then subcultured on two Media: 1. Murashige-Skoog (MS) Medium supplemented with 0.5 mg/1 naphthaleneacetic acid (NAA), 1.0 mg/1 kinetin and 10% coconut milk. 2. B-5 Medium supplemented with 0.5 mg/1 2,4-D, 1.0 mg/1 kinetin and 10% coconut milk. Data show that MS Medium produced much better Callus compared to B-5 Medium. Callus produced on MS Medium was more than double in weight compared to B-5 Medium. Color of the Callus on modified MS Medium was dark green, while the color of the Callus on modified B-5 Medium was light yellow to yellowish green. After three weeks of subculturing, the callus on B-5 Medium started dying.

Characterization of Peroxidases in Macropterus salmoides Lacepede, Cheryl A. Saggese and A. E. Woods, Middle Tennessee State University. Recent studies of bromine concentrations in freshwater fish and crayfish indicate that the enzyme, peroxidase, may be a factor affecting the bioaccumulation of bromine. Peroxidases are known to play an important role in the incorporation of iodine into tyrosine, a prerequisite for the formation of thyroxine and other thyroid hormones. The present study was undertaken to determine the location and activity of previously uncharacterized peroxidases occurring in freshwater bass in a natural habitat. Microsomal fractions were used as the crude enzyme preparations and the peroxidase activity was found to decrease in the order: heart, tail kidney, head kidney, liver. Other organs were found to contain very low specific activities of peroxidase. A purified extract was prepared using a DEAE-cellulose ion-exchange column and the pH optima for the different fractions were obtained. The K_m, V_{max} and isoelectric point for this enzyme was also determined as well as speculations made on the mechanism of its action.

Influence of Hormones on the Induction and the Growth of Soybean Callus, Jamileh Noshari, K. N. Pandey, and P. S. Kahlon, Tennessee State University. Four cultivars of soybean (*Glycine max* L. Merrill) namely, Davis, Forrest, Tracy and Picket were used representing four different genotypes. Surface

sterilized seeds were germinated on Miller's medium. Cotyledons obtained were cut into four pieces and placed in Miller's medium supplemented with several levels of hormone concentrations. The hormones used in this experiment were auxin (naphthaleneacetic acid, NAA) and cytokinin (Kinetin). The following levels of hormone concentrations were used: NAA, 0.1mg/l, 0.5mg/l, 1.0mg/l, 2.0mg/l, 5.0 mg/l, Kinetin: 0.1mg/l, 0.5mg/l, 1.0mg/l, 2.0mg/l, 5.0mg/l. Data at 2mg/l and 5mg/l concentrations show that NAA and Kinetin produced much better callus compared to the other concentration levels of the two hormones. Callus produced at these levels of concentrations appeared to be more viable with increased size as compared with callus at other levels of concentrations. Supported by USDA grant no. TENX.-7903-1-PS2.

DNA/RNA Determinations from Myelial Extracts of Phoma lingam and Rhizoctonia solani, Bill Bridges, Tennessee Technological University. The purpose of this study was to determine the presence, if any, of detectable DNA and RNA in two separate species of fungi; namely, *Phoma lingam* and *Rhizoctonia solani.*

Cultures of each fungi were grown in a liquid medium consisting of malt extract, dextrose, and yeast extract for three weeks. The contents were filtered and the mycelium was mixed with two buffers (pH 6.4 and pH 7.8) and insonicated to break down the cell walls and release the cell contents. The end product is the mycelial homogenate. This homogenate was then processed as according to Munro and Fleck, 1966 (VOL. 14 of *Methods of Biochemical Analysis.*). After obtaining the DNA and RNA extracts, they were compared with standard solutions of DNA and RNA using ultraviolet spectrophotography at a wavelength of 260 nm.

It was observed that both DNA and RNA were present in both the *Phoma lingam* and *Rhizoctonia solani,* in well resolvable quantities. It was also found that by using a pH of 6.4 instead of 7.8 for DNA and a pH of 7.8 instead of 6.4 for RNA better results were obtained.

WESTERN REGION

SOUTHWESTERN AT MEMPHIS

Dosage Relationships of Human Thymocytes in Antithymocyte Sera, O. H. Thomas, III. Christian Brothers College. Rabbits were immunized with 1 x 10^6 (low dose) or 10 x 10^6 (high does) human thymocytes in complete Freund's adjuvant. Each group received similarly-scheduled booster immunizations. The baseline bleeding and third and fourth post-immunization bleedings were tested for efficacy by leucoagglutination. Results thus far reveal no significant difference between the two groups.

"Ants: Anatomy, Habitat and Communication," Patricia Farmer, Lane College. Communication plays a vital role in ant colonies. It is believed that a chemical substance referred to as Pheromones produced by the animals makes communication possible.

Thirty to forty *Pogonomyrmex californicus* were placed in a glass case with sand where tunneling could easily be observed. The experiment included making an artificial trail by smearing whole body extracts in a circular pattern on white paper. Then live ants were placed on the paper and the directions they took before arriving at the remains of the dead ant were traced. Most of the ants made a similar trail however, when the procedure was repeated using the same ants; the ants went directly from the starting point to the remains of the dead ant. The trails were not identical but the destination point was reached sooner.

Synthesis and Resolution of Narcotic Analgesics, Dave Barron, Christian Brothers College. Opium has been used as an analgesic, a drug to allay pain, since pre-history. Before the invention of the syringe, opium and its derivatives were either smoked or eaten. Since opiates have many deleterious side effects, scientists have tried for years to modify these compounds' basic structure to increase the analgesic potency while decreasing the side effects. Investigations by Finney (1978) have revealed that the 1-substituted-4-(propananilido) perhydroazepines possess a high degree of analgesic potency in test animals. The literature shows that analgesics containing chiral carbon atoms commonly exhibit significant potency differences when the individual enantiomers are studied. Since certain opiate compounds have high analgesic potencies as racemic modifications, it was proposed that the resolution of the enantiomers be performed by making the bitartrate salt. This allowed them to be separated and individually tested for analgesic potency.

Rosette-forming T-Lymphocytes in Peripheral Human Blood of Young and Old Adults, Linda M. Smiley, Christian Brothers College. T-cell lymphocytes were determined in the peripheral blood of twenty adults. Ten were between 19-23 years of age, and ten between 62-85 years of age. No significant reduction was found in the total number of lymphocytes, the percent of T-lymphocytes, or the absolute number of T-cell lymphocytes in the 62-85 year group.

Physico-Chemical Study of McKellar Lake, Cindy Kitchens, Christian Brothers College. The purpose of this study was to detect physical, biological, and chemical characteristics of McKellar Lake. The tests performed were temperature, suspended solids, fecal coliform bacteria detection, turbidity, observation of microscopic plant life, orthophosphates, sulfates, nitrates, and carbon-dioxide.

There were three collection sites with ten samples being taken from each site throughout the months of February and March of 1980 at approximately 1:00 pm. The samples were collected in standard 500 ml collecting jars. After collection, the samples were stored in a styrofoam cooler containing ice until the tests were performed, which prevented further growth of bacteria. The tests were run within six hours of the collection time. The carbon-dioxide test was performed at the lake to assure more accurate results.

On the basis of the results of these tests, it can be concluded that there were no great variations of the characteristics measured from week to week. This may imply a consistency in the composition of the discharged wastewaters from the industries surrounding McKellar Lake and those located along its tributaries.

An Investigation of Recombination in the T4 Bacteriophage, Anne Lenski, Christian Brothers College. The purpose of this study was to demonstrate the existence of recombination in the T4 bacteriophage DNA as Benzer showed in 1955. Experimentation involved the use of two rapid lysis mutants in the r II group. Simultaneous injection on *E. coli* B was performed, allowed to lyse then injected on *E. coli* K. The wild type mutant will produce plaques on both strains B and K; r II mutants will produce plaques only on B; the K strain carries a lambda phage which prevents lysis with the r II mutants. Through recombination the r II mutants are transformed to wild-type mutants which can lyse the K strain. Detection of recombinants was done with a very sensitive method of plating and observing plaque formation. Results thus far have been highly inconsistent and are therefore inconclusive.

Helminths From Small Mammals of Mexico, Caroline Gaudet, Christian Brothers College. A study and identification of helminth removed from rats, mice, and bats of Mexico was made.

Purification and Assay of Penicillinase, Loel Hickman, Christian Brothers College. *Streptomyces albus* was used to produce penicillin β-lactam hydrolase (penicillinase). The bacteria were grown in flasks containing nutrient broth. Some flasks contained penicillin in order to determine if pencillinase was induced by the presence of penicillin. The micro-iodometric technique was used to test for exopenicillinase and endopenicillinase. A cell-free enzyme solution was prepared by centrifugation, filtration, ammonium sulphate precipitation, and dialysis. Penicillin was found to be an inducer of penicillinase. Exopenicillinase made up about 95% of the penicillinase produced.

Characterization of Sendai Virus mRNA from Infected Chick Embryo Lung Cells, Keith Vaughan, Christian Brothers College. Labeled (^{3}H-uridine) Sendai virus mRNA from infected CEL cells was extracted by the sodium dodecyl sulfate (SDS)—phenol method. The mRNA was then characterized according to its size, poly-A content, and specificity. The size was determined by sedimentation analysis in a sucrose gradient. The RNA was examined for poly-A content by chromatography on an Oligo-DT column. When run through the column, approximately 50% of the 18S RNA was bound, but also a good deal of 50S RNA bound unexpectedly. According to hybridization analysis, all labeled RNAs were virus specific.

The Amine Acid Composition of Wildflower Nectar Compared to the Structure of the Flower, Kathryn Newtan, Christian Brothers College. The coerolution of flowering plants and pollinators has produced chemical and structural modifications between different species of flowering plants and behavioral and anatomical modifications among the pollinators. This is beneficial to both parties by insuring species specific pollination for

the flower, and nutrient benefits for the insect. This project compared the morphology of certain wildflowers with the chemistry of their nectar to see if a direct relationship could be drawn between the nutrient requirements of the pollinators and the amine acids present in the nectar.

Fabrication of Cu_2O Photocells, William C. Ford and M. M. Garland, Christian Brothers College. Cuprous oxide (Cu_2O) is a promising material for the fabrication of solar cells. Theoretical efficiences of the order of 20% have been predicted. In practice, however, efficiencies seldom exceed 1% for front surface Schottky-barrier cells.

Coliform Examination of Small Urban Lakes Correlated with Storm Runoff, Phillip R. Northcross, Christian Brothers College. For many years, the coliform group of bacteria has been used to study pollution of water by mammalian excrement, and thus its suitability for domestic use and potability. Bacterial contamination in the soil from inefficient sewage drainage can be determined by examination of storm water runoff following the groundwater saturation characteristic of heavy rains. This study measured indirectly the amount of soil contamination by analyzing the fluctuations of coliform densities in some small, Memphis-area bodies of water subject to storm water runoff. Results indicate coliform contamination to a rather high degree in the samples taken following a sufficient rainfall.

Low Temperature Thermoluminescence Studies in LiF, Joanne F. Rhodes and D. Wayne Cooke, Memphis State University. The thermoluminescence and emission spectra of LiF TLD-100 over the temperature range 10-300 K was measured. Following x-irradiation at 10 K, the resulting glow curve exhibited peaks at 20, 44, 60, 66, 84, 124, 138, 150, 190, 236, 252 and 268 K. The most intense peak occurred at 138 K with a knee on each side at 124 K and 150 K. The intensity of this peak was ca. three orders of magnitude greater than that of any other peak. Single band emission spectra centered at approximately 400 nm were exhibited by all peaks except the three most intense ones at 124, 138 and 150 K. This three peak complex produced both 270 and 400 nm emission. Numerous methods (e.g. thermal cleaning, x-irradiation at fixed temperatures, and photobleaching) failed to produce isolated glow peaks that would exhibit only one type of emission, thus making it impossible to correlate any of these three peaks with a particular wavelength of radiation. These experimental data will be discussed in terms of a recently proposed model illustrating the production of thermoluminescence in LiF over a temperature interval of 90-300 K.

The Role of Conformational Flexibility in Drug Action: Synthesis of Pyrrolo(3,2-c)pyridine and 1,6-Naphthyridine Derivatives as Comformationally-Restricted Analogs of Fentanyl-Type Narcotic Analgetics, Barry Jarrigan, Union University. A great deal of effort has been expended in the search for drugs which are effective in alleviating pain without producing serious side effects, most particulary addiction. This goal has yet to be achieved. Within the past three years dramatic strides have been made in the understanding of the mechanisms by which morphine I produces its central analgetic actions. The discovery of naturally occurring analgetics, the endorphins which are peptides possessing analgetic activity 48 times greater than morphine, and the enkephalins which are smaller fragments of the endorphins, has given rise to renewed interest in studies designed to understand the interaction of morphine and the natural analgetics with biological receptors termed opiate receptors. Fentanyl (II) is a synthetic analgetic agent which is considerably more potent than morphine. Presumably both mimic the actions of the enkaphalins at opiate receptor surfaces. While morphine is a rigid structure, fentanyl is a rather flexible molecule. Not only is the piperidine chair capable of assuming intercovertible conformations, but the amide side chain is free to rotate and assume numerous conformations. In studying analgetic-opiate receptor interactions it would be of great interest to determine which conformation of fentanyl is most responsible for achieving maximum receptor interactions.

Catalytically Active Rhodium and Iridium-Carborane Complexes, David Humphreys, Christian Brothers College. The reaction of sodium salts of $2,3\text{-}C_2B_4H_7^-$ and $2,3\text{-}(CH_3)_2C_2B_4H_5^-$ with $(PPh_3)_3RhCl$ afford the new coordinatively unsaturated metallocarborane hydride complexes $[(C_6H_5)_3P]_2Rh(H)C_2B_4H_7$ and $[(C_6H_5)_3P]_2Rh(H)\text{-}[(CH_3)_2C_2B_4H_4]$ respectively. These rhodacarboranes were shown to be catalytically active in promoting hydrogenation and isomerization reactions of terminal olefins.

Synthesis and Property Studies of Complexes of Tropolone and Cr III, Terry Neely Witherington, Union University. Since there was previous indication that tropolone ($C_7H_5O_2$) will complex in several different ways with vanadium, it was decided that some interesting complexes could be obtained with a d^3 system, namely with chrominum III. Using different reaction conditions three attempts were made to form Cr III complexes with tropolone. Two of these attempts resulted in reactions. These two compounds were characterized as to their composition, physical, magnetic, and spectral properties.

Antihypertensive Agents in Kudzoo, Cindy Turner, UT Martin. This project dealt with the possibility of antihypertensive agents being present in Kudzoo. A technique of separating components by using organic solvents was employed. Each of the fractions was tested using rats. An emulsion of the fraction would be made and fed to the rats via a feeding tube. The blood pressure of the rats was recorded over a period of time and this data was then analyzed to determine the presence of an antihypertensive agent.

Adenosine Triphosphate Levels in Streptozotocin-Diabetic Rat Liver, Mary T. Dowling, Christian Brothers College. Insulin was first shown to alter ATP levels in liver tissue by Williamson in 1967. Recent disclosures by Solomon indicate that cyclic (c) AMP levels are abnormally high in diabetic liver cells. The purpose of this investigation was to observe ATP concentrations in normal and diabetic liver cells with an attempt to correlate this data with the cAMP alterations known to occur in diabetics. Results are currently inconclusive, but expected to be similar to those of Seitz, Müller, Krone and Tarnowski, where ATP levels in diabetic liver cells were usually low and rapidly heightened after injection of insulin.

Hemodynamic Effects of Caffeine in Normal Subjects, Holly Townsend, Christian Brothers College. The Whitney mercury-in-rubber strain gauge plethysmography was employed to study the effects of caffeine in normal volunteers. The plethysmography technique was used here to calculate capillary filtration coefficient (CFC), forearm vascular resistance (FVR), an index of venous compliance (VC_{10}), and forearm blood flow (FBF). Five males, in the normal blood pressure range, served as their own controls, then ingested 400 mg of caffeine in the form of NO DOZ tablets. Readings were then taken at 10 minute intervals for 90 minutes. Blood pressure was monitored with an arteriosande with each recording. Results showed a significant change in Mean Arterial Pressure (MAP) at 30 minutes after ingestion, at 90 minutes MAP had not returned to normal pre-caffeine levels. FBF fell an average of 52% from control values after 40 minutes. VC_{10} showed significant decrease from control at 50 minutes. No significant changes in CFC or FVR occurred.

Artificial Thought thru Simulated Evolution, John Roach, Southwestern at Memphis. Almost all of the research in the field of Artificial Intelligence during the past three decades has focused on the development of powerful softwares and algorithms useful in simulating the human thought process. Little if any research has been done in developing computer architecture which more closely approximates the structure of the human brain. One reason for this is the enormous complexity of the human brain and how little we know about it. This presentation discusses a technique which may enable one to overcome this difficulty.