

ABSTRACTS OF PAPERS PRESENTED AT THE SPRING COLLEGIATE MEETINGS

EASTERN REGION

LINCOLN MEMORIAL UNIVERSITY

"*Synthesis and Properties of Some Salts of Trichloroacetic Acid.*" Joseph Chu, Tim Faugl, and Glenn Porcella. Bryan College.

Very few of the metal salts of trichloroacetic acid are reported in literature and little is known about their properties and structures. Students were assigned various salts for preparation and study. Salts of copper, aluminum, zinc, molybdenum, and magnesium were prepared and their properties were studied. All of the salts differed from the reported oxides, acetates, and chlorides of the respective metals. Copper trichloroacetate was studied in some detail. An analysis of the product indicated that it contained an abnormally large amount of water of hydration and roughly two atoms of copper to each trichloroacetate ion. The color in aqueous solution appeared to be the copper(II) ion. On the basis of studies so far, the salt appears to be either the basic copper trichloroacetate or a copper complex with cu-cu interaction with a trichloroacetate anion sandwiched between. The water of hydration is tightly bound and very difficult to drive off, even with extended heating. A study of the other salts and their properties is being continued.

"*A Preliminary Study of the Esterification of Trichloroacetic Acid with the Butyl Alcohols.*" Pam Ingram, Gary Degerman, and David Hobson. Bryan College. Preparation of the primary, secondary, and tertiary butyl esters of trichloroacetic acid was attempted using the Fischer esterification method. A solid compound, thought to be the tertiary Butyl trichloroacetate, was prepared at low temperature. The compound melted around 25° and appeared to boil at 33-35°. The compound gave a positive test for chlorides and gave an infra-red spectrum with strong absorption in the 1080-1300 and 1690-1780 mu regions, suggesting that the compound was an ester. Investigators of this compound in 1944 reported preparation by a different method. They reported a melting point of 25° and a boiling point of 37°.

"*A Photometric Study of the Eclipsing Binary Star Systems.*" David Hale. Bryan College.

"*The Photometric Search for Variable Ap Stars.*" Edward W. Burke. King College.

"*A Preliminary Study of Protozoan Ectoparasites of Centrarchid Fishes at a TVA Nuclear-Fueled Steam Generating*

Plant." S. Morse, S. Wages, and G. Litchford. The University of Tennessee at Chattanooga. A preliminary study on the feasibility of studying the effects of altered parameters upon protozoan ectoparasites as they exist in the field. The study is based upon parameter changes expected to occur during the operation of TVA's Sequoyah Nuclear-fueled Steam Generating Plant.

Base data collection, specimen field collection techniques, and laboratory techniques have been established. Protozoan ectoparasites identified include species of Urciolaridae, Chlamydomontidae, and a suspected new family of the Odontostomatida.

"*Effects of Early Environmental Experiences on Hebb-Williams Problem Solving in Rats.*" Mark Herman. Maryville College. This study was concerned with the effects of various living environments on the learning ability of Sprague Dawley rats. Upon reaching the ages of 21 to 25 days, rats were divided into groups according to four living conditions. After grouping, these animals lived in their respective environments for an additional 45 days. Of the four environmental groups, the first consisted of an enriched-environment group, in which eight rats were kept in a large brightly painted cage with an outside view. A group of toys was placed inside the cage for these animals to manipulate. A second group lived in a deprived-isolation condition in which the wire mesh laboratory cages were only 15 x 9 x 7 inches, and outside stimulation was restricted. A deprived-social group consisted of three rats living in a 15 x 9 x 7 inch wire mesh laboratory cage with a good view of the room. A fourth group, called the deprived exercise group, consisted of rats which lived singularly and without outside stimulation in small mesh cages fitted with exercising wheels. After a 45 day period a Hebb-Williams maze was used in testing the rats' intelligence. The enriched-environment group and the deprived-exercise group achieved the best performance. The deprived-social and the deprived-isolation groups showed similar performances. It was concluded from this investigation that early opportunities to exercise provide an important variable which cannot be overlooked in assessing the maze performance of the rat.

"*Sleep Learning in REM Sleep.*" Lawra Dance. Maryville College.

MIDDLE REGION

DAVID LIPSCOMB COLLEGE

"*The Effects of Alleged Popularity on Opinion Formation: A Field Study.*" Helen Doane. Belmont College. This study was designed to determine the effect of implied social pressure on conformity. Employing the guise of a beer preference survey, the experimenter induced social pressure by openly displaying two large graphs indicating the percentage of previous tasters' preferences for each beer. As in actuality only one beer was varied and given two fictional names, the results are particularly interesting. When one beer was rated at 70% preference level, the other at the 30% level, conformity was optimal. Beyond this point, conforming behavior was inversely related to the degree of difference in popularity.

"*First Report of Analysis of Belle-Meade—East Nashville Report Data.*" Robert Ogles. Belmont College. Thurstone scaling technique was used to construct a 15 item attitude scale

which was administered, along with a 20 item questionnaire, to 50 subjects in two diverse community areas within metropolitan Nashville, Tennessee. Questions indicating community awareness and community involvement were correlated and when incorporated with the attitude scale provided a basis for comparison of similarity and dissimilarity between the two areas. Additional descriptive information obtained from the sample was useful in determining the socio-economic level of each group.

"*Peace Theory of Psychology.*" Michael Day. Belmont College.

"*A Factorial Study of College Students on Abortion.*" Shirley Sisco. Tennessee Technological University. Forty students in introductory psychology classes were scored on a 16 item attitude survey on abortion. The questionnaire, consisting of

scenarios of possible abortion situations, contained 3 pairs of variables: old/young couples; married/unmarried; male/female decider. The results showed that subjects generally thought the female should be the decider of the abortion. There was, however, a three-way interaction between the questionnaire variables which indicated that in married older couples the male should be the decision maker whereas in unmarried and/or younger couples the female should make the decision about the abortion.

"*Nitrites in Saliva.*" Tim Shando. Walters State Community College. Nitrites are suspected of causing the formation of carcinogenic nitrosamines in the digestive tract, therefore samples of saliva were taken from over 100 individuals at Walters State Community College and analyzed for nitrite. An average of 4 ppm was found, men having a slightly higher average than women. The older and younger age groups averaged higher than the 18-29 age group. Saliva was also incubated at body temperature with sugar and nitrate added which resulted in increased nitrite levels. This seems to indicate that eating habits contribute to the nitrite levels in saliva. Sucrose caused increases of nitrite similar to the increase seen after a meal.

"*Patty Hearst: A Semantic Differential Approach in Measuring Her Character.*" Robert Jones. Tennessee Technological University. Forty-four female and forty-four male college students were given a semantic differential on Patricia Hearst, the recently convicted newspaper heiress. Half of the subjects selected according to dress were hippies (22 female - 22 male), and the other half were categorized as straight dressers. The study was conducted during the portion of the trial that the defense was presenting its case.

The items were divided into three categories which were evaluative, legal, and potency. Results were analyzed by analysis of variance which indicated that hippies and females were more sympathetic to the plight of Miss Hearst as opposed to straights and males. An interesting aspect observed was that Patty Hearst was rated more guilty by all groups, but was rated less likely to be convicted. The lack of significant interactions on specific factors was due to ambivalence on whether they considered her SAD vs. HAPPY; SANE vs. INSANE; and SCARED vs. NOT SCARED.

"*Sex Bias in Criminal Punishment of Moral Offenders.*" Yvonne Crisp. Tennessee Technological University. 160 college students, eighty males and eighty females, were exposed to six scenarios in which they were to give legal sentences to convicted moral offenders. Prostitution, exhibitionism, and child molesting were the three types of offenses with an example of each type given for each sex.

Results of analysis of variance indicated that female subjects were more punitive than males, and the male offender was more severely punished than the female offender. Molesters were more severely sentenced than exhibitionists and exhibitionists were more severely dealt with than prostitutes. However, there was an interaction between sex of offender and type of offender which was generated by the fact that a female molester was treated less harshly than a female exhibitionist as well as a male exhibitionist or molester.

"*Expressed Attitudes About Interracial Dating as a Function of the Interviewer.*" Cynthia D. Williams and P. Annette Webb. Tennessee Technological University. The results of two additional studies were compared. In the first study, 25 white females gave 100 Caucasian females and 100 males a white females attitude questionnaire about interracial dating. In short verbal attitude questionnaire gave the same questionnaire the follow-up study, a black female gave the same questionnaire to 41 white males and 25 white females. The second study met the requirements of a 1% representative sample of the six undergraduate colleges at Tennessee Technological University by sex. No subjects served in both studies.

Over 57% of the males expressed a willingness to date black females when interviewed by the black experimenter, though less than 28% indicated a willingness when the experimenter was a white female. Similarly, 48% of the females expressed a willingness to date blacks when the interviewer was black. With the white interviewer, only 12% indicated a willingness to

date blacks. The males and females that were willing to date generally had friends who had dated blacks and those that did not have friends who dated blacks were generally unwilling to date blacks.

An analysis of the subjects' home towns between ages 6-12 indicated that males from non-Southern cities expressed much more willingness to date blacks when the experimenter was black. A similar pattern was found with females who came from Southern towns between 10,000 and 50,000 people. This is to say the effect of the black experimenter was greatest on these two groups.

"*Effects of Ethyl Alcohol on Motor and Cognitive Skills in Experienced and Non-Experienced Drinkers.*" Dale A. Hullander. Tennessee Technological University. The purpose of the study was to test the effects of .12% blood alcohol on male and female subjects divided into drinkers and non-drinkers. The test used to indicate effects were the penny-lag test for motor-coordination and digit symbol test to measure short-term memory.

Significance was found at the .05 level (F test) between sex on the penny-lag test with females doing better than males. Significance at the .01 level was found in the sex, drinker/non-drinker interaction. This indicated that non-drinkers were more seriously affected by the alcohol than the drinkers and that more effect was found in males than females. There was a significant effect on the short-term memory tests in that females did significantly better after the alcohol than before the alcohol; no effect was found in males. In summary alcohol seems to depress motor behavior consistently, but has an inconsistent effect on short-term memory.

"*Imprinting Chicks.*" Trudi Beth Bratten, David Ours, and J. T. Lewis. Tennessee Technological University. Imprinting to a 4 inch diameter blue styrofoam ball rotating continuously in the living chamber in a 6 inch diameter circle at 6 r.p.m. was induced in a newly hatched Rhode Island Red chick as demonstrated in a maze test. Imprinting was unsuccessful with a second newly hatched Rhode Island Red chick subjected to the same conditions except a rotation speed of 4 r.p.m. and a path of only 2 inch diameter. A control chick kept in a similar chamber with no ball attempted to escape when placed in the maze with a 4 inch diameter blue styrofoam ball. The control chick which was subjected to considerable handling became imprinted on the investigator.

"*The Hardy-Weinberg Law and Selection.*" Steve Woods. Tennessee Technological University. The purpose of this research was to gain insight into the reliability and application of the Hardy-Weinberg law in populations of *Drosophila melanogaster* under the control of artificial selection. Indeed, through the study of two independent populations of fruit flies, it may be ascertained, beyond reasonable doubt, that the mathematical methods concerning the Hardy-Weinberg law are valid. Also, despite the possibilities of such factors which could invalidate the data, such as preferential mating, the research upheld the law as being true.

"*Five Species of Aquatic Phycomycetes of Radnor Lake.*" Ralph Webb. David Lipscomb College. From January 1975 through June 1975 five aquatic Phycomycetes were collected and identified from Radnor Lake, in Davidson County, Tennessee. The isolated Phycomycetes were *Saprolegnia declina*, *Saprolegnia ferax*, *Saprolegnia subterranea*, *Achiya americana*, and *Dictyuchus monosporus*. Each species was isolated using the standard sterile technique and initially cultured on the seeds of *Cannabis sativa*. *S. ferax*, *A. americana*, and *D. monosporus* were found to be abundant throughout the study interval. However, *S. subterranea* and *S. declina* appeared only rarely in samples. It is speculated that species abundance varies with water temperature.

"*A Partial Limnological Study of Radnor Lake.*" David Hardison and Jon Lowrance. David Lipscomb College. Studies were carried out on Radnor Lake between June, 1975 and February, 1976. With the observation of turnover and stratification due to temperature, it was suggested that Radnor is a warm monomictic lake. During the stratification of summer and fall the

oxygen profile conformed to the standard clinograde oxygen profile. The oxygen levels equalized with the onset of the turnover and maintained approximately the same levels for the rest of the study period. In a conductivity test it was determined that the two northern coves registered the highest, thus showing the most runoff. The main topic of study, especially in January and February, was on organisms. The succession of predominant organisms was as follows: *Anabaena* and *Urogleptis* in July; *Anabaena* and *Microcystis* in August through November; and *Synedra* and *Microcystis* in January and February. There is an urgent need for increased study concerning all aspects of the continuing eutrophying process at Radnor Lake.

"*Reactions of Cyclobutenes.*" Gwen D. Goretkas and James H. Hutchinson, Middle Tennessee State University. In the synthesis of 1-chloro-3,3-difluoro-2,4,4-trimethoxycyclobutene (II) from 1,2-dichloro-3,3,4,4-tetrafluorocyclobutene (I), the appearance of an infrared absorption at 1810 cm^{-1} was noted. By varying conditions the relative intensity of this apparent carbonyl absorption could be increased. Attempts at the isolation of the suspected product (III) will be discussed.

"*Steric Effects on the Interaction of Mefloquine and Related Quinolines with DNA.*" Michael W. Davidson and Bill Griggs, Vanderbilt University. The emergence of drug resistant *Plasmodium* strains has prompted a continuing effort toward finding an efficacious agent useful in all aspects of malaria chemotherapy. One result of this effort has been the synthesis of mefloquine [2,8-bis-(trifluoromethyl)- α -(2-piperidyl)-4-quinoline-methanol] a quinine analog which was recently shown to possess substantial antimalarial activity in human volunteers (G. M. Trenholme, et al., Science 190:792(1975)). For most quinolines displaying antimalarial effects, the mode of action has been postulated to involve chromophore intercalation between parasite DNA base-pairs. However, the results of our spectrophotometric and viscosity experiments indicate that mefloquine binds only weakly to DNA by electrostatic attachment to the anionic periphery of the double helix. Experiments designed to elucidate the structural constraints preventing formation of a mefloquine-DNA intercalated complex were conducted with mefloquine derivatives lacking either the 2- or the 8- trifluoromethyl substituents. An analog with fluorine substituted for trifluoromethyl in the 8- position behaved identically to mefloquine (did not intercalate) under our experimental conditions. In contrast, exchanging the mefloquine 2-trifluoromethyl for a carbamoyl moiety resulted in a compound which increased DNA viscosity, a feature consistent with intercalation. These results strongly suggest that mefloquine and the 8-fluoro analog do not bind to DNA by intercalation, but that substitution of the mefloquine 2-trifluoromethyl for a less bulky substituent allows formation of an intercalated complex. A worthy note is that the mefloquine analog which intercalates DNA displays no significant antimalarial activity. In conclusion, our results raise questions concerning the precise mode of action of mefloquine and other unstudied quinoline methanol antimalarial agents.

"*Effects of Cinnamic Acid Derivatives on the Growth of Avena Coleoptiles.*" R. H. Tilford and M. L. Martinez, Vanderbilt University. Effects of 13 naturally occurring hydroxylated derivatives of cinnamic acid upon the growth of 4-day-old dark-grown coleoptiles of oats was investigated. The compounds studied also included related lactones and flavonoids. 10mm segments of the coleoptiles were cut, and their growth was measured 24 hours later, after incubation in water controls, in indoleacetic acid (IAA) + sucrose controls, and in indoleacetic acid + sucrose + various concentrations of the test compounds. IAA-induced growth was found to involve both protein synthesis and gain in dry weight. Six of the test compounds failed to induce growth in excess of that in IAA + sucrose controls, while seven compounds tested resulted in such increases. The significance of these findings will be discussed.

"*Resonant Frequencies of a Curved Rod.*" Byron Darnell, Trevecca Nazarene College. In the past much effort has been given to the theoretical analysis of resonant frequencies of a curved rod with few experimental results obtained. Due to this fact, an experiment has been performed that measures the

resonant frequencies of a rod at varying angles of curvature. These resonances were produced and then detected by using a function generator that drives a coil on the rod while in a magnetic field, and an oscilloscope that detected both the driving and pickup signals. The change of angle in bending the rod was obtained by placing varying torques on its ends.

"*A Study of the Reaction $K^-p \rightarrow \Lambda^0 \pi^+ \pi^-$ at K^- Momenta Near 460 Mev/c.*" Donald Hamilton, Vanderbilt University. A study has been made of quasi-two-body final state production in the reaction $k^-p \rightarrow \nu \pi^+ \pi^-$ at K^- momenta near 460 Mev/c. The analysis utilizes 335 $\Lambda \pi^+ \pi^-$ events and the process $k^-p \rightarrow Y^{*+} \pi^+; Y^{*+} \rightarrow \Lambda \pi^+$ will be discussed. Mass plots showing the missing mass at the $\pi^+ \pi^- +$ missing hyperon production vertex and plots which indicate the final state resonance with its reflection will be presented.

"*Photoelectric Photometry of the Bright Radio Star UX Arietis.*" Charles R. Evans and Douglas S. Hall, Vanderbilt University. UBV photoelectric observations indicate a change in the light curve of UX Ari (= HD 21242). Previous 1972 UBV measures showed a wave-like variability in all colors with an

amplitude of about 0.08 in visual (Montle, R. E., Hall, D. S. 1972, I.B.V.S. No. 646; Atkins, H. L., Hall, D. S. 1972, P.A.S.P.

84, 638). Minimum light was around 0.1, where phase is reckoned with the spectroscopically determined ephemeris

$$JD(\text{hel.}) = 2440133.76 + 6.43791 \cdot E$$

(Carlos, R. C., Popper, D. M. 1971, P.A.S.P. 83, 504). We obtained 185 differential UBV observations with respect to 62 Arietis during the period from October 1974 to March 1975. The constancy of the comparison star 62 Ari was checked via 10 differential observations with respect to BS 999. These mean differences were consistent with 1972 measures. The light curve obtained from these new measures shows dramatic changes.

The amplitude has decreased to about 0.03. The overall level

of the light curve has decreased by about 0.12. Minimum light

still occurs at 0.1. UX Ari is known to be a bright radio star (Gibson, D. M., Hjellming, R. M., Owen, F. N. 1975, Ap.J. 200, L99). It is not yet known how the intensity variations in the two wavelength regions are related to each other.

"*The Spotted Eclipsing Binary SS Bootis.*" Susan G. Neff and Douglas S. Hall, Vanderbilt University. SS Bootis is a member of the peculiar group of binaries of which RS Canum Venaticorum is the prototype. These systems are characterized by strong H and K emission arising from one star, and extremely distorted light curves.

During the 1975 observing season, we used three-color (UBV) photoelectric photometry to obtain an out-of-eclipse light curve of SS Bootis. The 24-inch reflector at Dyer Observatory was used. Comparison of this light curve with the 1970 light curve by Oliver (Ph.D. thesis, U.C.L.A., 1974) showed interesting changes. Although both light curves showed a wave-like distortion, the amplitude of the disturbance is much smaller in 1975 than in 1970. Oliver's curve showed a disturbance ampli-

tude of about 0.2, whereas our 1975 curve showed an ampli-

tude of only about 0.05. Apparently the source of the disturbance is not constant. The other major difference in the light curve from 1970 to 1975 is the phase at which the distortion occurs. It seems to have migrated, with the maximum light intensity moving from about phase 0.3 to phase 0.6.

These phenomena are interesting, but not unique. They have been observed in many of the other members of the group. These variations are seen as manifestations of massive spotting on one star, covering perhaps half of the stellar surface. The periodic amplitude variation can be interpreted as a "starspot" cycle similar to the eleven year sunspot cycle. The wave's migration can be interpreted as a combination of tidal effects and differential rotation in the upper layers of the star.

SS Bootis has not yet been studied enough to determine either the period of its spot cycle or the migration rate of the spotted region. It is an interesting system, however, and should be a rewarding subject for continued study.

"Mass Loss in the Eclipsing Binary Star System RY Geminorum." Tilman Stuhlinger and Douglas S. Hall. Vanderbilt University. From observations obtained by astronomers from 1908 to 1975, including several made by us at the Dyer Observatory, we are presenting evidence for the loss of mass from the eclipsing binary star system RY Geminorum. We collected and analyzed the 32 times of mid-primary eclipse obtained by these astronomers to show that, around 1950, the period P decreased by an amount equal to $\Delta P/P = -3.8 \times 10^{-5}$, which, using the binary's period of 9.3 days, gives a period decrease of about 30 seconds. Our theory is that this decrease was produced by a sudden outflow of mass from the cooler star, most of which left the system. We used the above period decrease to calculate that an amount of mass equal to about 10^{-5} solar masses or 3 earth masses was lost from the system. Future observations will reveal whether all of the ejected mass was

lost from the system, as would be indicated by no further period changes, or whether some mass was assimilated by the companion star, as would be indicated by a slow, steady period increase after the abrupt decrease.

"Changes in the Orbital Period of the Eclipsing Binary Star System RZ Cassiopeiae." William C. Keel and Douglas S. Hall. Vanderbilt University. The O-C curve from 1897 to 1970 (given by the 72 normal times of minimum of Svechnikov, Surkova and Danilov) is represented by 10 upward-curving parabolic segments, the simplest representation consistent with the Biermann-Hall period-change model. The residuals appear Gaussian in distribution and the average residual, disregarding weights, is less than 0.001 day.

A typical period decrease corresponds to $\Delta P/P = 1.9 \times 10^{-5}$. A sudden decrease like this could be produced by the sudden transfer of 0.65×10^{-6} solar masses of stellar material from the cooler star (which fills its Roche lobe) to the hotter star. Intervals between transfers are unequal, averaging 6.8 years. The average rate of mass loss from the cooler star is approximately 10^{-9} solar masses per year, which is its thermal rate.

WESTERN REGION

LEMOYNE-OWEN COLLEGE

"Effects of Microwaves on *Drosophila melanogaster*." Karen Crawford. Christian Brothers College.

"Graphic Variation in *Orchopeas leucopus*." O. S. Fuller and M. L. Kennedy. Memphis State University. From 1 December 1975 to 5 March 1976, 650 fleas of the species *Orchopeas leucopus* were obtained by live trapping and brushing the mammalian hosts and from existing collections. *O. leucopus* have been examined from localities in 11 states, including Maine, New Hampshire, Maryland, New York, Michigan, Tennessee, Oklahoma, Kansas, Colorado, Wyoming, and Utah. In addition to host and locality data, 16 morphological measurements were recorded for each female specimen and 14 morphological measurements from each male. An attempt is being made to detect patterns of geographic variation in this species using multivariant techniques.

"Flight Speeds of Five Species of Bats." P. K. Price, M. L. Kennedy and O. S. Fuller. Memphis State University. On 4 and 8 January 1976, *Balantiopteryx plicata*, *Pteronotus personatus*, *P. davyi*, *P. parnellii*, and *Mormoops megalophylla* were collected from a small cave approximately 16 km NW of Manzanillo, Colima, Mexico. Specimens were transported to a simulated cave passage cleared in a dense lowland forest. Speeds of each individual were measured to a distance of 9.1 and 12.2 m. Of the species tested, the larger *M. megalophylla* (females: 13.44 mph, 10.07 mph; males: 11.91 mph) and *P. parnellii* (females: 12.40 mph; males: 10.49 mph) had the fastest average speed and *B. plicata* (females: 5.68; males: 6.06) the slowest.

"Trapping Success in Seven Habitats in Mexico." M. C. Wooten and M. L. Kennedy. Memphis State University. Seven diverse habitats were sampled for small mammal populations from 28 January 1975 to 10 December 1976. These habitats are located in Nuevo Leon, San Luis Potosi, Michoacan, Colima, and Jalisco, Mexico. Semidesert, scrub forest, pine forest, tropical deciduous forest, mangroves, thorn forest, and oak-pine forest were sampled. Greatest trapping success occurred in tropical deciduous forest and least success in pine forest.

"Separation and Study of Old and Young Erythrocytes." Jeff Kirchner. Christian Brothers College.

"Skeletal Effects of Parathormone on New Born Mice." Chris Brush. Christian Brothers College.

"In vitro and In vivo Studies of Murine Transferrins." Mark A. Castellaw and Charles J. Biggers. Memphis State University. Transferrins of inbred stock of *Mus musculus*

(C57BL/6J and CBA/J) were separated by electrophoresis on block polyacrylamide gel. The transferrins were identified by specific staining and selective precipitation. The transferrins exhibited two bands per phenotype. The fast migrating bands of the homozygotes did not appear in the hybrid. When the sera of the homozygotes were mixed *in vitro*, the electrophoretic pattern is the same as in the actual hybrid. Staining patterns of the transferrins varied. Attempts were made to show the different staining patterns as a function of the iron concentration.

"Preparation and Testing of Stimulant Drugs in Mice." Kim Bowen. Christian Brothers College.

"The Osage Orange, Resource or Waste?" M. Lamar Jones and G. Leon Howell. Memphis State University. The Osage Orange fruit and tree are two of the most valuable of North American fruits and trees. Its botanical name is *Malclura pomifera*. Many experiments were performed with the fruit and wood. One experiment was using the dye, which was extracted from the heartwood of the Osage Orange wood. It was used to stain tissue sections of the Osage Orange leaves and fruit. The dye did stain the tissue, but to be able to identify how the tissue elements were stained, much research, time and study needs to be done.

"Gossypol: Possible Anti-Cancer Agent." Tim Petersin. Christian Brothers College.

"A Histological Study of Various Tissues of Bitis nasicornis, The African Rhinoceros-Nosed Pit Viper." Sharon A. Johnsey and Leon Howell. Memphis State University. Tissues of the African Rhinoceros-nosed Pit Viper were removed by dissection in order to investigate the effect of the general histological stains and one specific stain, Verhoeff's Elastic Fiber stain. The tissues were fixed with 10% formalin. The general histological stains used were Harris Hematoxylin, Masson's Trichome stain - adapted from Mallory, and Masson's Trichome stain - Modified. The stains used here were a cross section of staining schemes to produce the best results for these types of tissues. The tissue was embedded in paraffin and sectioned at an average of six microns. Over two hundred slides were made and investigated.

"Ascorbic Acid Content in Aging Rats." Amelia Clincy and Yolanda Winters. Lemoyne Owen College. Ascorbic acid plays an important role in the aging process of rats. What we have been trying to do is determine the levels of ascorbic acid in the liver, kidney and skin of the rat. However, we first wanted

to determine these levels of ascorbic acid in one particular age group. The rats were 9-11 months of age. All were female rats and were normally fed with Wayne Lab Blox.

Future plans include comparing the results obtained from normally fed rats with the rats that have been fed and raised on tobacco, that is, determine the levels of ascorbic acid in the liver, kidney, and skin tissue of normally-fed rats with the levels of ascorbic acid found in the liver, kidney, and skin tissue of tobacco-fed rats.

"*Tetrazolium Oxidase Polymorphism in Dipodomys ordii*, *Bufo woodhousei fowleri*, and *Bufo americanus americanus*." Onyejebose O. Okwumabua, James T. Mahan, and Charles J.

Biggers. Memphis State University. Blood samples of *Dipodomys ordii*, *Bufo woodhousei fowleri*, and *Bufo americanus americanus* were differentiated by the use of vertical polyacrylamide gel electrophoresis. Venom samples of the toads were also tested. An investigation of the electrophoretic pattern of the enzyme tetrazolium oxidase was made. Results are presented for *Dipodomys ordii*. The electrophoretic pattern of the two species of *Bufo* revealed interspecific and intraspecific polymorphism of tetrazolium oxidase. There were variations in the mobility of the bands of the blood and venom samples of these toads. The significance of these findings is that the differences in the mobility of the bands of tetrazolium oxidase could be used to group and separate taxa.

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AUTHOR CHALLENGES SCIENTISTS TO DEBATE

CONCORD, MASS.—Bannister Associates has today published a paper by Heinz Koster challenging 186 scientists and Nobel prize winners to a public debate on whether stars and planets can influence our future.

The paper is a response to the scientists' assertion that it is an error to think that forces exerted by planets and stars at birth can in any way affect our futures (see Bok et al., *Objections to Astrology*, *The Humanist*, Sept./Oct. 1975, pp. 4-6). The author attempts to show that, to the contrary, stars and planets can and do affect our futures, not only at birth but also for the duration of an entire lifetime.

The author partook of intensive training in the sciences. He holds degrees from M.I.T. and Vanderbilt University. He has served as a collegiate department chairman at the rank of full professor. He is the author of two books and several short publications. He has served as consultant in astronomy to several planetariums.