

ABSTRACTS OF PAPERS PRESENTED AT THE SPRING COLLEGIATE MEETINGS

EASTERN REGION
BRYAN COLLEGE

A Study of Male-Female Math Scores. Darlene Mabry, Roane State Community College. In a study of eighty-seven eighth grade students and the entire population of TMTA Math Contest students taking the test at Roane State Community College, a study was made on male-female math scores. In the eighth grade study, there was no significant difference between male and female test scores. For Algebra I, Geometry, and Algebra II there was no significant difference on test scores. On test scores on the comprehensive math test, however, which is taken by senior math students, the male's scores were significantly higher. Only four females attempted the Advanced Topics test, two of whom placed.

Quantitative Studies of an Experimental Organo-Copper Complex. Carol Crisler, Beth Butler, presented by Jim Lewis, Bryan College. Several quantitative studies were made on an experimental copper chloride-DMSO complex and copper(I) chloride and copper(II) chloride for comparison. Values for the copper-DMSO complex, based on the assumption that it contained copper(I), ranged from 33.12% to 42.88% copper in the complex. Comparing these percentages to ones obtained from tests run on copper(I) and copper(II) chloride, including solubility tests, it appears that the complex is most likely the copper(I) form.

MIDDLE REGION
AUSTIN PEAY STATE UNIVERSITY

The Effects of Environmental Familiarity on Noise Production. Charlene Odle-Tennessee Technological University. The impetus for this study was the informal observation that people in unfamiliar environments, i.e., newcomers to the library, tend to produce less noise in the course of normal action than those more familiar with the environment. Little or no relevant literature exists in this area, previous studies having focused on noise as an independent variable instead of a dependent one.

To test our hypothesis sixteen subjects were tested in a within-subjects design over four consecutive sessions. Each subject was tested individually, with the four sessions being completed in two to three days. Subjects were told that the experiment concerned variations in pronunciation over time, and were asked simply to enter the experimental room and read a list of words into a tape recorder. Posture, distance from the tape recorder, and volume control were standardized, though the subject was always alone when performing the task.

The tape recorder was running when subjects entered the room. We were thus able to record the opening and shutting of the door to enter the room, the word pronunciation task itself, and the opening and shutting of the door to exit.

Converting the recordings to decibel levels showed results generally supporting the hypothesis. Noise levels on all measures generally decreased slightly for the second session, increased considerably during the third session, and increased still more sharply for session four. These effects reached significance for "door opening to enter"; "door opening to exit," and for the word pronunciation effect. A Tukey test revealed session four to differ from all other sessions, with session three marginally differing from session two.

The results thus generally confirm the hypothesis that as one's environment becomes more familiar, one generates increased levels of noise in the course of normal activity. Further research is proposed in this area to separate task familiarity from environmental familiarity.

Effects of Hue and Direction in Phi Phenomena Task. Jeff Baird, Tennessee Tech University. The Phi-phenomenon is most often described as a sequence of light flashes which blend together to form a continuous illumination. The illusory effect was re-explored in this study with a couple of important distinctions from past research. In the current study, 48 differing displays of red, green, and blue rectangles were presented horizontally on a small color television screen. These three stimuli were displayed underneath a horizontally centered, white, fixation cross with Phi motion occurring to the left or right, linearly across the screen. The foveal region of the retina was fixated on the cross throughout testing. The binocular vision field was divided into halves in front of the subject's nose. The septum, vertically placed, split the fixation cross and the center rectangle shown in each presentation. Darkness adaptation was allowed for

each subject. The tip of each subject's chin rested approximately 67 cm. from the screen during the experiment. Forty-eight presentations were shown to the subjects after the warm-up. These presentations were sequenced in accord with a latin square technique for color repetitions and for directional repetitions. This randomized each presentation and its successor. An Apple II + computer, using low-resolution graphics was programmed to present the stimuli. Phi were rated on a 0-5 confidence scale, with 0 being no Phi perceived and 5 being a clear Phi effect. Motion results repeated recorded as left, right, or none. No subject reported an absence of motion.

Results indicated males had stronger subjective Phi, and were more likely to be correct in the direction of the perceived Phi $F(1,8)=9.21, p<.016; F(1,8)=11.61, p<.012$. There was a slight tendency to see Phi more often to the left than to the right. Colors were also significant at $F(2,16)=5.25, p<.02$ with red being the most difficult to detect. Colors were sequenced across the screen to the left or right in movement with either no repeats, repeats occurring with the first and middle rectangle, first and last rectangle, or middle and last rectangle. Patterns of colors were marginally significant at $F(3,24)=2.97, p<.051$ with higher detectability on the latter two sequences. The interaction between sequences and colors were significant at $F(6,48)=3.11, p<.012$ with red being difficult to detect in the bilateral repeats. These results were interpreted to be consistent with the extent of color vision normally found in the macular and extra-macular regions of the retina.

"Effects of Caffeine on A Human Motor and Cognitive Task." Connie Freed, Tennessee Technological University. Eight male and eight female college students were given 2.5 mg/kg of caffeine in an orange juice and soda water mixture. Prior to receiving the caffeine, steady state baseline data was taken on three measures from the Purdue Pegboard test and from a visual tracking test. Subtests on the Purdue Pegboard test were the simple pin test with preferred hand, with non preferred hand, the third was the assembly task with pin, washers, and bushing. The cognitive test consisted of searching for telephone area codes on a U.S. Map in numerical sequence. To induce rapid uptake of the drug, along with the soda water, subjects had to ride an exercycle while maintaining a reading of 15 mph for two minutes. Subjects were asked to wait while occupying themselves with an intervening, but unrelated memory task. The second series of tests were run at least 20 minutes after drug ingestion.

The raw frequency data, from each test, were subjected to analysis of variance. Two males and two females were compared separately having eaten just before ingestion of the drug. Caffeine was found to improve visual tracking performance $F(1,10)=9.79, p<.01$. The four subjects having eaten served as a control for the fasted group and a significant interaction $F(2,13)=7.97, p<.005$, indicated no increase with caffeine in the stated group. On the two handed assembly task there was a significant drug effect $F(1,12)=7.95, p<.015$, with caffeine resulting in better performance. Analysis of variance of the simple pin test with the non-preferred hand indicated no significant drug or gender effects. On the pin test with the preferred hand, females scored significantly better than males $F(1,12)=6.04, p<.03$, which is consistent with the normative data on the test. Interestingly, when best performers were stratified from poor performers on baseline training, a positive caffeine effect was found with the poor performers and a decrement was found with the better performers $F(1,12)=6.02, p<.03$. This later finding gives some support for a Yerkes-Dodson Law interpretation of the pin test. Control analysis indicated no practice or warm effects carried over after drug ingestion.

Indices of Student Satisfaction as a Function of the Type of University Registration Procedure. Betty Sells, Tennessee Technological University. In the present study an attempt was made to find if there was a difference in the attitudes expressed toward Tennessee Technological University between students registering for the first time during the pre-Fall; or Summer, and the Fall Registrations. A questionnaire was given to sixty students following their completion of the registration process occurring during either the pre-Fall registrations for freshmen in the Summer or the regular Fall procedure. Ten subjects from each of the following majors in Education, Business, Engineering, Arts & Sciences, a group combining Agriculture, Home Economics, and Nursing majors, and ten in General Curriculum comprised the sample.

Questions appearing on the attitude survey included the subject's first correspondence with Tennessee Tech, the appearance of Tech's campus, personnel and students on campus encountered by the subject, and how the registration process at Tennessee Tech was viewed by the subject.

Responses on a six point Likert scale constituted the data. The data were subjected to analysis of variance. Significance was found between Summer and Fall Registrants [$F(1,108)=13.42$ $p<.001$] when a comparison between season of registration, college of majors and the four semantic factors implying the Summer Registration was preferred. Since the semantic factors were significantly different [$F(3/324)=5.99$ $p<.001$] the factors were then analyzed separately.

A significant difference in attitudes between the Summer and Fall groups was found in the beginning correspondence category [$F(1/108)=14.94$ $p<.001$]. A significant difference was found between Summer and Fall Registrants [$F(1/108)=6.35$ $p<.013$] in the physical plant appearance category.

A significant difference was just missed between Summer and Fall registrants in the personnel category [$F(1,108)=3.74$ $p<.052$]. There was a significant interaction between college and questions [$F(15/324)=2.07$ $p<.012$] within the semantic factor. This interaction was due primarily to the fact that students in the College of Engineering perceived the administrative personnel to be unfriendly compared to the other colleges with the exception of general dissatisfaction, found among the individuals opting for General Curriculum.

Significance was also found between the Summer and Fall Registrations [$F(1/108)=15.01$ $p<.001$] in the advisement category with Summer preferred. There was also a significant difference [$F(5/108)=2.83$ $p<.02$] between colleges in this category with those students in General Curriculum and Engineering ranking advisement significantly below that of students in the other schools or colleges. There was also a significant interaction between season and questions within the semantic factor [$F(3/324)=5.83$ $p<.001$]. Most of the interaction was due to Fall Registrants feeling their registration experience was significantly less efficient than those registering in the Summer.

The Effects of Tartrazine and Noise on the Activity of Young Rats. Marcia Wood, Dagmar Nye, and Anthony Golden, Austin Peay State University. Two models have been suggested for the mechanism by which food dyes might alter activity levels, allergy and behavioral toxicity. A recent suggestion was that tartrazine (FD&C yellow dye #5) might interfere with the ability to habituate to a sensory stimulus. The present study examined the ability of young rats, exposed to tartrazine before testing, to habituate to the onset and offset of pulsed masking noise. Twelve male CD derived rats were tested for 16 days in cages equipped to measure activity. Starting conditions of quiet or masking noise (76 db, on 1 sec/off 1 sec) were rotated daily. Noise conditions within sessions were alternated for each of eight 5 minute intervals. Beginning at fifteen days of age, all subjects received daily subcutaneous injections of either tartrazine or bacteriostatic water which continued throughout the study. Testing began at 23 days of age. Activity levels increased across the first six blocks of days. The control group showed no difference between sessions started in the noise or started in the quiet. Tartrazine subjects were less active when they began the test session in the noise. No noise effect was obtained in the control animals except on Day 1, indicating rapid habituation to the noise stimulus. Although the noise effect decreased across the seven days for the dye animals, it was obtained throughout the study. The difference between the two groups would support the suggestion that tartrazine interferes with the ability to habituate.

Effects of Amobarbital and Guthion on Leucocyte Differential. Alexander C. Wells and John Stewart, Tennessee State University. Pharmacodynamic interactions with amobarbital, guthion, atropine sulfate and atropine methylbromide have been investigated in Sprague-Dawley male rats. Varying dosages of each drug were given to groups of rats intraperitoneally (I.P.). Dose range for the guthion was 1-10 mg/kg. The dose range for the other experimental agents was between 20-120 mg/kg based on the ED50 and LD50, respectively. A leucocyte differential was performed on each animal of each group and the final value was expressed as the mean value representative of the group. The cells were stained with Wright's Rapid Stain following the same procedure for all groups for continuity of attained data. The percent of each cell was determined based on 100% total cell count and the values from each group of treated animals were compared to the values of the determined control animals which were subjected to physiological saline solution. These resulting values were compared using student "T" tests, standard deviation and the standard error of the mean. Conditions of leucophillia, leucopenia and pathology of the cells were associated with various dosages of the chemical agents used.

The Effects Of Amobarbital On The Morphology Of Erythrocyte And Thrombocyte Count. Alexander C. Wells and Noritis Cohen, Tennessee State University. A study of the influence of amobarbital sodium on the morphology of erythrocytes and thrombocyte count in adult, Sprague-Dawley male rats has been carried out. Dose range for the amobarbital was

20-120 mg/kg. Control animals were given physiological saline as a "sham" injection in place of drug administration. The routes of administration of amobarbital and saline were intraperitoneally (i.p.) and at a volume of 0.01 ml/g body weight. Blood samples were taken from the animals twenty hours after the last injection. The slides were observed under oil immersion lens at 1000 times magnification for abnormal morphology of red blood cells and abnormal platelet count. Time sequence of drug administration, measured in time before giving the amobarbital was as follows: Physiological saline (3 hours); physiological saline (2 hours); amobarbital (0 hours). The results showed that amobarbital, when administered under certain conditions, causes a significant change in the red blood cells, morphology and platelet count, which may indicate that the amobarbital may have a direct effect on the reticuloendothelial red marrow cells and circulating red blood cells.

Attitudes Toward Infant Euthanasia Based Upon Imbedded Factorial Scenarios. Susan Williams, Tennessee Technological University. A sample of forty college students, stratified by class standing and gender, with five subjects per cell, were given a survey instrument dealing with infant euthanasia. The attitudinal instrument was a specially designed series of stories or scenarios to cover sensitive issues. Imbedded in each scenario are four bivariate factors that allow for a full statistical analysis, yet vary enough to provide evidence of generality to a variety of similar situations. Each scenario involving a "Baby Doe" situation had a component of each of the four bivariate factors in all possible combinations to generate 16 scenarios. Each scenario was rated on a six point Likert scale indicating agreement with the parents decision to terminate or maintain treatment. Scores were subjected to analysis of variance.

Male subjects were less protective of the infants than were female subjects $F(1,38)=4.71$ $p<.04$. The subjects were more likely to protect a child of poor parents than those of affluent parents $F(1,38)=6.71$ $p<.015$. Infants with short life expectancies were more likely to be protected than those living longer $F(1,38)=17.13$, $p<.001$. Also subjects were significantly less likely to protect infants from well educated parents, as those from poorly educated parents $F(1,38)=8.71$ $p<.005$. First borns were less likely to be subjected to euthanasia than third or later borns in a family $F(1,38)=5.81$ $p<.05$. Short-lived infants were more likely to be protected if the parents were poor, no difference was found with infants having longer life expectancies, $F(1,38)=5.96$ $p<.02$. Well educated, affluent parents were less likely to have their child protected by the father than other parent categories, $F(1,38)=4.26$, $p<.05$. Rich parents with third born or later child were less protected than comparable categories $F(1,38)=21.90$ $p<.001$. A number of significant higher order interactions were found that reinforced the patterns of significance in simpler comparisons. The results generally support the concept that the less competent the parent is perceived, poor or not well educated, the greater the concern or level of protection given to the infant. Also the more helpless the infant, less expected longevity, the more concern or disagreement with euthanasia is found.

Effect of Picloram and Other Hormones in Callus Induction from Soybean Hypocotyls. Patricia McCarroll and Prem S. Kahlon, Tennessee State University. Picloram (4-amino -3,5, 6-trichloropicolinic acid) was tested alone and in combination with other hormones to determine its effectiveness in inducing callus from soybean (*Glycine max.* (L.) Merrill) hypocotyls. The other hormones used were kinetin, 2,4-dichlorophenoxyacetic acid (2,4-D), and naphthaleneacetic acid (NAA). Soybean seeds of cultivar Tracy were grown on Muarshige and Skoog (MS) medium, the hypocotyls from these seedlings were placed on MS medium containing various hormone concentrations. The hormone combinations used were the following: picloram and kinetin; picloram and NAA; picloram and 2,4-D; NAA, kinetin, and picloram; kinetin, 2,4-D, NAA, coconut milk, and picloram; and picloram alone. In each treatment the concentrations of the other hormones were constant, and the concentrations of picloram were 10^{-5} , 10^{-6} , 10^{-7} , 10^{-8} , and 10^{-9} molar. Growth was noted in each of the various treatments, but only at certain concentrations of picloram. The calli that grew as a result of the presence of picloram and kinetin in the media were greenish in color and soft in texture, where as the calli that were grown in the absence of a cytokinin with only auxins (NAA, 2,4-D, picloram) were generally beige in color. Since picloram and 2,4-D are known to cause inhibition of chlorophyll production in calli and this inhibition may sometimes be overcome by the presence of cytokinin in the media, the results of this study appear to confirm this conclusion for soybean callus development.

Religiosity and Reactions to Life Crises in College Students. Donny Ray Ballard, Tennessee Tech University. The present study investigates the characteristics of college students undergoing a life crisis and its subsequent effects on attitudes, especially those of a religious nature. Eighty-five subjects, forty-five females and forty males, with an average age of 22.7

years, from Tennessee Tech University, participated in an attitude survey designed to gather information about the subject's religious background, questioning of this background, present religious standing, and if there was a crisis which precipitated any change in religious values and habits. Each of the fifteen questions in the survey had six potential answers which were set up on a six point Likert scale, with six being the most religious and one the least. Based upon this scale, the completed questionnaires divided into three groups; a crisis group containing fourteen males and fourteen females, a no crisis, religious group containing sixteen males and sixteen females, and a no crisis, non religious group containing ten males and fifteen females. The no crisis groups were compared to the crisis group, and then to each other by analysis of variance.

Eleven of the fifteen questions were used in analysis to examine patterns of differences among the subjects. From the analysis, it is clear that the crisis group was more similar in general religiosity to the no crisis, non religious group, than to the no crisis, religious group, $F(2,79 \text{ df})=12.75$, $p<.001$. However, as children, the subjects in the crisis group had been more like the no crisis, religious group. The crisis group was divided equally into a religious and a non religious subgroup based upon how the subjects presently rated themselves on strength of beliefs. Males in the crisis group tended to be much more agnostic after a crisis than females, $X^2=5.72$, $p<.05$, although as youngsters, the males had been more religious. Females in the crisis group were the least religious of all the groups in high school, $F(2,79 \text{ df})=4.27$, $p<.02$. Also, the non religious, male crisis subjects had attended church more often than the female non religious, crisis subjects. This appears to indicate that enforced church attendance of males predisposes those who later have a crisis to become more agnostic than those who were not forced to go to church. In summary, those males who faced a crisis tended to change toward a more agnostic stand. Those in the no crisis groups did not change their religiosity significantly between high school and college.

Science Concerns and Attitudes Reflected in the "Tennessee Teacher". H. Hull Rush, Austin Peay State University. The author's intent was to assess a possible Educational Concerns taxonomy to be deduced from an emerging pattern of the articles. It was hypothesized that all things occur and recur in distinguishable patterns. Following are some generalizations realized in testing the hypothesis: 1937-1941 A time of the "Great Depression" and its aftermath. Society was concerned with survival. Few Science Education articles appeared in the Literature. Those that did appear were mostly concerned with 'Nature Study' (BASIC Science?). 1941-1946 Concerns and attitudes altered to embrace the war effort. The Literature was filled with articles of Physics, Bio-Chemistry and Mathematics. BASIC Science had taken on a new complexion. 1946-1957 With the war over, concerns again shifted; NEW technology was reflected in the Literature and was once again concerned with the 'homefront'. We were content to bask in recent accomplishment (?). 1957-1965 People were jolted from their complacency by the Russian space feat. Suddenly concerns were for High Technology and 'Beat the Russians to the Moon'. BASIC Science had again taken a radical turn. 1965-1971 It was only after all the other parameters were reduced to paper and the whole picture viewed that it became apparent that this period was part of another cycle within the sought-after taxonomy. The period, then, must be discarded for purposes of this study. Although the time was 'correct' for war in its 'proper' place in recurring history, the attitudes of society were not attuned to it—the "I—ME" attitude was dominant and did not allow for the 'naturally' recurring war. 1971-Present A time not unlike the Great Depression era and its aftermath. Trends in education have again shifted, and the cry is "Back to BASICS" (although nobody is quite sure just what the term means). **CONCLUSIONS** A cycle occurs and recurs as periods of: recession/depression; war; and the aftermath of war, with a slackening off near the end of the latter segment as attitudes and concerns cool. We are currently in a recession/depression segment of the cycle. It was delayed by the "I—ME" and Vietnam eras. If, indeed, history does repeat itself (and the Literature appears to support this well-known observation), then, it is apparent that the 'naturally' following segment can only be the inevitable one: WAR and a return to the high technology concerns and attitudes that accompany that segment of the cycle.

WESTERN REGION SOUTHWESTERN AT MEMPHIS

An Investigation of the Mechanism of Poly(Vinyl Chloride) Smoke- and Flame-retardance by Molybdenum Trioxide. Jane E. Pernell, Christian Brothers College. MoO_3 has been used as a flame- and smoke-suppressant for poly(vinyl chloride) (PVC). The principle mechanism of action includes *cis-* to *trans-* isomerization of the initially formed polyene. The all *trans-* form cannot cyclize to form benzene, thus eliminating one form of flame

and smoke species. MoO_2Cl_2 , produced *in situ* from MoO_3 and HCl , catalyzes the isomerization of *cis-*2-pentene to *trans-*2-pentene.

Electrophilic Aromatic Substitution of Pyrroles. Helmuth M. Gilow and Richard P. Hodge, Southwestern At Memphis. Classical studies of electrophilic aromatic substitution of pyrrole coincide with molecular orbital calculations in predicting that the ring nitrogen atom will preferentially direct the approaching electrophile to enter the α -position. A decrease in this α -directing effect, with subsequent increase in β -substitution, has been observed in electrophilic substitution reactions of various N-substituted pyrroles. Another effect, which has been documented, is the acid catalyzed rearrangement of some α -substituted pyrroles to their β -isomers. In each case, isolations of the pure β -isomers have proven to be both tedious and economically unfeasible. Thus, past efforts have been limited primarily to the use of blocking groups in the α -position. This particular study examines the explanations for these reactions and seeks to classify them on the basis of the above effects. For this purpose, we have synthesized pyrroles with the following groups in the N-position: acetyl, adamantyl, t-butyl, methylsulfonyl, phenylsulfonyl and trifluoromethylsulfonyl.

Catalytic Addition of 2-Chlorobutane to Benzene. Mark Oliver, Christian Brothers College. Molybdenum dioxide dichloride and aluminum chloride were each separately used as catalysts to attach 2-chlorobutane on to a benzene ring. Reaction tubes were sealed under a vacuum and reacted in an oil bath at temperatures ranging from 230°C to 100°C. It was found that the molybdenum dioxide dichloride catalyst attached the 2-chlorobutane to benzene forming sec-butyl benzene in high amounts when temperatures ranged from 150°C to 230°C. However, the aluminum chloride catalyst only reacted to form sec-butyl benzene at temperatures near 100°C. Temperatures higher than this caused the molecule to be decomposed into lower chained hydrocarbons. A blank tube was run and did not react.

The Zero Length Spring. Scott Alan Budzien, Southwestern At Memphis. In the high technology world of modern physics, learning something new about a simple device can be refreshing. Such is the case with the zero length spring. First developed by L. J. B. La Coste in 1934 for use in a seismometer, today the zero length spring remains unknown to almost all but geophysicists. The zero length spring differs from other springs in that its length, rather than its displacement, is proportional to the load it supports. When one end of such a spring is attached to a wall and the other end to a boom on that wall, and certain conditions are satisfied, the system will be in equilibrium for all possible positions of the boom. The beauty of the system lies not only in the fact that most of the equations can be worked with a knowledge of first semester physics, but also that the apparatus is fairly simple to build.

The Asymmetry and Intensity Indices in a Two Resonance Model. Gail Wilson, Christian Brothers College. Theoretical analysis is made of the spectral properties of a two-resonance model using a doorway state coupling scheme developed earlier (Z. V. and Rhodes, J. Chem. Phys. 65, 4895 (1976) and Cable and Rhodes, J. Chem. Phys. 73 (10), 4376 (1980)). The focus is on the effects of the asymmetry and intensity indices on the spectral distribution of the first of the states, which represents the cross section spectrum for any process for which the first state is the doorway state. The behavior of these indices is investigated and the effects on the resulting spectrum are related to the energies and widths (lifetimes) of the two states in both strong and weak coupling limits.

Efficiency of Large-Area Plastic Scintillators. David J. Abbott, Southwestern at Memphis. An investigation of the inefficiency of large-area plastic scintillators to be used as cosmic ray veto counters was made. This was done in connection with the neutron-antineutron oscillation experiment being planned at ORNL. Results from variations in high voltage, discriminator thresholds, and position on the scintillator are presented, and evidence for a strong light attenuation effect was found. Several methods to increase light collection and reduce attenuation are discussed.

Seromucoid Glycoprotein Concentrations in Blood Serum From Normal and Cancerous Subjects. Karen M. Gehrs, Southwestern at Memphis. Marked changes in overall and specific seromucoid glycoprotein concentrations in patients with malignant and nonmalignant diseases have been the subject of much research. Two recent studies using differential pulse polarography (DPP) have indicated that the Brdicka two-step catalytic protein wave obtained with human blood serum exhibits a significant increase in peak height in patients with urological cancers. This observation, which has potential as a diagnostic and prognostic tool, prompted further investigation of Brdicka waves in other types of cancer.

In this study, serum from normal individuals, nontreated cancer patients, and cancer patients receiving chemotherapy was studied using DPP, a Lowry assay for protein, and a Resorcinol assay for sialic acid. Three types

of cancer were represented in the nontreated group and six types in the group receiving chemotherapy.

This analysis indicates that Brdicka waves are increased in other types of cancer as well as in urological cancers. Although there is some overlap among the groups, DPP appears to differentiate between them better than do the Lowry and Resorcinol methods. This study also indicates that some chemotherapeutic agents may alter glycoprotein concentrations and that hemolysis may interfere with the DPP analysis. Further investigation of the last two observations and of a larger population of malignant and nonmalignant conditions is needed to determine whether DPP can be used to diagnose and monitor cancers.

Video Game Stress as Measured by Excreted Catecholamines. Stephen C. Sharp, Southwestern at Memphis. Subjects (college-age, non-athletic men) will have stress response measured after playing video games. Changes in pulse, excreted catecholamines, and possibly excreted lactic acid will be measured. Catecholamines will be quantified by fluorometry.

Comparative Bioavailability of Five Chlorzoxazone-Acetaminophen Preparations. Mike Fitts, Christian Brothers College. The relative bioavailability of five different commercially available tablet formulations containing 250 mg chlorzoxazone and 300 mg acetaminophen was determined in ten healthy male volunteers. The subjects received doses of two tablets in the morning after an overnight fast and blood samples were obtained just prior to and at times up to 12 hours after the doses. All samples were assayed in duplicate by high pressure liquid chromatography for their content of the two drugs. For chlorzoxazone, concentrations ranged from 9.9 to 15.7 ug/ml, the time of peak concentration from 1.16 to 1.71 hours, and the 12-hour average concentration from 29.1 to 39.4 ug-h/ml. For acetaminophen, peak concentrations ranged from 7.0 to 9.1 ug. ml, time of peak from 0.64 to 0.82 h, and the 12-hour average concentration from 25.0 to 28.4 ug-h/ml. The innovator's product (Parafon Forte) resulted in the highest peak chlorzoxazone concentration, the shortest time to peak, and the largest 12-hour average. In no instance, however, were there any significant differences among the five products in any of the parameters measured. It was concluded that the five products could be considered interchangeable insofar as their bioavailability is concerned.

Student Experiments With a Zoom Lens System. Susan Gamble, Southwestern at Memphis. A zoom lens provides a variable magnification at the image position. The simplest of all zoom lenses is a one lens system. A study has been made to see what kind of acceptable zoom range can be obtained from a one lens system. Assuming a reasonable out-of-focusness one can obtain about a 1 1/2 zoom range of magnification with a simple set-up suitable for a classroom demonstration. The next simplest zoom system is a three-lens system. This study is continuing to find ranges attainable and suitable with this system.

Development of a Convenient Assay for Alpha Amylase Activity. Harland Douglas Simpson, Christian Brothers College. A test was developed to measure the activity of alpha amylase. The test uses a potassium iodide/iodine indicator and relies on the direct relationship between optical density and concentration of a starch/potassium iodide/iodine solution. The test used for comparison measured maltose which is a product of amylase activity. Spectrophotometric methods were used in both tests. Using the potassium iodide assay, starch was hydrolyzed at a velocity of 4.5×10^{-6} g/ml/sec whereas maltose was produced at a velocity of 2.2×10^{-6} g/ml/sec using the same enzyme concentration. Overall the potassium iodide test was found to be more convenient.

Cellulase Secretion in Trichoderma Reesei. Rick Waggener, Southwestern at Memphis. Secretion of cellulase enzymes by *Trichoderma reesei* can be induced artificially by low levels of lactose. A viscometric assay employing a soluble cellulose derivative (CMC) was used in order to selectively measure the activity of the endo-cellulase component. The optimal conditions for reproducible cellulase secretion were studied, as was the time course of the response. This work is being conducted prior to investigation of the cellular mechanism of cellulase secretion, using metabolic inhibitors.

An Attempt to Generate and Isolate Queuine Auxotrophic Mutants of Chlorella Pyrenoidosa. Carmen Chave, Christian Brothers College. The use of a queuine auxotroph in a bioassay for queuine, a modified base incorporated posttranscriptionally into transfer RNA, has been proposed as an alternative to assays presently used. Colonies of *Chlorella pyrenoidosa* (1230 Chick) were treated with ethyl methane sulfonate to induce mutations. After mutagenic treatment the colonies were tested for queuine auxotrophy by sampling and replica plating onto enriched media with or without added queuine. Colonies which grew in the presence of queuine but not in its absence were picked and replica plated. After picking and replica plating the supposed queuine-requiring mutants three times, a high rate of reversi-

bility was observed eventually resulting in the reversion of all of the mutants. These results suggest that *Chlorella* is not a good organism to use in the search for queuine auxotrophs unless the cause for the high reversion frequency can be eliminated.

Growth and Enterotoxin Production in Staphylococcus Aureus at PHS Between 4 and 9. Retha Goad, Christian Brothers College. *Staphylococcus aureus* is one of many microorganisms which can cause food poisoning. Factors such as pH, salt content and water activity of the medium, temperature, and competing organisms are known to affect growth of *S. aureus*. This experiment investigated the effect of varying the pH on the rate of growth and enterotoxin production of *S. aureus* strain 100. Growth in tryptic soy broth at pHs between 4 and 9 was monitored spectrophotometrically. Enterotoxin A production was assayed by immunoprecipitation. The rate of growth was fastest at pHs from 6 to 8.

Effects of the Interaction of Eyestalk Ablation and Photoperiod on the Moulting Rate of Crayfish. M. Sharp and S. Ivy, Southwestern at Memphis. The moulting rate due to bilateral eyestalk ablation in Crayfish was examined in regards to the effect of constant darkness (DD) and a 12 hour light/12 hour dark (L/D) photoperiod. There was a significant delay in the period between the moults of the ablated Crayfish exposed to a photoregime of 12L/12D as compared to those exposed to DD.

The effects of Varying Concentrations of Dimethyl Sulfoxide on Pixie Hybrid Tomato Plants. Chuck Hughes, Jeff Phebus, and Billy Sewell, Christian Brothers College. Dimethyl sulfoxide (DMSO) is an organic solvent known to facilitate transport across animal skin. The possible ability of DMSO to facilitate transport in plants was investigated using Pixie Hybrid tomato plants given 0.1 to 5% DMSO with and without nitrogen fertilizer. Plants were observed for the following: size, number of leaves, number of blooms, number of fruits, days to blooming and to bearing, germination of F1 seeds, size, juice content and juice pH of fruit, soil pH, plant appearance, and percentage of diseased plants. Concentrations of DMSO above 2.5% were completely lethal. Concentrations between 1 and 2.5% were damaging to various degrees. No difference was noted between control plants and those given 0.1% DMSO. These results suggest that DMSO in the concentrations used was harmful. Lower concentrations could be investigated.

Effect of Dietary Leucine, Lysine, and Tryptophan Supplementation on the Growth and Development of Young Rats and Mice. Mario Ingram and Martin Tohill, Christian Brothers College. An investigation was conducted to determine whether supplementing diets of young rats and mice with three essential amino acids would have any effect on their rate of growth and development. New litters of rats and mice were given diets supplemented with lysine, leucine, and tryptophan both in the food and in the drinking water. Control litters were given unsupplemented food and water. The weights and behavioral development of the young animals were followed for a period of one month. No significant differences were noted between the experimental and control groups.

Polymorphism in Lamium. Rick Sullivan, Southwestern At Memphis. *Lamium amplexicaule*, commonly referred to as henbit, is a wildflower that is common throughout most of the United States.

Henbit possesses two flower forms which vary in their size and color. One flower is short and light blue while the other form is longer and possesses a purple color. The main objective of this experiment is to determine if this second flower form is a separate morph of *Lamium amplexicaule* or if it reveals itself to be a member of a separate taxa. In order to determine the nature of this second flower type, four areas were studied; population size and measurements, vegetative characteristics, floral pigments, and crosses between the two morphs.

After examining the results, I was not able to justly class the two types of flowers in separate taxa; however, I found marked differences between the two types of flowers which supports the hypothesis that *Lamium amplexicaule* is polymorphic.

Glucose Production From Sawdust Catalyzed by Extracts of Heterobasidiomycetes. Ben Booker and Ed Brucker, Christian Brothers College. This investigation was undertaken to determine whether the cellulose in sawdust, a waste product, could be conveniently converted into glucose, a useful product, using enzymes isolated from wood-digesting fungi. The heterobasidiomycete fungi *Irpex mollis* and *Excidia recisa* were collected in local hardwood forests and homogenized. The homogenates were filtered and the crude enzyme-containing filtrates stored at 4 degrees Celsius. Enzyme activity was determined by incubating extracts with sawdust and determining changes in the glucose content of the mixtures during incubation at 48 degrees for four days. Both extracts catalyzed glucose production.

Genetic Studies in the Common Housefly. Carol H. Claus, Southwestern At Memphis. In this research the esterase profiles of several inbred lines of the common housefly (*Musca domestica* L.) were surveyed using polyacrylamide gel electrophoresis (PAGE). Two suitable lines were selected, and single-pair matings were made. The F1 progeny of these crosses were likewise analyzed with PAGE for esterases, and the inheritance patterns were determined.

Effect of Multiplicity of Infection, Time After Infection and Host on Reversion Frequencies of Two X174 Mutations. Paul Tucker, Christian Brothers College. Cultures of *E. coli* HF4714 and *E. coli* C were infected with X174 am3 cs3310 mutants at various multiplicities of infection. Samples were taken at various times postinfection and the relative frequencies of viral phenotypes determined. At a multiplicity of infection of 1 in HF4714, the am3 and cs3310 mutations reverted to wild type at the same rate.

Lake Sediment Chlorophyll Degradation Product Profiles. John Pardue, Southwestern At Memphis. Short sediment cores were taken from the Blue Basin in Lake Reelfoot, TN using a simple coring technique. Total chlorophyll degradation product concentration was determined for one core at 1-2 cm intervals as outlined by Wetzel and Likens (1979). This procedure will

be repeated for an homogenized core being kept under constant conditions for 5 weeks. These data will be used to further test Carnigan and Flett's (1981) hypothesis of post-depositional phosphorous redistribution. These results will be compared to total phosphorous concentrations of the same cores.

The In Vivo Mitogenic Responses of Mouse Splenic Lymphocytes to Various Gram Positive Bacteria. Amy Hill, Southwestern At Memphis. The *in vivo* proliferation of mouse splenic lymphocytes was measured in response to injection of various killed gram positive bacteria. An attempt was made to correlate the number of recovered lymphocytes to known differences in bacterial cell wall composition. Further correlations were made between these data and those obtained in *in vitro* studies (Staber and Johnson. 1980. *J. Cell. Physiol.* 105:143-152).

Zoosporogenesis in Achlya Ambisexualis. Eleanor Venable, Southwestern At Memphis. Mycelia of *Achlya ambisexualis* can be induced to produce zoospores when placed in a solution of 0.5 mM CaCl₂. Experience shows that the number of zoospores to be expected in any one sporulation is difficult to predict. This investigation attempts to determine which cultural conditions are needed to produce the largest and most reproducible number of zoospores.

Interested In A New Computer Section?

Several TAS members have expressed some interest in establishing a *Computer Sciences and Applications Section* at annual November meetings. If you are interested in supporting such a section by presenting computer-related papers in a session at the annual TAS meeting, please contact Dr. David E. Fields, Health and Safety Research Division, Oak Ridge National Laboratory, Oak Ridge, TN 37830. Even if it is too late to actually have a section this year, perhaps movement in that direction can be accomplished for 1984.