

# ABSTRACTS OF COLLEGIATE DIVISION PAPERS PRESENTED AT THE ANNUAL MEETING

SATURDAY, NOV. 26, 1966, 9:30 A.M.  
MUSIC HALL, EAST TENNESSEE STATE UNIVERSITY  
RICHARD J. RARIDON, CHAIRMAN

*The Status of Amoeba chromatosa as an Etiological Organism of Cancer.* James W. Overstreet, III, The University of the South. An attempt was made to verify the existence of a protozoan, *Amoeba chromatosa*, which was reported by Wyburn-Mason to be an etiologic agent of neoplastic disease in humans and other animals. Thirty samples of malignant and non-malignant human tissue were examined. All samples were subjected to Wyburn-Mason's protozoan extraction technique, and the suspected organism, when isolated, was studied by histological and cultural methods. The reported organism was found to have no consistent morphology, cellular structure, or organelles. The morphological variations attributed to the organism were found to be unrelated. Refractile granular inclusions in the suspected protozoan were faintly Feulgen positive and acid-fast. Similar granular particles were found in tissue section. These results indicate that the classification of the suspect bodies as protozoa is erroneous. They strongly resemble certain mycobacteria and Wuerthele-Caspe and others in tumor tissue. The true identity of the presumed protozoan is a bacteria-filled tissue cell.

*The Fecundity of the Spotted Sucker in the Center Hill Reservoir.* Jan R. Roberts, Tennessee Technological University. The fecundity of the spotted sucker, *Minytrema melanops*, increases with the length, age, and weight of the species. The 62 female suckers collected ranged in size from 347 mm. to 464 mm. in length, 570 g. to 1390 g. in weight, and ranged in age from two to five years determined by scale readings. An older sucker produces more eggs than a younger sucker of the same size. The greatest increase in length and weight comes between the second and third year class while the greatest increase in ova production is between the third and fourth year class.

*A Bacteriological Survey of the Cumberland River from Clarksville to Dover.* Robert Wallus, David P. Roe, and Haskell C. Phillips, Austin Peay State College. During the spring and fall of 1966 a survey was made of Clarksville contamination of the Cumberland River before and after the installation of a sewage disposal plant. Water samples were taken from above the city to Dover, approximately 40 miles downstream. These were tested for coliform bacteria by the membrane filter technique. After installation of the disposal plant, contamination was practically eliminated above the junction with Red River but showed little reduction at that point and below. The assumption is that industrial waste is responsible for remaining contamination.

*Effects of Alkenylsuccinic Acids on Water Permeability of Bean and Tomato Roots.\** Betty Currie, Maryville College. Increasing the number of  $\text{CH}_2$ -groups in the chain of alkenylsuccinic acids was reported to increase permeability of root cells. Decenylsuccinic acid (DSA) was found most effective. It was later reported that DSA acts as a metabolic inhibitor and that increases in permeability resulted from injury to the cells. This investigation was carried out to determine whether or not the increases shown as a result of increasing chain length demonstrate the final changes, or result from differences in rate of permeability change. Results of the investigations indicate that increases in permeability occur at the same rate during four one-hour periods. Electrical conductivity of solutions surrounding treated roots and that of root exudate indicate damage to cells resulting in leakage of salts. No correlation was found between increasing chain lengths and amount of injury.

*Effects of Diets and Dietary Controls on White Mice.* Trace Morgan Lewis, Jr., Tennessee Technological University. The dietary habits of white mice which have been kept in a laboratory differ greatly from wild mice. During a regular 24-hour cycle white mice tend to eat very little during daylight hours; eating most half their food (17.3 g. out of a total of 31.9 g.) between the hours of 6 p.m.-3 a.m. However, if the lights in the room were not turned off the mice ate about 1.3 g. of food per hour steadily throughout the 24-hour cycle. Field mice controlled the same way, however, were not apparently affected by this change of light. The mice were then subjected to a time feeding experiment with the purpose of changing their eating habits. The mice were fed in 3-hour cycles gradually reversing their regular eating habits. At the end of 15 days the two groups of mice used were allowed to continue their regular eating on a 24-hour cycle to determine the effects of the limited feed cycle. Within a period of three days the mice in both groups had reverted back completely to their old cycle of eating. The diets of these mice were then varied to determine the effects of different types of food. The results showed that meat with a high concentration of fat caused the mice to gain more weight per vol. of food intake (1 gr./35.30 gr.) than either lab chow (1 gr./209.25 gr.) or a mixture of corn and meat with fat (1 gr./87.49 gr.); meat without fat (1 gr./71.61 gr.) or a diet of corn alone in which there was a loss of weight of 1 gr./31.31 gr. of food eaten. The experiment also showed that all the mice stayed in good health except the groups on a diet of meat with fat, and a mixture of

\* Research supervised by Dr. P. J. Kramer under a NSF Undergraduate Research Participation Grant at Duke University.

corn and meat with fat. These mice broke out in a rash the third day of the experiment with shedding of hair and sores that would not readily heal.

*A Study of the Factors Involved in the Explanation of the Horizontal-Vertical Illusion.* Henry Gambrell and Karen Whittle, Tennessee Wesleyan College. This study was an attempt to further clarify the factors involved in the Horizontal-Vertical illusion. Following Finger and Spelt's suggestion, an effort was made to study the effect of expanding the procedure to include all possible combinations of estimates (up and down, middle and end, and right and left). It was hypothesized that when Ss were presented with vertical and horizontal illusions in any combination, there would be a significant over-estimation of the vertical and that left and down would be significantly greater than right and up estimates. Nine female and eleven male students at Tennessee Wesleyan college were tested under the same conditions with four illusion boards consisting of eight illusions. The standard line, 40/20 of an inch, was the same for each illusion. All results were in direction of the proposed hypothesis. Results were interpreted in terms of plane compared to the vertical plane which would be the relative ease of eye movement in the horizontal reflex itself in over estimate once the effort was made to judge the horizontal distance.

*Relation of Interest to Academic Achievement.* Virginia E. Chism and Robert H. Morrison, Tennessee Wesleyan College. This study was designed to investigate the relationship between interests and academic achievement among high school seniors. The hypothesis tested was that there would be no significant relation between scores on an interest inventory and academic grades in subjects related to these same interests. Scores on the three divisions of the Gilford-Zimmerman Interest Inventory (G-ZII) test scores and high school grades actually received in related subjects were correlated. The subjects used were the 32 female students and 24 male students of Etowah High School, Etowah, Tennessee. Analysis of the data indicated only one significant relationship. There was a significant correlation between Group II, girls, G-ZII (Literary, Creative, Aesthetic, and Leadership), and grades in Language and Mathematics among girls in the study. These results confirm previous research, but leave the question of relationship between interests and academic achievement still unanswered.

*Attitudes and Beliefs of Believers and Non-believers in Extra-sensory Perception.* Roy Nichols and Giles Gilmer, Tennessee Wesleyan College. The objective of this experiment was to test the attitudes of believers and non-believers in ESP, and after falsifying the first results of chance scores, the objective was to correlate chance scores, beliefs and attitudes on a second experiment. Our hypothesis that non-believers would do significantly lower than believers was supported but, the second part of our hypothesis that after falsifying results, non-believers would tend to do better than believers was not supported. A class of thirty-nine general psychology students of Tennessee Wesleyan College were used as subjects. The non-believers tended to

become significantly poorer in the experimental situation. It was suggested that if this experiment was done again using twice as many students who know very little psychology, a more significant analysis might be made.

*Educational Aspiration and Juvenile Delinquency.* Lyle Yorks, Tusculum College. The purpose of this paper is to examine the relationship between the high school curriculum and juvenile delinquency. Emphasis is placed upon the role of a vocational training curriculum as a possible deterrent to juvenile delinquency. It is recognized that juvenile delinquency is a multi-dimensional phenomenon. This paper examines the question of whether or not rebellion is manifested by high school adolescents as a result of their home and school environments. The theoretical basis for this paper is Reference Group Theory as defined by Muzafer Sherif. According to Sherif, "A reference group can be characterized simply as those groups to which the individual relates himself as a part or to which he aspires to relate himself psychologically." The values and norms of this reference group provide the individual with a frame of reference. The individual's attitudes, judgments, and decisions are determined within this reference frame. His level of aspiration is raised or lowered in relation to his reference group. Briefly, a major function of the reference group is to provide an anchoring for the individual. With this orientation to reference group theory, the statistical analysis of studies by men such as Robert H. Ellis, Richard J. Simpson, Lloyd E. Ohlin, and Sheldon and Eleanor Glueck are cited. Two hypotheses are examined: (1) The peer group and home environment are the primary influences upon the educational aspirations of the individual. (2) Where the home and school values are in opposition, the probability of delinquent behavior is higher when the individual's reference group is the home environment. The results appear to support the hypothesis in that direct relationships are noted between the individual's level of educational aspirations and his home and peer group. A positive correlation between the rejection of the school curriculum and delinquent behavior is also presented.

*Major Element Analyses of Diet and Excreta.* Harriet P. Corrick, University of Tennessee. To obtain the average amounts and day-to-day variations of trace elements in ordinary diets and excreta, the Trace Elements Laboratory in the Physics Department of the University of Tennessee with the cooperation of the Kettering Laboratory College of Medicine at the University of Cincinnati set up a study to determine the daily intake and output of twenty-six major, minor, and trace elements. Emission spectographic analyses afford the data for twenty-one of these elements. A colorimetric method was devised for phosphorus while a flame photometric analyses was done for calcium, magnesium, potassium, and sodium. Basic research concerning the dissolution of these five latter elements and instrumental conditions for their determination were devised. Since these elements occur as major constituents of human food and excreta, a knowledge of their retention in the body is

of great importance in the assimilation of information concerning radioactive dosimetry.

*Vacuum Deposition of Thin Films and the Measurement of their Thicknesses.* Bobby D. Conatser, Austin Peay State College. Since the preparation of targets is crucial to the success of the study of a nuclear reaction, there has been considerable experimentation of methods of preparation of thin targets. The techniques employed are discussed. It has also been found that the thickness of the thin films can be measured by use of a Michelson interferometer. A comparison is made of theoretical and experimentally determined values of thickness.

*Protein Synthesis: Mechanism of Chain Termination.\** Frank Eggers, Maryville College. Presupposing a theorized mechanism for termination where the growing peptide chain bonds to the phosphate group rather than an amino group (and is later cleaved off) sRNA was charged with C<sup>14</sup> serine, C<sup>14</sup> threonine and a control and aliquots were digested with RNAase and base. When subsequent degradation products were analyzed with descending paper chromatography and high voltage paper electrophoresis, one whose migration tendencies resembled those of known phosphorylated serine was found. Sufficient evidence has not been found but

\* Research supervised by Dr. G. D. Novelli and Dr. L. C. Waters at the Oak Ridge National Laboratory under an ORAU Student Program.

results were encouraging enough to determine further experimentation. The theory seems reasonable because chains are initiated by altered amino acids, anhydride bonds of the carboxyl to phosphate are known and are liable, and it provides an entity which could attach to the coded RNA by a specific sRNA.

*The Michael Addition of Phosphines to Alkynes.\** Edward D. Smith, Maryville College. It is known that triphenyl phosphine readily adds to acrylonitrile in the presence of a proton source, such as ammonium iodide (Michael addition). Study of Michael addition has been extended to alkyne systems. Previously Sandra Briggs at Maryville College found that two moles of tri-n-butyl phosphine added to one mole of phenyl acetylene in the presence of two moles of ammonium iodide. The less reactive triphenyl phosphine added on an equimolar basis. Further studies of alkyne systems has revealed that tri-n-butyl phosphine also adds in a two to one stoichiometric ratio to dimethylacetylenedicarboxylate. Analytical and infrared spectral data were used to establish the structure. However, the reaction of triphenyl phosphine with dimethylacetylenedicarboxylate followed a different course, and the product of the reaction is believed to contain both an ylid and a phosphonium group.

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## BOOK REVIEW

A REVIEW OF SYSTEMATICS OF THE GENUS *GYRINOPHILUS*. By Ronald A. Brandon. Illinois Biological Monographs No. 35. Published by The University of Illinois Press, Urbana, Ill. 1966. 86 pp., Price \$4.50—Dr. Brandon himself gives the purpose of this study. "This study involves a complete re-examination of specimens and literature in an attempt to interpret and integrate existing material into a factual taxonomic understanding of this genus of plethodontid salamander." The examination of more than 1450 specimens drawn from all available collections rather than a chosen few and the evaluation of some 70 odd pieces of literature, over and above references from Dunn 1926, and Bishop 1941, is certainly reflected in this scholarly yet readable monograph. The massive Caudata material which has appeared in recent years in widely scattered journals make this a timely work.

The writer has incorporated ecological, geographical and phlogenetic studies of his own and other sources to suggest that two species currently are the sole representatives of the genus *Gyrinophilus*. One species has four recognized subspecies: *G. p. porphyriticus*, *G. p. duryi*, *G. p. danielsi*, and *G. p. dunni*. The other species is represented by three subspecies: *G. p. palleucus*, *G. p. necturoides* and *G. p. gulolineatus*. Dr. Brandon has very appropriately synonymized *G. p. inagnoscus*, *G. p. polystictus* and *G. lutescens* with *G. p. porphyriticus*, *G. p. danielsi*, and *G. p. duryi* respectively. A key is included which is concise and clear, and should prove indispensable in field and laboratory to both professional and amateur herpetologists. The key is particularly helpful in separating *G. palleucus* from *G. porphyriticus*.

Any paper of merit raises questions for future studies and this one is no exception. The observations noted in the course of this review are not intended to invalidate the value of Dr. Brandon's work. Rather these notes should emphasize that the taxonomic and zoogeographic status of the genus *Gyrinophilus*, indeed the order Caudata, is far from complete; and this treatise would well serve as a firm foundation on which to build.

In this work a comprehensive study concludes: "The variability of vertebrae in *Gyrinophilus* prevents their being used in identifying to species and subspecies," yet this character is used in the included key for separating the related subspecies *G. p. necturoides* and *G. p. gulolineatus*.

Dr. Brandon agrees with Cope in declaring "the canthus is characteristic of and restricted to the genu" (*Gyrinophilus*). The acceptance of the canthus as a universal genus characteristic seems to be based on tradition rather than fact. This is supported by lack of canthus in the species *G. palleucus*. Even with thyroxin to induce metamorphosed animals, he finds that "no canthus rostralis forms," and excuses this with the seemingly poor argument that "the integument of the anterior part of the head is probably not completely responsive to thyroxin." This among several other considerations lead one to question the species *palleucus* as being a member of the genus *Gyrinophilus*.

Comprehensive historical to present day zoogeographical consideration is given to the genus *Gyrinophilus* which is correlated with all known collecting records. This presents a useful tool in assessing present day ranges and evolutionary trends. However it is disturbing to see so much emphasis placed on rivers as being isolating range barriers. It leads one to suspect that collecting efforts are lacking when one uses a river as a range periphery particularly when both sides are physiographically identical.

It can only be concluded that Dr. Brandon's work is a most valuable asset particularly here in Tennessee where such a variety of caudate fauna is found. This monograph should take a significant place in every herpetological library. THOMAS E. ASHTON, Belmont College, Nashville, Tenn.