

ABSTRACTS OF PAPERS AT SPRING SECTIONAL MEETINGS, COLLEGIATE SECTION

The Distance from a Point to a Line. J. Thomas Moore and Herman Matthews, Lincoln Memorial University. The distance from the origin to an oblique line not passing through the origin is obtained as a special case is presented. An analogy and a simple derivation of the formula for the general case. The paper concludes with brief explanations regarding the use of direct distances from points to lines. Some special cases that may arise are pointed out, but no attempt is made to treat them in detail.

The Use of Thin Layer and Column Chromatography in Purification of a Thionamide. Donnie Markham, Lincoln Memorial University. The main objective of this work was to find a better process for the purification of N, N, N', N'-tetramethylmalonthionamide. Purification was attempted using column chromatography instead of repeated recrystallization. The use of thin layer chromatography had already shown a separation of impurities and product. Three distinct bands were formed. As separation continued the bands moved down the column with the chloroform. After collecting the solutions separately according to color changes, thin layer chromatography was run on each solution. The results showed that most of the product remained in the first solution collected with an impurity of about the same solubility. Through repeated column chromatographic separations and refining the technique by changes in rate of elution, a sample of purified compound was obtained.

Chemical Differences in Plant Leaves and Their Relation to Taxonomy. Harold Francis Mabee, Lincoln Memorial University. The assumptions of this report are that all organic compounds found in different genera of tree leaves are not alike and that evidence to support this assumption can be shown by employing thin layer and paper chromatography. Leaf extracts from five trees, *Quercus ilicifolia*, *Castanea dentata*, *Fagus grandifolia*, *Ginkgo biloba*, and *Lirodendron tulipifera*, were used to show differences and similarities in chemical composition of tree leaf extracts.

Chromatographic solvents from Stahl (1964), Mabry (1965), Alston (1965), Turner (1965), Heftman (1964), Vyver (1960), were used for the separation and identification of the presence of dicarboxylic acids, pheonic carboxylic acids, flavone glycosides, chlorophylls, and other plant pigments.

Differences and similarities were shown graphically. *Ginkgo biloba*, the most remote tree taxonomically, was most distinctly different. The writer believes, on the basis of his work, that plants may be classified with a chemo-taxonomic system.

Magnetohydrodynamics in a Small Diameter Linear Electric Shock Tube. Joseph C. Foster, Jr., Memphis State University. A linear electric shock tube with a diameter of 2 cm was constructed in such a manner as to allow measurement of some of the properties of a

shock wave. The shock waves observed were produced by an electric discharge in a chamber of controlled pressure. The waves were used in the energy range of 0.3-0.6 joules produced in a pressure of about 0.5 Torr.

Measurement of Thin Film Thickness Using Multiple Beam Interferometry. Harry B. Nichols, Memphis State University. The method of multiple beam interferometry, involving wedgefringes of constant thickness (Fizeau fringes), is used to determine the thickness of vacuum-deposited thin films. An approximately half-transmitting, aluminized optical flat and an aluminum overcoated film and its substrate are the two mirrors of the interferometer. The displacement of these fringes (due to the step in the film of unknown thickness) is measured with a measuring microscope, and from the fringe displacement, the film thickness is found.

A Study of Thermoluminescence in Irradiated Crystalline Materials. William David Brown, Memphis State University. An apparatus has been constructed to study thermoluminescence and related effects in irradiated crystalline materials. The equipment is designed for use with any type of radiation, ranging from infrared to gamma rays, and with temperatures from 77° K. to 500° K. The pumping system will provide a pressure of approximately 10⁻⁶ Torr. Final testing has been completed, and studies on lithium fluoride have begun.

Industrial Estates as a Solution to Urban Centralization Problems. Lyle Yorks, Tusculum College. This paper reports the usefulness of the concept of industrial estates as a possible solution to the urban centralization problems of slums, unemployment, and traffic congestion. The concept of the industrial estate originated in both the United Kingdom and the United States approximately eighty years ago. It has been, however, only in the last 15 years that industrial estates have undergone rapid development over the world. On a world scale these estates have attempted to serve two quite different objectives: a) Industrialization of underdeveloped countries and b) regional development and reorganization in industrially advanced countries. It is with the latter that this paper is concerned. As the rapid growth of industrial estates continues it is becoming evident that there are certain principles which must govern the development of an estate if it is to fulfill its function. By controlling such variables as location in relation to town and regional planning, plot layout, zoning within the estate, lease restrictions, provision of utilities, and provision for future expansion; the concept of industrial estates can serve as a useful tool in urban planning, housing, traffic, social welfare and related aspects.

Development of a Velocity Transducer for Mossbauer Spectroscopy. Charles Watlington, Memphis State University. To observe gamma-ray resonance absorption by means of the Mossbauer effect one wishes to sweep the energy of the emitted gamma-ray as seen by the

absorber. A convenient means of doing this is to use a linear doppler shift by a moving source nucleus. The essential element of the doppler technique is a mechanical motion with precisely controlled velocity. The apparatus constructed is a high-Q velocity transducer driven by a feedback circuit capable of operating the transducer near 20 cycles per second with either a sine wave or a triangular wave velocity variation.

The Biology and Ecology of the Scorpion. Alex L. Smoot and Omar E. Smith, Memphis State University. The scorpion *Vejois carolinianus*, Beauvois 1805, has recently been recorded in the State of Tennessee. The area of collection was in Hardin County, Tennessee and Tishamingo County, Mississippi. *V. carolinianus* averages 24.28 mm in length for the males and 32.58 mm for the females. The ratio of males to females collected in the field is 1:12 as compared to a 1:2 ratio at birth in the laboratory. The average number of young delivered per female was 19. In the laboratory *V. carolinianus* preferred a temperature range from 24.0° C to 31.3° C with an average of 26.9° C. Six of 24 scorpions survived 129 days of starvation while one of nine survived 144 days. *Vejois carolinianus* is able to withstand abrupt temperature changes under laboratory conditions. The scorpions appear in April and are easily collected until late October. They are pests to campers during the summer months and inhabit summer homes during the winter months.

An Application of Inverse Theory to Mechanics. C. J. Joyce, Christian Brothers College. The mechanical problem to be solved deals with how to change circular motion into linear motion. The solution is achieved by an application of Inverse Theory of Geometry. To illustrate this I define inverse points and the circle of inversion, show that a circle through the center of inversion maps into a straight line, and then demonstrate Peaucellier's Cell.

Growth of Paramecia and Their Digestive System. Karen Keefe, Siena College. I started my culture of paramecia in October, collecting them from a pond. I prepared a special culture in order to keep them reproducing and growing in the lab. There are several solutions that can be used, but the one I have used successfully is Brandwein's Solution diluted in distilled water. To feed the paramecia, I added 5 to 8 pre-heated dry rice grains to each culture jar. I then inoculated each jar with 2 or 3 pipettes full of water containing paramecia. The organisms had to be fed about once a month, and solution lost by evaporation had to be replaced. By checking the jars weekly for about a month, I noticed several consistencies in their growth. Jars inoculated with large paramecia continued to reproduce large offspring and those originally inoculated with small paramecia produced like organisms. Also, the smaller specimens seemed to reproduce more

rapidly and in larger numbers. In March I performed an experiment and observed digestion in this organism. By feeding them yeast dyed with Congo red, I saw the formation of food vacuoles and followed their path throughout the cell. Congo red is an indicator which changes color as the pH changes. Therefore I have been able to show how digestion changes the food which has been taken in through the oral groove.

*The Effect of Quantitative Nutrition as a Stimulus for Induction of Diapause in the Boll Weevil *Anthonomus grandis* Boheman.* D. B. Hays, Memphis State University. Studies were conducted during 1965-67 in an attempt to determine the quantity of natural food compared with artificial adult diet eaten by the boll weevil daily. Once the normal consumption was established, the possible influence of reduced feeding periods on the incidence of diapause in laboratory cultures was investigated. Weevils fed artificial diet pellets for 2 weeks under reduced daily feeding periods exhibited a high incidence of repressed reproductivity. The periods of lesser feeding times had the higher per cent of non-reproductive weevils. Weevils fed for 2 weeks under reduced daily feeding periods and 1 week continuously exhibited a lower incidence of repressed reproductivity. Only the lowest feeding period (2 hours per day) produced weevils that were non-reproductive. The fat content of the weevils in all groups was determined.

A Projective Treatment of Two Cubics. Mary C. Deyding, Lambuth College. My paper presents an explanation of the fundamental concepts of perspectivity and projectivity, applied to both point rows and pencils of rays of both the first and second order. I set up a projectivity between a pencil of rays of the first order and a pencil of rays of the second order and thus form a point row (locus) of the third order. I then get the algebraic equation of this point row of the third order which is a cubic. I do this for two cubics, a festoon and a Trisectrix of McLauren.

Ex-convicts in Society: A Case Study Approach. Lyman Kelley, Tennessee Wesleyan College. The treatment of juveniles after their delinquency has been established is a major factor in the effective rehabilitation of these youths from being those who do not accept standard moral values to those who are beneficial members of society. A case study, supported by a review of the literature, lead to the conclusion that the lack of effective follow-up procedures on the part of social and legal agencies is a major factor in the repetition of delinquency in many cases. The place of the social group was very evident. The difficulty in rehabilitating delinquents is increased by the pressure of their reference groups. Rationality is not necessarily a factor in their actions after one considers the influence of their environment. Interviews with ex-convicts revealed these issues in rehabilitation.