naturally occurring reversal of polarity was found occassionally in the follicles of older animals.

*****************************************************************************

III. BLOOMSBURG STATE COLLEGE (1974)

(Abstracts 20-28)

Abstract III-20


Six commercial brands of membrane filters were compared for enumerating *Staphylococcus aureus* on both pure cultures and in swimming pool water. The following filters were tested: Gelman GN-6, Millipore HAWG 047SO, Nucleopore NO40CPR, Oxoid Nuflow, Sartorius SM 114, and Selectron B9. Standard membrane filter (MF) procedures with m-staphylococcus broth were used for enumeration. Plate counts of the pure cultures were made by adding 1.7 percent agar to the m-staphylococcus broth. Counts on all six filters for both pure cultures and pool water varied and the counts on Nucleopore filters were consistently lower than the other brands. The organisms recovered from the pool study were gram positive cocci and the colonies ranged from white to yellow-gold in color. Approximately 15 percent of both the white and yellow-gold colonies were coagulase positive indicating that colony color alone does not denote the presence of coagulase positive *S. aureus*. Since there was no
correlation between colony color and coagulase, the feasibility of coagulase-testing only the yellow-gold colonies for bathing water analysis is questionable.

****************

Abstract III-21

In previous studies, the levels of chromosomal DNA, RNA, and protein from livers of inbred and hybrid male rats of the Holtzmann and Fisher 344 strains were shown to follow different and definite trends during periods of development. The changes in these ratios may indicate that different mechanisms of RNA metabolism are involved in observed heterotic effects.

Further studies are being conducted with liver tissue from inbred H-males for the period of 20-30 days of age to investigate the variation of levels of chromosomal DNA, RNA, and protein as possible clues to gene action mechanisms in development.

****************

Abstract III-22
Preliminary Studies of the Female Reproductive Biology of Two Mushroom Fly Species: Megaselia bovista and Lycoriella mali. William Anderson and Carolyn Anderson, (West Chester State College).

Females of two economically important species of mushroom infesting flies; Megaselia sp. (Diptera:Phoridae) and Lycoriella sp.
(Diptera:Sciaridae) were studied to gain information useful in formulating a pest control strategy.

Ovaries were dissected from anesthetized females of both species of flies. A photomicrographic study was made to determine the presence and number of trophocytes, and the number of ovarioles per ovary. The ovaries of the phorid and sciarid flies were found to consist of polytrophic ovarioles oriented perpendicular to the long axis of the oviduct.

The in vitro incorporation of tritiated histidine and tritiated uridine by the oocyte was also studied. Intact ovaries were dissected out of anesthetized phorid flies and incubated in the presence of radioactive RNA and protein precursors. After embedding and sectioning an autoradiographic study was made. Labeled protein was evident in areas that seem to correspond to typical dipteran trophocytes, while labeled RNA was observed in follicle cells.

***************

Abstract III-23

Glycolate Oxidase Activity of Extracts of Deciduous Tree Leaves.


A study was undertaken to measure the activity of glycolate oxidase in the extracts of leaves of Western Pennsylvania deciduous tree species in order to assess its magnitude relative to that of other \( \text{C}_3 \) plants and to determine the role of this activity, as a measure of potential photorespiration, relative to adaptations of the leaves of shade tolerant and intolerant trees. During the month prior to sampling, periodic measurements of the incident light
intensity and underside surface temperature of 80 selected, individual leaves of three shade tolerant, two intermediate, and three shade intolerant species were performed. The glycolate oxidase activity was measured in a crude, cellfree homogenate of each individual leaf using a Clark oxygen electrode. Only leaves of Catalpa and Liriodendron showed the high rates of glycolate oxidase normally associated with C₃ plants; others showed rates comparable to C₄ plants. Acer rubrum had no detectable activity. Enzyme activity, based on chlorophyll and on leaf fresh weight, was higher (statistically significant differences) in the intolerant species than in the tolerant and intermediate ones, but differences based on protein content were less clear. These results will be discussed relative to the problem of tree adaptation to shade.

***************

Abstract III-24

Macroinvertebrate Populations in Varying Levels of Acid Mine Pollution in Canoe Creek, Clarion County, Pennsylvania. Geoffrey G. Kay, (Clarion State College).

Canoe Creek, an acid mine polluted stream in Clarion County, was sampled at four locations from February 10 to March 30, 1973. Benthic macroinvertebrate sampling consisted of weekly drift net samples and a single set of Surber samples collected at the conclusion of the study. Water samples were collected bi-weekly over the same period. The physicochemical parameters monitored included water temperature, dissolved oxygen, turbidity, total iron, sulfates, total alkalinity, total acidity and pH. Percent saturation values were also derived.
All physicochemical parameters were analyzed statistically through ANOVA tests and *a-posteriori* tests where applicable. Numbers or organisms collected from both drift and Surber samples were similarly analyzed. Species diversity indices, correlation coefficients, and comparative standing crop estimates were derived from the data and compared.

It was found that no statistically significant differences existed between sampling locations for percent O₂ saturation, temperature, turbidity or numbers of organisms (either as drift or Surber alone, or combined). A significant difference was found for pH, total alkalinity, total acidity, total iron and sulfates. In all cases, *a-posteriori* analysis showed the upstream station to be the most severely polluted, with the water quality ameliorating steadily through each of the subsequent three stations.

The density, diversity, and community structures of the benthos did not reflect the expected correlation with improving water quality. It is argued that these divergencies from expected are the result of differing levels of ferruginous deposits.

***************

**Abstract III-25**

Microphotography with Zeiss-Nomarski Differential Interference Contrast Optics: A Pictorial Presentation of a Variety of Untreated Biological Specimens as Revealed by Double-Beam Polarized Light.

W. E. Rogers, (Shippensburg State College).

Interference of wave fronts differing in optical path (phase and amplitude differences) allows the examination of untreated
biological materials. The magnitude of the path difference, hence contrast in the final image, is a function of the refractive index and geometrical thickness of a transparent object, wavefront deformation increasing with the thickness of the object and with decreasing refractive index. In the Nomarski interference microscope, plane polarized light is split into parallel beams whose planes of vibration are at right angles. As the distance separating the two beams approximates the resolving power of the system, the interference fringes that result cover the entire field of view, and the large numerical apertures provide for good resolution and shallow depth of field. Photographs of a number of biological materials such as cestode and embryos, trematode cercariae, various protozoa, and different cells and tissues demonstrate the usefulness of this variation on light microscopy.

****************

Abstract III-26


Experiments were initiated to establish bioelectric parameters for the ovarian complex of the hemipteran *Oncopeltus fasciatus*, the milkweed bug. These complexes are of the telotrophic type, in which syncytial nurse cells are confined to an apical trophic chamber. They are connected to oocytes in early development by means of long trophic cords. RNA synthesized by the nurse cells is known to move into the oocytes through these trophic cords. Steady state electric potential measurements were carried out on oocytes, yielding average values of
-3.4 ± 1.4 mV for 14 oocytes, relative to the dissolving fluid. Similar attempts to establish average values for tropharia have been unsuccessful.

***************

Abstract III-27

Previous studies on in vitro RNA synthesis from rat liver chromatin have shown different rates of $^3$H-UTP incorporation as a function of age and strain. Template concentration and time dependency in relation to in vitro RNA synthesis for the 20-30 day period of the Holtzmann male rat were studied. The possible role of transcriptional differences during development will be discussed.

***************

Abstract III-28

Ovarian follicles in many insects contain a set of nurse cells clustered at one end of a single oocyte. The nurse cells produce ribosomes and other materials that are transmitted to the oocyte through intercellular bridges. The bridges are open channels of cytoplasm that arise by incomplete cytokinesis. Intracellular electrodes detect a 10mV potential difference between the cytoplasms of nurse cells and oocyte and this has been shown to be sufficient to effect one way passage of acidic materials through the bridges.
toward the oocyte. Resistance of the bridges averages 12K so that the potential difference between seven nurse cells and the oocyte should generate a total current of 6 amp. The metabolic rates of ovarian follicles are ample to support such a current. The potential gradient has been confirmed by drawing follicles into tightly fitting capillaries and placing electrodes in the medium at the two ends. Its maintenance requires oxygen and it is reversibly inhibited by DNP. The magnitude and sign of the extracellular potential differences measured in this way are the same as those from intracellular recording. The mechanisms generating the potential remain unexplained.

IV. CALIFORNIA STATE COLLEGE (1975)

(Abstracts 29-36)

Abstract IV-29

The Ultrastructure of Thiobacillus ferrooxidans under Conditions of Heterotrophic Growth. Richard A. Borchilo and Foster E. Billheimer, (California State College).

The gross morphology and ultrastructure of the chemolithotrophic bacterium Thiobacillus ferrooxidans were examined after heterotrophic growth on a glucose-basal salts medium. Light microscopy revealed basic structural differences between autotrophic and heterotrophic cells. The heterotrophic convertants were consistently larger in general size, formed chains of two to six cells, contained